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LOCAL AUTHORITY PUBLIC EXPENDITURE:
A CASE STUDY OF GLASGOW 1948/1970

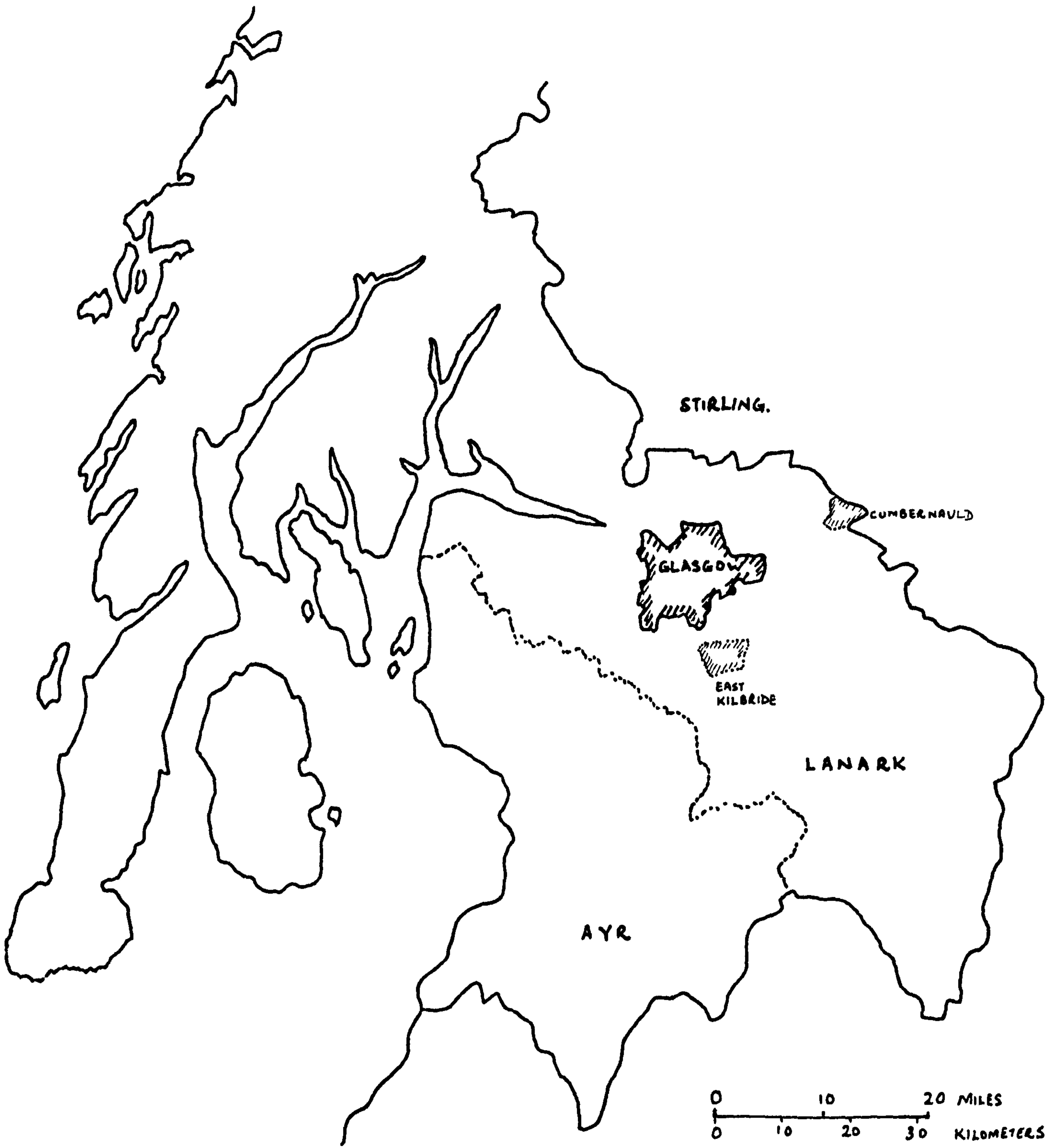
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P.M. JACKSON

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GLASGOW

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Chapter 1

The Local Public Economy

Introduction

- 1.1. The Treasury Studies
- 1.2. Earlier Studies of Public Expenditure
- 1.3. The Level of Analysis
- 1.4. The Data Base
- 1.5. Hypothesis Testing
- 1.6. An Overview of the Chapters
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Conclusion

Appendix 1.A The Corporation of the City of Glasgow

Appendix 1.B Data Sources

C H A P T E R 1THE LOCAL PUBLIC ECONOMY¹Introduction

Most of the people in Western Europe and North America live in towns. One hundred and fifty years ago only one person in five, in Britain, and one in twenty-five in the U.S.A. lived in urban settlements. The growth of the modern town dates from the Industrial Revolution and was accelerated by improvements in transportation systems, which have allowed it to extend its influence over an ever growing area.

A large number of the social problems facing society today arise within the context of the urban area. High density living, traffic congestion, and noise, are all aspects of consumption externalities or social costs. Local markets in imbalance characterise a large number of urban areas. The disequilibrium of local housing markets, local labour markets, and local product markets is a common feature of a large number of modern towns and cities. Very little, however, is ever said by the economist about the imbalances in the public sector of urban areas. Individuals complain about poor housing standards, poor educational facilities, poor health and welfare services and the problems of crime in cities. The rate-payers' or local taxpayers' revolution, which is frequently reported, testifies to the importance of the local public sector. This thesis attempts to redress the imbalance.

Local government expenditures² (excluding debt interest) accounted for 16.0% of GNP in 1970. This figure compares with 3.4% in 1890 and 9.6% in 1950. As a proportion of total public expenditure local government expenditures were 24.8% of the total in 1950 and 34.7% in 1970. In 1970, 10% of the working population of the U.K. were employed by local governments. Local

1. For an earlier use of this phrase, see Thompson (233).

2. All information is at current prices.

government has been one of the fastest growing sectors of the U.K. economy in the post war period. However, it is a sector of the U.K. economy which has escaped, almost entirely, the interest of the economist, even although it is such an important allocator of the nation's resources. Gramlich (97) makes the point clearly in the context of the U.S.A.:-

"The recent spate of large econometric models has probed into many previously unexplored corners of the United States' economy. But there is one sector still relatively untouched by the model builders and strangely enough, it is a sector which today is generating some of the most heated political controversy - that of state and local governments." (p 163)

1.1. The Treasury Studies

The purpose of this chapter is to set the study into context. When work on this thesis was started in 1970 the rather simple, and, perhaps now in retrospect, naive aim of the project was to explain the rapid increase in local authority expenditures of the U.K. in the post war period. The study was intended to be a continuation of work which the author had started whilst carrying out research into public expenditure control when in H.M. Treasury. The Treasury project, under the direction of W.A. Godley, had produced a number of interesting forecasting models and had raised a number of interesting problems of organisational and bureaucratic control. The author's main criticism of the Treasury studies was their lack of theoretical foundation. These studies had been carried out within a different framework and with different objectives in mind. The aim was to establish a forecasting system for public expenditures, which would allow the Treasury to control the expenditures of all parts of the public sector. The need for such a procedure it was recognised, was necessary for the wider purposes of demand management. By the time the author had left the Treasury a number of reports had been completed. These covered education (primary, secondary and further education), some local health and welfare services, prison building, government office building and selected defence projects. The local authority services which had been studied had been examined in the aggregate. The

author was aware that what was missing from these studies was an understanding of how the local authority sector of the British economy actually operated. A survey of the literature revealed that whilst the corporate sector occupied a large space in the economic literature no comparable studies could be found for the public sector. In the literature of micro-economics and industrial economics there existed a well established theory of the profit making firm. Only on the outskirts of economic theory had people started to talk about the economic behaviour of non-profit making organisations, especially the behaviour of the non-profit making hospital in the United States. It was therefore felt that an important contribution to economic theory could be made through an examination of the behaviour of non-profit making organisations in the public sector.¹

1.2. Earlier Studies of Public Expenditure

Another survey of the literature revealed a mountain of studies, which had been carried out by researchers in the United States. They had examined, on a cross-section basis, the determinants of expenditures by state and local governments in the U.S.A. At that time only one study could be found for the U.K. That was a single chapter in the work of Boyle (35), who was in actual fact looking at the problems of central government grants to local authorities and not expenditures. Since that time the work of Boaden (30) and Davies (70,71) has been published. Whilst these are valuable studies in their own right and will be surveyed and critically appraised along with the determinant studies carried out in the U.S.A. in chapter 2, they suffered from the problem that they were essentially statistical exercises, which tried by using multiple regression analysis to find out which exogenous variables might be used to explain levels of public expenditure in different local authorities. What was lacking was an underlying theory to explain why these variables were important and how the behaviour of a local authority

1. Writers such as Downs (77) and Buchanan and Tullock (23) had started to pave the way. Breton's book (48) which was published in 1974 but which only came to my attention in January 1975 was too late to be incorporated in this study. The spirits of our approaches are similar.

might be explained by using the traditional tools of economics. In other words what was lacking was an analytical model of the local authority unit comparable to the traditional economic model of the firm. There existed no model which would give a priori hypotheses which might subsequently be tested empirically.

1.3. The Level of Analysis

Having placed the study into some sort of historical context it is now necessary to place it into the context of economic theory. The thesis is written within the tradition of the positive theories of public expenditure. That is, it is a part of the literature which tries to understand and explain the observed pattern and level of government expenditures and the changes in these expenditures over time.

Peacock and Wiseman (1960) emphasise the importance of our knowledge of public expenditure. They state that we must find out more about the behaviour of public expenditure, "if progress in other fields is not to be nullified by our inadequacy in this one". (p 12)

A number of authors have emphasised the fact that there is a dearth of public expenditure studies. C Lowell Harris pointed out, when surveying public finance in B F Haley (ed), "A Survey of Contemporary Economics" (1952):-

"Economists specialising in public finance have generally concentrated on taxation. Perhaps there is not much the economist can say about spending. The nature of the problems especially the unavailability of bases for appraising results make study difficult. Description plus the statement of rather obvious generalities may about exhaust the possibilities".

This rather pessimistic view of Harris' was not shared by other economists and in the late 1950's and certainly through the 1960's a large number of studies especially in the United States attempted to explain the behaviour of public expenditure beyond that of just generalities. Musgrave (1975), writing after the determinant studies of the U.S.A. had been carried out, gives an indication of the work which remains to be done in this area. He

says on p 122,

"The theory of expenditure growth remains a fascinating but somewhat elusive problem. Even if economic factors only are considered it is difficult to arrive at an expenditure law. Inferior goods are the exception in the public as well as the private sphere, so that there is every reason to expect a positive association between the absolute levels of public outlay and per capita income Disaggregation is needed if hypotheses differ with respect to capital, consumption and transfer outlays and the weights of these components are subject to change so that the overall pattern is left in doubt."

Musgrave along with a large number of writers¹ has called for greater degrees of disaggregation when carrying out expenditure studies. It was decided in this study that the level of disaggregation which would be chosen would be that of the single local authority and that the expenditure of that authority would be further disaggregated to the level of individual services. Hence an attempt will be made to explain the changes in the expenditures of the City of Glasgow² for services such as education, police and fire services. For the purposes of analysis these services themselves have been further disaggregated so that for any particular service the expenditures for any single year have been disaggregated into their components such as wages and salaries and expenditures on other inputs.

1.4. The Data Base

One severe problem, which this study has encountered is a lack of data. By using time series analysis a run of historical data was required. Unfortunately information and basic statistics are commodities which are easily lost in large organisations. When the organisation moves to new premises or when a new incumbent of a role takes up office the first item which is likely to be jettisoned is data since the storage costs can be high. The cost of disposing of data in this way is that basic management information is completely lost. Indeed one disturbing feature that this study and the

-
1. For example consider the following quotation from Morss et alia (170). They conclude their study of fluctuations in American state expenditures as follows: "In conclusion, it appears quite clear that the detailed understanding of state expenditure patterns necessary for forecasting and policy recommendations requires a disaggregated study of the political and institutional environments of individual states".
 2. Appendix 1.A describes what is meant by the City of Glasgow.

earlier Treasury study revealed was the lack of appreciation of the value of keeping historical time series as a guide to the trends in the organisation's behaviour and in the behaviour of its environment.

A great deal of effort and patience, sometimes equivalent to that of the archaeologists, has gone into piecing together a consistent picture of the period 1950/70 for the City of Glasgow. One contribution of this thesis therefore has been to preserve and to present statistics for the period which might be of some value to future researchers. The requirements of economy of space has not permitted the presentation of all the statistical series which have been collated. Appendix 1.B outlines the principal data sources used throughout the remainder of the thesis.

1.5. Hypothesis Testing

One original intention was to test the hypotheses provided by the theoretical model by means of econometric methods. Given the lack of some important items of data this approach was abandoned. It was decided that a careful description of and analysis of trends would be more fruitful than presenting a number of meaningless regression results which nevertheless had respectable R^2 's.

1.6. An Overview of the Chapters

a) Chapter 2 surveys the literature on previous expenditure determinant studies which are mainly American cross-section studies. The literature survey is extensive and comprehensive, and care was taken in presenting it to keep in mind that this was a literature which was not familiar to students of public finance in the U.K.¹ The determinant studies, which failed to specify an underlying model of public expenditure were, nevertheless, extremely useful in suggesting those variables which would have to be incorporated into any theoretical model.

1. It is, however, a literature which will become of growing importance to students in the U.K. in the future. Already studies at L.S.E. are repeating some of the earlier U.S. cross-section studies on U.K. data.

- b) Chapter 3 sets out to establish a model of the micro-economics of public expenditure determination. Using the traditional maximising model of the economist a model is constructed which incorporates the principal variables found to be of statistical significance in the studies reported in chapter 2. The model represents a first attempt at constructing such a theory whilst recognising that future developments of it are likely.
- c) Chapter 4 presents the socio-economic background of the Glasgow regional economy. In chapter 3 it was suggested that a local government is a social organisation which reacts to problems presented by an environment. Chapter 4 establishes some features of that environment in terms of basic social indicators such as population growth, birth and death rates, housing conditions and unemployment etc.
- d) Chapter 5 for the first time reports upon a set of price indices which show the movements in the prices of inputs purchased by Glasgow's local government service departments. Using these indices it is then possible to demonstrate how much of the increase in local government current expenditure growth is due to increases in input prices and how much is due to an expansion in the real volume of inputs. The method adopted to construct these indices, i.e. using Laspeyre indices, required a large volume of data which fortunately did exist. It was also possible using the data collected to show the movement in the wages and salaries of local authority employees relative to those in other industries.
- e) Chapter 6 discusses the growth in the current and capital expenditures of Glasgow's local services over the period 1950/70. A comparison is made between Glasgow's growth rates and those in the national averages for Scotland, England and Wales. Per capita expenditure growth rates are examined as also are real expenditure growth rates for selected services, at 1963 constant prices. The chapter finishes with an examination of the trends in Glasgow's rate revenue.

- f) Chapter 7 In this chapter an attempt is made to give a crude test of Baumol's relative price effect which as is pointed out in chapter 3 suggests that the prices of public sector outputs relative to private sector outputs will tend to rise over time due to a productivity differential between the two sectors. There is general support for the hypothesis but the underlying causes suggested by Baumol are questioned.
- g) Chapter 8 takes up a point which was made at the close of chapter 3 namely that whilst the external factors to a local government may be of significance to expenditure determination so also might internal organisation forces. Chapter 8 looks at the procedures of determining Glasgow's annual budget.
- h) Chapter 9 Having set out in detail in chapter 6 the trends in expenditure growth, chapter 9 then proceeds to examine in greater detail three services, education, police and fire services. The principal question to which an answer is sought is what has caused real expenditures, at 1963 prices, on these services to grow at their observed rates? By examining changes in the environment of these services an explanation is built up.
- i) Chapter 10 concludes the study by making a number of recommendations for future analysis.

1.7. A Guide to the Layout

The appendices to each chapter are found immediately at the end of the chapter. For chapter 3 a special pull-out is provided in appendix 3.B and serves as a guide to the variables used in that chapter. Table numbers refer to specific chapters only.

Conclusion

The principal aims of this thesis are to make contributions to the economist's

understanding of the local government sector of the economy, of the process of public expenditure growth, and of the behaviour of some aspects of the City of Glasgow's local public sector during the post war period.

APPENDIX 1.AThe Corporation of the City of Glasgow

Prior to November 1895 the Town Council administered the various civic services in several separate capacities.¹ As the Corporation it managed the property of the Common Good, Tramways, Municipal Buildings, Libraries, etc; in the capacity of Trustees under the appropriate Acts it administered the Public Parks, City Improvements and Markets; as Commissioners controlled the Water, Gas and Electricity Services; and as the Police Commissioners administered the Police Acts embracing the services of the Police, Fire Brigade, Lighting and Cleansing Services, Public Baths and Public Halls; Streets, Bridges, Sewers and Sewage Purification; the Public Health and Sanitary Services etc. The Glasgow Corporation and Police Act 1895 enacted that the separate administration by the Town Council as Trustees or Commissioners for the various civic services be discontinued and that the control and management of all Municipal Departments be transferred to the Corporation. It was not, however, until 1904-1905 that the separate administration by the Police Commissioners (now the Corporation Police Department) was merged in the general control by the Corporation. Until that year there was a Clerk of Police (as distinct from the Town Clerk) who prepared and issued to the Town Council separate minutes of the activities of the various committees of the Police Department. There was also a Treasurer of Police (as distinct from the City Chamberlain) in charge of the books and the accounts of the Police Department and it was not until 1912 that the office was combined with the office of City Chamberlain.

By the Local Government (Scotland) Act 1929 the functions of the Education Authority, Parish Councils and District Boards of Control were transferred to the Corporation, so that the Corporation is the sole Local Authority for

1. This information is taken from "Facts and Figures" (Corporation of the City of Glasgow) 1966.

the administration of all local services.

The above describes historically and in legalistic terms the evolution of the Corporation of the City of Glasgow. Local government rests firmly on a statutory basis. "Local authorities are creatures of statute and derive practically all their powers from statute."^{1,2} The principal statute which has guided the administration of local government during the post war period was the Local Government (Scotland) Act 1947. "This Act prescribes who may and who may not be elected to a local authority and how elections are to be conducted. It regulates in considerable detail the way in which local authorities are to order their business, the form of internal organisation an authority may adopt, the officers it employs, and the way in which it must represent its financial transactions."³ This Act, however, does not deal with specific local government functions such as police, health, fire, and the like. These form the subject matter of a very large number of other statutes which are continually being added to as the scope of local authority functions change. "Taken together, these statutes regulate almost every detail of what a local authority may and may not do."⁴

As a "county of a city" the Corporation of the City of Glasgow, along with the other three counties of cities in Scotland (Edinburgh, Aberdeen and Dundee), performs all the functions which a local government is entitled to by statute. It is, therefore, an all-purpose authority⁵ and is the largest of the counties of cities, in terms of number of employees, expenditure and population; see Table 1.

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1. "Royal Commission on Local Government in Scotland 1966-1969", Cmnd 4150, HMSO 1969, p 28 para 55.
 2. The phrases "local government" and "local authority" are used interchangeably.
 3. Royal Commission on Local Government in Scotland, op. cit., para 56.
 4. Op. cit., para 57.
 5. For a comprehensive discussion of the organisation of Scottish Local Government prior to 1974 see paras 48-58 of the Royal Commission (op. cit.).

Table 1 Comparative Data for Aberdeen, Dundee, Edinburgh and Glasgow¹

	Area Acres (1971) ²	Number of Local Authority Employees (1971)	Population 1971 Census	Total Rateable Value 1972/73 (£)
Aberdeen	12,371	8,267	181,785	9,816,113
Dundee	12,295	8,326	182,930	10,946,284
Edinburgh	33,294	18,416	453,025	31,195,300
Glasgow	38,727	45,940	893,790	59,601,000

Notes:

1. A more detailed description of the trends in expenditures and revenues for the various services under the control of the Corporation of Glasgow will be found in chapter 6 below.
2. Data on Area, Number of Employees, and Rateable Values taken from "Rating Review" 1971 (published by I.M.T.A. Scottish Branch).

APPENDIX 1.BDATA SOURCES

The following list describes the primary data sources used in the thesis. Other sources of data are referenced at the appropriate point in the text.

One point which will be emphasised time and again is the great difficulty which was frequently encountered when collecting basic data. Much of this basic data which is of the type necessary for management of services was frequently unavailable.

a) Expenditure and Revenue Data

The only sources of data on Glasgow's expenditure were:-

- i) "The Abstract of the Accounts", which are the audited accounts for the Corporation of Glasgow.
- ii) "Facts and Figures" This annual publication by the Corporation of Glasgow gives a summary of the main points contained in the Abstract of Accounts.

The primary data was collected from the Abstract of Accounts. This was checked against the data in Facts and Figures and it was found that both sets were consistent. The final data used was that from the Abstract of Accounts.

No published or unpublished time series for Glasgow's revenue and expenditure existed; the time series data presented in later chapters seems to be the first time that the data has been arranged and presented in this form.

For individual services other ancilliary sources were available:-

- i) Police Expenditure - the annual government publications, "Report of Her Majesty's Chief Inspector of Constabulary for Scotland". The expenditure data contained in these reports agreed with that for the Abstract of Accounts to within 5%.
- ii) Fire Expenditure - "Report of Her Majesty's Chief Inspector of Fire Services for Scotland".

- iii) Education Expenditure - Annual reports by the Scottish Education Department on "Abstract of the Accounts of Education Authorities ..."
 These ceased to be published after 1964 but were replaced by the HMSO annual publication "Education Statistics for Scotland".

The Institute of Municipal Treasurers and Accountants (I.M.T.A.) publication "Rating Review" provided data on a number of services. This is an annual publication.

Although alternative data sources did exist the Abstract of Accounts provided a consistent and continuous series which the others did not. All data on expenditure and revenue referred to in this thesis which refers to Glasgow has the Abstract of Accounts as its source.

Data on expenditure and revenue for local authorities in the U.K. and Scotland is available from the following government publications:

- i) "Local Government Financial Returns for England and Wales" - (Department of the Environment) - published annually.
- ii) "Local Financial Returns - Scotland" (Scottish Office) - published annually.

The following general points should be remembered when interpreting expenditure and revenue data:-

- i) The local government financial year runs from 1st June - 31st May.
- ii) Data has been recorded in later chapters on a financial year basis.
- iii) Expenditure refers to outlay and hence will conform to the accountant's general notion of cost but not to the idea of opportunity cost. Hence when actual expenditures are referred to as costs in subsequent chapters this narrower definition is used.
- iv) Selective Employment Tax which would have caused a jump in expenditures when introduced was not paid by local authorities and hence does not create any problems.

b) Input Price Data

Data on input prices, used to calculate the input price index was collected

as follows:

- i) wages and salaries for Glasgow employees are listed along with numbers employed in each employment category in "Return of Departmental Establishments' Salaries and Wages" published by the Corporation of Glasgow annually. For earlier years 1950/51 - 1964/65 a similar version of this publication was used. The series were consistent.
- ii) Interest rates, the average annual rate of interest paid on Glasgow's debt is available from IMTA Rating Review.
- iii) Other inputs - published price indices. For data of this kind which can be found in the Annual Abstract of Statistics or the Blue Book, a useful publication which had collected these into time series was "The British Economy Key Statistics 1900-1970" published by the London and Cambridge Economic Service.

c) Comparative Wage and Salary Data

Data used to compare wages and salaries for Glasgow employees with those in other occupational groups was collected from "British Labour Statistics 1886-1968" published by the Department of Employment and Productivity (HMSO 1971).

d) Population Data

Glasgow's population data was collected from the Censi for 1951, 1961 and 1971. Estimates of population for interim years are to be found in "Facts and Figures" and "Quarterly Returns of the Registrar General for Scotland".

e) Income Data

The personal incomes of those individuals living in Glasgow was difficult to establish. Data was put together from the following sources:-

- i) Her Majesty's Commissioners of Inland Revenue Annual Reports for 1957, 1962, 1969.
- ii) Scottish Abstract of Statistics 1971, table 63.
- iii) Department of Employment New Earnings Survey 1968 and 1970.
- iv) Greater Glasgow Transportation Study 1964.

f) Data on Individual Services

For the three services studied in detail data was gathered from departmental annual reports:-

- i) Annual Report of Education Department of Glasgow Corporation
- ii) Annual Report of Chief Constable for Glasgow
- iii) Annual Report of Chief Firemaster for Glasgow.

It should be stressed that very little published data exists on individual services for a single local authority over the period 1950/51 - 1969/70. This is one of the major problems confronting anyone who wishes to use time series for this level of micro-analysis. Published data exists in central government reports for individual years but not for a run of years. When it was possible the Glasgow time series data was checked against these sources but difficulties arise over definitions and coverage. Because this time series data has been assembled for what seems to be the first time, an effort has been made to present most of it in tabular form when the individual services are discussed in later chapters. It is hoped that this presentation of the data will assist future researchers and managers of Glasgow's public services.

For Education Statistics for Glasgow the Annual Reports of the Education Department for Glasgow had to be supplemented with data from the Department's own files and from the Scottish Education Department. This was especially true regarding pupil and teacher numbers. Sets of data on teacher and pupil numbers were collected from the Education Department, Glasgow, and from the Scottish Education Department. However, they did not match up. The margin of difference amounted to as much as 5% for any year. In the end the following data were used:-

- i) Pupil numbers for primary and secondary schools represent the numbers in average daily attendance. Source - Glasgow Education Department.
- ii) Teacher numbers refer to the numbers at March of each year. Source - Glasgow Establishments Department. The same numbers were used to construct the teachers' wages and salaries index.

- iii) Number of 15-18 year olds in Glasgow's school population. Source - Scottish Education Department. It was the only source which could supply this data for the period 1950/51 - 1969/70.
- iv) Pupil teacher ratios (PTR's) were calculated from the data given in (i) and (ii) above. They were then checked against published pupil teacher ratios given in IMTA "Rating Review" and the Scottish Education Department's "Measures to Secure a More Equitable Distribution of Teachers in Scotland" (HMSO, 1966), which gave PTR's for the years 1961/62 - 1964/65. In all cases the comparison of the calculated PTR with the other sources showed consistency. (Problems clearly exist if pupil and teacher numbers in different studies are measured at different times of the year.)

For the Police and Fire Services, manpower data was collected from the Department's Annual Reports and from Glasgow's Establishments Department. In all cases the data corresponded exactly. Crime rate and fire rate statistics and data on all other activities of the Police and Fire Services had as their sources the Annual Departmental Reports and the Departmental files. Again the time series data is presented in this form for the first time.

CHAPTER TWO

SURVEY OF THE LITERATURE

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CHAPTER TWO

SURVEY OF THE LITERATUREIntroduction

In recent years there has been an increased concern with the determinants of local government expenditures. This concern is partly the result of an increased awareness of the importance of state and local governments for economic activity and has been reflected in the number of reports¹ and published research articles, which have appeared over the past ten years.

It is, however, true to say that the majority (well over 90%) of the research articles relate to the behaviour of state and local governments in the U.S. economy. In addition almost all of the studies set out to explain why per capita local government expenditures vary from one area to another. Few have been interested in the dynamic aspects of the problem; an attempt to explain why per capita expenditures have increased over time.

This chapter will examine some of the major contributions which have been made to the economics of local government in recent years.² It will review the development of cross section local government expenditure "determinant studies" which have attempted to explain the variations in per capita expenditure of different local governments at a single point in time. The cross section studies can be subdivided into a number of categories depending upon the particular explanatory variables which the study focused upon. Thus, for example, grants-in-aid studies

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1. For example in the U.K. alone there have been the Wheatley (264) and Radcliffe-Maud (266) Reports plus their research appendices. There was also the Maud Commission (261) and a Green Paper on Local Government Finance (267).
 2. There have been a number of reviews made of this literature see, Bahl (15) Pryor (196) (197), Miner (161), Wilensky (251). This literature review is more comprehensive than the above and more detailed in its criticisms.

have examined the influence of central government grants-in-aid upon local government per capita expenditure. When reviewing the determinant studies they will be classified into groups; each group of studies will be examined in turn.

Another group of studies, which will be examined in this review, are those which have turned their attention inwards taking the budgetary decision-making process as the object of their studies. These studies, carried out by economists, political scientists and organisation theorists (like behavioural theories of the firm) direct their attention to explanatory variables internal to the organisation to explain per capita expenditure variations. They are for example interested in the information and decision making processes which result in public budgets.

The study, which is written up in this thesis, is a time series study of the budgets of a specific local government. It seeks to explain the variation in the per capita expenditures of a local government over time. It has not, however, been possible to review an extensive literature on time series expenditure studies since it essentially doesn't exist. The value of reviewing the determinant studies and the budgetary studies is that they do give a strong indication of some of the more important explanatory variables which have to be taken into account when constructing a time series model. Therefore, to take an example from another area of economics, just as income is one of the major independent variables used in cross section consumption function studies so too does it feature in time series estimations of consumption functions.

Before looking at specific studies the first section of this chapter will review the problems which expenditure studies are likely to encounter. After this first section the determinant studies will be surveyed and they will be followed by a review of the budgetary studies. A number of criticisms will then be made about these studies and the chapter will conclude with some recommendations for future analysis.

2.1. Problems in Public Expenditure Analysis

Public expenditure is, in accounting terms, simply the product of price times quantity where the prices are the input prices and the quantities are the real inputs. The economist, however, would like to explain variations in expenditure in terms of how input prices vary and by reference to variations in the derived demand for inputs. These variations in input prices and quantities can be thought of as existing over time for a single political unit or across a number of political units at the same moment in time. Explanations of variations in these derived demands for inputs in turn stem from variations in the actual output and the quality of output of the final product of the public sector and in turn the variations in final outputs can be explained by appealing to the basic theory of demand and supply.

The problem which confronts those who carry out public expenditure studies is that whilst input prices and input quantities are in principle observable and measurable the quantity and quality of final outputs are not. Of course the problem of determining increases in costs due to changes in the the nature of the product (i.e. quality) exists in cost studies of any industry; a 1946 automobile is different from a 1973 automobile. Fisher, Griliches and Kaysen (87) were able to get rough estimates of the cost of automobile model changes but the nature of local government outputs do not readily lend themselves to such analysis, nor is it obvious, at the moment, that those methods which employ hedonic price indices will be immediately adaptable to public sector output.

It might be as a result of these problems that public expenditure analysis has developed very slowly for there certainly has been a great deal of pessimism about the economist's ability to deal with public expenditure problems. Look, for example, at a statement made some twenty years ago by Harriss when reviewing the state of public finance; (107)

"perhaps there is not much (that) the economist can say about public spending. The nature of the problems ... makes study difficult. Description, plus the statement of rather obvious generalities may about exhaust the possibilities." (p. 262).

Although many of the problems still remain today that degree of pessimism cannot be justified. The economist studying public expenditure has a mountain of studies both theoretical and empirical on which to draw. During the past twenty years economics has been presented with Samuelson's (210) pioneering theoretical study of the pure theory of public expenditure and a flood of subsequent studies which it inspired.

These models have developed a normative theory of public goods (expenditure) restoring a balance in the public finance theory of the Anglo-saxon countries¹, which had become imbalanced by a concentration of attention towards the taxation aspects of the subject especially the problem of allocating the burden of taxation in the "best" way. The normative theory of public expenditure has addressed itself to the problems of market failure, the provision of pure public goods, the efficiency of non-market allocating mechanisms (e.g. the political system) and the optimal allocation and distribution of public goods. Although, as will be seen later, it is surprising that so few empirical studies have used the knowledge gained from these normative theories to construct a positive theory of public expenditure. The power of the neoclassical logical-deductive method is that it can be used to provide testable hypotheses.

2.2. Public Expenditure Growth

A number of authors have attempted to explain the growth in public

1. The German, Italian and Swedish schools of public finance had maintained an interest in public expenditure theory through the work of Wickseil, Lindahl, Sax, Pantaleoni and Mazzola - see R.A. Musgrave, and A.T. Peacock, (eds.), Classics in the Theory of Public Finance, Macmillan, 1958.

expenditures over time. These studies have either tried to provide explanations of the trends in absolute levels of public expenditure or, as is more frequently the case, they provide explanations of changes in the ratio of public expenditures to a measure of income, usually G.N.P.

One of the earliest of these studies was carried out by the 19th century German economist Adolf Wagner (241).¹ Wagner suggested that as a society became industrialised then the set of social, commercial and legal relationships within society would become more complex. Government would therefore occupy a more prominent role in setting up and running institutions which attempt to control this complexity.² These regulatory and protective functions of the state would enlarge the size of public budgets. Wagner also believed that many public outputs were income elastic so that during periods of rapid industrialisation, and hence income growth, public expenditures would expand.

Whether or not Wagner's hypotheses were borne out by the facts or whether or not there were methodological problems associated with his approach lie outside the scope of this study.³ Wagner's study, however, does suggest a number of interesting features which are relevant to the present study. If public expenditures are income elastic then the growth in incomes in the economy will explain part of the rising trend in public expenditures. Industrialisation, urbanisation and demographic changes will result in public expenditures in so far as the public sector reacts to these social

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1. It is generally assumed that Wagner was explaining trends in the ratio of government expenditure to G.N.P. although Wagner never actually makes this explicit. For more detail see Musgrave (175) page 73 footnote 1.
 2. This is in many respects a forerunner to the market failure debate.
 3. For a critical appraisal of Wagner's Law see Peacock and Wiseman's (190) Introduction to the second edition and Bird (25). Bird also evaluates some of the subsequent empirical tests of Wagner's Law.

processes by provided the infrastructure for urbanisation and industrialisation and by establishing new programmes to deal with the social costs of congested urban life. Wagner's approach, therefore, contains a number of relevant features which ought to be unincorporated into any analysis of public expenditure growth.

The seminal work in public expenditure growth was carried out by Peacock and Wiseman (1960) although the earlier work of Fabricant (1951) tends to have been unnecessarily overshadowed by that of Peacock and Wiseman. Peacock and Wiseman aimed at an, "... explanation of the time pattern of expenditure growth rather than upon the absolute magnitude of public expenditures" (p. vii).

Their results were:

"We found that what might be called the 'permanent' influences on growth, such as population and employment trends, could not explain the observed time pattern, and were therefore driven to speculate as to the other relevant influences. Our suggested explanation rested on a rudimentary theory of the political process and a rudimentary theory of social disturbance." p. vii (2nd edition).

The "time pattern" referred to by Peacock and Wiseman was the set of values taken by the ratio of public expenditure to GNP over time. Their rudimentary theory of the political process" was that in a democracy in which the citizenry had an idea of what constituted a tolerable burden of taxation governments were, therefore, severely constrained from increasing public expenditures dramatically. During periods of "social disturbance" such as a war, a famine or some natural disaster the citizenry's level of tolerance for taxation is reviewed upwards and public expenditures expand. The result is that the ratio of public expenditure to GNP will display a sudden jump and the mix of public

expenditures will change. The jump in public expenditures was referred to as the "displacement effect" and Peacock and Wiseman demonstrated from U.K. data that such displacements had occurred at the times of the world Wars. This theory was supplemented by one which hypothesised that after the social disturbance the tolerable burdens of taxation would not return to their original level. This ratchet effect coupled with their "inspection effect"¹ provided an explanation of the time pattern of public expenditures which occurred after the social disturbance had subsided.

Peacock and Wiseman's original work provided the framework for many other empirical studies of the time pattern of expenditures, for example see Veverka (240), Andic and Veverka (5), Gupta (98), Tait and O'Donoghue (231) and Emi (80). The displacement effect has, however, come under some criticism from Musgrave (175), Holmans (123) and Pryor (196). The spirit of these criticisms is that Peacock and Wiseman have misinterpreted their statistics. Musgrave demonstrates that after the first and second world wars in the U.K. the ratio of public expenditure to G.N.P. returned to its pre-war long term trend i.e. there is no long term effect of social disturbances upon public expenditures. In the second edition of their book Peacock and Wiseman appear to have changed their definition of the displacement effect: on pages XIV-XV they say:-

"It seems clear to us that, even where displacement appears (statistically) to be no more than an interruption of a long term trend, it is unlikely to be explicable simply as an 'anticipation' of developments that would otherwise (i.e. in the absence of social disturbances) have fitted the trend. The character of public expenditures must be expected to have been changed by the disturbance".

1. i.e. that during the social disturbance groups and individuals in society become aware of the need for expanded public expenditures.

Before concluding this section on Peacock and Wiseman's work it is worthwhile mentioning their "concentration effect". By this they meant the tendency, in the U.K., for more and more expenditures to be concentrated at the level of central government as opposed to local government. For example the Nationalisation of the electricity, gas, and hospital services during the 1940s took these functions out of the sphere of control of local governments and gave them to central government. The reason for these concentrations were argued on the grounds that redistributive policies ought to be in the hands of central government and not local government or that for particular services such as hospitals there was a strong desire for uniformity across regions. The concentration effect would, therefore, show up in the analysis of the long term trend of total local government expenditure.

Peacock and Wiseman's analysis like those of Wagner, Fabricant and Bator (21) and Musgrave and Culbertson (173) have concentrated upon the analysis of national trends in public expenditures. This present study focuses upon the expenditure of a particular local government unit. The national studies do, however, provide a framework within which data can be organised.¹

The studies outlined above concentrate upon the broad trends of public expenditure on which local government expenditure is a component. What is missing from all of them is a focus upon the specific growth trends of local government expenditures and an explanation of these trends.

The next section reviews the local government expenditure "determinant studies", which will give some ideas of the more important explanatory variables.

2.3. Cross Section Determinant Studies

Until the 1950s there had been very few studies of state and local

1. It must be stressed that the time series analysis of Glasgow's local public expenditure is the first such study in the U.K. known to the author. An earlier case study for New York City was carried out by Netzer and associates (178).

government expenditures. The 1941 U.S. Census of Governments was the first survey of the activities of all levels of government. This provided researchers with valuable data and, when coupled to the introduction of electronic computing methods into economics, resulted in what one author has called "an epidemic" of expenditure studies.

These studies had the objective of ascertaining the determinants of state and local government expenditures and per capita expenditures. They used linear cross section models and chose to include independent variables either on the basis of their reasonableness or because they met some predetermined statistical criterion. It should be stressed from the outset that the independent variables did not emerge as the end product of prior theoretical modelling. Instead they seemed to be reasonable explanands or from a very large list of possible variables these variables performed well in a stepwise regression programme, "which ranks variables and enters them into the regressions in a stepwise fashion in accordance with their marginal explanatory power (i.e. the variable with the highest R^2 is entered first)" ¹

The determinant studies can be sub-divided into various categories: each category relates a study to its primary objective:-

- i) pure determinant studies which explain variations in per capita expenditure
- ii) grants-in-aid studies which seek to establish the explanatory power of Federal Government aid to State and Local governments as an independent variable in determinant studies
- iii) economies of agglomeration (scale) studies which establish whether or not per capita expenditure declines as population size increases
- iv) fiscal plight studies which examine the thesis that as the economically active members of a city move to the suburbs as the fiscal

1. O.A. Davies and G.H. Haines (72).

base of the city is eroded which in turn leads to a fiscal crises.

The groups of studies outlined above, also examine the expenditures of different levels of government. They can be either,

- i) State government
- ii) Local government
- iii) Metropolitan areas
- iv) Special districts, e.g. school districts and fire districts.

The form of the estimating equation used in most of the determinant studies can be summarised as:

$$E = \alpha_0 + \sum_{i=1}^n \beta_i X_i + \mu$$

where,

E = total local government expenditure or per capita total local government expenditure or total expenditure by functional category, e.g. fire, police, education etc. or per capita expenditure on fire etc. (The precise form of E depends upon the particular study.)

α_0 = constant term

X_i = i^{th} exogenous variable, ($i = 1 \dots n$)

β_i = regression coefficient of the i^{th} variable

μ = error term.

Finally, a word about the expenditure which is being measured. Most studies concentrate solely upon operating or current expenditures. Some exclude debt charges from current expenditure. A few studies have grouped current and capital expenditures together but it will be assumed throughout that expenditures refers only to current operating expenses.

2.3.(a) Pure Determinant Studies

The earliest determinant studies were carried out by Walker (242) and Hansen and Perloff(102). They found that population was a significant variable when explaining variations in local government total expenditures. The studies which followed examined variations in total expenditure between states using independent variables such as topology, weather, racial

attitudes, population and income. The explanatory powers of these studies were not very high because no account had been taken of variations in the scope of state expenditure responsibilities. A county in one state might perform very different functions from a county in another state.

The pioneering work, however, was first carried out by Fabricant (81) and Hawley (108). This work was catalytic giving rise to the many subsequent studies.

Making use of the 1942 Census of Government data, Fabricant regressed per capita state and local government expenditure against, per capita income, population density and the degree of urbanisation. Using state and local government expenditure he avoided the problem of differences in fiscal responsibility mentioned above. His "troika" explained 72% of the variations and they became the standard variables in subsequent work.

On average, income was the most important of the three probably reflecting both tax paying potential and need.¹ Urbanisation, however, defined as the percentage of the population living in communities with a population in excess of 2,500, was found to be more significant than income for fire, sanitation, and welfare services. For functional categories of service Fabricant's model showed an R^2 ranging from .85 for police to .29 for highways.² Since highways are really an item of capital expenditure it is not too surprising to find that Fabricant's variables do not perform well when applied to this service.

Hawley chose the 1940 per capita municipal expenditures of 76 central cities as his dependent variable. His model has 18 social and economic variables, which can be divided into three groups: population densities,

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1. From the outset the determinant studies had problems of identifying between demand and supply explanations of expenditure variation.
 2. i.e. for individual services his set of exogenous variables was able to explain between 29% and 85% of the variation in per capita expenditures.

population size, and the characteristics of satellite areas. Population density and housing density of the central city, population density and housing density of the surrounding metropolitan area were all significant and positively correlated with per capita city expenditure.

The most comprehensive study ever to be undertaken was that of Brazer (43). He carried out three principal studies:

- i) explanation of the variation in per capita expenditures for 462 cities (population of each city greater than 25,000)
- ii) the larger sample of cities was divided into the cities of the states of California (35 cities), Massachusetts (30 cities) and Ohio (40 cities). No other states had a sufficiently large number of cities. By looking at the variations in city expenditures in each single state he was able to eliminate the effects of the state role in providing finance.
- iii) of the 462 cities the 42 largest (excluding Washington D.C.) were examined as a separate group, i.e. cities whose 1950 populations were greater than 250,000. Data relating to the characteristics of the surrounding areas were available for these cities.

His dependent variables were, total general operating expenditures, current expenditure on fire, police, highways, recreation, sanitation and general control. The independent variables were, population size, population density, inter-government revenue, rate of growth of population, median family income, and employment by 1,000 of the population) in manufacturing, trade and services. He predicted a negative coefficient for population growth, arguing that, "as a city's population grows the need for public services increases but per capita operating expenditure may be expected to lag behind as existing facilities are used more intensively either because of existing excess capacities or because budgetary allocations commonly do not keep par with the expansion of service requirements". Brazer (p. 20).

Brazer found that his second experiment, i.e. dividing the cities into those of 3 states improved the coefficients of determination. Expenditure levels were related to circumstances peculiar to the state in which the city was located. In the three state sample he found that whilst some variables were significant and important for the cities in one state this did not carry over to the other states. In fact many of his variables performed better when the analysis was confined to a single state. This finding suggested to him that the financial relations between a city and its state are important.

Per capita income was positively correlated to per capita expenditure and was significant, as so also was inter-government revenue, and population density (but not of significance for recreation). Highway per capita expenditure was negatively correlated with population density and was significant. Population growth and employment in manufacturing were generally important.

Again the relationship between the central city and its surrounding area was found to be significant; the ratio of central city population to total metropolitan area population was a significant variable.

Brazer also found differences between cities' per capita expenditures which led him to divide cities into seven different types; core city of a major metropolitan area, core city of a minor metropolitan area, high income residential or satellite city within a metropolitan area, low income residential suburb, industrial suburb, independent city and major resort city. Cities in the same group spent similar amounts on the same categories of expenditure. Brazer compared the variance within groups to the variance between groups to test the null hypothesis that there was no systematic relationship between the type of city and per capita expenditure. For all categories of expenditure the hypothesis was rejected at the 1% level implying a systematic relationship did exist. An analysis of the variance of the residuals within groups to between groups produced

similar results.

Brazer's study was monumental, showing that differences in public expenditures are complex and not easily identified.¹ Unlike other studies he did not find that population was an important independent variable but instead identified the ratio of city population to metropolitan population as important.² He further suggested that the explanatory power of models, such as those he had employed, might be improved by using other social variables such as age distribution, income distribution and the age and condition of public facilities.

Scott and Feder's (28) study of the 1950 per capita expenditures of 196 Californian cities was consistent with Brazer's model. Fisher (85) extended Fabricant's work using 1957 Census of Government data whilst Bahl and Saunders (11) also reworked Fabricant's study using data for 1903, 1942 and 1962. Fisher obtained a much lower $R^2 = .533$ in his study (compared to Fabricant's .82). His explanation was that the relative importance of variables changed over time.

Bahl and Saunders produced similar results and explanations of the results to those of Fisher, finding that the explanatory power of Fabricant's three variables declined over time. Using 1903 data they accounted for 80% of the variation; 1942 data 72% of the variations and 1962 data 46%. Their explanation was that there had been a series of structural changes in the economy, which had increased the relative importance of other variables such as federal aid. In addition, it was thought that as decision makers became more aware of the nature of the budgetary problem, through the use of more sophisticated decision making models,³ then other variables would have to be considered when

1. See Brazer (43), p. 66.

2. An early study by Spangler (228) found that population growth was significantly and positively correlated with certain categories of expenditure.

3. This is not consistent with some of the budgetary studies of for example Wildavsky (248). These studies are reviewed later.

accounting for variation in the explanatory power of Fabricant's variables.

Bahl (13) reworked Brazer's study using 1950 and 1960 data, obtaining results similar to those of Brazer.

Another significant piece of work was that carried out by Sack and Harris (209). They included federal aid in their list of variables and found that when aid was included Fabricant's three variables accounted for considerably less of the observed variation in per capita expenditures.¹ Using the standardised regression coefficients they found that federal aid was second to income in importance as an explanatory variable. In highways and welfare it was first. On a 1960 data base they tested the equation:-

$$E = \alpha_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4$$

E = per capita expenditure

x_1 = per capita income

x_2 = population density

x_3 = degree of urbanisation

x_4 = federal and state aid.

The inclusion of an additional variable especially if closely associated with the dependent variable will affect the significance of the other variables. As will be seen later the inclusion of inter-government flows of funds as an explanatory variable opens up a number of conceptual and methodological problems since federal and state aid are very closely associated with city expenditure, especially if the aid is matching. This is not to deny the importance of studying the effect of aid on expenditure decisions and Sack and Harris' work is therefore significant

1. This would explain the findings of Fisher, Bahl and Saunders especially since federal aid had become of increasing importance over time as a percentage of local revenue.

in the development of determinant studies, because it resulted in nearly all subsequent studies including federal aid or state aid as an independent variable.

Saville (214) concentrated upon a smaller scale study of the townships in Orleans county with a view to, "using the local community as a model of the general mechanism of public finance". (p. 163). He wanted to examine closely the fiscal policy, which had been followed by local communities and how expenditure levels were determined as a response to local crises such as fires, floods and riots. There have been very few other studies which have adopted this "micro" approach.¹

In summary, the independent variables which are generally thought to be of importance in the above cross section studies are:

- i) demographic variables such as population density
- ii) need variables such as the proportion of low income earners
- iii) grants-in-aid, property values, volume of retail sales, and income which are capacity to finance expenditure variables
- iv) non-resident population characteristics.

The studies vary in their degree of expenditure disaggregation and the level of government studied. They all employ ordinary least squares methods of estimation and with the exception of one experiment carried out by Scott and Feder, which was reported above they use linear expenditure functions.

2.3.(b) U.K. Cross Section Studies

Very few cross section studies have been carried out on U.K. local government

1. Bahl has pointed out to me that individual townships, cities and counties have commissioned small casual studies of their fiscal life. But these have not generally percolated into the mainstream literature. However, one study which has been published in that of Vieg (239) for Californian cities.

data.¹ The reasons for this are that the U.K. does not produce data on the scale provided by the U.S. Census of Governments. Expenditure data per individual local authority and for a number of expenditure functions has been published annually by the Institute of Municipal Treasurers and Accountants for the past 25 years but it is not possible to get useful data on independent variables such as income, for each local government. To use any regional income data which does exist would require aggregation of local governments into units which correspond to the region to which the income data relates. This has two major disadvantages. Local authority boundaries do not nearly correspond to the regional income boundaries and it is not clear what meaning could be given to the aggregated expenditure figures since it would be equivalent to adding together different units with a diversity of different expenditure needs. Also, aggregation would reduce the number of observations drastically thereby producing statistical problems when it came to estimate the parameters of the model.

Despite the above difficulties some researchers have produced studies of the variations in expenditures of U.K. local authorities. Boaden (30) using data which referred to the per capita expenditures of County Boroughs in England and Wales over the period 1960/65 carried out a study very similar in character to the U.S. determinant studies described above. Using variables, described below, he "suggests that activity in any service will depend on the incidence of need for that service, on the disposition of the authority to provide the service, and on the availability of resources with which to provide the service".² Population size, social class distribution, age distribution, and density are the principal variables used to measure need. The Labour Party's share of membership

1. See Study No. 5 of the Radcliffe- Maud Report (266).

2. Boaden (30) p. 21.

on councils, turnout in recent local elections, and organisation of the local authority's administration, in terms of committee and management structures represent his "disposition" variable. The resources available to the local authority are represented by rateable value per capita, rate levied and level of rate deficiency grant.

Boaden uses the same variables in a linear model to study variations in per capita expenditures for the categories of education, housing, personal social services, police, fire and libraries. It is not at all clear from Boaden's study which variables are supposed to relate to the demand for publicly produced goods and which refer to the supply side. Like many of the American studies he does not provide a theoretical model to justify the inclusion of these particular variables. Nor does he use his model to discuss its power of explanation for different categories of expenditure. Thus it is not known if rateable values per head are more important in explaining variations in per capita expenditures on education than say on police.

Another set of interesting studies are those which have been produced by Davies and his associates (70). Their modelling is more complex from a statistical point of view being based on methods of simultaneous equation estimation and factor analysis. Again they try to explain variations in per capita expenditures but confine themselves to two specific services, namely Services to the Aged and Children's Services. Their method has resulted in them being forced to collect a large volume of supplementary data to test their model. As far as can be gathered¹ they use exogenous variables to determine a second set of variables which

1. This phrase is chosen carefully because Davies et al have presented their work in such a way that makes it very difficult for the reader to follow all stages in their argument. It is hoped that this interpretation is not a distortion of their approach.

they then use to explain the variations in expenditures. Again they use cross section data and again they fail to provide the reader with a carefully argued model.

Both of these approaches are encouraging in so far as the U.K. Local Authority sector is now becoming an object for study but they indicate clearly that much work has yet to be done in formally modelling this sector.

2.3.(a) Grants-in-Aid Studies

Following the initial determinant studies other writers examined in greater detail the role of certain variables in the model. One such variable was grant-in-aid from higher level to lower level of governments. It was hoped that the magnitude and sign of the regression coefficients would confirm specific hypotheses about the behaviour of the system.¹ Previous studies had revealed that grants-in-aid were an important determinant of local government expenditures. Were grants-in-aid, however, substitutes or complements for local sources of revenue? If the aid coefficient was greater than unity then the conclusion that aid was stimulatory was justified; that is, one dollar of aid is associated with more than a dollar of state or local expenditures.^{2,3}

The object of Osman's study (187) was to discover whether or not federal aid stimulated expenditure. His model is summarised as:

$$T/N = -2.60268 + \frac{0.09858Y/N}{(0.00955)} + \frac{1.93583F/N}{(0.20239)^t} \quad R^2 = .789$$

-
1. Previous speculative a priori studies had been presented by, among others, Scott (217), Buchanan (50, 51).
 2. If the coefficient lies between zero and unity a dollar of aid is associated with less than a dollar of expenditures. In this case the aid is said to be substituting for state or local expenditures.
 3. Miner (161) and Renshaw (200) in their studies of the effects of state aid on local public spending conclude that the stimulatory effect is slight. These results, however, have to be offset against those by Osman (188), Sacks and Harris (209) et alia who have found that grants-in-aid are associated with between a 40% to 80% increase in local spending.

where T/N = total per capita general expenditure

Y/N = per capita income

F_t/N = per capita federal aid.

The standard errors are shown in brackets.

From the above equation it can be seen that a \$1 increase in per capita income will result in a \$0.09 increase in total per capita expenditure. But a \$1 increase in aid will result in \$1.93 increase in per capita expenditure. That is \$0.93 is the increase from local government's own resources.

Osman then carried out a similar analysis for eight expenditure categories. His regression equation for education was:

$$E_t/N = -66.2166 + 0.4106Y/N + 0.21875N_{si} + 5.11370F_e/N + 0.51923F_{t-e}/N$$

$$R^2 = .824$$

where E_t/N = per capita education expenditure

Y/N = per capita income

N_{si} = number of pupils per 1,000 of population

F_e/N = per capita aid to education

F_{t-e}/N = federal aid to other non-education services per capita

Hence \$1 of aid results in \$5.11 being spent on education.

Osman's¹ own study received criticism from Oates (182), who showed that the econometrics techniques used in the study tended to bias, in an upward direction, the effects of grants-in-aid. Some of the most virulent criticisms of "aid studies" came from Morss (169) and from Pogue and Sgontz (195).

1. Osman's study which is reported here is only one of a very large number of other empirical studies on grants-in-aid; viz, Breton (47), Solton and O'Brien (21), Sacks and Harris (209), Smith (225), Teeple (232), and Wilde (250).

The main problem centres around the direction of causation in these studies.

Clearly aid relaxes the constraint on expenditure since it adds to the local government's available resources. Expenditure will, therefore, be expected to rise.¹ But what determines the amount of aid granted? If a matching grant is used then the grant is a function of local expenditure. Using simple regression equations such as Osman's will produce biased estimates of the regression coefficients. The other effect that the aid variable has is to produce a phenomenal improvement in the coefficient of determination. Thus the results obtained by Sacks and Harris (op. cit.) and Bahl and Saunders (op. cit.) were not too surprising. This follows from the fact that they are virtually regressing one variable upon itself or as Morss put it, using either local taxes per capita or federal aid per capita "serves little more than verification of the quite obvious fact that government receipts and expenditures are closely related."² Using aid as an explanatory variable overestimates and behavioural relationship between local expenditures and federal aid and provides us with very little information about the expenditure process.

Morss reworked the models which used an aid variable and obtained a reduced form which circumvented the previous problems. When this modified model was tested he found that federal aid was not an important variable for explaining variations in per capita expenditures from its mean.

Pogue and Sgontz (195) carried out a similar study to Morss' and again found that the aid variable was in part determined by local expenditure and

1. This is seen from indifference curve analysis. See Oates (184).
2. Morss (169), p. 96. That is an identity is being estimated.

when the model was adjusted aid proved not to be a good explanatory variable.

In recent years the "determinants study approach" to the empirical investigation of grants-in-aid has given way to both a more theoretical approach and also to a closer examination of the form of the grant.

The theoretical discussion of a local government's probable reaction to a grants-in-aid programme is exemplified in the works of, Bradford and Oates (38,39) and Goetz (95). These studies employ the economists' standard choice model to examine the income and price effects of different types of grants.

The second approach, which is normally found in the public administration literature, is clearly complementary to the first approach. Different types or forms of grants-in-aid are examined in order to place some upper bound upon their likely effects. Thus, matching grants are analagous to a reduction in the price of the local public service, since \$1 of local resources will purchase more than \$1 of the service. The extent of the "price reduction" will depend upon the precise nature of the matching ratio. Non-matching grants come in two broad categories, non-matching conditional grants and non-matching unconditional grants, the distinction depending upon whether or not the grant has to be spent upon a particular service. In both cases the non-matching grant is similar to an income change for the local community.

Given these distinctions in grant types it then becomes necessary to estimate separately the income and substitution effects of grants-in-aid. Such a study, however, has never been done. Also, it becomes important to recognise that different expenditure programmes will have different grant forms and that the effects of grants-in-aid will, therefore, differ from programme to programme. In the U.K. grants studies similar to those carried out in the U.S.A. have not been performed. This is primarily

due to problems of data availability. One study which can, however, be reported is that by Godley and Rhodes (94), who demonstrate the complexity of the grants-in-aid programmes of U.K. local governments. Matching grants play a less significant role in the U.K. than they do in the U.S.A. In the U.K. the principal grant, namely the Rate Support Grant (RSG) is a non-matching unconditional grant. These findings will be formally modelled in chapter 3 below.

2.3.(d) Economies of Agglomeration and Economies of Scale

Do economies of scale exist in the production of public sector goods? This question has been approached from two distinct routes which have been frequently confused with one another. First of all there exists the production function approach. This traditional method of searching for economies of scale attempts to establish whether or not an increase in the factors of production will lead to a proportionate increase or decrease in output.

The second, and more popular approach, has been to establish whether or not larger populations have associated with them a higher or lower level of per capita expenditure.¹ It is useful to distinguish this later class of studies from the economy of scale studies, referred to above, by calling them "economy of agglomeration studies".

The measurement of economies of scale, whether for private sector or for public sector goods, is a tricky business. It is essentially because the concept of "economies of scale" is so well known on a theoretical level that errors of interpretation are frequently made when they are studied empirically. To appreciate this a number of distinctions have to be made between the concept of economies of scale and those other

1. Taking per capita expenditures to represent the long run average cost curve, the line of reasoning is:
 Increased population → increased output → increased cost → increased expenditure. In this case population is taken to be a surrogate for output and per capita expenditure is taken as a surrogate for long run average costs.

factors which might cause the average cost of serving a larger population (i.e. producing more output) to fall.

Firstly, there is the shift along the production function referred to above. For a given (and constant) set of factor prices by how much will output increase or decrease for a given increase in inputs? That case is to be distinguished from one which allows factor prices to vary as more output is produced. Therefore a larger firm might not only gain reductions in average costs because economies of scale exist but these might be supplemented by the ability to bargain for bulk discounts in purchasing, preferential rates of loan finance or monopsony power in the labour market. These additional cost advantages of size would reduce average costs.

There is the problem of indivisibility of one or more of the inputs. Administrative staffs for example do not come in continuous units. Thus an administrative staff of a particular size is capable of servicing a wide range of outputs. Conceptually the indivisibility means that one of the factors (in this case "administration") is fixed and, therefore, the changes in average costs as a result of output increases do not represent economies of scale but instead economies to a fixed factor.

The indivisibility referred to above is an indivisibility in one or more inputs. When public goods or publicly produced goods are being examined indivisibility on the output side is also to be considered. This is the classic case of Samuelson's (210) pure public good. Now few goods are pure public goods but a number of goods produced by the public sector do display varying degrees of publicness. This means that as the size of the population served by the output increases public output will grow less than in proportion (if it shows some degree of publicness). The result is that the per capita expenditures for larger populations

will be lower.

Finally all of the above effects must be distinguished from shifts in the long run average cost curve brought about by shifts in the production function caused by for example technological change.

Whilst these different effects can be easily separated a priori they are in practice extremely difficult to identify separately on an empirical level. Appendix 2A lists a number of studies and their results, which try to go directly via a production or cost function to measure economies of scale. These studies have the additional problem that since outputs are seldom directly observable in the public sector then output surrogates have to be sought.

The other group of studies, namely, the economies of agglomeration studies, can be represented by the work of Bahl (13). These studies invariably use a cost function of the form:-

$$C = \alpha + \beta_1 P + \sum_{i=2}^n \beta_i X_i + \mu$$

where:-

C = per capita expenditure

P = population

X_i = independent variables other than population

μ = error term

By definition, $\beta_1 = \frac{\partial C}{\partial P}$ and $\beta_i = \frac{\partial C}{\partial X_i}$

If $\frac{\partial C}{\partial P} < 0$ and statistically significant then economies of scale are assumed to exist. The claim for this conclusion, however, is not strictly correct. It is preferable to conclude that economies of agglomeration are shown to exist and that they are due to either:

- (i) the existence of economies of scale, i.e. as population increases output expands and economies of scale are reaped.

- (ii) the emergence of external economies of size coming through from changes in input prices
- (iii) the existence of indivisible inputs
- (iv) the fact that outputs have some degree of public good characteristics.

Therefore whilst economies of scale are part of the more general phenomenon of economies of agglomeration it is misleading to argue, as so many have done in the past, that falling per capita expenditures (costs) associated with rising population size is indicative of the existence of economies of scale in public sector production. The conclusion might be correct but it has to be supplemented with further analysis which separates that possibility from the others.

The above example demonstrates a more general problem which occurs with regularity in many of the determinant studies; that is, a failure to consider carefully the underlying theoretical model which is being tested. This point has been made by a number of observers including Hirsch (19). Thus it is seldom ever clear from economies of agglomeration studies whether it is assumed that each local government unit is assumed to be using the same production function¹ and producing the same quality of output.² If these assumptions are not made then these variations should be recorded in appropriate independent variables (i.e. the X_i) but it would seem from an examination of the independent variables used that this has not been done. In so far as these sources of variation have not been accounted for then the value of the correlation coefficient will be biased downwards and the estimated parameters will also be biased.

Given the problems associated with these studies what results have been

1. i.e. including the same level of productive efficiency.
 2. i.e. are they producing the same products. If not then the production function is likely to vary.

obtained? Appendix 2A to this chapter shows that those studies using production function or cost function methods find constant returns to scale or economies of scale in existence over a very small initial range of outputs and constant returns to scale thereafter. The economies of agglomeration studies tend to find that $\frac{\partial C}{\partial P}$ is either close to unity or negative. The effects of population size are more complex than even suggested above. A further discussion of the problems of interpreting the results is given in Chapter 3 below.¹

This concludes the section on economies of scale. It is an area in which the pitfalls are plentiful especially in the absence of a well developed a priori theory. The next section takes up again the influence of population upon per capita expenditures but this time looks at population movements and the effects of the metropolitan areas' population on a city's² public expenditures.

2.3.(e) Central City Problems

A number of studies have concentrated attention on the burdens which populations outside the city area place on city public expenditures. Brazer (43), Kee (134) and Campbell and Sacks (58) have included in their determinant studies variables which relate central city expenditures to the socio-economic and demographic characteristics of the wider region. These and related studies examine in some detail what in the literature has come to be known as the "central city exploitation thesis".³ Brazer (43) and Hawley (108) found in their earlier studies an inverse relationship between central city per capita expenditure and the proportion of the population of the Metropolitan Area which lived in the city. Those cities which are centres for shopping, employment and

-
1. For example there are also price effects causing an increase in the demand for output thus if $\hat{C} < \hat{P}$ then C/P falls. For an equal cost sharing arrangement there is an expected increase in demand if C/P falls.
 2. It could be a central area local government rather than a city.
 3. These models have their roots in the Tiebout (234) hypothesis.

recreation (theatres, libraries, museums and parks) tend to have higher per capita expenditures than those cities which are not centroids. Many studies have consistently shown that per capita public spending by central cities is more closely related to the size of the "contact" population than to the population living within its boundaries. Variables frequently used to capture this effect are: the ratio of city employment to city population and per capita retail sales. The suburban population receives benefits from the city expenditures without contributing through property taxes to the financing of these expenditures.¹ These spillovers can have adverse effects upon the fiscal life of the city. If population moves to the suburbs a part of the property tax base moves with it (assuming that the net effect is for total population to decline). The population which moves to the suburbs are usually the economically active leaving behind in the city those high need citizens such as the aged, the infirm and those of school age. Total expenditure is unlikely, therefore, to fall as a result of the population decline, but those remaining in the city are likely to face higher tax bills. This reinforces the migratory process since it will induce other citizens to move to areas which offer the same levels of expenditures for lower tax payments. This use of the Tiebout hypothesis (234) has been used by many writers to explain this behaviour but much work remains to be done before the decisions which the population make when they migrate are fully understood. Tiebout's model for example makes the restrictive assumption that the decision maker is fully informed.

Netzer (179) has also noted that the problem of fiscal mercantalism or fiscal blight, as it has become to be known, is also aggravated by the migration of industrial and commerical property from the city since

1. Although in the U.S.A. they would contribute through local sales taxes and possibly local income taxes. In the U.K. this effect would be more pronounced since the local property tax is the only local tax used. But note that the suburban population do pay central government taxes which finance Exchequer grants to local governments.

business property taxes will rise to fill the gap between expenditures and revenues left by the migrating population. Netzer remarks;

"These relatively high tax rates in central cities have consequences, which reinforce the central cities' plight. Relatively high tax rates on a tax base in which business property is a major component - property which is hardly likely to benefit proportionately from increases in property tax financed expenditures - can speed the dispersal of economic activity from central cities to outlying areas". (p. 122).

Whether or not it is higher property taxes which cause the population to migrate from the city or whether it is a search for employment is still an open question. Whether the relocation of industry from the central city to the suburb is caused by higher business property taxes or because the industry moves with the population or for other reasons still remains to be discovered. A study by Campbell (58) of the factors which influenced industries locating in the New York Metropolitan region calls into question the fiscal imbalance theory. Similar finds were reported by Burkhead (55) who found more uniformity in tax rates and per capita expenditures than had been previously recorded.

Because it is a dynamic process which is being studied and one which might therefore be cyclical in nature care must be taken when interpreting the results of these cross section studies. Migration to the suburbs might in the first phase of the process result in fiscal imbalance but as expenditures in the suburbs rise (i.e. suburbanites do not consume all services provided by the central city) a greater degree of fiscal homogeneity will result.

It is not denied that population migration has caused problems for the central cities but if useful policy prescriptions are to be made from such studies the system has to be more carefully modelled than it has

until now. The empirical studies have indicated that a problem exists. It is now necessary to find out the precise nature of the problem.¹

2.4. A Critique of The Determinant Studies

Some passing remarks have been made about the specific studies reviewed above. This section concentrates upon the more general criticisms of the cross section determinant studies.

Seigel (220), Bahl (13), Morss (169) and Hirsch (119) have stressed the lack of a priori theory and model building in the above studies. Consider some of the criticisms which have been made. Miner (161) points out that,

"In only a few of the studies is there an attempt to develop a general explanation of public spending as a basis for selecting explanatory variables ..."

(p. 67).

Hirsch (119) who himself had earlier come under criticism by, amongst others, Miner later exclaimed,

"All these expenditure studies have serious shortcomings, The single most important one being the absence of a rigorous, logical, underlying theory. Expenditure functions are usually related to factors affecting costs as well as demand. In some cases, cost considerations are more strongly emphasised, and in others, demand considerations are more important". (p. 500).

Finally, Pryor's (196) critique is probably the most direct,

"... (the) group of studies can be considered as completely empirical, with no real theoretical basis underlying the choice of variables or techniques. Here regressions

1. An interesting group of studies have recently been reported from the U.S. They attempt both to extend the Tiebout model and to integrate some of the initial results of the central city exploitation theorists. Where they differ from previous studies is in their concern to get the a priori modelling correct before testing the hypotheses. See Baumol (18, 19) Oates, Howrey and Baumol (183), Bradford and Kelejian (40).

are calculated with public expenditures as the dependent (explained) variable and with a group of independent (explanatory) variables which strike the fancy of the investigator. With the advent of electronic computers and standard computer programmes, it costs little more effort and only a few pennies more to run a multiple regression with 24 independent variables, rather than three. For such dustbowl empiricism the sky is the limit and the economist with the fattest deck of computer cards wins". (p. 425).

The cut and the thrust of Pryor's criticism clears the way for more meaningful public expenditure research in which the intricacies of model building are given first priority. Whilst this is a general criticism it is not true of all the studies notable exceptions would be the work of Hirsch (121) Oates (184) and James (131) who do set about testing a priori models. Recently Borcharding and Deacon (31), and Bergstrom and Goodman (24) have considerably advanced the conceptual framework of the determinant studies. But the main point remains. Many studies have in the past and many continue today to maximize R^2 , including or rejecting variables on the basis of their ability to increase the value of R^2 . The relative importance of each variable is then found by ranking them by the value of their partial correlation coefficient. This practice has resulted in many interesting hypotheses being abandoned and has hindered theoretical development. Following on from the seminal work of Brazer very few other researchers have innovated either with respect to the form of the estimating equation, which is generally assumed to be linear, or with respect to the variables used.

The regression equations as a rule suffer from the problem of multicollinearity, thereby, biasing the values of the estimated regression coefficients. There are a number of ways of circumventing this

problem. The use of proxy variables for one of the variables and its closely related variable is one method. Another is to use principal components analysis (or factor analysis) to eliminate inter-correlations between the independent variables. Pidot (192) and Bahl (14) have both used principal components analysis in their studies. One problem with this analysis is that since the principal components are linear combinations of the original variables it is not clear what they represent.¹ Specific hypotheses, therefore, cannot be tested. Finally, a more careful specification of a priori models might reduce multi-collinearity.

Very little consideration has been given to the form of the estimating equation. In general the expenditure equation is assumed to be linear and additive, i.e. the change in per capita expenditures resulting from a unit change in one of the predictor variables is the same no matter what the level of the other predictors might be. Kurnow (140) reformulated the estimating equation in the form of a joint regression model:

$$Y = \alpha X_1^\beta X_2^\gamma X_3^\delta$$

where:

Y = per capita expenditures

X_i = ith independent variable

α = constant

β, γ, δ = parameters.

He then estimated the log linear equation:

$$\log Y = \alpha + \beta \log X_1 + \gamma \log X_2 + \delta \log X_3 + \dots + \mu$$

In this case the regression coefficients are elasticities.² They

1. This point was made above with respect to the U.K. studies carried out by Davis et. al. (70).
 2. Note also the restriction of the constant elasticity form of the original equation. A decision has to be made of how restrictive this is. Kurnow does not note the restriction.

estimate the proportional change in the dependent variable that will result from a given change in the independent variable. Also the effect on the dependent variable of a single independent variable is influenced by the levels of the other independent variables. Using this equation Kurnow reworked the studies of Fabricant and Fisher. He found that using the 1942 data R^2 increased from .72 in Fabricant's study to .88 using his form of the equation. For the 1957 data R^2 increased from .53 to .78. The 1957 estimated equation was:

$$Y = X_1^{0.56} X_2^{0.22} X_3^{0.26} X_4^{-0.39}$$

$$(0.15) (0.00) (0.04) (0.07)$$

where:

- X_1 = per capita personal income
- X_2 = degree of urbanisation
- X_3 = per capita federal aid
- X_4 = student teacher ratio

It has been remarked already that the studies have used cross section data. Time series data on an annual basis is more difficult to collect. It also has the additional drawback that the data has to be adjusted for price changes which means that suitable input price indices have to be calculated. Fabricant used comparative static analysis, comparing the regression coefficients in cross section studies at different moments in time. Sacks and Harris (209) and also Bahl and Saunders (11,2) examined the stability of standardised regression coefficients computed from cross section studies of different years. Kee (134) regressed first differences of selected variables on first differences of per capita expenditures. Studies such as Kee's are open to the criticisms often levelled at cross section studies of the consumption function which use first differences to estimate the marginal propensity to consume. The changes which are measured in this way might be overstated because changes in other exogenous variables might be of equal importance.

Cross section studies are seldom careful enough to compare like with like. For example the reader is left to make the implicit assumption that each government unit produces outputs of the same quality and with the same homothetic production function. If these assumptions are not being made then appropriate variables should be included to test the significance of these variations on expenditure levels. Differences in input prices never seem to be included in the equations. Can it be assumed that in an economy which covers so many states and localities as does the U.S.A. that there are no differences in regional prices which affect local government and city expenditures? What is the nature of the labour market for local government employees? Are wages exogenously determined at a national level or is there scope for local bargaining? Do all local and city governments face the same horizontal supply curve for labour?

Is like really being compared with like in these studies? What education does state A produce compared to state B? Is the education alike in all respects and are the educational activities identical? For example does state A have a greater proportion of high school pupils than state B? These points are forcefully made in the study of hospital costs by

Montacute (168):

"For whilst in theory inter-hospital comparison is excellent, the use of crude costs for the purposes is really a comparison of incomparables and even the enthusiast finds that he is bogged down by unexpected differences. I am convinced that continuing to compare crude costs is only likely to do a disservice to costing. What is needed, and it is a paramount need in the service and not merely for costing purposes, is more information about the factors which lead to differences in costs in hospitals and the relative weights of each of these factors." (p. 209).

What effects do different organisational forms have upon expenditures? Booms

(32) tried to answer this question in one study. He proposed that different organisational forms would produce the same quantity and quality of goods with different degrees of efficiency. The two organisational forms which he examined were major administered and manager administered forms of government. A dummy variable was included in a determinant type study to measure this effect. Mayor administered cities were found to be associated with lower per capita expenditures.

In recent years some researchers have tried to use simultaneous equation methods to separate out the forces of demand and supply. Booms and Hu (33) use public expenditures on education for 1960 U.S. Census Data on 50 states to illustrate the advantages of separating out demand and supply forces. Although their methods do not produce very encouraging statistical results, as they themselves point out it was only a first attempt at estimating an extremely complex system.

Public expenditure is the resultant of demand and supply forces. As Chapter 3 below will demonstrate it is a complex resultant. Each local government has a development plan which manifests itself in expenditures. There is no reason, however, to believe that all local governments are at the same stage of development. This point again tries to introduce the dynamic nature of the process which has been washed out by the cross section studies. Variations in per capita expenditure will, therefore, depend upon each areas' relative positions on the development cycle. No determinant study seems to make allowance for this fact which might explain a good deal of the unexplained variation. This point can be illustrated from cross section per capita educational expenditure for Scotland 1965/66. The minimum value for loan charges and revenue contributions towards capital for the 35 Scottish Education Authorities was £8.77 and the maximum was £41.4.¹ The item loan charges etc. since

1. Variation in total expenditure per pupil was min £123, max £293.

it reflects the effects of capital expenditure on the revenue account gives a crude indication of the position of the development cycle.

Areas such as Aberdeen, Dundee, Dumbarton and Stirling, all of which had very similar pupil numbers, had varying loan charges per pupil respectively as follows:

£22.7, £15.7, £20.1, £18.9

Another criticism is that no study has adjusted for differences in the product mix between local governments. This rather obvious point has been made in cross section studies which compare differences in the cost per patient day for different hospitals. Just as differences in hospital costs per patient day can be explained in terms of the illness being treated so variations in local government expenditures can be explained in terms of differences in the mix of product that they produce. This is a general extension of the previous criticism that cross section studies have not taken sufficient care to make sure that they are comparing like with like. To take the example of education again. Vaizey (238) and Cumming (67) have shown that there are differences in the total costs of providing different school subjects for example Classics, English, Science, etc. Do all local governments produce the same mix of subjects and is the intensity of the mix (i.e. the number of periods of instruction of of each subject) the same for all?

Another related aspect is the difference in the proportion of primary and secondary school pupil and the number of 4th, 5th and 6th formers in secondary schools. Vaizey (op. cit.) and Cumming (op. cit.) have again shown that upper school (4th, 5th and 6th formers) pupils cost more per pupil than lower school pupils, because upper school classes are smaller; also secondary school pupils cost more per pupil than primary school pupils because amongst other reasons secondary school teachers are paid more than primary school teachers and pupil:teacher ratios are lower in secondary than in primary schools.

These examples could easily be extended to other categories of expenditure. Again it clearly demonstrates the problems of not properly interpreting the dependent variable especially one as treacherous as per capita or per pupil total expenditure. It is useful to point out at this stage that per capita expenditure is only one of a number of possible unit cost ratios which could have been chosen. Total cost per unit of output (the economist's usual choice), total cost per square foot, total cost per fire, or total cost per crime detected are other likely choices. The choice of ratio depends upon what the researcher wishes to illustrate.

Before concluding this section one study which is worthwhile mentioning is that carried out by Morss, Friedland and Hyams (170). In an earlier article Morss (169) has commented.

"... because the factors influencing government expenditure decisions probably differ considerably among governments, some detailed specific time series are needed in order to learn more about expenditure determinants."

Morss partially fulfilled this in his own study with Friedland and Hyams (170). They carried out both time series and cross section studies on per capita state expenditures for 48 states, covering the period 1951-1962. This gave them 12 observations for the time series study and an extremely large number for their pooled time series analysis. Using three lagged debt variables (assuming that the size of the debt would constrain expenditure) and two measures for the change in population (one a short run measure and the other a long run) they carried out cross section studies for each year getting values of R^2 between 0.04 and 0.43.

There are a number of important features of this study. Firstly there is the recognition that the dynamic aspects of the problem are important explanatory factors. Secondly even although they do not present a theoretical model nevertheless they do argue their case from a theoretical standpoint.

It is always easy to make criticisms of previous studies. Many of the researchers have been aware of the shortcomings of their studies but what is so disappointing is that so many of these studies were carried out over such a long period of time with very little in the way of logical development and less in the way of learning from the mistakes of previous studies.¹

It would be wrong to conclude that the above criticisms of the cross section determinant studies renders them useless. They have served the useful purpose of demonstrating that particular phenomena exist to be explained. Variations in per capita expenditures between local governments do exist but in most cases it still has to be explained why they exist. The theoretical significance as opposed to the statistical significance of the explanatory variables has still to be established and this can only be done through careful a priori modelling.

This concludes the discussion of the determinant studies. The next section attempts to integrate to the discussion those studies which have contributed to public expenditure analysis from the fringe.

2.5. Political Science and Organisation Theories

No review of expenditure studies would be complete without a discussion of the organisational and political studies of the expenditure process. This is the "fringe" area of the subject which was referred to earlier.

The determinant studies take an external view of the world. Expenditure differentials are explained in terms of variations in external stimuli. Political Science and organisational theory both emphasise those independent variables which are internal to the organisation. This is not to deny the importance of external events; instead, these external

1. It must be stressed that this is now part of the history of economic thought. The 1970s have witnessed a slow turn round in the emphasis away from pure empiricism towards hypothesis testing.

events are treated as the data which are processed by an internal organisational structure. It is this process which is the focus of attention. Expenditures are the outcomes of the interactions between political and bureaucratic processes and an external environment. Instead of treating the organisation as a "black box", organisation theory analyses the budgetary process in terms of power structures, coalition interactions, and negotiations. The spirit of this approach is represented by the work of Argyris (6), Cyert and March (68), March and Simon (155) and Wildavsky (248). Another feature of the organisation theorists' approach is that it refers to the short run; many variables such as population and income change slowly over time and can therefore be taken as given in the short run theories.¹ In the longer run determinant studies, in contrast, the budgetary process is taken to be a passive response to external factors.

A union of the longer run and short run theories would seem to be the best way of proceeding in the future. Adams (2) in a review of Crecine's book (65) said,

"a major void in the public finance literature has been the lack of an integrated and positive theory of the municipal resource allocation problem."

This lack of positive theory has resulted in social scientists, especially economists, having a reduced ability to grapple with the problems of local public policy. The general belief presented in this thesis is that more valuable results can only be obtained by carefully modelling the micro-economics foundations of the expenditure process.

Dahl's (69) study of decision making in New Haven, Connecticut, can be translated into the market forces of demand. He modified the traditional

1. An alternative is to consider anticipated changes in population etc. in the planning process.

public finance view that, "we spend our money on private goods and cast our votes for public goods", by examining closely the distribution of power within the local community. Instead of using the pseudo perfectly competitive model of political science in which each person's vote has an equal weight, Dahl concludes that very few people in the external community have sufficient power to influence decisions. The power elite exerts power in almost all decision making areas. Sayre and Kaufman (215) have carried out a similar study for New York City and reached similar conclusions. Davis and Haine's (72) study could be described as a determinant study which also includes political variables. Basing their reasoning on the work of Downs (77), and Buchanan and Tullock (268) they set up a determinant model of the form;

$$E_j = F_j(X_1, X_2, X_3, X_4, X_5)$$

where:

- E_j = per capita expenditure for the j'th function, e.g. education, fire, police, etc.
- X_1 = population density
- X_2 = percentage of electorate owning property, i.e. $\frac{\sum \text{owner occupier}}{\sum \text{voters}}$
- X_3 = market value of personal property
- X_4 = market value of industrial property
- X_5 = median family income.

The model was tested on municipalities in the Pittsburgh Metropolitan region. They expected $\frac{\delta E_j}{\delta X_2} < 0$ showing that the greater proportion of the electorate that owned property the less they would wish to see expenditure increase. Since industrial owners are unlikely to be voters $\frac{\delta E_j}{\delta X_4}$ is expected to be positive.

For all items of expenditure $\frac{\delta E_j}{\delta X_2}$ was positive. This inclusive test of a political model is due to the form in which the model was specified; since owner occupation is closely associated with wealth which in turn is expected to be positively related to expenditures.

In the U.K. Oliver and Stanyer's (196) analysis of the effects of political party composition on expenditure levels was also inconclusive; although labour party strength on the local council was positively associated with current expenditure the relationship was weak and not statistically significant. Their findings can be summarised as:

$$y = 0.388L + 49.49 \quad r = 0.14$$

$$(0.03202)$$

where:

y = current expenditure per head

L = percentage of labour seats.

Their conclusion was that, "there is no evidence that political attitudes have any effect on current expenditure or on rate receipts" (p. 183).

This conclusion, however, has to be compared with those of Boaden (op. cit.) and Davis (70) who conclude from their studies that the spending patterns, by functional category of expenditure, do differ significantly as between Labour and Conservative held councils. This topic is obviously one of current controversy which can only be resolved in the future by more detailed empirical analysis.

Another important factor, which could legitimately be labelled as a political or organisation variable, is the relationship between central and local government when considering the determination of the size of the local budget. This relationship is probably better defined as an organisational constraint, which is placed upon the local decision making process, and whilst it is rapidly internalised to the organisation its source nevertheless emanates from outside the organisation. The central government's powers to sanction and to give approvals for the timing of the start of capital projects, the content of the plans for capital projects and the borrowing of funds to finance capital projects reveals that they have a substantial degree of power over the size of local budgets if they should care to exercise that power. This has led a number of writers¹ to claim that

1. See Dearlove (76), Robson (204), Jackson (130), and Boaden (2930).

it is the policy (and hence political complexion) of central government rather than local government which is of significance. The precise nature of the relationship between central and local government is of such complexity that very careful modelling and empirical analysis is necessary in order to understand it fully.

Crecine (65) pursued an entirely different approach. Using the basic framework of Cyert and March (68) he constructed a computer simulation study of the budgetary behaviour of Cleveland, Detroit and Pittsburgh. The budgetary process was viewed as a process which contained the conflicts and competition between departments each vying with one another for limited funds.

Other studies by Wildavsky (240) and Davis, Dempster and Wildavsky (73,74,75) try to formalise the nature of the budgetary procedures. This work is based on Wildavsky's original thesis of "incrementalism". After a long interviewing programme in which budgetary decision makers at all levels of government were interviewed Wildavsky concluded that the budget process could be described in the following terms:

- a) experiential budgeting; if the problem is of a huge magnitude "make only the roughest guesses while letting experience accumulate".
- b) simplification; ignore complicated parts of the problem. Concentrate on those items with which the decision maker is familiar.
- c) satisfice¹ rather than maximise.
- d) incrementalism; "The largest determining factor of the size and content of this year's budget is last year's budget. Most of the budget is a product of previous decisions".

This approach, coming through the literature of political science, is very

1. This term was first used by H.A. Simon "Models of Man", (1957). It is similar to the "aspiration level" of March and Simon (op. cit.) and the "acceptable level decision criteria" of Cyert and March (op. cit.)

similar to some parts of the literature on the economics of uncertainty. Wildavsky's notion of simplification is in many ways analogous to Radner's (199) and Simon's (221) concept of "bounded rationality". Because information is costly both in terms of time spent on the search procedure and resources consumed in the analysis of data, decision makers are likely to adopt strategies which partition the set of all feasible states of the world into a subset which they can handle given the resources at their disposal. They therefore maximise (or satisfice) their objective function over this local set of alternatives.

Incrementalism is similar to Cyert and March's view that the budgetary process is "history dependent". The decision maker does not come to the decision process with a "tabula rasa". He is, instead, constrained in the decisions he can make today by the decisions he made in a previous period.

A few studies have tested Wildavsky's model. Davis, Dempster and Wildavsky (73) examined the budgetary decision process of a number of Federal Government Agencies in the U.S.A. formulating eight alternative decision making rules which might explain observed budget data. They also wished to find if there was a stable relationship between an agency's requests and the appropriations which Congress made to it. The rule which they found to work best was that of incrementalism; that this year's expenditure was a function of last year's.

Sharkansky (219) used the Davis, Dempster and Wildavsky model on state and local government budget data. Like the previous studies he found that the incremental rule performed best.

A number of criticisms of the "incrementalism" studies can be made. The studies are based upon an "impression" of the working of the budget. A useful development would be to establish them in a rigorous micro-economic model of the budget process. Sharkansky completely ignores the problem of

serial correlation when estimating his equations. If his results are to be useful for prediction as he suggests that they might be then it would be necessary to adjust the estimates of his regression coefficients to remove auto regressive bias.

The political science/organisation theory studies therefore do not treat the decision making process of the budget as a passive response to external factors. Public expenditure is the outcome of these decision making processes. It therefore depends upon the decision maker's perception of the significance of the external forces. But of significance for what? For the satisfaction of the demands of members of the community or the satisfaction of his own objective function? Downs (77) building upon the earlier work of Schumpeter (206) has suggested that the objective function of politicians and political parties is to maximize the probability of their election to office. They therefore choose those policies and platforms which are sufficiently close to those favoured by the median voter.¹

Once again, however, there is a degree of passivity in such theories. While that may be the strategy which the politician, who wishes to gain office, ought to adopt it begs the question, why should he wish to gain office at all? It is not necessary to appeal to reasons such as "some are born to lead". There does exist an incentive system, a system of rewards which occupying a political role does afford.² Thus the politician's utility function would contain as arguments power, prestige, and perquisites which being a politician gives.

The strategies adopted by politicians and political parties to remain in office are extremely complex. They involve a series of trade-offs between pressure groups, the granting of political favours, supplying the

1. See Duncan Black's Theorem (28).

2. This is by analogy very similar to Williamson's (254) objective function for managers.

goods to keep the majority of the electorate satisfied, and vote trading on specific issues. Buchanan and Tullock (268) have gone a long way to providing an economic theory of such behaviour in addition to focusing on the importance of such behaviour for budgetary and hence public expenditure determination.

Finally Niskanen (181) has introduced the concept of the non-neutral bureaucrat.¹ Earlier theories of bureaucracy viewed the bureaucrat as passively serving the interests of his political master. Niskanen, however, from his studies of the behaviour of various bureaucrats in American government agencies suggests that this is an over-simplified view. The bureaucrat, like Williamson's (254) manager, has his own utility function which contains prestige and power as arguments. It is Niskanen's belief that a bureaucrat's power etc. is directly related to the size of his staff and hence the size of the budget. It can also be related to the amount of political power which the bureaucrat can exercise through his political master.²

The importance of Niskanen's work is that it brings into focus another variable which could be of significance in determining the size and composition of public expenditures.

Summary and Conclusions

The literature surveyed in this chapter is one which is likely to be new to most U.K. economists. Given the recent trend in the U.K. for economists to study local government expenditures it was felt necessary to review the literature in a systematic fashion trying to impose some structure upon it and trying to draw together a wider set of studies. It is for that

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1. This should be compared with the earlier theories of bureaucracy by especially Weber (243) and Von Mises (176).
 2. This fact is borne out by the Crossman Diaries published by the Sunday Times 1975.

reason that the literature survey in this thesis is longer than most. Because local government expenditure studies are new to the U.K. and further because a time series analysis of local government expenditure is new to both sides of the Atlantic attention has also been given to taking stock of the "current state of the art".

Public expenditure is a complex magnitude. It is the resultant of demand and supply forces operating through the economy. But it is more than that. The channels through which the demands of voters for public expenditures are made can become blocked or distorted by the behaviour's of politicians and their bureaucrats. It is possible to go a long way towards explaining variations in per capita public expenditures by looking at differences in selected variables external to the local government's decision making process. This has been accomplished by the cross section determinant studies. Their work is supplemented by those who take these external factors as data for the decision making process and consider the way in which public expenditure decisions are in fact made. The different approaches are not rivals. Instead they complement one another. Adopting a wider approach which incorporates the work of these different groups will prove to be a more fruitful way to understanding public expenditures. Mason Haires' (101) remark about the different approaches of studying an organisation is equally appropriate for the study of public expenditure,

"One of the first things one notices ... is the parallel with the fable of the blind men describing an elephant. There is little doubt that there is a single elephant being discussed, but, by and large, each of the observers begins his description from a different point, and often with a special end in view."

(page 2).

The pieces of the patchwork quilt are already in existence. What is now required is to supply the threads to join the parts. This is the aim of the next chapter. To provide a general theory of local government

expenditure which can be used by those whose aim it is to consider variations in expenditures over time, variations between local governments or to understand the budgetary process. But just as no two patchwork quilts are identical so no two comprehensive theories of public expenditure are likely to be identical, at least not for some time, until some dominant pattern has been adopted.

APPENDIX 2AEconomies of Scale Studies

Gillespie (269) has usefully summarised the major studies in this area and because we will wish to make reference to the economies of scale arguments we reproduce his table 18 in this appendix.

Table 1 Cost Curve Studies of Scale Economies

S = statistical data; AUC = average unit cost; Q = questionnaire data; E = engineering data.

<u>Name</u>	<u>Service</u>	<u>Type</u>	<u>Result</u>
1. Riew (202)	Secondary Education	S	AUC is U shaped with trough at 1,700 pupils
2. Kiesling (136)	Primary and Secondary Education	S	SUC is about horizontal
3. Hirsch (118)	Primary and Secondary Education	S	AUC is about horizontal
4. Schmandt-Stevens (26)	Police Protection	S+Q	AUC is about horizontal
5. Hirsch (119)	Police Protection	S+Q	AUC is about horizontal
6. Will (252)	Fire Protection	E	AUC is declining with major economies reached at 300,000 population
7. Hirsch (119)	Fire Protection	S	AUC is U shaped with trough at about 110,000 population
8. Hirsch (120)	Refuse Collection	S	AUC is about horizontal
9. Hirsch (118)	School Administration	S	AUC is U shaped with trough at 44,000 pupils
10. Nerlove (177) Isard and Coughlin (127)	Electricity Sewage Plants	S S	AUC is declining AUC is declining
11. Lomax (148)	Gas	S	AUC is declining
12. Johnston (132)	Electricity	S	AUC is declining.

The Royal Commission on Local Government in England reported a research study carried out for the Commission by Hutton and Gupta (100) and is summarised in Table 2.

Table 2 Summary Chart Showing Existence of Economies (Diseconomies) of Scale

Service	Scale Variable	Dependent Variable	County Councils	County Boroughs	Non-County Boroughs	Urban District Councils	Rural District Councils	
Housing	I. Population II. Total Stock of Dwellings	(a) Cost per foot super	-	Diseconomies	Diseconomies	Zero Effect	Diseconomies	
		(b) Supervision & Management	-	Zero Effect	Diseconomies	Economies	Diseconomies	
		(a) Cost per foot super	-	Zero Effect	Zero Effect	Economies	Zero Effect	
		(b) Supervision & Management	-	-	Economies	Economies	Zero Effect	
Highways	I. Population II. Total Mileage	(a) Total Expenditure per mile	Economies	Economies	Economies	Diseconomies	-	
		(b) Unclassified Road Expenditure per mile	Zero Effect	Zero Effect	Economies	Zero Effect	-	
		(a) Total Expenditure per mile	Economies	Economies	Zero Effect	-	-	
		(b) Unclassified Road Expenditure per mile	Economies	Zero Effect	Zero Effect	Zero Effect	-	
Health Services	I. Population II. Total Number of Visits	(a) Cost of Ambulance Service (per 1,000)	Zero Effect	Diseconomies	-	-	-	
		(b) Per cent Administration Costs	Economies	Economies	-	-	-	
		(c) Cost per Visit (Home Nursing)	Zero Effect	Diseconomies	-	-	-	
		Cost per Visit (Home Nursing)	Zero Effect	Economies	-	-	-	

Chapter 3

Microeconomics of Public Expenditure

Introduction

- 3.1. A General Over-view
- 3.2. Characteristics of Public Output
- 3.3. Determination of The Level of Output
- 3.4. The Demand for Publicly Supplied Goods and Services
- 3.5. The Environment
- 3.6. The Impact of Population on Public Expenditure
- 3.7. The Relative Price Effect
- 3.8. Quality
- 3.9. The Combined Model
 - 3.9.1. Cross Section Studies
 - 3.9.2. Intertemporal Studies
- 3.10. Embellishments

Conclusion

Appendix 3.A Single Peakedness and The Median Voters' Preferences

Appendix 3.B Key to the Variables used in Chapter 3.

NOTE TO THE READER

Appendix 3.B provides a pull-out sheet which can be used to read alongside the text.

CHAPTER 3

THE MICROECONOMICS OF PUBLIC EXPENDITURE

Introduction

This chapter presents a model of public expenditure determination, which employs the economists' traditional maximisation calculus. It was frequently pointed out in Chapter 2 that previous empirical studies lacked a strong theoretical foundation. This hindered their ability to account for the role which was played by many of their variables. By setting down, in a careful fashion, the assumptions about the behaviour of the system and the definitions of the variables to be used, the analysis in this chapter proceeds to formulate the nature of the relationships between the set of variables. It is then found that many of the relationships are much more complex and subtle than intuitive guesswork might have supposed.

The chapter will proceed as follows. After an introductory over-view of the public expenditure problem the nature of the public sector and the characteristics of the goods which it provides will be discussed. That section then leads into an analysis of the determination of the level of public sector output and an examination of the demand for public goods. Thereafter the effects of a number of variables upon the size of public expenditure will be discussed. These variables are population size, the environment, public sector productivity and costs, and the quality of the goods provided.

Having established the model it is then used to sketch out a priori explanations of public expenditure variations cross sectionally and inter-temporally. The chapter then concludes with a section which relaxes some of the earlier assumptions.

The reader is forewarned that it is a "jigsaw" approach which is being adopted

and each part of the jigsaw is examined closely. This means that the complete picture will not be clear until the end. However, the majority of jigsaws are provided with a replica of the pattern, which should emerge. Such a replica or over-view is provided in the next section.

3.1. A General Over-view

Public expenditure is the product of a complex interaction of several forces. Not all of these forces are economic in origin nor can all of them be identified empirically. Musgrave points out the problems which the analyst faces:-

"Even if the conceptual distinctions can be drawn, it remains difficult to verify hypotheses regarding the role of our economic factors. If we consider the change in (public)* expenditure share for any one country over, say, the last hundred years, this change may be related to economic development as measured by rising per capita income. But rising per capita income was not the only influence on budget policy during this period. The other factors, including conditioning and social factors, entered as well, and their influence cannot be separated neatly from that of our economic factors."¹

The aim of this chapter is to separate out the conceptual distinctions.

Expenditure, whether it is public expenditure, consumer expenditure or business expenditure, is the product of price and quantity; i.e. the price of the good and the number of units purchased at that price. Figure I, shows the typical situation facing the consumer who is purchasing a good such as X

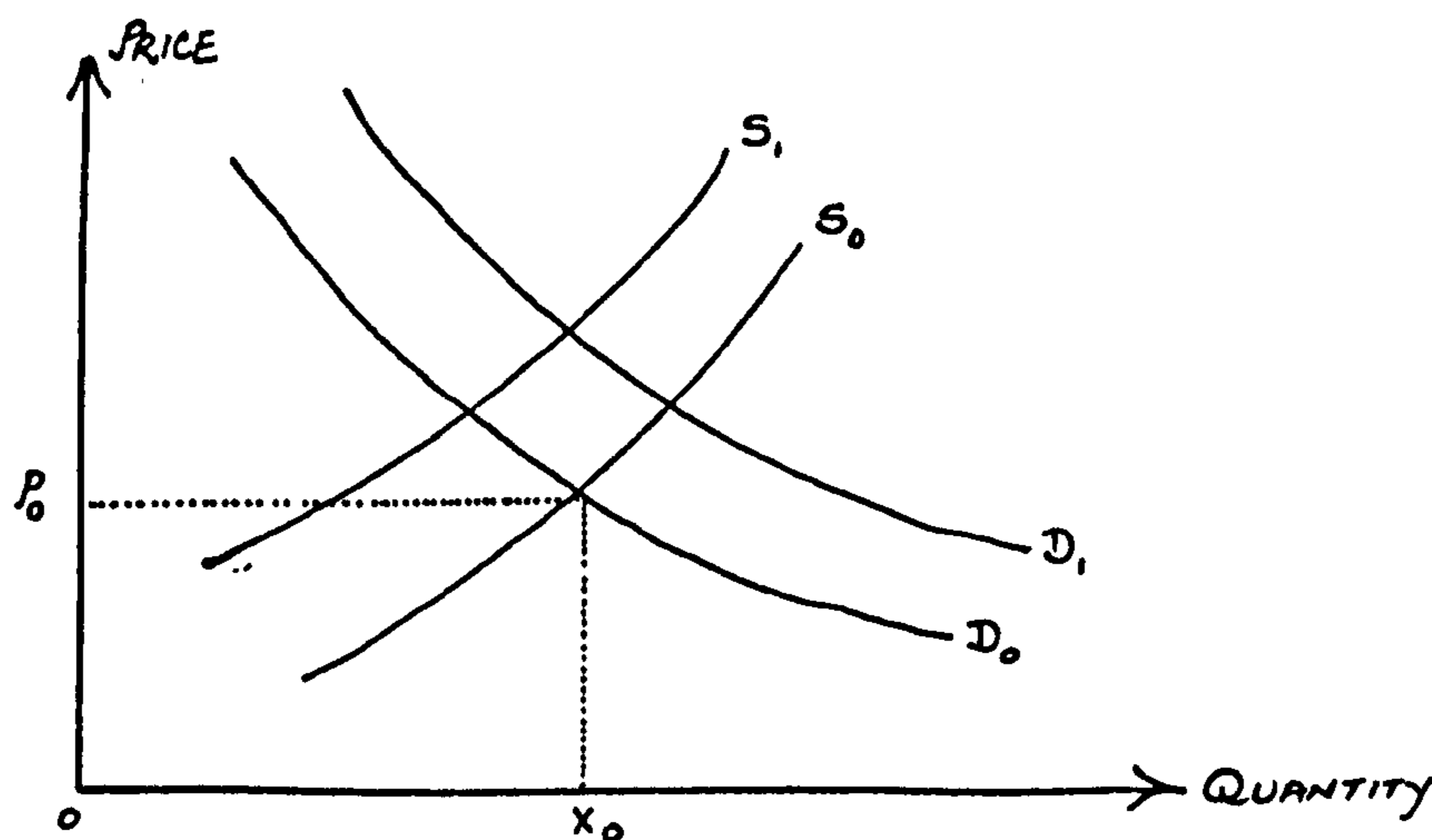


Figure I

* parenthesis added

1. Musgrave (175) p 71.

Consumer expenditure is the product $P_0 \cdot X_0$. In order to understand variations in expenditure it is traditional to look at factors which cause the consumer to move along his demand curve or which cause a shift in the demand curve or both. The effects of these changes upon expenditure will depend quite critically upon factors such as the price elasticity of demand. Movements in the supply curve also provide explanations of expenditure variations.

By aggregating all such demand and supply models across all individuals and for all goods a magnitude referred to as aggregate consumption expenditure is derived. Analysis of this aggregate has occupied much of the literature on macro-economic consumption functions in the post-war period. Just as there are strong micro-economic foundations to aggregate consumption expenditure so also there exist micro-foundations to public expenditure. The principal problem, however, in the case of public expenditure is that these micro-foundations have still to be formally delineated.

The micro-economic model developed below, therefore, seeks to set out the arguments of the demand and supply functions for public sector goods and thereafter to examine the interaction of these variables as a means of explaining both the levels of public expenditures and variations in public expenditures.

3.2. Characteristics of Public Output

This section will set out the characteristics, which are associated with public sector outputs. It will also discuss some of the conceptual and empirical problems, which surround the notion of public outputs. Without a clear understanding of these characteristics and problems many of the results of the theoretical model, which will be presented in subsequent sections, could not be interpreted adequately.

The public sector, whether it be at the level of central or local government,

is a collectivity of individuals. At some earlier state of society individuals agreed to surrender some of their individual liberties¹ in order to enjoy the benefits of collective action. In order to understand why individuals undertake collective action it is, therefore, appropriate to ask why these benefits originate from collective action rather than from individual action.

There is no single reason which explains why individuals enter into a set of contractual agreements to provide certain goods and services collectively.

It is because there are many bases to collective action that a collectivity, like the public sector, is such a complex system to analyse.² The principal foundations to collective action through the public sector are now examined.

The existence of a class of goods referred to as pure public goods³ has frequently been used to explain the existence of the public sector. It is a well known result in the literature that the existence of pure public goods will result in the failure of the market mechanism to produce such goods. Both Samuelson (2/0) and Arrow (8) have demonstrated this result. Indeed, Arrow regards the phenomenon of public goods to be a subset of the wider class of phenomena, which he refers to as market failures. The market fails to produce pure public goods because it would require a profit maximising producer to be a perfect price discriminator and would further require, in the large number case, that each consumer truly reveals his preferences and did not engage in behaviour such as that of the free rider. Clearly these conditions are extremely difficult or costly to attain in practice and hence the market fails.

1. See Buchanan (54) for an elaboration of this point.
2. It will be seen from the discussion which follows that the public sector encompasses many reasons for collective action.
3. Samuelson (2/0, 2/1, 2/2) was the first economist to give a precise definition of a pure public good as one "... which all enjoy in common in the sense that each individual's consumption of such a good leads to no subtraction from any other individual's consumption of that good ...". This 1954 definition was widened by Samuelson (2/3) in 1966 when he said that a pure public good is "... one with the property of involving a 'consumption externality' in the sense of entering two or more person's preference functions simultaneously", p 102.

In the face of market failure, if pure public goods are to be provided then it is necessary to consider an alternative system of supplying them. An alternative method is through collective action. If individuals demand the benefits, which public goods provide, and if they are willing to pay for these benefits then the collectivity will agree to provide the goods for joint consumption and, moreover, it will agree upon sharing the costs of provision according to some predetermined rule. Whether or not the collectivity actually produces the good or subcontracts the actual production to a private producer is not relevant. The point is that individuals, acting in concert, agree that the good will be produced and, furthermore, agree upon how much of the good will be supplied.

Pure public goods, however, seldom exist in practice. Margolis (1956), et alia, have pointed out that a pure public good just like its counterpart, the pure private good, is an analytical "ideal type". Few goods ever conform to the strict definition of a pure public good as given by Samuelson. However goods such as defence, the law and street lighting, all of which are provided by the public sector, come very close to the pure public good category. This means that the majority of goods, which are provided via the public sector, must be at some distance removed from the category of pure public goods. It is, therefore, necessary to inquire further and to discover other reasons for the collective provision of goods and services.

Whilst not all public sector goods are pure public goods, nevertheless, many of them do display varying degrees of consumption externality. It is, therefore, likely that those goods,¹ which have associated with them the greatest degrees of consumption externality, or non rivalness in consumption, will be collectively provided via public sector budgets.² The existence of consumption externalities will cause the utility maximising individual to calculate a level of private consumption, of the good, which although optimal

1. Education, health and welfare are normally given as examples.

2. Head (1909) and Musgrave (1974) deal more fully with these points.

to the individual is not optimal to the collectivity. The collectivity, therefore decides upon the optimal level of output.¹ One central issue which is seldom ever discussed is, why is collective provision managed through an institution like the public sector? Why don't individuals form lots of small groups? To answer such a complex and fundamental question lies outwith the scope of this study but a sketch of the answer would be that each small group's choice of outputs would produce consumption externalities upon other groups, just as in the case of individuals outlined above. In order to provide a socially optimal vector of consumption externality goods a single group is necessary.² It could also be argued that the transactions costs of seeking out partners of association are less in a large group than in a small group.³

Musgrave has provided another explanation of why certain goods might be provided collectively through the public sector. He refers to these goods as "merit goods". This is rather a complex category of goods and has given rise to much discussion.⁴ In this case it is assumed that an individual's preferences for these goods have in some way been distorted or that the individual lacks the necessary information to make a decision, which will maximise his utility. The state therefore acts in a paternalistic role and decides on the individual's behalf the appropriate level of provision of the good which will maximise his welfare. One frequent example given of a merit good is the health service for which the individual does not have the necessary knowledge to decide upon the level of service which will maximise his utility. In the case of education unless an individual has knowledge about the future (as in any investment decision) he will, if he is myopic, underconsume education services. This class of goods is closely associated

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1. It must be assumed that members of the group "care" about the effect which their choice has on others.
 2. This requires that the individual surrenders more liberty and freedom when he joins a large group than when he joins a smaller group.
 3. This argument is similar but not identical to Buchanan and Tullock's (268).
 4. See especially, Head (109), Pulsipher (198), McLure (164) and Auld and Bing (9).

with those which were discussed as consumption externality goods. In that case the individual's choice was not socially optimal although it was optimal to the individual. In the case of merit goods the individual's choice is assumed neither to be individually optimal nor socially optimal.

In the case of merit goods it must be assumed that the state has access to information which the individual does not or that by acting collectively the group can pool its skills and spread the high fixed costs of information collection and processing. In this case the collectivity acts in the same way as a fully informed individual would act. But this conception of the state introduces a number of methodological problems. If the state or collectivity is going to act on behalf of the individual then has the individual surrendered all liberty and freedom to act to the state? How can an abstract entity like the state be informed but an individual be ill informed? In other words how can the state exist independently of the individuals who make it up?¹

In order to maintain the economist's traditional assumption of methodological individualism it will be assumed that the collectivity dispenses information to its members and that the individuals then make their decisions. This approach, therefore denies any anthropomorphic notion of the state existing separately.

Many goods and services would require an individual to incur such a large volume of expenditure that he could never hope to enjoy the benefits of the goods because they would lie outwith his budget constraint. If, however, the individual only wishes to make use of these goods periodically or if more than one person can make use of the good simultaneously then there exists the possibility of individuals agreeing to provide the goods collectively and

1. These questions are fundamental to political science. The issue surrounding much of the discussion of merit goods is that of paternalism. Paternalism can be interpreted in a number of ways but it is usually assumed that some well informed ruling elite knows better than the individuals in society.

sharing the cost. Such goods clearly are not pure public goods since they will after some relatively small finite number of users be subject to congestion. There are many examples of these goods amongst which are, roads, bridges, swimming pools, fire engines and parks, etc.¹ This basis of collective action is in many ways similar to Buchanan's theory of clubs (52). Individuals will join together to reap the benefits of joint consumption provided that the benefits of association are greater than the costs.

The reasons given for collective provision of certain goods have been devoted solely to Musgrave's allocative branch of government. The government, however, provides other activities which generate a derived demand for inputs and hence expenditures in public budgets. These other activities are the functions of the distributional branches and stabilisation branches of the public sector. In a simple world it would be possible to identify separately those items of expenditure within the public sector's budget, which have allocative functions, those which are distributional and those which are directed at the problems of aggregate demand management. The public sector budget, however, is more complex than this simple view because the provision of goods and services via the budget of the public sector has distributional effects and also impacts upon the aggregate level of demand. When considering distribution and stabilisation the taxation functions of government have to be carefully considered. Take for example housing services which are provided via the budgets of local governments in the U.K. Housing is not a pure public good, indeed it has most of the characteristics of a private good. Nevertheless housing services are provided via public budgets as part of the public sector's income distribution programme. The precise nature of the redistribution also depends upon the tax structure and the level of rents charged for the service. The house building programme has impacts upon levels of employment in the building industry and its associated sectors.

1. Note it is the indivisibility of these goods which force them outwith many individual's budget constraint.

Whilst many components of expenditure in the public sector's budget can be explained in terms of the distribution and stabilisation functions of government these functions will play a secondary role in this present study,¹ which will consider a theoretical model of the allocative branch of government.

Whilst discussions about the rationale of the public sector's existence is of interest and whilst the design of optimal fiscal systems is of extreme importance they lie well outwith the scope of this study. Any positive theory of public expenditure must take as given the fact that public sector does, for reasons historical or otherwise, provide certain types of goods and services. It is because of the differences in the nature of the goods and services, which the public sector provides, that the above classification was made. Will these differences in the nature of goods have an impact upon the behaviours of different public expenditures? This question is analysed formally below but in the meantime the following example will illustrate how important it can be to know precisely what kind of service it is that the public sector is providing.

It was generally shown in the determinant studies that larger absolute levels of public expenditure were associated with larger populations. This apparently "obvious" fact is however less obvious when the goods which are being provided are pure public goods. In the case of the provision of pure public goods an increase in population would not warrant an increase in expenditure. For near pure public goods, after some level of population, congestion will necessitate an increase in the provision of the good and hence an increase in expenditure. The link between population and public expenditures is, therefore, more subtle than at first it appears and consequently requires careful modelling.

1. Nevertheless it must be appreciated that this study does not ignore the importance of these functions nor does it disregard that the provision of goods and services via the allocative branch does have distributional and stabilisation impacts, see Aaron and McLure (162) on this point.

The public sector provides a variety of goods and services some of which are pure public or near pure public goods and others which are not. To avoid confusion, therefore, the phrase "public goods" will be reserved for the class of pure public goods a la Samuelson et al, whilst the more convenient phrase "publicly supplied goods" or public sector goods will refer to the entire set of goods, services and policies provided via the public sector and which result in expenditures in the budget.

The output of public sector goods is extremely difficult to measure in practice. This arises from the fact that many public sector goods are of the form of a personal service. That is, they are generally not tangible like many private sector goods such as an automobile. Services like education, health, police and fire are both produced and consumed simultaneously. The result is that no tangible item can be pointed to and called, for example, education. The public sector provides activities, which are consumed in the producer/consumer interaction to produce the final product which the consumer demands. Thus in the production of a certain level of education (i.e. what the consumer demands) the public sector will produce a set of activities such as class room hours. These activities are intermediaries in the consumption of public sector goods.

This view of public sector goods is not far removed from Lancaster's (141) theory of consumption. In terms of that theory the automobile would be viewed as an intermediate private sector good since what the consumer finally demands is hours of travel.

Whilst public sector output is extremely difficult to measure empirically, it is, nevertheless, more straightforward to handle in an analytical model. The method, which will be adopted throughout this study, will follow a slightly modified version of a method which was used by Bradford, Malt and

Oates (37).¹ It is assumed that the consumer demands those public sector outputs which ultimately enter his utility function; that is, for example, education or police protection. Thus for the i 'th consumer his utility function is represented by;

$$U^i = \phi_i(C^*, X)$$

where C^* = vector of public sector goods: $C^* = \{C^*_1 \dots C^*_m\}$

X = vector of private sector goods: $X = \{X_1 \dots X_n\}$

For the k 'th public sector good C^*_k the individual will demand a particular level of C^*_k which maximises his utility function subject to his budget constraint.² Since most publicly supplied goods are difficult to measure in practice it is found that the use of the phrase "a level of" C^*_k is more appropriate than talking about an "amount" of C^*_k , which is the normal usage. In order to identify that level of C^*_k which is consumed by the i 'th individual the subscript i is added to the definition thus, C^*_{ik} .

To understand the above formulation of the problem a brief example is given. Individuals demand protection from the event of an outbreak of fire. To be more precise they wish to minimise the expected value of fire damage. In order to provide fire protection (C^*_f) ³ the fire department performs a number of activities e.g. various fire fighting activities, and fire prevention activities. Each activity requires a vector of inputs and it is the factor payments to these inputs which result in public expenditures. A number of

1. Bradford, Malt and Oates distinguish between C output i.e. that finally consumed by the consumer and D output i.e. that intermediate public sector output which is directly produced. The difference between their approach and that above is that their D output is dropped and replaced by the concept of a "set of activities". This alternative approach it is felt is more general and easier to handle.
2. The budget constraint is specified below.
3. In the case of police services the C^*_p output would be a level of police protection which minimises the probability of a crime being committed. For education the C^*_e output is a level of education which could be thought of as the probability of attaining some score on a test. In the case of street cleansing the C^*_c output is some level of cleanliness.

points should be noted. The same level of C^*_f output could be produced by different activity vectors. If the public sector is cost minimising then it will chose, amongst a number of alternative activity vectors,¹ that which results in the least cost.² The initial problem of explaining public expenditure changes can, therefore, be reduced to explaining the following:-

- i) changes in the level of C^*
- ii) changes in the activity vector and hence the changes in the vector of inputs
- iii) changes in input prices.

The next section considers how the level of C^* is determined.

3.3. The Determination of The Level of Output

The determination of the level of public sector outputs and hence the size of public expenditures and public budgets has been the subject of a large number of alternative analytical models.

Wicksell (247) provided a partial equilibrium model of the budgetary process which was based upon the voting principle of unanimity.³ Wicksell's work, which was later extended by Lindahl (142) and Johansen (133), is more concerned with demonstrating the existence of a partial equilibrium⁴ than with the determination of the size of public sector budgets.⁵

Similar comments can be made about the work of Samuelson et alia, who formulate the conditions which are necessary to obtain a general equilibrium

1. N.B. each vector producing the same level of C^* .
2. This means that there is a set of trade-offs in the vector of activities.
3. Wicksell relaxed this requirement to one of "proximate unanimity".
4. Writers such as Foley (89), Roberts (203) and Milleren (167) have recast the "Lindahl Equilibrium" into general equilibrium models.
5. The size of public sector budgets and the conditions necessary to guarantee a partial equilibrium are not of course separate. Also, Wicksell did pay some attention to the institutional arrangements surrounding the budgetary process but this was not his primary concern.

for an economy which contains both public and private goods. These models do not contain a decision making or institutional mechanism for the determination of the size of public budgets. The use of a Samuelson-Bergson social welfare function solves for the size of public outputs and hence public expenditures.

These abstract models have been designed to integrate the public sector into the broader class of neoclassical models which the economist traditionally employs. Thus questions such as the existence and uniqueness of a public sector equilibrium can be formulated along with questions about the Pareto-optimality of the equilibrium.

Whilst these exercises provide useful insights for the positive economist they will only play a secondary role in the model building of this study. It is not necessary in practice to assume the existence of a social welfare function in order to determine the size of the public sector's budget.¹ The existence of a dictatorship, which will decide for the rest of society, is a possible alternative. Therefore, any positive theory of the public expenditure process, no matter how simplistic it is, requires some specification of the institutional structure within which output decisions are made.

Schumpeter's (206) model of the public sector, which was later amplified by Downs (77), provides a useful starting point for a positive theory of public expenditure determination. Schumpeter and Downs demonstrated that assumptions about maximising behaviour, traditionally employed by the economist when treating the behaviour of the household and the producer, could also usefully be extended to the behaviour of political parties in a democracy. They assumed that politicians and political parties behaved in a way that would maximise the probability of their election or re-election. Politicians will,

1. Arrow (7) has of course demonstrated that a social welfare function which aggregates individual preferences into a set of social preferences and which furthermore conforms to a set of reasonable requirements does not exist. The positive economist must therefore look for another route.

therefore, supply policies and publicly supplied goods which will ensure them a majority of the votes in an election. This is demonstrated by a quotation taken from an address given by Governor Patrick J Lucey (149)

"As an elected public official and chief executive of a State a governor must be concerned with both the quality of services the State provides and the cost of these services. If he is a good politician, he knows that in order to be re-elected he must walk a narrow line between those who want government to do more and those who want to pay less for whatever it is that government does. If he is a good administrator, he may be able to widen that line - by improving the efficiency and productivity of government."

Individuals have preferences over the set of goods and policies which the public sector supplies. They also, as Governor Lucey recognises, have a set of preferences over the taxes which the public sector raises.¹ The thin line which the politician has to walk along is identified in Schumpeter and Down's analysis as the key role played by the preferences of the median voter.

According to Black's theorem (28) the political party, which manages to provide a vector of policies, goods, and tax rates which satisfies the preferences of the median voter, is that which will gain a majority of the votes and, hence, will be elected to office. This means that the analysis can be simplified to finding the vector of states of the world which will satisfy the median voter. Having found that set of policies which will ensure its election it is further assumed that the political party in office will honour its contractual agreement to the electorate by providing the goods and services which it promised.

This stylised model of the behaviour of political parties is now used in a model of public sector output determination. To begin with, a number of simplifying assumptions are made, which render the analysis tractable. In subsequent sections they will be relaxed.

1. This is clearly associated with Peacock and Wiseman's (190) notion of the "tolerable burden of taxation".

Assumptions

1. The analysis is based upon methodological individualism i.e. the individual is the best judge of his own welfare. This automatically discounts the anthropomorphic concept of the state as an organic entity¹ which is independent of the citizens which make it up. It also discounts the paternalistic role of the state.
2. The institutional structure is one of representative democracy, i.e. individual citizens elect, through a voting procedure, a representative who will present their views to an assembly.
3. A constitution exists which defines the voting rights of individuals, the scope of the authority of elected representatives, the legislative and executive functions of the government, and the method and procedure of voting.
4. Majority voting is the decision rule employed.
5. Voters are well informed about the impact of alternative policies offered to them. They are informed about the costs and benefits of government spending.
6. Citizens vote for policies not for the personality of the politician.
7. A multi-party system exists; one party is in power whilst the remainder are in opposition.
8. A system of local governments exist which satisfy the preferences of the local community. The relationships between central and local governments are for the moment assumed to extend no further than the central government will grant funds to the local government automatically according to some predetermined formula.

1. This has been the basis of the theory of the state used by Plato (194), Pigou (193) and Wagner (241). Comments on this view have been made by Peacock and Wiseman (190) and Steiner (229).

9. A bureaucracy exists which services the political system and which provides the goods and services. The bureaucracy is assumed to be neutral i.e. it does not enter directly into decisions about how much public output to produce etc.
10. Public sector agencies or departments are assumed to be cost minimising non-profit making bodies. This means that there is no slack or X-inefficiency in the system and that any level of output is produced at the least cost for the current state of technical knowledge. This assumption conforms to the neutral bureaucracy assumption (see assumption 9 above).
11. Politicians choose to produce that vector of goods, services, policies and taxes which will satisfy the preferences of the median voter and hence ensure their election to office. Politicians wish to be elected in order to enjoy the benefits associated with the role of politician which might include, personal status and financial reward,¹ i.e. the politician's utility function could be summarised as

$$U^P = \phi(X, C^*, S)$$

where:-

- U^P = the utility function of the p'th politician
 S = private gain or benefit from holding political office
 X = vector of private sector goods
 C^* = vector of publicly supplied goods.

12. Logrolling and side payments are assumed to be inefficient because of high transactions costs.
13. The individual household has a set of preferences over private goods, publicly supplied goods and tax rates. The household attempts to maximise its utility function subject to its budget constraint. If the vector of public outputs and taxes which is actually provided for

1. This approach is similar to Williamson's (254) theory of the firm.

the household is at variance with that which is desired by the household then the household will engage in some form of political action¹ provided that the costs of such action are less than the expected benefits to be gained.²

3.4. The Demand for Publicly Supplied Goods and Services

The assumptions, which were outlined above, serve to provide the basis of a rudimentary model of the micro-economics of public expenditure determination. In this section the median voter's demands for publicly supplied goods will be considered. This will constitute the first section to the more complete micro-model which will be built up over the next few sections to this chapter. The fundamental question which is, therefore, being asked in this section is how are the levels of public outputs determined?

The model developed here is a general model of public expenditure determination. That is, in its present formulation the specification of the budget constraint makes it applicable to local government budgetary decision making. However, by simply respecifying the budget constraint to conform to a different set of institutional arrangements the model could be applied to the budget decision making of any level of government.

The following definitions are made:-

i = represents the median voter; $i \in N$, where N is the set of all voters

X = the vector of private goods; $X = \{X_1 \dots X_n\}$

C^* = the vector of publicly supplied goods; $C^* = \{C^*_1 \dots C^*_m\}$

X_{ik} = the k 'th private good consumed by the median voter i

C^*_{ih} = the h 'th public good consumed by the median voter i

M_i = the disposable income of the median voter i.e. net of central government taxes and subsidies

1. Examples of political action undertaken by the household include, the formation of pressure groups, lobbying, voting, "voting with their feet" i.e. Tiebout (234) hypothesis; for further discussions see Breton (48), Olsen (185) and Rothenberg (205).
2. The costs of political action are discussed more fully by Downs (17), Buchanan and Tullock (268) and Tullock (237).

p = the vector of consumer prices for private sector goods;

$$p = \{p_1 \dots p_n\}$$

t = the local property tax rate; frequently referred to as "the rate"

A_i = the assessed value of the property of the median voter

ΣA_i = the total "rateable value" of the local government

e_m = the unit cost of producing the m 'th publicly supplied good. e is the vector of unit costs i.e. $e = \{e_1 \dots e_m\}$

T_i = the total tax bill paid by i i.e. $T_i \equiv tA_i$

A number of points of clarification are necessary so as to avoid subsequent confusion arising from interpreting the above variables alongside their real world counterparts. Firstly, there is assumed to be a single local tax rate, "t", which does not vary across local tax payers. This assumption is a simplification on the real situation in which domestic and commercial local tax payers pay different rates. The simplification does not affect the results. Secondly, the assessed value of the median voter's property A_i is the assessed rental value and not the assessed capital value. The magnitude A_i is in practice referred to as the "rateable value" of the property.

It follows from these assumptions and definitions that the following definition will hold;

$$t = \frac{eC^*}{\Sigma A_i}$$

This definition sets out formally the accounting relationship that the local tax rate is determined by dividing total expenditure by the total rateable value for the area. It also follows from this definition, by implication, that all local government expenditure is financed from the local property tax and that a local government is a non-surplus making organisation which just breaks even at the end of each accounting period incurring no debt. This assumption will be modified subsequently.

The determination of the vector of publicly supplied goods C^* is now

modelled as a two stage process. The reason for choosing to show it in two stages is that the model will then capture more of the actual decision making process. In a one stage process the median voter would simply choose that vector of private goods and publicly supplied goods along with a tax rate which would maximise his utility directly. In practice the median voter is a tax rate taker and a public output taker. He takes from the political mechanism that set of policies which is provided. It is, however, known from the assumptions made above that in a Downsian world the political party in power will seek to produce that vector of public output which maximises the utility of the median voter. It is this part which constitutes the division. Thus the first stage is the median voter's maximisation of his direct utility function taking C^* and t as parametric and the second stage is the political mechanism's maximisation of the median voter's indirect utility function. The use of an indirect utility function has the additional advantage that given its properties¹ it is extremely easy to derive an intuitively appealing demand function for publicly supplied goods.

The choice of C^*_i is now formally modelled as follows.

Consider the median voter; he has income $M_i > 0$ and a rateable value $A_i > 0$. His consumption consists of a vector of private goods $X_i = \{X_{i1} \dots X_{in}\}$ and a vector $C^*_i = \{C^*_{i1} \dots C^*_{im}\}$ of publicly supplied goods.

Assume that the median voter's consumption possibility set is the non-negative orthant of the $(n+m)$ dimensional Euclidean Space R_+^{n+m} . On this space the voter has a preference ordering which is:-

- i) complete, transitive, continuous and non-satiated
- ii) strictly quasi-concave.

This preference ordering can, therefore, be represented by the median voter's

1. For the properties of indirect utility functions see Simmons (223) p 22 and Christensen, Jorgensen and Lau (64) p 368 ff.

direct utility function, which is both continuous and strictly quasi-concave:-

$$U_i = U(X_i, C^*_i)$$

which satisfies the condition that $\forall (X_{i1}, C^*_{i1}), (X_{i2}, C^*_{i2})$ with $(X_{i1}, C^*_{i1}) \neq (X_{i2}, C^*_{i2})$ and $U(X_{i1}, C^*_{i1}) \geq U(X_{i2}, C^*_{i2})$ then $\forall \lambda, 0 < \lambda < 1$

$$U(\lambda X_{i1} + (1-\lambda)X_{i2}, \lambda C^*_{i1} + (1-\lambda)C^*_{i2}) > U(X_{i2}, C^*_{i2})$$

Now define the median voter's indirect utility function V_i as,

$$V_i(t, C^*_i, p, A_i, M_i) \equiv \max U_i(X_i, C^*_i) \quad \text{s.t.} \quad pX_i \leq M_i - tA_i$$

Let $X_i = \phi(t, C^*_i, p, A_i, M_i)$ be the vector which achieves this maximisation.

Then X_i exists and is unique, that is;

$$V_i(t, C^*_i, p, A_i, M_i) \text{ is defined } \forall p \gg 0; \quad 0 \leq t \leq M_i/A_i; \quad \text{and } C^*_i \geq 0$$

Let there exist a set of feasible alternative policies for the government defined as:-

$$F = \{(t, C^*_i) \geq 0 \mid eC^*_i \leq t\sum A_i, t \leq \min M_i/A_i\}$$

Thus F is the set of all policies (t, C^*_i) such that the total cost eC^*_i of producing C^*_i does not exceed the total revenue from the local property tax and such that the local tax bill does not bankrupt the household.

The maximisation procedures are as follows. The median voter i seeks to maximise his direct utility function $U_i(.)$ subject to his budget constraint, i.e.

$$\max U_i(X_i, C^*_i) \quad \text{s.t.} \quad pX_i \leq M_i - tA_i$$

This gives X_i as a function of p, t, A_i, M_i and C^*_i and the median voter maximises $U_i(.)$ for given values of t and C^*_i .

The political mechanism chooses those values of t and C^*_i from the set of feasible policies defined by F above in order to maximise the median voter's indirect utility function $V_i(.)$ i.e.

$$\max V_i(p, t, A_i, M_i, C^*_i) \quad \text{s.t.} \quad t\sum A_i = eC^*_i$$

Note that the political mechanism takes e as parametric.

The first order conditions for the maximisation of $V_i(.)$ are:-

$$L = V_i(p, t, A_i, C^*_i) + \lambda(t\epsilon A_i - eC^*_i)$$

where L is the Lagrangian function and λ is the Lagrangian multiplier.

$$\frac{\delta V_i}{\delta t} = -\lambda \epsilon A_i \quad (1)$$

$$\frac{\delta V_i}{\delta C^*_{ij}} = \lambda e_j \quad (2)$$

Now

$$\frac{\delta V_i}{\delta t} = \sum_k \frac{\delta U_i}{\delta X_{ik}} \cdot \frac{\delta X_{ik}}{\delta t} \quad (3)$$

Equation (3) shows the effects of a change in t upon the choice of the private good X_{ik} .

$$\frac{\delta V_i}{\delta C^*_{ij}} = \sum_k \frac{\delta U_i}{\delta X_{ik}} \cdot \frac{\delta X_{ik}}{\delta C^*_{ij}} + \frac{\delta U_i}{\delta C^*_{ij}} \quad (4)$$

Equation (4) shows the effects of a change in C^*_{ij} upon the choice of the private good X_{ik} which also includes the direct benefit effect of a change in C^*_{ij} .

Now from the individual i 's maximisation of his direct utility function equations (5) and (6) follow i.e.

$$\max U_i(X_i, C^*_i) \quad \text{s.t.} \quad pX_i \leq M_i - tA_i$$

gives

$$\frac{\delta U_i}{\delta X_{ik}} = \mu_i p_k \quad (5)$$

and

$$\sum_k p_k X_{ik} = M_i - tA_i \quad (6)$$

By substituting equation (5) into equation (3) gives

$$\frac{\delta V_i}{\delta t} = \mu_i \sum_k p_k \frac{\delta X_{ik}}{\delta t}$$

and using equation (6) this gives equation (7) as follows

$$\sum_k p_k \frac{\delta X_{ik}}{\delta t} = -\Lambda_i \quad (7)$$

Substituting equation (7) into equation (1) gives

$$\mu_i \Lambda_i = \lambda \Sigma A_i \quad (8)$$

and from equation (6)

$$\sum_k p_k \frac{\delta X_{ik}}{\delta C^*_{ij}} = 0 \quad (9)$$

Therefore, from equations (5) and (9)

$$\frac{\delta V_i}{\delta C^*_{ij}} = \frac{\delta U_i}{\delta C^*_{ij}}$$

$$\therefore \frac{\delta U_i}{\delta C^*_{ij}} = \mu_i \frac{A_i}{\Sigma_i} \cdot e_j$$

$$\text{and} \quad \frac{\delta U_i}{\delta X_{ik}} = \mu_i p_k$$

The indirect utility function provides a quick and useful means of obtaining a demand function for publicly supplied output. The maximisation of $V_i(\cdot)$ subject to the budget constraint $t \Sigma A_i = e C^*_i$ generates the demand function C^*_i where C^*_i is the i 'th voter's demand for C^* :

$$C^*_i = \phi_i(p, A_i, M_i, e, \Sigma A_i)$$

This demand function has a great deal of intuitive appeal since it captures all the variables which might be thought to be relevant. Figure 2 shows a graphical representation of the demand function in which C^*_{ik} is shown as a function of e_k (the cost per unit of C^*_k).

1. Note that it is now the demand for a specific good k which is shown. In this case the prices of other publicly supplied goods are subsumed in the vector p .

The demand function can also be interpreted as the locus of equilibrium levels of C^*_{ik} for different values of e_k .

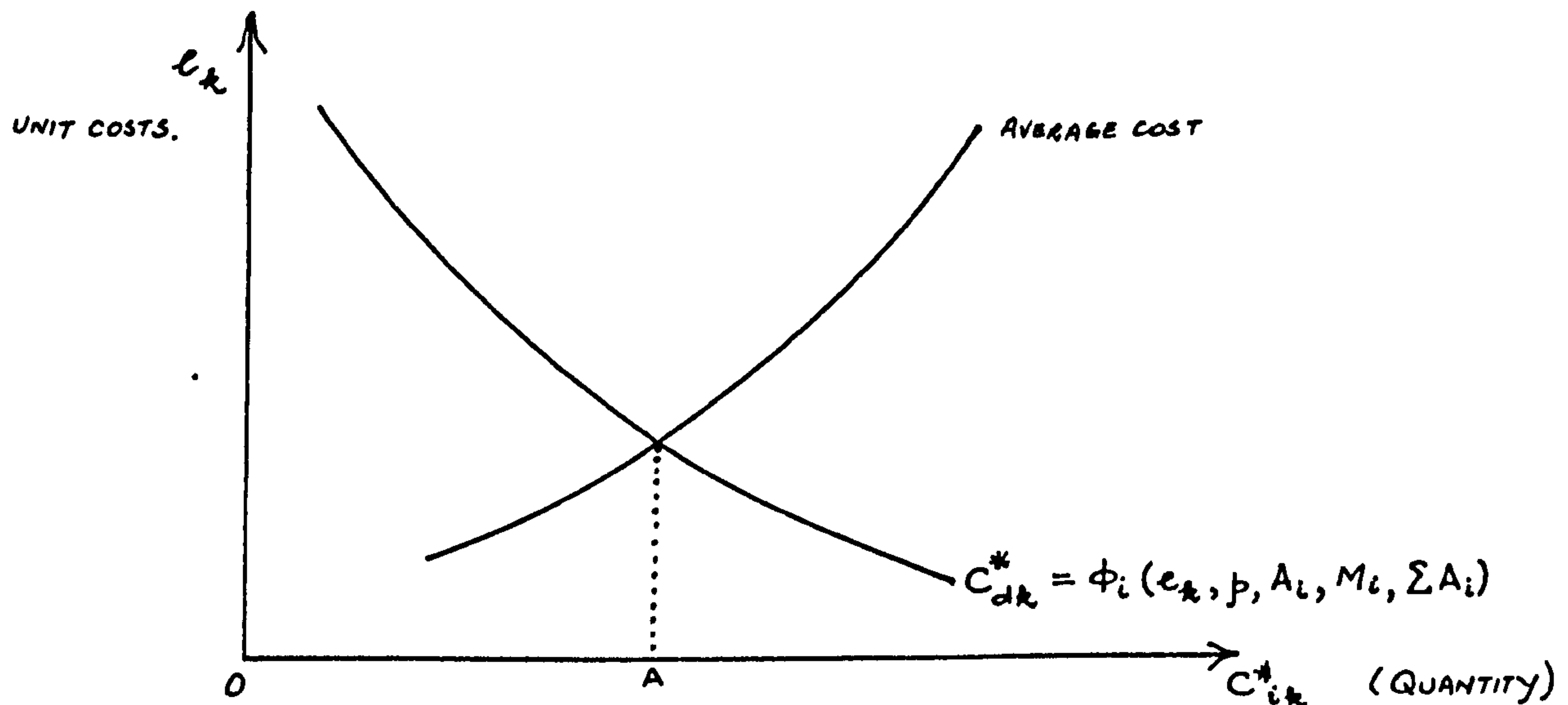


Figure 2

Demand Function for Publicly Supplied Goods

The signs of the demand relationships are:-

- i) C^*_{ik} increases (i.e. an outward shift) if A_i decreases cet. par.
- ii) C^*_{ik} " " " if M_i increases cet. par.
- iii) C^*_{ik} " " " if A_i increases cet. par.

The effect of a change in p depends upon the nature of the relationship between the private good, whose price is changing, and the publicly supplied good.

The above model has demonstrated that the determination of a level of C^*_{ik} can be usefully represented as a two stage process in which the median voter plays a key role. In order to close the model the average cost function of supplying different levels of C^*_{ik} is superimposed on figure 2.¹ The average cost is derived simply from the total cost function which sustains the levels of activities necessary to produce different amounts of C^*_{ik} . The equilibrium level of C^*_{ik} is given as OA in figure 2.

1. The cost side to the model is discussed in more detail below.

A number of further observations and embellishments can now be made on this model of demand. Firstly, Black's theorem relating to the behaviour of the median voter was employed. It is well known that one of the underlying assumptions of Black's theorem is that the individual's preferences are single peaked. This raises the question of whether or not this assumption of single peakedness is restrictive. It is shown in Appendix A to this chapter that for the model of demand outlined above preferences are single peaked under a very mild set of assumptions.

Secondly, there still remains in this model much scope for political action. It is the preferences of the median voter which are satisfied in equilibrium and whilst this guarantees a majority of the votes, nevertheless, there is clearly at most 49% of the electorate who would prefer an alternative set of policies. The remainder of the electorate are, therefore, likely to continue to express their preferences through pressure group action, voting with their feet,¹ lobbying, writing to the press and so on. It is for this reason that care has been taken to express the vector of publicly supplied goods and services C^*_i as that which satisfies the median voter i . All others have to take the vector C^*_i even although an alternative vector would have maximised their utility function.²

Free riders in a sense do exist in this model. Those who own no property, i.e. those for whom $A_i = 0$, but do consume the benefits of public sector goods can be thought of as obtaining a free ride. Care, however, should be taken in this interpretation since some one must own the property in which the free rider resides and some form of forward shifting of the local property tax could take place.³

Up until now the only source of revenue available to the local government

1. See the Tiebout model (234).

2. It should be realised that given the nature of the goods which the public sector provides it is very difficult for the non-median voters to trade public sector goods in order to reach their own private maximum.

3. No evidence is supplied to substantiate this possibility.

has been that raised from the local property tax. It is of course the case that in practice, in the U.K., about 50% of local government expenditures are financed from central government grants.¹ In order to introduce government grants into the above model a change is made to the definition of the local government's budget constraint.

Central government grants to local authorities are of two broad types; lump sum grants and matching grants. In the case of the lump sum grant the accounting relationship becomes;

$$eC^*_i = t\Sigma A_i + G \quad \text{where } G = \text{lump sum grant}$$

This gives a definition of the local tax rate as:

$$t = \frac{eC^*_i - G}{\Sigma A_i}$$

For a matching grant some proportion of local government expenditure is financed by central government. Thus the accounting relationship becomes:

$$eC^*_i = t\Sigma A_i + \alpha eC^*_i$$

where α is the proportion of total expenditure which is matched.

The local tax rate then becomes:

$$t = \frac{(1-\alpha)eC^*_i}{\Sigma A_i}$$

The analysis of demand outlined above could, therefore, be reworked with these new budget constraints. In the case of the lump sum grant the effect of the grant is equivalent to a pure income effect, whereas in the case of the matching grant the effect is to influence the relative price of the vector of publicly supplied goods. In the U.K. almost all grants are lump sum grants.²

The model which has been developed above certainly abstracts from reality

1. The figure of 50% was certainly the correct order of magnitude over the period 1950/70, which is the period covered in this study. The current 1975/76 figure, however, is now in excess of 60%.

2. i.e. the Rate Support Grant.

and has ruled out, by assumption only, the kinds of transactions costs which these previous studies have dwelt on. It is normal in the analysis of the demand for private sector goods to ignore the existence of transactions costs. Without knowledge relating to the structure, magnitude and relevance of these costs it is justifiable to ignore them.¹

Certain publicly supplied goods are closely associated with private sector goods. Thus for example automobiles and motorways are complimentary so that when there is an increase in the demand for automobiles so too will there be an increased demand for the services which motorways provide. In this way it would be possible to derive price and income elasticities of demand for publicly supplied goods. Not all public sector goods have derived demands in this way. It is, however, generally believed that publicly supplied goods have a high income elasticity of demand. Inferior goods are just as rare in the public sector as they are in the private sector. It is also generally assumed that the price elasticity of demand for public sector goods is low.² It should, however, be recognised that some groups do have a strong preference for private sector goods over publicly supplied goods. Thus as their incomes increase some switch out of consuming public sector health care or education and move into private sector counterparts. This behaviour in no way proves that publicly supplied goods are inferior. The individual is moving into a different product.

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1. All studies of the demand for public goods, of which there are only a few, have until now concentrated upon the empirical aspects of the demand for publicly supplied goods. These studies are represented by Birdsall (26), Wilson and Banfield (255) and Frey and Kohn (90). They have tended to concentrate upon the voting calculus of an individual who weighs up the costs involved in voting against the benefits to be gained from voting. Thus if for a large number of individuals there is likely to be a net cost of voting then turnout at the polls will be low. Income has the effect that those with higher incomes will be more able to afford these costs.
 2. Empirical studies of these elasticities are rare given the estimation problems involved. However for general statements see Bradford and Oates (41) footnote 23, p 88.

Finally Brazer (43), as was seen in chapter 2, found that median family income¹ in his cross section studies was a good explanatory variable. This would be interpreted in the above model as suggesting that cet. par. those local authorities for whom the median voter's income is higher will supply more output and hence incur higher expenditures. Income, however, is an extremely complex variable in any public expenditure function. It has been introduced in the traditional way, in the above model, as an argument in the demand function. It will therefore be useful in explaining the level of output which exists for one class of goods provided by the public sector but for another class of goods income will behave in an apparently unexpected way. That is, the lower the income the greater will be the volume of public expenditure since low personal incomes are indicative of high need and hence a higher volume of public sector resources to close the needs gap. Public sector resources will be voted to be allocated in this way in terms of the model developed above if the median voter in some sense "cares" about the welfare of others. That is if the median voter is concerned about those on low incomes. This example serves to show that the model of demand developed above is sufficiently general to handle both allocative and distributional policies of government. It also shows that a great deal of care has to be taken when interpreting empirical models. In this case a hasty interpretation would have given an incorrect specification of the relationship between personal income and public expenditures.

3.5. The Environment

Different environments will affect the level of output of publicly supplied goods and will, therefore, have a direct impact upon the activities of the public sector and its expenditures. Very few people have fully appreciated the significant role which the environment plays in public expenditure determination. Baumol (18) makes reference to environmental conditions and

1. Note that the median family income is different (except under very restrictive assumptions) from the income of the median family.

Bradford, Malt and Oates (37) model the environment explicitly but they stop short of emphasising its significance.

The environment is of course an extremely complex set of conditions and is therefore difficult to define precisely. The general notion of environment employed in this analysis is that set of socio-economic, political and topographical variables which influence the level of the service which is provided and thus consumed. Take for example the case of police services. Assume that at any one moment in time a level of police protection C^*_{ip} is being provided for the median voter. Further assume that it is an equilibrium level. That level of police protection is geared for a particular environment defined by the amount of "swag" in the area, the probability of arrest, and the general social and democratic profile of the area.¹ If these variables change then the existing set of police activities will no longer be appropriate for the production of C^*_{ip} . As a reaction to this situation it is assumed that the level of public sector activity is modified thereby returning the system back to C^*_{ip} . Thus the public sector production unit is viewed as an adaptive system which reacts to changes in the environment. This process can be modelled following Bradford, Malt and Oates (op. cit.):-

the individual's direct utility function is defined as $U_i(C^*_i, X_i)$

Let $C^*_{ik} = \phi_1(B_k, H_k)$

where $B_k =$ the set of activities necessary to produce C^*_{ik}

$H_k =$ the set of variables which define the environment of the k'th service

and $B_k = \phi_2(I_k)$ (i.e. the production function)

where $I_k =$ the vector of inputs necessary to produce the set of activities B_k .

The significance of the environmental variable is that as the environment deteriorates more resources have to be devoted to maintaining the level of

1. For more details of this see Becker (22), Erlich (79), Stern and Carr-Hill (61).

output C^*_{ik} . Thus it costs, in public expenditure terms, more just to stand still, and the "price" of a given level of public sector output varies with its environment. This can be demonstrated with the aid of figure 3.

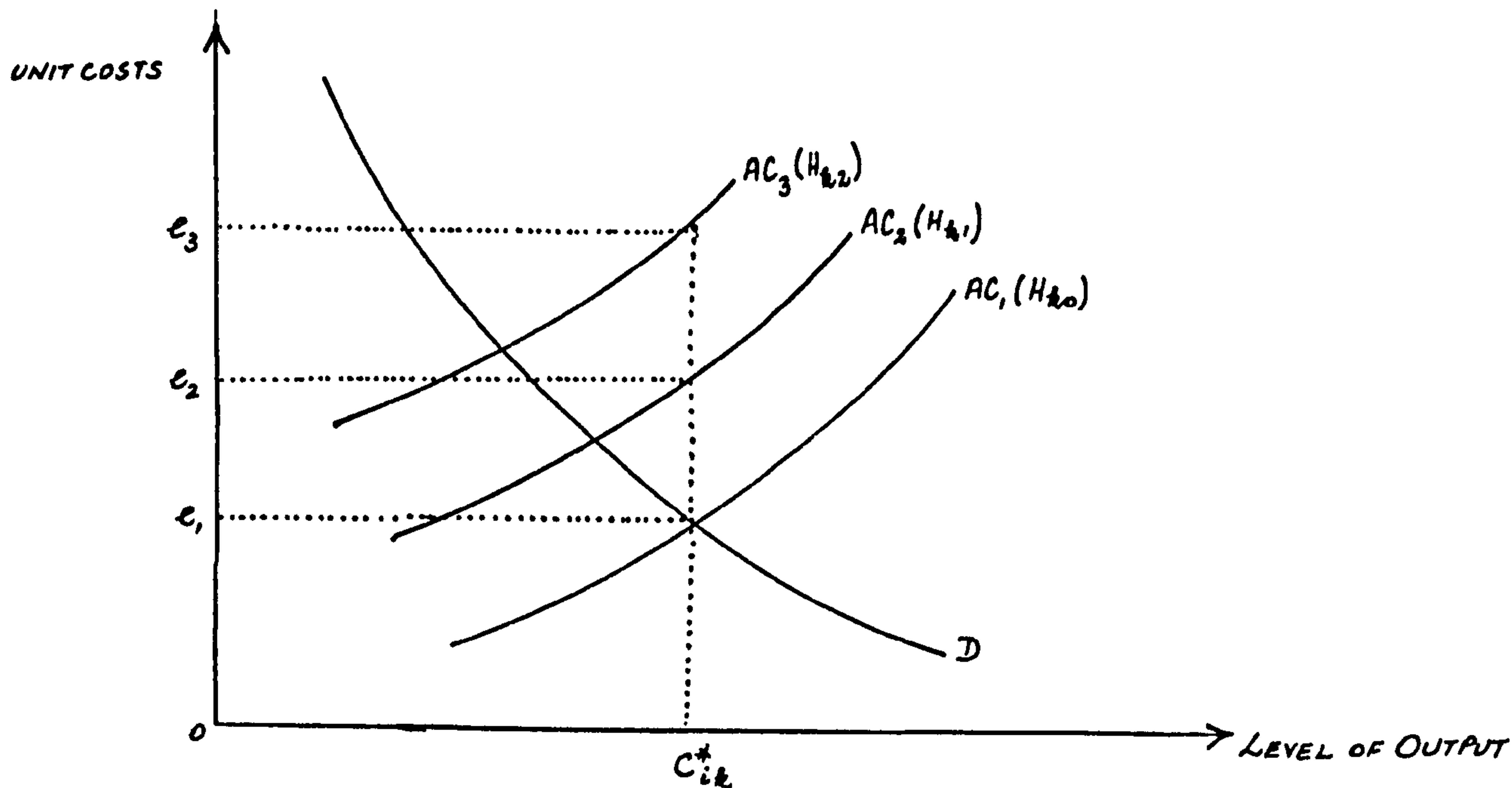


Figure 3

In figure 3 the demand function and average cost function which were presented previously in figure 2 are reproduced. On this occasion, however, the average cost curve is drawn for a particular set of environmental variables. In the case of the first average cost curve, AC_1 , the set of environmental variables H_{k0} is parametric. As the environment deteriorates the average cost curve moves upwards. Three different environments, H_{k0} , H_{k1} and H_{k2} and their corresponding average cost schedules are shown in figure 3. Taking any level of output C^*_{ik} , the unit cost of producing that level C^*_{ik} is e_1 for environment H_{k0} but is e_3 for environment H_{k3} .

Different local governments at any one moment in time will have different environments and the environment of any single local government is likely to vary over time. Thus, the set of environmental variables are a significant set of explanatory variables when discussing variations in expenditures either intertemporally or cross sectionally.

Many of the early cross section studies did have environmental variables in their regression equations but the role played by such variables was never

carefully explained. Variables such as the level of unemployment, the proportion of immigrants in the population, the age and condition of the housing stock and population density could all be thought of as being environmental variables.

By making the set of environmental variables explicit two useful notions are presented for further consideration. Firstly, a local authority can be thought of as an adaptive system which reacts to changes in a prescribed set of environments. As such a local government (or any public sector production unit) becomes a problem solving unit with the environment presenting the problems to be solved. Crimes have to be prevented and those which have not been prevented have to be detected and solved. Fires are to be prevented and those not prevented have to be extinguished. Old people have to be cared for and children have to be educated. Garbage has to be collected and disposed of and streets have to be freed from traffic congestion. The public demand that these problems be solved or contained to a level thought to be acceptable.¹ In order to solve these problems the public sector hires resources which results in public expenditures. The public sector is judged in terms of its degree of success in dealing with these problems whilst the magnitude of the problems is a function of the environment which gives rise to them. It can therefore be seen that public sector activities are directed towards the manipulation and change of environments.² Secondly, by viewing a local government as a problem solving unit it highlights one of the areas about which social scientists know least. What is the precise nature of the environments which give rise to the problems? Without a clear understanding of the set of variables or conditions which give rise to crimes, fires, education levels, child deprivation and so on it becomes difficult to understand in purely efficiency terms what the least cost method of solving

1. i.e. the C^*_i in the models above.

2. Glasgow's overspill programme which attempted to change the population variables in the environment is one example.

these problems might be.¹

Discussion of environmental variables also places into relief the concept of "need" which is frequently used in the literature to explain differences in public expenditure. Differences in public expenditures, it is frequently argued, arise because of differences in need.² Such differences can be explained very easily by reference to differences in environments. One local authority will have a greater "need" than another if its environment makes it worse off in the sense that it requires (needs) more resources and activities to bring its level of C^*_i up to the same level as that provided by a local authority, which has a more favourable environment.

3.6. The Impact of Population Change upon Public Expenditure

Brazer et al found that population size was a statistically significant variable when explaining differences in public expenditures between different local authorities. This section introduces population size into the public expenditure function and explains the way in which differences in population size will account for differences in expenditure. It should be noted from the outset that it is the "consuming population", which is of prime interest rather than the total population of the local authority. Therefore, that part of the population, which is of school age, is the relevant population when discussing the impact of population changes upon education expenditure. Population size and population characteristics could be viewed as a subset of the environmental variables which were discussed above.

Intuitively it would be expected that as population increases then the level of activity produced by the public sector would have to expand in order to serve the larger population. Thus, for example, as the number of children of school age expands the number of teachers and other inputs in the education process would have to increase also if existing class sizes and other service

1. This problem confounds much cost effectiveness analysis.

2. This was touched upon briefly when discussing the demand for public sector output.

conditions were to be maintained with the now larger population. This increase in the derived demand for inputs is then reflected as an increase in expenditure in the public sector budget. The intuitive answer is, however, only a first approximation to a more careful modelling of the relationship between population size and the size of public expenditure.

The nature of the relationship between population size and public expenditure size depends upon the nature of the good or service which is being supplied. Thus, in the case of a pure public good the marginal social cost of an additional member to the population is by definition zero. There is, therefore, no reason to expect, in the case of a pure public good, that an increase in population will result in an increase in expenditure (cet. par.¹). Different goods are, however, characterised by differing degrees of publicness. It would, therefore, be expected a priori that if population increased and, furthermore, if the level of output consumed by each member of the group was to remain constant then for those goods which are near public goods an increase in population would result in a less than proportional increase in expenditure. For pure public goods an increase in population would result in a proportional increase in expenditure.

For those services, which possess surplus capacity at the time of the population change, a population change, which simply takes up the slack in the system, will result in a less than proportional increase in expenditure. Consider the example of an old people's home which is only 50% occupied. Changes in the number of old people entering the home will only result in changes in certain variable costs,² such as food costs.

Population changes have, however, been considered in the context of assuming that the level and quality of the service remains constant before and after the population change. Litvack and Oates (146), however, have pointed out

-
1. i.e. the level of output and quality remaining constant.
 2. These examples always introduce tricky conceptual problems, since the labour services are now spread over a large number of residents and, therefore, the nature of the product which the previous residents enjoyed will now have changed.

that, in the case of pure public goods, a population increase will result in a zero increase in expenditures. Since, however, the level of expenditure is now to be allocated over a larger group each member of the group's share of expenditure will fall. This is equivalent to a price change which will cause the demand for the level of the service to increase. Depending upon the value of the elasticity of demand this could result in an increase in expenditure. This result of Litvack and Oates' could be generalised to the case of any public sector good for which a change in population leads to a less than proportional increase in expenditure. In that more general case expenditure per capita declines and a price effect could then result as above in the pure public good case causing expenditure then to increase.

Population increases can, however, place strains upon service conditions in addition to the direct impacts discussed above. As population increases in a well defined geographical location population density will also increase with the result that social costs of congestion will be precipitated.¹ These congestion costs influence in a negative way the individual's utility such that additional resources have to be expended upon the service in order to make each individual just as "well off" after the change in population as he was before the change. Thus given the existence of external costs of population change an increase in population will result in a more than proportional increase in expenditure given that the level of output and quality of the service remains constant.²

This latter case can be illustrated by an example taken from the provision of fire services. The median voter i for a population of a given size n_0 demands a particular level of fire protection C_{ifo}^* . Now assume that the

1. See Buchanan (52). Buchanan in his theory of clubs demonstrates clearly the benefits and the costs to members of a group which result from an increase in the group size.
2. By the same argument as that used by Litvack and Oates as per capita expenditure rises the "price" or share of the cost of providing that level of public output rises. The effect upon total expenditure will again depend upon the price elasticity of demand.

population of the area increases to n_1 with a concomittant increase in population density. It is generally recognised that an increase in population density will result in an increase in the probability of fire damage occurring. Hence, in order to maintain the level of fire protection C^*_{ifo} the fire department would be required to expand its level of activity and thereby hire more inputs which would result in an increase in public expenditures.

The discussion of the relationship between public expenditure and population size is, therefore, an extremely complex one. The different cases of the relationship between public expenditure and population size which were outlined above are now considered in a generalised model.

The following definitions are made:-

- i) C^*_{ik} = the level of output of the k'th publicly supplied good which is demanded by individual i (again defining the median voter)
 - ii) C_k = the total amount of the k'th good which is produced
 - iii) it follows from Samuelson's definition that for a pure public good
- $$C^*_{ik} = C_k$$

The general relationship between C^*_{ik} and C_k can be defined as

$$C^*_{ik} = n^{-\gamma} C_k ; \text{ where } n = \text{population size,}$$

such that when $\gamma = 0$ then $C^*_{ik} = C_k$

When $\gamma = 1$, then;

$$C^*_{ik} = \frac{C_k}{n}$$

i.e. each person enjoys a $1/n$ 'th fraction of the good which, in the case of $\gamma = 1$, is a perfectly divisible pure private good. The value taken by γ determines the nature of the good which was discussed above.

Given the definitions above the analysis now proceeds along the same lines as the analysis of demand in the previous section. That is, given a change in population what effect does this have upon the median voter's demand for

C*? The median voter maximises his direct utility function $U_i(.)$

$$\max U_i(X_i, C^*_i) \quad \text{subject to} \quad pX_i \leq M_i - tA_i$$

The indirect utility function $V_i(C^*_i, t, M_i, A_i, p)$ is formed. The public sector maximises $V_i(.)$ subject to $t\Sigma A_i = eC^*$.

$$\text{Now } C^*_i = n^{-\gamma} C$$

$$\text{Therefore by substitution } t\Sigma A_i = en^{-\gamma} C$$

and therefore

$$t = \frac{en^{-\gamma} C}{\Sigma A_i} \quad (1)$$

The individual's maximisation problem is now:-

$$\max U_i(X_i, C^*_i) \quad \text{subject to} \quad pX_i \leq M_i - \frac{en^{-\gamma} C_i A_i}{\Sigma A_i}$$

In this case $\frac{A_i en^{-\gamma}}{\Sigma A_i}$ is by definition the "price" of the public good to the i 'th person. Now form the constant elasticity of demand function¹ for C^*_i :

$$C^*_i = a \left[\frac{A_i en^{-\gamma}}{\Sigma A_i} \right]^{-\delta} M_i^\epsilon \quad (2)$$

where: $a = a$ constant

$\delta =$ price elasticity of demand

$\epsilon =$ income elasticity of demand.

$$\therefore C^*_i = a \left[\frac{A_i}{\Sigma A_i} e \right]^{-\delta} \cdot n^{-\gamma\delta} \cdot M_i^\epsilon \quad (3)$$

To simplify the analysis an equal cost sharing arrangement amongst the population is assumed.² Hence

$$T = \frac{eC^*_i}{n} \quad \text{where } T \equiv tA_i \quad (4)$$

$$\therefore tA_i = \frac{eC^*_i}{n} \quad (5)$$

$$\text{and } t = \frac{eC^*_i}{\Sigma A_i} \quad (6)$$

1. To consider the impact of the prices of private sector goods and cross elasticities of demand it is only necessary to assume that these factors determine the constants a , δ and ϵ in this function.

2. This assumption does not influence the results. More complex cost sharing arrangements would be more cumbersome to model.

∴ Combining (5) and (6), for equal cost sharing $\frac{A_i}{\Sigma A_i} = \frac{1}{n}$ (7)

Substituting (7) into (3):-

$$C^*_i = an^{(1-\gamma)\delta} e^{-\delta} M_i^\epsilon \quad (8)$$

Now total cost = eC . Assuming constant returns to scale and defining per capita expenditure as E/n :-

then $E/n = \frac{eC}{n}$

i.e. $\frac{E}{n} = \frac{en^\gamma C^*_i}{n}$ (since $C^* = n^{-\gamma}C$)

i.e. $\frac{E}{n} = en^{(\gamma-1)} C^*_i$

∴ $\frac{E}{n} = en^{(\gamma-1)} \cdot ae^{-\delta} n^{(1-\gamma)\delta} M_i^\epsilon$

Substituting for C^* from (8)

i.e. $\frac{E}{n} = ae^{(1-\delta)} n^{(\gamma-1)(1-\delta)} M_i^\epsilon \quad (9)$

Equation (9) shows per capita expenditure as a function of the unit cost of the good, the price and income elasticities of demand and population. The behaviour of E/n will therefore depend upon changes in n but the precise nature of that impact will depend upon the values taken by the parameters γ and δ .

The following results are summarised:-

- i) For $\gamma = 1$ (pure private good) and e constant then an increase in n has no effect upon E/n .
- ii) For $\gamma < 1$ and $\delta < 1$ an increase in n will result in a fall in E/n .
- iii) For $\gamma < 1$ and $\delta > 1$ an increase in n will result in an increase in E/n .

Thus it is seen that the relationship between population and public expenditure is extremely complex. The elasticity of per capita expenditure with respect to population is summarised by the exponent $(\gamma-1)(1-\delta)$ in equation (9) with the value of that exponent depending upon the relative magnitudes of γ and δ .

The analysis above has been presented in terms of the demand function of the median voter for the vector of public goods C^*_i . A demand function for a specific public sector service such as C^*_{ik} could also be formulated using exactly the same analysis but replacing C^*_{ik} for C^*_i .

Again it should be noted that the median voter plays a key role in the model of demand. It is the impact of population size upon his demand which is significant for the analysis.

3.7. The Relative Price Effect

It has been demonstrated that public expenditure rises as a result of an expansion in the activities provided by the public sector. The level of activities are determined by the level of final output demanded by the median voter, the size of the population served by the public sector and the nature of the environment within which the public sector has to operate.

Increases in public expenditures also result from rises in the costs of inputs to the public sector production functions. This section will show that the public sector shares in common, with a wider class of goods and services, the problem of not being able to fully offset increases in its costs against the advantages of productivity increases, economies of scale and technological change. This problem, which was formally analysed by Baumol (18)¹ helps to account for the persistent and cumulative rising costs of producing an economy's "personal services", of which the services provided by central and local governments are a large part.

In his model Baumol divides the economy into two sectors, which he labels as the progressive and non progressive sectors.² The progressive sector is

1. The problem which has been subsequently labelled as Baumol's "cost disease" has been developed further in analytical terms by Jackson and Ulph (128), Bradford (36); critiques of the model are found in Bell (23), Lynch and Redman (150), Worcester (244), Birch and Cramer (27). Applied studies which employ Baumol's model are Baumol and Bowen (17), Bradford, Malt and Oates (37) and Jackson (129). Earlier studies by Gupta (98) and Andic and Veverka used a variant on Baumol's model.

2. Note that these are stylised terms and are not intended to be evaluative.

characterised by cumulative increases in productivity per man hour, which arise from economies of scale and technological change. In the non-progressive sector labour productivity advances at a slower rate than that experienced in the progressive sector. Baumol's results depend upon there being a productivity differential between the two sectors. It does not imply, as some have incorrectly thought, that there are always zero productivity increases in the non-progressive sector.

One reason for the existence of a productivity differential is the key role which is played by labour inputs in the production of the non-progressive sector's goods. In the progressive sector labour is, "primarily an instrument, an incidental requisite for the attainment of final product".¹ This contrasts with the non-progressive sector for which, "labour is itself the end product".² This means that in the case of the progressive sector capital can be substituted for labour without affecting the nature of the product. In the non-progressive sector, however, since labour services are themselves part of the product which is being consumed, a reduction of the labour content would drastically change the product which is being produced.³

The non-progressive sector generally includes the service industries; for example, central and local government services, restaurants, craft industries and the performing arts; that is services which are labour intensive in their production. Productivity increases are not impossible in these services. They do in fact frequently occur, but they take place either sporadically or at a very slow rate. Many examples of productivity increases can be given for local government services. Horse-drawn fire engines have been replaced by modern mechanically propelled vehicles which embody the latest design in fire fighting equipment. Policemen and firemen can move

1. Baumol (18) p 416.

2. Op. cit.

3. For a fuller explanation of this point see Bell (23). The point is that for a public service like domicilliary care of old people it is not clear how the labour input to the service can be reduced without destroying the service.

to the scene of an incident much more quickly today partly because of the faster vehicles, which they have at their disposal, but also because of improvements in communications systems. The personnel employed by the public sector are better trained than they were in the past and improved systems of public administration contribute to increases in output. These are a small selection of the examples which have been provided by Fabricant (82), and Lytton (151) who have both found evidence of positive increases in public sector productivity but who have also found that in the majority of cases the productivity increases were less than those experienced in the manufacturing sector of the economy.

In other cases, however, the scope for productivity increases is impossible; consider the following two examples;

"A Schubert trio scored for a half hour performance simply requires one and a half man-hours of labour in its public presentation and that is all that there is to the matter." Baumol and Oates (20) p 47.

"Removing Judge Brach from the cast of Hedda Gabler would certainly reduce labour input to Ibsen's masterpiece but it would also destroy the product. Nor could one increase the productivity of the cast by performing the play at twice the speed. Anyone doubting this proposition should try playing modern long-playing discs at 78 revolutions per minute." Peacock (191).

As long as consumers expect a "certain degree" of labour content in the production of non-progressive sector goods then the scope which technological change offers for improving the labour productivity in these activities is limited. It is possible to imagine teachers teaching larger classes, or children instructed via a machine or unmanned firefighting equipment or a recording of Schubert's Trio. But in each case the product has changed. A recording of Schubert's Trio is a different product from a live performance, just as a pupil teacher ratio of 1:20 provides a different type of education when the pupil teacher ratio is 1:60. The consuming public are, therefore, faced with choices between similar products, each product having a different set of characteristics and a different "price tag". The problem is not sufficiently different from the consumer who wishes to buy an automobile.

Each automobile provides "transportation" but each provides a different set of characteristics such as colour, degree of comfort, whether or not the upholstery is real leather or synthetic and so on. Each automobile has a price tag and the consumer chooses that automobile which satisfies his preference function subject to his budget constraint. By analogy there exists a vector of different kinds of education, police or fire services such that the differences between each kind are defined in terms of labour content and other characteristics. The individual chooses that type of public sector good which satisfies his preference function subject to his budget constraint. The choice problem facing the median voter is now much more complex than that described above in section 3.4. But this additional complication will be handled more fully in the next section when product quality is discussed.

Consider now the behaviour of the progressive sector of the economy. In that sector it is assumed by Baumol that improvements in labour productivity are matched by equal increases in hourly wage rates. It follows, therefore, that unit costs in the progressive sector remain constant over time.

In order to prevent labour moving in search of higher hourly wage rates, from the non-progressive to the progressive sector of the economy, the non-progressive sector has to match the hourly wage rate increases given by the progressive sector. If, as it is assumed, the productivity increase in the non-progressive sector is less than that in the progressive sector then unit costs in the non-progressive sector will rise. This means that in the next time period of the economy the opportunity cost of the non-progressive sector's output relative to that in the progressive sector will have increased. The consumer's reaction to this change in the relative prices of the outputs depends upon a number of other factors. For example it has been demonstrated by Jackson and Ulph (120) that the level of output, of the non-progressive sector, demanded by the consumer will not fall provided that the income elasticity of demand is greater than the price elasticity of demand.

In the event of the level of output not falling then if unit costs rise the total costs of the non-progressive sector will rise also. Baumol's model, therefore, provides a possible explanation of public expenditure increase. If the public sector is one for which productivity increases are less than those in other sectors of the economy and if the wages of public sector employees move in line with wages in other sectors of the economy then ceteris paribus¹ public expenditure will rise. In other words it will, "cost the public sector more just to stand still".²

In order to appreciate the power of this underlying force in an economy the following numerical example shows how fast public sector costs will cumulate even for a relatively small productivity differential. Throughout the example it is assumed that output per man in the manufacturing sector rises at 3% p.a. whilst in the public sector it rises at 1% p.a.:-

Year 1	manufactured good costs £1 - output per man rises at 3% p.a. whilst wages rise at 3% p.a.
	public good costs £1 - output per man rises at 1% p.a. whilst wages rise at 3% p.a.
Year 2	manufactured good costs £1
	public good costs £1.02
Year 10	manufactured good costs £1
	public good costs £1.22
Year 20	manufactured good costs £1
	public good costs £2.67

In the course of 20 years the price of the public good has increased by 167% whilst that of the manufactured good has remained constant. This dramatic increase has taken place on the basis of only a 2% productivity differential.

Before concluding this section it should be made clear that in this formulation of the relative price effect model the productivity differential

1. The other things remaining equal are the level of output, the quality of the output, the size of the population served and the environment.

2. Bradford, Malt and Oates (37).

does not arise because labour in the public sector is working inefficiently. This was ruled out earlier when it was assumed that there was no X-inefficiency in the system. In practice, however, cost reductions could be made by a more efficient allocation of the labour stock.

3.8. The Quality of Publicly Supplied Goods

Economic analysis, both theoretical and applied, has been generally concerned with commodities which are assumed to be homogeneous. In recent years some attempts have been made to weaken the homogeneity assumption. In the area of management economics, economists have recognised the existence of branded goods, quality variations within a commodity and the introduction of new products and the disappearance of old ones. Lancaster (141) in a theoretical treatment of the general problem has viewed a commodity as a vector of "characteristics", an approach which is very similar to that adopted many years earlier by Houthakker (125). Clearly, if each element of a vector of commodity characteristics carried a price (the final price of the commodity being some function of these individual prices) then as the characteristics change over time so too will the final price of the commodity change.

This section considers the effect of quality changes upon public expenditures. Throughout the foregoing analysis it has been implicitly assumed that the median voter has demanded a level of public sector output of a given quality. The quality dimension has always remained constant. Indeed, many of the reactions which were outlined above could be interpreted as the public sector's attempt to maintain the quality of its output. Thus a congested service (i.e. one for which the level of output provided is insufficient for the size of the population) could be thought of as a public sector good of a lower quality than one which was less congested. When discussing the relative price effect it was pointed out that different types of public output, with each type having a different labour content, could be interpreted as goods which differed in quality. Quality is a difficult magnitude to define clearly but a useful approximation to what is implied by the use of the word

is that a good which requires the efficient use of more inputs in its production is of a superior quality to one which requires less.¹ Thus, especially in the public sector, a good which requires more labour input is of a higher quality to one which requires less.

An education system which has a lower pupil teacher ratio is generally assumed superior to one which has a high pupil teacher ratio. An education system which provides the most modern equipped classrooms is considered superior to one which has no equipment. A hospital fully equipped with capital equipment and with a low patient to personnel ratio is considered superior to one which has little in the way of equipment or personnel.

Products possessing different qualities are different products. Thus public expenditures will rise if the median voter demands a more expensive product of a higher quality. Public expenditures therefore change as a result of changes in the product. In order to integrate quality changes into the model it should be appreciated that an increase in demand has two meanings. There is the interpretation, frequently used in economics and everyday speech which is, that an increase in demand is an increase in the willingness to purchase more of the output at the same price. But there is a second interpretation of an increase in demand which is usually forgotten and that is a willingness to pay a higher price for the current level of output. It is the latter which is important when discussing quality differences. Because individuals are willing to pay more for a modified product this provides an incentive for producers to supply the new product.

Consider the constant elasticity demand function which was introduced above:-

$$C^*_{ik} = a \left[\frac{A_i e n^{-\gamma}}{\Sigma A_i} \right]^{-\delta} M_i^\epsilon \quad (1)$$

In that case the median voter i was choosing a level of output C^* of the k 'th good. If such a function was empirically estimated then the absence of a

1. For example hand-tailored garments are regarded to be of a higher quality than machine stitched goods. A Rolls Royce embodies more man-hours of labour than an assembly line car.

quality dimension would bias the estimated coefficients and the values of the elasticities. The demand function is now reformulated by introducing a quality dimension Q_k

$$C^*_{ik} = a \left[\frac{A_i e n^{-\gamma}}{\sum A_i} \right]^{-\delta} M_i^\epsilon Q_k^\eta \quad (2)$$

It was assumed above that improvements in quality implied an increase in the derived demand for inputs. This relationship between quality and inputs is given by

$$Q_k = \theta I_k^\beta \quad (3)$$

Substituting equation (3) into (2) gives:-

$$C^*_{ik} = a \theta \left[\frac{A_i e n^{-\gamma}}{\sum A_i} \right]^{-\delta} M_i^\epsilon I_k^\beta \quad (4)$$

This now places equation (2) into an estimable form, having substituted inputs for quality.

The median voter has now a complicated choice to make. Originally he had to choose the levels of public outputs in the vector C^* which would maximise his utility function subject to his budget constraint. Now his choice is over a set of different levels of public outputs and different qualities of these outputs. There are many more products to choose from¹ and many trade-offs to make. The constrained consumer must now trade off quantity against quality.

This approach towards the integration of quality into the analysis is only an approximation. There are a number of pitfalls in using the volume of resources as a measure of quality in practice. These pitfalls are summarised as follows:-

- i) increases in personnel per unit of output can reflect a substitution of labour for non-labour inputs or a substitution of lower skilled for higher skilled labour.

1. The information problem facing the consumer has multiplied also but at the moment information is assumed to be perfect and costless.

ii) although one measure of quality might be improving other measures might be worsening. This is due to the multi-dimensional nature of quality. What is required is a measure which will capture "average quality". For example two plausible measures of the quality of education might be:

- a) the age of the capital stock: assume it is increasing and hence quality is decreasing
- b) the teacher pupil ratio: assume it is rising and hence quality is increasing.

The problem is deciding upon the weights to use when combining these two measures of quality in order to arrive at an average.

iii) it was seen that a deterioration in the environmental variable resulted in an increase in the volume of inputs. Thus an increase in the volume of inputs can only be interpreted as an improvement in quality provided that all other things remain equal.

The quality dimension is part of a wider class of problems, which could be labelled "product differences". In all public expenditure analyses the most obvious first question to ask is, are there differences in the product which is being produced? Thus variations in public expenditures cross sectionally and inter-temporally could be explained in terms of product differences. Is the education provided by local government X the same as that provided by Y; or is the education which was produced in 1940 the same as that produced in 1970? These fundamental questions, however, are extremely difficult to answer empirically because of the immense difficulties involved in measuring outputs and defining the characteristics of the goods produced.

3.9. The Combined Model

The sections above have delineated the components of a complete public expenditure system. This section brings these components together.

Figure 4 shows the demand curve, which was derived in section 3.4, along with

the average cost curve. A single public sector good C^*_k is considered in this diagram.

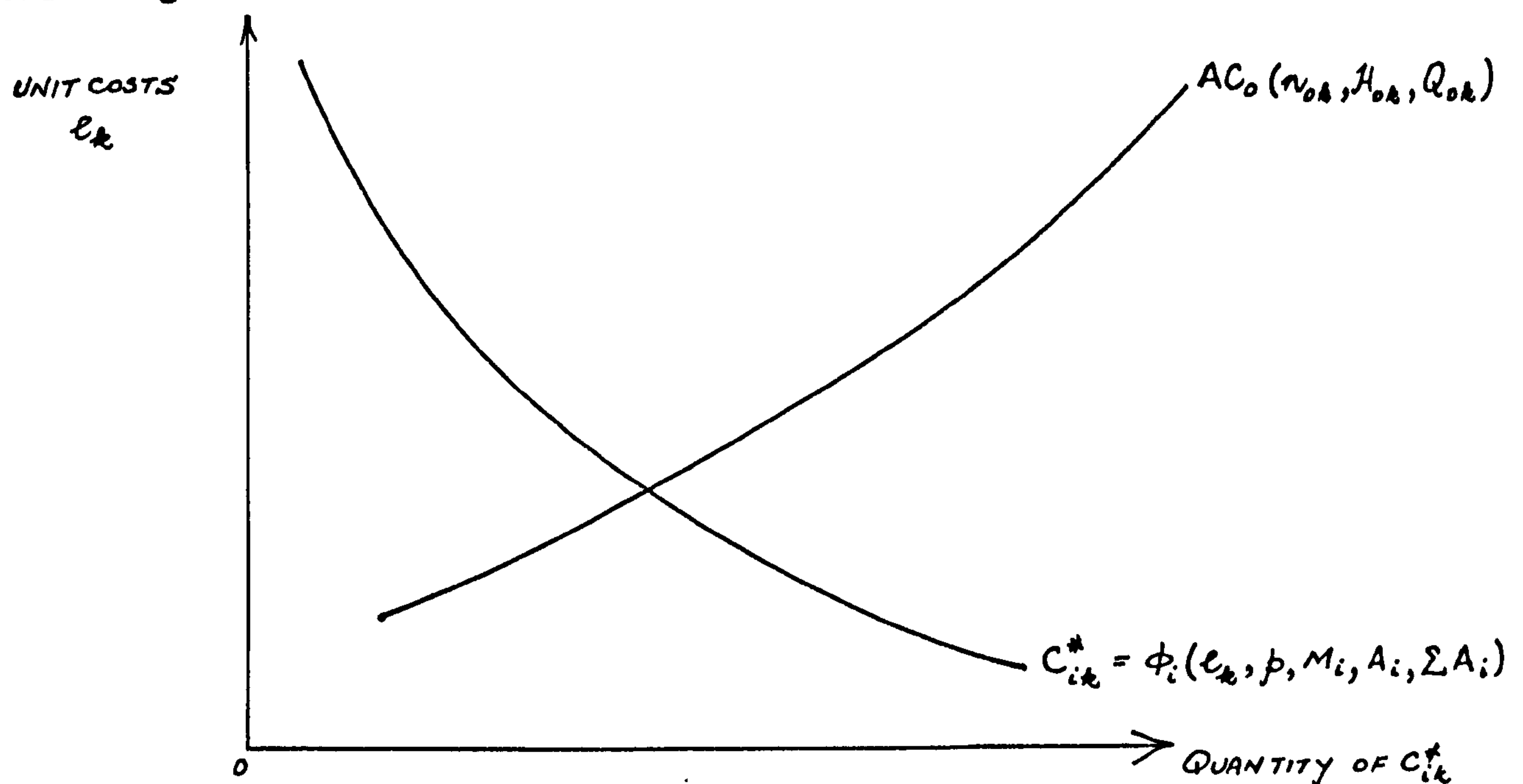


Figure 4

The average cost function is assumed to be a function of the level of output produced, the volume of real inputs required and the factor prices. The average cost curve AC_0 is also drawn for parametric values of population n_{ok} , environment H_{ok} and product quality Q_{ok} .

It should, in principle, be possible to use this model to discuss variations in public expenditures between local governments in addition to variations in the public expenditures of a single local government over time. Indeed, that would be a useful test of the model. Does this model, in fact, provide the a priori theory which was lacking in the positive determinant studies reviewed and criticised in chapter 2? The cross section case will be reviewed first and this will be followed by the inter-temporal case.

3.9.1. Cross Section Studies

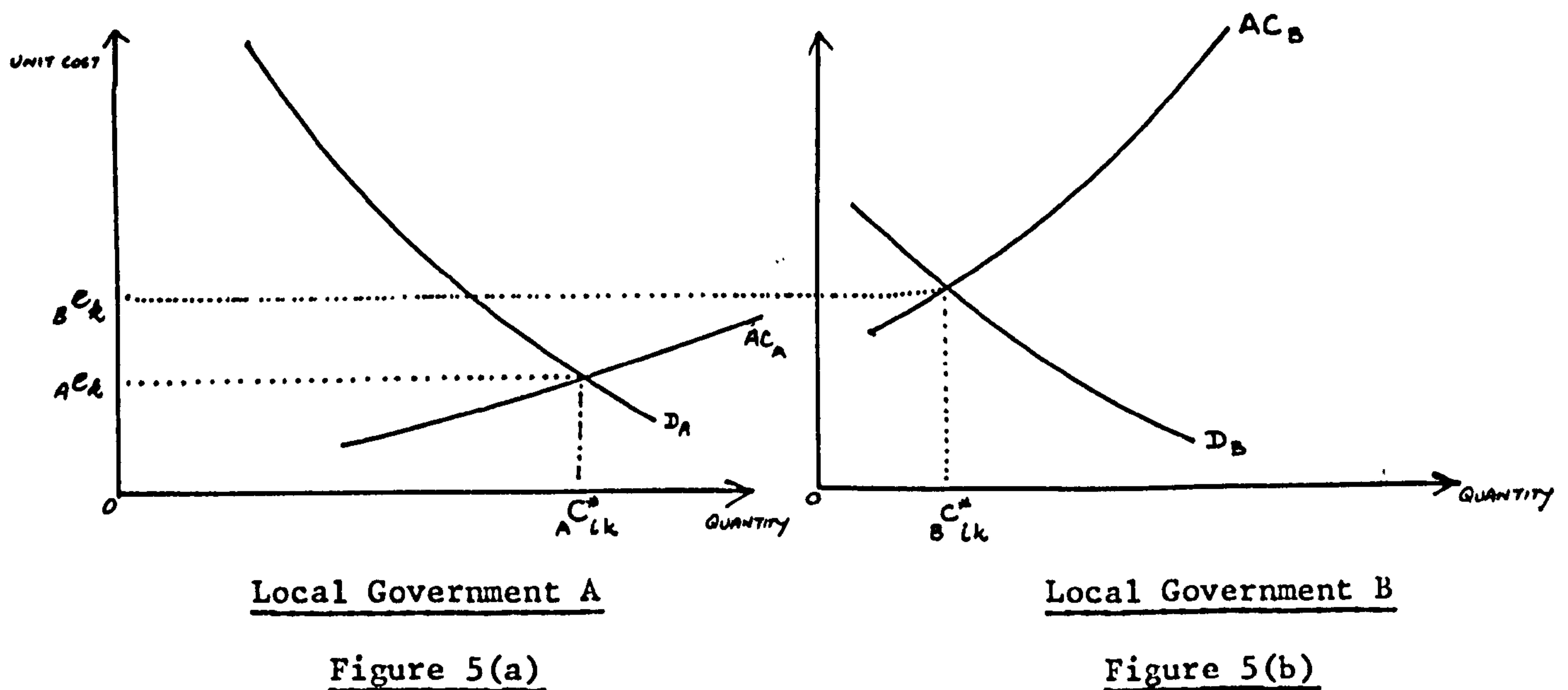
Differences in public expenditures between local governments will arise because of differences in the demand functions of the median voters in each area. Thus differences in unit costs, personal incomes, regional private sector consumer prices and local rateable values will all result in different levels of C^*_k being demanded. Differences in the underlying preference

functions¹ of the median voters will also result in differences in C_k^*

Unit costs will vary from one local government to another if there are differences in the underlying production functions, in the quality of inputs used, in the vector of regional input prices and in the parameters of the average cost function. Thus, regional differences in population, environment and quality of product will all result in differences in the average cost function.

The result is that public expenditures can vary from one local government to another for any combination of these reasons given above.

Consider two local governments A and B. The equilibrium values of C_k^* for each local government are given in figures 5(a) and 5(b).



The demand curve for C_k^* of the median voter in area A is given by D_A and for area B by D_B whilst the respective average costs for the two areas are AC_A and AC_B . Local government area A has a median voter who has a significantly higher personal income than his counterpart in area B whilst the median voter in B lies in an environment which is significantly worse than that of A. Hence differences in the environments account for the differences in AC_A and AC_B . The result is that total expenditure in area A

1. Tastes and preferences have not been introduced as explicit variables in the median voter's demand function. When comparisons are made between individuals, as in this case, a taste variable ought to be introduced.

is greater than that in area B and the inhabitants in area A enjoy a greater level of C_k^* than those in area B.

The model thus accounts for differences in public expenditures between regions and also serves as a model which policy makers can use to sort out the social problems of inequalities between different regions.

3.9.2. Inter-Temporal Studies

A similar use can be made of the model when considering changes in public expenditures over time. In this case it is the demand functions of different median voters at different periods of time which are being compared.

Increases in real incomes over time will cause the demand curve to move out to the right as will changes in preferences.

Increases in factor prices without offsetting changes in factor productivity will cause the average cost curve to move upwards. A change in the products' quality, an increase in the area's population and a deterioration of the area's environment will also cause the average cost curve to rise upwards.

Whether or not public expenditure will increase as a result of these changes in demand and cost depends upon the relative magnitudes of a complex interplay of amplifying and offsetting changes. It will be recalled from an earlier discussion of population changes that the outcome depended upon the relative magnitudes of the price and income elasticities.

In order to get an intuitive grasp of the dynamics of the expenditure process, Figure 6 sets out the system in an alternative form. This presentation of the system is a modified version of that presented earlier by Jackson (129). The model encompasses four quadrants. A description of each quadrant is given below.

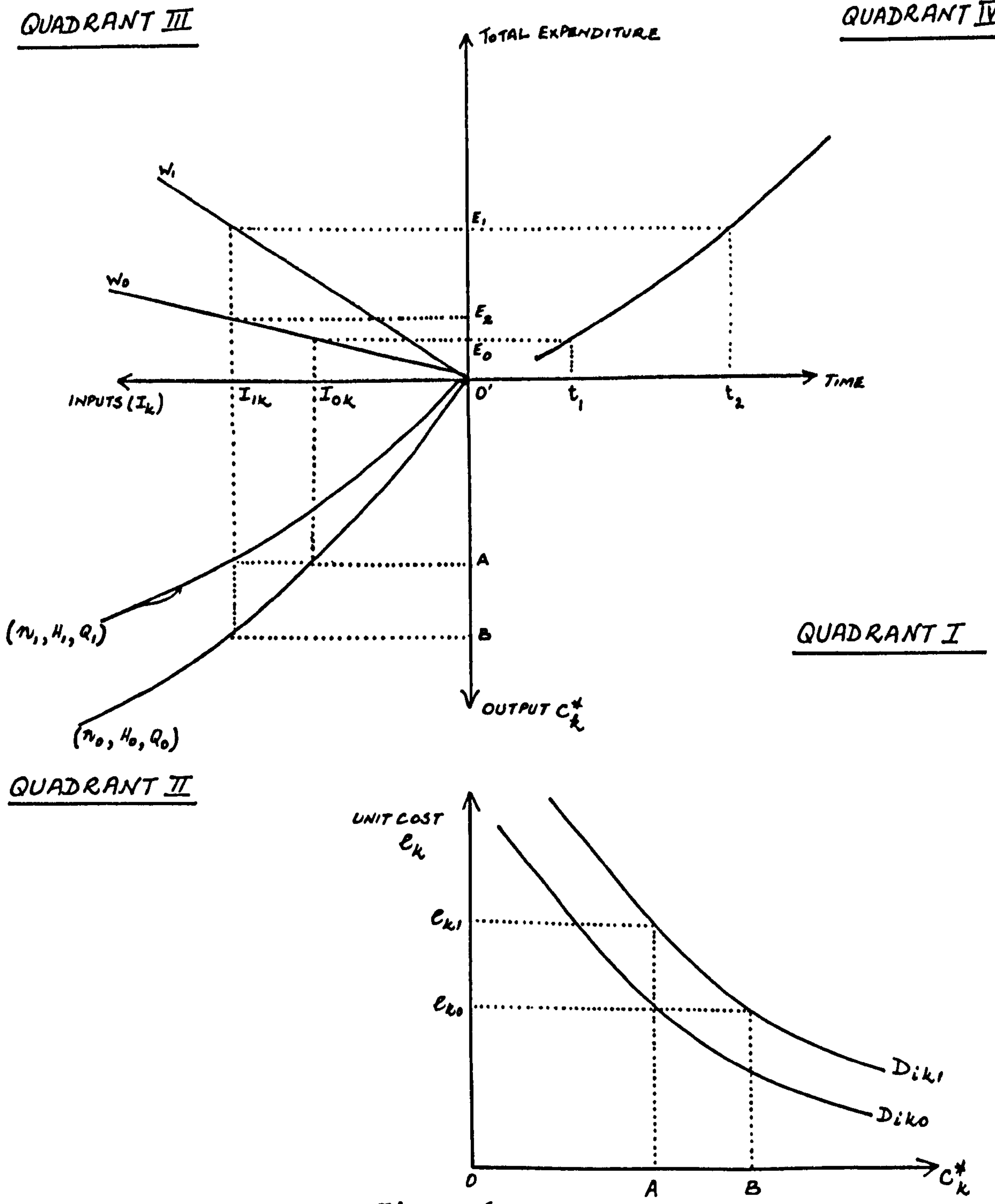


Figure 6

Quadrant I

This quadrant is a reflection of the median voter's demand function, which is given immediately below quadrant I. Let D_{iko} be the median voter's demand for C^*_k then:-

$$D_{iko} = f(e_k, M_i, p, A_i, \Sigma A_i)$$

Also assume that for median voter i, OA is the equilibrium level of C^*_k , i.e. that value of C^*_k which maximises the individual's utility function. Thus OA in quadrant I is taken from the demand model.

Quadrant II

In this quadrant the production function for the production of C^*_k is shown.

It relates the vector of inputs I_k to different levels of C_k^* . Notice that each production function is drawn for parametric values of n , H and Q .

Quadrant III

The line Ow_0 shows the unit costs of the input vector I_k . Thus $OI_{ok} \cdot Ow_0$ gives the value of total expenditure OE_0 . The value of the unit cost $e_k = \frac{OE_0}{OA}$ is of course that which is fed into the demand function so that total expenditure is in a sense an equilibrium value.

Quadrant IV

This quadrant gives a total expenditure function, which is drawn over successive time periods (t). This is in fact what is observed in practice and the advantage of this presentation of the model is that the effects of changes in the different components of the expenditure function can be shown in terms of changes in total expenditure.

Thus, for example, if population increases from n_0 to n_1 , if the environment deteriorates from state H_0 to state H_1 , and if the product quality improves from Q_0 to Q_1 then the production function will move such that in order to produce a level of C_k^* equivalent to OA then I_{1k} units of inputs will now be demanded instead of I_{ok} . If, over and above these changes wage rates increased from Ow_0 to Ow_1 , then in order to continue producing OA of C_k^* total expenditure in period t_1 would increase from OE_0 to OE_1 in period t_2 . Furthermore, in order to maintain the level of output OA at the new unit cost of e_{k1} there must be some compensating change on the demand side, such as an increase in the median voter's personal income, in order to maintain an equilibrium.

The role played by demand is also demonstrated. An increase in the median voter's personal income moves the demand curve from D_{iko} to D_{ik1} . Assume that all variables and parameters on the supply side remain constant so that e_{ko} remains constant also. The equilibrium output is now OB . Following this change round the model results in an increase of total expenditure from

OE_0 to OE_2 .

For quadrant II an improvement in productivity would cause the production function to move around in an anti-clockwise direction whilst the other changes discussed above are pulling the production function around in a clockwise direction. The point to notice is that there are strong tendencies in an economy to drive public expenditure in an upward direction and fewer forces tending to pull it down.

3.10 Embellishments to the Model

The model of the demand and supply of public sector goods by representative governments which was outlined above rests upon a number of assumptions. A positive theory of public expenditure determination has to consider the realism of the assumptions and whether or not they restrict the heuristic value of the model.

The model of the median voter assumed that he made his decisions in a rational and fully informed fashion. In practice voters are not fully informed. As Downs (77) has indicated they lack contextual knowledge in addition to having little knowledge about the consequences of the decisions they make. The real resource cost of being informed has occupied much of the political economy literature since the seminal work of Buchanan and Tullock (269) and formed the basis of the demand models of Birdsall et alia.¹ Information costs and voting costs account for low turnouts at election time and will affect the precise nature of the choices of public sector outputs which are chosen. A relaxation of the assumption of the fully informed voter does not, therefore, lead to a radical reformulation of the model. It means that actual public sector outputs are likely to be sub-optimal.

The nature of the relationship between the voter and the representative politician requires careful analysis in practice. Until now emphasis has

1. Loc. cit.

been placed upon the word "representative" but to what extent are politicians in practice representative of the views of the electorate? Since each individual consumes similar levels of the public outputs which are produced then all except the median voter will be dissatisfied with the vector C^* and tax rate t . This means that in practice a politician had to administer an extremely complex set of relationships trading off favour and displeasure amongst different groups and individuals in order that he maintained his majority. In so far as the electorate are ill informed, lack contextual knowledge and find that the costs of political action are high then the politician is in a position to choose the vector C^* and tax rate t whether or not it maximises the utility function of the median voter.¹ The implications of this for the model are that once again more realism is introduced, but the spirit of the demand model outlined above still remains. The actions of politicians are constrained by their fear of not gaining election. The existence of ill informed electors and costly political procedures relaxes that constraint and hence widens the bounds of feasible action.

It was assumed that the bureaucracy which produced the public sector goods was neutral. That is bureaucrats did not decide upon the level of output which was produced. In practice this assumption might not hold in all circumstances. Bureaucrats frequently have contextual knowledge which politicians do not possess. This places the bureaucrat in a relationship similar to that between a doctor and his patient.² The agency relationship between politicians and bureaucrats varies from situation to situation and is best analysed in a game theoretic framework, similar to that of bilateral monopoly. The outcome of such relationships depends upon the distribution of power and knowledge within the system. The result for the demand and supply model is that if the agency relationship is complete and the bureaucrat does in fact

-
1. This is very similar to the idea of the discretionary power a manager has in an industrial company vis-a-vis the shareholders of that company - see Williamson (254).
 2. Following this analogy with health economics the politician/bureaucrat relationship will be referred to as the "agency relationship".

choose the elements of the vector C^* then this renders the median voter and the politician, in the demand and supply model, impotent. Of course for this relationship to emerge in practice requires a relaxation of the constraints facing politicians so that they will be re-elected on the basis of the choice of C^* made by the bureaucrats.

On what basis will bureaucrats choose the elements of C^* ? A number of theories exist which attempt to answer this question. The best articulated theory is that provided by Niskanen (1971). In his theory Niskanen assumes that the bureaucrat seeks to maximise his personal utility function for which one of the arguments is the size of the budget the bureaucrat administers. The larger is the budget which the bureaucrat administers the greater will be his utility since it is assumed he derives satisfaction from the size of the staff he commands and that personal status within the organisation is a function of budget size. A theory like Niskanen's clearly requires careful empirical testing, however, it does call into question the reality of the assumption of a neutral bureaucracy and provides a further plausible explanation of why public expenditures will grow.

Niskanen's thesis also questions the assumption that there is no X-inefficiency in the production of public sector goods. The public sector like most sections of the economy offers scope for reducing inefficiency and hence public sector costs.

Finally, one other source of expenditure growth arises from changes in the scope of the activities provided. A change in scope can be thought of as an addition to the set of goods which the local government currently provides. A local government is analogous to a multi-product firm. Labels such as education expenditure do not suggest that these are the expenditures arising from a single output called education. Within the education budget many goods are produced. A change in scope, therefore, in the case of education would be equivalent to offering nursery education to a section of the

population which has not up until then been served. Successive legislation produced by central government has expanded the scope of the services which local governments can legally provide. This in turn has led to an increase in local public expenditures. In practice it becomes difficult in a number of cases to distinguish between changes in scope and changes in existing products, the latter was discussed in section 3.8 above.

Conclusion

Whilst these embellishments to the model add more realism, none of them reduces the explanatory power of the demand and supply model which was outlined above. Like most models in economics it is an "as if" formulation of the problem, and it is, furthermore, the qualitative predictions of the model rather than the realism of its behavioural processes which are of interest. The price of simplicity must always be loss of detail.

The model outlined above is a first attempt at modelling the micro-economics of the public expenditure process. Its approach is novel in so far as it brings together within the economist's traditional framework a diversity of approaches to the problem; from economics, political science, public administration, and organisation theory. It, moreover, provides the a priori theoretical basis to the empirical studies of public expenditure which were reviewed in chapter 2. The approaches which were discussed in chapter 2 can now, with ease, be discussed within a simple model.

It is now time to make the model work. Chapter 4, which now follows, describes the socio-economic environment of the City of Glasgow, which forms the case study of this thesis. Chapter 5 proceeds to determine the movement of input prices. That is it examines closely movements in the Ow line of quadrant III of figure 6 above. Chapter 6 sets out the locus of expenditures for quadrant IV of figure 6 for Glasgow's local public expenditures whilst chapter 7 makes a first attempt to estimate the relative price effect. Chapter 8 outlines the budgetary decision rules which Glasgow uses and

chapter 9 provides three case studies of expenditure growth for Glasgow's Police, Fire and Education departments.

APPENDIX 3.A SINGLE PEAKEDNESS AND THE MEDIAN VOTERS' PREFERENCES¹

The analysis of demand presented in section of Chapter 3 used the assumption that the median voter's preferences were single peaked. This appendix examines the severity of the restrictiveness of this assumption. In section the variables which are used in this appendix were defined.

It will be recalled that the median voter maximized his direct utility function $U(.)$ subject to his budget constraint whilst taking the vector of public sector outputs C^*_i and the local tax rate t as parametric. The public sector seeking to satisfy its own objective of maximizing the probability of its election sought to maximize the median voter's indirect utility function $V_i(.)$ subject to the public sector's budget constraint.

This process resulted in values for C^*_i and t . The values of C^*_i and t were chosen from a set of feasible alternatives (F) defined as:-

$$F = \{(t, C^*_i) \geq 0 \mid e(C^*_i) \leq t \sum A_i, t \leq \min_i M_i/A_i\}$$

It is now shown that if F is convex and compact then every voter has single peaked preferences over F.

The first stage in the proof is to show that $V(.)$ is strictly quasi-concave in (t, C^*) for $C^* \geq 0, 0 \leq t \leq M/A$.

Take any such $(t_1, C^*_1) \neq (t_2, C^*_2)$ with

$$V(t_1, C^*_1, p, A, M) \geq V(t_2, C^*_2, p, A, M)$$

Let $X_1 = f(t_1, C^*_1, p, A, M)$

and $X_2 = f(t_2, C^*_2, p, A, M)$

Then $V(t_i, C^*_i, p, A, M) = U(X_i, C^*_i) \quad i = 1, 2$

This gives $p(\lambda X_1 + (1-\lambda)X_2) \leq M - (\lambda t_1 + (1-\lambda)t_2)A \quad 0 < \lambda < 1$.

From the strict quasi concavity of $U(.)$ then:-

1. I am grateful to D.T. Ulph's assistance in this Appendix.

$$U(\lambda X_1 + (1-\lambda)X_2, \lambda C^*_1 + (1-\lambda)C^*_2) > U(X_2, C^*_2) = V(t_2, C^*_2, p, A, M)$$

But $V(\lambda t_1 + (1-\lambda)t_2, \lambda C^*_1 + (1-\lambda)C^*_2, p, A, M)$

$$= \text{Max } U(X_1, \lambda C^*_1, + (1-\lambda)C^*_2) \text{ s.t. } pX \leq M - (\lambda t_1 + (1-\lambda)t_2)A$$

Hence $V(\lambda t_1 + (1-\lambda)t_2, \lambda C^*_1 + (1-\lambda)C^*_2, p, A, M) \geq U(\lambda X_1 + (1-\lambda)X_2, \lambda C^*_1 + (1-\lambda)C^*_2) > V(t_2, C^*_2, p, A, M)$

And so $V(\cdot)$ is strictly quasi-concave.

A peak of $V(\cdot)$ in F is defined as a point (\bar{t}, \bar{C}^*) in F , such that, for some neighbourhood $N'(\bar{t}, \bar{C}^*, \epsilon) \cap F$.¹

$$V(t', C^*, p, A, M) < V(\bar{t}, \bar{C}^*, p, A, M) \quad \forall t', C^*, \epsilon \in N(\bar{t}, \bar{C}^*, \epsilon)$$

Theorem If F is convex and compact $V(\cdot)$ is single peaked on F .

Proof Since F is convex and compact, $V(\cdot)$ attains a unique maximum on F . Hence there is at least one peak. Suppose there were two, and furthermore suppose they are, (t_1, C^*_1) and (t_2, C^*_2) with $(t_1, C^*_1) \neq (t_2, C^*_2)$ and $V(t_1, C^*_1) \geq V(t_2, C^*_2)$.

But then $\forall \lambda, 0 < \lambda < 1$

$$V(\lambda t_1 + (1-\lambda)t_2, \lambda C^*_1 + (1-\lambda)C^*_2) > V(t_2, C^*_2)$$

But as $\lambda \rightarrow 0$, $\lambda t_1 + (1-\lambda)t_2, \lambda C^*_1 + (1-\lambda)C^*_2 \in N(t_2, C^*_2, \epsilon) \cap F$ and so (t_2, C^*_2) is not a peak.

1. A neighbourhood $N(X, \epsilon)$ of a point X in A is the set $N(X, \epsilon) = \{y \in A \mid y \neq X \text{ and } \|y - x\| \leq \epsilon\}$.

APPENDIX 3.B KEY TO THE VARIABLES USED IN CHAPTER 3

- i represents the median voter; $i \in N$ where N is the set of all voters
- X the vector of private sector goods; $X = \{X_1 \dots X_n\}$
- C^* the vector of publicly supplied goods; $C^* = \{C^*_1 \dots C^*_m\}$
- X_{ih} the h 'th private good consumed by the median voter i
- C^*_{ik} the k 'th public good consumed by the median voter i
- M_i the disposable income of the median voter i.e. net of central government taxes and subsidies
- p the vector of consumer prices for private sector goods;
 $p = \{p_1 \dots p_n\}$
- t the local property tax rate
- A_i the assessed rental value of the property of the median voter
- ΣA_i the total rateable value of the local government
- e_k the unit cost of producing the k 'th publicly supplied good
- e the vector of unit costs; $e = \{e_1 \dots e_m\}$
- T_i the total tax bill paid by i ; defined as $T_i = tA_i$
- n the population size
- C the vector of total outputs produced by the public sector;
 $C = \{C_1 \dots C_m\}$. This differs from C^* which is the level of the public output ultimately consumed by the individual: therefore,
 $C^*_{ik} = n^{-\gamma} C_k$
- B_k the vector of activities which the public sector provides in the production of C^*_k : $B_k = (B_{1k} \dots B_{rk})$
- I_k the vector of inputs used in B_k
- G lump sum central government grant to the local government
- E total public expenditure; $E = \sum_{k=1}^m E_k$ where, $E_k =$ total public expenditure on the k 'th good
- H_k the environment surrounding the k 'th public sector good
- Q_k the quality of the k 'th publicly supplied good
- w_k the vector of input prices used in the production of good k
- Δ_k the state of technology used in the production of k

When t is used as a subscript it refers to time.

CHAPTER FOUR

THE STUDY AREA

Introduction

4.1. The Problems of the Past (1800-1959)

4.2. The Record of the 1960s

4.3. Social Indicators

4.3.(a) Population and Population Change

4.3.(b) Socio-Economic Factors

Conclusion

Appendix 4A Population Change and Structure

Appendix 4B Number of Pupils Attending School Glasgow 1950/70

CHAPTER FOUR

THE STUDY AREAIntroduction

Many people are born and subsequently socialized in the womb of a city; they work, shop and are entertained in social organisations located within the city. People eventually die in city residences or in city hospitals are are buried in city cemeteries. The city, therefore, is a dominant social institution¹ especially for those who live in the developed world. It follows that the environment of the city will be an important argument in the utility functions of city dwellers.

It is the environment of the City of Glasgow which is of particular interest in this chapter. Indicators and summary statistics will be presented, which will give general information about the nature of the environmental problems, which confront Glasgow's citizens and its local politicians.

It will be recalled from Chapter 3 above that public expenditures are generated as a reaction to solve the problems supplied by the physical and social environments. This view is a restatement of the findings of the earlier cross-section determinant studies, which found that certain socio-economic variables were significant in explaining variations in public expenditures between local governments. In that same chapter environmental variables played the role of determining the supply of problems. Thus socio-economic variables enter as explanatory variables in a supply of crimes function; housing densities and the condition of the housing stock together determine the magnitude of the housing problem

1. Urban economists have long recognised that population agglomerations or cities exist to reap technological economies of scale in production and consumption.

to be solved; the size and age structure of the school population determine the problems tackled by the education, child care, and health and welfare services. These examples give a strong indication of the importance of environmental variables and the need to present indices which will serve to capture their relative magnitudes.

A city is like an organism.¹ It is made up of a number of interacting parts. Whilst the whole organism shares the same environment there are parts of the common environment which will be of more significance to the functioning of one part of the organism than to another part. Each part of the organism, can produce externalities, which will affect the functioning of other parts. Thus, for example, a decline in the economic life of the city, a failure to attract growing industries to replace existing declining ones, will lead to unemployment, and an out migration of the working population, setting in motion the process of central city decay. Inhabitants within a city and residents outside the city, who use the city for work, shopping and entertainment, are likely to place external costs upon one another.² Many public services are intended to offset the externalities that are due to crowded living patterns in urban areas.³ The city environment therefore contains the genesis of many social problems.

To talk about the environment of a city can be misleading. What for example are the boundaries of such an environment and what elements will be included in its description? There is no simple answer to this question. Different groups of urban analysts concentrate upon different features. The

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1. This analogy should not be taken too far. For example it is tricky to argue for a homeostatic adaptive mechanism.
 2. See Baumol (1974) for a description of these externalities. It should also be recognised that external costs from agglomeration should be balanced against external benefits.
 3. For example municipal water supply, sewage disposal and refuse collection. Police services apart from crime detection are also concerned with the control of traffic and crowds. The probability of fire spreading in densely populated urban areas is great hence fire prevention activities.

method adopted in this chapter is to present information relating to the size, the density, and the age structure of Glasgow's population.

Data on Glasgow's housing conditions, employment conditions and personal incomes are also presented.

At any single moment in time a city's environment is the cumulative result of past decisions, past processes, and past problems. To understand the environment presented to local government decision makers it is useful to take an historical perspective. Current decision making, especially in an organisation like a local government, is likely to be directed at a stock of unsolved problems; problems which either have not been solved in previous periods or which take such a long period solve that they accumulate. The next section of this chapter looks at the emergence of Glasgow's environmental problems from the 19th century. It is then followed by a closer examination of the social indicators mentioned above.

It will be the intention of this chapter to show that by nearly every social indicator used, e.g. age structure, housing, death rate, or economic criteria, Glasgow shows up worst than almost every other city in the U.K.

4.1. The Problems of the Past (1800-1959)

During the 19th century Glasgow experienced rapid physical and economic growth. In 1801 the census of that year enumerated 100,749 persons living in an area encompassing 1,864 acres. By 1901 the population through boundary changes and immigration as well as natural increase had grown to 761,712 persons, who occupied 12,975 acres (see Figure 1). An expansion in European markets, from 1850 onwards, resulted in the growth of industries, located within Glasgow, such as shipbuilding, and heavy engineering (railway locomotives and rolling stock).¹ The incoming population which satisfied the excess demand in the labour markets were housed in densely packed four storey tenement flats with a large number of families sharing w.c.

1. See R.H. Campbell (60) and S.K. Checkland (63).

CITY OF GLASGOW POPULATION 1801-1971.

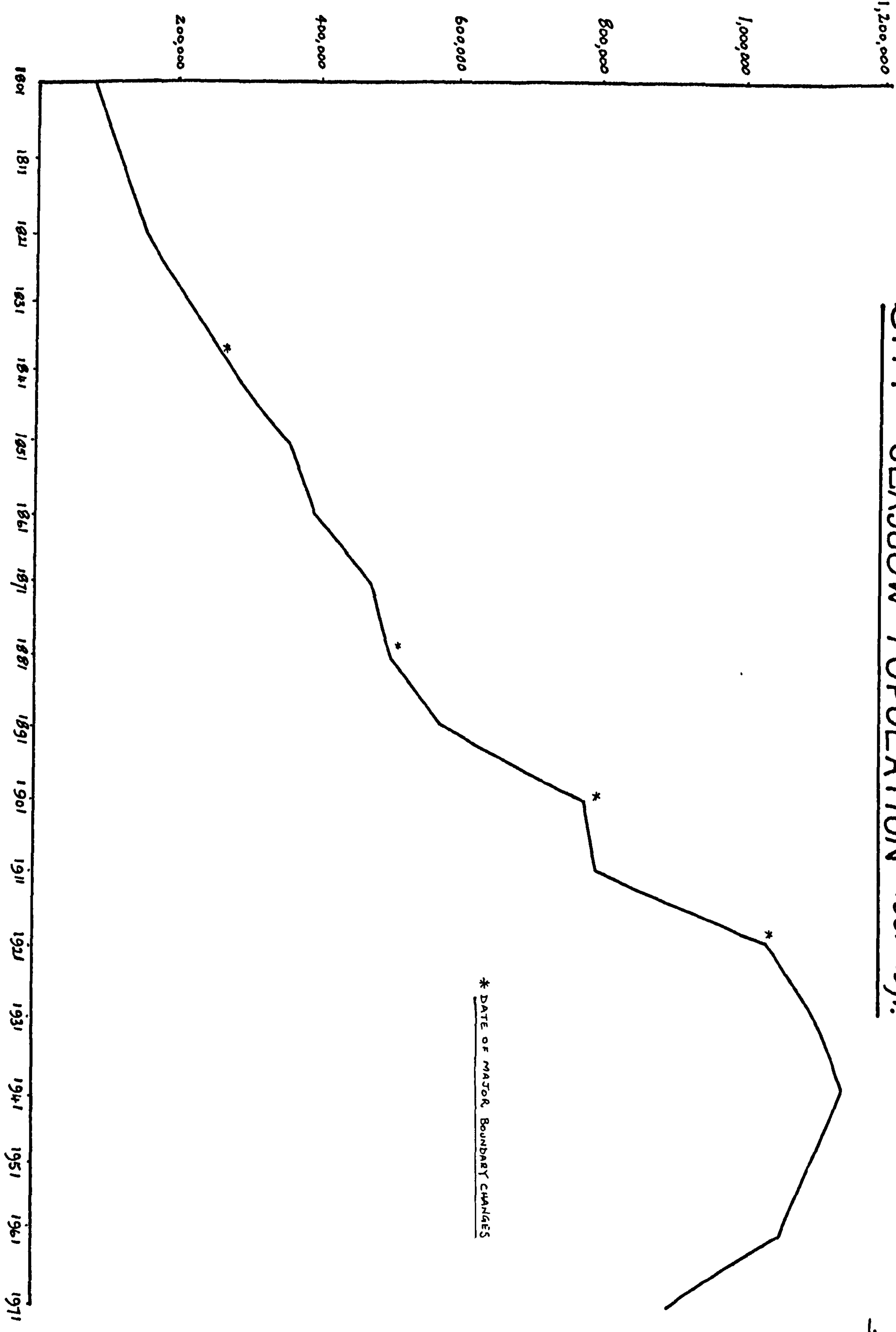


FIGURE I

facilities. The location of the immigrant population was haphazard, resulting in a higglety pigglety spatial distribution of population. These growth patterns, accompanied by a natural segregation of the wealth owning classes, laid the foundations for the future shape of the city. The wealthy industrialists moved to the West and to the periphery of the City, whilst slums grew up in those areas between the factories and the docks.

During the 19th century Glasgow's population had, in one hundred years, grown by 900%. At the turn of the century one Scot in every five was located in the city. The first half of the 20th century witnessed growth also. The city boundaries expanded, finally resting at their present size of 39,725 acres in 1938. The population size reached its peak of just under 1,200,000 in 1941¹ (see Figure 1).

In 1940 reports showed that the state of Glasgow's housing stock was well below standard and that Glasgow had one of the worst infant mortality rates in the U.K.² In 1943 the Clyde Valley Plan was set up by Thomas Johnston, the Secretary of State for Scotland, under the chairmanship of Sir Patrick Abercrombie, who met with representatives from local authorities to evolve a regional plan. Abercrombie's report made recommendations to solve Glasgow's overcrowding and housing problems which required decanting 500,000 people from Glasgow to the surrounding area and new towns, which, it was planned, would be built at East Kilbride, Bishopton, Cumbernauld and Houston.

Abercrombie's proposals were met with fierce opposition from Glasgow City Councillors who had been presented with an alternative plan from Robert

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1. This is the highest estimate but note 1941 was a war year and so population estimation for that year is tricky.
 2. The death rate of infants per 1,000 live births in Glasgow for 1941 was 111 this compares with 63 for the U.K., 60 for England and Wales and 82.7 for Scotland. (Source Annual Abstract of Statistics, 1973 (HMSO), and Facts and Figures for Glasgow). For comparison the 1969 figure for Glasgow is 27.

Bruce, the City Engineer, who proposed to rehouse Glasgow's existing population within the city boundaries. The implications of this were that the City would not lose ratepayers, the City would not have the "green belts" incorporated in Abercrombies' plans, and that housing densities would be greater under the Bruce plans than under Abercrombies'. The Bruce Plan also argued that building new towns would place demands on the building industry's input markets thereby diverting resources from the City's own house building programme.

Conflict between Glasgow City Councillors and Scottish Office representatives was overt for a number of years but conditions changed. It became obvious as time passed that the Bruce plans were not feasible; there simply wasn't enough room to build the desired number of houses at reasonable densities not even if they built the tallest multistorey flats in Europe (which they did).

This rapid historical tour ends at the beginning of the period of this analysis, namely 1950. Glasgow with a severe housing and social environment problem,¹ a problem inherited from the cumulation of previous events, decided to adopt a comprehensive redevelopment plan. It was the pressure of these physical and social problems which was to dominate the thinking of Glasgow City Councillors and Members of Parliament for the next twenty years. Areas were to be pulled down and rebuilt; a massive capital expenditure on new housing was to be incurred. As the population relocated and areas were redeveloped new schools, community centres, fire stations, police stations, roads, streets, and sewage systems also had to be built, adding further to capital expenditure and interest charges on current account.

1. See Abercrombie and Matthew (1) in one area close to the dockland 12,500 people lived in 18 acres. J. Tivy (235)^{reported} 700,000 lived in the centre of the city concentrated in 3 square miles. It is difficult to make comparisons between Glasgow and other cities but see Baker (16), overall densities in Glasgow were similar to those of Liverpool and Manchester and only slightly higher than in Birmingham. But due to the lower proportion of land occupied by housing within Glasgow average gross residential densities were much greater, e.g. in 1944 Glasgow's residential densities were on average 2½ times greater than those in Birmingham.

Overspill Plans

The 1957 Housing and Town Development (Scotland) Act enabled Glasgow to enter into population overspill arrangements with other local authorities. The overspill scheme was designed as one method of providing new housing for those people decanted by Glasgow's redevelopment plans. At the time of Glasgow's first Quinquennial Review (1960) it was envisaged that 16,000 migrants would leave the city each year between 1960 and 1970. Amongst these migrants there was expected to be a constant 10,000 people leaving the city through the overspill scheme. Figure 2 shows that on average the overspill programme never really reached this figure of 10,000 p.a. and figure 3 shows that the expected total net migration figures were very much underestimated.¹

The overspill programme was seen to benefit areas outwith Glasgow. The Toothill Committee Report (250) commented, "If overspill works well it can provide the initial increase of population and diversification of industry in those areas which can turn them into communities with their own power of attracting or generating further development". In other words the Toothill Committee saw the overspill programme contributing to the success of their proposed growth point strategy, assisting in the optimal allocation of labour resources in the economy.

The first Quinquennial Review of the Development Plan (1960) also set out proposals for 29 comprehensive development areas (CDAs). Together the 29 CDAs contained 113,528 houses (i.e about 30% of the city's total housing stock). Of these 52,000 were of immediate need for demolition and 33,000 did not have long to go. It was planned to demolish 5,000 p.a.

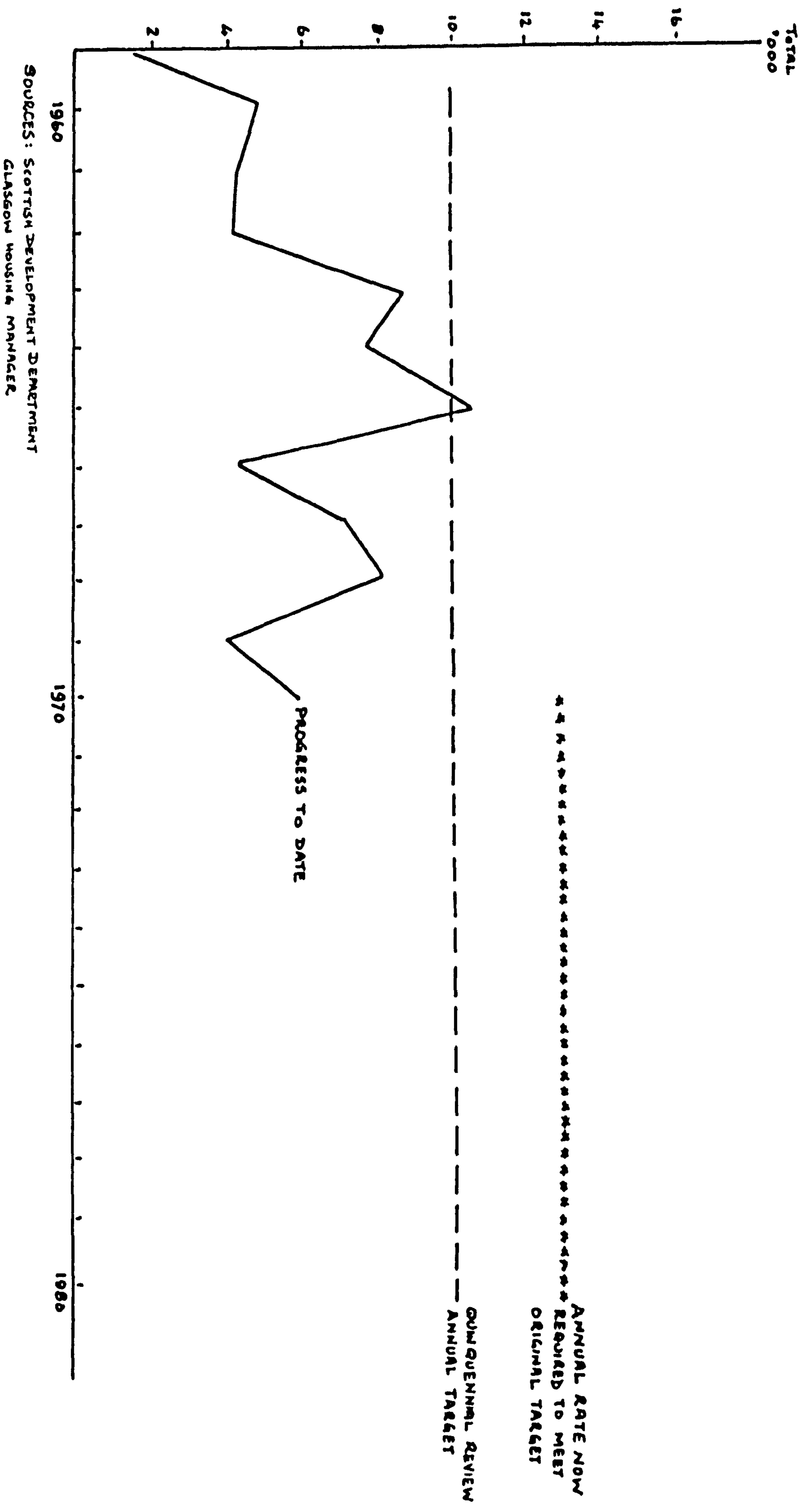
4.2. The Record of the 1960s

The number of dwellings with less than 500 square feet of floor space had

1. Compare the data in figure 3 with the expected emigration of 16,000 p.a. envisaged by the 1960 Quinquennial Review.

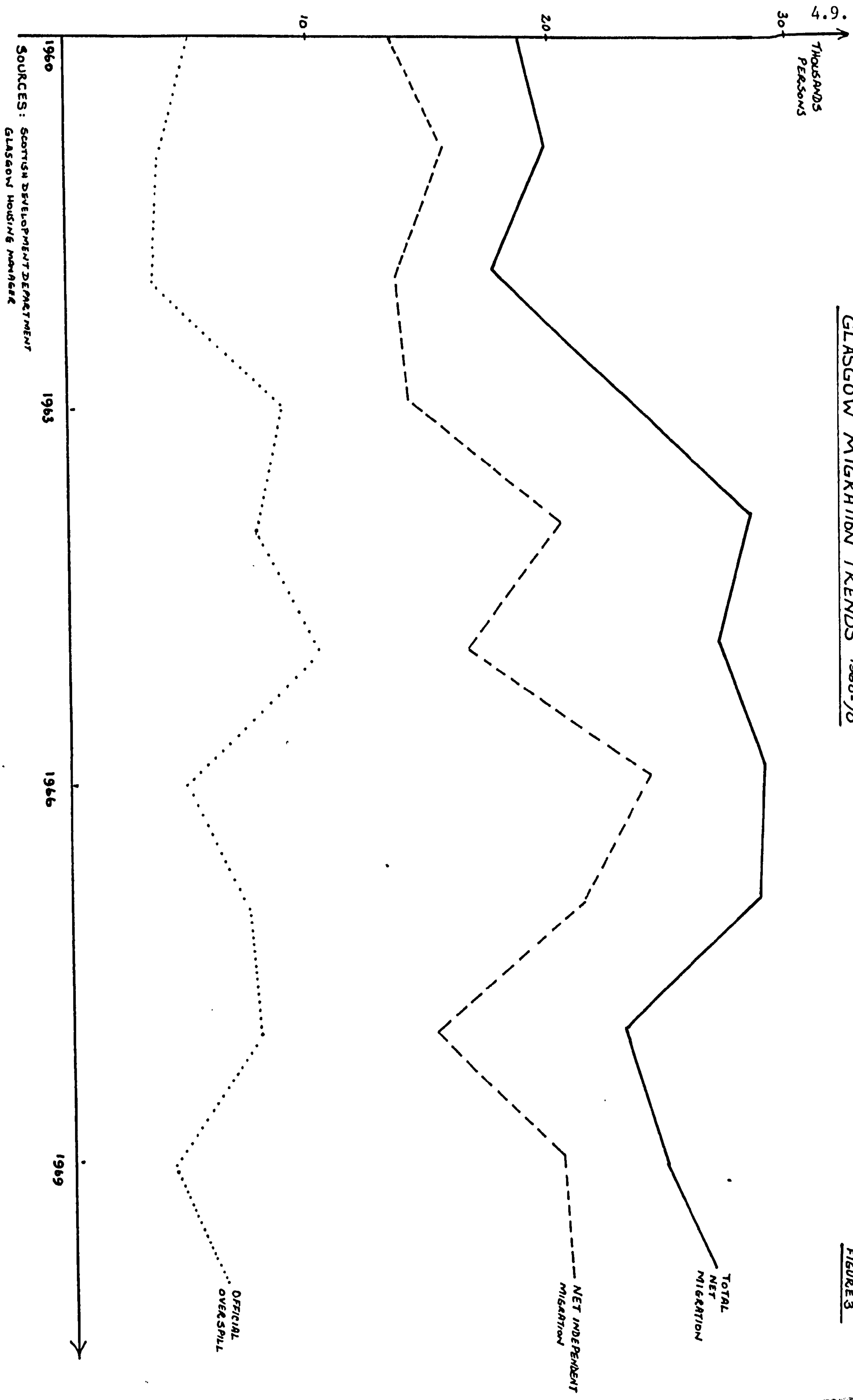
OVERSPILL PROGRESS AND TARGETS

FIGURE 2



GLASGOW MIGRATION TRENDS 1960-70

FIGURE 3



THOUSANDS PERSONS

30

20

10

1960

1963

1966

1969

SOURCES: SCOTTISH DEVELOPMENT DEPARTMENT
GLASGOW HOUSING MANAGER

TOTAL NET MIGRATION

NET INDEPENDENT MIGRATION

OFFICIAL OVERSPILL

fallen from 50% of the city's housing stock in 1960 to 13% in 1970, whilst the proportion of 19th century housing had fallen from 40% to 23% over the same period.¹

Of the 29 original designated CDAs only 8 have received Secretary of State for Scotland approval. Of the remainder 5 have been given detailed plans and await approval.²

Farmer and Smith (83) report that of the 52,000 houses, which the first Quinquennial Report said were in need of immediate demolition, 45,040 had been cleared by 1970. In addition to Glasgow's own housebuilding programme, which is discussed in more detail in Chapter 6 below, by 1971 23,000 houses had been built for Glasgow's population in nominated overspill reception areas. This compares with the forecasted figure of 33,000. One reason for this shortfall is that the poor performance of the Scottish economy has meant that the reception areas did not have the industrial capacity in the form of job vacancies to attract Glasgow's population. Another feature is that only 27% of all overspill families came from unfit or overcrowded houses. Those living in poor housing conditions tend also to be unskilled and so could not find jobs in the reception areas. Table 1 shows that highly skilled workers such as engineers and transport and communications workers were very mobile. The other interesting feature which will be returned to later is that the retired and the unemployed sections of Glasgow's population were immobile. Glasgow therefore retained its "high cost"³ citizens.

4.3. Social Indicators

The above description of Glasgow had demonstrated that it is a city with

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1. See J.B. Cullingworth and C.J. Watson (66).
 2. This shows the close link between Central Government and Local Government decision making.
 3. i.e. those citizens who tend to contribute most to the need for public expenditure.

TABLE 1Composition of Overspill by Occupation

<u>Occupation Classification</u>	<u>Overspill (%)</u>	<u>Glasgow (%)</u>
1. Farmers, foresters, fishers	0.01	0.49
2. Miners, quarrymen	0.19	0.29
3. Gas, coke, chemicals workers	0.77	0.46
4. Glass and ceramics workers	1.77	1.19
5. Furnace and foundry workers	0.57	0.27
6. Electrical and electronics workers	4.91	2.79
7. Engineering, allied trades workers	36.63	17.67
8. Wood workers	3.75	2.98
9. Leather workers	0.51	0.35
10. Textiles workers	1.08	0.40
11. Clothing workers	0.33	0.60
12. Food, drink, tobacco workers	1.69	2.09
13. Paper, printing workers	2.15	1.25
14. Other products	0.77	0.61
15. Construction workers	3.21	3.24
16. Painters, decorators	2.31	1.68
17. Drivers of cranes etc.	0.73	1.86
18. Labourers n.e.c.	1.75	9.91
19. Transport and communication workers	11.09	10.02
20. Warehousemen, packers	2.74	3.76
21. Clerical workers	4.91	5.78
22. Sales workers	6.09	6.35
23. Services, sports etc.	3.53	5.57
24. Administrators, managers	1.24	1.44
25. Professional, technical, artists	3.39	4.54
26. Armed Forces	0.88	0.34
Retired	1.74	6.65
Unemployed (inc. sick)	1.26	7.42
	<hr/> 100.00%	<hr/> 100.00%

Source: Overspill: Housing Manager

Glasgow: 1966 Census

an environment that presents social problems to those who live in it. It is an environment, in the terms of the theoretical model developed in Chapter 3 above, which needs resources to bring it in line with acceptable standards; standards which are demanded by its inhabitants. The employment of these resources show up as expenditures in the local governments' budgets. This section takes the description further. It will be recalled from Chapter 3 above that population is an important variable in the local government's budgetary function. Not only does the absolute size of the population correlate with the magnitude of the problems to be solved, e.g. the absolute number of school children to be educated, but the size of the population also gives insight to the size of the group over which costs are to be shared. The composition of the population of a city is also of significance. Central city decay theories tend to suggest that over time the economically active members of the city population emigrate leaving behind the high cost citizens, those who play the significant role in the supply of problems function, so that not only will local city public expenditure not fall, the costs will be shared over a smaller group and per capita expenditures will rise. The demonstration of rising per capita expenditures is reserved for a later chapter but in the meantime it is instructive to examine the nature of the changes in Glasgow's population both in absolute terms and by composition.

4.3.(a) Population and Population Change

Figure 1 has already shown the rapid expansion in Glasgow's population through immigration, boundary change and natural increases during the 19th and early 20th centuries. The 19th century growth rates of the city could not be expected to continue indefinitely. Over the period of study, 1950/51- 1969/70, however, Glasgow's population has declined.

Table 2 shows the magnitudes of population change for Glasgow and selected other cities. Over the period 1951/71 Glasgow has experienced circa

TABLE 2

Population in Glasgow and Other U.K. Cities 1951-1971

	<u>Period 1</u> <u>1951/61</u>						
		Glasgow	Birmingham	Leeds	Liverpool	Manchester	
1951 population		1,089,767	1,112,685	505,219	788,659	707,082	
1961 population		1,055,017	1,110,683	510,676	745,750	661,791	
Absolute change		-34,750	-2,002	+5,457	-42,909	-41,291	
% change		-3.2	-0.2	+1.1	-5.4	-5.9	
Absolute natural increase		+77,342	+67,295	+21,047	+66,855	+36,079	
% natural increase		+7.1	+6.1	+4.2	+8.5	+5.1	
Absolute Net Migration		-112,092	-69,297	-15,590	-109,764	-77,370	
% net migration		-10.3	-6.3	-3.1	-13.9	-11.0	
	<u>Period 2</u> <u>1961/71</u>						
1961 population		1,055,017	1,110,683	510,676	745,750	661,791	
1971 population		896,958	1,013,366	494,971	606,834	541,468	
Absolute change		-158,059	-97,317	-15,705	-138,916	-120,323	
% change		-15.0	-8.8	-3.1	-18.6	-18.2	
Absolute natural increase		+77,908	+87,746	+27,611	+53,844	+39,192	
% natural increase		+7.4	+7.9	+5.4	+7.2	+5.9	
Absolute net migration		-235,967	-185,063	-43,316	-192,760	-159,515	
% net migration		-22.4	-16.7	-8.5	-25.8	-24.1	

Sources:

- (i) Census of Population for the years 1951, 1961, and 1971
- (ii) Annual Reports of Registrar General for Scotland
- (iii) Statistical Reviews for England and Wales 1951 - 1971 published by Registrar General.

an 18% reduction in its total population. Although in percentage terms Glasgow has not had the largest percentage fall in population compared, for example, to Liverpool and Manchester, it has since 1961 had the largest absolute fall in population. Of the Scottish Cities Glasgow has had both the largest percentage net loss of population as well as the largest absolute loss (see Table 3). Figure 3 shows the migration trend for 1960-1970. Analysis of total population, however, hides major changes in composition.

The three components of population change are births, deaths and migration. Of these, death rates have been the least changeable over time. Minor fluctuations in the death rate for Glasgow and Scotland indicate the absence of any marked trend¹ with the occasional peak being accounted for by events such as influenza epidemics. In 1961 Glasgow's death rate was 12.5 persons per 1,000 population and as Table 3 shows this was 13.3 in 1969. The birth rate, however, is much more subject to fluctuations depending, as it does, on a complex of socio-economic factors. In 1961 the Glasgow live birth rate was 22.0 per 1,000 population and in 1969 the figure was 18.8. The fall in the birth rate could be explained as follows. Firstly there was a general decline in the birth rate for the whole of the U.K. a decline which was not anticipated by the General Registrar's Office. Secondly a decline in the birth rate for Glasgow could be explained by migration patterns especially with the out-migration of the 15-44 year age group of the female population. Taken together the birth rates and death rates give natural rates of population increase for Glasgow of 9.5 persons per 1,000 population in 1961 and 5.5 persons per 1,000 population in 1969. What do these figures indicate? Table 3 shows that Glasgow, despite an emigration of the middle age group of the female population,

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1. See, Glasgow's Planning Policy Report on Population by J.H. Rae, November 1973.
 2. See Appendix 4A to this Chapter for more details of the age distribution of the emigrating population.

TABLE 3

COMPARATIVE STATISTICS OF URBAN CONDITIONS IN GLASGOW AND OTHER SELECTED AREAS

	GLASGOW	ABERDEEN	DUNDEE	EDINBURGH	BIRMINGHAM	LIVERPOOL	MANCHESTER	NEWCASTLE	LEEDS	SCOTLAND	GREAT BRITAIN
POPULATION											
Population 1961 (Thousands)	1055.0	185.4	183.0	468.4	1110.7	745.8	661.8	269.7	510.7	5179.3	51283.9
1971 (Thousands)	896.9	182.0	182.0	453.4	1013.4	606.8	541.5	222.2	494.9	5227.4	53821.4
Net Loss 1961 - 71	- 158.1	- 3.4	- 1.0	- 15.0	- 97.3	- 39.0	- 120.3	- 47.5	- 15.8	+ 48.1	+ 2537.5
% change p.a. 1961 - 71	- 1.5	- 0.2	- 0.1	- 0.3	- 0.91	- 2.04	- 1.99	- 1.92	- 0.31	+ 0.1	+ 0.5
AGE STRUCTURE											
% under 15 (1970)	27.5	23.4	26.6	23.8	23.7	24.4	23.4	N/A	N/A	26.2	24.0
% 15 - 64 (1970)	59.4	63.0	61.0	62.1	64.5	62.7	63.7	N/A	N/A	61.7	63.4
% over 64 (1970)	13.1	13.5	12.5	14.1	11.9	12.9	12.9	N/A	N/A	12.1	12.6
Dependency Ratio (Note 1)	683	586	641	610	552	563	570	N/A	N/A	621	577
HOUSING CONDITIONS (as at 1970)											
% population at over 1 - 5 persons per room	11.8	4.0	5.2	4.9	5.6	5.3	4.5	5.7	2.5	5.4	1.6
% Housing of:-											
1 - 3 persons per room	45.9	36.4	37.6	33.1	12.0	10.6	9.9	15.3	12.5	27.9	11.8
over 7 rooms	1.9	4.9	4.1	6.3	3.5	6.2	4.2	3.2	3.0	3.0	4.8
% households lacking hot water tap	23.8	15.1	22.5	10.5	17.5	20.2	13.0	13.8	7.5	12.4	12.5
% households lacking bath	32.7	31.3	32.4	20.2	18.6	25.6	19.5	17.9	12.0	20.0	15.4
% households lacking exclusive use of W.C.	17.8	30.8	17.9	6.2	11.1	7.7	6.9	5.1	14.7	11.2	8.1
% of multi-dwelling buildings (Note 2)	88.7	59.4	66.9	70.4	11.0	13.8	10.0	39.8	13.2	51.7	14.4
% owner occupied dwellings	20.1	29.4	18.7	47.3	39.9	29.8	34.2	28.7	41.0	28.2	46.7
MORBIDITY ETC.											
Deaths per 1000 population all causes (1969)	13.3	12.5	12.3	12.9	11.6	12.3	12.7	13.2	12.3	12.3	11.9
Tuberculosis (per 1000 population 1969)	0.09	0.02	0.01	0.02	0.03	0.03	0.04	0.02	0.03	0.03	0.04
Bronchitis (per 1000 population 1969)	0.84	0.50	0.55	0.56	0.74	0.69	1.20	0.97	0.82	0.56	0.68
Live Births per 1000 population (1969)	18.8	14.1	16.9	14.8	17.5	16.6	16.8	13.8	16.1	17.4	16.4
Infant mortality per 1000 live births (1969)	27	17	20	22	21	20	29	16.0	21	21	18
ECONOMIC GROUPING											
% males, professional, managers, and employers (1969)	8.7	14.0	11.1	17.3	10.2	9.3	10.7	12.1	13.8	13.2	15.1
% males, intermediate and junior non-manual and semi and unskilled manual workers (1969)	48.0	46.7	46.8	45.0	44.2	52.1	46.7	45.1	41.9	45.7	43.3
% unemployment June 1971	6.5	3.2	6.7	5.6	3.3	5.5	3.1	6.0	3.2	5.6	3.2

- NOTES: (1) Dependency ratio: the number of persons under 15 and those over 64 per 1000 persons aged 15 - 64
- (2) Multi-dwelling buildings: buildings containing more than one house e.g. tenements, multistorey flats, etc..

has still the highest birth rate of all the cities compared. It has also the highest death rate but this is to be expected from the proportion of its population aged 64 and over. For 1969 it had the second highest rate of natural increase in its population with Birmingham at 5.9 per 1,000 population being marginally higher. This means that population pressures to provide school places, childcare and health and welfare services whilst reduced compared to previous periods nevertheless remains as a powerful force.¹ The effect of a fall in the natural rate of increase in the population coupled with an increased annual rate of emigration has resulted in a change in the age structure of Glasgow's population. In 1951 Glasgow had a lower proportion of retired people than Scotland as a whole. By 1971 this situation had been reversed. A reversal has also taken place in the proportion of the 15-44 age group. In 1951, Glasgow had a greater than average proportion of the 15-44 age group in its population. By 1971 this had reduced to a figure below the British national average. The 1970 age distribution for Glasgow is compared to those for other cities in table 3.²

The pressures which Glasgow's population age structure generates for the demand for public services aimed specifically at the young and the old can be summarised by a dependency ratio which is both defined and shown in Table 3. It is seen that for 1970 Glasgow, out of the cities compared, had the highest dependency ratio.

Before leaving the discussion of population indicators attention should be drawn to the growth in the population of the conurbation surrounding Glasgow. Glasgow is part of the Central Clydeside Conurbation and as

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1. Appendix 4B shows changes in the numbers attending schools in Glasgow. Notice also that there could be other reasons than simply population size placing pressures on increased expenditure for these services.
 2. More comparative information is given in Appendix 4A to this chapter along with data on the changing composition of Glasgow's population.

Table 4 shows the population of the Central Clydeside Conurbation, excluding Glasgow, had been growing. This, of course, is partly due to the fact that an extremely large percentage of Glasgow's emigrants settle within 25 miles of the city. But that is insufficient to explain all of the growth in the Conurbation's population.

Table 4 The Central Clydeside Conurbation's Population

Region	1951	1961	1966	1971
Central Clydeside Conurbation	1,751,422	1,794,536	1,765,630	1,731,048
Glasgow	1,089,767	1,055,017	976,540	897,848
Central Clydeside Conurbation excluding Glasgow	661,655	739,519	789,090	833,200

Sources: Censi, 1951, 1961, 1966, 1971.

The population of the surrounding conurbation uses the city for work, shopping and recreation.¹ For example the 1964 travel to work study² for Glasgow showed that 133,550 people from the conurbation travelled into Glasgow to work whilst 83,074 people travelled out of Glasgow to work in surrounding areas.

The imigrant population in many respects, according to the central city exploitation theory (viz.), will contribute to the costs of public budgets. The day time population is served by the city's police, fire, cleansing, sewage, street, and road systems. Whether or not the conurbation population provides benefits to outweigh or equal these costs is another

1. For details of these patterns see Glasgow's Planning Policy Reports on Employment (1973) and Shopping (1974).

2. op. cit. footnote 1.

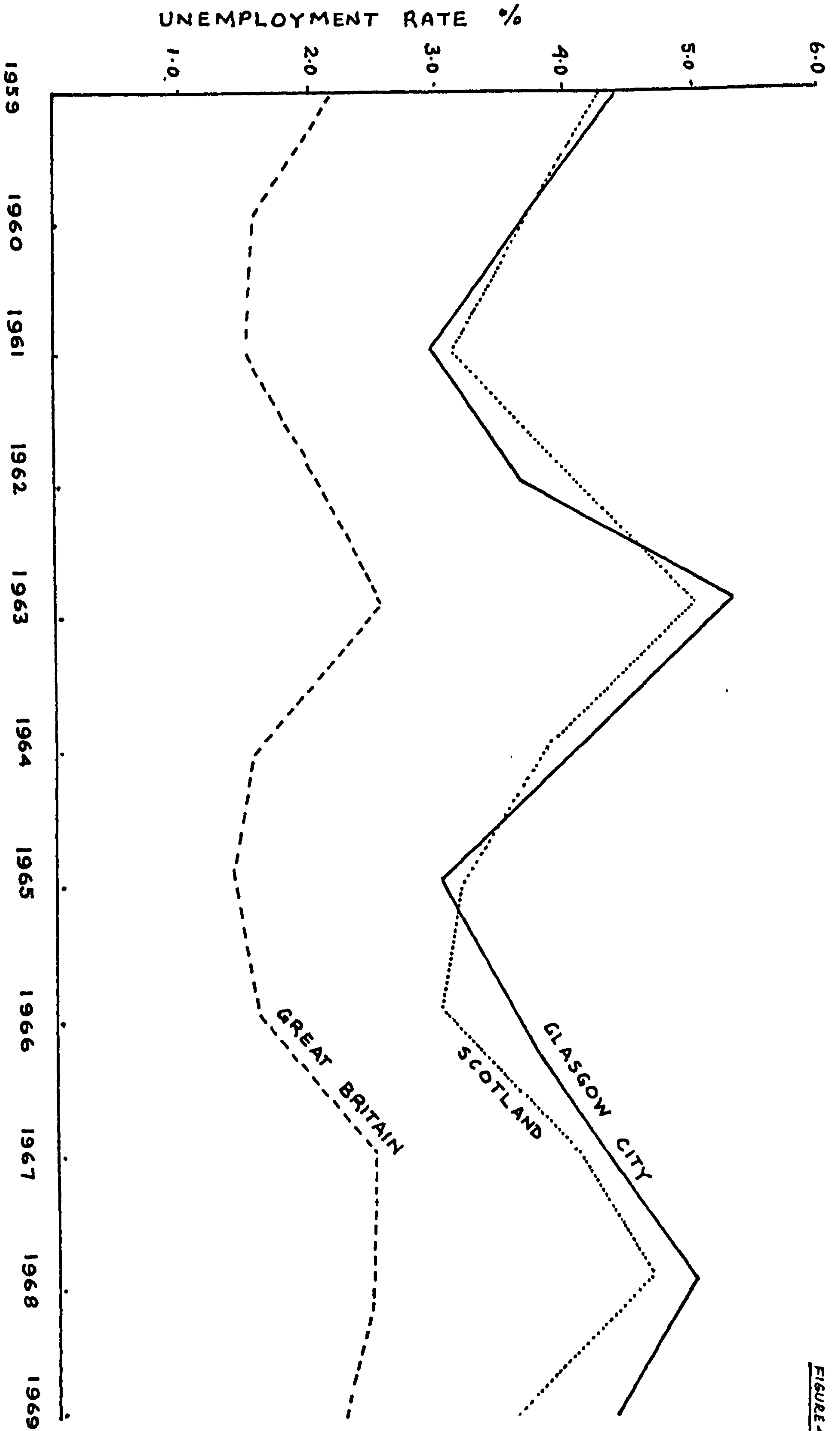
question but it is the cost side which is of interest here.

4.3.(b) Socio-Economic Factors

It has already been mentioned that skilled and professional workers have tended to be those who have emigrated from Glasgow over the past 20 years. Table 3 gives a summary of the proportions of broad socio-economic groupings for each city as at 1970. It is seen that Glasgow has one of the highest proportions of low skilled workers in its population and the lowest proportion of professionals and managers.¹ This data is only suggestive. It suggests that the higher the proportion of lower socio-economic groups within a population the higher might be the need for certain services, e.g. health and welfare services. But it is not a hypothesis which is tested in this thesis nor is it one which plays a dominant role in the present analysis. It is just another set of data which could be important in explaining the need for resources to be channelled through public budgets. If the distribution of incomes is skewed towards lower economic groups then it could be argued that there will be a lower propensity for households to complement public expenditures with own expenditures to reduce social problems.

The rate of unemployment in Glasgow serves as another datum. Table 3 shows that as at June 1971 Glasgow, at 6.5%, had one of the higher rates of unemployment. Figure 4 shows that whilst the pattern of Glasgow's unemployment rates have not been dissimilar to those for Scotland or Great Britain nevertheless the absolute value of Glasgow's unemployment rates have been persistently higher.

1. For a more detailed breakdown of Glasgow's socio-economic groups see Glasgow's Planning Policy Report on "Employment" December 1973.



COMPARATIVE RATES OF PERCENTAGE UNEMPLOYMENT 1959-1969.

Cities with low incomes and high unemployment rates are areas of social deprivation and high need. It has been suggested above that those needs can be reflected in public expenditures. Another area of public expenditure which is likely to reflect those conditions is the Housing Revenue Account,¹ which is likely to record a large volume of rent rebates, low rents, and large net housing expenditures financed from the local rate and Central Government Grants-in-Aid. For the year 1968/69 rent rebates on the Housing Revenue Account amounted to £485,270 which represents 10.7% of the Housing Revenue Account's total gross expenditure (excluding loan charges). Discussion of the financing of Glasgow's housing account is delayed until a later chapter. In the meantime it is sufficient to note that Glasgow runs a large housing revenue account deficit.

Low income families are also eligible to receive rate rebates.² During 1968/69 18,000 ratepayers (5.6% of all domestic ratepayers) received rate rebates; 14,400 out of these 18,000 ratepayers (i.e. 80%) received the maximum benefit.

Income data for a region the size of Glasgow is extremely difficult to obtain. That data which does exist was supplied by the Department of Health and Social Security. Its source is a 0.5% sample of income tax returns for residents of Glasgow. Table 5 summarises the data.

Given the size of the sample any conclusions drawn from the data would require qualification but it can be seen that the rate of change in Glasgow's average (male) gross earnings over the period has been lower than that

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1. The house-building programme shows up both in the capital account and in the revenue account as interest charges.
 2. See Rating Act, 1966. Notice that since ratepayers whose rates are regularly paid in full by Supplementary Benefits from the Department of Health and Social Security are not contained in these figures then in-so-far as this is so the figures underestimate the extent of the problem.

Table 5 Comparisons of Average Gross Earnings (Male) for Glasgow and Scotland

Year	Glasgow (£)	Scotland (£)	Rate of Change Glasgow 1964/65=100	Rate of Change Scotland
1964/65	973	937	100.0	100.0
1965/66	1,061	1,018	109.0	104.6
1966/67	1,112	1,080	114.3	115.3
1967/68	1,189	1,161	122.2	119.3
1968/69	1,289	1,245	132.5	132.9
1969/70	1,386	1,347	142.4	143.8
1970/71	1,577	1,543	162.1	164.7
1971/72	1,732	1,696	178.0	181.0
1972/73	1,955	1,926	200.9	205.5

Source: D.H.S.S.

for Scotland.¹ No reasons for this observation are given here but clearly unemployment and industrial structure will be important variables in explaining the difference. Very little can be concluded about the relative distributions of incomes from a crude comparison of averages. Although the data indicates that, for this sample, Glasgow's average gross (male) earnings are marginally higher than those for Scotland nevertheless to get some idea of comparative social needs a more detailed knowledge of the distribution of personal incomes for all groups is required. Unfortunately this kind of data does not exist.

Conclusion

What kind of picture has been painted of Glasgow's socio-economic environment?² It is a city with a declining population, accompanied by a rising dependency ratio; a city with a high rate of unemployment and a

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1. Cameron (57) also demonstrates that the growth in personal incomes for Central Clydeside over the period 1964/65 to 1968/69 has lagged behind that for Scotland.
 2. For other interpretations (but which reach the same conclusions) see John Gretton, "Glasgow; a city in collapse", New Society 19/10/72, or, Andrews Hargrave, "Glasgow: rescue plan for a city", Financial Times, 15/7/72.

lagging income growth; a city with a housing problem inherited from the industrial boom years of the past; a city which comes out looking worst on almost any social indicator chosen. But it is a city which is in the process of redevelopment and rebuilding. In its attempts to alleviate short-run poverty problems presented by the current environment Glasgow has over the past twenty years generated much public expenditures. Public expenditures are a reflection of a reaction to the extent of that environment's advertisty.

The picture is, finally, brought right up to date in a report prepared by Glasgow's Planning Department.¹ This document sets out the areas and degrees of deprivation in the city. It points out that in its attempts to solve the housing problem Glasgow has neglected to provide essential amenities such as open spaces, car parking facilities, schools, and community centres. Past "building on the cheap" means that many corporation houses² are now below average size and quality and are approaching slum conditions. The report concludes that almost one third of the city's total area is suffering from "serious multiple deprivation" in social and environmental terms.³

The future for Glasgow then gives all the indications of anticipated expenditure growth but on a declining population. Migration which is currently running at 25,000 p.a. from the city is expected to reduce

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1. R.D. Mansely, "Areas of Need in Glasgow", published by Glasgow Corporation Planning Department, 1972.
 2. Note these are post 1945 houses! Recent expedient solutions to the problem are coming up again as problems for the immediate future. As expectations change about the standard and quality of the social capital stock and public services then more resources have to be allocated to upgrading. Also just like industrial capacity the older becomes the capital stock then the more there has to be spent on maintainance. In many respects the problems facing urban planners is that of drawing up plans for an optimal capacity (i.e. social capital stock) to discover that over the long gestation period that the demand has changed leaving the plans non-optimal. The solutions to today's problems generate tomorrow's problems!
 3. Glasgow's own report has been recently endorsed by an independent enquiry carried out for the Department of The Environment. For details of this see "The Scotsman" 15.4.75.

the city's population by a further 150,000 over the next decade. Again it is the economically fit and active which are expected to move, leaving the city with an even higher dependency ratio.

APPENDIX 4A

table (a) Age Distribution Glasgow's Population (thousands)

table (b) Age Distribution Glasgow's Population (percentage)

table (c) Comparisons of Age Structures - Glasgow and Overspill 1966

1951

1961

1966

1971

65+
60-64
45-59
30-44
25-29
20-24
15-19
5-14
0-4

65+
60-64
45-59
30-44
25-29
20-24
15-19
5-14
0-4

65+
60-64
45-59
30-44
25-29
20-24
15-19
5-14
0-4

65+
60-64
45-59
30-44
25-29
20-24
15-19
5-14
0-4

120 100 80 60 40 20 20 40 60 80 100 120

120 100 80 60 40 20 20 40 60 80 100 120

120 100 80 60 40 20 20 40 60 80 100 120

120 100 80 60 40 20 0 20 40 60 80 100 120

AGE GROUP

AGE GROUP

AGE GROUP

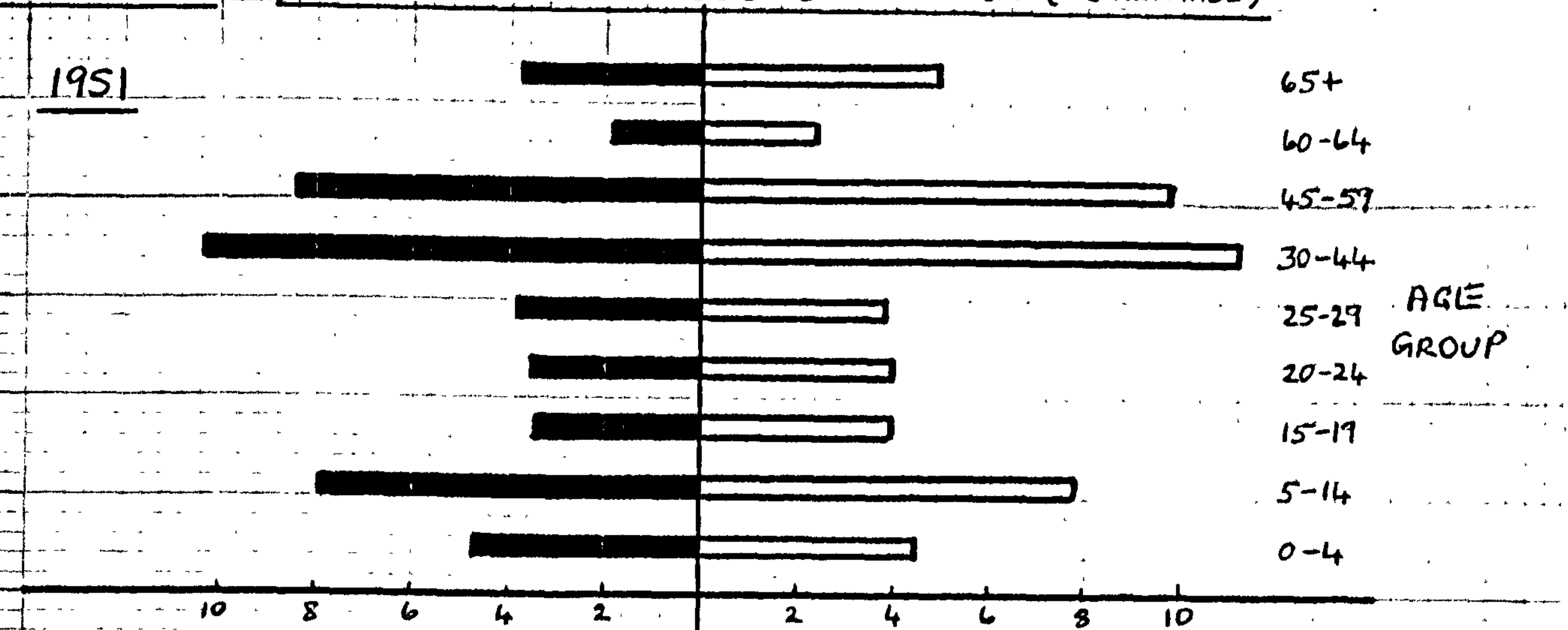
AGE GROUP

POPULATION OF GLASGOW (THOUSANDS)

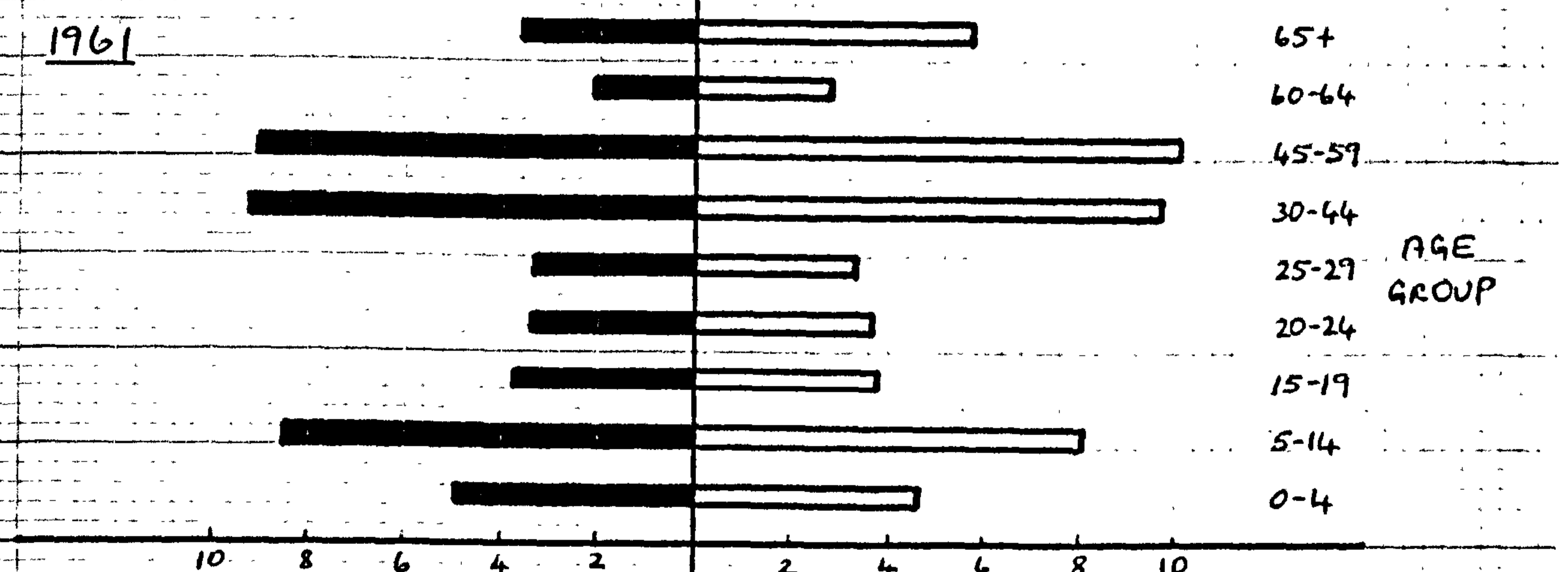
MALES

FEMALES

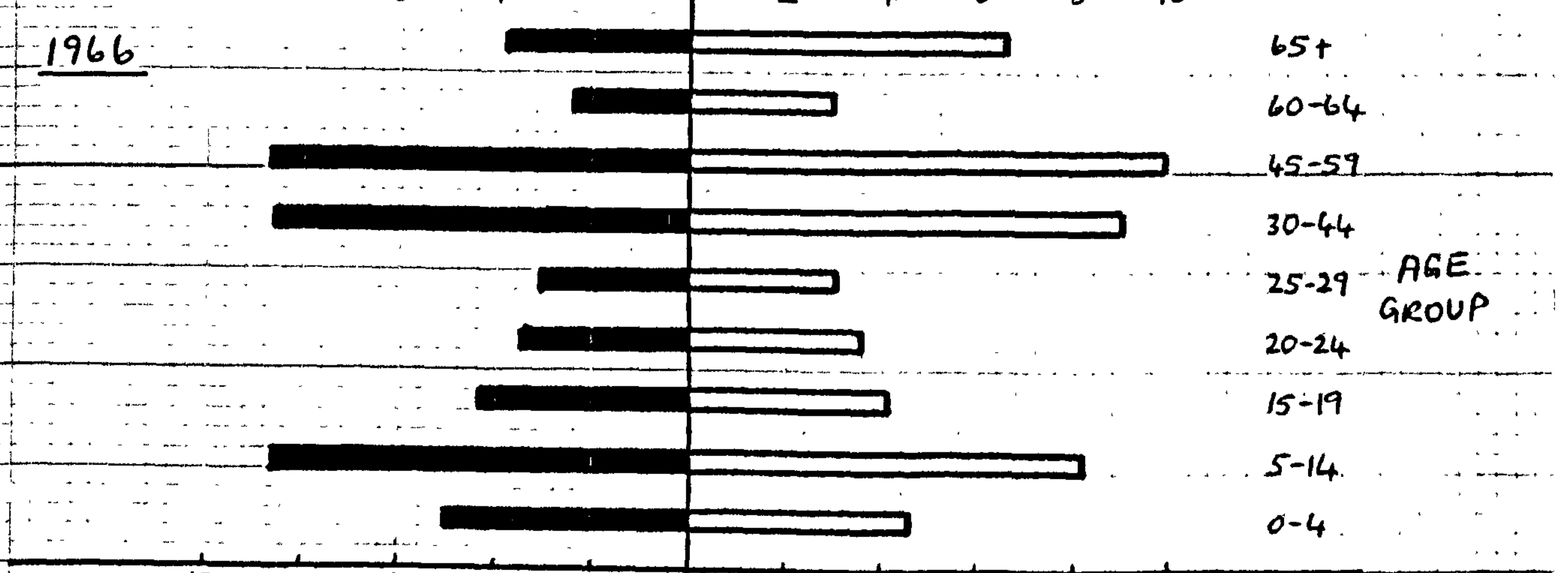
1951



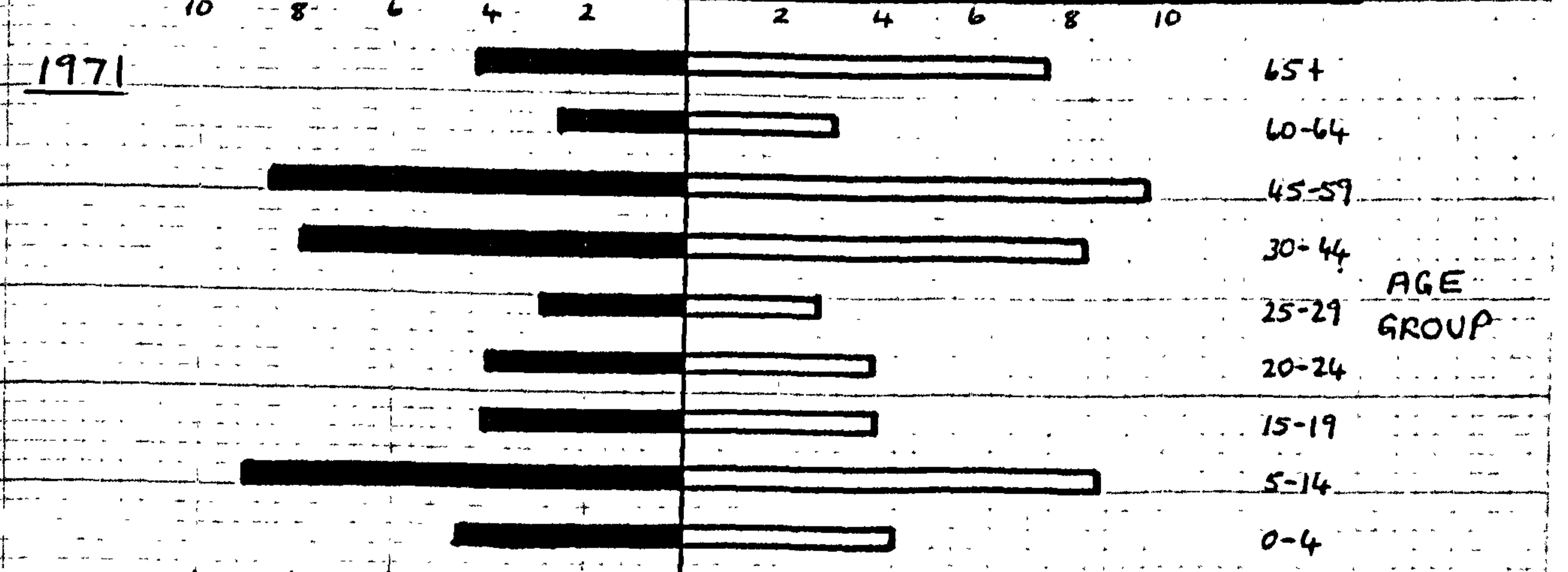
1961



1966



1971



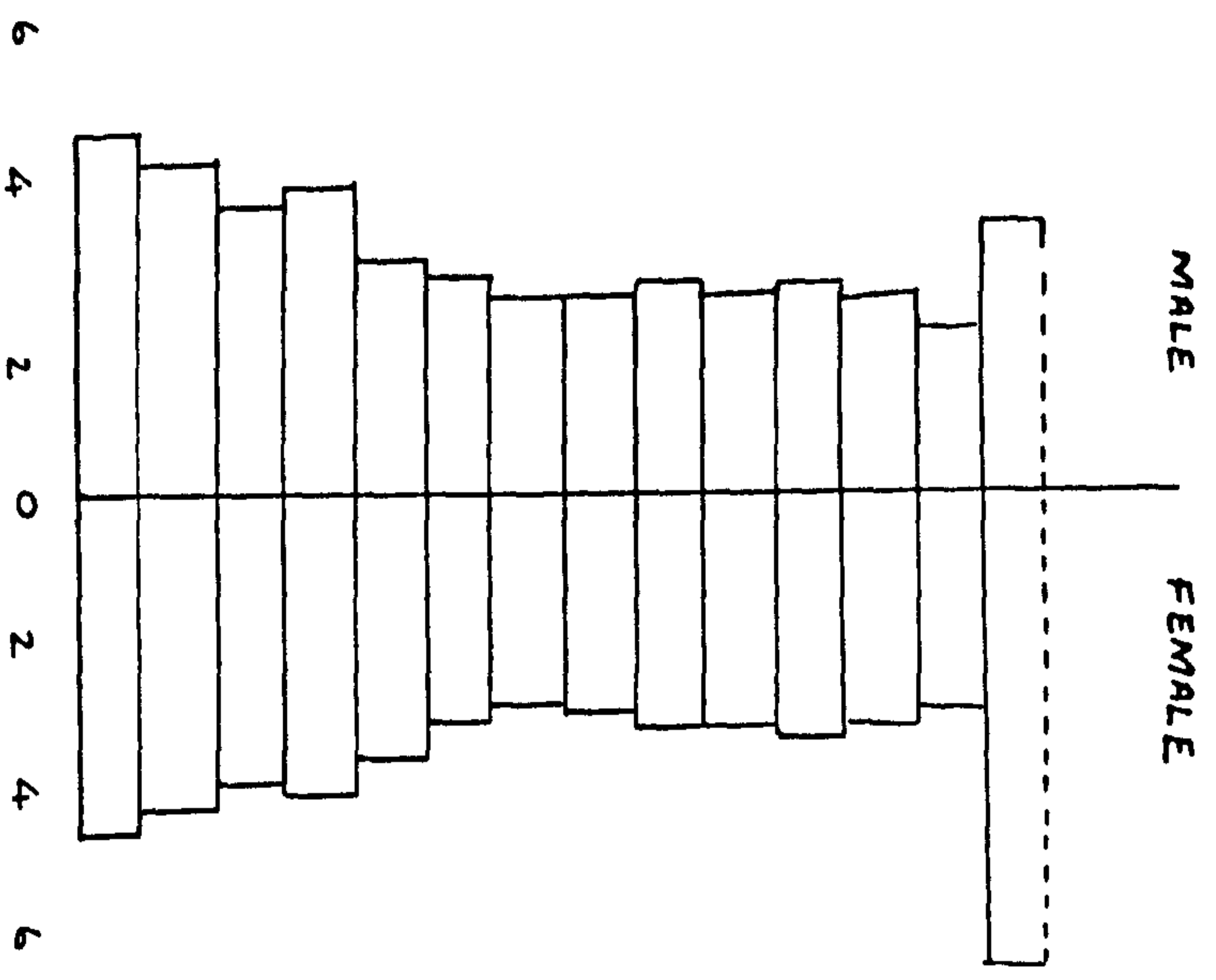
PERCENTAGE OF POPULATION OF GLASGOW

MALES

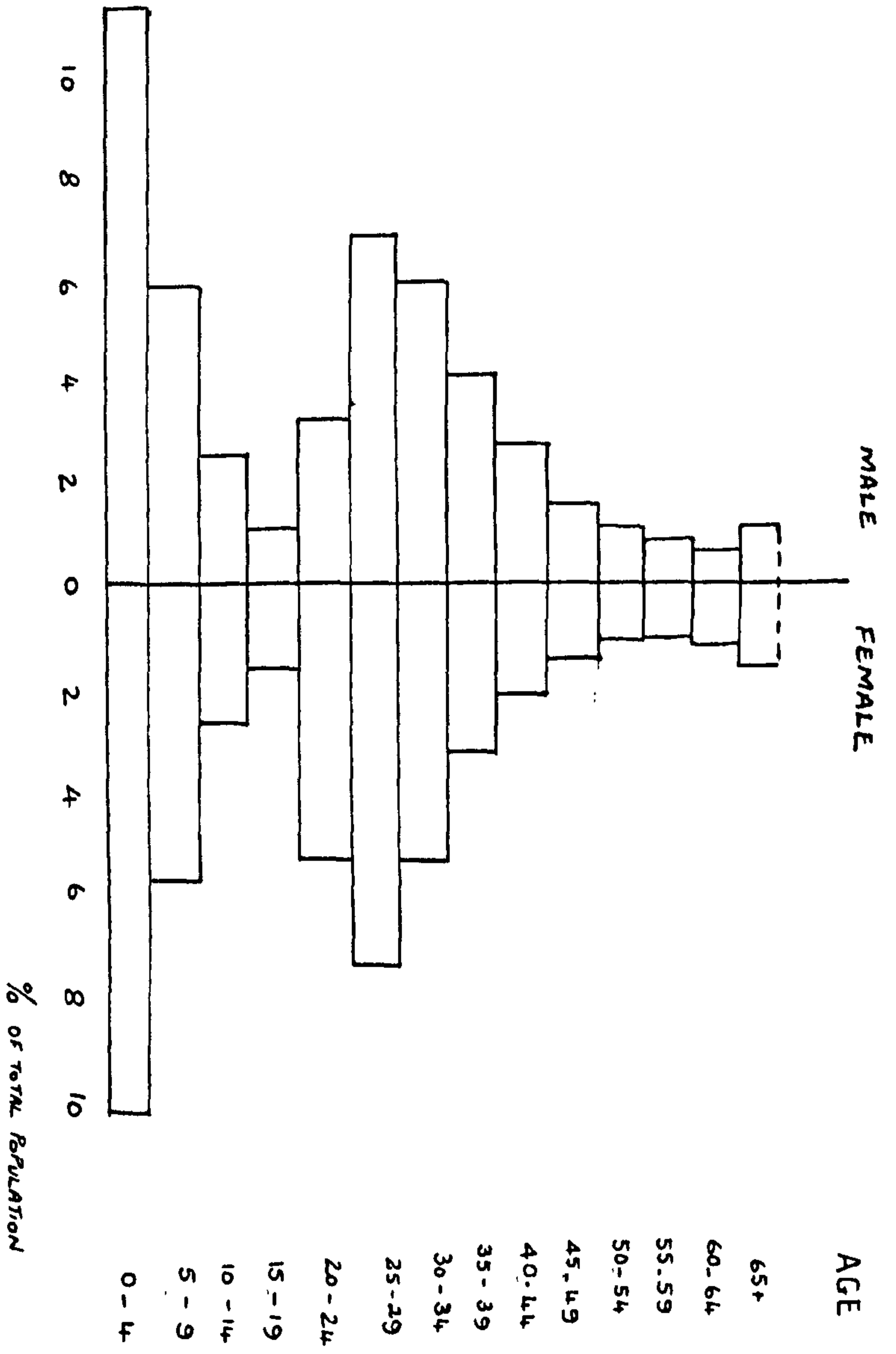
FEMALES

COMPARISON OF AGE STRUCTURES - GLASGOW AND OVERSPILL 1966

GLASGOW



OVERSPILL



SOURCES : CENSUS 1966
HOUSING MANAGER

% OF TOTAL POPULATION

AGE

A P P E N D I X 4 BNumber of Pupils Attending School in Glasgow 1950/70

Year	Number
1950/51	173.2
1951/52	174.5
1952/53	178.1
1953/54	172.6
1954/55	177.7
1955/56	177.5
1956/57	179.0
1957/58	178.9
1958/59	179.1
1959/60	179.6
1960/61	178.6
1961/62	179.0
1962/63	177.7
1963/64	176.9
1964/65	175.3
1965/66	174.1
1966/67	173.5
1967/68	174.4
1968/69	174.1
1969/70	174.4

Source: Glasgow Education Department.

CHAPTER FIVE

THE EFFECTS OF INFLATION UPON LOCAL GOVERNMENT EXPENDITURE

Introduction

- 5.1. Calculation of Input Price Indices
- 5.2. Comparison of Glasgow's Input Price Indices with Other Published Indices
- 5.3. Changes in Public Employees Relative and Real Wages and Salaries
- 5.4. General and Concluding Remarks.

Appendix 5A Commodity Classification used to Construct Education Expenditure Index

Appendix 5B Price Indices

Appendix 5C Wages and Salaries Index

Appendix 5D C.S.O.'s Methodology

Appendix 5E The Rating Account Input Price Index

Appendix 5F Real and Relative Pay Indices

CHAPTER FIVE

THE EFFECTS OF INFLATION UPON LOCAL GOVERNMENT EXPENDITUREIntroduction

How much of the increase in local authority expenditure is due to inflation¹ and how much is due to improvements in the services provided? Any question like this can only be answered if adequate price indices are available. It is the purpose of this chapter to explain how a set of input price indices were calculated for a selection of local public services provided by the City of Glasgow.

In recent years there has been some discussion of the effects of inflation upon the budgets of local governments.² This discussion, however, has been primarily speculative since it has been conducted without the aid of price indices specific to local government services.

The calculation of a set of input price indices for local government services represents a major step forward in national income accounting in the U.K.³ In a recent statement made by Fitzpatrick (273) the C.S.O.'s position on local government input price indices was made clear. The C.S.O. does not have access to the necessary data for the construction of such indices. This data is held only by local governments and the

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1. i.e. increases due to changes in the absolute level of input prices as opposed to expenditure increases due to increases in the volume of inputs.
 2. See Harper (106) and IMTA (274). It should also be realised that during the current inflation local government accountants, amongst others, are turning attention to inflation accounting. Therefore another use of price indices would be in the forecasting of budgets in money terms.
 3. It should be realised that a few researchers in the U.S.A. have attempted to construct input price indices for local governments, see Walzer (275) Bradford Malt and Oates (37) and Greytack, Gustely and Dinkelmeyer (276).

C.S.O. has, therefore, set up plans to carry out a pilot study of the London Boroughs in order to find out how easy it would be to collect the data for the construction of such indices. The results of this chapter, therefore, contribute to the C.S.O. exercise.

This chapter is divided into the following sections.¹ Section one describes the calculation of the Glasgow input price indices. Section two compares the Glasgow indices with other indices such as the retail price index (RPI). Section three makes some general comments about the indices and looks at the significance of some of the subindices especially the wages and salaries indices. A concluding section discusses some of the uses to which the indices may be put.

5.1. Calculation of Input Price Indices

Any price index attempts to measure the change in prices, of the same good or vector of goods, between two periods of time. For any local government, existing in an economy for which prices are rising, the operating costs of that local government will rise also. That is to say local government money expenditures will rise, in the absence of any change in the quantity and quality of its outputs, because the price of its inputs (furniture, stationery, labour, etc.) are rising.

It will be easier to explain the method of index construction adopted if an example is taken from a particular service. In this case the education service will be chosen.

To calculate an input price index for the education service the first task was to establish the precise nature of the inputs used in the production

1. Many appendices are used for this chapter. Each appendix contains most of the finer points of detail used in the construction of the indices. This information is presented in appendices rather than the main text so that the general argument is not clouded by detail. Furthermore it was felt that the fine detail should be reported to assist future researchers.

of the service. Each input can be thought of as a distinct commodity. The commodity breakdown used for the education price index is outlined in Appendix 5A.¹ For each commodity used in the production of education a price index was calculated. These commodity price indices are referred to throughout as sub-price indices. The overall education service input price index was then calculated as a weighted average of the sub-indices, as follows:

$$I_E = \sum \pi_i L_i \quad (1)$$

where: I_E = the overall education input price index
 L_i = the sub-price index of the i^{th} commodity
 π_i = the i^{th} commodity's weight in final education expenditure

In order to calculate the commodity weights a complete commodity breakdown for each year of the series had to be determined. It was, however, the calculation of the sub-price indices which proved to be the most difficult.

For many commodities official price indices were available. Thus, for example, in the case of expenditure on heating and lighting price indices for heating and lighting used in the retail price index were used as sub-price indices, along with their sources. The commodities, for which published price indices were available, however, covered at most only 25% of total expenditure on each service. The major item of expenditure, for which no price indices were available, was on wages and salaries.²

To overcome this difficulty a set of wage and salary indices were calculated for a number of categories of labour. The Laspeyre form of the price index was used such that;

1. The data for this exercise was collected from the City of Glasgow's Abstract of Accounts (i.e the annual audited accounts).
2. Accounting for between 60%-70% of total expenditures.

$$L = \frac{\sum w_{ti} q_{oi}}{\sum w_{oi} q_{oi}} \quad (2)$$

where: w_{ti} = the average wage or salary of the i^{th} category of labour in year t

q_{oi} = the number employed in the i^{th} category of labour in the base year zero.

Thus to calculate the wages and salaries index for the education service it was necessary to collect the following information; a list of each type or category of labour, the numbers employed in those categories in the base year, and the average wage or salary paid to each category for each year of the series. Appendix 5C gives precise details of the construction of the wage and salary indices.

The construction of the wages and salaries indices was a major task since a statistical series of such complexity runs into severe problems of data availability. Fortunately the data had been retained by the Establishment's Branch of Glasgow Corporation.¹

The wages and salaries indices, thus calculated, are presented below in tables 1 and 2. More will be said about the movements in these indices in section 3 to this chapter. In the meantime it is necessary to make an estimate of the plausibility of the indices. This was done by comparing the Glasgow wage and salary indices with an unpublished set of wages and salaries indices calculated by the C.S.O. The C.S.O. series is presented in table 3. Appendix 5D gives an explanation of the differences in methodology used in the C.S.O. and Glasgow constructions. It is shown that there is an error in the C.S.O. methodology, which causes an upward bias in their estimates. This bias is most pronounced for the police and fire services. However, in the calculation of their other wages and salaries indices the C.S.O. employed a method similar to that used in the Glasgow case. In the case of the teachers' wages and salaries indices

1. Indeed the series could have been taken back to 1850 if so desired.

TABLE 1. Labour Input Price Indices for City of Glasgow Services 1963 = 100

Year	Fire	Police	Teachers ¹	Education Administration	Education Attendance Officers	Education Janitors/Cleaners	Administration Cleansing	Administration Streets/Sewers
1947	39.3	37.5	38.4	71.1	50.3	38.2	46.4	40.9
1948	39.3	37.5	40.9	71.7	49.0	40.4	48.6	49.3
1949	40.5	44.2	40.9	74.2	49.0	41.1	51.1	51.9
1950	49.1	44.8	40.9	76.0	49.0	42.9	53.1	52.3
1951	51.5	52.4	47.6	79.6	53.8	54.1	54.5	58.1
1952	57.7	54.0	47.6	84.9	57.5	49.8	60.3	63.1
1953	60.1	56.2	52.0	73.5	57.5	51.4	63.1	63.3
1954	62.8	59.4	55.6	76.9	62.6	52.7	64.9	65.9
1955	66.6	64.8	56.5	80.6	73.7	58.0	72.3	68.9
1956	71.8	67.2	65.7	76.9	80.4	62.2	78.8	77.5
1957	74.6	68.9	71.3	79.8	81.9	64.8	82.2	81.7
1958	77.3	71.9	72.5	84.5	85.8	66.3	84.4	85.2
1959	78.5	71.9	75.9	84.5	88.4	68.1	85.6	84.3
1960	85.2	88.3	82.9	90.5	92.3	75.2	87.5	89.9
1961	90.2	93.7	84.0	96.7	96.4	89.6	96.8	97.6
1962	97.5	97.1	89.3	99.5	99.3	94.9	98.7	98.3
1963	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1964	104.4	105.8	101.7	102.6	105.8	107.6	108.3	109.7
1965	108.1	107.8	109.8	105.1	111.6	115.4	116.3	119.5
1966	108.8	110.2	114.8	108.1	137.7	115.8	122.7	124.2
1967	115.0	117.6	117.6	108.1	146.5	122.9	125.1	124.2
1968	119.8	122.3	124.5	115.2	168.1	130.6	135.9	136.2
1969	129.9	131.1	126.7	120.3	175.4	138.2	142.9	145.8
1970	143.7	155.8	137.8	143.0	176.0	161.8	167.2	165.6

1. These refer to Primary, Secondary and Sepcial School Teachers only.

TABLE 2 Labour Input Price Indices for Glasgow's Health Service 1963 = 100

Year	Administration	Health Visitors	Domestic Midwifery	Childrens Homes	Education Health Service
1947	56.1	48.5	37.9	N/A	41.5
1948	56.1	49.3	46.7	N/A	48.4
1949	59.3	49.3	46.8	51.9	48.4
1950	62.6	52.3	51.6	51.9	54.7
1951	65.4	52.3	51.7	51.9	54.7
1952	69.8	52.9	53.1	59.7	54.7
1953	69.8	58.9	58.9	60.8	61.1
1954	73.2	58.9	58.9	61.6	61.3
1955	76.7	61.9	61.9	63.1	64.4
1956	78.1	66.4	66.5	73.8	69.6
1957	80.5	66.4	66.5	76.1	70.0
1958	85.0	72.8	68.7	77.4	71.5
1959	90.3	87.6	88.2	77.7	86.9
1960	90.9	91.4	91.8	85.8	89.5
1961	96.4	95.3	95.8	93.1	94.9
1962	99.7	99.9	99.8	95.3	98.7
1963	100.0	100.0	100.0	100.0	100.0
1964	101.1	109.6	109.6	104.9	108.9
1965	102.1	119.2	116.3	109.9	115.7
1966	104.3	130.5	128.4	118.2	127.4
1967	104.3	130.5	128.4	118.2	127.4
1968	132.9	133.1	136.2	127.2	134.5
1969	134.1	140.2	140.8	135.6	139.5
1970	162.1	147.6	168.5	156.1	166.7

TABLE 3 Labour Input Price Indices Produced by the C.S.O. (1)

1963=100

Year	Fire	Police	Teachers	Other Salaries	Other Wages
1963	100.0	100.0	100.0	100.0	100.0
1964	112.8	108.4	101.7	103.0	106.0
1965	122.9	114.7	111.6	106.3	114.1
1966	129.7	125.5	116.9	108.2	121.7
1967	145.8	132.4	121.9	115.1	127.1
1968	157.0	138.9	126.1	117.4	134.7
1969	172.0	157.2	132.6	121.7	142.5
1970	194.0	182.0	142.4	135.5	155.4

Source: C.S.O.

(1) N.B. refers to England and Wales only.

it will be seen that the Glasgow index lags behind the C.S.O. index for England and Wales. This is due to the fact that wage and salary awards for teachers in England and Wales can lead those in Scotland by anything up to 9 months.

Before concluding this section on methodology it is worthwhile noting the problems posed by discount prices of certain inputs. Local authorities frequently purchase non-labour inputs at specially negotiated prices from suppliers. Central purchasing agencies for a number of local government services are also able to reduce the impact of increases in manufacturers list prices by purchasing in bulk before price increases occur. The problem of beating price increases by forward purchasing has been ignored in the calculation of the price indices since adjustment for this would require information on the itemised prices actually paid.¹ Price discounts present less of a problem because it is price changes and not levels which are of importance in the construction of price indices. Changes in discount and non-discount prices for the same good are likely to be the same.

Input Price Indices for the City of Glasgow's Services

The above discussion has centres upon the construction of the sub-indices and expenditure weights which were necessary in order to calculate the total input price index for any specific service; such as that for education, outlined in equation (1) above. Table 4 presents the total input price indices for a number of Glasgow's services. These are shown along with an item referred to in Table 4 as the Local Authority Index, which is the input price index calculated for Glasgow's total current rating expenditure. The Local Authority Index, which is a weighted average of all the sub-indices calculated for each service, was essentially calculated

1. For example from invoices. The effort required for such an adjustment is not worth the benefits. However, if a system were being set up to monitor the current inflation facing a local government these would be the appropriate prices to use.

TABLE 4

Input Prices Indices for City of Glasgow Services

1963 = 100

Year	Police	Fire	Education Whole Service	Primary & Secondary School Index	Local Authority Index (3)	Public Authority Index (1)	Retail Price Index (2)	Wholesale Price Index (4)
1951	68.9	60.9	62.0	52.7		56	71.1	79.5
1952	67.6	65.8	60.5	54.4		61	75.3	84.0
1953	67.7	66.5	63.4	57.3		62	76.8	83.6
1954	69.2	69.2	65.9	60.3		64	78.3	83.4
1955	74.3	72.8	68.6	61.2		68	81.0	85.6
1956	76.5	78.3	75.7	69.4		74	84.7	89.2
1957	78.1	81.8	79.8	74.1		78	87.5	92.1
1958	79.5	82.9	80.9	75.7	80.1	82	89.9	92.7
1959	81.4	83.8	83.8	78.9	82.8	86	90.8	93.0
1960	91.8	88.8	87.6	85.1	86.5	89	91.8	94.3
1961	95.0	92.5	90.2	87.5	91.4	93	94.5	96.8
1962	97.3	97.6	93.2	92.3	95.3	96	98.1	99.0
1963	100.0	100.0	100.0	100.0	100.0	100	100.0	100.0
1964	105.0	104.3	107.2	105.5	105.8	105	103.3	102.9
1965	107.5	108.5	109.9	109.9	108.7	112	108.0	106.8
1966	110.3	110.2	114.3	113.8	113.1	118	112.1	109.6
1967	114.2	114.9	116.7	117.3	117.7	124	114.9	110.9
1968	120.9	120.1	123.4	124.2	126.1	131	120.1	115.3
1969	127.8	129.1	130.1	127.4	132.0	140	126.5	119.8
1970	142.8	139.9	140.7	139.7	141.7	153	133.3	127.6

(1) Public Authorities Current Goods and Services Blue Book 1972, table 16.

(2) Blue Book 1972, table 16.

(3) Input price index for Glasgow's Current Rating Account (see appendix 5.F. for a discussion of this index).

(4) WPI for all manufactured goods. Source "The British Economy Key Statistics 1900-1970".

TABLE 5 Comparison of Year on Year Price Changes⁽¹⁾

Year	Police	Fire	Education	Primary and Secondary School	Local Authority (Glasgow)	RPI	WPI	Public Authority
1953/54	2.2	4.1	3.9	5.2		1.3	-0.24	3.2
1954/55	6.7	5.2	4.2	1.5		5.2	2.6	6.3
1955/56	3.0	7.6	10.3 ⁽²⁾	13.4 ⁽⁴⁾		4.8	4.2	8.8
1956/57	2.1	4.5	5.4	6.8		3.7	3.3	5.4
1957/58	1.8	1.3	1.4	2.2		3.0	0.7	5.1
1958/59	2.4	1.1	3.6	3.2	3.4	0.7	0.3	4.9
1959/60	12.7 ⁽³⁾	6.0	4.5	7.9	4.5	0.0	1.4	3.5
1960/61	3.5	4.2	3.0	2.8	5.7	3.4	2.7	5.0
1961/62	2.4	5.5	3.3	5.5	4.3	4.1	2.3	3.2
1962/63	2.8	2.5	7.3	8.3	4.9	2.0	1.0	4.2
1963/64	5.0	4.3	7.2	5.5	5.8	3.2	2.9	5.0
1964/65	2.4	4.0	2.6	4.2	2.7	4.7	3.8	6.7
1965/66	2.6	1.6	3.9	3.5	4.1	3.7	2.6	5.4
1966/67	3.5	4.3	1.7	3.1	4.1	2.6	1.2	5.1
1967/68	5.9	4.5	5.7	6.0	7.2	4.7	4.0	5.6
1968/69	5.7	7.5	5.4	2.6	4.7	5.5	3.9	6.9
1969/70	11.7	8.4	8.1	9.7	7.3	6.4	6.7	9.3

NOTES:

(1) The series in this table are, calculated from table 4 according to the convention,

$$\dot{p}(t) = \frac{p(t) - p(t-1)}{p(t-1)} \times 100 ; \text{ where } \dot{p}(t) \text{ is the rate of change in}$$

prices for period t.

(2) introduction of equal pay for male and female teachers causing large increase.

(3) large jump due to a restructuring of pay scales.

in the same way as the other indices (see Appendix 5E for more details).

5.2. Comparison of Glasgow's Input Price Indices with Other Published Indices

One question which may be asked is how does the impact of inflation upon the City of Glasgow's public budget compare with that of other sectors of the economy? To answer this question the indices of Table 4 can be compared with other indices such as the retail price index or the public authorities' index.

These comparisons show that on average the input prices of Glasgow's local government services rise faster than those represented by the RPI and the WPI. If the public authority index shows changes in the input prices for the whole of the public sector then on average public authority input prices change faster than those of Glasgow's public services.

Table 5 sets out more fully the year^{on year} changes (expressed as percentages) in the price indices.

It can be seen from Table 5 that towards the end of the period covered (1969/70) the rate of change in input prices for local government services began to accelerate. In order to see if this phenomenon continued a comparison of changes in the input price indices with the RPI was made for the years 1970/71 - 1972/73. These are summarised in Table 6.

Table 6 Year on Year Price Changes 1970/71 - 1972/73

(%age)

Year	Police	Fire	Primary and Secondary School	RPI
1970/71	8.8	17.4	7.6	6.3
1971/72	10.3	10.2	11.0	9.0
1972/73	9.2	13.4	8.3	7.0

The rapid increase, towards the end of the 1960's, in Glasgow's local government input prices relative both to the increases of previous periods and to the retail price index has continued into the 1970's as Table 6 testifies. One plausible explanation for this phenomenon would be that over the period 1969/73 local authority employees were "catching up" in terms of their relative and real wages and salaries. This hypothesis is considered in the next section.

5.3 Changes in Public Employees Relative and Real Wages and Salaries

It was suggested above that one plausible explanation of the recent rapid increase in certain local government input prices was that the wages and salaries paid to employees in those sectors were in some sense "catching up" over the late 1960's and early 1970's.

The phrase "catching up" is not unambiguous and requires some careful explanation. The main ambiguity is, with what were they trying to catch up? There are two not unconnected answers to this question:-

- (i) catching up with the retail price index. Over a period employees' expectations of increases in real living standards are not fulfilled. This is then followed by a period of rapid increase in real wages.
- (ii) catching up with the real and monetary wages and salaries of other comparable occupations.

These two explanations are examined in more detail with the help of figures 1 and 2.⁽¹⁾ Figure 1 shows movements in real gross⁽²⁾ wages and salaries over the period 1951/70. It can be seen that, for the occupational groups shown, substantial improvements in real wages and salaries took place over the period 1951/61, but that this was followed during the 1960's by a

1. The calculations underlying these figures will be found in Appendix 5F.
 2. i.e. gross of income tax.

levelling off in the real wages and salaries for these public sector employees. This, it is assumed, was due to the prices and incomes policies adopted during this period. In addition, it is not altogether unlikely that public sector employees were amongst those most heavily hit by such policies as a comparison between the real wages and salaries of the public sector employees and the average weekly earnings of the private sector reveals. (see Figure 1).

Figure 2 shows the position of these public sector occupations relative to the average earnings of administrative technical and clerical workers in the manufacturing sector. Over the 1960's the position of the public sector occupations declined relative to those employed in the private sector.

This decline in the relative position of public sector employees in the wage and salary leagues coupled with a lack of growth in real wages and salaries helps to explain the high wastage rates of teachers, policemen and firemen⁽¹⁾. It also explains why, in the 1970's, local employees took strike action for the first time. Public sector employees have in the past lost ground in wage and salary awards because of the passive behaviour of their trade unions and because it is generally assumed that they are dedicated individuals who put the public interest before their own self interest.

The 1970's however have shown that public sector employees will in the end take strike action. In the City of Glasgow alone the following groups of workers have, for substantial periods, withdrawn their labour:-

1973/74	Firemen's Strike
1974	Teachers' Strike
1974/75	Sewage Worker's Strike
1974/75	Corporation Electricians' Strike
1974/75	Dustmans' Strike

1. In Glasgow for the year 1969/70, Police were 17% undermanned, Fire were 26% undermanned and teaching staffs for 1968 were 16% below requirements.

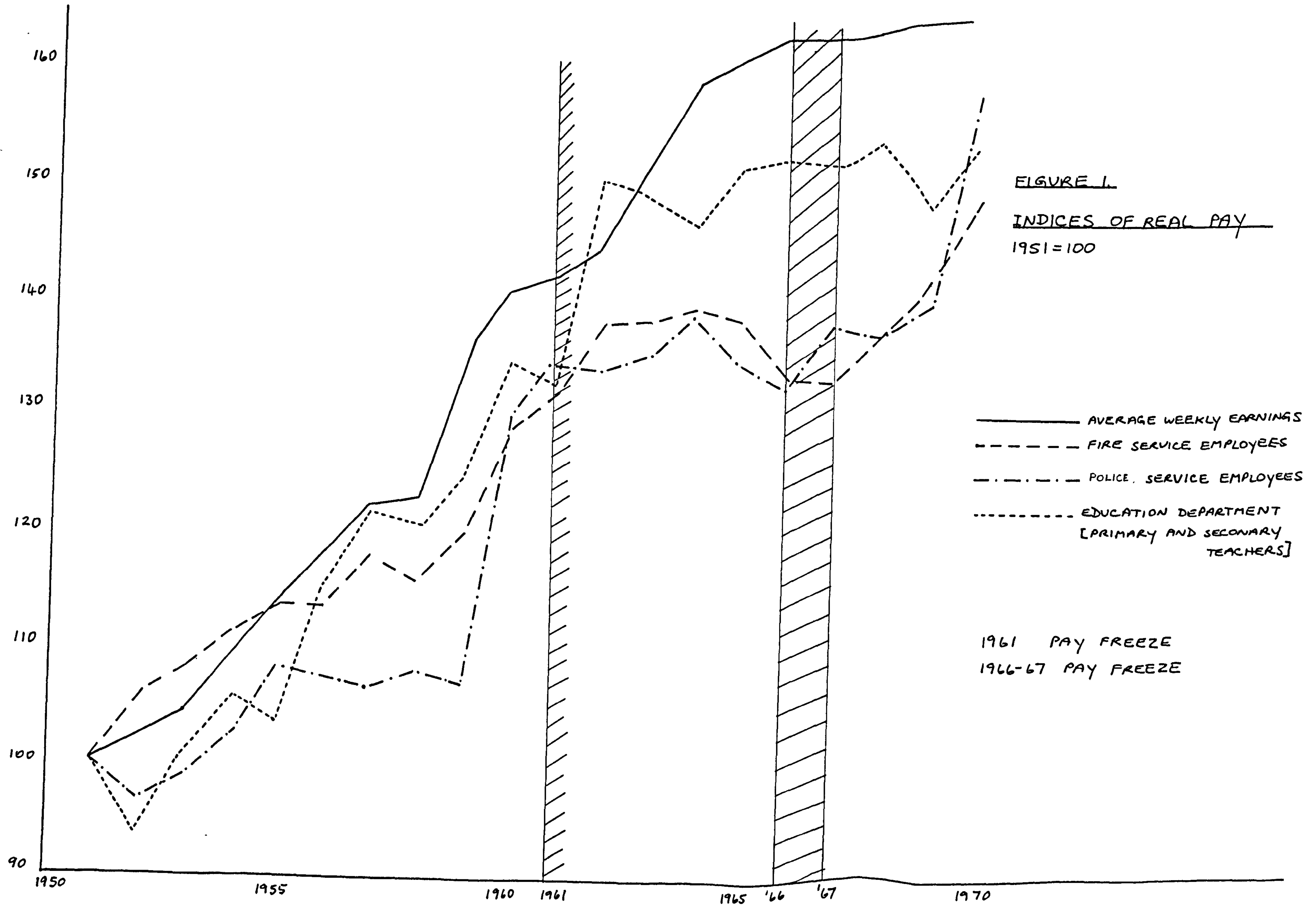


FIGURE 1.
INDICES OF REAL PAY
 1951=100

- AVERAGE WEEKLY EARNINGS
- FIRE SERVICE EMPLOYEES
- POLICE SERVICE EMPLOYEES
- EDUCATION DEPARTMENT
 [PRIMARY AND SECONDARY
 TEACHERS]

1961 PAY FREEZE
 1966-67 PAY FREEZE



FIGURE 2.

RELATIVE PAY INDICES 1955 = 100

- PRIMARY AND SECONDARY SCHOOL TEACHERS
- FIREMEN
- POLICEMEN

This action was part of a general wave moving its way through all parts of the public sector. Other public sector employees outwith the local authority sector, who have withdrawn or threatened to withdraw their labour, have been hospital consultants, nurses and university teachers.

Whilst this is not an appropriate place to discuss fully the problems of labour relations in the public sector, nevertheless a number of important conclusions can be drawn. A sector, like local government, which is heavily dependent upon its labour inputs to produce its service, runs the risk of placing in jeopardy both the quality and the quantity of the service provided, if it persistently fails to maintain both the real and relative wages and salaries of its employees. Already it has been seen that for one local authority towards the end of the 1960's its services were badly undermanned and this was followed by a period of strike action. When local authority employees lose out in wage increases it also means that local government expenditure is lower than it might otherwise have been.⁽¹⁾ Thus, by their passive action, local authority employees have in the past helped to subsidise public budgets.

Finally a more subtle implication of the "cheap labour" episode of the 1960's is that more labour inputs were hired than might otherwise have been if wages and salaries had been higher. There did not, therefore, exist an economic climate which would serve as an incentive for local authorities to seek more efficient methods of production, especially labour saving methods. The result is that an overmanned local authority sector then finds it difficult to maintain its position when demands for large wage increases come along.⁽²⁾

In order to find out if the input price rises could be explained in terms of

1. Assuming that the same volume of labour is employed.
2. This is what has happened over the period 1973/75 which has been one of inflation coupled with recession. Local authority employees have not faced redundancies and have been encouraged to stay on in order to produce existing levels of services. The inflation has brought with it large wage demands from local authority employees with the result that local budgets have expanded.

a catching up hypothesis the real wages and salaries of the selected local government employees, used in section 2 above, were examined for the 1970's. Year on year changes in these wages and salaries for the period 1970/1973 are summarised in Table 7, along with year on year changes in the RPI and the index of average earnings. It can be seen from Table 7 that the real position of these employees did improve and that they did manage to go some way towards maintaining their relative position although it is doubtful if they managed to catch up in relative terms.

Table 7 Year on Year Changes in Wages and Salaries for Selected Services 1970/73

Year	Police	Fire	Teachers	RPI	Average Earnings
1970/71	8.7	21.3	8.0	6.3	11.8
1971/72	13.0	11.5	13.0	9.0	11.3
1972/73	8.9	14.6	11.0	7.0	15.8

Notes the year on year changes in this table are very much greater than those shown for the total input price indices in table 6. This is mainly due to the fact that the volume of labour inputs continued to fall over the period.

5.4 General and Concluding Remarks. about Input Price Indices

The sections above have demonstrated that the input price indices of the various services are sensitive to movements in the wages and salary component. This result is expected for a sector which is so heavily dependent on labour inputs. Therefore whether or not the process of inflation affects local authority budgets more severely than other sectors of the economy depends upon whether or not the real living standards of local government employees are maintained by suitable wage increases.

The exercise performed above also demonstrates how it is possible to construct an input price index for local government expenditure. This clearly contributes to the C.S.O.'s pilot study mentioned in the introduction to this chapter.

Whether or not the historical series calculated for the City of Glasgow services would be appropriate for more general application will depend upon the precise nature of Glasgow's vectors of inputs viz. a viz. those of other authorities. Since, however, the principal input prices, namely wages and salaries, are nationally negotiated and given that experiment shows that the results are not over sensitive to changes in the input weights then the Glasgow indices would be more appropriate surrogates than other indices such as the R.P.I.⁽¹⁾.

The input price indices developed here have many uses. Firstly they dissolve the speculative element in discussions of the impact of inflation on local government budgets. They enable the analyst to separate out those increases in local government expenditure which are due to input price rises and those increases which reflect expansion in the volume of inputs. Furthermore the expansion in real expenditure can then be analysed in terms of associated changes in other variables which might explain the rise in the volume of inputs⁽²⁾.

Finally a fuller understanding of the determinants of local government expenditure will also assist discussions of the fiscal or urban crisis facing many city governments. It will be recalled that this "crisis" occurs when local government expenditure rises faster than the local tax base. In the face of such crises local governments and central governments have the choice of increasing local tax rates or cutting back on the real expansion of local

-
1. The author is currently calculating a set of national input price indices. So far these compare very favourably with the Glasgow indices.
 2. These subsequent exercises are carried out in the Chapters which follow this one.

services. An understanding of how much of the crisis is due to inflation will enable decision takers to make more meaningful trade-offs between these alternatives⁽¹⁾.

1. This has much wider implications for public expenditure control in general. In the absence of detailed knowledge about the effects of inflation on local budgets, the decision maker will never know how much of his cut was a reduction in real expenditure.

A P P E N D I X 5ACommodity Classification Used to Construct the Education Expenditure Index

The following commodities were identified from an examination of the annual accounts of the Corporation of Glasgow.

1. Wages and Salaries
 - Teachers
 - (i) Primary
 - (ii) Secondary
 - (iii) Others
 - Janitors
 - Cleaners
 - Painters
 - Garage Staff
 - Attendance Officers
 - Administrative Staff
 - Medical Staff.
2. Supperannuation Contributions and Allowances.
3. National Insurance.
4. Uniforms
5. Local Rates
6. Rents
7. Insurances
8. Property repairs
9. Furniture and equipment
10. Heating and lighting
11. Cleaning and laundry
12. Painting
13. Feedstuffs
14. Food
15. Books, periodicals, and publications
16. Clothing and Footwear
17. Telephones
18. Stationary and Printing
19. Transport
20. Upkeep of motor vehicles
21. Interest on Debt
22. Miscellaneous.

A P P E N D I X 5B Price Indices

The following published indices were used in the construction of the input price indices.

<u>Item</u>	<u>Published Price Index</u>
Food	Retail price index for food
Clothing and Footwear	Retail price index for clothing and footwear
Cleaning	Retail price index for soap and detergents
Laundry	Retail price index for laundry charges
Postage and telephones	Retail price index for postage and telephones
Transport and Vehicles	Retail price index for transport and vehicles
Repair and Maintenance	MPBW index of costs for repairs and maintenance
Fuel and light	Wholesale price index for coal, gas and electricity used in manufacturing
Equipment	Wholesale price for products of order XIX (other manufacturing industries)
Books	Wholesale price index for printing publishing and bookbinding
Furniture (Education)	Wholesale price index for wooden furniture (other than domestic)
Furniture (Non-Education)	Wholesale price index for metal furniture filing cabinets etc.
Vehicle Running costs	Retail price index for petrol and oil.
Miscellaneous	Retail price index.

The following regression equations were used to estimate price indices over the period 1947/70 where the existing series did not cover the whole period.

Let X = retail price index.

Repairs and Maintenance Index: (RMI)

$$\text{RMI} = 0.66X + 34.48 \quad R^2 = 0.99$$

Motoring Index (M)

$$M = 0.55X + 50.8 \quad R^2 = 0.79$$

Postage and Telephones Index (PT)

$$PT = 1.18X - 18.20 \quad R^2 = 0.94$$

Paper Industry Index (P)

Wholesale price index = WPI

$$P = 1.1\text{WPI} - 12.79 \quad R^2 = 0.95$$

(The WPI gave the best fit.)

Table 5.B.1. records those indices which have been specially calculated.

The following indices summarised in Table 5.B.1. were calculated from primary data.

Table 5.B.1. Summary of Indices 1963 = 100

<u>Year</u>	<u>National Insurance</u>	<u>Interest Rates</u>	<u>Local Rate Poundage</u>
1948	44.58	57.67	81
1949	44.58	57.86	82
1950	44.58	58.25	83
1951	44.75	58.83	86
1952	53.73	62.33	89
1953	53.73	64.08	82.5
1954	53.73	66.21	85.0
1955	64.82	71.46	82.5
1956	64.82	77.67	89.2
1957	64.82	83.69	100.8
1958	84.82	86.02	110.8
1959	84.82	87.38	116.7
1960	84.82	90.87	115.0
1961	87.95	95.15	115.0
1962	87.95	98.06	94.2
1963	100.00	100.00	100.0
1964	100.00	105.43	105.8
1965	138.07	109.51	111.7
1966	138.07	117.48	116.7
1967	164.10	119.03	102.5
1968	169.64	123.88	108.3
1969	169.64	139.03	121.7
1970	169.64	143.69	124.2

Notes: (to Table 5.B.1.)

- (i) National Insurance. This index of employers contributions was calculated by recording from various copies of Hansard the employers contribution and calculating a simple set of price relatives.
- (ii) Interest Rates. It was a major task to collect average rates of interest on the liability portfolio of each service. This method was tried initially but the time involved was too great. The Scottish Branch of the Institute of Municipal Treasurers and Accountants publish each year in "Rating Review" an average for the rate of interest paid by each authority. The index is a simple price relative of this annual average.
- (iii) Local Rate Poundage. Calculated from local Glasgow data on property taxes.

A P P E N D I X 5.C.

Wages and Salaries Index

Index Construction

To construct the indices a list was compiled of the job descriptions and for each and every year the actual salary paid or the average salary paid was recorded alongside the job description. The numbers actually employed in each job description was also recorded. A fine set of job descriptions was employed. In the case of the education service 72 job descriptions were recorded. For other services such as fire the job descriptions were as low as 20. Taking education, therefore, the data was recorded as follows:

	P_i	q_i	P_{i+1}	q_{i+1}	----->
<u>A Administration</u>					
Director					
Senior Depute					
Junior Depute					
⋮					
Clerical Assistants					
Telephonists					
<u>B Janitors & Caretakers</u>					
<u>C Attendance Officers</u>					
<u>D Primary School Teachers</u>					
Headmaster					
⋮					
Chapter IV teacher					
Uncertificated					
<u>E Secondary Schools</u>					
Headmaster					
⋮					
<u>F Handicapped Schools</u>					
⋮					

The Laspeyres index $\frac{\sum w_{ti} q_{oi}}{\sum w_{oi} q_{oi}}$ was calculated for the total set of wages and salaries and subindices were calculated for administrative salaries, janitors

and caretakers, primary school teachers, secondary school teachers, etc...

Since the data was available in each case to calculate the Paasche index

$\frac{\sum w_{ti} q_{ti}}{\sum w_{oi} q_{ti}}$ this was done for police, education and fire. The Paasche and

Laspeyre index in most cases were identical. It was therefore decided to use the Laspeyre index to calculate the other indices since it required less computation. An examination of the weights confirmed that the Laspeyre form would not differ significantly from that of the Paasche.

Job descriptions and job titles for some categories of labour changed over the period for which the index was calculated. Where the change was simply one of job title there was no problem, a consistent title was used throughout. In those cases where new jobs appeared or where existing jobs were restructured the problems were more difficult. The introduction of new jobs were treated as a case of introducing a new product to an index. The case of restructuring was handled by chain linking the index at the period of the restructuring.

Timing of Pay Awards

Care was taken, when constructing the wages/salaries index, to note the timing of pay awards. Since the financial year of Scottish local governments to which the expenditure data refers runs from 1st June to 31st May it was necessary to calculate the average price paid for labour over that period. Thus if a category of labour q_{it} in year t was paid fx for the first six months of the financial year and fy for the second six months then if the value fy was taken as the price of labour the index would be biased. A weighted average of x and y was used instead.

Wages Creep

A methodological problem worthwhile making explicit is that of "wages creep"

ie a situation caused by employees moving up a salary scale by annual increments.

Most of local authority employees are on a salary scale which gives them an incremental increase over and above any negotiated changes to the scale which compensate for cost of living changes. This means that the price of labour will change for two reasons:-

- (a) negotiated changes to salary scales
- (b) incremental changes (ie "wages creep") or the natural progress of employees up a salary scale(1).

The method used to calculate the wages and salary indices has taken the first change into account but has not adjusted for the second change. By taking the mean of the salary scale instead of the actual mean salary paid it has been assumed that actual wages paid are normally distributed about the mean of the scale. To have made any adjustments for wages creep would have meant the collection of information about the distribution of employees within salary scales. This data was not available.

Quality of Inputs

One of the insurmountable problems encountered in the construction of any price index is that of keeping the quality of the vector of goods constant. A clerk in 1955 is assumed to be the same clerk in 1964.

An example of this problem is that of the job description "teacher".

Different teachers have different educational qualifications and may be paid more in terms of additional increments. (see wages creep above) Also as teachers become more experienced over time they progress along a salary scale. Quality differences therefore creep in two ways,

-
1. Increments paid from one year to the next are usually justified because it is assumed that the labour has gained more experience. In other words a quality difference has been introduced such that inputs of labour are in no sense strictly homogeneous. This subtle problem is ignored in practice.

- (i) if suddenly a greater proportion of teachers had master degrees as opposed to bachelors degrees
- (ii) if the average age of the employees increased.

An attempt was made to collect data as a rough check on this problem but it proved to be fruitless. It was not possible to find data on years of teaching or the educational qualifications of teachers.

For policing their average age moved within the range $33\frac{3}{10}$ years to $39\frac{1}{2}$ years over the period 1935/6 to 1969/70. The average number of years of service was within the range $11\frac{2}{12}$ years - 16 years over the same period.

These are the only data which were readily available. Informal discussions with informed persons leads to the conclusion that the quality of labour in most sectors has improved over the past twenty years. Most individuals are now better trained.

Policemen receive formal and intensive training in crime detection, the process and mechanics of law, communications systems and so on. Likewise firemen are trained in engineering skills, basic building design (in their efforts to install fire prevention systems in new and existing buildings) the chemistry of inflammable materials and communications systems. To become a policeman or a fireman examinations have to be taken and stiff interview procedures have to be passed. Teachers are also better trained. They are introduced to the psychology of the child and the technology of education techniques. The managerial revolution in addition to the training revolution has swept all levels of the public sector. This means also that the improved quality of the outputs of the public sector are embodied in the quality improvements of the inputs used.

A P P E N D I X 5.D.An Examination of the C.S.O.'s Methodology for Wage and Salary Indices.

Tables 1 and 2 of Chapter 5 were compared to table 3 in which the C.S.O.'s wage and salary indices were displayed. This appendix examines the underlying methodology employed by the C.S.O. and compares it to that method adopted in Appendix 5.C. for the construction of the Glasgow indices.

Tables 1 and 2 gives the calculated prices indices for City of Glasgow employees listed by service. Table 3 lists comparable indices for England and Wales supplied to the author by the C.S.O. A number of points of clarification are necessary when comparing these tables:-

- (i) teachers wages and salaries:- both sets of indices relate solely to primary, secondary and special school teachers. The two indices are likely to differ because of differences in the weights used in their construction but more importantly because teachers in England and Wales have different salary scales in addition to receiving salary increases anything up to 12 months before teachers in Scotland. As it can be seen that the index for England and Wales tends to lead that for Glasgow.

The indices are sufficiently close to have confidence in using the Glasgow index.

- (ii) Fire and Police:- The C.S.O. indices for England and Wales are very significantly different from those for Glasgow. This gave some initial concern over the validity of the Glasgow indices. A number of tests were made on the Glasgow and C.S.O. indices.

The C.S.O. indices were not constructed in the same way as the Glasgow indices they were instead price indices implied by a volume index of manpower strength applied to the wages bills. "The implied index was obtained by dividing the

salaries and wages bill at current prices in each period by the estimated bill at constant prices for the same period. The constant price estimate has been obtained by applying a volume index of strength to the base year salary i.e.

(police strength in each period \div police strength in 1963) x salaries bill in 1963".¹

This means therefore that the C.S.O. implied index is calculated as:-

$$\sum W_i Q_i \div \sum W_{63} Q_{63} \cdot \left(\frac{Q_i}{Q_{63}} \right)$$

This presumably is on the assumption that $\sum W_{63} Q_{63} \cdot \left(\frac{Q_i}{Q_{63}} \right)$ reduces to

$\sum W_{63} Q_i$ giving the Paasche Index $\frac{\sum W_i Q_i}{\sum W_{63} Q_i}$ when $\sum W_{63} Q_i$ is divided into the

current wages and salaries bill. But in its present aggregative form

$\sum W_{63} Q_{63} \left(\frac{Q_i}{Q_{63}} \right)$ will not reduce as required. It would only reduce in the

disaggregate form:-

$$\left(\frac{W'_{63} Q'_{63} \cdot Q'_{64}}{Q'_{63}} \right) + \dots \dots \dots \left(\frac{W^n_{63} Q^n_{63} \cdot Q^n_{64}}{Q^n_{63}} \right) = \sum_1^n W_{63} Q_{64}$$

Having demonstrated that there was a logical fault² in the C.S.O. index a second experiment was carried out. This time the empirical validity of the indices were tested. Data for the period 1950/70 on wages and salaries for Police and Fire services in Scotland and England and Wales were supplied by the Scottish Home and Health Department and The Home Office respectively. Although weights were not available for each "rank" in the labour hierarchy a set of price relatives for the salary scales of each rang were calculated for police and fire services in England and Wales and Scotland. Not un-
suprisingly the price relatives of the principal ranks moved very closely

1. Quoted from a letter from C.S.O. to the author 17 April 1974.

2. The C.S.O. have now rectified this fault and calculate the indices using Laspeyres index.

together. More importantly they moved extremely close to the Glasgow Police and Fire indices so that the weights used for different types of labour in the construction of the Glasgow index would not have influenced the results of this simple experiment.

Having carried out both of these simple experiments it is fair to say that the Glasgow indices for police and fire services are more robust.

(iii) Other wages and other salaries:- Other salaries refer to a mixture of professional and clerical staffs. It is not clear just what labour types have been included in this index. The same applies to the other wages index. The point to note is that they are reasonably close to the other indices which have been calculated for Glasgow.

A P P E N D I X 5.E.

The Rating Account Input Price Index

This index was calculated by making a commodity breakdown of total current expenditure on the Rating Account. Table 5.E.1. gives the proportion of total final expenditure taken up by each category. These proportions were then later used as weights for the index.

Table 5.E.1

Expenditure item	1953 %	1960 %	1969 %
1. Remuneration (wages, rent, food, and other allowances)	49.2	48.2	42.3
2. Loan Charges; Interest Contribution towards liquidation of debt	15.8	20.3	21.9
3. Maintenance of property and furniture	13.5	13.3	11.7
4. Rates, rents, feuduties	6.3	2.7	4.3
5. Bursaries, maintenance of children and grants to schools and voluntary bodies	1.1	33.2	2.3
6. Administration and sundry	2.4	2.7	3.3
7. Payments to other authorities	2.6	0.7	0.4
8. Maintenance of motor vehicles and transport of children	1.5	1.7	1.1
9. Textbooks, Apparatus, etc. for education	1.7	1.9	1.6
10. Stationary, printing, library books			0.6
11. Food, clothing, drugs, dressings	3.9	3.4	2.3
12. Miscellaneous	2.0	1.9	2.3
	100.0	100.0	100.0

Summaries

13. (1+2)	65.0	68.5	70.1
14. (3+8)	15.0	15.0	12.1
15. (13+14)	80.0	83.5	82.2

From the data held in the Establishments Division it was possible to construct a number of general indices for wages and salaries of professional and clerical employees. These supplemented the indices for wages and salaries which had previously been calculated (i.e. for police, fire, etc.) Each index was

weighted by the expenditure proportion. Hence for wages the index was

$$L_w = \sum w_i L_i$$

where w_i = expenditure weight

L_i = wages/salaries index of i^{th} category of labour.

L_w = total wages and salaries index.

Using this new wage and salary index along with the expenditure weights and other sub-indices, previously calculated the local Authority Index was calculated as follows:-

$$I_R = \sum \bar{\mu}_i L_i$$

where I_R = the Local Authority Index

$\bar{\mu}_i$ = the expenditure weight (of total current Rating expenditure) of the i^{th} commodity.

L_i = the sub-price index of the i^{th} commodity.

A P P E N D I X 5.F. Real and Relative Pay Indices

Real Pay Indices

Deflating the money wage index by the consumer price index produced the real pay index. Since the original indices were on the base of 1963 = 100 they were rebased on 1951 = 100.

Table F.1.1.

Indices of Real Pay for Glasgow Services 1951-1970

Year	Primary & Secondary Teachers	Police (uniformed)	Fire (uniformed)	Average Weekly Earnings	Average Weekly Wage Rate
1951	100.0	100.0	100.0	100.0	100.0
1952	93.7	96.8	105.7	102.0	102.5
1953	100.8	98.8	107.9	106.7	104.9
1954	105.8	102.5	110.7	112.5	107.2
1955	103.8	108.0	113.4	118.7	110.4
1956	115.4	107.1	113.3	121.4	113.5
1957	121.4	106.2	117.7	122.8	115.2
1958	120.1	107.9	115.9	128.3	115.8
1959	124.6	106.9	119.4	128.6	117.6
1960	134.5	129.9	128.1	137.7	118.8
1961	132.5	133.9	131.6	141.3	120.1
1962	150.8	133.7	137.7	139.9	119.7
1963	149.0	135.0	139.0	143.0	120.0
1964	146.8	138.2	139.5	150.4	121.5
1965	151.5	134.7	138.1	154.6	120.2
1966	152.5	132.7	133.9	157.2	121.0
1967	152.4	138.1	138.1	157.8	122.8
1968	154.5	137.4	137.7	163.2	126.5
1969	148.5	139.9	141.7	167.5	127.0
1970	153.2	157.8	148.8		131.9

Notes:

1. Average Weekly Earnings Index. This index was calculated from data given in "The British Economy Key Statistics 1900-1970" published by the London and Cambridge Economic Service. The earning data allows for changes in wage rates, hours worked and relative proportions of men employed in different occupations and industries and for the effect of changes in output for workers on piecerates.
2. Average Weekly Wage Rates. This is a Department of Employment and Productivity Index measuring the average movement in the level of full time weekly wage rates of wages from manual workers fixed by collective agreements.

Indices of Relative Pay

A large number of alternative calculations were performed in order to establish the behaviour of the indices of relative pay. A number of problems emerge in any comparison of wages between occupations in order to establish relativities. The first is that there can be significant differences between changes in wage rates and changes in earnings since the latter will include overtime working which can vary depending upon the degree of excess demands in the product and labour markets. Since teachers for example have little scope for augmenting their earnings from overtime working (in the traditional sense, of course they may have second jobs) it would be misleading to compare them with a group for which additional income was a significant component of average earnings. On the other hand policemen and firemen are eligible for overtime earnings. Data on their overtime earnings are not available (the effort involved in collecting such auxiliary data would have been immense). The data which is readily available relates to changes in basic wage rates in all cases and so it was decided to compare these with the changes in wage rates in other occupations. In all the cases tried the relative position of teachers, policemen and firemen has grown steadily worse. With respect to their relative positions on an average earnings hierarchy it is extremely likely that the same situation would be found. Although policemen and firemen do earn overtime their overtime rates along with normal rates will have fallen behind other occupations. Policemen do in some instances receive lodging and housing allowances which should strictly be taken into account: this complication was, however, ignored.

The relative pay index was calculated by comparing the average annual salary of the group under review with the average annual salary of Administrative Technical and Clerical Staff in Manufacturing. The exercise was done for males and females. In both cases the results were similar. Only the results relating to males are recorded in table D.2.1.

Table F.2.1.Indices of Relative Pay 1955/1970 1955 = 100

Year	Fire	Police	Education
1955	100.0	100.0	100.0
1956	99.1	95.3	107.2
1957	100.4	92.8	109.4
1958	100.1	95.6	110.2
1959	101.6	91.5	110.5
1960	99.4	105.8	113.7
1961	102.0	108.7	111.5
1962	108.1	110.6	116.2
1963	109.0	112.0	128.0
1964	106.9	111.3	122.4
1965	102.3	104.9	122.1
1966	103.0	102.4	121.9
1967	101.8	106.9	122.2
1968	98.4	103.3	120.1
1969	97.2	100.8	110.7
1970	97.4	100.2	109.7

Notes:A. Sources for tables D.1.1. and D.2.1.

- (1) Wages for City of Glasgow employees were obtained from successive issues of "Return of Departmental Establishments, Salaries and Wages".
- (2) Wages for Manual Workers see table 48 of British Labour Statistics, published by Department of Employment and Productivity.
- (3) Wages and Salaries of Administrative technical and Clerical Workers see table 53 of British Labour Statistics (op. cit.).

B. Gross vs. Net Income

These exercises relate only to the real and relative positions for gross income no adjustment has been made for the payment of income tax.

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- 6.1. The Growth in the City of Glasgow's Local Government Expenditure 1950/1970
- 6.2. The Composition of Rating Account Current Expenditure 1950/1970
- 6.3. Glasgow's Expenditure Growth and the National Averages
- 6.4. Per Capita Expenditure Growth
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- 6.6. Composition of Inputs to Service Expenditures
- 6.7. Capital Expenditure Growth
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Summary and Conclusions

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- Appendix 6.C Housing Statistics
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CHAPTER 6

EXPENDITURE AND REVENUE TRENDS 1950/1970

Introduction

This chapter will present information on the growth and pattern of financing local public expenditures for the City of Glasgow over the period 1950/1970. It was shown in chapter 3 that the growth of public expenditures is the resultant of a complex interaction of economic, social and political forces. In terms of the quadrant diagram presented in chapter 3 this present chapter will examine the behaviour of quadrant IV for the City of Glasgow. That is the locus of money expenditures traced out over time will be considered without much reference to the interaction of variables in the other three quadrants.

The chapter is divided into the following sections. In the first section the basic growth rates in Glasgow's local public current expenditures are examined. This is followed by sections which will examine the composition of expenditures, the growth rates in individual categories of expenditure, per capita expenditure growth and the growth in expenditures at constant 1963 prices. The trends in Glasgow's expenditures are then compared with those for Scotland and England and Wales. After current expenditures have been examined the growth in capital expenditure and local authority debt is reviewed. The chapter then concludes with a consideration of the changing pattern of financing expenditures over the period.

Throughout the chapter the source of all data relating to Glasgow's expenditures and revenues has been the annual audited accounts of the Corporation of Glasgow.¹ All other data relating to Glasgow in this and subsequent chapters have primary sources; mainly "Facts and Figures" which

1. "Abstract of the Accounts" for the year ending 31st May -, Corporation of Glasgow.

is published annually by Glasgow Corporation. None of the data was readily available in the form necessary for analysis. This chapter, therefore, represents a first attempt at examining the history of Glasgow's local public expenditures and revenues over the period 1950/70.

There are a number of reasons for choosing the period 1950/70. The start of the period represents a period of stability in so far as it was sufficiently far enough away in time from the 1939/45 war, the boundaries of the city had not changed over that period,¹ and there were no transfers of local government services to central government over the period. Data for a wider period is, however, on occasions considered.

6.1. The Growth in the City of Glasgow's Local Government Expenditure 1950/70

The City of Glasgow's local government expenditures for the period 1950/70 are shown in Table 1 below. The Rating Account, which covers activities such as police, fire, education and health services and which are charged to the local rates, is the largest of the accounts,² absorbs almost 80% of total current expenditures and 98% of capital expenditures. Because of its importance, both in terms of absolute size and the categories of services which it covers the Rating Account will be the only account examined in detail.

It can be seen from Table 1 that part of the increase in Rating Account expenditure can be explained immediately by observing that in 1955/56 part of the Housing Account was transferred from the Revenue Producing Account to the Rating Account. This was the only year for which transfers between

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1. The last major revision to the boundaries of the city were made in 1938.
 2. A more detailed description of the composition of each account is given in Appendix 6.A to this chapter.

TABLE I

CURRENT AND CAPITAL ACCOUNTS FOR GLASGOW CORPORATION

£(m) [CURRENT PRICES]

	<u>CURRENT EXPENDITURE</u>					<u>CAPITAL EXPENDITURE</u>					Combined Capital and Current Ex- penditures	
	Common Good Account	Rating Account	Revenue Pro- ducing Account	Sundry Account	Trust Account	Total Current Expenditure	Common Good Account	Rating Account	Revenue Pro- ducing Account	Sundry Account		Total Capital Expenditure
1950/51	6.66	17.69	4.11	0.65	0.74	29.81	1.03	1.10	7.44	—	9.57	39.38
1951/52	7.22	20.09	4.61	1.39		33.32				—	9.93	43.25
1952/53	7.91	22.58	5.56	0.97	0.67	37.69	0.28	2.31	9.31	—	11.91	48.26
1953/54	8.59	23.75	4.77	0.25	0.65	38.01	0.88	2.10	11.18	—	14.17	52.18
1954/55	8.67	23.86	7.04	0.31	0.67	40.55	1.64	2.31	9.94	—	13.89	54.44
1955/56	9.29	33.72 ⁽¹⁾	1.30	0.36	0.85	45.48	0.94	12.25	0.59	0.03	13.82	59.29
1956/57	10.13	37.36	1.40	7.67 ⁽²⁾	0.91	57.43	0.98	12.61	0.42	0.03	14.04	71.47
1957/58	10.35	38.51	1.57	7.23	0.87	58.54	1.20	12.04	0.31	0.02	13.57	72.11
1958/59	10.46	41.69	1.68	6.75	0.99	61.57	1.70	10.17	0.16	0.02	12.50	73.62
1959/60	10.20	43.62	1.69	6.58	1.04	63.13	1.36	11.16	0.16	0.03	12.70	75.83
1960/61	11.43	46.10	1.88	6.92	1.13	66.45	0.82	12.88	0.14	0.04	13.89	80.34
1961/62	10.17	50.22	1.82	6.64	1.19	70.03	1.16	15.97	0.09	0.04	17.27	87.30
1962/63	10.40	54.01	1.82	8.12	1.27	75.61	1.29	19.41	0.13	0.03	20.87	96.47
1963/64	10.78	58.73	1.65	9.17	1.48	81.80	0.18	26.55	0.55	—	27.25	108.05
1964/65	11.32	64.52	1.66	9.20	1.54	88.25	0.77	26.53	0.56	—	27.83	116.08
1965/66	11.64	71.21	1.75	9.31	1.64	95.56	0.32	27.77	0.33	0.06	27.45	123.01
1966/67	11.85	80.89	1.91	13.03	1.80	109.48	0.43	33.63	0.34	0.18	34.48	143.96
1967/68	12.37	88.50	2.07	15.10	1.99	120.03	0.57	35.84	0.92		37.28	157.31
1968/69	12.72	96.97	1.20	15.79	2.12	128.81	0.38	40.80	0.99	0.05	42.17	170.98
1969/70	13.31	108.84	1.47	12.81	2.29	138.73		33.75	0.55	0.03	34.16	172.89

Notes: (1) 1955/56 Housing City Improvements and Public Water — transferred from Revenue Producing Account to Rating Account.

(2) 1956/57 Building Department now in Sundry Accounts.

accounts were made over the period 1950/70. Thus, taking 1955/56 as the base year the annual compound rate of growth in the current expenditures of the Rating Account (at current prices) over the period 1955/70 was 10.0% p.a.¹ The corresponding figure for capital expenditures was 5.4% p.a.

The annual rate of increase in a magnitude such as the current expenditures of the Rating Account is not without ambiguity in interpretation. It was shown above that changes in total current rating expenditures are sensitive to changes in the composition or scope of the activities subsumed under this account. Thus the transfer of housing expenditure into the Rating Account will affect the annual rate of change as too will the transfer of services out of the account. It is because of these changes, due to accounting transfers, that the period 1950/70 was chosen. Prior to 1950 a large number of services which had been administered and financed by local governments were transferred to central government. These transfers, which constitute Peacock and Wiseman's (196) "concentration process", are accounted for in Appendix 6.B. The effects of the concentration process can be seen in figure 1, where total current expenditure on the Rating Account fell over the period 1947/48 - 1948/49.

By taking the period of study back to 1936, as is done in figure 1, an interesting picture emerges. That is, figure 1 shows relatively little activity or changes (except for accounting transfers) in current expenditure until the 1950's when expenditure began increasing at a remarkable rate. In order to search for the causes of these changes the first thing to do is to examine the composition of total Rating Account current expenditure to find out which services have contributed to this growth in the total.

1. It should be emphasised from the outset that it is compound annual rates of growth which are used throughout this and other chapters. Other authors such as Holmans (124) for example use average annual rates of growth. This means that simple comparisons between different studies will not always be valid.

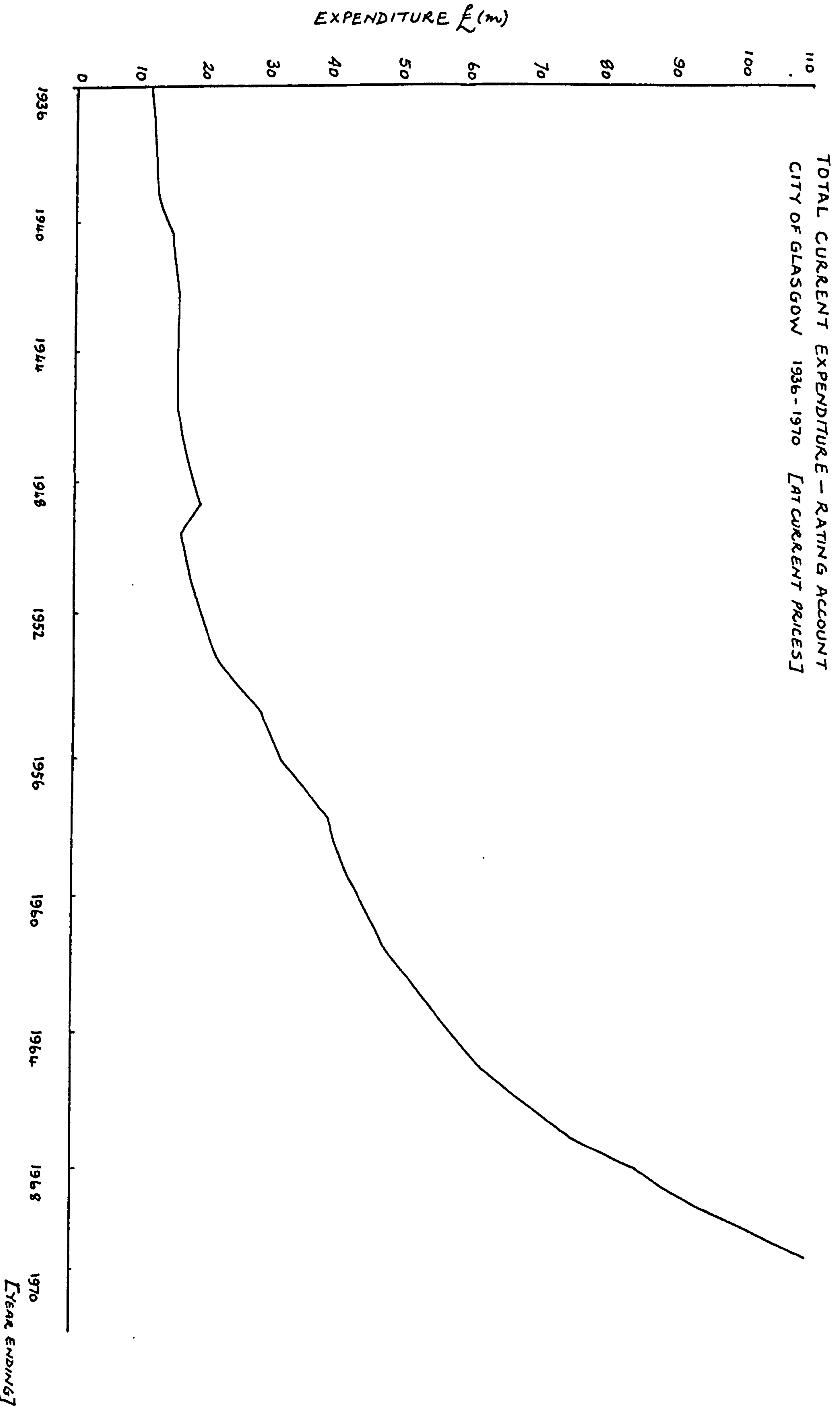


FIGURE I.

6.2. The Composition of Rating Account Current Expenditure - Glasgow 1950/70

The composition of current expenditure on the Rating Account is shown in Table 2. The expenditures are shown at current prices and are gross. Furthermore none of the increase in expenditure can be accounted for by anomalies such as the introduction of Selective Employment Tax in 1966.¹

It can readily be seen from Table 2 and figure 2 that different services have grown at different annual rates with housing expenditure and planning expenditures being the fastest growing accounts.

The 10.6% p.a. growth in the Housing Account's current expenditure is partly due to the rent policy, which has been adopted by Glasgow Corporation, and partly to the housebuilding programme, which resulted in higher loan charges to the current account. (Appendix 6.C gives a more detailed breakdown of the composition of the current expenditure on the Housing Account.)

Education current expenditure, which has grown at 8.9% p.a., is by far the largest item of total current expenditure on the Rating Account. In 1969/70 it accounted for 36.5% of total current rating expenditure. The period 1950/70 has been a period of major changes in education. The period started off with the implementation of the Butler Education Act of 1944. Education was offered to a much wider age group as a result of the 1944 Act and this was reflected in expenditure growth. The school building programme of the post war period² and the expansion in the number of school places contributed to an increase in loan charges, which were financed out of current expenditure. The expansion in further education after the Robbins Report contributed to education expenditure growth during the 1960's.

-
1. Every care was taken to ensure that no accounting anomalies were introduced. The figures show gross expenditures since netting out miscellaneous income or government grants destroys the trends.
 2. New schools were built to replace existing old ones, to replace those destroyed during the war. As the population moved from the centre of the city to the suburbs new schools had to be built in the new housing estates.

TABLE 2

GROSS CURRENT EXPENDITURE : CITY OF GLASGOW RATING ACCOUNT (£m)

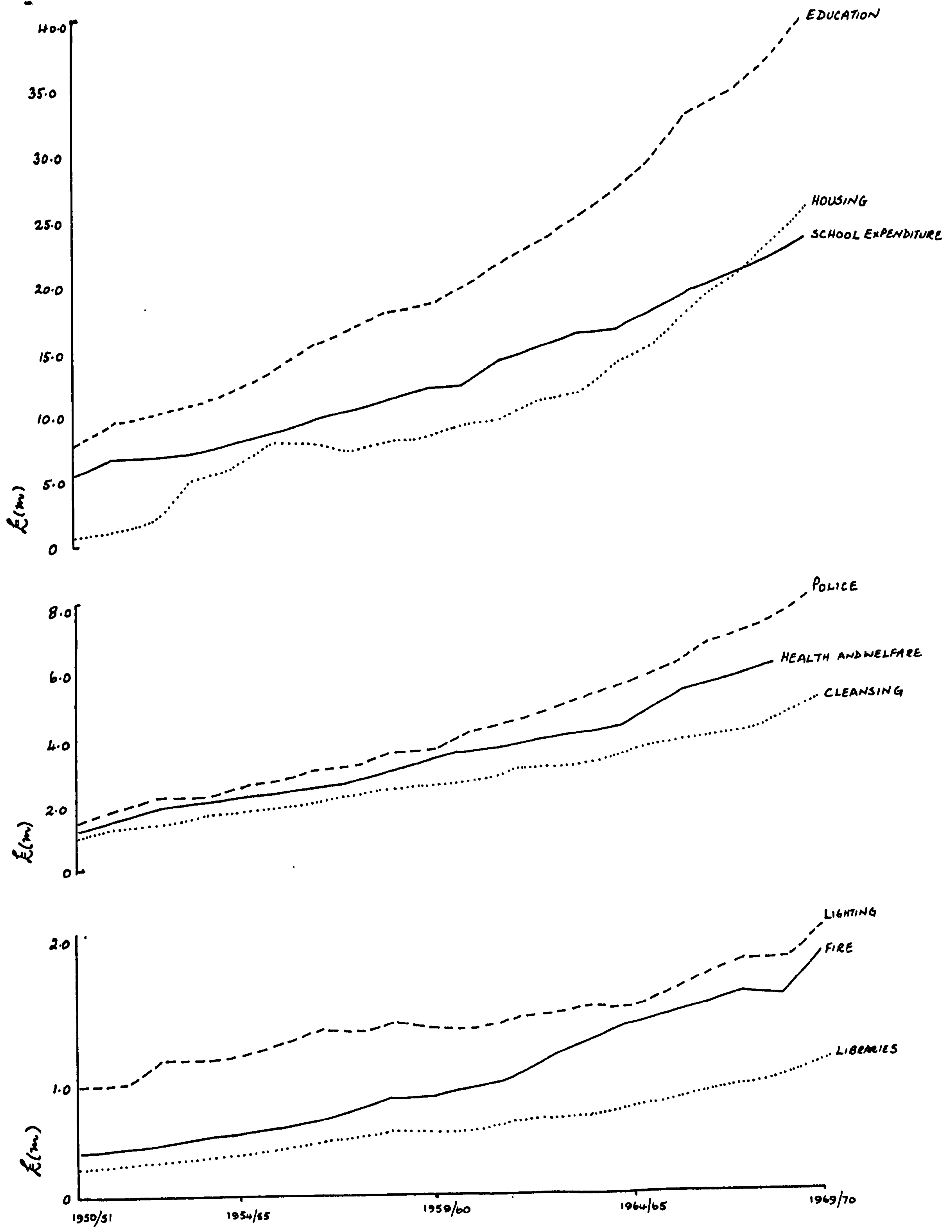
(current prices) (£m)

SERVICE	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	Annual Compound rate of growth
Police	1.74	1.94	2.03	2.07	2.21	2.52	2.93	2.98	3.26	3.44	3.92	4.23	4.59	4.97	5.29	5.75	6.23	6.79	7.19	7.98	8.3%
Lighting	0.84	0.86	1.06	1.01	1.08	1.17	1.27	1.24	1.31	1.27	1.27	1.31	1.37	1.42	1.40	1.51	1.61	1.77	1.75	1.95	4.5%
Fire Service	0.37	0.39	0.41	0.44	0.46	0.51	0.59	0.66	0.73	0.74	0.82	0.89	1.06	1.19	1.29	1.33	1.44	1.51	1.49	1.73	8.4%
Cleansing	1.20	1.33	1.44	1.53	1.62	1.80	1.92	2.13	2.22	2.36	2.41	2.59	2.63	2.78	3.06	3.37	3.61	3.89	4.10	4.88	7.7%
Parks and Burial Grounds	0.52	0.59	0.65	0.65	0.71	0.79	0.86	0.91	0.97	1.00	1.06	1.13	1.15	1.24	1.33	1.53	1.67	1.90	2.08	2.36	8.3%
Libraries	0.22	0.25	0.27	0.29	0.31	0.35	0.39	0.41	0.44	0.46	0.48	0.52	0.55	0.58	0.61	0.68	0.74	0.79	0.85	0.94	7.9%
Museums and Art Galleries	0.62	0.87	0.89	0.89	0.91	0.99	1.12	1.17	1.16	1.29	1.32	1.49	1.72	1.87	2.09	2.22	2.33	2.77	2.82	3.14	8.9%
Streets	—	1.05	1.02	1.29	1.32	1.43	1.43	1.46	1.87	1.87	1.90	2.02	2.09	1.99	2.04	2.15	2.35	2.66	3.11	3.41	6.7%
Sewers	—	0.10	0.11	0.14	0.12	0.13	0.15	0.11	0.09	0.09	0.09	0.09	0.12	0.12	0.13	0.14	0.18	0.20	0.17	0.21	4.3%
Sewage Purification	0.49	0.50	0.62	0.56	0.60	0.65	0.73	0.66	0.67	0.67	0.64	0.68	0.67	0.72	0.78	0.91	1.06	1.16	1.29	1.38	5.6%
Planning	—	—	—	—	—	0.04	0.06	0.06	0.08	0.12	0.17	0.23	0.34	0.46	0.74	1.14	1.75	2.36	2.89	3.55	37.8%
Education	7.84	9.11	9.95	10.42	11.53	12.77	14.73	15.84	17.23	17.86	18.99	21.03	22.35	24.27	26.31	28.68	32.13	33.54	36.42	39.69	8.9%
Children Services	0.32	0.36	0.40	0.39	0.39	0.41	0.43	0.48	0.49	0.50	0.53	0.57	0.67	0.67	0.75	0.82	0.92	1.03	1.21	—	7.7%
Health and Welfare	1.63	1.78	1.96	1.94	2.01	2.19	2.49	2.74	2.94	3.14	3.30	3.38	3.74	3.97	4.16	4.76	5.13	5.52	5.89	—	7.4%
Housing	0.68	0.78	1.20	4.94	5.57	7.07	7.29	6.78	7.27	7.65	8.21	9.00	10.01	10.94	12.92	14.66	17.10	19.05	21.75	24.99	10.6% ¹
Primary and secondary school expenditure	5.11	6.04	6.52	6.67	7.23	7.72	9.09	9.98	10.60	11.12	11.77	13.55	14.23	15.05	15.87	16.87	18.80	19.67	21.08	22.74	8.2%
Total current expenditure	19.69	20.01	21.24	23.75	23.86	33.72	37.42	38.51	41.69	43.62	46.10	50.22	54.01	58.73	64.52	71.21	80.89	88.49	96.99	108.84	10.0%

NOTES.

1) OVER THE PERIOD 1953/54 - 1969/70 HOUSING EXPENDITURE GREW AT 20.9% P.A. THE FIGURE 10.6% P.A. IS CALCULATED FOR 1953/54 - 1969/70

CITY OF GLASGOW CURRENT EXPENDITURES (AT CURRENT PRICES) 1950/51 - 1969/70



The increase in police expenditure reflects a reaction to growing crime rates and an increase in the volume of city traffic whilst the increase in fire service expenditures should be seen in relation to the growing incidence of fires within the city.

The growth in expenditure on sewers can be explained in part by the complementarity between housebuilding and the construction of sewers. Over the period 1950/70 the number of miles of public sewers, which drain into the main trunk sewer, increased by 40% i.e. from 598.5 miles to 839.0 miles. Planning expenditure is also associated with housing and the more general activity of redevelopment of the city. About 60% of planning expenditure is allocated to debt charges on land and buildings, located within the city, which have been purchased by the Corporation for future development. In 1969/70, 26.1% of the total acreage of the city was owned in this way.¹

Increases in expenditures on children's services, health and welfare and social services reflect a reaction to the deteriorating physical and socio-economic conditions described in chapter 4. In addition the scope of these services has also changed over the period. For example the 1959 Mental Health Act required that local authorities provide care for those who were mentally ill but who were not in hospital. An expansion in domiciliary health care reflects a change in the length of stay in hospital.

A number of reasons could be given for the growth of expenditures for each service. However, a more detailed analysis of the expenditure growth of the police, fire, and education services is given in a subsequent chapter. It was seen in chapter 3 that explanations of public expenditure growth are likely to be multi-faceted and complex. At this stage, therefore, nothing other than the most superficial of explanations can be offered to account for the trends in expenditure growth presented in Table 2.

1. The average cost per acre in 1966/67 was £487.

A breakdown of the annual rates of growth for a number of sub-periods is given in Table 3. It can be seen that there is an unevenness in the rates of change for each service as between sub-periods, thereby suggesting that an examination of each sub-period would be likely to indicate particular events which have influenced expenditure growth.

Table 3 Compound Annual Rates of Expenditure Growth for Glasgow Services
(Current Prices)

Service	%			
	1950/51- 1954/55	1955/56- 1959/60	1960/61- 1964/65	1965/66- 1969/70
Police Service	6.2	8.1	7.8	8.5
Lighting	6.5	2.1	2.5	6.6
Fire Service	11.3	9.8	12.0	6.8
Cleansing	7.8	7.0	6.2	9.7
Parks	8.1	6.1	5.8	11.5
Libraries	8.9	7.1	6.2	8.4
Museums & Art Galleries	10.1	6.9	12.2	9.0
Streets etc	7.9	6.9	1.9	12.2
Sewage Purification	5.2	0.8	5.1	11.0
Planning	-	31.6	44.4	32.8
Education (total a/c)	10.1	8.7	8.5	8.5
Children's Service	5.1	5.1	9.1	13.8
Health & Welfare	5.4	9.4	6.0	7.4
Housing	-	2.0	12.0	14.3
Primary & Secondary School Expenditure	9.1	9.6	7.8	7.8

6.3. Glasgow's Expenditure Growth and the National Averages

The rates of expenditure growth which were established in Table 2 for Glasgow are now compared against national averages. This is done in two ways, which are complementary to one another. Firstly, Appendix 6.D presents year on year changes in the current expenditures of a number of services for Glasgow, Scotland and England and Wales. It should, however, be remembered that since Glasgow is a significantly large proportion of Scottish Local Authority expenditures,¹ then annual changes in Scottish

1. Clearly the proportion will change from service to service but Glasgow's total local government current expenditure is 25% of the equivalent Scottish total (i.e. for 1970).

expenditures will tend to move close to those for Glasgow. It should further be noted that there is nothing to suggest that the absolute value of the annual changes in Glasgow's expenditures should be the same as those for the national averages. The important point to note is the timing of the peaks and troughs of Glasgow's annual changes compared to those for the national averages. The second way in which Glasgow's expenditure trends are compared with the national averages is to calculate the annual compound rates of growth in the expenditures of a number of rating services for Scotland and England and Wales. This comparison is made in Table 4 below.

One word of caution is necessary before any comparisons are made between Glasgow's expenditures and those for Scotland and England and Wales. It cannot be easily established if the definitions of the coverage of expenditures used by the C.S.O. when compiling the Annual Abstract of Statistics are identical to those used in the Glasgow Accounts. The assumption is made that they are in fact the same.

Table 4 Comparison of Rates of Change in Selected Expenditures for Glasgow, Scotland, England and Wales

Service	Area	%	
		1950/51- 1969/70	1960/61- 1969/70
1) Total Local Government Expenditure (a)	Glasgow	8.4	8.5
	Scotland	8.9	9.6
	England/Wales	10.0	10.4
2) Total Rating Account Expenditure (b)	Glasgow	10.0	10.2
	Scotland	N/A	10.1
	England/Wales	N/A	11.2
3) Police	Glasgow	8.3	8.2
	Scotland	9.1	9.3
	England/Wales	9.5	10.6
4) Fire	Glasgow	8.4	8.6
	Scotland	9.4	10.4
	England/Wales	7.7	9.6
5) Education	Glasgow	8.9	8.5
	Scotland	9.4	9.2
	England/Wales	10.9	10.7
6) Housing (c)	Glasgow	10.6	13.5
	Scotland	10.5	12.1
	England/Wales	11.0	11.4

Notes

- a) Total Local Government includes Revenue Producing Account expenditure
- b) It was not possible to separate out Rating Account expenditure from total Local Government expenditure for Scotland and England and Wales over the period 1950/51 - 1960/61.
- c) Instead of 1950/51 - 1969/70 the growth rate in the first column is calculated over 1953/54 - 1969/70.

Sources

Glasgow data from Abstract of Accounts (Glasgow Corporation)
 Scotland and England and Wales data from Annual Abstract of Accounts, HMSO

The picture which emerges from Table 4 is that the annual compound rates of growth in those selected items of current expenditure are lower for Glasgow than they are for Scotland and England and Wales, with the exception of housing expenditure which shows Glasgow having the fastest rate of growth. This is also borne out in Appendix 6.D, which shows the same pattern for more services than those shown in Table 4.

The slower rate of growth in Glasgow's expenditures (excluding housing expenditure) reflects the severe manpower shortages, relative to the national averages, which have been characteristic of the majority of Glasgow's services. The annual reports of Glasgow's Police Department, Fire Department, Education Department, Social Work Department etc all show an increase in wastage rates over the period 1950/70.¹

Another interesting feature revealed in Appendix 6.D is that the timing of pay awards to school teachers and further education lecturers in Scotland lag behind those in England and Wales by anything up to 12 months. This puts the year on year changes in expenditures for Glasgow and Scotland out of phase with those for England and Wales.

To explain thoroughly the reasons for the rate of growth in Glasgow's housing current expenditure relative to that for Scotland and England and Wales would go beyond the scope of this study. Partial explanations would include the persistent policy of successive local administrations in Glasgow over the period to delay, behind the rest of the country, increasing rents on local government housing. This has resulted in increases in rent subsidies which are paid from the housing account. The proportion of the housing stock owned by local authorities in Scotland is greater than in England and Wales. In 1969/70 40% of the housing stock in Scotland was owned by local authorities compared to 25% for England and Wales. The corresponding figure for Glasgow

1. See Appendix 6.F for more details of manpower growth over the period.

was 49%. Glasgow's house building programme, which is discussed below, contributed to an expansion in loan charges. Whether or not these observations are adequate explanations for the differences in growth rates in housing current expenditures could only be answered by a more detailed analysis.

The general picture, which emerges from these comparisons, is that, for those categories of current expenditures, which have been compared, the rates of increase in Glasgow's expenditures have been slightly lower than those for the nation as a whole. The notable exception, however, was housing expenditure, which grew faster in the case of Glasgow. Appendix 6.D confirmed that the timing of the direction of the year on year changes in Glasgow's expenditures followed very closely the pattern for the national averages. This suggests that whilst Glasgow has its own particular environment which determines its expenditure pattern, nevertheless a large part of that environment is shared in common with other local authorities throughout the U.K.

6.4. Per Capita Expenditure Growth

The ratio of expenditure to population size serves a number of useful purposes. For example to deflate expenditure by population is a first approximation to adjusting expenditure changes resulting from changes in population. Another possible use of the per capita expenditure magnitude is to indicate the expenditure of resources (at current prices) made per member of the population. Finally the per capita expenditure figure indicates roughly the share of total expenditure each person is likely to be asked to bear in the form of taxation.¹

In the case of Glasgow, over the period 1950/70, per capita current expenditures (at current prices) for each service have increased. This is shown in Table 5. A comparison between Tables 5 and 2 reveals that in all

1. The actual burden will depend upon the cost sharing rules.

TABLE 5

PER CAPITA EXPENDITURES CURRENT RATING ACCOUNT GLASGOW (£)

(current prices) (1)

SERVICE	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	Annual Compound * rate of growth 1950/70 (2)
Police	1.59	1.78	1.86	1.92	2.05	2.33	2.73	2.76	3.02	3.19	3.66	4.03	4.37	4.78	5.64	6.23	6.93	7.07	7.57	8.58	9.2%
Lighting	0.77	0.79	0.97	0.94	1.00	1.08	1.18	1.15	1.21	1.18	1.18	1.24	1.30	1.37	1.37	1.51	1.64	1.84	1.84	2.12	5.4%
Fire Service	0.34	0.36	0.38	0.41	0.42	0.47	0.55	0.61	0.68	0.69	0.77	0.84	1.01	1.14	1.26	1.33	1.47	1.57	1.57	1.86	9.2%
Cleansing	1.10	1.22	1.32	1.40	1.50	1.67	1.78	1.97	2.06	2.19	2.25	2.47	2.50	2.65	3.00	3.37	3.68	4.05	4.32	5.24	8.5%
Parks and Burial Grounds	0.48	0.54	0.59	0.59	0.65	0.73	0.79	0.84	0.90	0.92	0.99	1.06	1.10	1.19	1.30	1.53	1.70	1.98	2.20	2.54	9.1%
Libraries	0.20	0.23	0.25	0.27	0.29	0.32	0.36	0.38	0.41	0.42	0.45	0.50	0.52	0.56	0.60	0.68	0.76	0.82	0.89	1.01	8.6%
Museums and Art Galleries	0.57	0.79	0.82	0.82	0.84	0.91	1.04	1.08	1.07	1.19	1.23	1.42	1.63	1.80	2.05	2.22	2.38	2.89	2.97	3.38	9.6%
Streets	—	0.96	0.94	1.19	1.22	1.32	1.32	1.35	1.73	1.73	1.78	1.92	1.99	1.91	2.00	2.15	2.40	2.77	3.27	3.66	7.6%
Sewers	—	0.09	0.09	0.13	0.11	0.12	0.14	0.10	0.08	0.08	0.08	0.88	1.11	1.13	1.24	1.41	1.87	2.10	1.77	2.20	19.4%
Sewage Purification	0.45	0.46	0.57	0.52	0.56	0.60	0.68	0.61	0.62	0.62	0.60	0.65	0.64	0.69	0.76	0.91	1.08	1.10	1.36	1.48	6.5%
Planning	—	—	—	—	—	0.03	0.06	0.06	0.07	0.11	0.16	0.22	0.32	0.44	0.72	1.14	1.79	2.46	3.04	3.82	37.0%
Health and Welfare	1.50	1.65	1.81	1.80	1.86	2.03	2.31	2.54	2.72	2.91	3.08	3.22	3.56	3.82	4.08	4.76	5.23	5.75	6.20	—	6.9%
Housing	0.69	0.72	1.11	4.57	5.16	6.55	6.75	6.27	6.73	7.15	7.58	8.50	9.53	10.52	12.67	14.66	17.45	19.84	22.89	26.87	11.7%
Children Services	0.30	0.33	0.37	0.37	0.37	0.38	0.40	0.44	0.45	0.46	0.50	0.54	0.64	0.64	0.74	0.82	0.94	1.07	1.27	—	8.3%
Education	7.19	8.35	9.13	9.65	10.68	11.82	13.63	14.66	15.95	16.54	17.75	20.02	21.28	23.35	25.79	28.68	32.79	34.94	38.33	42.68	9.8%
Primary and Secondary school expenditure per pupil	29.54	34.51	36.69	38.78	40.62	43.62	50.78	55.75	59.22	61.78	65.75	75.59	79.94	85.03	90.69	96.95	108.05	113.05	121.15	130.69	8.1%
Population (million)	1.09	1.09	1.09	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.07	1.05	1.05	1.04	1.02	1.00	0.98	0.96	0.95	0.93	
Number of local government voters (million)	0.73	0.73	0.73	0.73	0.73	0.73	0.72	0.71	0.71	0.71	0.70	0.69	0.68	0.67	0.66	0.65	0.63	0.63	0.61	0.64	
Primary and Secondary pupils (million)	0.173	0.175	0.178	0.172	0.178	0.177	0.179	0.179	0.179	0.180	0.179	0.179	0.178	0.177	0.175	0.174	0.174	0.174	0.174	0.174	

Notes: (1) Source Annual Abstract of Accounts, Glasgow

(2) Annual Compound Rates of Growth for the services of Streets, Sewers, and Planning have been calculated over the period for which data exists up to 1969/70.

cases per capita expenditures have increased more rapidly than absolute values of expenditure. The reason for this can be seen from the trend in population, also shown in Table 5. It will be recalled from chapter 4 that Glasgow's total population has declined over the post war period and that the rate of decline increased during the 1960's, partly as a result of deliberate policy through the overspill programme and partly due to voluntary emigration. The result has been that current expenditures (at current prices) have been rising whilst the population has been falling producing the more rapid increase in per capita expenditures.

One interesting feature of this movement in per capita expenditure is that if current expenditure (at current prices) for any of Glasgow's services is plotted against population size then the general shape of the curve shown in figure 3 is produced.

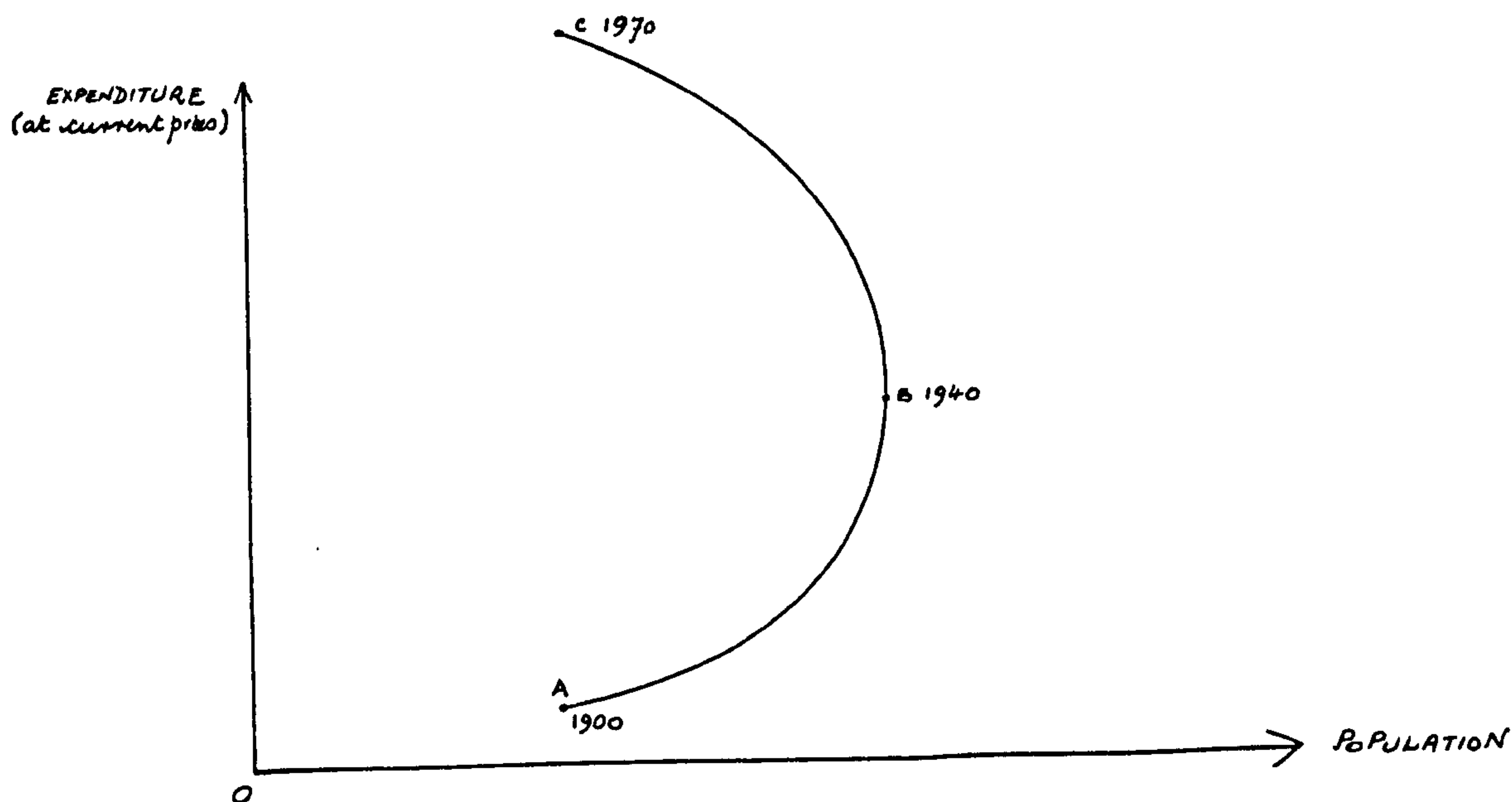


Figure 3

Point A corresponds to population size and expenditure in, for example, 1900. Population and expenditure both increased over the period 1900 - 1940 which is shown by the line AB. Expenditure grew for a number of reasons e.g. in response to the larger population, because of changes in environmental variables and increases in the input prices.¹ In 1940, however, population

1. Chapter 3 gives a more extensive list of possible causes of expenditure growth.

began to fall but since there were pressures which caused expenditure to continue rising the curve bent back and moved, over time, to a point such as C.

The implications of this phenomenon are of some significance especially for distributional efficiency. Since it is the economically active who have the greatest chance of leaving the city those who remain are more likely to be the aged, the very young, and those on lower incomes. This was seen to be the case in chapter 4. These households which remain in the city have, therefore, to bear an increasing share of a growing set of expenditures. This in turn promotes a further decline in the population as more are driven out of the city because of the growing local tax burden.^{1,2}

6.5. The Impact of Inflation on Expenditure Growth

In chapter 5 a number of input price indices were calculated, which showed the rise in the prices of the vector of inputs purchased by Glasgow relative to prices in the base year 1963. This section will use these input price indices to show how much of the increases in current expenditures can be explained by the inflation in input prices.

Table 6, below, shows the annual growth rates of certain categories of current expenditures, at 1963 prices, for Glasgow, whilst Table 7 compares the growth in real expenditures for Glasgow, Scotland and England and Wales.

Table 6 Annual Growth Rates in Current Expenditures (at 1963 prices)

<u>Service</u>	<u>1950/60</u>	<u>1960/70</u>	<u>1950/70</u>
Police	4.2	4.2	4.2
Fire	3.5	4.1	3.8
Education	5.4	3.3	4.3
School	3.4	2.1	2.8
Total Rating	N/A	4.2	N/A

1. This process of central city decay is prevalent in many major American cities. New York provides a good example.
2. Central government policy exercised through the Domestic Element, the Resources Element and the Needs Element of the Rate Support Grant plus the Rates Rebate Scheme tries to alleviate these problems.

Table 7 Annual Growth Rates in Current Expenditure at 1963 Prices (1950/70)
(U.K., England and Wales, Scotland and Glasgow)

<u>Service</u>	<u>U.K.</u>	<u>England and Wales</u>	<u>Scotland</u>	<u>Glasgow</u>
Fire	5.0	3.4	4.2	3.8
Education	6.5	5.2	4.6	4.3
Police	5.8	4.8	4.6	4.2

Sources

- i) the rates of increase for the U.K. were provided by the Treasury and are published in Goldman (96). They are in terms of 1972 prices.
- ii) the rates of increase for England and Wales and Scotland were calculated by applying the Glasgow indices calculated in chapter 5 to local government expenditures for England and Wales and Scotland collected from the Annual Abstract of Statistics.

By comparing the annual rates of growth in real expenditure given in Table 6 with the rates of growth in money expenditures given in Table 2, the impact of the inflation of input prices on Glasgow's expenditures can be calculated. Thus, inflation accounted for 51% of the annual increase in Glasgow's Police expenditure, 55% of Fire expenditure and 66% of School expenditure over the period 1950/70. Over the same period 52% of the annual increase in Glasgow's current expenditure on the Rating Account was explained by inflation.

Applying¹ the input price indices calculated for Glasgow to local government expenditures for England and Wales and Scotland provided the calculation to give the rates of growth in real expenditures shown in Table 7. The figures for the U.K. are taken from Goldman (97).

The rates of increase in real expenditures for England and Wales, Scotland and Glasgow are similar, however, the figures for the U.K. are significantly larger. One explanation for this would be that there is an important difference in the indices used by Goldman and those calculated in chapter 5. Since Goldman does not make any reference to the indices which he used further comment is not possible.

One possible interpretation of the rates of increase in real expenditures

1. The problem with such an exercise is that the weights are likely to be different. However the exercise is simply a first approximation.

is that they indicate an increase in the volume of resources used in the production of public sector output. Moreover, in the case of Glasgow since population is falling per capita real expenditures are rising also. However to jump to the conclusion that rising per capita real expenditures indicates an improvement in welfare can only be justified under a limited number of cases. Consider the following illustrative example. If the environmental variables for a particular service are deteriorating then an increase in the demand for real resources will be necessary to maintain current levels of output quantity and quality. Thus to make the statement that an increase in per capita real expenditures on public sector services implies an increase in welfare must be severely qualified, since it does not automatically follow that an increase in the volume of inputs implies an expansion in the quantity or quality of output.

Year on year changes in Glasgow's total Rating Account current expenditure at 1963 prices are compared with Local Authority current expenditure on goods and services for the U.K. at 1963 prices, GDP at 1963 factor cost, and Public Authority current expenditure on goods and services at 1963 prices. These comparisons are made in Table 8.

Table 8 Year on Year Changes in Expenditures at 1963 Prices

%

Year	Rating Current Expenditure Glasgow (a)	Local Authority Current Expenditure U.K. (b)	GDP at 1963 factor cost (c)	Public Authorities Current Expenditure (d)
1957/58	1.8		0.0	-2.3 (e)
1958/59	4.7		4.5	2.1
1959/60	0.1		5.4	2.2
1960/61	0.0		1.8	3.7
1961/62	4.6		1.4	3.1
1962/63	2.5		3.3	1.6
1963/64	3.0		5.8	1.7
1964/65	6.8	3.8	2.6	2.8
1965/66	6.1	5.5	1.7	2.7
1966/67	9.0	5.7	1.5	5.7
1967/68	2.0	4.5	3.9	0.0
1968/69	4.9	2.5	2.3	0.0
1969/70	4.5	1.2	1.7	0.0
1970/71	4.2	5.5	1.9	3.1

Notes: *to table 8.*

- a) deflated by Glasgow Rating Account Price Index
- b) Local government current expenditure on goods and services (Source: HMSO, National Income and Expenditure) deflated by an unpublished price index provided by C.S.O. This index only goes back as far as 1963.
- c) Source: Table B, "The British Economy Key Statistics 1900-1970"
- d) Current expenditure on goods and services only. Source - as for (c)
- e) reduction due to run-down in defence expenditure, 1954/58, following the Korean war.

It can be seen from Table 8 that the growth in Glasgow's Rating Account real expenditure has been greater than the growth in real GNP at factor cost. The same is also true for U.K. Local Government current expenditure on goods and services. This confirms the impression held by many that local government expenditure has been one of the fastest growing components both of GNP and of public expenditure at both current and constant prices.

6.6. Composition of Inputs to Service Expenditures

The section above discussed the impact of input price changes upon expenditure growth. This section will examine changes in the composition of the inputs employed in certain services. In particular it will examine payroll expenses, loan charges, and pensions. The objective of this exercise is to identify those components of expenditures which have contributed to overall growth (at current prices).

Table 9 shows payroll expenses as a proportion of current expenditure (at current prices).

Table 9 Payroll Expenses as a Proportion of Current Expenditure (Glasgow)

<u>Service</u>	<u>1949/50</u>	<u>1954/55</u>	<u>1959/60</u>	<u>1964/65</u>	<u>1969/70</u>
Education Teachers' payroll (a)	50.5	63.0	60.3	60.7	57.2
Police	69.6	69.9	61.8	65.8	58.2
Fire	56.1	61.2	61.4	62.0	58.7
Cleansing	71.2	71.0	67.9	72.2	70.1
Libraries	67.2	72.8	72.0	69.8	66.4
	48.6	51.9	50.7	50.6	51.6

Note:

- a) Teachers' payroll shows the proportion of primary and secondary school expenditure devoted to teachers' payroll.

Payroll expenses for this exercise have been defined to include wages and salaries, national insurance and employer's contributions to superannuation. It can be seen that there is no strong trend in payroll expenses. This confirms the observations made in chapter 5, that there exist a large number of unfilled vacancies in most services and furthermore there have not been, over the period, substantial wage awards in the local government sector.

One component of expenditure which is frequently omitted from discussions of public expenditure growth but which is of growing importance is that of expenditure on superannuation and pension schemes. For 1969 60% of Glasgow Corporation's employees were members of the Corporation's Superannuation Scheme.¹ This number excluded operational personnel in the Police Force and the Fire Service and excluded school teachers who have their separate schemes. The superannuation fund is a non-rating account administered by the Corporation. However, the Corporation contributes a sum equal to the employees' contributions and also pays an "equal annual charge" in respect of actuarial deficits. The Corporation's contributions are charged to the Rating Accounts. These charges are included in the payroll expenditures of Table 9.

The Police and Fire services have their own pension schemes, so that in addition to contributions to their superannuation scheme being charged to the Rating Account's expenditures the actual payment of pensions is also shown as a charge to the current expenditure account.

Table 10 shows the proportion of total current expenditure on Police and Fire services allocated to the payment of pensions.

1. The scheme was established under a Local Act of 1923 and subsequently modified in 1938 under the "Glasgow Corporation (Superannuation) Modification Scheme 1938", to comply with the provisions of the Local Government Superannuation (Scotland) Act 1937. In 1955 a new scheme came into operation framed in terms of the Local Government (Superannuation) Act 1953.

Table 10 Pensions as a Proportion of Current Expenditure

<u>Service</u>	%				
	<u>1950/51</u>	<u>1954/55</u>	<u>1959/60</u>	<u>1964/65</u>	<u>1969/70</u>
Police	17.1	15.9	14.8	14.0	13.4
Fire	N/A	N/A	6.0	7.5	8.4

The decline in pension payments as a proportion of police expenditures reflects the fact that policemen are now leaving the police force before they reach pensionable age. This corresponds with the high wastage rates mentioned above.

With recent developments in pension schemes the Corporation's contributions will become an important source of expenditure increases. The 1971 (Pension) Increase Act introduced radical changes to the arrangements for increasing the pensions of public sector employees. The 1972 Superannuation Act also improved the benefits of pension schemes generally. As a result of these changes the Corporation's contributions were increased as from 1st June 1973.

Finally a major item of expenditure for any service is loan charges. These charges are made up of interest paid on borrowed capital and contributions made towards the liquidation of the debt. Both of these items are charged to the current expenditure account. Table 11 shows loan charges as a proportion of current expenditure. The growth in loan charges reflect changes in interest rates and the increase in debt due to expansions in capital expenditure.

Table 11 Loan Charges as a Proportion of Current Expenditure (Glasgow)

<u>Service</u>	%				
	<u>1949/50</u>	<u>1954/55</u>	<u>1959/60</u>	<u>1964/65</u>	<u>1969/70</u>
Education	3.2	4.5	7.3	9.4	12.3
Police	N/A	1.7	2.9	2.9	2.4
Fire	N/A	4.5	4.8	4.6	4.9
Cleansing	1.9	13.3	10.9	19.3	33.3
Libraries	5.4	4.4	5.2	5.8	6.7

Increases in capital expenditures, which have contributed to the growth in

loan charges are now considered in the next section.

6.7. Capital Expenditure Growth

This section will examine the trends in the growth of capital expenditure on the Rating Account. Glasgow, like many cities and urban areas in the U.K., emerged from the 1939/45 war with much of its social capital in a war damaged state. Even if war had not damaged the City of Glasgow it is still likely that reconstruction would have occurred. The war, acting as a catalyst, probably precipitated the action a bit sooner. Glasgow was a Victorian city and its schools, housing and other forms of social capital were beginning to reach the end of their economic life. The population of the city had reached its zenith during the second world war with 1.12 million people. Strains were being placed upon housing space and housing quality (housing densities, and the age of housing stock) and the automobile required town planners to think about urban motorway systems. A growing juvenile population also placed stress on existing class-room places in schools.

The post war period, therefore, witnessed a physical reconstruction of the city but more importantly a re-location of its inhabitants.¹ New housing schemes were built by the Corporation on the outskirts within the boundary of the city. Slum clearance programmes moved the population to these new areas of the city and also through planned population overspill and voluntary emigration to areas outwith the city. Appendix 6.C shows the extent of the Corporation's house building programme which was pursued from 1945/69. Over that period 85,036² houses were completed compared to 54,361 completed between 1919/1944.

As the population moved to new areas in the city, new schools, police and fire stations, roads, streets, sewers and street lighting had to be constructed.

Table 12 shows gross capital expenditure on Glasgow's Rating Account. Like

1. These changes are discussed in more detail in chapter 4.
2. This represents 16% of the total number of council houses built in Scotland over the same period. For Scottish housing data, see "Local Government Trends", (IMTA) p 146.

(£m)

GROSS CAPITAL EXPENDITURE : CITY OF GLASGOW RATING ACCOUNT

TABLE 12

SERVICE	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70
Police	0.07	0.13	0.09	0.27	0.12	0.21	0.16	0.23	0.11	0.14	0.18	0.09	0.12	—	0.19	0.11	0.05	0.06	0.11	0.22
Lighting	—	—	—	—	—	—	0.02	0.03	0.01	—	0.02	—	—	—	—	—	—	—	—	0.11
Cleansing	0.02	—	0.01	0.02	0.05	0.15	0.39	0.84	0.31	0.12	0.06	0.07	0.51	0.32	0.15	0.18	0.04	0.16	0.84	0.12
Fire	—	0.09	0.04	0.14	0.02	0.07	0.01	0.05	0.03	0.01	0.04	0.11	0.04	0.03	0.04	0.07	—	0.02	0.10	0.11
Libraries	—	0.02	0.04	0.04	0.01	0.03	0.05	—	0.02	0.01	0.01	0.02	—	—	—	0.02	0.08	0.11	0.08	0.29
Parks	—	—	—	—	0.01	0.02	0.04	0.04	—	0.03	0.02	0.04	0.04	0.03	—	—	0.08	0.05	0.08	0.08
Art Galleries and Museums	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	—	0.03	0.04	0.02	0.02
Streets/Bridges	0.03	—	—	0.03	0.04	0.04	0.10	0.47	0.75	0.17	2.05	2.39	2.65	1.05	0.97	1.65	4.58	8.09	7.17	6.85
Sewers	0.02	—	0.16	—	—	—	—	—	—	—	—	—	0.06	0.08	0.15	0.04	0.14	0.02	0.24	0.09
Sewage Purification	0.14	0.08	0.14	0.35	0.39	0.28	0.18	0.08	0.22	0.15	0.14	0.11	0.51	0.33	0.13	0.79	0.48	0.16	0.33	0.25
Education	0.67	1.02	1.74	1.19	1.55	2.24	2.34	2.17	2.43	2.79	2.47	3.62	4.28	3.55	3.54	3.05	4.79	5.23	7.77	7.52
Housing	—	—	—	—	—	9.05	9.10	7.85	5.98	5.95	7.51	7.90	10.19	15.20	18.38	17.06	21.29	20.92	21.36	13.65
Health/Welfare	0.05	0.7	0.04	0.04	0.04	0.04	0.10	0.12	0.06	0.05	0.03	0.06	0.13	0.13	0.20	0.14	0.12	0.18	0.24	0.03
Total Capital expenditure on rating account	1.10	1.50	2.31	2.10	2.31	12.25	12.61	12.03	10.17	11.16	12.88	15.97	19.41	26.55	25.53	27.77	33.63	35.84	40.80	33.74

- Notes: (i) For the years in which capital expenditure was less than £10,000 but greater than zero, a dash is recorded
(ii) From 1956 Housing capital expenditure was recorded under Rating Account instead of as previously the Revenue Producing Account
(iii) Storm damage 1969 = £6,415,194; 1970 = £2,024, 966
(iv) Glasgow Airport: Cost of initial development £4.3m. The Corporation paid £2.43 millions of this spread overs years 1966/71

most items of capital expenditure it fluctuates from one year to the next. Police capital expenditure shows periods of rapid growth when new police stations were being built followed by periods of relative inactivity. Education, Housing and Streets' capital expenditures show a persistent rise as would be expected.

The definition of capital expenditure used is perhaps slightly different from that which the economist is accustomed to using. In all cases the capital expenditure shown in Table 12 refers to expenditure on buildings e.g. new schools, police and fire stations. Other capital items such as police cars, wireless systems, fire engines etc are charged in the year of purchase to the current account. These definitions conform to standard local government accounting procedures.

The rise in capital expenditures accounts for the rise in loan charges on the current accounts. In the cases of Education, Housing and Streets, for which capital expenditure is large and persistently expanding, loan charges as a proportion of current expenditure have been growing: see Table 11 above.

Table 13 shows the expansion in the debt outstanding.

Table 13 Debt Outstanding Glasgow (as at 31st May)

Year	Debt on Rating Account	Rating Account Debt per capita (£)	Total Debt ¹ Outstanding	£(m)
1939	41.58	36.8	53.57	
1945	40.85	38.9	46.85	
1950	54.01	49.6	58.60	
1955	98.45	91.2	106.45	
1960	142.35	131.80	153.21	
1965	213.97	209.77	234.47	
1970	346.33	368.08	364.23	

Source: City of Glasgow Accounts (various years)

The average annual growth in Rating Account debt per capita has been increasing at the following rates;

1. Total debt for all other accounts e.g. Revenue Producing Account and Loans for house purchase.

1955/60 average annual increase = 8% p.a.
 1960/65 average annual increase = 11% p.a.
 1965/70 average annual increase = 15% p.a.

In summarising the above sections on expenditure growth, it has been shown that rating expenditure is the most important item of local government expenditure in terms of its size and rate of growth. The rating services have experienced marked growth both in real and in money terms. In per capita terms the growth has been even greater for Glasgow since expenditure growth has been accompanied by a fall in population. Capital expenditure has also shown a noticeable increase contributing through loan charges to increases in current expenditure.

6.8. Rating Account Revenue

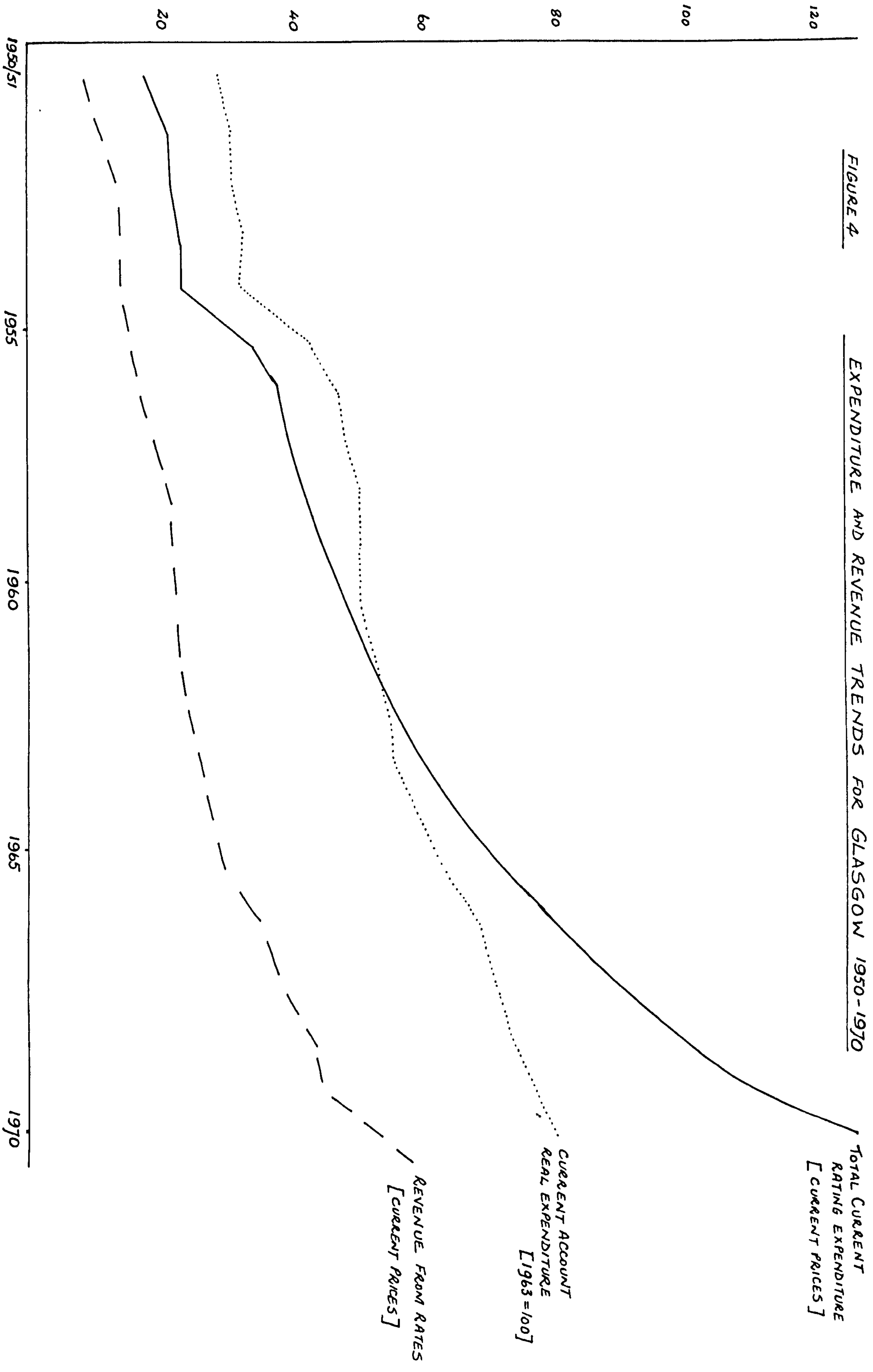
The above sections have concentrated upon expenditure growth. This next section is devoted to the financing of these expenditures.¹ Local governments have three sources of finance. Firstly there is the rate call or the local rate, which is essentially a local property tax based upon rental values rather than capital values. Secondly there are a number of central government grants in aid to local government of which the principal component is the Rate Support Grant (R.S.G.). Finally there is the possibility of borrowing. Loan finance, however, is traditionally used to finance capital expenditure and seldom ever used to finance current expenditure. In addition to these principal sources of finance there is a miscellaneous category which is made up of user charges, rents and fines. Miscellaneous income is, however, not significantly large.

During periods of rapid growth in the money expenditures the burden of taxation may increase also. In recent years a number of pressure groups of local ratepayers have emerged in the U.K. complaining of the pressures of local taxation. Figure 4 shows the growth in total rating account current expenditures (at current prices) and the growth in revenue from the local rate

1. See Appendix 6.E for more details.

£ (m)

FIGURE 4 EXPENDITURE AND REVENUE TRENDS FOR GLASGOW 1950-1970

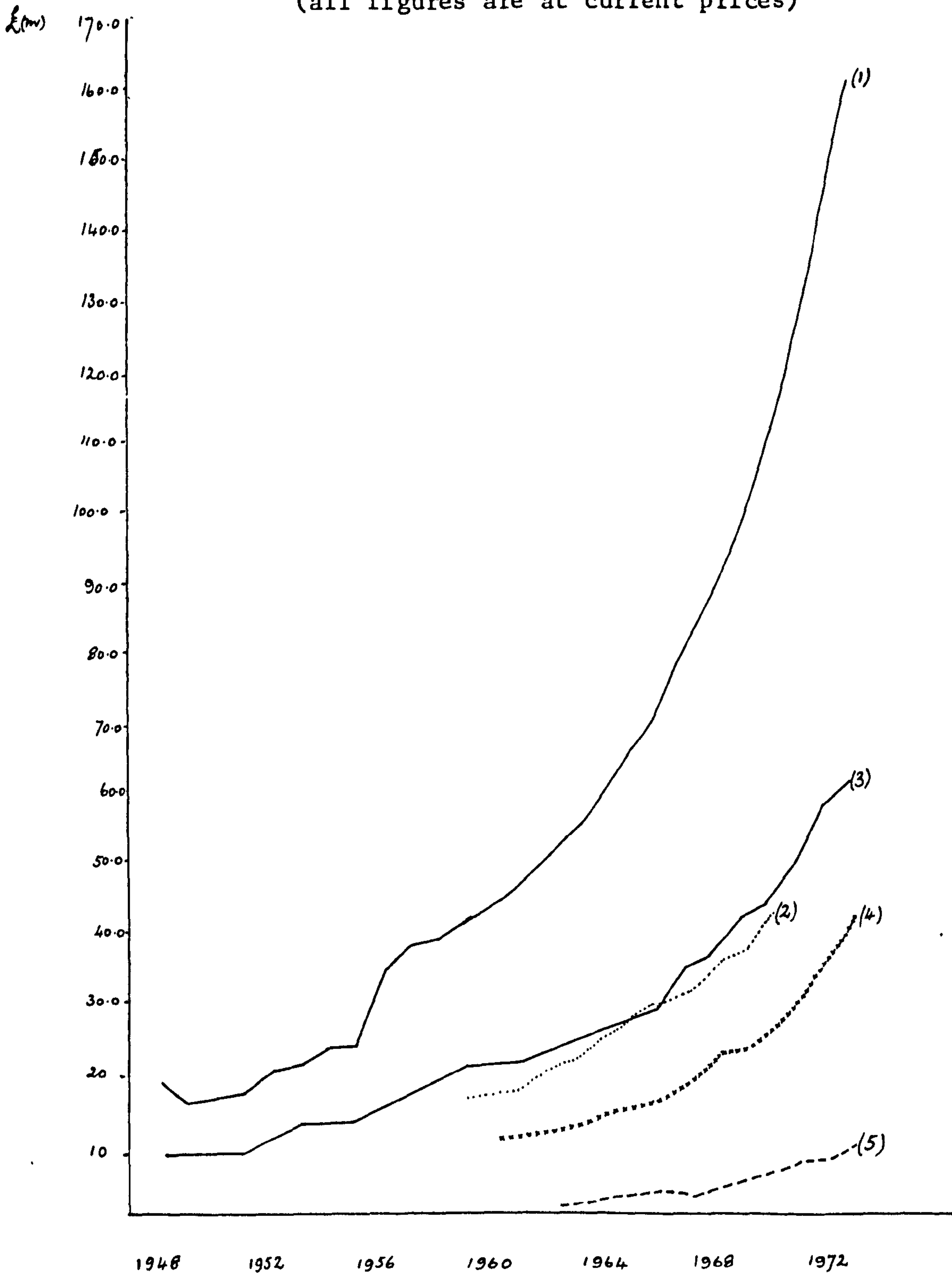


for Glasgow. It can be seen that there has been an expansion in the income gap over time¹ (i.e. the difference between rating expenditures and rate income). Figure 5 shows the growth in central government grants. Given the many changes in the grant structure² which have taken place over the period it has not been possible to show a longer series for grant income. Rate income, however, as a percentage of total Rating Account income has fallen from 52% in 1950/51 to 37% in 1972/73. The gap has been filled by increased central government grants.³

Figure 6 shows the movements in Glasgow's rateable values and rate poundages. The growth in revenue from the local rate is shown alongside the growth in the rateable value for Glasgow (both are at current prices). It is well known that rateable values, which is the local tax base upon which the local rate is levied, lacks buoyancy. This is clearly demonstrated in the case of Glasgow by an inspection of figure 6. Real increases in rateable values come from increased real values of existing buildings or from the addition of new buildings. Glasgow, however, has been a city which has reduced its housing and building densities. This loss of rate revenue through "planning blight" is a problem which faces many cities like Glasgow. Figure 6 shows that for some years, for example 1962/63, 1968/69, 1972/73, 1973/74, the rateable value of the city was falling. This lack of growth in the rate base implies that rate poundages have to increase in order to finance rate-borne expenditures. Figure 6 also shows the rises in rate poundages which have occurred. The discrete jumps in figure 6 for the years 1961/62, 1966/67,

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1. Many other writers have noted this income gap in other services. See for example Baumol and Bowen's (i7) analysis of the American performing arts.
 2. See Appendix 6.E.
 3. It should be noted that it has not been possible to carry out a more detailed analysis of revenue growth, because it turned out to be a major statistical exercise to analyse non-rate income which is made up of non-matching grants, specific grants and miscellaneous income such as rents and user charges. For 1958/70 total grants are shown in figure 5, thereafter, it has not been possible to separate out specific grants from miscellaneous income. A general comment is that such basic summary statistics ought to be more readily available.

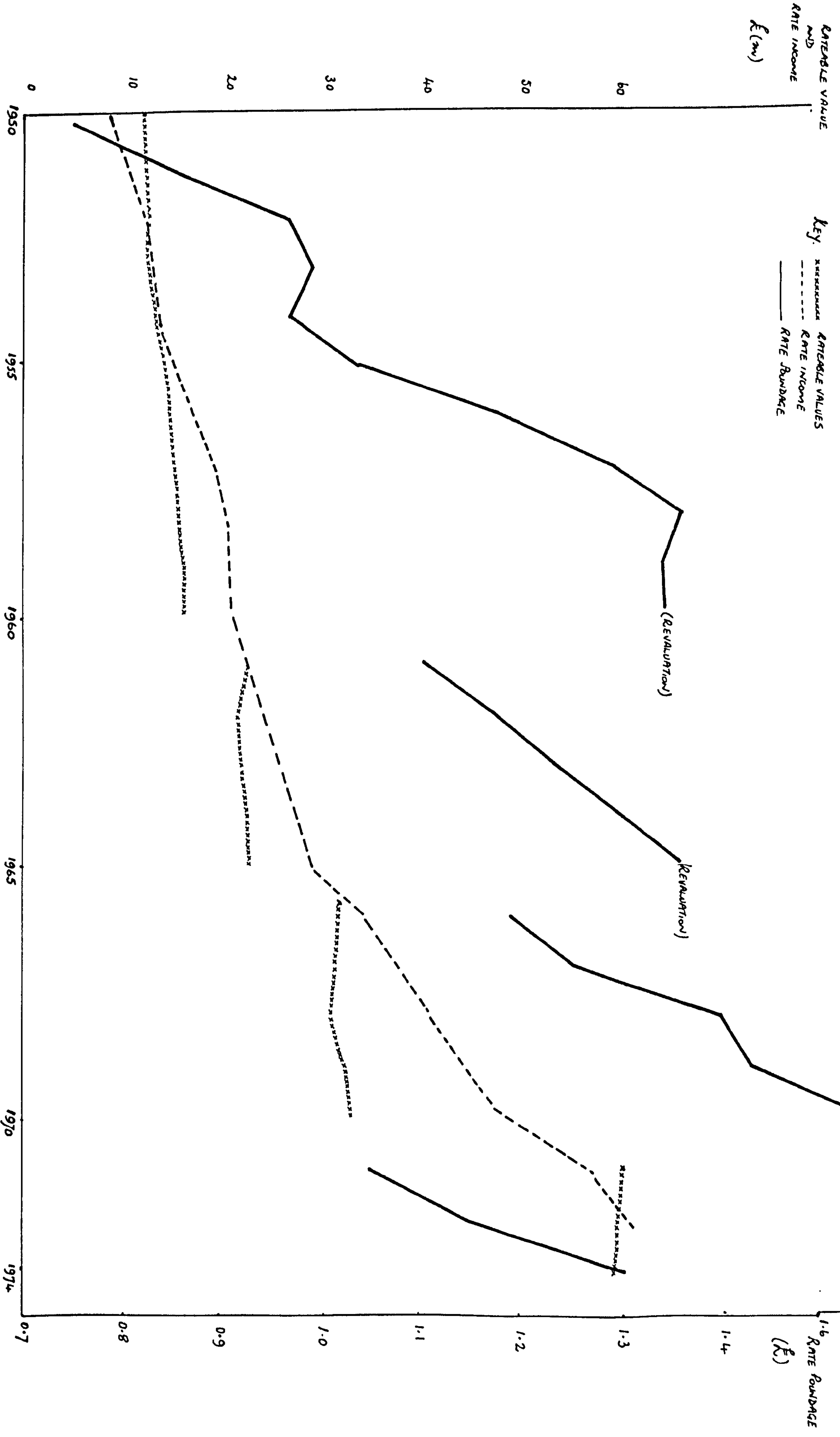
Figure 5 Expenditure and Revenue Trends Glasgow 1948-1972
(all figures are at current prices)



- Notes:
- (1) Total Rate Account Expenditure
 - (2) Grant Income i.e. (4) + (5) + Specific Grants
 - (3) Rate Income
 - (4) General Grant Income
 - (5) Equalisation Grant Income
- } RSG introduced in 1966^(a)

(a) The needs element of RSG continues the General Grant Graph and the Resources Element of RSG continues the Equalisation Grant Graph. The Domestic Element of RSG is not shown.

FIGURE 6 RATE INCOME, RATEABLE VALUES, AND RATE POUNDAGES, GLASGOW 1950/74



1971/72 represent the quinquennial revaluations of the city's rate base.

Another important feature of the local rate apart from its lack of buoyancy is its regressivity. In 1965 the Allen Committee (24) was set up to assess the impact of local rates on households in different income groups and in different parts of Great Britain. The committee found, as had the Fitzgerald Departmental Committee on Valuation for Rates in 1938, that rates were, for many households with moderate incomes, substantially less in amount than taxes paid on alcohol or tobacco. They found that rates were undoubtedly regressive and that the highest burden was felt by those who whilst eligible for social security benefit had not applied for it. The main problem of hardship was experienced by retired families and those on fixed incomes.

Lady Ursula Hicks'¹ comments on the Allen Committee Report made the point that:-

"Although rates in relation to incomes are not on the average any higher than they were pre-war, most families now have many more commitments than they had These can put them into a situation of chronic illiquidity in which they find it almost impossible to reserve a substantial sum of money for a semi-annual rate payment".

This point of Lady Hicks' was taken up in the Crossman Local Government Act (1966), which enabled the domestic rate payer to pay his rates by monthly instalments.

It was not possible to examine the rate burden across income groups in the case of Glasgow. Such an exercise would require the data of a special survey. However, for 1969/70, 37.5% of the total rateable value of the city fell upon domestic households, who constitute 88% of the subjects rated. The remainder is borne mainly by commercial and industrial subjects.

Summary and Conclusion

This chapter has provided the information which is the essential starting point for any analysis of local authority expenditure.

1. Journal of Royal Statistical Society, Series A; vol 128 part IV (pp 588-592)

That this most basic information was not readily available (and so had to be laboriously collected) may provide one part of the explanation of the rapid increase in current expenditures (at current prices) which has occurred. It must be very much more difficult for councillors and local officials to control expenditure effectively when such basic information about trends is unavailable.

The use of the input price indices, which were calculated in chapter 5, has made it possible for the first time to accurately identify that proportion (just over 50%) of the increase in money expenditure which can be accounted for by rising input prices.

Why real inputs have increased by 4.2% p.a. on average over the period 1950/70 (compared to a real increase in GDP of 2.2% p.a.) is clearly an important question for public policy.

One possible explanation is that the amount of expenditure depends upon the method by which this expenditure has been financed. There has been a fall in the proportion of local expenditure covered by the local rates (from 52% in 1950 to 37% in 1973) and a corresponding rise in the proportion of expenditure financed from Central Government. This increase (from the Rate Support Grant) was intended to reduce the burden of rates on domestic rate payers. This has almost certainly made the overall finance of local expenditures less regressive (since centrally collected taxes are not on the whole regressive). However a secondary effect of increased central government intervention in the financing of local government services has been to distort the shadow prices of these services. Since the local taxpayer receives little information about the opportunity cost of providing local services the cushioning of domestic rate payers from rate increases may have made local authorities more willing to expand services than they would otherwise have been had all of the extra cost fallen on the local taxpayer.

The method by which central government fixes R.S.G. is also a probable source

of expenditure increase. Since R.S.G. for the next two years is based upon the actual current expenditure of local governments during the negotiating year instead of upon that level of expenditure which central government expected local governments to achieve, there is no effective means of expenditure control. It means that there is an upward bias in the R.S.G. calculations.

These views outlined above have been eloquently expressed by Sir John Hicks (116):-

"It is essential to realise that the immediate problem is very largely one of local expenditure, which has been increasing much more rapidly than that which is under the direct control of central government while central government expenditure has increased by rather less than one third (over the period 1960/65), local expenditure has increased by nearly two thirds

A large part of the increase in local expenditure has been on education account, and one must clearly recognise that this is a result of national policy. It is in origin national expenditure, though it passes through local budgets. But in the case of the current expenditure, where it is easily possible to distinguish, only one half of the increase is ascribed to education; other expenditure by local authorities has increased by a practically equal amount. Over much of this remaining field it must be impossible to make the same defence - or excuse - of national policy. It is dreadful to think how much of our national deficit is ultimately traceable to local expenditure on "civic amenities", expenditure which would not have been made if the cost of it had been brought home to those responsible for it Unhappily the cost is no longer brought home to councillors. Local authorities in old days were deterred from excessive expenditure by the "burden on the rates", but this deterrent has now been largely removed. They have been assured that once the rate begins to pinch they will, in one way or another, be helped out." (pp 15-17)

The reasons for the real growth in local public expenditures are analysed in more detail below when case studies are presented for Glasgow's expenditure on education, police and fire services. In the meantime Hicks' comments stand. There is no doubt that local government expenditure has risen, the question which remains is why?

APPENDIX 6.ALOCAL GOVERNMENT EXPENDITURE: A Definition of Terms

The Current and capital expenditures of any local government are classified and recorded under four headings:-

- a) The Common Good Account
- b) The Rating Accounts
- c) Revenue Producing Accounts
- d) Sundry and Trust Accounts.

The Common Good Account

"The Common Good is an ancient patrimony of the Burgh with additions which have taken place from time to time. It is that part of the property of the Burgh which is held by the Corporation for behalf of the community, and in regard to which the Corporation is not gerrered by statute as to its utilisation and as to the disposal of its revenues. In ancient times all the Burghal Services were provided from the Common Good, which consisted originally of lands granted by the Crown, of the fines and impositions of the Burgh Courts and of the taxes and imposts on trade levied as tolls, petty customs or dues. It now comprises any such property still remaining together with those lands and properties which have been acquired from time to time from its funds."

The main assets of Glasgow's Common Good are various parks, estates, halls, art galleries and the transport undertaking although the latter's accounts are treated under the Revenue Producing Accounts.

The Common Good is an interesting example of a local public good. Lord Kyllachy judged that "The Common Good is corporate property, and falls as such to be administered by the Town Council as the executive of the Corporation, and applied by them for the benefit of the community in such a manner as, using a reasonable judgement, they think proper".

"It is, therefore, an indispensable qualification of any object to which the Common Good, can be legally applied, that it should be one in which the general public of the City of Glasgow, as distinct from the general public of any other locality, is interested."

The expenditure on the Common Good is for the purpose of:

- a) expenses of civic ceremonials
- b) maintaining and improving the Corporation property
- c) granting donations to public institutions and charities.

Rating Accounts

These are by far the largest of the accounts and represent the main services of the local government e.g. education, police, fire, health and welfare, etc. The principal sources of revenue for these expenditures are from the local rates and from central government grants. Another minor source of revenue for this account is the miscellaneous income from fines, dues, sale of items, user charges etc.

Local rates are a form of local taxation imposed by the local government on the occupiers of lands and heritages within its area. The basis of the levy is the rateable value and under the Valuation and Rating (Scotland) Act 1956 the City Assessor revalues all subjects in the valuation roll every five years (these have occurred 1961/62, 1966/67, 1971/72). Rateable value¹ is the value upon which rates are calculated.²

Government assistance is given in aid of local rating services by means of Exchequer grants. Grants are of two main types, specific grants towards the cost of some particular service and general grants towards the whole of the rating services provided by a local authority.

Capital Expenditure on Rating Account for new buildings and equipment -

houses, schools, streets etc - which are assets with a long economic life is financed out of borrowing. The annual instalments in repayment of the sums borrowed together with interest on the outstanding balance are charged as part

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1. Rateable Values and Net Annual Values are the same thing. The Net Annual Value represents the annual rent which a tenant may reasonably be expected to pay, he himself being responsible for repairs, maintenance etc.
 2. Industrial premises are entitled to a 50% derating. Certain subjects such as churches and Crown property are exempt.

of the running cost (i.e. current expenditure) of the particular service over a period of years depending on the type of asset and its estimated life (e.g. houses - 60 years). Since 1883 a Loans Fund has been operated for the more efficient management of the City of Glasgow's capital finances.

All sums borrowed by the Corporation are paid into the Loans Fund which in turn makes advances to the spending accounts as required.

Each local authority before it can make a capital purchase and finance it from borrowing must receive a borrowing consent or loan sanction from the Treasury and the appropriate central government department. However, under the Local Authorities' Loan Act 1945, an individual local government could borrow directly from the Public Works Loan Board without Treasury approval. On 31st December 1952 Section I of the 1945 Act was repealed so that the veto on borrowing on the open market was withdrawn.

As from 1st April 1964 local authorities were permitted to borrow a "quota" of 20% of their annual long-term finance from the Public Works Loan Board; this percentage was progressively increased to 50% over the period 1964/68 (1965 = 40%, 1967 = 44%).

Revenue Producing Accounts

The expenditure on this account is not charged to the Burgh rate. The items covered by this account are the local markets, the Public Water, Transport and Glasgow Airport. These activities are revenue producing, the markets charging rents, Public Water charging water rates and the other two accounts are financed from user charges. Capital expenditure is financed from borrowing.

Sundry and Trust Accounts

These are an assortment of accounts which cover items such as the Building Department (i.e. direct labour force), Fire Insurance Funds, Printing Department, and of extreme importance the Superannuation Fund for Corporation

employees. The superannuation scheme is established under the Local Acts of 1923, 1938, 1939, 1953. The Corporation contributes a sum equal to the employees' contributions and also pays an equal annual charge in respect of the liability of the Fund for the non-contributory service of the employees prior to 1923, and subsequent actuarial deficits. These charges are an important item of expenditure in the Rating Accounts against which they are charged. On 31st May 1969 the number of employees in the various superannuation schemes equalled 19,082. (This excludes operational personnel of the Police Force and the Fire Service and school teachers, who have their own separate schemes.)

APPENDIX 6.BTHE CONCENTRATION PROCESS

In the years immediately after the war a reorganisation of some local government services took place, e.g. from 5th July 1948 the Corporation was relieved of expenditure on Hospital Services, which, in terms of the National Health Service (Scotland) Act 1947, became the responsibility of the central government. From the same date the Poor Law ceased to operate and in lieu of it provision was made in the National Assistance Board Act 1948 for assistance by the National Assistance Board to persons in need. On 1st April 1947, under the terms of the Electricity Act 1947, the Corporation Electricity Department was taken over by the British Electricity Board; and the Corporation Gas Department under the conditions of the Gas Act, 1948, was taken over on 1st May 1949, by the Scottish Gas Board. The Water (Scotland) Act 1967 resulted in the Corporation's Water undertaking being taken over by the Lower Clyde Water Board on 16th May 1968.

These structural changes would be interpreted as Peacock and Wiseman's concentration process.

Other services have been added to Glasgow's expenditure base. Glasgow Airport which is owned and operated¹ by the Corporation of Glasgow became operational on 2nd May 1966.² Under the powers conferred by the Town and Country Planning (Scotland) Act 1954, a Planning Committee was set up by the Corporation.³

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1. The Ministry of Aviation provide Air Traffic Control and Navigation services.
 2. Glasgow Airport was taken over on 1st April 1975 by the British Airports Authority.
 3. The function of the Planning Committee is development control, preparation of a development plan, redevelopment, and the management of overspill and relocation of industry.

APPENDIX 6.CHOUSING STATISTICS6.C.(a) Housing Current Expenditure (Glasgow)

Current expenditure on Housing covers wages and salaries and associated payroll expenses, for 1968/69 these accounted for 0.6% of total expenditure; administration 2.9%, interest charges on loans 65%, contribution to liquidation of debt 14% (hence loan charges = 79% of total expenditure), repairs 12%.

The total gross expenditure of £21.75m for 1968/69 was met as follows:-
Rents 37.7%, Exchequer subsidy 20.7%, Rates 35.9%. The remaining 6% was met by payments of feu duties and interest payments made to the Corporation from house purchasers (i.e. the Corporation under Section 75 of the Housing (Scotland) act 1950 may advance loans to enable individuals to purchase homes or convert buildings into houses).

6.C.(b) House Building (Glasgow)

Corporation and Scottish Special Housing Association Houses completed at
31st May 1969

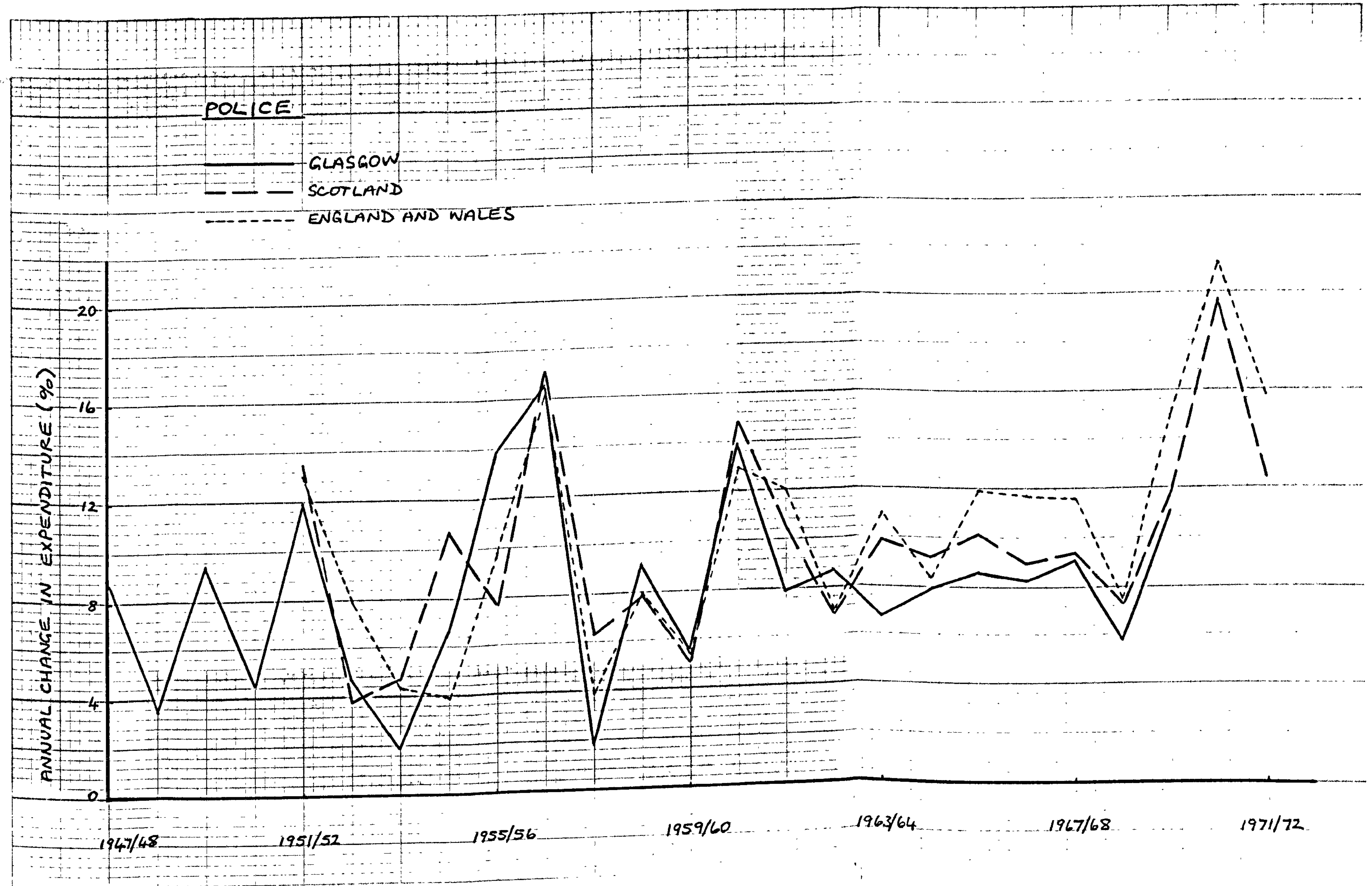
<u>Corporation Houses</u>					
Year	Built by Housing & Works Department	Built by Private Contractors	Total	S.S.H.A. Houses	Grand Total
1919 } to		54,361	54,361	-	54,361
1944 }					
1945	491	-	491	-	491
1946	1,034	70	1,104	-	1,104
1947	1,004	402	1,406	100	1,506
1948	1,143	1,275	2,418	104	2,522
1949	1,597	2,036	3,633	378	4,011
1950	1,697	2,438	4,135	20	4,155
1951	2,152	1,587	3,739	100	3,839
1952	2,037	1,378	3,415	514	3,929
1953	2,726	2,416	5,142	548	5,690
1954	3,074	3,138	6,212	248	6,460
1955	3,322	1,426	4,748	592	5,340
1956	3,488	920	4,408	630	5,038
1957	2,902	1,951	4,853	726	5,579
1958	2,475	1,283	3,758	256	4,014
1959	2,514	174	2,688	370	3,058
1960	2,635	620	3,255	72	3,327
1961	2,116	769	2,885	164	3,049
1962	1,646	303	1,949	56	2,005
1963	2,299	865	3,164	328	3,492
1964	2,356	1,952	4,308	482	4,790
1965	2,014	2,145	4,159	601	4,760
1966	1,811	1,827	3,638	1,372	5,010
1967	1,743	2,680	4,423	1,156	5,579
1968	1,802	2,257	4,059	440	4,499
1969	309	656	1,046	32	1,078
			139,397	9,289	148,686
Temporary Houses			2,550		
Less Demolished			2,272		278
					<u>148,964</u>

APPENDIX 6.DYEAR ON YEAR CHANGES IN CURRENT EXPENDITURES (AT CURRENT RATES)

- a) figure 6.D.1. Police Current Expenditure
- b) figure 6.D.2. Education Current Expenditure
- c) figure 6.D.3. Fire Service Expenditure
- d) figure 6.D.4. Lighting Expenditure
- e) figure 6.D.5. Cleansing Expenditure
- f) figure 6.D.6. Parks Expenditure

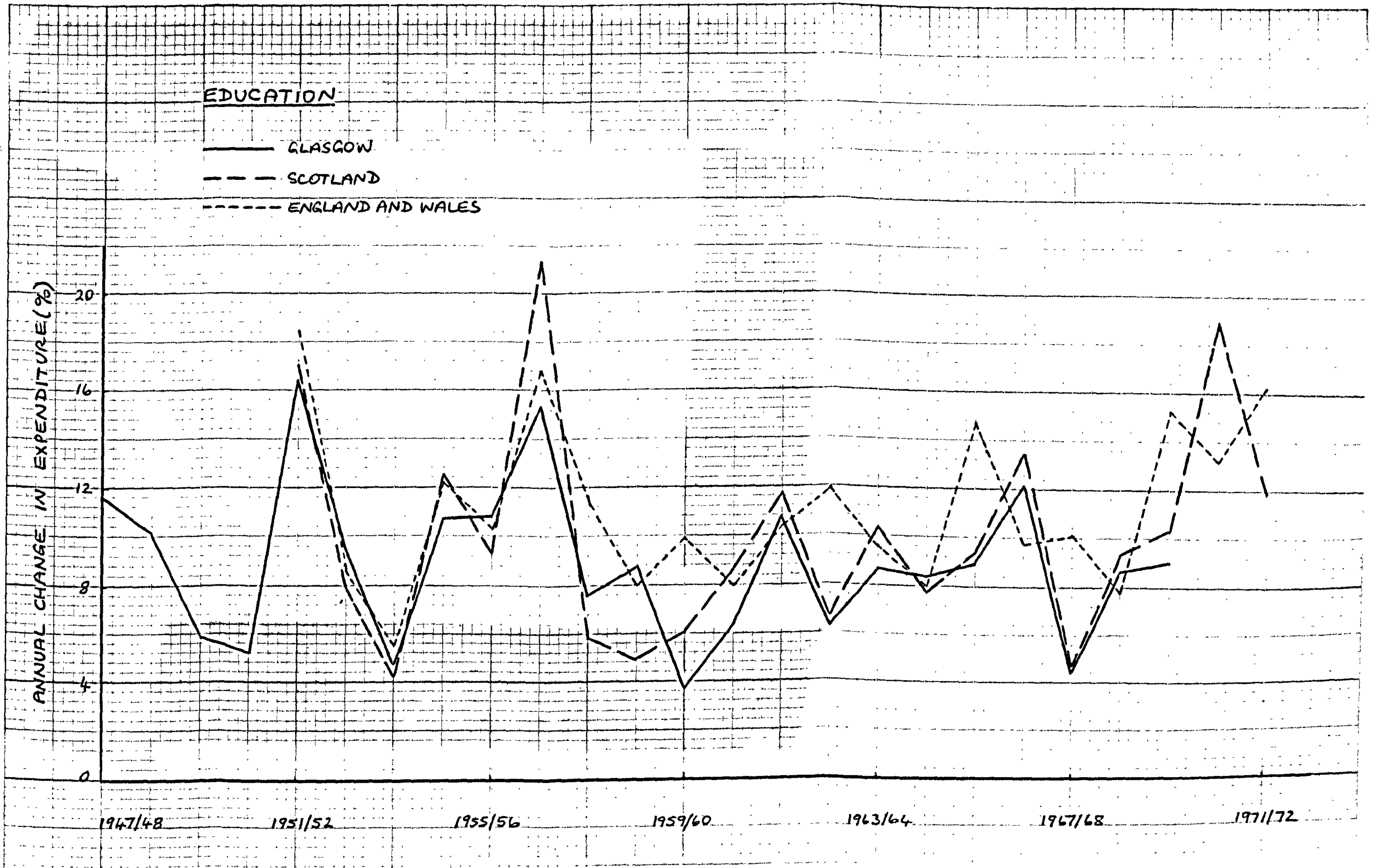
Year on Year Changes in Police Current Expenditure (at current prices)

Figure 6D.1



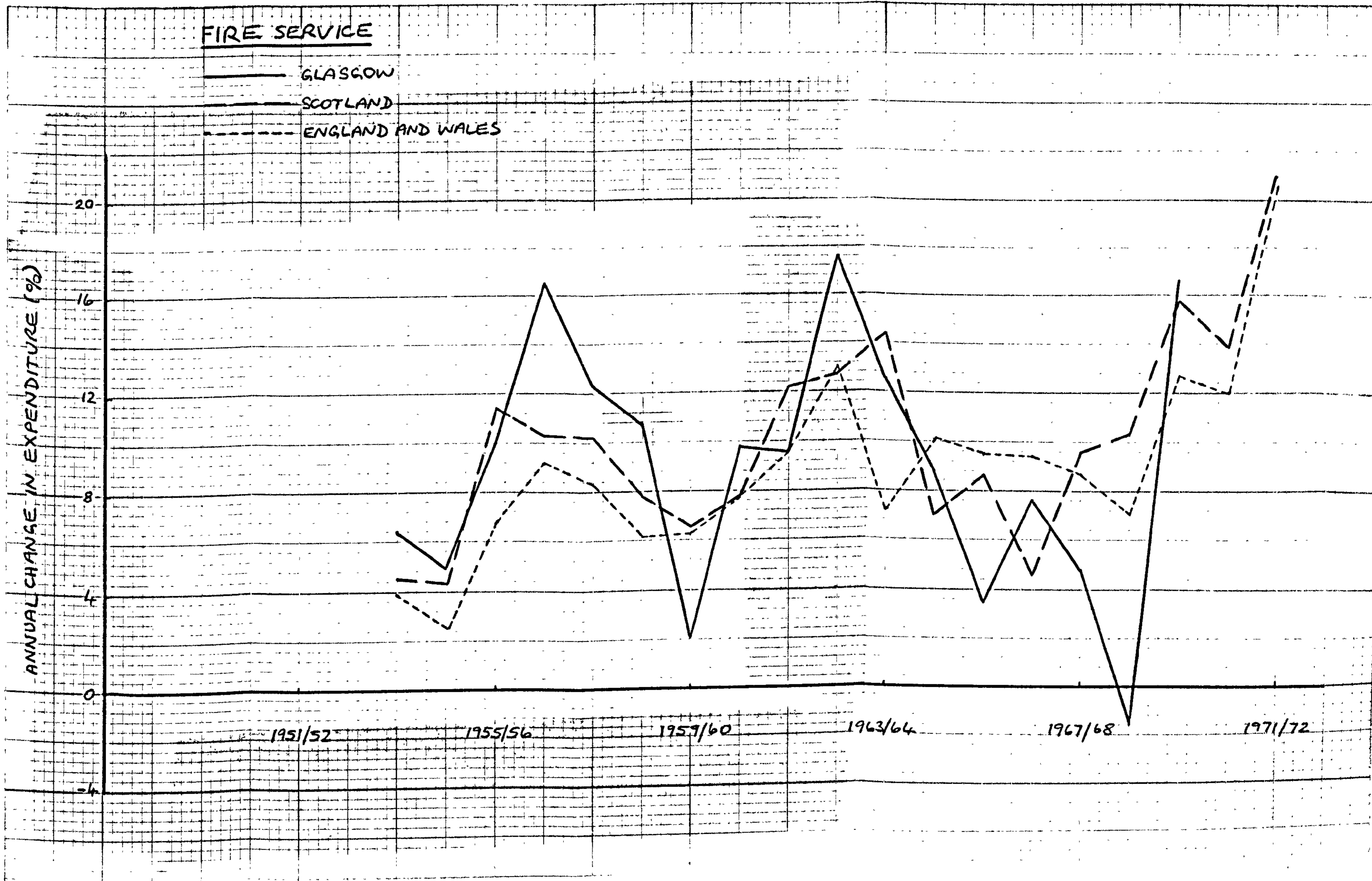
Year on Year Changes in Education Current Expenditure (at current prices)

Figure 6D.2



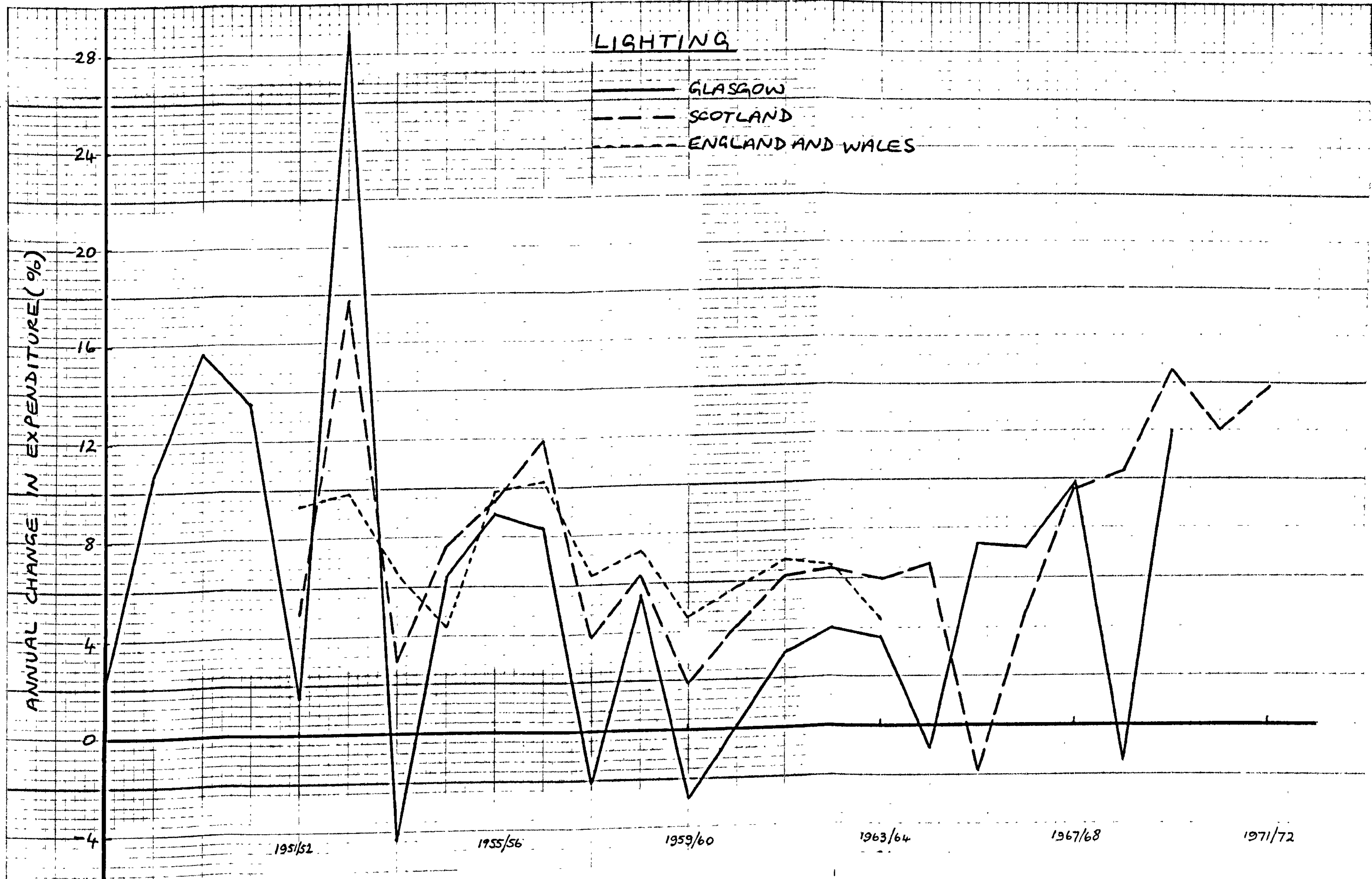
Year on Year Changes in Fire Service Current Expenditure (at current prices)

Figure 6D.3



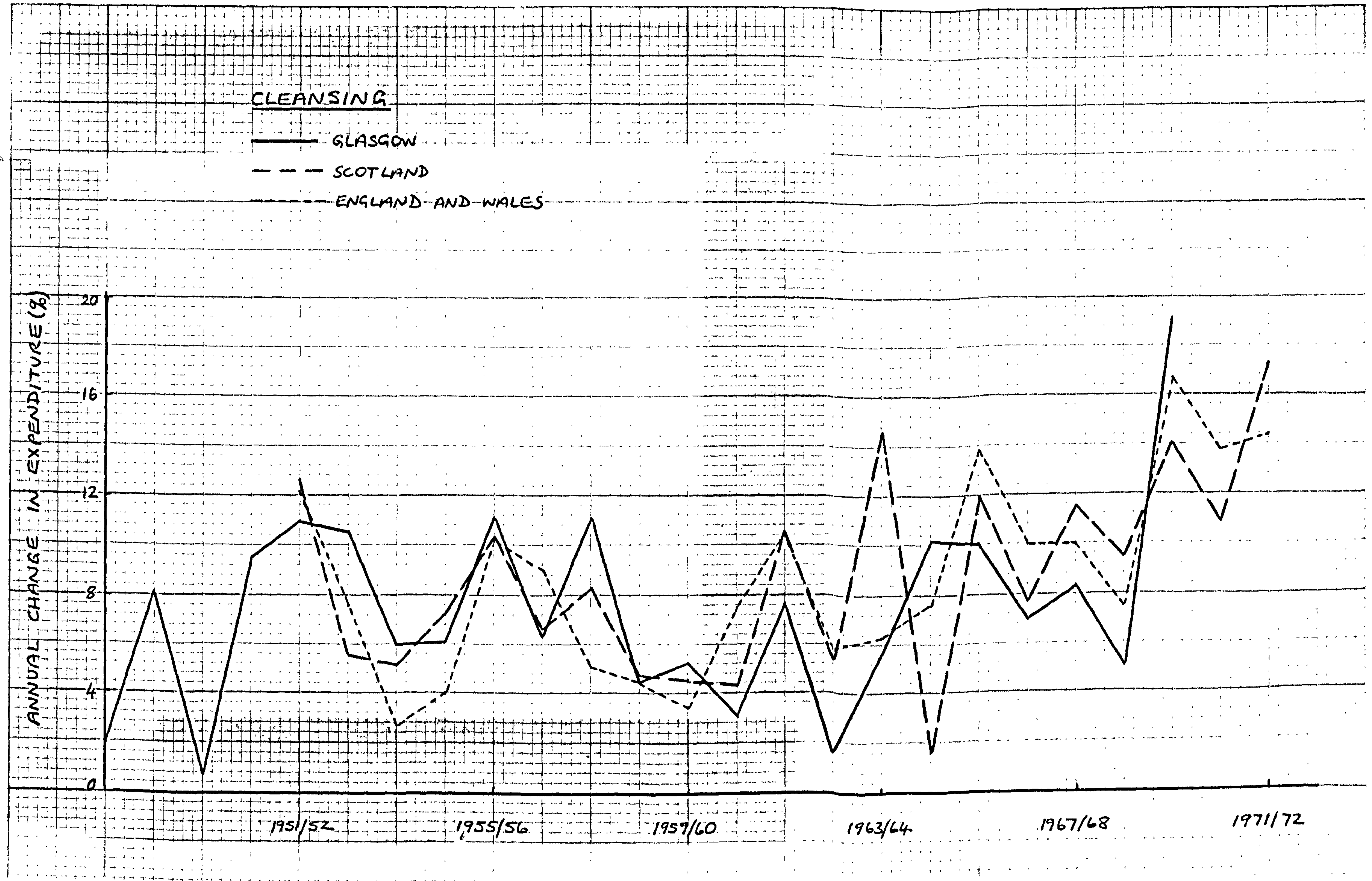
Year on Year Changes in Lighting Current Expenditure (at current prices)

Figure 6D.4



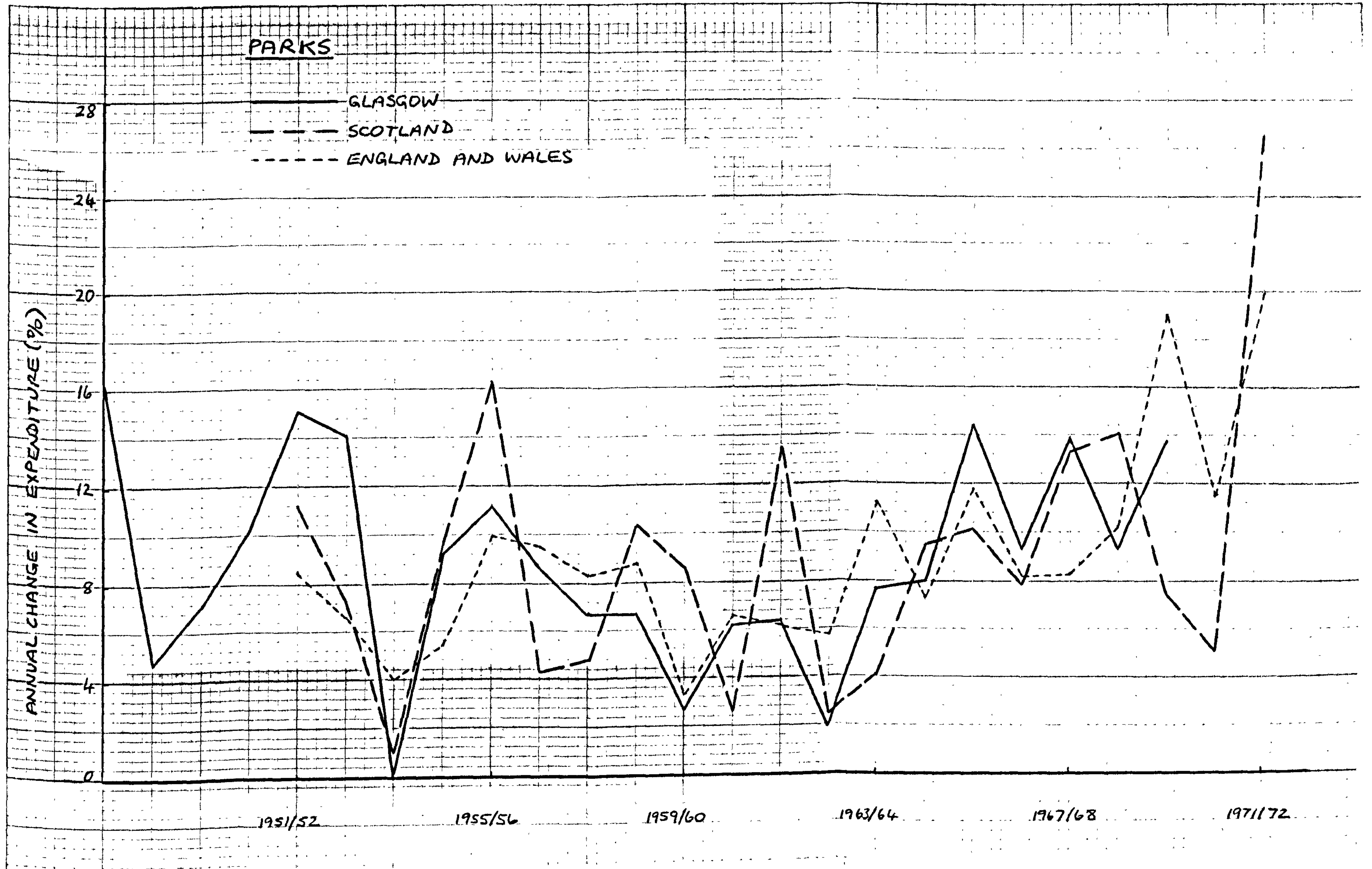
Year on Year Changes in Cleansing Current Expenditure (at current prices)

Figure 6D.5



Year on Year Changes in Cleansing Current Expenditure (at current prices)

Figure 6D.6.



APPENDIX 6.ELOCAL GOVERNMENT ACTS AND LOCAL GOVERNMENT FINANCEIntroduction

Local governments in the U.K. are creatures of statute. As the provisions of local government Acts change then the functions and financing of these functions carried out by local governments change also. This appendix sets down the major post war changes in the various local government Acts.

Attention will be devoted narrowly to the expenditure and revenue provisions of the Acts. Since Scotland enjoys its own legal system, this means that it has its own set of legislation for local government. It is, however, true in practice that on most major items Scottish legislation has been identical to that applying to English and Welsh local governments. The major difference is the timing of the implementation of the law.

The Acts are presented briefly in chronological order.

Local Government Act 1948

1. introduced the Exchequer Equalisation Grant which attempted to equalise resources between local governments. This replaced the existing major source of central government grant in aid to local government namely the Block Grant.
2. rates paid by nationalised transport and electricity industries were abolished. Local governments were paid central government grants in lieu of rate revenue foregone.
3. responsibility for valuation of property for rating purposes was transferred from the local rating authorities to the Board for Inland Revenue.

The Exchange Equalisation Grant (E.E.G.)

The Block Grant, which the E.E.G. replaced in 1948 had been in existence

since 1929. The Block Grant, however, did not take into account the wide variations in rateable values between local areas. Nothing was done prior to 1948 to equalise rate poundages. The central valuation by the Board of Inland Revenue (1948) reduced some of the variation due to different methods of valuation.

The E.E.G. was calculated annually on the basis of a formula containing information on the weighted population of the local government (the forerunner to a "needs element") and whether the area's rateable value was below the national average (a "resources element").

Aneurin Bevin's, now famous, remark about the E.E.G. was that,

"The Exchequer will step in and become a ratepayer to the extent¹ that the local authority's rateable value is below the average".

Local Government Act 1958

1. introduction of a General Grant to replace many specific grants.
2. introduction of a Rate Deficiency Grant.
3. industry re-rated from 25% to 50%.

Specific grants were percentage grants i.e. central government paid a fixed percentage of specific expenditures incurred by a local government. Central government took the view that this practice stimulated spending and was not conducive to financial responsibility.

The General Grant was calculated so that the amount of aid given depended upon need and not on the amount actually spent. It was, however, found in practice, at the time, difficult to define needs except in terms of expenditure.

Certain specific grants were discontinued for the services of education, fire, homes for the aged, child care, and town and country planning.

1. House of Commons "Hansard" 18th November 1947, column 994.

The General Grant was fixed by the Minister for Housing and Local Government. It was not set according to a formula but subject to central government negotiations with local government representatives and subject to Parliament's approval of the final amount thought to be the "best" by the Minister. The negotiated amount was based upon "relevant expenditures" which included certain foreseeable increases in prices, wages and other costs. The grant was fixed for a two year period but if inflation was higher than anticipated over the two years there was provision made for a revision of the grant.

The General Grant was distributed amongst local governments according to "objective" factors such as the age structure of the population, the area's population density and trend of population growth.

Central Government Controls

The 1958 Local Government Act made it clear that the central government was responsible for setting national policies and minimum standards.

Rating Act 1966

1. introduced rate rebates.
2. allowed domestic rate payers to pay rates by instalment.

This Act was part of the 1960's Labour Government's policy towards local government pioneered by Richard Crossman.

Local Government Act 1966

This was the second part of Crossman's reform of local government finance. In Crossman's words the Act was "designed, first to achieve a small but steady annual shift from rates to taxes; and secondly, to use this shift in order to help the domestic rate payer".¹

The 1966 Local Government Act:

1. House of Commons "Hansard" 14th June 1966, column 1279.

1. introduced the Rate Support Grant (R.S.G.).
2. introduced a new set of specific grants.
3. discontinued the grant on school meals and school milk (these were thereafter included in the new R.S.G.).
4. local governments were given the power to rate empty properties.

From the time of the introduction of the R.S.G., specific grants made up 15% of total grants-in-aid to local government with R.S.G. making up the remaining 85%.

The R.S.G. replaced the Exchequer Equalisation Grant. The distribution of R.S.G. is in three parts:

- i) a needs element based on population and other objective factors (this is similar to the old General Grant formula but does not necessarily embody the same weightings).
- ii) a resources element payable to those authorities with a low penny rate per head of population. This element corresponds to the old Exchequer Equalisation Grant and is a modification of the Rate Deficiency Grant.
- iii) a domestic rate-aid-element which is a new addition. It secures that the rate levied in each area is reduced for dwelling houses by a prescribed number of pence in the £1, fixed throughout Scotland by the Secretary of State for Scotland¹ to correspond to the aggregate amount of the domestic element for that year. Examples of reductions for Glasgow are 4.8p in 1967/68, 8p in 1968/69, 12.5p in 1969/70, 16p in 1970/71. Since it is a reduction in rate per £1 then occupiers of houses with higher rateable values benefit most.

1. The Minister for Housing and Local Government fixes it for England and Wales.

APPENDIX 6.FMANPOWER GROWTH IN GLASGOW'S SERVICES 1952/69

The following Table shows annual compound rates of change in the number of full time staff employed.

Department	%					
	Males 1952/60	Males 1960/69	Males 1952/69	Females 1952/60	Females 1960/69	Females 1952/69
Cleansing	1.53	0.84	1.18	12.34	1.88	7.68
Education	-1.97	4.65	1.60	0.69	6.37	3.89
Fire Service	2.28	0.72	1.56	7.66	3.77	6.05
Health & Welfare	1.08	-1.14	-0.50	4.93	1.58	3.11
Housing	-0.43	0.86	0.18	-2.08	20.69	8.61
Libraries	0.40	0.60	0.42	0.98	-0.04	0.68
Parks	2.61	1.67	2.14	-4.17	-4.85	-4.62
Police	0.83	1.97	1.45	3.39	3.31	3.33
Architecture & Planning	2.08	3.17	3.02	11.92	8.64	9.46
Art Galleries & Museums	3.74	4.65	4.04	12.80	0.68	5.51
Children's Service	0.24	7.16	4.31	1.53	0.22	1.27
Probation Officers	8.64	5.12	7.16	8.18	9.57	8.92
Stipendiary Magistrates & Police Courts	16.99	6.59	11.33	15.85	9.05	12.69
Transport	-2.06	-2.32	-2.30	-6.40	-5.32	-5.82
Total all Departments	-0.58	0.52	-0.09	0.30	3.79	2.25

Chapter 7

Public Sector Output Indices

Introduction

7.1. The Level of Output

7.2. Prices

7.3. The Output Price Indices

7.4. Limitations of The Analysis

Conclusion

CHAPTER 7PUBLIC SECTOR OUTPUT PRICE INDICESIntroduction

How much does a day's education in 1970 cost compared to the same day of education provided in 1950? How much do the levels of personal protection provided by the police and fire services cost in 1970 compared to the same levels of protection provided in 1950? How much does a resident week in an old folks' home cost in 1970 compared to that of 1950? These questions will be considered in this chapter.

In a previous chapter¹ the trends in input prices were examined by means of the construction of input price indices. These indices revealed how inflation in the various markets of the economy affected the budgets (expenditures) of local government.

This chapter focuses upon a different set of problems. Given the production functions of the various sectors of a local government how have the shadow prices² of the outputs changed over time? As in all index number theory it is assumed that the consumer starts off with a vector of outputs which represent some point on his utility map. These quanta are kept constant whilst prices are varied. Since it is output which enters the consumers utility function he is, therefore, no better and no worse off. The question which has then to be answered is how much does it cost the consumer (in terms of budgetary expenditures) to

1. See Chapter 5 above.

2. The phrase "shadow price" is used in this instance since the prices are not in practice observable. Later in this chapter they will be replaced by the more general phrase "pseudo demand price", but the notion of output price requires further discussion which is provided later. Until then shadow price will be used.

remain in this state? This could be rephrased to ask the question: how much does it cost a local authority to continue providing its citizens with a constant level of service?

Unless it is known how much it costs (in resource terms) to allow a local government to continue providing the same level of service to its citizens then any expenditure cuts could have the effect of reducing the level and or the quality of the service. In so far as the welfares of many citizens in modern complex social systems depend upon the levels of services which local governments provide then it is an important and meaningful question to ask.

The answer to the question, however, is not so easily obtained. In order to begin analysing such a complex issue the question has to be respecified. Is it the cost to the citizen of consuming a specified and constant quanta of public services which is of interest or is it the cost to the local government of providing them? The two questions obviously, are not unrelated. Both are of equal interest and both are extremely difficult to answer.

The principal problem in answering such innocuous questions when the subject matter is the public sector is always that an appropriate data base does not exist. This case does not provide an exception.

It is, therefore, necessary to tackle the problem in such a way that an approximate answer is made available.

The approach adopted in this instance is to make a number of simplifying but nevertheless plausible assumptions which will, it is hoped, cause the answer to "fall out" at the end. The reader should note carefully the precise nature of the assumptions since in the end it is the set of assumptions chosen which will indicate the conclusions which may legitimately be drawn from the analysis.

In general it is found that the evidence shows that there is support for the hypothesis¹ that the price of public sector outputs do rise relative to private sector outputs.

The chapter is divided as follows. Firstly the conceptual problems of getting a useful working definition of public sector output are considered. The output problem is of primary importance since it is "output" price indices which are being calculated. It will be shown by using the assumption of a constant level of output that progress can be made in the calculation of output price indices. The second section to the chapter examines carefully the notion of prices which is to be used in the calculation. In both sections the assumptions, upon which the analysis is based, are stated precisely. The third section presents the output price indices which have been calculated for a selection of the City of Glasgow's public services over the period 1950/70. After some discussion of the indices the concluding section considers the limitations of this mode of analysis.

7.1. The Level of Output

The output of public sector services can be thought of in two ways.² The outputs directly produced by public sector activities constitute intermediate goods or services and are referred to as the D-outputs, whilst those goods and services which are actually desired by the consumer and which enter the consumer's utility function are labelled C-outputs.

-
1. See Baumol (18) Bradford Malt and Oates (37) Jackson and Ulph (128) and Jackson (129) for specifications of the hypothesis.
 2. It will be recalled from Chapter 3 above that this notion was employed by Bradford, Malt and Oates (37).

In practice both C and D outputs are extremely difficult to measure.¹ They are will-o-the-wisps, which the economist chases but never seems to catch. Modern trends in programme budgeting have made attempts to finesse D-output measures but to date this approach is still in an early stage of development.² In order to proceed with the calculation of a set of output price indices it will, given the problems associated with output measurement, be necessary to make a number of working assumptions. Economists are familiar with the general logical status of working assumptions so no justification of such a methodology is provided here. Whether or not these working assumptions have an empirical counterpart is of little importance at this stage of the analysis. Their importance lies in the fact that they are necessary to get the analysis started.

The working assumptions made in the analysis of output price indices are:-

- (i) only C-outputs will be considered. These are the outputs which the consumer ultimately demands. To consider D-output measures would go well beyond the scope of the present study, demanding a data base which was not readily available.
- (ii) as in the majority of price index calculations quality changes are ignored. Again, a consideration of hedonic price indices lies beyond the scope of this analysis.³
- (iii) the level of C-output for each service has not changed over the period. This assumption is more substantial in the current context and therefore requires some justification. The Laspeyre form of a price index it will be recalled is:-

1. Hirsch (119, 121) gives examples of ways in which economists have sought proxies for public sector outputs. These methods have met with varying degrees of success.
2. The Institute of Public Finance and Accountancy and also the Management Accounting Unit of H.M.T. have recently made progress in this area.
3. Hedonic price indices have never been calculated for public sector outputs. This is not too surprising given the problems which exist for the relatively more simple measurement of private sector outputs.

$$L = \frac{\sum p_i q_o}{\sum p_o q_o}$$

The problem is to keep quanta constant and to vary prices.

Such an approach would, therefore, require measures of the level of output in the base period and prices in other periods.

Such data are obviously not available. However, it is possible to circumvent the problem if it is assumed that the level of C-output has not changed over the period.

The assumption of a constant level of C-output is not as far removed from reality as it may at first thought seem. For the protective services provided by the Police and Fire Departments the level of C-output generally considered relevant is in the case of fire protection the probability of fire damage and in the case of police it is the probability of a crime being committed.¹ When considering changes in the level of C-output for the police and fire services the relevant question to ask is what has happened to the level of safety in both cases?

Consider the Fire Department's level of C-output first. Data for Glasgow reveals that the total number of fire calls² per 1,000 population, which the Fire Department responded to increased at a rate of 5.4% p.a. over the period 1950/70 and that the number of fires³ per 1,000 population attended over that period increased at a rate of 11% p.a. There would, therefore, appear to be a strong case to be argued in favour of the assumption that the C-level of output had remained "at least" constant,⁴ whilst the level of D-output, and hence expenditure, had increased in order to maintain the level of C-output. That is to say,

-
1. These concepts have been treated more fully in Chapter 3 above.
 2. Excluding false alarm calls.
 3. Excluding chimney fires.
 4. By "at least" is meant that a case could be made out for arguing that it had in fact declined. It should be appreciated that this is an extremely conservative assumption.

over time it has cost more to maintain a constant level of fire safety in the city. It is the rate of increase in that cost which is of interest in the calculation of the output price index.

Similar arguments are advanced for the C-level of output of the Police Department. Table 1 shows the changes which have taken place in the crime rate for each class of crime in the City of Glasgow over the period 1950/70. The total number of crimes per 1,000 population for Glasgow has increased by 2.9% p.a. over this period. Again there is no evidence to suggest that the level of C-output for police services has increased. Instead the interpretation placed upon the evidence is that more D-output has been provided in order to maintain existing levels of safety.

Table 1 Crime Rates - Glasgow - 1950/70

(crimes per 1,000 population)

Crime Class	1950/51	1969/70	Annual Growth Rate 1950/70
1. Crimes against the person	1.06	2.37	4.2%
2. Crimes against property with violence	12.21	25.29	3.9%
3. Crimes against property without violence	13.92	20.65	2.1%
4. Malicious injury to property	1.46	0.59	-5.0%
5. Forgery and crimes against currency	0.06	0.25	7.7%
6. Other crimes	0.32	0.71	4.2%
7. Total (Items 1 to 6)	29.03	49.87	2.9%
8. Miscellaneous Offences ¹	23.40	67.61	5.7%

Source: Annual Reports of Chief Constable Glasgow City Police.

1. Note offences include violation of Police Acts, motoring offences, drunkenness, Betting and Gaming Acts violations, etc. They are not crimes.

When a service such as education is discussed it becomes more difficult to find suitable proximate measures of the level of education, which it is assumed is the equivalent C-output of the Education Department. Special

standardized tests would be necessary to make empirical statements about changes in the level of education over time. Evidence which does exist tends to support the hypothesis that although the number of pupils educated and hence the level of D-output has increased, nevertheless, the level of C-output has remained constant. The first piece of supportive evidence is gleaned from the current controversy amongst educationalists. There exists a body of opinion,¹ which suggests that the level of educational attainment of the average school child has not increased over the post war period.

Other evidence, which is more specific to the City of Glasgow, shows that during the period 1950/70, 75% of the number of pupils, who were presented for examination under the Scottish Higher Leaving Certificate Board, pass each year.² Of course further evidence regarding the proportion of grades attained would be necessary for a complete analysis but unfortunately that evidence does not exist.

In conclusion to this section; it has been argued strongly for the three services³ of education, police and fire, that there is little evidence to support the hypothesis that the level of C-output has in each case changed over the period 1950/70. If the evidence above is coupled with the knowledge that all departments over the same period have faced severe manpower shortages than this labour shortage in itself lends support to the conclusion that C-output has not increased. Unless there had been an appreciable substitution of capital for labour then

1. See C.B. Cox and R. Boyson (272).

2. This figure of 75% has remained constant over the period. The figure is taken from successive reports of the Director of Education for the City of Glasgow. The figure is difficult to interpret since it is generally known that the examination board decide to pass 75% of all presentations. Therefore very little can be said about improvements in the level of education received by each child.

3. Similar arguments could be made for public cleansing, streets, lighting, etc.

C-output could only have grown if manpower had grown also. This has not generally been the case. Increases in manpower, which have occurred, have added to D output and not C output.

Not all services present the same problems of output measurement. Thus some health and welfare services do have identifiable C-outputs.

The unit of output frequently used in hospital studies is the "patient day" or the "patient week".¹ Thus it is possible to employ a similar measure for the services of Child Care and the care of the aged. In those cases the unit of output used is the "child week" and the "resident week".

Two services which provide physical measures of output are sewage purification and street maintenance. In the case of the first service the output measure is gallons of sewage treated whilst in the second case it is miles of street maintained.

7.2. Prices

The above section discussed the problems involved in defining a useful concept of final public output which could be employed in the construction of a public sector output price index. The next problem which has to be discussed is what concept of price is to be employed?

Ideally the prices used would be those prices which the household faces for that level of output provided. In other words it would be the household's "tax price", which was discussed in Chapter 3 above.²

Since different households face different tax prices it would be necessary

-
1. For a comprehensive justification of this measure see Feldstein (270,271).
 2. For a general equilibrium the actual price which the household pays for C_1 units of output would be identical to his personalised pseudo demand price as defined by Samuelson (210).

to calculate an output price index for each household or homogeneous class of households. If, however, it was assumed that all the tax prices moved in the same proportion then the price index of a representative household would suffice. Given the structure such an assumption of proportionality is too strong, but must nevertheless be made to simplify the analysis.

Data on the tax prices faced by different households are not readily available.¹ Recourse must, therefore, be made to alternative and less satisfactory methods. One method is to assume that expenditure represents the product of price and output i.e.

$$E_0^i = p_0^i q_0^i$$

where,

E_i = total expenditure on the i^{th} category of service

q_0^i = the level of C output of the i^{th} service in year zero.

In this case p_0^i is the producer price² of producing the i^{th} service in year zero. This method, therefore, substitutes the producer price for the consumer price. Since q_0^i is, by the argument provided in the previous section, assumed to be constant, the output price index then becomes;

$$\pi^i = \frac{E_k^i}{E_0^i}$$

where,

π^i is the output price index of the i^{th} category of service

E_k^i is total expenditure on the i^{th} category of expenditure in year k

E_0^i is the total expenditure on the i^{th} category of expenditure in year zero.

1. An attempt was made to collect it but the task was too great.

2. Of course given that $\Sigma \text{MRS} = \text{MRT}$ the producer price is the sum of the consumer prices.

Another way of approaching the problem is to make an attempt at getting a better measure of the consumer price. This is done in part by taking per capita expenditures¹ instead of total expenditures as the appropriate measure. Thus as before:-

$$\pi_i = \frac{E_k^i \cdot n_o}{n_k E_o^i}$$

where n_o and n_k are the population sizes for years zero and k respectively.

7.3. The Output Prices Indices

The sections above have outlined the problems involved in attempting to construct an output price index for public services. These problems, which have prevented others from making progress in this area, can, it has been argued, be overcome if a number of assumptions and qualifications are made.

This section presents output price indices for a number of public services provided by the City of Glasgow. Tables 2 and 3 present these output price indices for the two different definitions of price outlined above. In Table 2 the indices are calculated on the notion of "producer price" whilst the indices in Table 3 use the "per capita expenditure" notion of price.

The evidence presented in both Tables 2 and 3 tend to support the relative price effect hypothesis; that is, the prices of public sector outputs tend to rise faster than those of private sector outputs.² The

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1. This of course implicitly assumes an equal cost sharing arrangement in the fiscal group which does not exist in practice.
 2. Note that the retail price index is a weighted average, and is used here to represent the rate of change in private sector goods. Within the vector of goods represented by the R.P.I. there might be prices which will rise faster than the prices of public sector goods considered here - only a more disaggregated approach would reveal this.

Table 2 Output Price Index for Selected Services Provided by the City of Glasgow - 1950/1970¹

1962/63 = 100

Year	Police	Fire	Education ²	School ²	Sewage Purification ³	Street Maintenance ⁴	Residential Accommodation For Old People ⁵	Boarded Out Children ⁶	Children in Voluntary Homes ⁶	Retail Price Index
1950/51	37.9	34.9	35.1	35.9	75.5	-	-	-	-	71.1
1951/52	42.3	36.8	40.8	42.4	83.8	-	-	-	-	75.3
1952/53	44.2	38.7	44.5	45.8	93.3	-	-	-	-	76.8
1953/54	45.1	41.5	46.6	46.9	80.7	-	-	54.5	48.3	78.3
1954/55	48.1	43.4	51.6	50.8	N/A	-	-	57.0	47.8	81.0
1955/56	54.9	48.1	57.2	54.3	108.8	-	-	58.1	45.2	84.7
1956/57	63.8	55.7	65.9	63.9	N/A	88.6	-	56.0	48.6	87.5
1957/58	64.9	62.3	70.8	70.1	99.6	93.9	-	63.5	51.4	89.9
1958/59	71.0	68.9	77.1	74.5	102.7	99.4	79.3	66.4	56.8	90.8
1959/60	74.9	69.8	79.9	78.2	97.8	99.1	76.1	64.3	60.5	91.8
1960/61	85.4	77.4	84.9	82.7	92.4	98.5	78.6	67.1	65.6	94.5
1961/62	92.2	83.9	94.9	95.2	99.4	111.9	90.4	67.1	68.0	98.1
1962/63	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1963/64	108.3	112.3	108.6	105.8	108.5	103.7	108.8	102.5	100.5	103.3
1964/65	115.3	121.7	117.7	111.5	120.9	111.9	109.4	110.8	132.0	108.0
1965/66	125.3	125.5	128.3	118.6	145.6	110.2	128.3	107.2	113.2	112.1
1966/67	135.7	135.8	143.8	132.1	158.2	114.9	133.5	109.4	119.9	114.9
1967/68	147.9	142.5	150.1	139.6	169.4	115.3	146.0	116.6	142.9	120.1
1968/69	156.7	140.6	163.0	148.1	183.8	127.9	159.8	140.8	186.8	126.5
1969/70	173.9	166.0	177.6	159.8	200.3	137.4	175.5	143.3	214.0	133.3

- Notes:
1. Source: City of Glasgow Annual Accounts.
 2. Education refers to expenditure on the entire education account whereas school refers only to expenditure on primary and secondary schools.
 3. Index of costs per gallon of sewage treated.
 4. Index of cost per mile of street maintained.
 5. Index of cost per resident week.
 6. Index of cost per child week.

Table 3 Output Price Index for Selected Services Provided by the City of Glasgow 1950/70¹

1962/63 = 100

Year	Police	Fire	Education	School	Retail Price Index
1950/51	36.4	33.7	33.8	37.0	71.1
1951/52	40.7	35.6	39.2	43.2	75.3
1952/53	42.5	37.6	42.9	45.9	76.8
1953/54	43.9	40.6	45.3	48.5	78.3
1954/55	46.9	41.6	50.2	50.8	81.0
1955/56	53.3	46.5	55.5	54.6	84.7
1956/57	62.5	54.5	64.0	63.5	87.5
1957/58	63.2	60.4	68.9	69.7	89.9
1958/59	69.1	67.3	75.0	74.1	90.8
1959/60	73.0	68.3	77.7	77.3	91.8
1960/61	83.8	76.2	83.4	82.2	94.5
1961/62	92.2	83.2	94.1	94.6	98.1
1962/63	100.0	100.0	100.0	100.0	100.0
1963/64	109.3	112.9	109.7	106.4	103.3
1964/65	129.5	124.8	121.2	113.5	108.0
1965/66	142.6	131.7	134.8	121.3	112.1
1966/67	158.6	145.6	154.1	135.2	114.9
1967/68	161.8	155.5	164.2	141.4	120.1
1968/69	173.2	155.5	180.1	151.6	126.5
1969/70	196.3	184.2	200.6	163.4	133.3

1. Source: City of Glasgow Annual Accounts.

notes provides in Table 2 give more details about what the index represents but in each case what has been shown is the changes in the costs of providing a given vector or level of service.

The index for Street maintainance is, however, ambiguous and could be misleading. Care must, therefore, be taken in interpreting it. It shows the changes (on a 1962/63 base) in the costs of street maintainance divided by the average number of miles of street in existence rather than the average number of miles of street maintained. The ideal measure would be the changes in the costs of maintaining a standard mile of street but since such a measure does not exist the number of miles of street in existence was used.

7.4. Limitations of The Analysis

There will, obviously, be many limitations to an exercise of this type. Any one of the large number of assumptions made above is a restriction.

The major objection which can be levelled at the analysis is that it assumes an unchanging vector of outputs. Up until now reference has been made to the level of C-output as if there was but one final output produced. Of course in practice each public sector service produces a complex set of many outputs. This limitation, however, goes well beyond the scope of the current analysis. It moves the analysis into modern "consumer theory".¹ If new final products are being added and old ones being subtracted from the vector of products then the foundations of the analysis falls. But before this attack can be made a clear specification of the elements of the vector of final products must be made and it is at this point that an impasse is encountered. Hence the reason for the

1. i.e. see Lancaster (141).

simplifying assumption of an unchanging and unique level of C-output.

If exercises of this kind are to be carried out in the future then one interesting additional feature would be to calculate the price index of D-outputs. Such indices would be of more immediate and relevant use to decision makers and could be used in resource allocation activities. Essentially the data for such an exercise would have to be collected over a number of years since it is not collected currently. Shadow prices of a standardized activity such as police surveillance of a block of houses would be recorded along with the shadow prices of a large number of other activities. Rates of change in the "price" of these activities could then be compared and this information fed into the decision to allocate resources amongst the alternative activities.

Conclusion

The calculation of price indices for public sector outputs is still in its infancy and is primarily constrained by lack of data. As decision makers become more convinced of the value of the information which such indices convey then it is hoped that the raw data will be collected.

This chapter has reported the results of a simple exercise to calculate a set of price indices for a number of public sector outputs provided by Glasgow over the period 1969/70. By using a number of restrictive assumptions about outputs and prices it is generally concluded that it does in fact "cost the public sector more simply to stand still". Whether or not the public sector does stand still remains a moot point but is one which can only be answered by more detailed analysis. For these reasons too much should not be claimed for the indices.

The other important point which lies outside the scope of this analysis is to determine the impact of rising prices of public sector outputs on the household. Such an analysis is clearly tied up with the analysis

of the distribution of tax burdens and deserves more attention than it has received.

Chapter 8

Budget Determination

Introduction

- 8.1. The Incrementalists
- 8.2. Budget Decision Making in Glasgow 1950/70
- 8.3. A Simple Test of Incrementalism

Conclusion

CHAPTER 8BUDGET DETERMINATIONIntroduction

Politicians choose to pursue particular policies which result in public expenditures. In chapter 3 it was seen that politicians choose those policies which maximise the probability of their election to office. That model further showed how changes in the set of environmental, quality and technical variables contributed to public expenditure changes. In other words the model was essentially a maximising model of the kind traditionally employed by economists which was supplemented by a set of explanatory variables, which were external to the decision making organisation.

Maximising models of this kind have, however, come under attack from a number of people,¹ who argue that the synoptic or rational model of the economist is not sufficiently realistic. That is to say, such synoptic models emphasise the set of external variables and fail to account for the importance of the internal or organisational variables which determine the choice of particular policies and the behaviour of politicians in the process of determining public expenditures.

The relevance of institutional variables was recognised in chapter 3. Like all abstractions from reality the synoptic approach of the maximising model has to trade off tractability against description. It is not, therefore, correct, as many like Wildavsky and Lindblom have assumed, that the maximising models lack usefulness. On the contrary their usefulness lies in their ability to separate out the complex interactions which occur in reality.

1. See Wildavsky (248), Lindblom (145), Braybrooke and Lindblom (42), March and Simon (155), Cyert and March (68), Crecine (65), Sharkansky (219), Niskanen (181), Davis, Dempster and Wildavsky (74), Hirshman and Lindblom (122), Klein (138), Klein and Meckling (139), Snyder, Bruck and Sapin (226), Rothenberg (205).

When supplemented by a description of the actual choice mechanism the maximising model becomes more powerful in explaining choices.

This chapter will examine some of the major contributions which have been made to accounts of the behaviours of budget decision makers. This will then be followed by a description of the budgeting procedures which have been adopted by the City of Glasgow in the post war period.

8.1. The Incrementalists

There are two strands to the arguments used by those writers,¹ who attempt to account for the observed behaviours of politicians and decision makers choosing amongst alternative policies and budgets. The first is that reality is complex and as a result the decision maker uses aids when calculating which alternative policy should be adopted. The second notion is that the outcome of one choice of policies has implications for the scope of future choices.

It is generally recognised in all branches of economics that individuals are required to make choices amongst alternatives when they are uncertain about the consequences of their choices or when they are uncertain of future events generally. Since information is costly² many decisions have to be made in a state of almost complete ignorance. Even when information is available the decision maker frequently is unable to understand its significance. In order to deal with this situation decision makers simplify the problem which is to be solved and employ simple rules of thumb as aids to calculation.³

Such rules of thumb are usually those which been proved to be efficient in the past. Crecine (65) sums this up when he describes a typical decision

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1. It should be noted that there is no single school of thought. Each writer usually has his own set of conceptual models which come from a variety of disciplines including political science, organisation theory, and public administration. The term "incrementalists" has been used to classify them since all at least believe in incrementalism (viz) in one form or another.
 2. See Buchanan and Tullock (269) and Alchian (4).
 3. These ideas are essential to Simon's (221) idea of "bounded rationality".

maker as, "a man with limited information and limited cognitive ability making a policy choice in an uncertain world by drastically simplifying the problem and making marginal adjustments in past successful policies to formulate current policies."¹

Rather than being regarded as a severe attack upon the maximising model used in chapter 3 this approach should be thought of as an embellishment, bringing out more clearly the many constraints, other than the simple budget constraint, which bound the decision maker's actions.²

The second argument used by the incrementalists is that for any single year a large proportion of the budget is "fixed". That is, the current year's expenditure is the result of decisions taken in the past which have committed the organisation to continuous action in some sphere of activity. This notion is related to the first since the fixity of much of the budget reduces the complexity of current decision making enabling the decision maker to concentrate only upon marginal adjustments to policies. According to Wildavsky (248), Braybrooke and Lindblom (42) et alia, the prime aid to budget calculation is that of incrementalism. That is;

"Budgets are almost never actively reviewed as a whole in the sense of considering at once the value of all existing programmes as compared with all possible alternatives. Instead this year's budget is based on last year's budget with special attention given to a narrow range of increases or decreases."³

Incrementalism suggests that the greatest part of any budget is the product of past decisions. This is similar to Cohen and Cyert's (68) notion that the budgetary process is, "history dependent". Wildavsky's (249) latest view is;

"Because most of the budget is a product of previous decisions the largest determining factor of the size and content of this year's budget is last year's budget The budget is thus like an iceberg. By far the largest part of it is below the surface, outside the control of anyone."⁴

1. Crecine (65) p 11.

2. This is central to Radner's (199) work on uncertainty.

3. Davis, Dempster and Wildavsky (74)p 529.

4. Wildavsky (249) p 89.

Once again such a view does not destroy the model adopted in chapter 3. Incrementalism has little to say about how the marginal adjustments to budgets are made or how policies are chosen.¹ That is, it says little about the choice of public outputs and the qualities of these outputs. What it does point, correctly, is that once chosen these policies become an element in a portfolio of policies which exists through future periods.

That budgets in any particular year are dependent upon decisions taken in previous periods is not a surprising result. Long range commitments have financial or resource consequences for future budgets as the plan unfolds. Schools and teachers which existed last year to teach last year's children still exist in the current year and are continuing to be paid. The budgetary decision does not begin with a "tabula rasa". In other words budgeting is incremental; existing programmes are continued and expanded slightly in both real and money terms. New programmes are introduced slowly. Mandatory programmes continue from one year to the next, and capital expenditure decisions have implications for current expenditures for a number of years in the future.

The essentials of incrementalism were seen in chapter 6. There it was seen that a large proportion of public expenditures were allocated to items such as debt charges and pensions, which would have to be paid even if the service was closed down. Since rapid changes in policies are unusual,² many inescapable costs of a "stock maintenance" type are incurred each year e.g. rents, rates, insurances, heating and lighting. Incrementalism supports the generally accepted view that in the short run public expenditure is sticky in a downward direction. The public sector does not reconsider during each budget period whether or not it will continue to supply education or police services etc. It takes these as obligatory and mandatory and proceeds from

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1. This would open up a large area of political science which lies beyond the scope of this current work. For an idea of the processes involved see Buchanan and Tullock (268), Breton (48) and Rothenberg (205).
 3. Incrementalism does not apply in the case of Peacock and Wiseman's "displacement effect".

that point to consider what developments will be made to the existing services.

The picture which emerges is that politicians choose policies, each year at the margin, which will, it is assumed, maximise the probability of their re-election. The politics of policy choice are complex but generally involve a series of political exchanges¹ either between politicians or between the legislature and particular pressure groups. The scope for manoeuvre in the total budget is limited since commitments have already been made to the policies of earlier periods. The choices which are made in addition to being politically complex are also made in an environment of limited information and uncertainty.

The next section examines the budgetary process for Glasgow in the post war period.

8.2. Budget Decision Making in Glasgow 1950/70²

Any description of the budgetary procedures of a local government like Glasgow must be incomplete especially when the person who is making the description has never witnessed the procedures at first hand. In order to make this description it has been necessary to rely upon the interviews provided by a number of persons (see footnote 2) who have at one stage or another been involved in the preparation of the budget. Detailed discussions about policy formulation and choices and the estimated expenditures of these policies are made in private committee. The working papers of these committees are strictly confidential and are destroyed soon after the decisions are taken. This means that a detailed analysis involving a comparison of ex ante policy intentions and ex post actual outcomes is not possible. The description which follows merely outlines the budgetary cycle, from the

1. e.g. logrolling.

2. I am very grateful for the lengthy conversations on the budgetary procedures of the Corporation of Glasgow which I had with Mrs E McCulloch (Treasurer 1972/75), Dr L Boyle (City Chamberlain 1970/75), Mr K Patterson (Deputy City Chamberlain 1970/75), and Mr C Thompson (Local Government Correspondent to the Glasgow Herald).

initial stages of preparing the estimates of the budget to the audit which completes the loop.

The system of budgeting followed by Glasgow in the post war period was embodied in the ideas of financial control contained within a series of Local Government Acts. In the Local Government (Scotland) Act 1947, local authorities were required to consider estimates "as early as practicable in each financial year" and to approve their estimates and fix their rate not later than 31st October - some five months after the start of the year. In these days the budget was not thought of as a financial plan for the future but rather as a purely fiscal document for fixing the local rate and controlling expenditures within approved limits. These ideas were modified under section 16 of Local Government (Financial Provisions) (Scotland) Act 1963, to allow for the consideration of estimates and the fixing of local rates "before or as soon as may be after the commencement of each financial year".

Whilst these changes were being introduced at a national level via the local government acts, Glasgow, independently, had instituted a number of measures in 1957 and 1962 which were aimed principally at ensuring a forward look at capital commitments to assist in resource allocation.¹ The essence of these changes required that when any proposal to incur expenditure came before a committee or sub-committee of the Corporation then it should be fully supported by information such as the reasons for undertaking the proposed works, a detailed breakdown of the estimated costs, the anticipated loan charges, the estimated annual costs of maintenance, the estimated net effect upon the rate poundage and so on. In other words, the committee was calling for fundamental cost accounting information.

The Corporation of the City of Glasgow is divided into a number of sub-committees. The convener or chairman of each sub-committee is a member of

1. These changes are embodied in the General Finance Committee Minute "Procedure in Dealing with Proposed Expenditure by Departmental Committees" (Print No 7, pp 659-661) 8th August 1962. This embellished a previous Minute of the same committee dated 1st November 1957, Print No 15, pp 1150-1.

the majority party and the majority party has a majority of votes on the sub-committees. The area of responsibility for each sub-committee coincides with a particular service or category of activities. Thus there is a Police Sub-Committee and the Education Sub-Committee etc. Each sub-committee in consultation with the policy planning group of the majority party formulates, in January and February, policies which the Corporation will follow in the next year. These discussions which are conducted in private committee are made in consultation with the full time senior local government civil servants. The civil servants supply information to the sub-committees on the basic technical and budgetary constraints which will make proposals feasible or infeasible.

The whole set of interactions between politicians and between politicians and their bureaucrats is extremely complex.¹ During conversations with those who have been involved with the process at this stage in the cycle it was revealed that the interplay of personalities was an extremely important determining factor in the choice of policies. On some occasions the politicians were sufficiently powerful so that their proposals were dominant and bureaucrats were forced to find alternative routes around constraints. In other instances the views of the bureaucrat, it was claimed, were dominant and it was the bureaucrat rather than the politicians who formulated and dictated policies.²

Once policies have been formulated the costs of these are then estimated. There are at this stage a series of interplays between the members of the members of the sub-committees and the City Chamberlain. The Chamberlain has an overall view of the proposals of all the sub-committees and is in the best position to advise if the implied growth rate of each sub-committee's estimated expenditure is reasonable. The degree of "reasonableness" is considered once he has a view of likely total estimated expenditure, the

1. See Wildavsky (248), Niskanen (181), Helco and Wildavsky (110).

2. This kind of analysis requires the careful documentation of particular cases. This is absent from the present study. Clearly the outcome of such "games" depends upon the relative power positions of the players, and also their access to information.

expected amount of R.S.G. and other income and the implied rate poundage. His views are also tempered by the general economic climate and what he feels the Department of Environment would consider to be reasonable growth. The Chamberlain has also built up from past experience an idea of those departments which have the greatest propensity to "pad" their estimates. He can therefore advise the chairman of the General Finance Committee upon which estimates to cut. At the same time as the estimates are considered changes in manpower requirements resulting from marginal adjustments to programmes are also considered. It must be emphasised that the Chamberlain's role and that of his staff is purely advisory.¹

The preliminary estimates were prepared for April and the final estimates were considered by the Corporation for final approval in August (i.e. three months into the financial year!).

The Corporation as a whole has to approve (by a majority) the proposals which are contained within the estimates and the Treasurer's annual budget speech. At this stage changes in the budget are in principle still possible but in practice changes are seldom made although much rhetoric is supplied. At this budget meeting of the Corporation both the estimated expenditures and the implied local rate are both agreed for the ensuing year.

It is interesting to note the kind of information which is presented on these occasions. Both the estimates and the Treasurer's budget speech present the data in absolute money terms but also in percentage terms. That is, for example, education expenditure is expected to increase by 10% on this year's expenditure. Another form of expressing information is to refer back to the immutable items of expenditure which are mandatory and carried forward from previous years. Debt charges are a classic example which are always referred to as lying beyond the control of the Council. Many expenditure increases are also presented as being beyond the control of the Council e.g. increases in interest rates, increases in wage rates that are nationally

1. Op. cit.

negotiated, or increases in expenditure which result from changes in central government policies which local governments operate. These behaviour patterns all conform to the general ideas of incrementalists, that information is presented simply in terms of percentage changes and that this year's expenditure be considered determined mainly by previous events.

There are a number of features in this budgeting procedure which can account for expenditure growth. It will be recalled from chapter 6 that information on basic trends in expenditures had to be collected from primary sources. That is, such basic information was not readily available to councillors when they were making expenditure and local taxation decisions. In addition to this lack of historical information there was also over the period 1950/70 little in the form of forward estimates of expenditure on anything other than a 1 year basis.¹ It was only in 1968 that the Corporation prepared, for the first time, a five year budget. This means that whilst the sub-committees and the General Finance Committee would have had some basic cost accounting information they did not have a set of information which was necessary for optimal resource planning. Frequently the attitudes of many sub-committees has been "here are our proposals, now get the accountant to cost them and then find the cash". That is, basic notions of opportunity cost seldom enter the calculation.

Only projects which already had a policy approval could be included for consideration in the annual estimates. This made both earlier estimating and longer term estimating correspondingly less practicable. The requirement also encouraged the submission of additional projects to the Sub-Committee on Expenditure i.e. to the committee which considers proposals for expenditure which arise during the year for which no provision has been made in the estimates. Such items of expenditure should ideally be submitted at

1. The Plowden Committee Report (259) of 1960 grew out of an internal Treasury Committee which investigated complaints from M.P.'s at the time that the Annual Civil and Defence Supply Estimates upon which they were asked to vote were inappropriate for financial control. See 7 and 12 of Plowden. Goldman (96) gives an excellent account of developments which have taken place in the post Plowden period.

a much earlier stage and considered with the overall review of needs and resources. A regular stream of proposals went before the Sub-Committee on Expenditure introducing an inflationary element to the actual budget.

Another major defect of the procedures used through the period was that capital and current expenditures were considered separately. Clearly capital expenditure on school building will carry a commitment to current expenditure, in the following years, for loan charges and running costs. In addition, a complete analysis, which would take account of staffing costs also, would have revealed the implications of current decisions on the pre-emption of future resources. In the absence of forward planning, however, such exercises are meaningless. Once again the system did not provide adequate management information necessary for the purposes of financial control and efficient resource allocation.¹

Finally the estimates were presented on a constant price basis. It was not until 1973/74 that Glasgow made any serious attempts at accounting for inflation. Known price increases, such as wages which had already been approved, were taken account of but no general view about inflation was taken when preparing the estimates. In the budget statement an allowance is generally made for some modest amount of inflation when fixing the rate poundage. It must be realised, however, that the major part of the rises in input prices are met by supplementary central government grants. If the local rate was not sufficiently high to meet total net expenditure then the deficit was carried forward to the next year and financed from the next year's local rate.

8.3. A Simple Test of Incrementalism

In the absence of detailed case study material of the budgetary process a simple and crude test was made of the incrementalists' model. One of the incrementalists' main theses is that this year's expenditure is some function

1. On a more general point resource planning techniques such as cost benefit analysis or investment appraisal were not used until late in the 1960's. Even then they were seldom used.

of last year's expenditure. That is a simple model of the form;

$$E_t = \phi(E_{t-1})$$

where

$$E_t = \text{expenditure in year } t$$

$$E_{t-1} = \text{expenditure in year } t-1$$

Such a model is a simple Markov chain, and was estimated for the data on Glasgow's expenditures over the period 1950/70 in the form,

$$E_t = \alpha_0 + \beta_0 E_{t-1} + \epsilon \quad \begin{array}{l} \alpha_0 \text{ and } \beta_0 \text{ are constants} \\ \epsilon \text{ is the error term} \end{array}$$

The following results were obtained (the t statistics are shown in brackets).

Police Expenditure (E_{Pt})

$$E_{Pt} = -197498 + 1.13914 E_{Pt-1} \\ (-2.48694) \quad (72.9233)$$

$$\bar{R}^2 = 0.9958 \quad \text{D.W.} = 1.4339$$

Education Expenditure (E_{Et})

$$E_{Et} = -781315 + 1.13914 E_{Et-1} \\ (-2.01794) \quad (73.6336)$$

$$\bar{R}^2 = 0.9959 \quad \text{D.W.} = 1.1816$$

Fire Expenditure (E_{Ft})

$$E_{Ft} = -23748 + 1.1282 E_{Ft-1} \\ (-0.760188) \quad (41.4893)$$

$$\bar{R}^2 = 0.9879 \quad \text{D.W.} = 1.3589$$

Lighting Expenditure (E_{Lt})

$$E_{Lt} = -35489 + 1.09163 E_{Lt-1} \\ (-0.611048) \quad (26.6204)$$

$$\bar{R}^2 = 0.9698 \quad \text{D.W.} = 1.9226$$

Cleansing Expenditure (E_{Ct})

$$E_{Ct} = -82090 + 1.12149 E_{Ct-1}$$

(-1.50366) (62.0928)

$$\bar{R}^2 = 0.9943 \quad D.W. = 1.6369$$

Library Expenditure (E_{Xt})

$$E_{Xt} = -28983 + 1.15204 E_{Xt-1}$$

(-2.55675) (61.7077)

$$\bar{R}^2 = 0.9946 \quad D.W. = 2.1121$$

Streets Expenditure (E_{St})

$$E_{St} = -629915 + 1.38755 E_{St-1}$$

(4.12857) (23.4729)

$$\bar{R}^2 = 0.9734 \quad D.W. = 2.2148$$

Note that each of the estimated equations has a high value of \bar{R}^2 . In addition, the Durbin-Watson statistic although biased towards 2.0, in some cases, because of the lagged endogenous variable, does not, however, suggest significant serial correlation in any of the equations.

The set of equations above lends strong support to the general idea that a large proportion of one year's expenditure is a function of the previous year's.

Conclusion

This chapter has examined the way in which the budgets were determined for Glasgow over the period 1950/70. A number of shortcomings of the procedure were outlined and a simple test of the incrementalists' model confirmed their general claim that the options available to decision makers in any single year to make radical changes are limited. Any serious discussion of policy formulation and budget decision making must, however, be made from extensive case study material, an approach which was not feasible in this study.

CHAPTER 9

Introduction

1. Education

- 1(a) The Structure of Education Expenditure
- 1(b) Primary and Secondary School Expenditure
- 1(c) Growth in Primary and Secondary School Expenditures
- 1(d) Changes in Pupil Mix
- 1(e) Quality Changes
- 1(f) Pupil Teacher Ratios
- 1(g) Embodied Changes
- 1(h) Real Inputs on Books, Apparatus, Furnishings, etc.

2. Fire Service

- 2(a) Introduction
- 2(b) Current Expenditure on Fire Services
- 2(c) The Environment
- 2(d) Expansion in Real Resources

3. Police

- 3(a) Introduction
- 3(b) Police Expenditure Growth
- 3(c) The Environment
- 3(d) Growth in Real Expenditure

Conclusion

Appendix 9A Classification of Crimes

Appendix 9B Crime Statistics

CHAPTER 9

THE ANALYSIS OF REAL EXPENDITURE GROWTH

Introduction

This chapter examines more closely the pattern of expenditure growth which was outlined in chapter 6 above. Three services are examined in detail. They are: Glasgow's education, fire and police services. The specific purpose of this chapter will be to make an attempt at explaining the increase in current expenditures at 1963 prices.

The general approach which has been adopted is to consider each service as reacting to changes in a specific environment. Those environments and their changes are described to the extent that data exists. The service is then seen to purchase additional inputs in order to tackle these problems whilst at the same time improving the quality of the product. Changes in the nature of the product and scope of the service are also examined.

The case studies reported in this chapter are a first attempt to piece together a set of indices which will provide a logical and comprehensive story of real expenditure growth over the period 1950/70. The case studies, however, are severely constrained by data limitations.

The chapter is divided into three sections. In the first section education expenditure is examined. To be more precise primary and secondary school expenditure is discussed. The second section deals with the fire service, whilst the third and final section examines police service real expenditure growth.

1. EDUCATION

1(a) The Structure of Education Expenditure

The product or set of products which the education department of a local authority like Glasgow provides is complex. Schools and colleges are provided and stocked with a variety of human and non-human inputs. These inputs are combined in a number of different ways, via an education production function, to implant in students a number of cognitive and motor skills and abilities which are either thought to be demanded by society and/or considered to be desirable ends within themselves. In addition to the production of this vector of direct outputs a number of auxiliary services are produced which service and maintain the educational system.¹ These direct and indirect services result in educational expenditures.

The education department of a local authority also has a welfare role to play. Thus financial assistance is provided to parents in need, free transport is provided and charged to the education account likewise subsidised school meals and milk, free clothing and bursaries. In addition to the welfare role the education department attempts to create an acceptable social environment by providing holiday camps, youth clubs, grants to local youth organisations, playing fields and sports facilities and adult "leisure" classes.

The outputs of the education department are consumed by a large variety of individuals. Pupils of school age 5-18 years consume, directly, the major part of the education budget. However, pre-school children are offered nursery education, handicapped children receive special education as do children in hospitals. Education is provided for a number of people serving prison sentences and borstal (list D) schools are charged to the education account. Finally, upon leaving secondary school career guidance is provided and further, or tertiary education is offered to those who wish to continue to be trained.

1. This is used to describe the services of cleaners, janitors, secretaries etc.

It can therefore be seen that to talk about the output of the education sector is a misleading concept. Instead the education sector provides a variety of services. These services frequently have consumption externalities associated with them. Thus there are social benefits in addition to the private benefits of educational activities to be considered. Table 1 summarises the breakdown of the broad components of Glasgow's current education expenditure (at current prices).

Table 1 Allocation of Education Current Expenditures (Glasgow)

Expenditure Category	1950/51	1955/56	1960/61	1965/66	% 1969/70
Further Education	5.1	5.7	7.0	11.3	13.4
Primary & Secondary Education	65.1	60.5	62.0	58.9	57.3
School Health Services	1.8	1.5	1.3	1.2	1.2
School Meals	10.6	10.0	7.8	7.9	6.7
School Milk	0.2	2.8	2.0	1.6	1.0
Loan Charges	3.2	4.9	7.7	9.6	12.3
Miscellaneous	14.0	14.6	12.2	9.5	8.1

Source: Abstract of Accounts (Glasgow)

Over the period 1950/70 total education expenditure grew at an annual compound rate of 8.9%. This has already been shown in chapter 6. It is readily seen from Table 1 that the different categories of education expenditure at current prices have grown at different rates over the period. Loan charges have grown at the fastest rate; over the period 1950-1970 they grew at an annual compound rate of 16.9%. This period coincides with the massive school building programme for the city.

Further education expenditure¹ grew at 14.6% p.a. (compound) over 1950/70. The sub-period 1960/65, which followed the Robbins Committee Report on Higher Education (1961), showed the fastest growth in further education expenditure

1. Excluding debt charges.

at 18.2% p.a. (compound). There has been a rapid growth in the demand for "vocational" courses provided by further education colleges. This demand has come both from the students and from employers who have frequently made special arrangements to establish "sandwich courses".

Primary and secondary school expenditure¹ has grown at 8.1% p.a. over 1950/70 with the most rapid growth occurring over the period 1955/65 (i.e. 9.4% p.a.). This period witnessed a number of changes in the school system following from the provisions made in the 1944 Butler Education Act. In 1947 the school leaving age had been raised to 15 and school expenditures took a number of years to adjust to this change. In 1951 and 1954 teachers received substantial pay awards and in 1955 equal pay was introduced for female teachers.

It has not been possible to allocate debt charges to further education and day school expenditures. The increase in the number of day schools has, however, contributed to their growth. In 1950 there were 323 primary and secondary schools in the city whilst in 1970 this number had grown to 389 (these figures do not record the extensions made to existing schools²).

1. Op. cit.

2. It was not possible to collect data on changes in the number of school places resulting from the capital programme.

Table 2 Analysis of Education Current Expenditure (at current prices)
(Glasgow) 1969

Expenditure Category	% of total expenditure	Net Expenditure as % of Gross Expenditure	%
			Income Sources
Nursery Schools	1.3	99.0	rent, sale of materials
Primary/Secondary Schools	57.3	99.5	fees, rents, endowments
Holiday Camps	0.3	83.0	rents, parental contributions
Playing Fields	0.5	99.0	rents
Child Guidance Clinic	0.4	100.0	-
Further Education "Pooled"	10.7	95.3	fees, rents, sale of materials
Further Education "Non-pooled"	2.7	68.6	fees, canteen receipts, sale of materials
Youth Clubs	1.1	97.9	fees, rents
Community Centres	0.3	87.0	fees, rents, canteen receipts
Contributions to other Local Authorities	1.1	69.1	receipts from other local authorities
Transportation of Pupils	1.1	100.0	-
Board & Lodgings - Residential Schools	0.9	92.3	contributions from parents
Bursaries & Allowances	0.5	100.0	-
Education in Hospitals	0.1	100.0	-
School Milk	1.0	100.0	-
School Meals	6.7	79.3	Specific Grant, sale of meals, rents
Clothing for Pupils	0.03	100.0	-
School Medical Service	1.2	99.1	contribution from Hospital Board
Loan Charges	12.3	100.0	-
Career Service	0.3	32.0	Specific Government Grant
School Crossing Patrol	0.4	100.0	-
Administration	2.7	99.4	rents, fines, sale of goods

Source: Abstract of the Accounts, Glasgow 1969/70

Note: to table 2.

Total net current education expenditure as a percentage of total gross current education expenditure was 96.4% for 1969/70. Net expenditure is financed from rates and Rate Support Grant.

In Table 2 more detail of the activities of the education sector is given along with a statement of how each is financed. Both Tables 1 and 2 show that primary and secondary school expenditures represent the major activity of the education sector. The remainder of this section will therefore mainly concentrate upon the factors which have been responsible for changes in day school expenditures.

Nursery school expenditure, which accounted for 1.3% of total education expenditure, has also grown over the period 1950/70. After the 1944 Education Act, which required each local education authority to provide nursery education this sector of education did not receive special treatment from central government until the 1960's. In 1950/51 there were 1,358 pupils in average daily attendance in Glasgow's nursery classes. This figure had increased to 1,880 pupils in 1960/61, which represents an increase of 38% over the 10 year period. In 1970/71 the figure had grown to 4,133 pupils, an increase of 119.8% over the period 1960/61-1970/71. It is possible that this growth is due to the supply of nursery school places which were provided but that this must be interpreted as a supply response to an increase in demand especially from households in which both parents work.

Nursery education expenditure is not part of the definition of primary and secondary day school expenditure which is considered in the next section.

1(b) Primary and Secondary School Expenditure¹

Table 3 gives a breakdown of primary and secondary school expenditures for

1. This expenditure category includes expenditure on handicapped schools.

1950 and 1970.

Table 3 Composition of Primary and Secondary School Expenditure (at current prices) Glasgow

<u>Item</u>	%	
	<u>1950</u>	<u>1970</u>
Teachers' Salaries ^a	69.9	60.0
Salaries of other staff ^b	8.6	12.8
Rates, Rent, Insurances	4.8	7.4
Repairs and Maintenance	6.6	5.7
Furniture and Fittings	1.0	1.2
Heat, Light, Cleansing	3.5	5.4
Books, Apparatus, Materials	5.0	5.9
Miscellaneous ^c	0.6	1.6
Total	100.0	100.0

Source: Abstract of Accounts, Glasgow

Notes:

- a) includes superannuation and N.H.I. payments
- b) op. cit.
- c) mainly transport, education T.V. services etc.

One interesting feature of Table 3 is that total wages and salaries is the main component of total school expenditure; 78.5% in 1950 and 72.8% in 1970. The balance has, however, shifted towards the staff costs of non-teaching staff (i.e. janitors, typists, cleaners etc) indicating that over the period the rate of growth in other staff costs has been greater than that for teaching staff.

Another interesting feature is the size of "system maintenance costs" such as rents, rates and insurances plus heat, light and cleaning. They amounted to 8.3% in 1950 and 12.8% in 1970. These costs are mainly fixed costs in the short term. If repairs and maintenance costs are added in then almost 1/5th of the budget in 1970 was of a fixed cost nature.¹ Assuming that there is a general no redundancies policy adopted then the margin of expenditures

1. Assuming that repairs and maintenance in many instances have to be carried out and cannot be delayed.

which are available for reductions in times of financial stringency are limited and trivial. This points to the general problems involved in trying to reduce public expenditure. Once the public sector has been built up then nothing short of its dismantlement¹ will allow significant reductions to be made in absolute values of public expenditures.²

The fall in teachers' salaries as a percentage to total school expenditure recounts the observation made in chapter 5 that teachers' money wage rates had not, relative to other occupations, risen very fast over the period. Table 4 below shows also that there has only been a very gradual increase in the number of teachers employed in Glasgow over the period 1950/70. The annual compound rate of growth in teacher numbers was 0.5% p.a.

1(c) Growth in Primary and Secondary Education (Glasgow)

Total school expenditure at current prices grew at 8.1% p.a. (compound) whereas at constant 1963 prices it grew at 2.8% p.a. Per capita (i.e. per pupil) real expenditures grew at 2.6% p.a. (see Table 4a). It, therefore, follows that input price increases accounted for 68% of the increase in school current expenditures over the period 1950/70. The remaining 32% has to be explained by reference to changes in variables such as population mix, quality and product differences. These are now considered.

-
1. Either in terms of reducing final output or reducing quality or both.
 2. Although attention will not always be drawn to it the same general argument applies to the other services studied below.

Table 4 Education Statistics - Glasgow 1950/51 - 1969/70Table 4a Financial Data (Glasgow)

Year	Total Current Expenditure at Current Prices (£m)	Total Current Expenditure at Constant Prices (£m)	Real Current Expenditure Per Pupil (£) (at 1962/63 prices)	School Input Price Index 1963/63 = 100
1950/51	5.11	9.69	56.0	52.7
1951/52	6.04	11.10	63.6	54.4
1952/53	6.52	11.37	63.9	57.3
1953/54	6.67	11.12	64.5	60.0
1954/55	7.22	11.81	66.3	61.2
1955/56	7.72	11.13	62.6	69.4
1956/57	9.09	12.27	68.4	74.1
1957/58	9.98	13.19	73.7	75.7
1958/59	10.59	13.43	75.0	78.9
1959/60	11.12	13.06	72.7	85.1
1960/61	11.77	13.45	75.3	87.5
1961/62	13.55	14.68	82.0	92.3
1962/63	14.23	14.23	80.1	100.0
1963/64	15.12	14.33	81.4	105.5
1964/65	15.87	14.43	82.3	109.9
1965/66	16.87	14.83	85.1	113.8
1966/67	18.80	16.03	92.3	117.3
1967/68	19.67	15.83	90.8	124.2
1968/69	21.08	16.54	95.1	127.4
1969/70	22.74	16.28	93.3	139.7

Source: Abstract of the Accounts, Glasgow

Table 4b Pupil and Teacher Data (Glasgow)

Year	Number of Pupils ^a	Ratio of Secondary School to Primary School Pupils ^a	Ratio of 15-18 year olds in school population ^b	Number of Teachers ^a	Pupil Teacher Ratio	Classes Oversized (%) ^c	Staff Shortage (%) ^c ¹
1950/51	173,207	0.44	0.029	6,575	26.5	12.5	5.7
1951/52	174,508	0.43	0.030	6,742	26.1	12.0	5.2
1952/53	178,102	0.42	0.030	6,968	25.8	12.5	6.9
1953/54	172,588	0.36	0.031	6,925	25.1	N/A	3.4
1954/55	177,700	0.38	0.033	6,981	25.7	N/A	N/A
1955/56	177,476	0.39	0.035	6,820	26.2	N/A	N/A
1956/57	179,034	0.41	0.037	6,882	26.2	11.8	11.8
1957/58	178,850	0.41	0.036	6,771	26.6	11.7	11.9
1958/59	179,098	0.42	0.041	6,929	26.1	11.7	11.8
1959/60	179,616	0.47	0.045	7,019	25.8	11.2	12.0
1960/61	178,599	0.49	0.043	7,058	25.6	11.6	13.0
1961/62	179,022	0.49	0.043	6,890	25.6	12.2	14.5
1962/63	177,686	0.47	0.058 ²	7,189	25.0	12.6	15.6
1963/64	176,945	0.47	0.061	7,270	24.6	11.8	16.0
1964/65	175,317	0.47	0.063	7,352	24.1	11.7	13.0
1965/66	174,070	0.46	0.061	7,831	22.6	12.2	14.8
1966/67	173,548	0.46	0.063	7,458	23.6	N/A	15.4
1967/68	174,385	0.48	0.068	7,395	24.0	N/A	16.4
1968/69	174,098	0.49	0.072	7,402	24.0	N/A	N/A
1969/70	174,361	0.50	0.076	7,262	24.5	N/A	N/A

Sources:

- a) Glasgow Education Department and Scottish Education Department
- b) Scottish Education Department
- c) Various years of "Education in Scotland" and "Scottish Education Statistics" published by the Scottish Education Department.

Notes:

1. Staff shortage refers to the number of teachers required to fill vacancies, reduce oversize classes and replace uncertificated teachers and replace teachers over 70 years of age as a percentage of all posts for certificated teachers.
2. "0" grades introduced that year causing an expansion in over 16 year olds.

1(d) Changes in Pupil Mix

Variations in the pupil mix over time induce changes in the activities vector B_e described in chapter 3. That is to say, as the ratio of primary school to secondary school pupils varies then the components of the activities vector will adjust to these changes. The changes in the activities vector will then show up as changes in total school expenditure. One significant variation in the activities vector will be the pupil teacher ratio. In the case of primary school children the pupil teacher ratio is higher than in secondary schools. Furthermore, within secondary schools the pupil teacher ratio for under 16 year olds is higher than that for over 16 year olds. For example in 1971 in Glasgow the average pupil teacher ratios were: primary school 1:36.8, 1st form of secondary school 1:26.5 and 6th form 1:9.4.¹ In addition, since primary school teachers were lower paid than secondary school teachers and since those teachers teaching sixth form pupils are more likely to be the older, more qualified teachers, and hence higher paid teachers, there will exist within an education system a set of different unit costs per pupil depending upon the age of the pupil.

Data on unit cost variations were not available for Glasgow. The C.S.O., however, has unit costs for the U.K. as a whole for the years 1963/64 to 1970/71 inclusive. Taking primary school unit costs as the base and equal to unity the following comparisons are made:-

Primary School	= 1:1
Secondary School (under 16 years)	= 1:1.9
Secondary School (over 16 years)	= 1:3.3
Special Schools	= 1:4.7

This means that a special school pupil costs 4.7 times as much as a primary school pupil to educate. Using these ratios for Glasgow the absolute number of school pupils in Glasgow were adjusted to take into account the variations in unit costs and the variations in the age structure of the pupils. Data²

1. "Scottish Education Statistics", HMSO, 1972.

2. The Scottish Education Department were kind enough to go back to their 1950 files and compute data which had not been published.

was gathered on the Glasgow school pupil population and broken down according to whether it was in primary, secondary or special school and furthermore according to age. Thus the number of special school pupils were multiplied by 4.7 and so on.

Table 4b shows that the ratio of secondary school to primary school pupils has increased over the period as too has the ratio of 15-18 year olds to the total school population. Thus the pupil mix has been changing over the period in such a way that it becomes more expensive to educate the total school population.

If current school expenditure, at constant prices, is then deflated by the adjusted pupil numbers, real per capita current expenditure growth declines from 2.8% p.a. to 2.3%. That is, about 6.1% of the original increase in per pupil expenditures at current prices can be explained in terms of changes in the mix of pupils.

A number of other writers especially Cumming (67) and Vaizey (21) have shown that different subjects have different unit costs. Cumming found that the teaching costs per pupil in Classics were twice those of English and seven times those of Geography. No information of changes in the subject mix or the unit costs of different subjects was available for Glasgow. Clearly, however, subject mix changes could be an important source of per pupil expenditure variations over time.

1(e) Quality Changes

The quality of education is an extremely complex magnitude to consider conceptually. Some would argue that the quality of education is indicated by the volume of real resources allocated per pupil. Others would argue that the quality of education is seen by an examination of the goals of the system. Is education simply a question of cramming knowledge into students in order that they pass standardised exams or is it more to do with the actual content of syllabi and the way in which students are motivated? These are moot points

and probably both sides to the argument would wish to include both measures in some overall index of quality although they would disagree on the weights applied to each component.

Fortunately, perhaps, the problem of assigning weights to the components of a quality index does not arise in this exercise since data on quality is so scanty that nothing more than the briefest of observations on the topic can be made. The following components are generally regarded as being indicators of quality changes:-

- a) changes in the pupil teacher ratio
- b) embodied quality improvements in better trained teachers
- c) improved teachers who have gained "on the job" experience
- d) embodied quality improvements in books and equipment.

These are considered in turn.

1(f)Pupil Teacher Ratios

There is no agreement that changes in the pupil teacher ratio result in quality changes. Some argue that a decline in the pupil teacher ratio brought about by bringing in many more inexperienced teachers with lower qualifications represents a reduction in quality. The matter is a complex one in which subtle trade-offs are made.

Glasgow has been faced with a shortage of teachers throughout the post war period, which has resulted in oversize classes. Table 4b above shows both the percentage of oversize classes and the percentage staff shortage for those years for which data was available. For all schools in the city Table 4b reveals that the teacher shortage has become more acute over the period. Data in this area is scant, however by piecing together some data gleaned from the Director of Education's Reports (Glasgow) Table 5 below was constructed, which shows the problem of oversized classes in more detail.

Table 5 The Number of Oversize Classes in Glasgow

<u>Classes</u>	<u>1961</u>	<u>1964</u>	<u>1967</u>	<u>Target Size²</u> (pupils)
Primary Classes	338 (11.5%) ¹	323 (10.9%)	357 (12.7%)	45
Secondary Classes (Forms I-III)	109 (6.8%)	71 (4.3%)	84 (5.2%)	40
Secondary Classes (Forms IV-VI)	62 (21.5%)	93 (25.4%)	59 (15.5%)	30

Source:

Director of Education Annual Reports (Glasgow)

Notes:

1. as a percentage of total number of primary school teachers
2. if a class is defined as oversized then it means that there are more than the target size number of pupils in it.

Although the staff shortages¹ have continued over the period nevertheless the absolute number of teachers has increased by 0.5% p.a. thereby reducing the average pupil teacher ratio from 1:26.5 in 1950 to 1:24.5 in 1970.

Table 6 shows the distribution of pupil teacher ratios over different classes for the years for which data exists.

Table 6 Distribution of Pupil Teacher Ratios (Glasgow) 1961/71^a

<u>Class</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
Primary	1:36.5	1:36.8	1:36.0	1:36.0	-	-	1:39.1	1:39.0	1:38.5	-	1:36.8
Secondary	1:18.7	1:17.8	1:17.0	1:16.9							
S1 ^b									1:26.3		1:26.5
S2								1:26.4	1:27.4	1:25.4	1:26.6
S3									1:18.7		1:20.6
S4									1:15.7		1:17.9
S5								1:15.0	1:16.0	1:15.6	1:15.6
S6									1:10.0		1:9.4

Notes:

- This table is made up from two sources hence all years might not be strictly comparable:-
 - 1961/64 from "Education in Scotland" published by S.E.D. 1965
 - 1967/71 from "Scottish Education Statistics HMSO
- S1 = secondary form 1 etc.

1. The teacher shortage can be explained in a number of ways e.g. low relative salaries of teachers generally, high travelling costs of central city schools, attractiveness of suburban schools.

Changes in the pupil teacher ratio together with changes in the ratio of secondary school teachers to primary school teachers from 1:0.87 in 1950 to 1:1.02 in 1970 will account for some proportion of the real increase in school expenditures. It was not possible to ascertain the precise percentage.

1(g) Embodied Changes

It was argued above that improvements in the quality of the teaching stock and in books and equipment could be considered as contributing to improvements in the quality of education. No data readily exists to confirm or deny that improvements in the quality of the teaching stock either from better training or from on the job experience has taken place. Likewise whilst many argue that books and equipment were of a better quality in 1970 than in 1950, no evidence is available to support this. Whilst these changes are both interesting and of importance when discussing educational quality there is no way in which they can be easily related empirically to increases in real expenditures.

1(h) Real Inputs on Books, Apparatus, Furnishings etc

Other inputs are combined with teachers (labour) in the education production function. These other inputs consist principally of books, apparatus, and furniture and fittings. Over the period 1950-1970 per pupil expenditure on books and apparatus has grown at 4.8% p.a. in real terms. As new schools have been equipped and new courses and curricula have been introduced, this has clearly resulted in increased expenditure on materials. Modern teaching methods require more non-teaching inputs per pupil.¹

Expenditure on furnishings and equipment (laboratories, desks etc) has grown at a per pupil rate of 4.2% p.a. in real terms. Over the period many schools have been re-equipped. Taking these items of expenditure together the categories on which expenditure was incurred is found in the Director of

1. See Cummings (67) and Vaizey (238).

Education's Reports (Glasgow). By 1961 each school had at least 1 projection room and a 16mm projector. All schools had been equipped to receive school radio broadcasts and during the 1960's schools were equipped to receive television broadcasts including those produced by the Glasgow E.T.V. unit. Every school was equipped during the 1960's with tape recorders for the teaching of English, Speech, Drama, Music and Modern Languages and school record players were updated. There was also an expansion in the number and equipping of school libraries and museums.

Curriculum developments also led to more expenditure on books, apparatus and equipment. Thus for example amongst the major curricular developments there were:-

- 1958/61 - introduction of maths and science teaching to primary schools
 - vocational training in engineering, building science and commerce
 - changes in the teaching of homecraft which demanded more equipment.
- 1961/70 - introduction of craft engineering, craft building, retail and distribution studies, nautical studies and automobile engineering
 - French was introduced to primary schools
 - the initial teaching alphabet was introduced
 - new maths and science syllabi were introduced to secondary schools

Curriculum developments and the introduction of new syllabi suggest that the nature of the final product has changed. It was suggested in chapter 3 above that changes to the characteristics of a product can be responsible for changes in real expenditures.

Bringing the above discussion together it can be seen that per pupil real expenditures in Glasgow day schools increased by 2.6% p.a. This increase can be accounted for by:

- i) changes in the pupil mix
- ii) changes in the quality of output including improvements in the pupil teacher ratio
- iii) modifications to the product through the introduction of new subjects

and the change in existing ones.

To allocate the total increase in real resources to specific changes in the environment is an impossible task given the lack of suitable data. This study has gone as far as the data will allow.¹ A number of hypotheses which have been suggested cannot be tested. For example, it is generally claimed that modern schools are more expensive to clean and to heat than older schools. This proposition might account for the increases in the heating and cleaning expenses.²

It is not clear whether or not the increase in real expenditures per pupil represents an improvement in pupil welfare (or social welfare). Society might be paying for an improved product or it might be paying more for the same product which is now packaged more expensively. Whilst these statements might on the surface appear to be provocative surely they raise the fundamental question of economic efficiency and distribution, namely what is the relationship between inputs and outputs? This leads to a discussion of output which has been omitted so far.

Very little has been said about the first quadrant or demand quadrant of the diagram presented in chapter 3. Whilst the total number of school pupils educated has increased it is impossible to say anything about changes in the level of education consumed per pupil. Changes could have been taking place in this magnitude and thus contributing to real expenditure increases via an increase in the derived demand for inputs. In the absence of suitable indicators nothing can be said about the level of educational output.

In summary then this study was able to present some basic time series data on educational expenditures and corresponding environmental variables.

Changes in the pupil teacher ratio, the age structure of the pupil population

1. Once again basic management information did not appear to exist. It took a long time to piece together the data which has been presented and to find series which were consistent with one another.
2. The increase in the absolute number of schools also accounts for the increase in these expenses.

and changes in the curriculum were identified as likely factors contributing to real expenditure growth. In the absence of other more fundamental data on indicators of quality and quantity of education, subject mixes etc it was not possible to go further. In other words in order to make sensible policy prescriptions in this area of public expenditure more needs to be known about the education production function at the level of the school or the classroom.

2. FIRE SERVICE

2(a) Introduction

"Reduced to first principles the task of the Fire Service is to extinguish such fires as it fails to prevent". Clearly, the prevention of fires must be a cooperative activity between the fire service and the general public; an activity in which the fire department, assisted in some cases by the law, provides information and expertise. Individuals provide, at their own expense, fire prevention capital. Thus owners of wealth and property which requires protection from destruction by fire will instal fire alarms, sprinkler systems, fire detection devices, fire extinguishing equipment, and will incorporate within the design of buildings fire safety features. In many instances the ability to purchase fire insurance or the price at which such insurance might be purchased depends upon the initial outlays on fire prevention. The expenditures of the local government's fire services on prevention and fire fighting are therefore only a part of the total amount spent on these activities in the whole economy. Furthermore the costs of fires in terms of loss of life, lost output, lost employment and damage costs are virtually unknown. Table 7 gives a comparison between Glasgow's fire losses and those for the U.K.

There are a number of problems of interpreting these statistics. The first is that the statistics are only estimates of the loss and as such are generally recognised as under-recording the value of damage. Secondly, the valuation of loss only refers to the damage to property, they do not refer to monetary valuations of loss of life, output or employment. In 1960 the fire damage for Glasgow as a percentage of the UK. rose to 11.4%. This was due to a number of very large fires in the city e.g. the Cheapside Street Fire¹ - £3m (14 members of fire service plus 5 members of salvage corps lost in one fire), Yorkhill Quay - £0.75m, Woolworths - £0.4m, and Princes Dock - £0.1,. In

1. Bonded warehouse fire.

Table 7 City of Glasgow and U.K. Fire Loss Statistics

Year	Estimated	U.K. Fire Loss fm	Glasgow Fire Loss as percentage of U.K. %	Number of		Number of Lives Lost in Fires Glasgow	Number of Lives Lost in Fires U.K.
	Fire Loss Glasgow fm			Fires for which Damage Glasgow £1,000			
1950	0.37	19.0	2.0	36	N/A	557	
1951	0.64	23.1	2.8	49	3	621	
1952	0.64	23.2	2.6	49	10	636	
1953	0.54	25.1	2.2	42	11	463	
1954	0.71	26.2	2.7	33	7	495	
1955	1.67	27.6	6.1	52	8	633	
1956	0.82	27.5	3.0	51	18	529	
1957	2.02	25.8	7.8	55	21	507	
1958	0.84	24.1	3.5	66	15	451	
1959	0.41	44.2	1.0	48	22	487	
1960	5.02	43.8	11.4	78	46	529	
1961	1.45	37.5	3.9	61	13	572	
1962	2.55	55.6	4.6	73	21	667	
1963	1.49	66.4	2.2	86	28	818	
1964	1.27	76.7	1.7	95	21	681	
1965	1.58	75.1	2.1	145	39	703	
1966	2.01	82.3	2.4	169	40	780	
1967	2.52	90.0	2.8	179	37	779	
1968	4.50	100.0	4.5	N/A	55	865	
1969	1.88	120.0	1.6	N/A	41	861	
1970	3.68	110.9	3.3	N/A	38	839	

Sources:

- a) Data for Glasgow was collected from successive copies of the Fire Master's Annual Report for the Corporation of the City of Glasgow.
- b) U.K. fire loss data from "Monopolies Commission Report on Fire Insurance" H.C. 396, 2nd August 1972.
- c) Lives lost in U.K. fires from "United Kingdom Fire and Loss Statistics" 1963 and 1972 editions, published by the Department of the Environment.

1968 of the 55 killed in fires 22 were killed in the James Watt Street fire when employees were trapped in a warehouse. The description of these fires gives some indication of the environment in which Glasgow's fire service operates.

2(b) Current Expenditures on Fire Services

Current expenditure, at current prices, on the fire service in Glasgow grew at 8.4% p.a. (compound) and at 3.8% p.a., at 1963 prices, over the period 1950/70.

Table 8 gives a breakdown of the components of fire service current expenditure for 1969/70.

Table 8 Composition of Fire Service Expenditure, Glasgow, 1969/70

<u>Item</u>	<u>%</u>
Staff costs ¹	70.1
Uniforms	1.2
Administration	1.7
Heat, light, cleaning	4.1
Repairs/maintenance to property	
New vehicles and vehicle maintenance	5.5
Local rates	1.6
Loan charges	4.9
Pensions	8.4
Miscellaneous ²	2.5
<hr/>	<hr/>
Total	100.0
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Notes:

1. Includes superannuation and NHI payments
2. Stationery, travelling, rents, insurances, telephones and wireless.

The fastest growing component of current expenditure on fire services (at current prices) over 1950/70 was loan charges which grew at 13.0% p.a.

(compound) compared to 8.3% p.a. for staff costs. The growth in loan charges reflects the increases in interest rates and the expanding capital expenditure

programme which was undertaken during the period. In 1950 there were 13

fire stations whilst in 1970 there were 16. Many of the fire stations which existed at the beginning of the period were relocated and others completely rebuilt thus bringing them up to modern standards.

The period has also coincided with the development of the fire service at a national level. This means that as national standards have been set Glasgow as a fire authority has had to spend resources in order to fall into line.¹ In 1936 when the Riverdale Committee reported on Fire Services² in the U.K., no local authority, with the exception of London, Edinburgh, Glasgow and Aberdeen, was obliged to provide a fire service. There was no central supervision, responsibility or exchequer grant for the fire department. In 1938 the Fire Brigades Act (C72), which followed from Riverdale's recommendations, made provisions for each local authority to supply fire services. The Act also abolished charges for fire services and established a central government department in the Home Office to be responsible for co-ordinating the activities of the local fire authorities. At the same time training boards were set up along with a central government Fire Inspectorate whose function was to maintain standards.

After the nationalisation of the fire service in 1941, as a wartime measure, the service was then returned to local control in 1947. (Fire Services Act C41) The local fire departments do not have a pure monopoly on the services provided. The Army, Airforce, British Airports Authority and some industrial firms have their own private fire departments. However, the local authority fire service is the most significant service and is generally in attendance along with the private fire fighting services when fires occur in these areas.

The fire service provides activities as a reaction to an environment. In this case the environment presents the following problems to be solved. Fires

1. It should be remarked, however, that Glasgow is one of the leading fire authorities in Western Europe and has frequently set the standards.
2. Cmdd 5224 - "Departmental Committee on Fire Brigade Services" Lord Riverdale, HMSO 1936.

which have started have to be extinguished and prevented from spreading, and fires have to be prevented. The next section takes a closer look at the environment within which the fire service operates.

2(c) The Environment

The environment of an area is an important factor in determining the supply of fires. Glasgow, in common with many conurbations, has a "fire environment" which is characterised by, high residential densities and an old housing stock in many areas of the city, derelict and unoccupied property, industrial processes which are high fire risks and a complex network of warehouses around a dockland. The docks and surrounding warehouses contain highly inflammable materials such as flax, jute, sisal cotton, coconut fibre, petrol, benzine, acetone, paper, rags and nitrates to mention but a few. Derelict and unoccupied property has been a frequent source of fires which have been started by children.¹ Old housing and high population densities increases the risk of fire spread and loss of life.

It was seen in the introduction that many of Glasgow's largest fires have occurred in the dockland and its surrounding warehousing complex.

In addition to the environment described above the household (within which 40% of all buildings fires took place over the period 1950/70)² has increased its fire risk. Many common household items are potential fire hazards e.g. electric blankets,³ paraffin stoves, television sets, electric fires,⁴ and polyurethane foams and plastics in household furnishings. Most fatalities associated with fire occur within the house.

1. In 1966/67 380 fire calls were made to fires started in derelict property by children. This represented 7.8% of all fire calls made that year.

2. Although the value of household property lost from fire is a small proportion of the total their increased incidence places a strain on the services.

3. In the U.K. 1955/70 there were on average 200 fires a week caused by electric blankets (no data for Glasgow). This represents an 800% increase over the period.

4. There were 8,000 electric fires in the U.K. in 1957. This had grown to 20,000 by 1967.

Table 9 below gives a breakdown of the causes of fires which occurred in Glasgow over various years between 1950 and 1970. From that Table it is seen that there has been a dramatic increase in the number of fires caused by children playing with lights. Caution, however, should be exercised when interpreting these statistics since they are sensitive to methods of recording, and changes of definition and classification.

The fire department, therefore, responds to a number of problems presented to it by its environment. Table 10 below shows the division of the fire department's activities amongst several services. The total number of calls represents the number of times the fire department responded to an alarm call. It can be seen that this total is divided between the actual number of fires (excluding chimney fires) attended, the number of chimney fires attended, the number of false alarms responded to and finally special services provided by the department. In 1970 the breakdown in percentage terms was:

Number of fires attended	7,102	57.5%
Number of chimney fires	580	4.7%
False alarms	3,584	29.0%
Special services	1,087	8.8%
Total	<u>12,353</u>	<u>100.0</u>

With respect to the composition of fire department activities over the period 1950/70 there have been a number of important features. Firstly there is the decline in the number of chimney fires attended. This is to be expected over a period for which there has been an increase in the incidence of central heating installations and which was coupled with a gradual movement towards a smokeless zoning system for Glasgow. There is also the rapid increase in the number of fires attended which represents a 3.5 fold increase over the twenty year period 1950/70 (see Table 10). This increase in the number of fires represents an 11.0% increase p.a. (compound). Finally there has been a substantial increase in the number of special services provided by the fire department. These points will be discussed below.

Table 9 Causes of Fires, Glasgow, 1950-1970

Causes	1950 No.	1955 No.	1960 No.	1965 No.	1970 No.
Motor backfiring	6	9	4	2	-
Boiling fat, oil, resin, tar etc	51	77	171	307	363
Children playing with lights	281	607	787	1529	3631
Defective fireplaces, hearth etc	433	328	204	105	-
Dropped lights	250	420	536	602	660
Electricity	186	238	316	377	462
Friction of machinery	11	17	24	18	-
Gas escapes, explosions	15	20	16	38	-
Goods in contact with lights	95	178	123	97	-
Heat from stoves, furnaces	28	11	6	8	-
Heat from sun's rays	-	9	1	2	-
Hot ashes, hot metal	196	373	276	454	-
Incendiarism	19	8	56	213	797
Oxyacetylene burners	17	32	27	26	-
Radiated heat	66	87	105	163	24
Sparks from chimney fires and locomotives	197	427	234	183	-
Spontaneous combustion	5	7	7	3	-
Vapour in contact with lights	60	57	111	108	-
Chemical action	1	2	-	-	-
Celluloid cine film igniting	1	-	-	-	-
Lightening	3	-	-	-	-
Television	-	-	13	7	-
Unknown	19	7	17	8	-
Total	1940	2914	3034	4250	7102

Source:

Annual Reports of Fire Master Glasgow Corporation

Note:

The system of classification for 1970 differs from that for previous years.

Table 10 City of Glasgow Fire Statistics 1950 - 1970

Year	Total Number of Calls	Number of Fires	Chimney Fires	False Alarms	Special Services	Response to Calls outwith Area	Number of River Fire Calls	Index of Number of Fires 1950 = 100	Index of Chimney Fires 1950 = 100	Index of Special Services 1950 = 100	Number of Fire Inspections
1950	5,576	1,940	1,985	1,797	54	99	112	100.0	100.0	100.0	536
1951	5,707	1,894	2,088	1,666	59	106	124	93.8	105.2	109.3	953
1952	6,370	2,013	2,286	1,955	116	126	166	99.7	115.2	214.8	1,116
1953	6,312	1,839	2,270	2,076	127	116	144	91.1	114.4	235.2	1,453
1954	6,057	1,859	2,099	1,971	129	132	124	92.1	105.7	238.9	1,244
1955	7,843	2,914	2,452	2,329	148	209	192	144.3	123.5	274.1	1,224
1956	7,747	2,554	2,552	2,445	196	184	189	126.5	128.6	362.9	1,514
1957	7,432	2,435	2,075	2,678	244	174	179	120.6	104.5	451.9	1,079
1958	8,106	2,542	2,340	2,906	318	N/A	129	125.9	117.9	588.9	1,277
1959	8,668	3,045	2,276	3,056	286	N/A	130	150.8	114.7	529.6	1,029
1960	8,740	3,034	2,432	3,001	273	242	128	150.3	122.5	505.6	1,088
1961	8,493	2,899	2,019	4,258	317	212	129	143.6	101.7	587.0	1,261
1962	8,843	3,090	1,944	3,499	310	235	115	153.0	97.9	574.1	2,018
1963	9,538	3,079	1,951	4,170	338	289	110	152.5	98.3	625.9	2,072
1964	9,570	2,955	1,622	4,566	427	318	134	146.4	81.7	790.7	2,292
1965	9,923	4,250	1,402	3,587	684	218	132	210.5	70.6	1,266.7	2,801
1966	10,569	4,817	1,268	3,614	870	236	N/A	238.5	63.9	1,611.1	4,208
1967	10,961	5,453	928	3,624	956	229	194	270.1	46.8	1,770.4	4,905
1968	13,340	6,950	794	4,533	1,063	266	239	344.2	40.0	1,968.5	6,554
1969	12,651	6,804	810	3,987	1,050	298	236	336.9	40.8	1,944.4	6,892
1970	12,353	7,102	580	3,584	1,087	327	N/A	351.8	29.2	2,012.9	7,563

Source:

Successive copies of the Fire Master's Annual Report for the Corporation of the City of Glasgow

Not only does the fire department respond to the environment it actively seeks to change it. The activities of the fire prevention section of the department are geared to reducing fire risk. Table 10 shows that the number of fire inspections (i.e. fire prevention) has increased at 14.8% p.a.¹ This figure only captures a small amount of the work done by the fire prevention department who give advice on the storage of materials, building design and general advice on fire safety. The work of the fire prevention officer has been assisted by legislation which has expanded the scope of his activities. The principal items of legislation include:

- a) 1955 Cinematograph (Safety) (Scotland) Regulations: personnel in cinemas were to be given instruction on fire fighting and first aid etc.
- b) 1959 Factories Act: provided legislative controls for fire prevention. H.M. Factory Inspectorate requested the Fire Department to inspect all factories.
- c) 1961 Licensing Act: the fire authorities were empowered to inspect licensed premises and to give a fire certificate before local magistrates would grant a licence.
- d) 1963 Offices, Shops and Railway Premises Act
- e) 1963 Building Standards (Scotland) Regulations
- f) 1971 Fire Precautions Act
- g) 1972 All hotels, hostels etc were to be registered with the fire department.²

Whilst this legislation has given the fire prevention officers more scope and the ability to insist upon environmental controls, nevertheless, the increased workload has not been matched by an equivalent expansion in manpower and hence the fire prevention service is over-strained.

1. More recently there has been a change in the work activities of fire station personnel. Instead of cleaning fire stations and equipment etc whilst on duty waiting for a fire alarm, station personnel now conduct fire inspections of property assisting in the work of fire prevention.
2. Fire Research Station shows that the risk of being burned to death in a British hotel is 10 times greater than being burned to death at home.

The importance of knowledge about the environment within which the fire department operates is usefully summed up by the Chief Fire Officer from Ipswich:¹

"The world today has become a complicated place and the kind of fire precaution advice which it needs for maximum security must vary according to the circumstances. The advice given to a theatre manager must be very different from that needed at a plastics factory, an oil fired power station, or a rocket base."

However one environment which the fire department has virtually no control over is the household or the home. The fire department can offer advice with regard to general building design but the contents of the home lie beyond their scope.²

2(d) Expansion in Real Resources

The expansion in real resources consumed by Glasgow's fire department has proceeded at 3.8% p.a. over the period 1950/70. As the volume of activities engaged in by the department expands i.e. in the areas of fire fighting and prevention then this is seen in an expansion of real resources. The principal resource is man-power. Table 11 shows what has happened to man-power over the period 1950/70. Taking the period as a whole operational man-power (i.e. firemen only) grew at 0.5% p.a. (compound). But if the sub-period 1950/63 is taken then man-power grew at 8.3% p.a. Over the period 1963/70 31% of the operational personnel in post in 1963 left the service. This reduction in man-power is explained in part by the low wages and salaries paid to firemen relative to other occupations (see chapter 5, Appendix 5.F). Furthermore the reduction in operational personnel coupled with an expansion in the number of fires attended clearly places strains on resources. In 1950 the figure was 4.3 fires per fireman; this had increased to 14.2 fires per fireman in 1970. In terms of total calls, the figure for 1950 was 12.3 calls per fireman and for 1970 it was 24.6. These additional strains in

1. See Griffiths "Municipal Year Book 1963".

2. One solution would be to control the sale of certain items to the household.

Table 11 Fire Department Man-Power, Glasgow, 1950/70

Year	Total Actual Man-Power	Total Establishment	Total Actual Firemen	Total Firemen Establishment
1950	626	643	455	469
1951	601	643	427	469
1952	629	643	453	469
1953	609	643	440	469
1954	610	643	439	469
1955	610	643	439	469
1956	637	681	461	507
1957	654	681	483	507
1958	754	761	513	521
1959	750	763	503	515
1960	754	768	502	515
1961	797	851	532	575
1962	925	851	647	575
1963	1,020	1,047	730	746
1964	1,040	1,108	731	789
1965	987	1,108	685	789
1966	929	1,108	629	789
1967	872	1,108	583	789
1968	801	1,108	518	789
1969	776	1,011	511	690
1970	782	1,011	503	690

turn contribute to further wastage from the service.¹

A comparison between the actual manpower figures and the establishment figures in Table 11 gives a further indication of man-power shortages. Thus in 1970 on operational personnel the Glasgow fire department was 27% below establishment whilst it was 3% below establishment in 1950.

Over the period as a whole some proportion of the expansion in expenditure at 1963 prices can be explained in terms of man-power growth. Of course whilst there has been a drop in the number of personnel, nevertheless, the supply of man-hours has been kept up by increasing amounts of over-time. Thus to explain the expansion in real resources the correct figure to look at is the number of man-hours supplied. Such an exercise is complex, mainly because such data does not exist and because the length of the standard

1. A further explanation is that in the later 1960's those who had been recruited in 1947 were then retiring but were not being replaced because recruitment was low.

working week for a fireman has changed over the period. These changes are shown below:

- i) 1949 60 hour week introduced
- ii) 1963 56 hour week
- iii) 1973 48 hour week

Since data on man-hours is not available it is not possible to give an indication of what proportion of the 3.8% increase in real expenditure is taken up by an increase in man-power.

Over the period the equipment used to combat fires has become more complex and more expensive. Table 12 below gives a detailed list of the technical developments which have taken place in order to deal with a more complex environment. At this stage it is worthwhile to consider Baumol's relative price thesis. Productivity advances have been made in this service. Technological developments such as those described in Table 12 mean that the fire service is able to provide a different or an improved type of product. It is able to deal with problems in a more efficient way. It has been changes in the environment and changes in the nature of the product which have given rise to the shift in relative prices between the private and public sector in this particular instance. Whilst the level of fire service output per head may not have increased over the period (i.e. the probability of loss due to fire has not decreased) nevertheless the fire department by hiring new resources which embody technical developments has managed to maintain its position despite adverse changes in its environment. Thus the lack of technical development or the lack of productivity is not a convincing reason for the existence of a relative price effect (as described by Baumol) in this case. Furthermore fundamental changes in the nature of the product tend to shift the grounds for Baumol's argument.

Given the increasing complexity of the environment and the technological developments which have taken place in fire fighting equipment, the skills of firemen have also changed over the period. Expenditure has been allocated

Table 12 Technical Developments in Fire Department Equipment (Glasgow)

1. 3,000 B.C. the fire pump was discovered in Alexandria
2. 410 B.C. the Romans introduced the fire pump into Britain
3. 17th century hand squirts(syringes) were used in the Great Fire of London
horse-drawn vehicles
4. 1942 radios were installed into all Glasgow's fire fighting appliances
5. 1944 British Standard Fire Hydrants were introduced. This resulted in a programme of standardisation. In 1950 in Glasgow there were 1,448 standard fire hydrants and 11,139 non-standard hydrants.
6. 1950 the types of equipment carried by fire fighting appliances included: inert gas extinguishers, foam inductors, turbine pumps, oxygen breathing apparatus, carbon dioxide resuscitating equipment, and photo-electric smoke detecting equipment.
7. 1951 Glasgow purchased 4 new fire engines with the following technical specifications: 50ft Ajax wheeled escapes and pumped 900 gallons of water per minute. The vehicles could travel at 50 m.p.h. Compare this with the 1906 version: pumped at 450 gallons per minute and travelled at a maximum speed of 22 m.p.h.
8. 1956 Glasgow purchased a new fire boat, 12 knots top speed, made of steel and capable of pumping 8,000 gallons per minute.
9. 1957
 - a) construction of new control room to deal with increased activity
 - b) rebuilding existing fire stations many of which were converted warehouses, or had been designed for horse-drawn vehicles. Also the population had shifted to new housing estates with the result that fire stations had to be relocated.
10. 1964 purchase of control unit vehicle which acts as a mobile H.Q. at the scene of a fire. This vehicle carries communications equipment plus film strips which give information of the floor plans etc of high risk buildings.
11. 1965 purchase of foam tenders incorporating the latest fire fighting techniques - 450 gallons of foam compound producing 72,000 gallons of foam in 11 minutes. new hydraulic ladders introduced.
12. 1966/67 modernisation of H.Q. control room; two manually operated switchboards were replaced by an automatic system.
purchase of special equipment to deal with fires and crashes etc on expressways and motorways.

13. 1968/69 new "Scoosher" with infra-red heat detector. The "Scoosher" has a ladder rescue, fire detection, remote control tower, 1,000 g.p.m. pumping capacity and was developed by the Glasgow Fire Service.
14. 1972 new breathing apparatus purchased. Air bags used to jack up heavy loads when normal means of jacking are impossible.
special road rescue unit designed.

to the continual retraining of firemen whilst new recruits now go through an intensive training programme. This would tend to suggest that the quality of the service provided has also improved over the period as the fireman has become more "professional". For example the modern fireman requires to be trained in engineering (both electrical and mechanical), chemistry, first aid, building design etc.

Resources have also increased along with developments in fire fighting techniques. Constant development and upgrading of existing equipment results in resource absorption. For example new vehicles of a greater horsepower are designed to get to the scene of the fire more quickly and once there their task is to pump water at as fast a rate and as great a pressure as is possible. Indeed in an emergency service like the fire service speed is of the essence and developments are usually designed to cut down the time lags within the system. The linkages in the system can be schematically described as:

- i) speed of turnout
- ii) speed of processing information
- iii) speed of deciding what equipment to send out
- iv) communications between fire site and fire control
- v) communications between firemen at site of fire.

The speed of turnout has already been mentioned and is incorporated in the technical capabilities of modern vehicles. Speed of turnout is also, however, dependent upon the location of fire stations within the conurbation and the extent to which roads are congested. The optimal location of fire stations is thus an important and integral part of fire system management.

The Holroyd Committee¹ reported on paragraph 39 that there was no evidence that an earlier arrival at the site of a fire would, on average, have prevented loss of life that did occur or reduce eventual damage.

Demands for increasing the speed of processing information has resulted in the installation of new information handling systems. Thus automatic switch-

1. Cmnd 4371 "Report of the Departmental Committee on the Fire Service", HMSO, May 1970.

boards instead of manual systems have been introduced along with new organisational designs to speed up information flow. A stock of information has also been accumulated over the years which gives technical information about the design and layout of buildings within the area, the location of fire points and fire escapes and an indication of the types of materials stored e.g. if toxic or not, or radioactive etc. Such information has to be relayed rapidly to the fire fighting crews and to those responsible for deciding upon the optimal mix of fire fighting equipment. Table 12 indicates the kind of systems which were introduced in 1964.¹

In order to tackle the problem of extinguishing a fire efficiently the controller must be in communication with all firemen. In addition each fireman must be in communication with others. Thus radio communication systems have been introduced.

The results of these improvements in the service lead to real expenditures being made.

Finally, the scope of the fire service has changed over the period. It has been remarked elsewhere² that, "Britain's fire services are becoming more and more a general disaster and rescue service". Table 13 gives an indication of the types of special or ancillary services provided by Glasgow's fire department. One important area which the fire department has moved into is that of motorway or expressway accidents. In order to deal with such problems special equipment has had to be developed and purchased (see item 12, Table 12). Road accidents involving tankers which are carrying toxic or corrosive materials require special equipment. In other words even although these events do not occur regularly, nevertheless, the fire department is required to purchase equipment and thereafter to maintain it in order to be prepared for such emergencies when they do occur.

1. These were replaced in 1974 by a computerised system. Each fire engine is radio linked to H.Q. by a line printer. As the fire engine is speeding to the fire information is being printed out.

2. Municipal Yearbook 1970.

Table 13 Special Services - Glasgow Fire Department

<u>Type of Service</u>	<u>1956</u>	<u>1961</u>	<u>1966</u>	<u>1971</u>
1. Road accidents	-	89	20	177
2. Rescue of persons	41	31	96	139
3. Rescue of animals	20	6	10	4
4. Opening lockfast premises	86	118	349	384
5. Standing by in case of fire in case of an emergency	19	9	29	22
6. Assisting police	4	10	34	31
7. Securing dangerous scaffolding	1	-	-	-
8. Pumping floodwater	2	20	15	-
9. Pumping out ships	5	-	-	-
10. Removing birds from buildings	1	-	-	-
11. Washing away spilled acid/oil/petrol etc	4	2	191	82
12. Watering football pitch	1	-	-	-
13. Removing dangerous chimney	5	3	-	-
14. Building collapse	2	9	27	3
15. Gassing incidents	-	8	9	4
16. Removing dangerous tree	-	3	-	-
17. Giving first aid	-	2	18	31
18. Miscellaneous ¹	5	12	12	243
19. Total	196	317	870	1,120

Source:

The Fire Master's Annual Report for the Corporation of the City of Glasgow

Note:

1. The miscellaneous category includes a multitude of items such as pumping operations, attending a leaking refrigeration plant, attending a leaking CO₂ installation, securing loose windows, shutting off leaking nitrogen etc. In other words the growth of the miscellaneous category tends to confirm the view that the growth of special services reflects the growth of the fire service as a general rescue and emergency service.

One major instance of the fire service acting as an emergency service occurred in January 1968 when a freak storm hit the West of Scotland. The storm which, in Glasgow alone, caused £9m worth of damage, made more than 400 families homeless, damaged 4,000 homes and rendered 79 buildings beyond repair. Between 0200 hours and 0900 hours that morning the Glasgow fire department responded to 82 calls and rescued 81 persons. In the aftermath the department assisted with roof patching.

Summary

In summarising this section it has been shown above that the increase in expenditure of 8.4% p.a. at current prices and 3.8% at 1963 prices can be explained in terms of a reaction to a more complex environment, an increase in the man-hours demanded to deal with the environment, an improvement in the technical capabilities of the equipment and finally an expansion in the scope of the service.

3. POLICE¹

3(a) Introduction

Like the fire department the police department reacts to a set of problems, which are supplied to it from its environment. The supply of crimes, which is the principal problem that the police department deals with, is the resultant of a complex set of interacting forces. A number of people have recently turned their attention to analysing the determinants of the supply of crimes function. The work of Becker (22), Ehrlich (79) and Carr-Hill and Stern (61) are best known in this area. The general thesis that these studies work with is one which was originally proposed by Becker (op. cit). Criminals acting in a rational manner make decisions to commit or not to commit a crime based upon their objective of maximising their expected utility. That is, the criminal is operating in a highly uncertain environment with some probability of being caught. He, therefore, calculates the expected value of the criminal act and carries out a cost benefit calculation to decide upon whether or not the crime is worthwhile committing.

Obviously the above description of the rational criminal is several steps removed from reality but it is removed from reality in much the same way as the economist's idea of the rational consumer is. The notion of a rational criminal will not accurately describe the actions of the small-time crook or certain acts of violence etc. The model of the rational criminal, however, is a useful paradigm for considering the task of the police department. Crime prevention activities are designed to adjust the criminal's environment in such a way that the expected value of his act declines. The expected value of the criminal's "pay-off" is both a function of the monetary value of the successful crime (swag) and the probability of being apprehended and then sentenced. There is in most instances little that can be done about changing the value of wealth in the environment but the probabilities of being apprehended can be improved. Burglar alarms and other such devices can be installed. Police "presence" can be stepped up as can police reaction time

1. Martin and Wilson (160) examined the police system for the U.K.

to responding to a call. Crime detection efficiency coupled with procedures for presenting evidence in courts makes the probability of being caught and successfully sentenced much greater for the criminal.

The model, therefore, is useful as an organising device. To what extent have the increased activities of the police been directed towards changing these probabilities, thereby making the criminal's environment more unfavourable? The model will not cover all activities of the police but it is a useful point to start from.

3(b) Police Expenditure Growth

Current expenditure on Glasgow's police services grew at 8.3% p.a. (compound) at current prices, over the period 1950/70, and at 9.2% p.a. in per capita terms. Allowing for input price rises, current expenditure at 1963 prices grew at 4.2% p.a. Like many of the other services which have been examined loan charges were the fastest growing component. Loan charges grew at 15.6% p.a. (at current prices). The reason for the rapid growth in loan charges is given by the expansion in capital expenditure over the period. New police stations were built in the new housing estates, which grew up in the post war period, and existing police stations were extended and modernised. Alongside the increase in capital expenditure on police stations the police department also purchased houses from the housing department of the Glasgow Corporation. The purchase of houses for policemen and their families was necessary since each policeman was required to live within the city boundaries.

Expenditure on allowances and over-time have also grown rapidly. As Table 14 below indicates the growth in Glasgow police man-power has been very slow and has declined over the period 1963/70. In 1950, the police department was 157 persons under-strength which represented a shortfall of 7.0%. This, however, had increased to 517 persons in 1969/70, representing a 17.0% shortfall. This severe man-power gap has had two effects upon expenditures. Firstly, over-time payments have grown (at current prices) at 14% p.a. (compound)

over the period 1950/70.^{1,2} Of course these additional man-hours represent the man-hours which would have been purchased by having a full establishment. The effect upon expenditure growth, however, is that over-time hours are purchased at a higher price. The second effect of the man-power shortage upon expenditure growth is that in order to attract new recruits to the service the police department has offered rent allowances. Allowances have grown at 10.5% p.a. (compound) over the period.

The breakdown of total current expenditure of police expenditures for Glasgow in 1969/70 is given as:

Payroll (incl. superannuation, NHI)	58.6%
Vehicles (new and maintenance)	2.5%
Loan charges	2.5%
Pensions	14.7%
Clothing and equipment	2.0%
Allowances (rent and over-time)	10.1%
Property charges (rent, insurance, rates, repairs, cleaning, lighting, heating)	5.2%
Administration, stationery etc	3.0%
Miscellaneous	1.4%

Again, from the above breakdown of expenditures it can be seen that there is a large number of fixed components to expenditure which does not readily allow expenditure reductions without making redundancies and reducing the quality of the services.

3(c) The Environment

Table 14 shows a crime index for class I to class VI crimes inclusive³ (Appendix 9.A gives a definition of these categories) and for class VII crimes. Table 15 shows the annual compound rate of increase in the crime rate for each category over the period 1950/70. The crime rate is defined as the number of crimes or offences committed per 1,000 of the population.

-
1. In 1950 over-time payments represented 2.6% of total expenditure on police services. By 1970 the over-time figure had grown to 7.0% of total expenditure.
 2. Martin and Wilson reported a 19.0% p.a. increase for England and Wales.
 3. These time series have been compiled for the first time.

Table 14 Basic Police Statistics (Glasgow)

Year	Crime Index ⁽¹⁾ 1950 = 100	Class VII Crime Index	Police Manpower Index 1950=100	Other Employ- ees Index 1950=100 ⁽²⁾	Index of crimes and offences per policemen	Index of Class VII crimes per policemen	Clear up Index ⁽⁴⁾ 1950=100	Clear up Index for class VII Crimes	Clear up Rate ⁽⁵⁾ for classes 1-6 (%)	Clear up Rate Class VII (%)
1950	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	26.5	91.6
1951	107.8	100.3	98.5	98.7	109.1	101.8	104.5	101.2	27.7	92.7
1952	104.9	102.5	100.3	99.0	104.5	101.8	107.2	101.3	28.4	92.8
1953	91.9	115.1	101.1	98.1	90.9	114.0	122.3	102.4	32.4	93.8
1954	87.2	116.5	101.6	98.1	85.6	114.0	127.2	102.2	33.7	93.6
1955	89.3	126.6	98.9	98.1	90.1	127.2	116.6	103.2	30.9	94.5
1956	95.5	135.4	100.7	98.1	94.7	134.2	120.0	103.5	31.8	94.8
1957	99.1	135.9	101.3	100.0	97.7	133.3	125.7	103.2	33.3	94.5
1958	124.3	147.2	104.6	100.0	120.5	142.1	109.4	101.6	29.0	93.1
1959	121.8	175.8	107.0	101.6	116.7	164.0	103.4	102.9	27.4	94.3
1960	127.7	218.3	109.5	108.6	116.7	199.1	106.0	104.1	28.1	95.3
1961	127.2	212.6	109.3	115.2	112.1	200.9	120.4	101.6	31.9	93.1
1962	135.1	226.1	120.5	115.5	115.2	186.8	115.5	101.3	30.6	92.8
1963	145.5	227.2	125.9	132.1	113.6	179.8	112.8	101.3	29.9	92.8
1964	141.7	235.6	124.8	130.7	123.5	187.7	113.9	102.9	30.2	94.3
1965	151.1	235.6	121.9	158.1	131.1	192.1	112.5	103.8	29.8	95.1
1966	149.9	237.4	114.4	157.5	132.6	207.0	121.9	104.5	32.3	95.7
1967	154.0	238.4	116.1	173.7	127.3	204.4	119.2	103.2	31.6	94.5
1968	147.7	207.5	115.0	227.6	126.5	179.8	126.4	103.6	33.5	94.9
1969	145.1	245.3	114.8	242.2	138.6	213.2	123.8	104.9	32.8	96.1
1970	156.8	246.9	113.4	239.7	148.5	217.5	123.7	103.7	32.7	95.0

Notes 1. This index is based on the total of Class I to Class VI crimes and thus excludes Class VII. For definitions of the various classes of crime see Appendix.9A.

2. This includes traffic wardens, scientific, photographic and forensic staffs, clerical and administrative staff and cleaners.

3. This index covers class I to class VI crimes only.

4. This index covers classes I to VI inclusively. A crime or an offence is "cleared up" if the police are convinced that the identity of the offender is clear. This is not the same as a conviction or an admission in court.

5. The clear up rate is the ratio of the number of crimes and offences regarded as cleared to the number of crimes and offences reported.

Table 15 Annual Changes in Crime Rates in Glasgow, 1950/70

	%
Class I (crimes against persons)	4.2
Class II (crimes against property with violence)	3.9
Class III (crimes against property without violence)	2.1
Class IV (malicious injury to property)	-5.0
Class V (forgery and crimes against currency)	7.7
Class VI (other crimes)	4.2
Total (I - VI)	2.9
Class VII (miscellaneous)	5.7

Source:

Annual Reports of Chief Constable of the City of Glasgow

From the information given in Tables 14 and 15 (which is the first time that such data has been presented in this way) it is readily seen that Glasgow's police department has been presented with an increasing volume of crimes to be solved over the period. There are of course a number of problems of interpreting criminal statistics as Appendix 9.B testifies. The figures only refer to reported crimes. In many instances where the event is thought to be trivial or where the offended party wishes to shun publicity then crimes are not reported. In the case of lewd and libidinous practices the parents of the child are disinclined to report the event especially if the child sustains no physical injury. Also even when such events are reported the police frequently receive a misleading report from the parents which hinders capture.

The growth in crime has occurred at the same time as a decline in police man-power. Thus the number of crimes and offences per policeman has increased by 48% over the period 1950/70. However, the clear-up rate has improved, over the period, by 23.7%. A crime or an offence is considered by the police to have been "cleared up" if the police are convinced that the identity of the offender is clear. This is not, however, the same as conviction or admission in court. There is thus a strong indication from

the clear up index and the index of the number of crimes per policeman that police productivity has improved over the period. Statements about productivity increases do of course have to be qualified since the clear up rate might have improved because of a shift in the mix of crimes from those which are more difficult to solve to those which are easier to solve. Table 15 gives no indication of such a pronounced shift. The improvement in the clear up rate might also have come about by a reduction in the standards of police work. This has serious implications for the quality of the police services.

An improvement in the clear up rate by satisfying a more lax set of criteria for arrest would imply that the police might be willing to consider a crime to be cleared up as soon as any suspect is apprehended. This in turn would mean that the probability of innocent persons being sent before the courts for trial would increase which would by any standards be regarded as a reduction in the quality of the police services. To check this hypothesis the records of the court proceedings were examined to find out if the number of unsuccessful convictions per class of crime had increased.

The results¹ were that there was a marked improvement in the conviction rate per class of crime. In other words the police were presenting cases which had a greater chance of resulting in a conviction. Thus, assuming no changes in court practices, the improvement in the clear up rate was accompanied by an improvement in the conviction rate. This gives a strong indication of both improved productivity and improved quality of service over the period since the amount of work per policeman which has to go into presenting each case to the courts has increased.

In terms of the models presented by Becker et alia the increases in the clear up rate and the conviction rate would have increased the probability of a successful arrest and would have caused the criminal to consider going for

1. These results which are cumbersome to present are readily available from from the author.

bigger payoffs (swag). It has not been possible to gain any impression of the value of goods which have been stolen in the area over the period, and so Becker's model cannot be tested in this context.

Why, despite the increases in the clear up rate and the conviction rate, have crimes increased over the period? To answer this very important question would require a description of the environment which social scientists at this moment in time do not possess. Impressionistic hypotheses gleaned from the analysis of many cases would suggest that many crimes are spontaneous non-premeditated acts. Most crimes of violence take place in the home whilst most thefts are for very small amounts. Thus it would be heroic to conclude that many of the reported crimes result from the stresses and strains of congested urban living in which the economic strain of low income and unemployment coupled with poor housing, and large families. At this moment in time it is difficult to test such hypotheses although an examination of many cases shows that these are associative factors.

Whilst a complete description of the environment is not possible it is nevertheless possible to provide information on some parts of it. Table 16 shows the changes which have taken place in the number of persons killed and injured in road accidents over the period. Over the period 1950/70 the number of vehicles licenced in the city of Glasgow increased by 6.0% p.a. (compound). Since this figure only refers to the number of licences issued in the city it will probably under-record the increase in traffic in the city. Traffic work, i.e. directing and controlling traffic flows, ties up a large proportion of total police man-hours. In 1968 traffic wardens were introduced to Glasgow. These traffic wardens have taken the strain of traffic control including parking violations from the police. (Table 14 shows there has been a gradual increase in civilian personnel over 1950/70.)

Table 17 shows the degree of drunkenness in Glasgow which resulted in persons being convicted. The number of persons per licenced house in the city has

Table 16 Motoring Offences, Glasgow, 1950/70

Year	Index of Number of Persons Killed in Road Accidents 1950 = 100	Index of Number of Persons Injured in Road Accidents 1950 = 100	Index of Number of Persons Convicted for being Drunk and Incapable 1950 = 100	Index of Number of Persons Proceeded Against for being Drunk in Charge of a Motor Vehicle 1950 = 100
1950	100.0	100.0	100.0	100.0
1951	89.0	94.2	119.0	115.3
1952	84.4	84.4	113.7	115.3
1953	99.0	105.8	111.9	165.9
1954	105.5	109.0	113.1	183.3
1955	100.0	113.9	117.6	224.3
1956	95.4	122.4	122.4	297.9
1957	83.4	133.9	163.2	362.5
1958	109.2	140.4	124.1	419.4
1959	98.3	153.3	125.8	489.6
1960	109.2	157.0	137.0	545.1
1961	99.9	170.5	157.0	581.9
1962	111.9	164.2	171.1	768.8
1963	127.5	168.9	188.4	731.9
1964	128.4	190.5	176.4	773.6
1965	133.9	205.4	171.1	915.3
1966	124.8	215.2	150.2	1,010.4
1967	129.4	214.1	142.8	1,016.7
1968	123.8	185.7	157.8	978.5
1969	148.6	192.9	170.6	1,065.3
1970	124.8	182.9	168.5	1,463.2

Source:

Annual Reports of the Chief Constable of Glasgow

Table 17 Drunkenness, Glasgow, 1950/70

Year	Number of People Proceeded Against for being Drunk and Incapable	Males Proceeded Against for being Drunk per 1,000 Male Population	Females Proceeded Against for being Drunk per 1,000 Female Population	Number of Persons Convicted for being Drunk and Incapable	Number of Persons Proceeded Against for being Drunk in Charge of a Motor Vehicle ¹	Number of Licenced Premises in Glasgow	Population per Licenced House
1950	2,933	2.2	0.5	1,696	144	1,355	820
1951	3,444	2.7	0.5	2,019	166	1,353	813
1952	3,473	2.7	0.4	1,930	166	1,354	812
1953	3,653	2.9	0.4	1,899	239	1,355	803
1954	3,717	3.0	0.5	1,918	264	1,353	805
1955	4,055	3.2	0.5	1,994	323	1,347	805
1956	4,813	4.0	0.5	2,076	429	1,347	806
1957	4,967	4.1	0.5	2,768	522	1,348	803
1958	4,953	3.8	0.5	2,105	605	1,351	799
1959	4,399	3.6	0.5	2,134	705	1,351	798
1960	4,690	4.0	0.4	2,324	785	1,362	790
1961	5,317	4.5	0.5	2,663	838	1,378	773
1962	5,477	4.7	0.5	2,901	1,107	1,419	742
1963	5,119	4.4	0.5	3,195	1,054	1,441	725
1964	4,855	4.2	0.5	2,991	1,114	1,454	700
1965	4,926	4.4	0.5	2,901	1,318	1,455	692
1966	4,581	4.2	0.3	2,547	1,455	1,450	676
1967	4,141	3.8	0.5	2,423	1,464	1,450	662
1968	3,966	3.6	0.5	2,574	1,409	1,434	665
1969	4,083	3.9	0.5	2,893	1,534	1,433	647
1970	4,179	4.0	0.5	2,857	2,107	1,422	646

Source:

Annual Reports of the Chief Constable of Glasgow

Note:

1. Breathyliser introduced in 1967 Road Safety Act

declined whilst drunkenness amongst the male population has increased. The incidence of drunk driving has also increased as was shown in Table 16.

Both in the case of motoring offences and offences arising from drunkenness the data on these environments are presented for information. They do not provide the basis of any hypotheses which will be tested.

The police also have to deal with a host of miscellaneous duties such as reporting sudden deaths and accidents. Tables 18 and 19 give details of these duties. It should be noted that for the police there is an opportunity cost in dealing with these problems. In having to write reports on these cases man-hours are diverted from crime detection and general patrol work.

Table 20 gives a breakdown of the age and sex of those who were convicted of crimes and offences. The majority of crimes and offences are committed by males. Over the period there has been a growth in the number of persons under 17 years of age against whom charges were proved (see Figure 1).

In order to gain some idea of the magnitude of the problem the following statistics show the number of calls made to the police. It excludes the number of "in person" calls made to police stations. The data refer to the year 1969 for Glasgow:-

i) Number of calls received in the information room from the public	615,294
ii) Number of 999 calls received	74,945
iii) Number of teleprinter messages	169,115
iv) Number of wireless messages made to cars	301,401

These statistics, it is reported by those administering the system, have been increasing over time and show part of the stimulus response pattern. Each call requires some kind of action.

The picture which emerges from the above description of the environment in which the police operate is that over time it has become more complex and continues to present an increasing number of problems to be solved. As the

Table 18 Police Duties (no. of cases)

Year	Fatal Accidents Reported ¹	Sudden Deaths Reported	Suicides Reported	Attempted Suicides Reported	Non-Fatal Accidents Reported ¹	Miscellaneous Duties ²	Number of Persons Killed in Road Accidents	Number of Persons Injured in Road Accidents
1950	126	962	80	80	3,061	28,714	109	2,807
1951	142	1,059	75	112	4,126	26,323	97	2,645
1952	133	1,138	56	104	4,125	26,386	92	2,371
1953	153	1,151	81	109	4,129	25,387	108	2,969
1954	132	1,331	94	101	4,012	24,244	115	3,059
1955	147	1,568	92	113	4,314	23,999	109	3,198
1956	158	1,512	95	131	4,390	23,510	104	3,437
1957	164	1,568	98	128	4,101	23,176	91	3,759
1958	176	1,611	125	169	4,684	26,688	119	3,940
1959	172	1,640	107	131	4,536	23,979	117	4,303
1960	149	1,579	100	138	4,185	25,197	119	4,407
1961	159	1,702	130	180	4,378	22,839	108	4,786
1962	192	1,825	135	203	4,719	25,644	122	4,608
1963	155	1,814	139	202	4,688	27,483	139	4,741
1964	158	1,711	113	214	4,413	27,993	140	5,348
1965	159	1,792	112	208	3,974	27,820	146	5,766
1966	128	1,626	100	165	3,258	27,807	136	6,042
1967	117	1,555	66	154	2,864	27,483	141	6,011
1968	132	1,440	62	180	3,237	28,084	135	5,210
1969	115	1,641	84	173	2,877	25,386	162	5,416
1970	95	1,736	74	189	2,626	23,229	136	5,136

Source: Annual Reports of the Chief Constable of Glasgow

Notes:

1. excluding vehicle accidents
2. for a breakdown of this aggregate see Table 19.

Table 19 Miscellaneous Police Duties (no. of cases)

<u>Item</u>	<u>1950</u>	<u>1955</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>
Lost children returned to parents	2,586	2,153	2,145	1,966	1,592
Arrests made for other police forces	228	235	219	327	217
Reports made to Water Board of water running to waste	61	92	212	60	
Reports made to Gas Board leaking gas	67	79	139	109	65
Reports made to Master of Works (unsafe buildings)	3,452	3,406	3,107	2,811	1,757
Premises found insecure	2,568	1,876	1,337	1,188	288
Shut-up houses notified to police	11,827	8,655	9,304	13,459	11,574
Stray dogs seized	4,269	2,953	3,955	4,585	5,002
Fires attended by police	3,556	4,553	4,737	3,315	2,614
Total	<u>28,714</u>	<u>23,999</u>	<u>25,197</u>	<u>27,820</u>	<u>23,229</u>

Table 20 Sex and Age Group of People Convicted of Crimes and Offences, Glasgow, 1950/70

<u>CRIMES</u>										
Age Range (years)	<u>1950</u>		<u>1955</u>		<u>1960</u>		<u>1965</u>		<u>1970</u>	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Under 14	1,034	10	643	48	813	43	998	109	1,331	115
14 under 17	524	37	612	53	869	73	1,554	245	1,936	177
17 " 21	572	65	635	89	1,045	81	1,522	162	2,250	175
21 " 30	1,005	130	1,159	157	1,631	171	1,785	153	2,251	178
30 " 40	630	116	771	159	1,072	144	1,035	168	1,232	221
40 " 50	352	97	422	120	439	119	494	130	663	138
50 " 60	150	49	168	74	185	69	226	78	271	84
60 +	48	18	53	24	61	45	100	33	86	57
Totals	4,315	522	4,463	724	6,115	745	7,714	1,078	10,020	1,145

<u>OFFENCES</u>										
Age Range (years)	<u>1950</u>		<u>1955</u>		<u>1960</u>		<u>1965</u>		<u>1970</u>	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Under 14	1,315	31	856	25	1,699	61	810	62	983	86
14 under 17	3,096	93	2,583	116	3,572	238	3,975	427	4,056	461
17 " 21	3,406	123	3,554	156	6,511	262	7,532	466	7,996	506
21 " 30	5,013	377	6,881	591	12,277	1,005	11,048	1,007	11,525	1,185
30 " 40	4,403	505	6,600	1,036	12,135	1,096	9,682	1,187	10,451	1,434
40 " 50	3,458	408	5,226	595	8,729	772	6,265	826	6,601	801
50 " 60	1,591	258	2,625	312	5,952	357	3,340	351	3,292	339
60 +	717	129	1,046	129	2,365	142	1,209	125	1,338	139
Totals	22,999	1,924	229,371	2,960	53,240	3,933	44,041	4,461	46,242	4,951

Source: Annual Reports of the Chief Constable of the City of Glasgow 1950, 1955, 1960, 1965, 1970.



JUVENILE DELINQUENCY 1949 - 1969 GLASGOW

NUMBER OF PERSONS UNDER 17 YEARS OF AGE AGAINST WHOM CHARGES WERE PROVED.

FIGURE I

criminal becomes sophisticated in the technology which he uses to commit a crime so the police must become equally sophisticated in the equipment which is used to prevent and to detect crimes. The police reaction to these changes in the environment is examined in the next section.

3(d) Growth in Real Expenditure 1950/70

Glasgow's current expenditure on police services at 1963 prices grew at 4.2% p.a. over the period 1950/70. This section views this increase in real resources as a reaction to coping with the changing environment. The man-power shortage has already been mentioned. The rate of growth in male uniformed man-power was 0.8% p.a. over 1950/70, whereas for female uniformed man-power the corresponding figure was 7.1% p.a. As before, however, in the case of the fire service this does not reflect the supply of man-hours to the police department. Over the period there have been a number of changes to the length of the policeman's working week. These changes took place as follows:

- | | | | | | | | | | | | | |
|----|------|----------|---------|------|-----|--------|---------|------|----|----|----|--------|
| a) | 1955 | standard | working | week | for | police | reduced | from | 48 | to | 44 | hours |
| b) | 1964 | " | " | " | " | " | " | " | 44 | to | 42 | hours |
| c) | 1970 | " | " | " | " | " | " | " | 42 | to | 40 | hours. |

This reduction in the number of standard hours supplied per policeman has been supplemented by an increase in the number of hours of over-time which was mentioned above. The increase in the number of policewomen¹ has enabled the policeman to allocate his time to other aspects of police work. Policewomen generally deal with problems involving children and women and are allocated to administrative and office duties. There has also been an increase in the number of civilian personnel. Table 14 above indicated that civilian personnel numbers had increased by 139.7% over 1950/70. This rapid increase is partly due to the introduction of traffic wardens in 1968,² but from

-
1. The increase in the number of policewomen placed strains on the facilities of existing police stations. This resulted in an expansion in capital expenditure.
 2. Road Traffic Improvements Act (1960) Section 2(i) gave police authorities the power to appoint persons to discharge the duties of certain functions normally undertaken by the police in connection with the control and regulation of traffic. In 1965 the "Functions of the Traffic Wardens Order" gave them powers to direct traffic.

1950/67 there had been a 73.7% increase in civilian personnel which had been accounted for by a growth in the number of telephonists, administrators,¹ forensic scientists, photographers etc. The deployment of civilian personnel released the man-hours required of the policeman, who had now, as a result of urban sprawl, more ground to cover. The increase in man-power numbers and man-hours, therefore, accounts for some proportion of the 4.2% p.a. increase in real resources.

Another item of expenditure which has grown over the period is the number of vehicles used by the police. As fewer policemen have been required to police a widening area due to population movements, they have made increasing use of motorised vehicles in order to maintain their presence. In earlier years the Glasgow police used motor bikes and scooters to patrol housing estates throughout the city. Now these have been replaced by the "panda car". There has developed a growing specialisation in the use of motorised transport. High powered cars are required for patrolling motorways but such cars are less suitable (and too expensive) for patrolling housing estates. In order to maintain open channels of communication between police cars and between police car and H.Q. control each car is fitted with a radio telephone. Technical change is embodied in the police cars which are renewed frequently. This change over to mechanisation has resulted in a growth in maintenance staff (i.e. another factor contributing to the growth in man-power). It also caused capital expenditure to rise as new garage facilities had to be provided.

Thus the increase in the number of vehicles used by the general public, the expansion in motorway systems which provide a rapid escape route out of the city for the criminal and urban sprawl plus the police man-power shortage has brought about a change in policing technology which is now reliant upon the automobile. This in turn has resulted in an expansion in real expenditures

1. i.e. administrative and clerical work such as recording and classifying traffic accidents, preparing statistical returns for the Home Office etc.

as outlined above.

One of the quality indicators frequently used to judge the police is their response time in getting to the scene of an incident. Obviously it is impossible, except by chance, for a policeman to be on the scene of every crime. Therefore the police depend upon an efficient system of getting to the scene of the crime quickly. This is achieved in part by having on 24 hour call a flying squad service which, given the fact that it is mobile, can move to any part of the city when demanded. The other link in this system is the speed with which incoming calls for assistance are processed. In order to reduce delays in this linkage developments have been made in the communications systems used. Thus new H.Q. control systems and telephone switchboards were introduced in the 1960's along with telex teleprinters and facsimile transmitting devices.¹ These communication systems had high installation costs.

In 1965 personalised pocket radios were introduced. These were phased in over the 1965/68 period and enabled for the first time H.Q. control to deploy efficiently its entire police man-power. Thus a constantly up to date picture was available in H.Q.

Basic patrolling, which is what has been described above, is only one activity of the police department. The other major activity is that of crime detection. Crime detection depends upon information. Information about the particular crime to be solved plus information built up from a series of crimes. A great deal of crime detection is devoted to building up statistics and examining these for patterns. The greatest breakthrough in information was of course the "finger print". Now the finger prints of all known criminals are stored on central records. The problem facing the police is how to assemble their information efficiently so that they have it available when it is required. During the 1960's there were expansions made to

1. i.e. downline reproduction of photographs, finger prints etc.

Glasgow's Central Records Office and new information storage systems were introduced.

There has been an expansion in the number of technical experts used by the police such as forensic scientists, photographers and other expert witnesses. Glasgow's police laboratories have also been expanded over the period.

It is not possible to emphasise strongly enough the importance placed upon information for problem solving. The information built up from criminal records enables the police to identify "black spots" within the city where the probability of a crime being committed is highest. It also enables the police to identify the time of day and the months in the year when crimes reach a peak. This information enables a Chief Constable to direct his manpower to those areas where they are needed most.

The information built up about a crime and about certain individuals' association with that crime increases the probability of arrest and successful conviction. It was seen above that both the clear up rate and the conviction rate had increased over the period. In 1969 an Organisation and Methods team of civilian personnel were introduced to deal with the management of the police department's information system.

Police expenditure in real terms has, therefore, increased for a number of reasons. The increase in man-power especially on the civilian side has been one major contribution. The installation of communication systems, information systems and police cars have also contributed to the increase in expenditure.¹ The quality of the service measured in terms of the number of policemen per head of population, the clear up rate, the conviction rate or the general level of training of the modern policeman also account for expenditure growth. Improvements embodied in human capital are of importance in the police service. Policemen are now better trained than they have been in the past.

1. These points were made by the Taverne Committee Report "Police Man-Power, Equipment and Efficiency", Home Office, 1967.

There is also evidence that productivity improvements have been marked in this service, resulting from improved management systems and the greater specialisation of personnel. Once again the increase in the relative price of police services vis-a-vis private sector services have resulted from a deterioration of the environment, rather than being explained by a marked productivity differential.

Conclusion

This chapter has looked at Glasgow's education, fire and police services expenditures. These expenditures were examined in terms of the model outlined in chapter 3. That is to say the environment which presents problems to the service is examined and then the departments' reaction is analysed in terms of how its real resources have expanded to cope with the additional problems, quality changes have been examined along with fundamental changes in the nature of the product and the scope of the service.

The statistical series on each service is the first time such data has been presented. The data available is thin and more would have to be gathered in order to test hypotheses about expenditure growth. However the picture which does emerge is that the environments in which these services are dealing are extremely complex and the social scientist as yet is still (especially in the absence of data) very much in the dark about the nature of the causes of these social problems and how effective departments are in dealing with them. Nothing has been said about the efficiency of resource allocation since the objective has been throughout to say what has been rather than what ought to have been.

Until these underlying expenditure relationships are fully understood public policy which is designed to improve the social environment or which is designed to cut back local public expenditure growth must be undertaken in a climate of extreme uncertainty.

APPENDIX 9.ACLASSIFICATION OF CRIMES1. Class I Crimes - Crimes against the Person

1. Murder 2. Attempts to murder 3. Culpable homicide 4. Assaults
 5. Threats to cruel and unnatural treatment of children 6. Procuring
 abortion 8. Concealment of pregnancy 9. Incest 10. Unnatural
 crimes 11. Rape 12. Assault with intent to ravish 13. Indecent
 assault 14. Lewd and libidinous practices 15. Procuration and
 Criminal Law Amendment Act etc offences 16. Bigamy 17. Other crimes
 against the person.

2. Class II Crimes - Crimes against Property with Violence

18. Housebreaking 19. Robbery and assaults with intent 20. Other
 crimes against property with violence.

3. Class III Crimes - Crimes against Property without Violence

21. Theft 22. Reset 23. Breach of trust and embezzlement
 24. Falsehood, fraud and wilful imposition 25. Offences in connection
 with bankruptcy 26. Post Office offences 27. Other crimes against
 property without violence.

4. Class IV Crimes - Malicious Injury to Property

28. Fire raising 29. Other malicious injuries

5. Class V Crimes - Forgery and Crimes against Currency

30. Forgery and uttering 31. Coining and other crimes against
 currency.

6. Class VI Crimes

32. High treason and treason felony 33. Mobbing and rioting
 34. Other crimes against the state and public order 35. Crimes
 against public justice (i.e. perjury, bribery etc) 36. Indecent
 exposure 37. Other crimes

7. Class VII Crimes - Miscellaneous

- a) Miscellaneous offences b) Offences against Intoxicating Liquor
Laws c) Offences against Labour Laws d) Offences against Road Acts.

APPENDIX 9.BCRIME STATISTICS

Crime statistics are traditionally divided into two categories. They are:

- i) Police Statistics; that is, the number of crimes known to the police
- ii) Judicial Statistics; that is, the age, sex and other characteristics of offenders and the sentences imposed by the courts.

It is police statistics which are of interest here. Each police authority is obliged to return to the Home Office, in the case of English and Welsh authorities and to the Scottish Development Department, in the case of Scottish authorities, a set of monthly reports on the extent of criminal activity within their area. This means that in principle good local data ought to exist with regard to the supply of crime. This was found to be the case with the Glasgow data.

A number of problems exist when interpreting the data.

- i) The number of crimes made known to the police is not the true amount of crime actually committed. Minor incidents are never reported but for some categories of major crime the same is also true. Thus for example many rape incidents especially on young persons are never reported because of the family's concern with the trauma and publicity of the follow up.

Avison's (10) estimates suggested that in the U.K. between 15% and 25% of crime is recorded as known to the police. On a per criminal activity basis the figures come out at about 5% for sexual offences, 60% for serious assaults and about 100% for unlawful removal of motor vehicles.

This can present serious difficulties for any analysis of a supply of crime function. Over time attitudes of people could change, thus more crimes are reported although more crimes are not necessarily committed. Cross section studies would pick up different geographical groups of

people's attitudes towards reporting crime, although this is likely to be less serious than time series analysis since attitudes across regions are likely to be similar for any particular time period.

- ii) The second source of error is to be found in the actual recording of crime. Avison (op. cit.) again found that in Scotland misrecording could lead to serious distortion, e.g.

".... attempted housebreaking with intent to steal is regularly written down when undetected to the less serious malicious damage category; in some police areas this leads to an under-recording of 60% in attempted housebreaking." (Avison, p 34)

"Unlawful removal of motor vehicles, when undetected, and when the vehicle was recovered intact in the same police area within a few days was not recorded as a crime or an offence at all ..." (Avison p 35)

- iii) Criminal statistics refer to numbers of persons, the problem with this can be seen from an exaggerated example. If on one Saturday night it was recorded that 1,000 persons were arrested for drunkenness there is no way in which it can be decided from these figures if these were 1,000 different individuals or 500 individuals each arrested twice in the one day.
- iv) The seriousness of crime cannot be found in the statistics. Thus one individual stealing £5 from petty cash is recorded as one crime, so also will be 10 people stealing £5m as in the great train robbery. In each case the amount stolen is different and the numbers involved are different.

Seriousness of crime is multi-dimensional e.g. amount stolen, was violence used, was an elderly person the victim? Society has its own ideas or "feelings" about the seriousness of criminal acts. As Avison points out the murder of a nightwatchman is felt by society to be more serious than a homicide in which a husband suffering from psychological stress kills his wife. Thus an ordinal ranking, however imperfect, does exist.

- v) The aggregation problem. Crimes are recorded by category thus there is a problem of adding crimes of violence to crimes against property in an attempt to produce an overall crime index. What weights ought to be used? Do criteria exist to give guidance on this?

It can be seen, therefore, from this very brief summary that the interpretation of crime statistics can be hazardous especially for the analyst wishing to make firm conclusions. This appendix serves as a warning. This does not deny the usefulness of extant crime statistics as social indicators, as information of the supply of crime or as Sir William Petty so eloquently said, we collect criminal statistics to know:

"the number of corporal sufferings and persons imprisoned for crimes to know the measure of vice and sin in the nation."¹

1. Quoted from Avison (10) p 33.

CHAPTER 10

Conclusions

Introduction

10.1. The Importance of Local Government

10.2. Theoretical Structure

10.3. Results

Conclusion

CHAPTER 10

CONCLUSIONS

Introduction

This concluding paragraph will bring together the results of the previous chapters. It will be divided into three sections. In the first section the primary objective of the thesis is once again discussed. Secondly the methodology used in the thesis is reviewed and thirdly the results contained in the various chapters are summarised.

10.1. The Importance of Local Government

The reader is once again reminded of the significance of local governments in the U.K. economy as one of the nation's more important allocators of resources. By almost any index chosen it can be seen that local governments' absorption of real resources has grown faster than all other sectors over the post war period. Real expenditures of local governments have grown faster than real G.N.P.¹ with the result that in 1950 local government expenditure (excluding debt interest) accounted for 9.6% of G.N.P. whereas this had increased to 16.0% in 1970.

Recently discussions have concentrated upon the magnitude of the public sectors' borrowing requirement and the contributions made to its growth from local government which has been one of the fastest growing parts of the public sector. Local taxpayers following local government reorganisation in 1974² and the rapid inflation of the post 1973 period have for the first time formed themselves into active and concentrated pressure groups demanding reductions in local rate burdens and reform of

1. See table 8 Chapter 6.

2. May 1974 for England and Wales and May 1975 for Scotland.

the system of financing local government expenditure.¹ The apparently rapid growth in local government manpower in the post war period has brought attention to possible underlying structural imbalances which have grown up within the post war U.K. economy.

Local government as an object of study in the U.K. can, therefore, no longer be regarded as the Cinderella of U.K. public finance. Its expenditures are of extreme economic significance, the services which it provides affect all welfares, and the methods of financing its expenditures force into the open fundamental issues such as the trade off between local autonomy and central control.

In order to control local government expenditure, however, either as an instrument of short term demand management or as part of the medium term plan for the structure of the economy requires that the planner in turn has an intimate knowledge of the underlying structure of local government. This thesis has provided a number of steps towards an understanding of that structure.

10.2. Theoretical Structure

A description of the structure of any physical object or social institution is only useful if it highlights those facets of the object which are considered to be of significance. Descriptions which simply present catalogues of disjointed facts become as useless as a telephone directory which does not organise the telephone numbers according to some predetermined convention. The economist has at his disposal

1. The reasons for rate increases are complex. It is certainly true that changes in the distribution of central government grant, the inflation in input prices (including a "catching up" of local government wage rates) the spreading of expenditures of conurbations to suburban and rural dwellers, and the short-run costs of reorganisation have all contributed to substantial rate increases for certain individuals.

a powerful and generally accepted convention for organising his data. That convention is the basic structure of the neoclassical maximizing model.

Chapter 3 set out such a general maximization model of the local government budgetary process. The model was clearly dependent upon a large number of assumptions such as the existence of rational well informed politicians and voters who each exchanged with one another in order to maximize their own particular objective functions. Relaxation of some of the assumptions, which was also done in Chapter 3, such as imputing alternative behavioural assumptions to politicians and voters, introducing uncertainty, lack of perfect information and other imperfections then enables the economist to consider how the theoretical significance of the relationships established within the context of the model are sensitive to changes in the underlying assumptions.

The methodology adopted in this thesis was to proceed from the broad and general model, embellished by the relaxation of a number of assumptions, towards the case study approach of examining in detail the expenditures of a single local authority. From this study the next stage would be to carry out similar case studies for a number of local governments and to proceed to construct a "middle range" positive theory¹ of the structure of local government in the U.K.

This thesis can therefore only claim to have produced a general model and one case study along with a general research methodology for further case studies. The creation of any middle range theory is some way off. The result, however, is more cheerful than C. Lowell Harris' pessimistic pronouncement presented in Chapter 1. The economist can certainly do more

1. ie by middle range theory it is meant that the results of a number of case studies are compared in terms of the structures which have given rise to these results. The significance of similar and dissimilar patterns are then identified. The approach is very similar to the natural history methodology of Lineas and Mendelieffs' construction of the periodic table of the elements.

with public expenditures than "description plus the statement of rather obvious generalities....." The generalities are less than obvious!

10.3. Results

This section will emphasise the principal results of the previous chapters. Furthermore it will underline a number of issues which are capable of further extension.

The first and second chapters placed the thesis into context. Firstly the Glasgow case study is the first of its kind to have been carried out in the U.K. It was carried out as a reaction to a severe lack of knowledge about local government as seen by economists working in central government and who were interested in public expenditure management and control. Secondly the theoretical developments were placed into the context of the literature on public expenditure which has grown up primarily in the U.S.A. Chapter 2 surveyed extensively this literature so that U.K. readers might sample the developments which have been made on the other side of the Atlantic. More-over since local government expenditure and taxation are likely to become fashionable areas of applied economics in the U.K. over the next decade, a comprehensive statement of the current "state of the cart" will enable more rapid progress to be made. The theoretical model, which was presented in Chapter 3, is a first attempt to provide an organising framework within which sensible and informed discussion about the behaviour of local government (and indeed central government¹) might take place. It provides a theoretical foundation for positive theories of expenditure differences between local authorities something which was lacking in the studies which were reviewed in Chapter 2. In addition and more to the point for this study the model enables

1. It will be recalled from Chapter 3 that it was claimed that by suitable respecification of the budget constraint that the model could be used to discuss central government expenditure growth. Of course differences between central and local government are merely by convention. The model applies to absorbtive public expenditures rather than to transfer payments.

the researcher to separate out the underlying influences on public expenditure growth. The interactions between these influences are also identified.

An examination of the growth of local or central public expenditures or a study of the causes of expenditure variations between local governments transcends mere academic curiosity. The services which local governments provide and which are manifested in expenditures and taxes are extremely significant arguments in the utility functions of the electorate. Some of the electorate enjoy the benefits of the services provided whilst others in some sense consider many of the services to disbenefit them in-so-far-as they would prefer not to be compelled to pay taxes for services that they do not wish. The activities of local government, therefore, enter our daily lives in a number of subtle and rather complex ways. It is the complexity of the process which makes government policy making with respect to local government a non-trivial exercise.

Take for example the question of real expenditure growth for local authorities. In formulating its medium term policy for local government expenditure growth central government will it is assumed take a view of what is considered to be a reasonable rate of real growth over the medium term taking into account the social opportunity cost of resources being directed to this part of the public sector. Such planning requires knowledge about the forces within the economy which cause real expenditure growth so that central government may be informed about the probable welfare implications of expenditure control. The distribution of central government grant to local government also requires knowledge of the impact of different environments upon the expenditures of different local governments. Clearly the equalization of per capita expenditures in a world of critically diverse environments is difficult to justify.

The advantage of the theoretical model which has been presented is that it rapidly throws into relief the key questions which policy makers have to ask and thereafter to answer.

Chapter 4 sets out a number of social indicators which described Glasgow's social and physical environment. It was seen that of all the major U.K. cities which were compared Glasgow ranked top on each indicator of social deprivation thereby confirming other similar reports that Glasgow is a city of high social need. Given this kind of environment and a strong preference of the inhabitants of the city to improve the environment such preferences are then manifested in expenditures in public budgets.

Any attempts to examine the historical growth of local government real expenditure requires the establishment of a suitable set of input price indices to deflate the series for inflationary increases in input prices. In the past many commentators have used either the retail price index or the wholesale price index to deflate local government expenditure. It was seen from the indices, which were calculated in Chapter 5, that deflation by the retail price index would overstate the growth in local government expenditure. This has important implications for policy towards local government expenditure control. If it is thought that local government's real expenditure is growing too fast as compared, for example, to the rate of growth in real GNP, then unnecessarily severe cuts might be made. This is not the only use of such price indices. The planning of government revenues and the public sector borrowing requirement demands knowledge of the impact of inflation upon government expenditures so that current price forecasts might be made. A related feature is the need for information on local government input prices when establishing the size of Rate Support Grant over the 2 year planning period. Finally economic analysis of the growth in local government expenditure requires

that real expenditure be identified from the outset.

Chapter 5 represents a first attempt at constructing a set of input price indices for local government expenditures. The data used in their construction also enabled an analysis to be made of the real increases in the pay of local government employees and a comparison of their earnings with those of other workers in the economy.

Chapter 6 used the price indices developed in Chapter 5 along with primary data on expenditures to examine the growth in Glasgow's current expenditure in money real and per capita terms. Capital expenditure growth and its implications for the growth in current expenditures via loan charges was also examined. It was seen in Chapter 6 that the financing of Glasgow's local public expenditure in common with other local governments, relied more upon central government funds. It was suggested that the separation of expenditure decisions from those of tax raising could explain part of the increase in expenditures. Such a hypothesis whilst plausible a priori is extremely difficult to test empirically. The hypothesis does, however, suggest the probable desirability of alternative means of financing local government and/or of monitoring its expenditure decisions.

Chapter 6 also took a detailed look at the components of local government current expenditures. It has been generally recognised that public expenditure is flexible upwards but sticky downwards. Building up the public sector, in real terms, at the rate which was demonstrated in the post war period represents a structural shift within the economy. The economy's resources of capital and labour move into those sectors and the scope of services provided by central and local governments expand. This expansion in local government expenditure builds up a structure which can be disadvantageous when that period of time occurs when local government expenditure must be controlled in either real and/or money terms. The structure of

public expenditures are such that they are "fixed" in the short term (or even the medium term). The principal components of local government expenditures being payroll costs, debt servicing charges, insurances, rents, rates, heating, lighting, etc... In most cases about 80% of local government expenditures are allocated to these items. The remaining 20% which is devoted to general materials used in the provision of services offer little scope for drastic reductions without a loss of the service provided.

This does not deny that in the short run economies could be made by seeking out more efficient methods. Short run tinkering, however, does not offer much scope for expenditure reduction without the prospect of releasing real resources from the public sector and the inevitable reduction in either the level and/or quality of the services provided. Public expenditure control must be coupled with medium term planning of the structure of the economy. That is, questions such as what kind of public services are to be provided, and what size of public sector can this economy support must be faced up to in the context of a medium term plan.

In Chapter 7 an attempt was made to consider the increases in the prices of the public sector final goods in this case the goods produced by Glasgow's police, education, and fire services. It was seen in that chapter by using a suitable set of assumptions that even although public sector output in these services was not directly observable, nevertheless, it was possible approximate to an answer by assuming that the level of output per capita had not increased. This crude test of the Baumol hypotheses highlighted a number of problems associated with the empirical verification of the hypothesis. In order to test Baumol's thesis it would be necessary to keep constant all other factors which would cause the producer price of public sector output to rise i.e.: keep constant quality, the nature of the product, the scope of the service,

and the environment in which the service is provided. These additional factors throw the Baumol thesis back into the melting pot since there are a number of alternative influences causing relative prices between public sector and private sector goods to rise it would be necessary empirically to separate out these influences.

Chapter 8 examined the budgeting process which had been adopted by Glasgow Corporation over the period. The problem encountered in this chapter was that any test of the "incrementalists" view of the budget was frustrated by the lack of case study material.

Chapter 9 presented data on the development of the current real expenditures (at 1963 prices) of those of Glasgow's services, namely the education, police, and fire services. The approach used was to consider changes in the environment for each service and to examine changes in the scope of the service and the quality of the service. A number of important statistical series describing social conditions in the Glasgow urban public economy were constructed from primary data sources and are presented for the first time. The picture which emerges for each service is one of severely undermanned services, in the post war period, which have extended their scope of activities along with changes in the nature of the product. These changes have been generally accompanied by a deterioration in their environments which has aggravated the problem and caused expenditures to rise.

Conclusions

This thesis represents the first step in a much broader research strategy to model the public sector and local government in the U.K. in particular. Already a data bank has been compiled upon computer files to examine the variations in U.K. local government expenditure between local governments for the period 1963/73. The model used in Chapter 3 is also being used to structure the analysis of local government expenditure

growth in the U.K. over the post war period. Finally it is hoped that by a more careful specification of econometric models the time series data used in Chapter 9 will be of value in separating out more clearly the contribution made by each component to the expenditure growth pattern.

B I B L I O G R A P H Y

- (1) Abercrombie P and Mathew R H The Clyde Valley Regional Plan, 1946, HMSO.
- (2) Adams R Journal of Economic Literature, March, 1971.
- (3) Adams R F On the Variation in the Consumption of Public Services, in Brazer, H., (Ed), Essays in State and Local Finance.
- (4) Alchian A Information Costs, Pricing and Resource Unemployment, in E S Phelps (Ed), The Micro-economic Foundations of Employment and Inflation Theory, (W W Norton & Co) 1969.
- (5) Andic S and Ververka J The Growth of Government Expenditures in Germany Since the Unification, (Finanzarchiv, XXIII, January, 1964, pp 169-289).
- (6) Argyris C Human Behaviour in Organisations, in Haire, M, (ed), Modern Organisation Theory, Wiley, 1967.
- (7) Arrow K Social Choice and Individual Values, Wiley, 1963.
- (8) Arrow K J Political and Economic Evaluation of External Effects and Externalities, in J Margolis (Ed) The Analysis of Public Output (National Bureau of Economic Research, Conference Series, No 23, 1970) pp 1-23.
- (9) Auld, D A L and Bing PC Merit Wants: A Further Analysis, Finanzarchiv, 1971.
- (10) Avison, N H Criminal Statistics and Social Indicators, in A Shonfield and S Shaw (Eds), Social Indicators and Social Policy, (SSRC, Heinemann, 1972).
- (11) Bahl, R W and Saunders R J Determinants of Changes in State and Local Government Expenditures, National Tax Journal, Vol (18), 1965, pp 50-57.
- (12) Bahl R W and Saunders R J Factors Associated with State and Local Government Spending, Journal of Finance, Vol 21 (3), September 1966, pp 523-534.
- (13) Bahl R W Metropolitan City Expenditures, (University Kentucky Press, 1969).
- (14) Bahl R W Intraurban Interactions, Social Structure and Urban Government Expenditures: A Stochastic Model, Socio-Economic Planning Sciences, Vol 3, Part 4, 1969, pp 279-290.
- (15) Bahl R W Studies on the Determinants of Public Expenditure: A Review, in S Muskin and J F Cotton, Sharing Federal Funds for State and Local Needs, (New York: Praeger 1969).

- (16) Baker B D The Glasgow Overspill Problem in The Glasgow Region, edited by R Miller and J Tivy, Glasgow 1958.
- (17) Baumol W J and
Bowen W G Performing Arts - The Economic Dilemma, New York, Twentieth Century Fund 1966.
- (18) Baumol W J Macroeconomics of Unbalanced Growth, The Anatomy of The Urban Crisis, American Economic Review.
- (19) Baumol W J The Dynamics of Urban Problems and Its Policy Implications in Essays - Honour of Lionel Robbins (Ed), Peston and Corry.
- (20) Baumol W J and
Oates W E The Cost Disease of the Personal Services and The Quality of Life, Skandinaviska Enskilda Banken Quarterly Review, 1972, Vol 2.
- (21) Bator F The Question of Government Spending, Harper & Row, 1960.
- (22) Becker G Crime and Punishment: An Economic Approach Journal of Political Economy, LXXVI (March - April, 1968) pp 169-217.
- (23) Bell C S Macroeconomics of Unbalanced Growth: Comment American Economic Review, September 1968 pp 877-84.
- (24) Bergstrom T C and
Goodman R P Private Demands for Public Goods, American Economic Review, June 1973, pp 280-296.
- (25) Bird R M The Growth of Government Spending in Canada (Canadian Tax Foundation 1970).
- (26) Birdsall W C A Study of the Demand for Public Goods in R A Musgrave (Ed) Essays in Fiscal Federalism (Washington D C Brookings, 1965) pp 235-294.
- (27) Birch J W and
Cramer C A Macroeconomics of Unbalanced Growth: A Comment, American Economic Review, September 1968.
- (28) Black D The Theory of Committees and Elections, Cambridge UK 1958.
- (29) Boaden N Central Departments and Local Authorities: The Relationship Examined, Political Studies June 1970.
- (30) Boaden N Urban Policy-Making, Cambridge University Press 1971.
- (31) Bocherding T E and
Deacon R T The Demand for the Services of Non-Federal Governments, The American Economic Review, December 1972 pp 891-901.
- (32) Booms B H City Governmental Form and Public Expenditure Levels, National Tax Journal, Vol 19, 1966 pp 187-199.

- (33) Booms B H and Hu, T W
Towards a Positive Theory of State and Local Public Expenditures: An Empirical Example, *Public Finance*, 1971(3), pp 419-423.
- (34) Boyle L
Expenditure Control in Local Government, in Peacock A T and Robertson D J (Eds), *Public Expenditure Appraisal and Control*, Oliver and Boyd, 1963.
- (35) Boyle L
Equalisation and the Future of Local Government Finance, (Oliver and Boyd, 1966).
- (36) Bradford D
Balance on Unbalanced Growth, *Zeitschrift fur Nationalokonomie*, XXIV, December 1969.
- (37) Bradford D F, Malt R A and Oates W E
The Rising Cost of Local Public Services, *National Tax Journal* Vol 22 (2) 1969.
- (38) Bradford D F and Oates W E
The Analysis of Revenue Sharing in a New Approach to Collective Fiscal Decisions, *Quarterly Journal of Economics*, Vol 85, August 1971, pp 416-39.
- (39) Bradford D F and Oates W E
Towards a Predictive Theory of Intergovernmental Grants, *American Economic Review*, Vol 61 (May 1971).
- (40) Bradford D F and Kelejian H H
An Econometric Model of the Flight to the Suburbs, *Journal of Political Economy* (May/June 1973) pp 566-89.
- (41) Bradford D F and Oates W E
Suburban Exploitation of Central Cities and Governmental Structure, pp 43-93 in HM Hochman and G E Peterson *Redistribution Through Public Choice* (University of Columbia Press, 1974).
- (42) Braybrooke D and Lindblom C E
A Strategy of Decision (Free Press 1963)
- (43) Brazer H E
City Expenditure in the United States, (New York: National Bureau of Economic Research, 1959).
- (44) Brazer H E
The Federal Government and State Local Finances, *National Tax Journal*, Vol (20), 1967, pp 155-164.
- (45) Break G F
Intergovernmental Fiscal Relations in the United States, (Brooking 1967), especially chapters 3 and 4.
- (46) Break G F
Revenue Sharing: Priorities and Policy Instruments, *Journal of Finance*, Vol XXIII(2), May 1968, pp 251-263.
- (47) Breton A
A Theory of Government Grants, *Canadian Journal of Economics and Political Science*, May 1965.

- (48) Breton A The Economic Theory of Representative Govern-
ment, (McMillan, Aldine Treatises in Modern
Economics, 1974).
- (49) Buchanan J M A Pure Theory of Government Finance, Journal
of Political Economy, Vol LVIII, 1949, pp 496-
505.
- (50) Buchanan J M Federalism and Fiscal Equity, American Economic
Review, September 1950.
- (51) Buchanan, J M Federal Grants and Resource Allocation, Journal
of Political Economy, June 1952.
- (52) Buchanan J M An Economic Theory of Clubs, *Economica*, February
1965.
- (53) Buchanan J M The Demand and Supply of Public Goods, Rand
McNally 1968.
- (54) Buchanan J M The Limits of Liberty; Between Anarchy and
Leviathan, (The University of Chicago Press,
1975).
- (55) Burkhead J Uniformity in Governmental Expenditures and
Resources in a Metropolitan Area, *National Tax
Journal*, Dec 1961, pp 337-48.
- (56) Burkhead J and Public Expenditure, (McMillan 1971).
Miner J
- (57) Cameron G C Economic Analysis for a Declining Urban
Economy, *Scottish Journal of Political Economy*,
November 1971, pp 315-344.
- (58) Campbell A K and Metropolitan America, (Free Press 1967).
Sacks S
- (59) Campbell A and Public Policy for Urban America, in Perloff H
Burkhead J and Wingo L, *Issues in Urban Economics*.
- (60) Campbell R H Scotland Since 1707, Basil Blackwell 1971.
- (61) Carr-Hill R A and An Econometric Model of the Supply and Control
Stern N H of Recorded Offences in England and Wales,
Journal of Public Economics, No 2, 1973, pp 289-
318.
- (62) Chase S B (Ed) Problems in Public Expenditure Analysis, (Brookings,
1968).
- (63) Checkland S G The British Industrial City as History: The
Glasgow Case, *Urban Studies* 1964/65 Vol 2,
pp 34-54.
- (64) Christensen, L R Transcendental Logarithmic Utility Functions,
Jorgensen D W and *American Economic Review*, LXV No 3, June 1975
La L J pp 367-383.

- (65) Crecine J P Governmental Problem Solving, Rand McNally
1967.
- (66) Cullingsworth J B and Housing in Clydeside (Edinburgh, HMSO 1970).
Watson C J
- (67) Cumming J Educational Costs, (Scottish Academic Press
1972).
- (68) Cyert R M and A Behavioural Theory of the Firm, Prentice
March J G Hall, 1963.
- (69) Dahl R A Who Governs, Yale University Press, 1961.
- (70) Davies B Local Authority Size: Some Associations with
et alia Standards of Performance of Services for
Deprived Children and Old People, Public
Administration Summer 1969, p255-248.
- (71) Davies B Social Needs and Resources in Local Services
(Michael Joseph, 1968).
- (72) Davis O and Political Approach to a Theory of Public
Haines G H Expenditure: The Case of Municipalities,
National Tax Journal, Vol 19, 1966.
- (73) Davis O, Demspster M A H Public Choice.
and Wildavsky A
- (74) Davis O, Dempster M A H A Theory of the Budgetary Process, American
and Wildavsky A Political Science Review, Vol LX, No 3,
September 1966, pp 529-548.
- (75) Davis O, Dempster M A H British Journal of Political Science.
and Wildavsky A
- (76) Dearlove J The Politics of Policy in Local Government
(Cambridge University Press 1973).
- (77) Downs A An Economic Theory of Democracy, Harper and
Row, 1957.
- (78) Eckstein O Trends in Public Expenditures in the Next
Decade, New York, Committee for Economic
Development, 1959.
- (79) Ehrlich I Participation in Illegitimate Activities: A
Theoretical and Empirical Investigation, Journal
of Political Economy, LXXXI (May-June, 1973)
pp 521-65.
- (80) Emi K Government Fiscal Activity and Economic Growth
in Japan 1868-1960 (Tokyo: Kinokuniya Bookstore
Co Ltd 1963).
- (81) Fabricant S The Trend of Government Activity in the US Since
1900, (New York Bureau of Economic Research 1952).

- (82) Fabricant S Productivity, International Encyclopedia of Social Science, Vol 12, 1968, Free Press, pp 523-35.
- (83) Farmer E and Smith R Glasgow Overspill 1943-1971, Urban and Regional Studies, Discussion Papers, No 6, University of Glasgow.
- (84) Feinberg M S The Implications of Core City Decline for the Fiscal Structure of the Core City, National Tax Journal 1964, Vol 17.
- (85) Fisher G W Determinants of State and Local Government Expenditure, National Tax Journal, December 1961, pp 349-352.
- (86) Fisher, G W Interstate Variations in State and Local Government Expenditure, National Tax Journal, 1964, Vol 17, pp 57-74.
- (87) Fisher F, Griliches Z and Kaysen C The Costs of Automobile Model Changes Since 1949, Journal of Political Economy, October 1962, Vol 70, pp 433-51.
- (88) Foley D K Resource Allocation and the Public Sector, Yale Economic Essays, Spring 1967, Vol 7, No 1, pp 45-103.
- (89) Foley D K Lindahl's Solution and the Core of An Economy with Public Goods, Econometrics, Vol 38, No 1, January 1970.
- (90) Frey R L and Kohn L An Economic Interpretation of Voting Behaviour On Public Issues, Kyklos 1970.
- (91) Gabler L R Economies and Diseconomies of Scale in Urban Public Sectors, Land Economics, Vol 5, November 1965, pp 425-434.
- (92) Gabler L R and Brest J I Interstate Variations in Per Capita Highway Expenditure, National Tax Journal Vol 20, 1967, pp 78-85.
- (93) Galper H The Federal Government Expenditure Process, Yale Economic Essays, Vol 7, No 1, 1967, pp 217-266.
- (94) Godley W A H and Rhodes J The Rate Support System, in 'Proceedings of a Conference on Local Government Finance', Publication No 10, Institute of Fiscal Studies, December 1973.
- (95) Goetz C Economics of Political Decentralization: Discussion, American Economic Review, Vol 61, May 1971.
- (96) Goldman S The Developing System of Public Expenditure Management and Control, Civil Service College Studies, No 2, HMSO 1973.

- (97) Gramlich E M State and Local Governments and Their Budget Constraint, *International Economic Review*, June 1969, Vol 10, No 2, pp 163-183.
- (98) Gupta S P Public Expenditures and Economic Growth, *Public Finance*, Vol 22, No 4, 1967.
- (99) Gupta S P Public Expenditure and Economic Development - A Cross Section Analysis, *Finanzarchiv*, October 1968, pp 26-41.
- (100) Gupta S P and Hutton J P Economies of Scale in Local Government Services, Research Study No 3, Royal Commission on Local Government in England.
- (101) Haire M Modern Organisation Theory, Wiley 1967.
- (102) Hansen A H and Perloff H State and Local Finance in the National Economy, 1944.
- (103) Hansen N M Municipal Investment Requirements in a Growing Agglomeration, *Land Economics*, February 1965, Vol 1, pp 49-56.
- (104) Harlow R L Factors Affecting American State Expenditures, *Yale Economic Essays* 1967, pp 263-308.
- (105) Harlow R L Sharkansky on State Expenditures: A Comment, *National Tax Journal*, Vol XXI(2), June 1968, pp 215-217.
- (106) Harper W R Getting to Grips with Inflation - Some Experimental Work at Greenwich, *Public Finance and Accountancy* 1974, No 3.
- (107) Harris C L Public Finance in B F Haley (ed), 'A Survey of Contemporary Economics', Irwin, 1952, Vol 2.
- (108) Hawley A H Metropolitan Population and Municipal Government Expenditures in Central Cities, *Journal of Social Issues*, Vol VII, 1951, pp 100-108.
- (109) Head J G Public Goods and Public Policy, *Public Finance*, No 3, 1962, pp 197-221.
- (110) Helco H and Wildavsky A The Private Government of Public Money, Macmillan, 1974.
- (111) Henderson J M Local Government Expenditure: A Social Welfare Analysis, *Review of Economics and Statistics*, Vol 1, No 2, May 1968, pp 156-163.
- (112) Hepworth N P The Finance of Local Government, Allen and Unwin, 1970.
- (113) Hicks J R and Hicks U K Standards of Local Expenditures, (NIESR, 1942).
- (114) Hicks J R and Hicks U K The Beveridge Plan and Local Government Finance, *Review of Economic Studies*, 1943, Vol XII.

- (115) Hicks U K The Control of Public Expenditure, Lloyds Bank Review, April 1961.
- (116) Hicks J After the Boom ..., Institute for Economic Affairs, Occasional Paper No 11, 1966.
- (117) Hirsch W Z Expenditure Implications of Metropolitan Growth and Consolidation, Review of Economics and Statistics, August 1959.
- (118) Hirsch W Z Determinants of Public Education Expenditures, National Tax Journal, Vol 13, March 1960.
- (119) Hirsch W Z The Supply of Urban Public Services, in Perloff H and Wingo L (eds), 'Issues in Urban Economics'.
- (120) Hirsch W Z Cost Functions of An Urban Government Service: Refuse Collection, Review of Economics and Statistics, Vol 47, February 1963, pp 87-92.
- (121) Hirsch W Z The Economics of State and Local Government, McGraw-Hill, 1971.
- (122) Hirschman A O and Lindblom C E Economic Development: Research and Development, Policy Making: Some Converging Views, Behavioural Science, Vol 7, 1962, pp 211-222.
- (123) Holmans A E The Growth of Public Expenditure in the U K Since 1950, Manchester School, Vol XXXVI, 1968, pp 318-327.
- (124) Holmans A E The Role of Local Authorities in the Growth of Public Expenditure in the U K, in Cairncross A (ed), 'The Managed Economy', (Blackwell, Oxford, 1970).
- (125) Houthakker H S Compensated Changes in Quantities and Qualities Consumed, Review of Economic Studies, 1951, July.
- (126) Hughes J T Economic Aspects of Local Government Reform, Scottish Journal of Political Economy, Vol XIV, Part 2, 1967, pp 118-137.
- (127) Isard W and Coughlin R E Municipal Costs and Revenues Resulting from Community Growth, (Chandler-Davis Publishing Company, 1957).
- (128) Jackson P M and Ulph D T The Relative Prices of Public Sector and Private Sector Goods, University of Stirling, Discussion Paper in Economics, Finance and Investment, No 15 (March 1973).
- (129) Jackson P M The Rising Costs of Local Government Services, in proceedings of a conference on 'Local Government Finance', publication No 10, Institute of Fiscal Studies, December 1973.

- (130) Jackson R M The Machinery of Local Government, Macmillan, 1965.
- (131) James L J A General Equilibrium Analysis of the Expenditure Effects of Federal Grants in Aid Programs, unpublished PhD University of Kansas, 1970.
- (132) Johnston J Statistical Cost Analysis, (McGraw-Hill 1960).
- (133) Johansen L Some Notes on the Lindahl Theory of Determination of Public Expenditures, International Economic Review, September 1963, pp 346-58.
- (134) Kee W S Central City Expenditures and Metropolitan Areas, National Tax Journal, December 1965, Vol 18, No 4, pp 337-353.
- (135) Kee W S City-Suburban Differentials in Local Government Fiscal Effort, National Tax Journal, June 1968, XXI(2).
- (136) Kiesling H J Measuring a Local Government Service: A Study of School Districts in New York State, Review of Economics and Statistics, Vol 49 (August 1967) pp 356-367.
- (137) King D N Why Do Local Authority Rate Poundages Differ? Public Administration, 1973, pp 165-173.
- (138) Klein A A Radical Proposal for R and D, Fortune, May No 112.
- (139) Klein A and Meckling J Applications of Operations Research to Development Decisions, Operations Research, Vol 6, pp 352-363.
- (140) Kurnow E Determinants of State and Local Government Re-examined, National Tax Journal, Vol 16, 1963.
- (141) Lancaster K A New Approach to Consumer Theory, Journal of Political Economy, Vol 74, 1966, pp 132-57.
- (142) Lindahl E Just Taxation - A Positive Solution, reprinted in Musgrave R A and Peacock A T, 'Classics in the Theory of Public Finance', pp 168-176, Macmillan, 1958.
- (143) Lindblom C E The Science of Muddling Through, Public Administration Review, Spring 1958, pp 79-88.
- (144) Lindblom C E Political Analysis, American Economic Review, June 1958.
- (145) Lindblom C E The Intelligence of Democracy: Decision Making Through Mutual Adjustment, Free Press, 1965.

- (146) Litvack J M and Oates W E Group Size and the Output of Public Goods, Public Finance, 1970, No 1.
- (147) Loewenstein L K The Impact of New Industry on the Fiscal Revenues and Expenditures of Suburban Communities, National Tax Journal, June 1963, Vol 16, No 2, pp 113-136.
- (148) Lomax K S Cost Curves for Gas Supply, Bulletin of the Oxford Institute of Statistics, Vol 13, 1951.
- (149) Lucy P in Public Administration Review, No 6, 1972.
- (150) Lynch L K and Redman E L Macroeconomics of Unbalanced Growth: A Comment, American Economic Review, September 1968.
- (151) Lytton H D Recent Productivity Trends in the Federal Government: An Exploratory Study, Review of Economics and Statistics, November 1959, pp 341-359.
- (152) Machlup F Theories of the Firm: Marginalist, Behavioural, Managerial, American Economic Review, Vol LVII, March 1967, pp 1-33.
- (153) Maxwell J A and Aaronson J R State and Local Capital Budget in Theory and Practice, National Tax Journal, 1967, pp 165-171.
- (154) Maxwell J A State and Local Government, Brookings, 1969.
- (155) March J G and Simon H A Organisations.
- (156) Margolis J A Comment on the Pure Theory of Public Expenditure, Review of Economics and Statistics, November 1955, pp 347-49.
- (157) Margolis J Metropolitan Finance Problems, in Buchanan J, 'Public Finances: Needs, Sources, and Utilization', (National Bureau of Economic Research, Princeton University Press, 1961).
- (158) Margolis J The Demand for Urban Public Services, in Perloff H and Wingo L (eds), 'Issues in Urban Economics'.
- (159) Martin A and Lewis W A Patterns of Public Expenditure and Revenue, Manchester School, September 1956, pp 203-44.
- (160) Martin J P and Wilson G The Police: A Study in Manpower, Heineman, 1969.
- (161) Miner J Social and Economic Factors in Spending for Public Education (Syracuse U P 1963).
- (162) McGuire M C and Aaron H Efficiency and Equity in the Optimal Supply of A Public Good, Review of Economics and Statistics, February 1969, pp 31-39.

- (163) McKean R N Public Spending (McGraw-Hill, 1968).
- (164) McLure C E Merit Wants: A Normatively Empty Box, Finanzarchiv, June 1968, pp 474-83.
- (165) McMahon W W Cyclical Growth of Public Expenditure, Public Finance, 1971, No 1.
- (166) Millward R Public Expenditure Economics, McGraw-Hill, 1971.
- (167) Milleron J-C Theory of Value with Public Goods, Journal of Economic Theory, Vol 5, 1972, pp 419-477.
- (168) Montacute original referenced in Feldstein M S, 'Economic Analysis and Health Service Efficiency', North Holland.
- (169) Morss E R Some Thoughts on the Determinants of State and Local Expenditures, National Tax Journal, Vol 19, 1966, pp 95-103.
- (170) Morss E R, Fredland J E and Hymans S H Fluctuations in State Expenditures: An Econometric Analysis, Southern Journals of Economics, April 1967, Vol XXXIII, No 4.
- (171) Morss E R Using Various Statistical Measures to Analyse the Size of the Public Sector, in Peacock A T (ed), 'Quantitative Analysis in Public Finance', Praeger, 1969.
- (172) Mushkin S J and Lupo G C Is there a Conservative Bias in State-Local Sector Expenditure Projections, National Tax Journal Vol 20, 1967, pp 282-291.
- (173) Musgrave R A and Culbertson J M The Growth of Public Expenditures in the United States 1890-1948, National Tax Journal, June 1953, pp 97-115.
- (174) Musgrave R A Public Finance, McGraw-Hill, 1959.
- (175) Musgrave R A Fiscal Systems, Yale University Press, Studies in Comparative Economics, No 10, 1969.
- (176) Mises Von L Bureaucracy, Yale University Press, 1944.
- (177) Nerlove M Returns to Scale in Electricity Supply, (Institute for Mathematical Studies in the Social Sciences, Stanford University, 1961).
- (178) Netzer D et alia Financing Government in New York City, Graduate School of Public Administration, New York University, 1966.
- (179) Netzer D Federal State and Local Finance in A Metropolitan Context, in Perloff H and Wingo L (eds), 'Issues in Urban Economics', 1969.

- (180) Nicholson R J and
Topham N
The Determinants of Investment in Housing,
Royal Statistical Society, Series A, March
1971.
- (181) Niskanen W A
Bureaucracy and Representative Government,
(Chicago: Aldine-Atherton, 1971).
- (182) Oates W E
The Dual Impact of Federal Aid on State and
Local Government Expenditures: A Comment,
National Tax Journal, Vol 21 (June 1968),
pp 220-23.
- (183) Oates W E, Howrey E P
and Baumol W J
The Analysis of Public Policy in Dynamic Urban
Models, Journal of Political Economy, Vol 79(1),
1971.
- (184) Oates W E
Fiscal Federalism (Harcourt Brace, 1972).
- (185) Olson M
The Logic of Collective Action (Harvard University
Press, 1965).
- (186) Oliver F R and
Stanyer J
Some Aspects of the Financial Behaviour of
County Boroughs, Public Administrations, Vol 49,
Summer 1969.
- (187) Osman J W
The Dual Impact of Federal Aid on State and
Local Government Expenditures, National Tax
Journal, Vol 19, 1966.
- (188) Osman J W
On the Use of Intergovernmental Aid as an
Expenditure Determinant, National Tax Journal,
December 1968, Vol XXI(4), pp 347-448.
- (189) Page H
Local Authority Capital Finance - Practices and
Problems, in Public Sector Economics, Prest
A R (ed), Manchester, University Press, 1968.
- (190) Peacock A T and
Wiseman J
The Growth of Public Expenditure in the United
Kingdom, (Geo Allen and Unwin, 1961).
- (191) Peacock A T
Welfare Economics and Public Subsidies to the
Arts, Manchester School of Economic and Social
Studies, Vol XXXVII, No 4, December, 1969.
- (192) Pidot G B
A Principal Components Analysis of the Determinants
of Local Government Fiscal Patterns, Review of
Economics and Statistics, May 1969.
- (193) Pigou A C
The Economics of Welfare, Macmillan 1920.
- (194) Plato
The Republic (translated by Lee H D P),
Penguin Books, 1955.
- (195) Pogue T F and
Sgontz L G
The Effects of Grants in Aid on State Local
Spending, National Tax Journal, June 1968, Vol XXI,
No 2, pp 190-200.

- (196) Pryor F L Elements of a Positive Theory of Public Expenditures, (Finanzarchiv, 1967, pp 405-430).
- (197) Pryor F L Public Expenditures in Communist and Capitalist Nations, (Geo Allen and Unwin, 1968).
- (198) Pulsipher A G The Properties and Relevancy of Merit Goods, Finanzarchiv, 1971.
- (199) Radner R Competitive Equilibrium under Uncertainty, Econometrica, Vol 36, No 1 (January 1968).
- (200) Renshaw E F A Note on the Expenditure Policy of State Aid to Education, Journal of Political Economy, Vol 68, April 1960, pp 170-74.
- (201) Ridley C E and Simon H A Measuring Municipal Activities, Chicago International City Managers Association, 1938.
- (202) Riew J Economies of Scale in High School Operation, Review of Economics and Statistics, Vol 48, August 1966.
- (203) Roberts D J The Lindahl Solution for Economies with Public Goods, Journal of Public Economics, Vol 3, 1974, pp 23-42.
- (204) Robson W A Local Government in Crisis, Allen and Unwin, 1969.
- (205) Rothenberg J A Model of Economic and Political Decision Making, in Margolis J (ed), 'The Public Economy of Urban Communities', Washington D C Resources for the Future 1964.
- (206) Schumpeter J A "Socialism, Capitalism and Democracy", George Allen and Unwin, 1942.
- (207) Sacks S Metropolitan Areas and Fiscal Federalism, Journal of Finance, 1968, Vol XXIII, No 2, pp 229-250.
- (208) Sacks S Spatial and Locational Aspects of Local Government Expenditures, Chapter 9 in 'Public Expenditure Decisions in the Urban Community' (Resources for the Future).
- (209) Sacks S and Harris R The Determinants of State and Local Government Expenditures and Intergovernmental Flows of Funds, National Tax Journal, Vol 17, 1964, pp 75-85.
- (210) Samuelson P A The Pure Theory of Public Expenditures, Review of Economics and Statistics, November 1954.
- (211) Samuelson P A Diagrammatic Exposition of a Theory of Public Expenditure, Review of economics and Statistics, November 1955.

- (212) Samuelson P A Pitfalls in the Analysis of Public Goods, Journal of Law and Economics, October 1967.
- (213) Samuelson P A Pure Theory of Public Expenditure and Taxation, in Margolis, J and Guitton H (eds), 'Public Economics' (Macmillan 1969) pp 98-123.
- (214) Saville L Patterns in Local Finance: The Case of Orleans County: Vermont, National Tax Journal, Vol 12, 1959, pp 163-178.
- (215) Sayre W S and Kaufman H Governing New York, 1960.
- (216) Schmandt H J and Stephens G R Measuring Municipal Output, National Tax Journal, 1960, Vol 13, pp 369-375.
- (217) Scott A D The Evaluation of Federal Grants, Economica, November 1952.
- (218) Scott S and Feder E L Factors Associated with Variations in Municipal Expenditure Levels, (Berkley Bureau of Public Administration, University of California, 1957).
- (219) Sharkansky I Some More Thoughts About the Determinants of Government Expenditures, National Tax Journal, Vol 20, 1967, pp 171-179.
- (220) Siegel B N On the Positive Theory of State and Local Expenditures in Kleinsorge P L (ed), 'Public Finance and Welfare: Essays in Honour of C Ward-Macy', University of Oregon Books, 1966, pp 171-186.
- (221) Simon H A Administrative Behaviour, Free Press, 1950.
- (222) Simon H A (et al) Public Administration.
- (223) Simmons P J Choice and Demand, Macmillan, 1974.
- (224) Smith V K and Fibiger W W An Approach for Efficient Estimation of State and Local Government Expenditure Determinants, Applied Economics 1972, 4, pp 101-123.
- (225) Smith D L The Response of State and Local Governments Federal Grants, National Tax Journal, 1968, Vol XXI(3), September, pp 349-358.
- (226) Snyder R C, Bruck H W and Sapin B Decision Making as an Approach to the Study of Politics (Princeton, 1954) reprinted in 'Foreign Policy Decision Making' (a collection edited by the same authors) (New York, 1962).
- (227) Solton J and O'Brien T Unconditional vs. Matching Grants: Further Comment, National Tax Journal, March 1968, XXI(1).

- (228) Spangler R
The Effect of Population Growth on State and Local Government Expenditure, National Tax Journal, 1963, Vol 16.
- (229) Steiner P O
The Public Sector and the Public Interest, in 'The Analysis and Evaluation of Public Expenditures', papers presented to the Joint Economic Committee Congress of U S Volume I, (91st Congress, 1st Session 1969) (Government Printing Office, Washington).
- (230) Sunley E M
Determinants of Government Expenditures Within Metropolitan Areas, American Journal of Economics and Sociology, Vol 30(4), October 1971, pp 345-365.
- (231) Tait A and O'Donoghue M
Public Expenditures in Ireland, in Bristol J and Tait A, 'Economic Policy in Ireland' (dublin: Institute of Public Finance, 1968).
- (232) Teeple R K
A Model of a Matching Grant in An Aid Program With External Tax Effects, National Tax Journal, December 1969, XXII(4), pp 486-496.
- (233) Thompson W R
A Preface to Urban Economics, (John Hopkins Press, 1965).
- (234) Tiebout C M
A Pure Theory of Local Expenditures, Journal of Political Economy, Vol LXIV, October 1956, pp 416-424.
- (235) Tivy J
Population Distribution and Change in 'The Glasgow Region', edited by Miller R and Tivy J, Glasgow, 1958.
- (236) Topham N
Housing Authorities and the Investment Decision, Manchester School, December 1970, pp 285-302.
- (237) Tullock G
The General Irrelevance of the General Impossibility Theorem, Quarterly Journal of Economics, May 1967.
- (238) Vaizey J et alia
The Political Economy of Education.
- (239) Veig J A et alia
California Local Finance, Stanford University Press, 1960.
- (240) Veverka J
The Growth of Government Expenditures in the United Kingdom Since 1790, Scottish Journal of Political Economy, Vol X, pp 111-127.
- (241) Wagner A
Three Extracts on Public Finance in Peacock and Musgrave (eds), 'Classics in the Theory of Public Finance', (Macmillan, 1967).
- (242) Walker M
Municipal Expenditures, (John Hopkins Press, 1930).

- (243) Weber M The Theory of Social and Economic Organisation, Free Press, 1947.
- (244) Weicher J C Determinants of Central City Expenditures: Some Overlooked Factor and Problems, National Tax Journal, December 1970, pp 379-397.
- (245) Weicher J C and Econometric Analysis of State and Local
Ermine R J Aggregate Expenditure Functions, Public Finance 1973, No 1.
- (246) Whitelaw W E The Determinants of Municipal Finance, A Time Series Analysis, The Annals of Regional Science, December 1969.
- (247) Wicksell K A New Principle of Just Taxation, pp 72-118 in Musgrave R A and Peacock A T, 'Classics in the Theory of Public Finance' (McMillan, 1958).
- (248) Wildavsky A The Politics of the Budgetary Process, Little, Brown and Co, 1964.
- (249) Wildavsky A Public Interest, No 33, Fall 1973.
- (250) Wilde J A The Expenditure Effects of Grant in Aid Programs, National Tax Journal, September 1968, XXI(3), pp 340-49.
- (251) Wilensky G Determinants of Local Government Expenditures, Chapter 8 in Crecine J P, 'Financing the Metropolis' (Vol 4, Urban Affairs Annual Series, 1970).
- (252) Will R E Scalar Problems in Urban Service Requirements, Yale Economic Essays, Spring 1965, Vol 5, No 1.
- (253) Williams A The Optimal Provision of Public Goods in a System of Local Government, Journal of Political Economy.
- (254) Williamson O E The Economics of Discretionary Behaviour: Managerial Objectives in a Theory of the Firm, (Markam, 1967).
- (255) Wilson J Q and Public Regardiness as a Value Premise in
Banfield E C Voting Behaviour, American Political Science Review, Vol 58 (December 1964) pp 856-887.
- (256) Wiseman J Local Government in the Twentieth Century, Lloyds Bank Review, January 1966, pp 15-29.

Government Publications

- (257) "Report by the Select Committee on Estimates: Treasury Control of Expenditure", July 1958.
- (258) Report of Committee Appointed by the Scottish Council (Development and Industry), Inquiry into the Scottish Economy 1960/61 (1961) (Toothill Report).

- (259) "Control of Public Expenditure", July 1961, Cmnd. 1432, H.M.S.O.
- (260) Committee of Inquiry into the Impact of Rates on Households, Cmnd. 2582, (Chairman, Professor R G D Allen), H.M.S.O. 1965.
- (261) Ministry of Housing and Local Government, Committee on the Management of Local Government (Chairman J Maud), H.M.S.O. 1967.
- (262) "Public Expenditure: A New Presentation", April 1969, Cmnd. 4017, H.M.S.O.
- (263) "First Report from the Select Committee on Procedure: Scrutiny of Public Expenditure and Administration", July 1969, H.C. 410.
- (264) "Royal Commission on Local Government in Scotland 1966-69", September 1969, Cmnd. 4150, H.M.S.O.
- (265) "Public Expenditure 1968-69 to 1973-74", December 1969, Cmnd. 4234, H.M.S.O.
- (266) "Royal Commission on Local Government in England and Wales 1966-69", Cmnd. 4040.
- (267) "The Future Shape of Local Government Finance", Cmnd. 4741, 1971, H.M.S.O.

Miscellaneous

- (268) Buchanan and Tullock "The Calculus of Consent".
- (269) Gillespie W I "Urban Canada", Research Monograph 4, (Ottawa 1971).
- (270) Feldstein M S "Hospital Cost Inflation: A Study of Non-Profit Price Dynamics", American Economic Review, December 1971, pp. 853-872.
- (271) Feldstein M S "Economic Analysis for Health Service Efficiency" (North Holland, 1967)
- (272) Cox C B and Boyson R "Black Paper on Education 1975"
- (273) Fitzpatrick F A "Local Authority Expenditure - Measuring Inflation" Public Finance and Accountancy, June 1974
- (274) I M T A Local Government Trends, 1973, Chapter 3.
- (275) Walzer N "A Price Index for Municipal Purchases", National Tax Journal Vol. 23, December 1970, pp. 441-447
- (276) Greytack D, Gustley R and Dinkelmeyer R J "The Effects of Inflation on Local Government Expenditure", National Tax Journal, Vol. XXVII, No. 4, December 1974, pp. 583-598.