Childbearing and First Birth in Scotland

Abstract

This thesis examines childbearing and first birth in Scotland. A description of empirical patterns and trends in childbearing and first birth in Scotland is given. Unique and appropriate analyses of data sources are presented. This includes analysis of the *Scottish Longitudinal Study* (SLS) and *Scottish Social Attitudes Survey: Fertility Module* (SSAS). The thesis clearly demonstrates the relationship between social stratification and childbearing within Scotland. This is apparent longitudinally, examining timings of first birth using the SLS, and in cross-sectional data using the SSAS, and comparing childbearing ideals and intentions with achieved numbers of children. The evidence suggests inequalities at play on parenthood. Those relatively less advantaged on measures of social stratification, for instance using data on occupations or educational attainment can be observed as starting families earlier than those more educationally or occupationally advantaged. Whether, and how, standard measures of geography relate to fertility outcomes is examined across several chapters and findings suggest that they offer some explanation relating to individual processes of first birth. A latent class approach is outlined which shows that economic theories of fertility can be reconciled with attitudinal indicators of opportunity cost and financial constraint. A distinctive theoretical position is also taken which culminates in the exposition of the position that childbearing can be usefully conceptualised in terms of a threshold effect.

To my parents, grandparents and family, Lorna and Emma-Louise,

Mr Thomas Ralston (senior) MBE

Mr James Robertson

Mrs Euphamia Robertson

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List of Acronyms

ASFR	Age specific fertility Rate
BHPS	British Household Panel Study
CAMSIS	Cambridge Social Interaction and Stratification Scale
EFP	European Fertility Project
ESRC	Economic and Social Research Council
CATT	Consistent Areas through Time
CRFR	Centre for Research on Families and Relationships
GDP	Gross Domestic Product
GROS	General Register Office for Scotland
GUS	Growing Up in Scotland
SDT	Second Demographic Transition
MCS	Millennium Cohort Study
NS-SEC	National Statistics Socio-economic Classifications
o/c	opportunity cost
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
REPRO	Reproductive Decision Making in a Macro-Micro Perspective
RGSC	Registrar General's social class
s.e.	standard error
SHS	Scottish Household Survey
SGSR	Scottish Government Social Research
SLS	Scottish Longitudinal Study
SSAS	Scottish Social Attitude Survey
TFR	Period Total Fertility Rate

Preface

Entropy, order tends towards disorder. If our colleagues in the physical sciences have it correct then the universe is destined to end in nothing, literally. Many billions and trillions of years before this our sun, at the centre of our solar system, will consume this planet as part of its life cycle, destroying anything living that may remain here. One day the last human to be born will enter the universe. One day the last human will breathe their last breath. As I see it these are facts. Unless our colleagues have it wrong. But, the universe is young and humans live only a short time.

Our own life cycle might simply be described as birth, ageing and death. This is a study concerned with birth.

I was lucky to get the chance to study for a Doctorate. It is a privilege to get paid to come to university and it is a privilege to learn. My own aim was to learn to use statistical methodologies in undertaking social research. When I started I never really knew what that meant, I had *heard* of regression analysis. For myself I have been successful in my aim. I know far more statistical methods than I had time to incorporate into the PhD. Indeed, people have entire successful and influential academic careers in social research without ever learning that OLS regression is the best linear unbiased estimator.

I am lucky to study at the School (previously Department) of Applied Social Science at the University of Stirling. I did not know it when I started, but it is now clear to me that there is no other institution in Scotland where there is such strong support and integration into networks. It was a fortunate coincidence that I ended up at Stirling. I was also lucky to undertake my research at a time when there were other people interested in learning about the application of statistical methods in social research. Witnessing what other people do both inspires and prompts envy in equal measures.

The process of studying fertility in Scotland has led me to form firmer views upon the issues of population. I was not sure before, but I now believe that a fertility level at or

just below replacement need not lead to calamity. Indeed it seems to me that the opposite scenario is more likely to lead to larger and more total disaster. The case of population growth outstripping our ability to provide adequate standards of living is not only a Malthusian prospect, but is the lived reality of many of the Worlds current population who exist on the margins. The current evidence leads me to believe that the population of Europe, much of the developed World and Scotland is likely to fall, but this may be a beneficent outcome, and in any case this projection may change in the future as technology advances.

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The staff and students at the University of Stirling are acknowledged. Particularly those from the *social surveys and social statistics research group*. Also the office and support staff who are equally helpful and encouraging.

Special thanks to Senior Lecturer, Dr Paul Lambert who has been with this project from the beginning. I cannot see how this would have been possible without the efforts of Dr Lambert. I remember our first supervision meeting. I had barely worked with survey data and I was afraid to undertake a PhD applying quantitative methodologies. Paul came to the meeting and told me that quantitative data analysis was exactly what I should do and it would be fine. I also appreciate the opportunity Paul gave me to play football, and drink beer in Essex and Cambridge. I do not know how you had the energy to read and comment on the drafts of this thesis. However, you read and offered constructive criticism on everything I ever sent you. I appreciate it so much.

Thanks also to Professor Vernon Gayle, who always has an encouraging word (and an extended anecdote); and I know he has gone well beyond what is expected for his students.

Thanks to Margaret Maxwell who began as supervisor, but who left the department after a year.

Thanks to Zhiqiang Feng at St Andrews and of the Longitudinal Studies Centre Scotland, who is ever helpful and very good company when running thousands of statistical models.

Thanks also of Claire Boag of the Longitudinal Studies Centre, Scotland

Chapter 1 - Childbearing and Below Replacement Fertility in Scotland

'I now describe my country
as if to strangers
this train is full of songs
of local winners
and the wind surrounds the towers
and the flags they are blowing
and the bunting and the distance
stretches over our sound

and when he teases the children
he calls them orphans
and he cries for all the flowers
of the forest
in his head there is no reason
to be sad about the garden
but his heart bleeds very often
for things forgotten like little orphans'

Orphans, Deacon Blue[1]

1.1 Introduction

This thesis examines childbearing and particularly first birth in Scotland. In 2002 Scotland was recorded as experiencing the lowest total fertility rate[2] (TFR) in its history, 1.48. At this time Scotland was the only country in Europe to undergo a natural decline in population (Graham and Boyle 2003). When this occurred fertility rates had

[1] Deacon Blue are a band formed in Glasgow in 1985, I once heard their front man, Ricky Ross, describing their song Orphans. He explained it was metaphor for Scotland of the 1980s and how he felt economic and social policies of the time alienated many communities in Scotland.

[2] The total fertility rate is a period measure of fertility. It is the average number of children that would be born to a woman over her lifetime if she were to experience the exact current age-specific fertility rates (ASFRs) through her lifetime, and she were to survive from birth through the end of her reproductive life. Age Specific Fertility Rate (ASFR) is the number of births per individual for a specific age during a specified time.

been declining continuously since the 1980s and there was no sense then that this would necessarily reverse sharply. Since 2002 fertility rates have risen, reaching 1.8 for 2008 before falling again in 2009. Following 2002 the population of Scotland has also been rising and this is thanks in part to increased immigration (Boyes, Harris et al. 2007; Lisenkova, McGregor et al. 2007). The most recent official total fertility rate available for Scotland at the time of writing is that of 2009, which stands at 1.77 (GROS 2010). This is slightly above the mean total fertility rate of 27 European countries for 2008 of 1.60 (as compiled for the European datasheet by populationeurope.org, see Lutz et al. 2010). However, a TFR of 1.77 still remains below replacement levels, considered to correspond to a TFR of 2.1 (Pearce and Carlos-Bovagnet 2005) for developed countries.

These recent trends in Scotland's fertility have crossed over from academic discussion into more general public discourse. Within the mainstream media a general sense is given that low fertility is causing a problem. How the implications of declining population and below replacement fertility will play out on Scotland has become a focus of some interest. For example, on the 14th January 2004 the *Glasgow Herald* ran a story headlined '**How to revive the Scots Economy – Make Babies'**, whilst in December 2007 the paper ran a story sub headed '**Low fertility rates and an ageing population mean we have to open our borders'**. The peaked curiosity in the demography of Scotland remains in place with the *Scotsman* publishing the headline **'Is the baby boom heading for a bust?'** in January 2009. Referencing the recent rise in fertility rates the article asked: *'After all, who else will work to pay for the care many will need if their extra years of life are spent in poor health?'*.

The portrayal of fertility levels as problematic forms the backdrop to this study. Equivalent arguments to those from newspaper headlines exist in academia and forthcoming analysis and reviews often engage with aspects of these debates. However, a nuanced understanding of first birth and childbearing within Scotland is sought throughout the thesis. This is particularly the case in respect of the theoretical contribution put forward which contextualises low fertility in Scotland, and more generally, in reference to historical trends and cross cutting social norms. The relationship between norms, cultural conventions and fertility outcomes are explored at length throughout. This brings to the fore interest in the relationship between social stratification and fertility outcomes, as variation in access to resources, whether cultural, or material and economic influences whether and how individuals act in relation to childbearing. In principle this unites macro and micro conceptualisations, as individual actions are conceived as occurring in relation to social structures of inequalities within overarching normative practice.

Since this study began the political and economic landscape has altered, quite dramatically. European and World economies have suffered as banking dept undermined their stability. The UK Government shifted from a left of centre party to a right of centre coalition, and the devolved Scottish Government is now (at time of writing) led by a majority nationalist party. The effects of these changes will take time to assess. However, both the political and economic changes have the potential to influence family formation and childbearing. Family focused policy has come under threat from a UK government absorbed upon the reduction of debt. In contrast the aspirations of the Scottish Government has led to the articulation of a specific

population policy: '*To match average European [EU15] population growth over the period from 2007 to 2017, supported by increased healthy life expectancy in Scotland over this period'* (Research 2010). On-going interest in the economic consequences of below replacement fertility, together with increased political attention, makes this work a timeous contribution to the discussion. In 2002 it seemed that Scotland would have to face the consequences of having a declining and ageing population. The subsequent rise in fertility and the experience of net immigration has made this issue less pressing. However, despite the recent upturn in fertility rates, medium term and long term projections for Scotland remain for population decline. Therefore concerns that inspired this study are still highly relevant and will remain so.

1.2 Outline of the Study

This thesis provides a description of empirical patterns and trends in childbearing and first birth in Scotland. In undertaking this general research aim the investigation makes several original contributions. Unique and appropriate analyses of data sources are presented. Indeed, this enquiry is one of the first undertaken using the *Scottish Longitudinal Study* and an extended analysis of this complex dataset is given across several chapters. The study also broadens the small amount of work that has used the *Scottish Social Attitudes Survey: Fertility Module*, applying an innovative latent class approach to expand the scope of previous analyses of attitudes. Part of this investigation tests the relevance of opportunity-cost theory in relation to expressed attitudes around childbearing. A distinctive theoretical position is taken which culminates in the exposition that childbearing might be usefully conceptualised in terms of a threshold effect. These contributions are underscored by descriptions of patterns of childbearing

intentions, first births and attitudes, across a period when fertility rates reached their lowest recorded level.

Chapter 2 reviews the literature on fertility and low fertility. The discussion places a particularly strong focus on theories of fertility and fertility decline. The chapter ends with sections that highlight what has already been done in examination of the population of Scotland, and with a survey of relevant data sources. Chapter 3 outlines the broad theoretical perspective and methodological approach taken throughout the thesis. Chapter 4 begins the analysis, and proffers a replication of previous research by Berrington (2004). Using British Household Panel Survey (BHPS) data Berrington (2004) examined the types of people who have postponed having their first child into their 30s, and the relationship between socioeconomic and ideational indicators and childbearing intentions. The investigation here extends Berrington's work in a number of ways. For instance, measures of occupational stratification are incorporated as explanatory factors, and the parenting intentions of those who were resident in Scotland are compared with those inhabiting England. Chapter 5 employs Scottish Social Attitudes Survey (SSAS) data to examine the role of attitudes in childbearing. The chapter contrasts measures of expected, ideal and actual childbearing and argues that relatively low childbearing ideals and intentions underscore overall low fertility levels. This chapter also elaborates a latent class approach to test whether variables measuring attitudes of opportunity cost, along with financial constraint, can be considered to relate systematically to different groups of people.

Chapters 6, 7 and 8 all report results based upon analysis of the Scottish Longitudinal Study (SLS). The SLS is a large scale longitudinal survey dataset, accessible only via a

stand alone system in Edinburgh, or remotely via a support officer. The analyses using the SLS focus upon the timing of births in contemporary Scotland – in particular, whether or not an individual experiences a first birth within the SLS study aperture. Therefore chapters 6, 7 and 8 all examine some aspect of the experience of first birth in Scotland. Chapter 6 and 7 study the relationship between social stratification and geography and how this relates to the timing of first birth in Scotland. In Chapter 8 it is argued that a threshold effect defines the timing of first birth to people at different ages. The chapter incorporates a synthetic cohort design to compare the type of people who are likely to experience first birth at different ages. The penultimate chapter reviews literature relating to social policy and fertility. On the basis of the review it is argued that it is difficult to formulate policy that will directly increase fertility as a wide array of influences impact upon childbearing. The final chapter concludes the thesis.

Chapter 2 - Review of literature and data sources

This review begins with an overview of general theories of fertility before moving on to cover the main empirical fields of study. Literature which examines fertility in relation to policy is also reviewed. What has been done in respect of research relating to fertility and childbearing in Scotland then receives attention. Finally the chapter concludes with an outline of the datasets that may be relevant to the study of childbearing in Scotland.

2.1 General theories of fertility and fertility decline

2.1.1 Demographic Transition

Alter (1992) suggests that it is family limitation which requires explanation (as opposed to fertility). This is because the reality of any potential childbearing relationship is that couples repeatedly face the question of whether to have a/another child. So what needs explanation is why parents, and potential parents, do not have a/another child. Why people choose, and have chosen, to limit their fertility is debated. The traditional consensus within the field was the theory of demographic transition[3] (Alter 1992). The theory of demographic transition places declining fertility within the context of low mortality rates associated with increasing technology and living standards that resulted

[3] Although widely cited in the field the theory of demographic transition is not specifically accredited. Perhaps it is most strongly associated with Frank W. Notestein (see Alter 1992: 18, Andorka 1978: 19, Kirk 1996).

from improvements related to the commercialising and industrialising world of the 18th and 19th Century (Andorka 1978). According to the theory, social and economic forces set in play by these processes reduced fertility through such mechanisms as increasing the cost of living. Whilst this was happening urbanisation and industrialisation altered lifestyles which reduced the economic contribution children could make to households. The theory of demographic transition therefore emphasizes the relationship between supply and demand suggesting that, for instance, increased numbers of children surviving reduced the impulse to produce a large family (Potts and Selman 1979).

At its most general, demographic transition theory provides a description of the transition from a high mortality and high fertility regime to low mortality and low fertility regimes. Kirk (1996) interprets demographic transition theory as comprising '*theory that societies progress from a pre-modern regime of high fertility and high mortality to a post-modern regime of low fertility and low mortality*'. Indeed the temporal aspect of the theory is open. For instance Caldwell et al. (2006) enquires whether the theory describes a modern transition or longer run trends in human history or development. The empirical experience of fertility transition within Europe has been shown to be more complex than the generalizations present in the theory of demographic transition. Alter (1992) illustrates this by outlining the implications of the European Fertility Project (EFP). The project was designed to relate indicators of economic development together with data on fertility throughout Europe. It was found that there was no simple, linear relationship between urbanisation, industrialization and

fertility decline (Alter 1992)[4]. The result of this has been a reassessment of the relationship between culture and economic determinants of fertility decline. Demographic transition theory characterizes fertility decline as a cultural shift driven by economics, whereas the implications of the EFP stresses the primacy of cultural change (Klusener and Goldstein 2009).

In the examination of the transitions across Europe the EFP draw upon historical data such as Census or vital events data over extended time periods. For example, Knodel's (1974) study of decline in German fertility straddles the period 1800-1939, whilst Lesthaeghe's (1977) analysis of Belgian fertility covers the period from 1800-1970. The EFP found that industrialization explains in respect of the European experience of fertility decline, but that fertility decline corresponded strongly to language regions. For

[4] The European fertility project published widely upon the transition from high fertility to a low fertility regime across Europe see their web pages at http://opr.princeton.edu/archive/pefp/. Monographs have been published upon French Van der Walle, F. (1974). The Female Population in France in the Nineteenth Century. Princeton, Princeton University Press.(1974), British Titelbaum, M. S. (1984). The British Fertility Decline: Demographic Transition in the Crucible of the Industrial Revolution. Princeton, Princeton University Press., Italian.Livi Bacci, M. (1976). A History of Italian Fertility during the Last Two Centuries. Princeton, Princeton University Press. Portuguese Livi Bacci, M. (1971). A Century of Portuguese Fertility. Princeton, Princeton University Press., Belgian Lesthaeghe, R. J. (1977). The Decline of Belgian Fertility, 1800-1970. Princeton, Princeton University Press., Russian Coale, A. J., B. Anderson, et al. (1979). Human Fertility in Russia since the 19th Century. Princeton, Princeton University Press. and German Knodel, J. E. (1974). The Decline of Fertility in Germany, 1871-1939. Princeton, Princeton University Press. fertility transitions. Articles have also been published upon Swiss Van der Walle, F. (1980). "Education and the Demographic Transition in Switzerland." Population and Development Review **6**(3)., Greek Siampos, G. S. and V. G. Valaoras (1969). Long-Term Fertility Trends in Greece. Paper delivered at the International Population Conference. London., Swedish Mosk, C. (1978). Rural-Urban Differentials in Swedish Fertility 1880-1960. Working Paper no. 123, Dept. of Economics, University of California at Berkeley., Danish Matthiessen, P. C. (1984). "Some Reflections on the Historical and Recent Fertility Decline in Denmark." Scandanavian Population Studies **6**(2)., Spanish Livi Bacci, M. (1968). "Fertility and Nuptiality Changes in Spain from the Late XVIII to the Early XX Century." Population Studies **22**(1, 2)., Austrian Forrest, J. D. (1975). Fertility Decline in Austria, 1880-1910. European Fertility Project. Princeton, Princeton University. **PhD**. and Austro-Hungarian Demeny, P. (1972). Early Fertility Decline in Austria-Hungary: a Lesson in Demographic Transition. Population and Social Change. D. V. Glass and R. Revelle. New York, Crane, Russak and Co.

example, Alter (1992) points to Lesthaeghe's (1977) study whereby Lesthaeghe matched Belgian villages for economic and social characteristics and showed that Waloon speaking villages underwent transition before Flemish speaking villages. This suggested that cultural factors perhaps explicable in terms of lines of communication, characterized fertility decline. Theoretically, the EFP highlights three requirements for fertility decline. Fertility has to be within the ambit of conscious choice; parents must want smaller families; and effective methods of contraception must be available (Alter 1992) . This is based on the belief that prior to the enlightenment people may not have considered fertility to be subject to human volition. The movement of fertility to within the ambit of parental agency allowed parents to regulate fertility, in combination with the use of birth control methods (Caldwell, Caldwell et al. 2006; MacInnes and Díaz 2007) . The EFP research therefore develop a updated version of demographic transition theory which brings to the fore cultural aspects of fertility decline, rather than an explanation emphasising the role of economic forces along with industrial development.

2.1.2 The Second Demographic Transition

The demographic transition describes the historical shift from high fertility rates and high mortality rates, to low fertility and mortality. The second demographic transition (SDT) describes the post World War II shift from baby boom high fertility rates to low and below replacement fertility (Van De Kaa 1987; Lesthaeghe and Neels 2002). The causal mechanism for this shift is related to ideational change and the dismantling of social supports that maintained robust family and childbearing systems and realigned post War Europe towards individualism. Bernhardt (2004) defines these circumstances concisely as having a twofold influence of *'less committed and more fragile relations*

between men and women…and…delayed and less likely transition to parenthood and a sharp reduction in higher-order births'. The SDT has also received criticism, for instance, Coleman (2004) re-characterises the 'transition' as a shift towards a set of preferences that may well be transient as they are contingent upon economic and policy conditions that are not static. This calls into question the definition rather than the description and the concept remains widely cited. Much of the literature referred to within this work engages with issues defined by the SDT.

2.1.3 Wealth Flows Theory

Where transition theory and the EFP are interested in explaining the historical shift to low fertility in Western Europe, John C. Caldwell has sought to theorize modern transitions in the developing world. Caldwell (1976) argues that there are two basic fertility regimes, one where there is an economic rationale to have large families, and one where there is an economic rationale to restrict family size. He suggests that childbearing behaviour can be usefully modelled as if it were a rational decision, and that maximum and minimum family sizes within regimes will depend on personal, social and psychological reasoning within families. According to Caldwell within the 'traditional' fertility regime wealth flows from children to adults and the point at which this reverses is the point when total fertility begins to decline. Caldwell (1976) stresses that this change is primarily the result of cultural change in shifting familial relationships and driven by Westernisation in the ideology of family form, the ideal of a

nuclear family[5]. The definition of wealth put forward by Caldwell (1976) is not only economic; it includes the social prestige of having a family along with any inherent satisfaction that this brings to parents. Historically, transition took place as a result of the economic shift to the capitalist mode of production which undermined traditional social-structural support for large families. This occurred along with an increase in the cost of children as extended education contributed to an alteration in the generational wealth flow. Caldwell therefore echoes the EFP in maintaining the primacy of a shift in cultural values in explaining modern transitions as he argues that non-developed nations may experience transition without a shift in local economic circumstance.

2.1.4 The Reproductive Revolution

Recently MacInnes and Diaz (2009) have outlined their concept of the reproductive revolution as an alternative grand explanation of fertility decline (and increasing life expectancy). They argue that populations should be considered as a 'flow' not a 'stock' (2009). There is a tendency in demography to consider population in terms of a stock which MacInnes and Diaz (2009) suggest is due to the nature of data collection, interpretation and analysis (see also, MacInnes and Diaz 2008). The often cross-sectional analysis of demographic phenomena, combined with the political imperative

[5] The nuclear family is a reference to the post World War II norm of family households dominated by a married couple Coleman, D. A. and J. Salt (1992). The British Population: Patterns, Trends and Processes. Oxford, Oxford University Press.. This type of household organisation came to the fore in the second half of the 20th Century within the more economically developed nations of Europe and North America and Caldwell Caldwell, J. C. (1976). "Towards a Restatement of Demographic Transition Theory." Population and Development Review **2**(3/4): pp. 321-366. sees the ideational dissemination of structures related to this type of organisation as influencing fertility decline.

to consider population bounded by the nation state, encourages the consideration of population as fixed and bounded rather than dynamic. However MacInnes and Diaz (2009) encourage us to treat population as a system in itself which flows depending upon the level of inputs (births) and outputs (deaths). Thus the system itself is the object of consideration.

The reproductive revolution, then, is the reclassification of the shift and the process whereby human population has transitioned from high early mortality, and high fertility, to low early mortality and low fertility. This idea elevates the perceived importance of these phenomena onto a par with the industrial and political revolutions of modernity: to paraphrase MacInnes' paraphrasing of Marx, the alteration of the forces of reproduction has fundamentally altered the relations of reproduction. The argument here is that the total social effort that was constrained in high childbearing (to keep fertility levels high in order to maintain population levels), is no longer required as infant and early mortality has been reduced. In MacInnes and Diaz's formulation this emancipates people, generating freedoms to determine timings and numbers of children. The reproductive revolution also enables rising equality between men and women, in sexuality and in the public sphere, as the social order reformulates and is no longer restricted by the requirements of high fertility (MacInnes and Diaz 2009). This reorients, rather than refute, demographic transition theory by centralising a decline in patriarchy.

2.1.5 Micro Level Perspectives of Fertility Change

Much of the empirical research conducted in reference to demography, fertility and population is related to economic models. Research that explicitly draws upon economic theory was influential in the 1970s and 1980s (Robinson 1997) and this is reflected in some of the literature referred to below. However, economic models of fertility remain highly important, for instance, Becker (Becker 1960) revisits his seminal theoretical contribution presented in the 1960 paper '*An Economic Analysis of Fertility'* in his (1991) monograph, '*A Treatise on the Family'*, and Becker (Becker 1993) *'The economic way of looking at behaviour*'. Demeny (1981) succinctly pulls together key research themes within the field of fertility which grew from micro level economic theorising. He suggests that research into the determinants of fertility can be categorised into three different, but broadly overlapping clusters of study. These are general socio-economic studies, which include sociology and social-demography; microeconomic; and psychosocial approaches (Demeny 1981).

Socio-economic explanations examine both macro and household level influences, and highlight thresholds of change whereby societies shift from high, to low fertility. The outcome of empirical analysis has been to highlight a complex relationship between fertility and the social structural outcomes characteristic of modernity. That is, modernity, in its social, economic and structural manifestations, broadly causes low fertility. However, as the EFP highlights, the relationship is complex and far from linear (Alter 1992). For example, the changing economic role of women has been equated with the fertility decline (e.g. Irwin 2000; MacInnes and Diaz 2009). One socio-economic explanation points to the growing numbers of women moving into

employment and higher education. Indeed Smith et al. (2007) report that women who participate in higher education delay childbearing and ultimately may have fewer children as they spend their 20s pursuing a career. Therefore the recent increase in the numbers of women in higher education correlates to decline in fertility levels. However, increased participation in education cannot fully account for the decline in fertility. Also, the correlation between increased participation of women in education and declining fertility requires further explanation. It is difficult to disentangle whether women are simply choosing careers over childbearing or if other structural or normative factors affect the choice. Smith et al. (2007) show that career orientated women have higher incomes as parents and are more likely to be with employed partners. However, this still does not tell us whether the choice is a positive one, to improve life circumstance prior to childbearing, or a negative one, in that socio-economic conditions are such as to discourage childbearing in their 20s. The interpretation of the correlation between current social and economic conditions and fertility is far from straightforward.

As with socio-economic research, the microeconomic school also examines households and the individual level or, more particularly, family groups comprising households. Microeconomic approaches posit a relationship between utility, resource allocation and outcomes, such as quantity and quality, to explain fertility (Demeny 1981; Robinson 1997). Roughly, the utility of commodities (children) to consumers (parents) interacts with resource allocation and competing preferences for other products to contribute in explanation for the number of children parents have. In keeping with theories of consumption, changes in price and income are considered to explain the shifting demand for children. For example, (Becker 1991) posits that there is a direct

relationship between quality and quantity that can explain demand for children. Therefore, according to Becker (1991), the interaction between the economic cost of having and raising children and their quality, in terms of time and money invested in them, can be used to directly predict fertility. Easterlin (1975) expresses this relationship between quality and quantity in childbearing in terms of consumer behaviour theory. That is, parents maximize satisfaction given a range of goods, their prices and their own tastes and income (Easterlin 1975) Rising income allows parents choice in terms of quantity of children and how much they wish to invest in them, in terms of time, money and education, *et cetera*, whilst costs that militate against fertility regulation include both market costs and emotional costs. These all operate through intermediate determinants of income, prices and tastes. Tastes incorporate the most sociological of the determinants employed by Easterlin (1975) as the concept incorporates norms and attitudes as well as tastes for goods.

In contrast to explicitly economic models, psychosocial approaches have sought to study attitudes and preferences as a means to understand childbearing *intentions*. Bagozzi and Van Loo (1978) provide a useful general theory of fertility that is based on economic rationale but attempts to explicitly integrate socio-psychological and environmental factors. The theory encompasses both socio-economic interactions and social psychological processes within the family. In this the authors attempt to account for attitudes and family interactions. The theory suggests that ongoing social psychological interactions within the family take account of external socio-economic determinants and influence fertility. Social psychological processes incorporate attitude and taste as well as partner interaction; socio-economic constraints include norms,

status and economic cost. The model attempts to provide a sophisticated understanding of familial interaction in relation to childbearing whilst drawing on the fundamental insights of microeconomics.

The socio-economic, microeconomic and psychosocial research clusters provide differing focus in terms of fertility outcomes. For example, the socioeconomic approach tends towards a micro-demographic perspective whereby links between demographic proximate factors are explored in accounting for fertility (Demeny 1981). However, this type of perspective can miss parents' intentions and decision making processes. Microeconomics offers a theoretical basis for decision making in relation to childbearing. However, this is generally within a consumer choice model and assumes a level of equivalence between the acquisition of children and consumption goods which is questionable (Caldwell 1977; Robinson 1997). Also, this approach might say little about how effects out-with the household impact on fertility. Psychosocial approaches can be seen as examining the context of factors that parents and prospective parents perceive as determining fertility outcomes.

Demeny (1981) offers a number of further criticisms of these general empirical schools. Firstly, the schools tend to take demographic transition for granted. This presents a problem because demographic transition has been questioned on a number of points, yet without the underlying thesis (that modernity accounts for low fertility) it may be difficult to reconcile the relationship between declining fertility and exploratory factors included in analysis. Also, the centrality of individuals and households to much of the analyses has been to the detriment of the wider structural and cultural environment. Therefore it is argued that empirical research has generally failed to culturally,

historically and geographically locate low fertility and levels of childbearing, though cultural explanation is central to much of the theoretical thinking. Likewise childbearing decision making processes can be subsumed by functionalist economics stressing goal optimisation within budget(s) (Robinson 1997). Finally, it is suggested that there is a lack of theory to explain how social, economic, political, administrative and cultural structures create incentives or disincentives to have children (Demeny 1981). This is all part of a general critique of this school of thought that research into fertility is not practically applicable in terms of its usefulness to policy makers as it fails to connect accounts of low fertility to contextualised, meaningful experience (Caldwell 1977; Robinson 1997; Caldwell, Caldwell et al. 2002; Zafirovski 2003; Maher 2008)[6].

2.1.6 Gender perspectives

The reconfiguration of gender relations is highlighted as influential in fertility decline by a number of authors. For instance, MacInnes and Diaz (2009) firmly equate declining fertility as determinative in undermining social systems they characterise as patriarchical. In this perspective modernity drives increasing living standards and medical technology that decreases mortality, this in turn frees women and society in general from having to produce lots of children to offset early mortality. This argument

[6] Caldwell (1977) and Zafirovski (2003) both take issue with a narrow definition of economic rationality in characterizing action. Caldwell et al. (2002: 19) argues that a specifically adhered to definition of economic rationality itself undermines policy support for families and childbearing as it underpins a general belief in non-intervention and individualized self support. Maher (2007) suggests that people explicitly deny that policy, and by extension material circumstances, influences their childbearing decisions.

is similar to the generalisation present in demographic transition, but is presented as a distinctive characterisation of the shift from high mortality and fertility to low mortality and fertility. McDonald (2000) also argues that falling numbers of births is a response to greater equality. It is also suggested that developed countries with low levels of gender equality in the public sphere experience lower fertility (Kohler, Billari et al. 2006). Furthermore, recent writing upon the postponement transition stresses how the relationship between variables representing gender equality has reversed in relation to fertility. A higher percentage of women in the workforce is now associated with higher fertility (Sobotka 2003; Sabotka 2004; Goldstein, Sabotka et al. 2009).

Irwin (2000) also relates low fertility to shifting relations between genders. Irwin (2000) offers a framework for the study of fertility change that in principle incorporates the diversity of factors understood to underlie low fertility and locates this within the historically and culturally specific relationships at the heart of childbearing, between men and a women, who are themselves also part of wider social and economic relations. In this Irwin (2000) puts forward the theoretical notion *reproductive regime* as a focus for research. The reproductive regime is the macro level social structure within which action takes place in relation to gendered social structures. Therefore, as an alternative axis of investigation Irwin (2000) provides a framework that can reorient the balance of analysis towards experience that connects low fertility to social context and the shifting relations between genders.

2.1.7 A Hypothesis of Constrained Choice

Theories of fertility and childbearing behaviour have attempted to reconcile a cost-benefit conundrum. Transition theory points out that high fertility and mortality transitions to low fertility and mortality and that the 'cause', very loosely speaking, is modernity. Economic theorists such as Becker (1991) and demographers, such as Caldwell (1976), have sought to explain this transition in terms of costs and benefits. In Becker's case this is formulated in terms of quality versus quantity in childbearing; in Caldwell's case it is the rationality of modern economic system to produce fewer children. Underlying this is the presumption that in the past parents benefited economically from having large families, whereas today the situation has changed. However MacInnes and Diaz (2009) refute this arguing that the cost of producing children has been reducing in modernity and that what drives lower fertility is the ability to choose how many children we have. Thus it is not cost that explains low fertility; it is simply that people have reduced wish and need for large numbers of children.

These differing emphases are not mutually exclusive. Choice may very well determine overall fertility, within parameters, and this balance of choice and constraints seems plausible across history. A synthesising argument could be made that cost benefit calculations may play out across people's lives today and affect things like timing and/ or the possibility that someone may reach the end of their fecundity without reaching their goals. The *reproductive revolution*, or *demographic transition*, both describe processes which make this type and diversity of choice possible. By the same reasoning it can be argued that in the past people were also able to choose to have children, or not,

subject to a similar balance of considerations. In this account the economic demands of earlier societies, and the social systems they created, encouraged high fertility, but people must still have been 'free' to choose, within parameters. Therefore people today can also choose whether to have children or not, and different contemporary fertility patterns simply emerge from current economic forces and social systems which neither encourage nor require high fertility.

The hypothesis of constrained choice is similar to the approach taken in current analyses such as Kohler et al. (2006) and Mills et al. (2005). Mills et al. adopt a rational choice framework to explain postponement in partnership formation and first birth. They interpret types of constrained choices as rational responses to increasing uncertainty related to globalization. Kohler et al. (2006) present a wide ranging analysis offering a mix of social-structural factors and forces that operate upon individual or couple childbearing decisions. They outline a compelling historical and cross national narrative description of low fertility and how it comes to be manifest in individual experience. However, unlike the hypothesis of constrained choice, these analyses are not explicitly orientated within the theoretical debate over historical drivers of fertility transition and economic or psycho-social micro level theoretical approaches.

2.2 Below Replacement Fertility in Europe[7]

Beck and Beck-Gernsheim (2002) have been relatively successful at influencing thinking early in this century, placing low fertility within the ambit of their thesis of individualization as a global force. This is based upon comparison of the collapse in fertility in post-Soviet block countries following the replacement of communist state structures with liberal capitalist. Beck and Beck-Gernsheim (2002: 120) argue that low fertility occurs in relation to a paradoxical conflict produced by late modernity between an ideal of independence and a desire for closeness or community. Thus women, and presumably men also, have to wrestle with a modern logic that demands individual self sufficiency, and square this with a relationship of dependence and love in childbearing (Beck and Beck-Gernsheim 2002: 120). The causal mechanism in the ideas of Beck is very similar to those of Kingsley Davis, who wrote, as far back as 1937, about the *'ripening incongruity between our reproductive system (the family) and the rest of modern social organization'* (in Davis 1997[1937]: 611).

Holdsworth and Elliott (2001) examine the timing of family formation and marriage in Britain and Spain and argue that general explanations of low fertility proposed by, for example, Beck and Beck-Gernsheim (2002), cannot account for differences in experience between countries. However, Mills et al. (2005) put forward a proposition

[7] This section examines comparativist research where country level variation is examined in an empirical context. The penultimate chapter of this thesis examines comparisons between countries in a policy context and includes a review of internationally comparative literature on policy and fertility.

that empirically links the concepts of globalization, uncertainty and risk in order to explain and analyze outcomes and processes for young people. Possibly the most compelling aspect of this analysis is the attempt to put some empirical clothes on the body of work associated with globalization and risk. They argue that globalization results in increasing uncertainty, that this is disproportionately experienced by different groups, and that this results in differing outcomes for people in terms of employment, partnership and fertility. In this they compare the apparent effects of globalization within 14 countries and provide evidence of increasing economic uncertainty for youth in employment, education and earnings (Mills et al. 2005).

Mills et al. (2005) argue that increased uncertainty leads to a postponement of entry into adulthood. This manifests in outcomes like delayed family formation and first birth. However, these outcomes are gendered and stratified by relative advantage. Men and women apparently adopt different strategies in the face of globalization; whilst those from the most disadvantaged backgrounds are disproportionately affected by negative consequences of globalization. Mills et al. adopt a rational choice framework to explain the responses to uncertainty they catalogue. Thus postponement in partnership formation and first birth are interpreted as rational responses to increasing uncertainty amid globalization. As such youth are portrayed as sheltering from a volatile labour market, in education, or forming more transient co-habiting relationships as a flexible alternative to traditional marriage and postponing family formation (Mills et al. 2005: 430-431), mirroring the perceived demands on a flexible workforce.

This contrasts somewhat with the work of MacInnes and Diaz (2009). Their narrative of declining fertility portrays the concept of modernity as the great liberator, which first

frees women medically from the burden of reproduction, then socially as this in turn undermines patriarchy. It appears that the empirical reality is, as often proves to be the case, more complex than the generalization. Freedom and constraint go hand in hand; freedom from one thing often means constraint in another. As Berlin (1969) famously points out, there are different types of freedom, which can be equated with the hypothesis of constrained choice: there are freedoms *from* and freedoms *to*. Freer from the burdening aspects of reproduction, and more free from an economic imperative to have many children, women and men are instead constrained in other contemporary social systems, such as through job insecurity. It then becomes a value judgment whether people today are freer to act than those of the past.

The relationship between uncertainty and risk as an explanation for variation in levels of fertility between nations is shared by Kohler et al. (2002; 2006) who discuss the emergence of a new concept in demography, the advent of 'lowest, low fertility'. This is represented by sustained Total Fertility Rates of 1.3 and below. Lutz et al. (2006) point to the potentially self-perpetuating nature of low fertility as fewer birth leads to the possibility of fewer potential parents in the future. There is a latent millennialism in the argument of Lutz et al. (2006), they clearly hint at dwindling populations in Europe and a 'childless Europe', introducing the concept of childless societies, and a low fertility trap. They speculate that lowest, low fertility may lead to fertility levels approaching zero as social feedback reinforces norms of fewer children towards zero. The phenomenon, and characterization, of 'lowest low fertility' has been central to much research and thinking of the last decade (Billari and Kohler 2004).

Zamac et al. (2010) examine the hypotheses of Lutz et al. (2006) that demographic momentum, social feedback and parental aspirations create a type of demographic trap leading to population collapse. They employ an agent based simulation to model the effects of these aspects on fertility. They show that if a system emerges whereby the relative cost of children is increasing and there is a reliance on intergenerational transfer of wealth to offset this, a trap can emerge. This is dependent on the social norm feedback mechanism, whereby declining fertility leads to norms of increasingly lower parities. The research establishes in principle the possibility of a fertility trap of the type outlined by Lutz et al. (2006). However, as a counterpoint to this it is worth considering that the European post war baby boom did not lead to spiralling fertility rates in perpetuity or an entrenched social norm of high numbers of children, so neither may it follow that a norm of low (below replacement) numbers of birth become entrenched. The history of fertility trends in the UK and Europe, over the course of the last century, is characterised more by steady decline punctuated by an unforeseen period of higher fertility following World War II (Coleman and Salt 1992: 114).

Even as Kohler et al. (2002, 2006) and Lutz et al. (2006) were teasing out the implications and effects of such widespread low fertility levels, it seems that the total fertility rates may have been changing direction across many of the low fertility countries. In an article entitled '*The End of Lowest, Low Fertiltiy?*' Goldstein et al. (2009) suggests that lowest low fertility is an effect exacerbated by postponement in births. Postponement drives down period measures of fertility, such as the total fertility rate, because the phenomenon of delay is a cohort effect (see also, Sabotka 2004). Thus a generation who delay fertility can cause the kind of collapse in total fertility rates that

have occurred. Only one lowest, low fertility country remained in Europe in 2008, Moldova (Goldstein et al. 2009). This is something of a speedy reversal of fortunes as since Kohler (2006) pointed out that, in 2002, 17 countries in Europe had lowest, low fertility, and the median total fertility rate for Europe was 1.31.

The revival of fertility in Europe, above lowest, low levels, does not mean that fertility is no longer an issue of concern. On the contrary fertility remains very low in many countries and variation between nations (and within nations) remains substantial (Goldstein et al. 2009). Kohler et al. (2006) note, however, that factors have shifted in the relationship between relatively high and relatively low fertility. For instance, the relationship between divorce and fertility has reversed, with a high national level of divorce no longer indicating lower fertility at the macro level. This is the case in respect of other factors, such as female participation in the labour force. Prior to the onset of the postponement transitions (see below), Kohler et al. (2006) argue that the relationship between fertility and female paid employment was negative. Following the postponement transition it is positive. The advent of trends towards lowest, low fertility has brought into focus tempo and quantum effects[8]. This called into question the usefulness of the total fertility rate as a measure of fertility as a period measure, open to

[8] Bongaarts and Feeney Bongaarts, J. and G. Feeney (1998). "On the Quantum and Tempo of Fertility." Population and Development Review **24**(2): pp. 271-291. define quantum of fertility as *'the Total Fertility Rate that would have been observed in the absence of changes in the timing of childbearing during the period in which the Total Fertility Rate is measured'*. The tempo of fertility is the '*distortion that occurs due to timing changes'*. More generally quantum is the number of children born to women in a cohort, while tempo is the timing of birth by mothers' age within a cohort.

an excessive influence from cohorts altering the tempo of childbirth (Sabotka 2003; 2004).

2.2.1 Postponement

The shift from low fertility, through lowest, low, and out the other side again, toward higher fertility rates approaching replacement has been characterized as the *'postponement transition'* (Goldstein et al. 2009: 688). This, Goldstein et al. suggest, is the current state of play in Europe and much of the developed world as total fertility rates are observed as rising and Scotland the decline in fertility rates reversed in 2002. The phenomenon of the postponement of childbearing has now been quite widely studied. In an analysis of timing of birth intervals amongst women in South Africa, Timeaus and Moulrie (2008) draw a distinction between spacers and postponers. The difference being that spacing is a proactive choice, with an aim; whereas postponement is a reactive result of circumstance. Leader (2006) offers a medicalised view of postponement and the medicalisation and problematisation of conceiving children has entered more mainstream public consciousness (e.g. Peoples and Ferguson 2003; Beer, Kantecki et al. 2006; Ledger and Gallup 2007). Leader suggests that postponement in childbearing is linked to a false belief that medical treatment can elongate the childbearing capacity of individuals. It is proposed that this is a result of women concentrating on pursuing careers and 'free' lifestyles, unencumbered by children (Leader 2006). Harper (2003) also seems to see fertility and a delay in childbearing as emerging from increased opportunity to pursue other options, as people are portrayed as choosing to delay life course transitions and to avoid adulthood. For example, Harper (2003) talks of people delaying full economic independence from parents. However,

this type of interpretation is in contrast to the empirical work of Mills et al. (2005) who relate postponement to the differentiated experience of risk and uncertainty.

Berrington (2004) conducts an analysis of fertility postponement in England and Wales. In a similar manner to Moulrie's distinction between spacers and postponers a central part of Berrington's analysis is an examination of the characteristics that define 'postponers'. She shows that women revise fertility intentions downwards as they age, and that overall intentions of men and women are similar. It is also shown that only half of the women in the sample, who have postponed fertility into their 30s and intend to have a child, will do so in the following six years. This highlights that some women who intend to have children may never achieve this aim. The evidence suggests that the intentions of childless women are more important than the intentions of a partner in predicting fertility (Berrington 2004).

Much literature may seem to re-enforce Leader's (2006) arguments as to why postponement occurs. It is possible to review any number of pieces of research (including much of this thesis) which show that women who pursue careers and remain in education delay fertility and first birth. For example, Bloemin and Kalwij (2001) argue that there are women who prefer work to children and that these women not only delay first birth, but have lower completed fertility. The theme of increasing time spent in education has been taken up by Black et al. (2008). They examine changes in legislation between the USA and Norway and argue that increasing time spent in education reduces fertility amongst the young, especially teenagers. In terms of social structure this suggests that gender differences in take up in extended education may account for some of the variation in fertility that exists between countries (Black,

Devereux et al. 2008; Perelli-Harris 2008). Also, increased take up in education over time within nations amongst women is related to the trend in postponement, as 'careers' and other alternatives to early motherhood, have become an option for increasing numbers of women (Bloemen and Kalwij 2001; Da Rocha and Fuster 2006).

Harper (2003) characterizes postponement as delaying adulthood, whilst Leader (2006) suggests that parenthood is eschewed in order to maintain personal freedom. This narrative of choice at the least implies certain selfishness amongst those who do not produce children. Yet the evidence of Kohler et al. (2006) and Mills et al. (2006) suggests that choice is not exerted equally by everyone in relation to life course transitions. People may well delay fertility to maintain personal freedom, however this may often be because they are in an undesirable or uncertain set of circumstances where having a child could provoke social opprobrium, or make a transition to more certain circumstances less likely (Sabotka 2004). In these scenarios the language of 'choice' related to postponement is less certain. It is important to acknowledge this dichotomy in terms of the nature of ‘choice’ in analysis. Taken in the macro context of the advancement of medical science and an increasing expectation of living to older ages, people today may appear to exert a choice to postpone childbearing that those in the past may not have had. We know that people had children differently in the past (Smout 1986; Anderson 1996; MacInnes and Diaz 2009) but empirical demonstrations of how choice has altered in relation to fertility are hard to come by. People *may* have more choice today in relation to fertility than those in the past, as Harper (2003) seems to suggest, however choice is not experienced equally by everyone.

The relationship between employment postponement and spacing behaviour is also examined by Da Rocha and Fuster (2006). They argue that unemployment induces postponement and delay in childbearing. Research in this vein often draws upon theories of the economic rationality or opportunity cost and Caucutt et al. (2002) examine the opportunity cost dichotomy linked to processes underlying births and childbearing. They suggest that wage inequality and labour market supply influence both fertility delay and marriage. Also, in comparing fertility between Finland and Spain, Oinonen (2004) argues that employment and economic insecurity are the key factors that explain contrasts between the countries. This research links fertility timing and postponement to macro factors that are unlikely to be entirely within the agency of individuals to control. In these terms characterizing fertility postponement as completely within the ambit of choice is open to question as it may downplay structural constraints upon childbearing.

Kohler et al. (2006) point to the positive relation between female employment rates generally and fertility both within, and between, nations. This is partly explained by national differences in the degree to which cultures recognise female economic activity as compared to cultures that expect a more traditional role for women. It appears that more traditionalistic countries more directly require a choice to be made by women as to whether they will adopt a family role or a more individualised life; here, women are required to avoid a family/childbearing role to achieve other life goals. This then leads to postponement of births and first births, and a more elongated postponement in comparison with less ‘traditional’ countries. Empirically this has been noted to be a particular feature of southern European countries such as Italy, Spain and Greece

(Munoz-Perez 1989; Shah 1997; Holdsworth and Elliott 2001; Del Boca, Pasqua et al. 2003; Martin Garcia 2010).

2.3 Contingent and negotiated relationships?

The rise of differing family forms has been central to the discussion of recent social change. Of particular relevance is the delay of marriage (Paterson, Bechhofer et al. 2004) and an accompanying rise of cohabitation and single parent families (Feijten and van Ham 2010). These phenomena have been a favourite amongst theorists of post-modernity such a Giddens (Giddens 1991) and Beck (Beck and Beck-Gernsheim 1995; Beck 1998) who characterize this as evidence of departure form modernity towards other defining forms. However the empirical data is more equivocal (e.g. Holdsworth and Elliott 2001; Gross and Simmons 2002; Rijken and Knijn 2009; Rijken and Liefbroer 2009).

Steele et al. (2005) perform a multi-level, competing risks analysis using the National Child Development Study, to analyse partnership transitions and fertility. Part of their findings, related to fertility, show that pregnancy amongst a co-habiting couple increases the probability of a marriage resulting prior to a birth, but not following a birth. This seems to suggests two types of cohabiters, those where marriage is intended and a birth may precipitate this, and those where marriage is a more distant option. Reed (2006) offers some research supporting that of Steele et al. (2005). In an analysis of 44 cohabiters in the United States, she found cohabiting to be a response to parenthood that allowed the partners to abstain from marriage. In contrast, in a more expanded review of literature around cohabitation Seltzer (2000) suggests that there is

a group of cohabiters for whom marriage is a preferred option; however, economic circumstances preclude this. In sum, cohabitation is a state that leads to pregnancy and child birth for some couples, although the evidence suggests that cohabiters are heterogeneous. Within the literature childbearing is usually considered as within relationships and partnerships, whether cohabitation or marriage. Childbearing to singletons occurs less often (chapter 8). However, teenage pregnancy is regularly defined as a distinct and problematic form of childbearing that occurs out-with marriage or cohabitation (Rosato 1999; Rendell 2003).

Furstenberg and Crawford (1978) characterised teenage pregnancy (in the USA) as a circumstance which happens to the new mother and the new mothers family, which *'curtails the…marital well-being'* of the teenager. The theme of teenage pregnancy as a separate and stigmatised form of childbearing remains a focus of study today and is examined by Rendell (2003). She engages with the considered exceptionality of teenage pregnancy in a study that investigates the perception that there are repeated patterns across generations between the daughters of teenage mothers who go on to become teenage mothers themselves. Examining data from England, Wales and France she finds that there is relatively little mother daughter repetition (Rendell 2003). Rosato (1999) also presents a working paper on recent trends of teenage fertility in England and Wales. In the analysis Rosato (1999), using the Longitudinal Study of England and Wales, suggests that measures of occupational stratification and relative advantage/ socio-economic status, along with household variables of family structure, are strong indicators of teenage pregnancy. The political interest in this subject drives a large literature on the question (e.g. Wellings, Wadsworth et al. 1999; Lopoo and DeLeire

2006; Black, Devereux et al. 2008) and this form of childbearing is considered a conceptually discrete entity in research and policy alike. Teenage pregnancy is not engaged with here as a problematic, however first birth to teenage men and women is examined (chapter 8) within a life course perspective which highlights the differential experience of inequality associated with social stratification to people at different life stages.

Rijken and Knijn (2009) also compare the experience of becoming a parent amongst a group of parents who experienced a birth at relatively young age with those who postponed first birth. However, this is undertaken in the context of the assessment of post modern family formation. They found that the process was similar amongst both groups. This was contrary to their hypothesis which was based upon ideas of individualization, reflexive modernity and risk present in the works of Giddens (1991) and Beck and Beck-Gernsheim (1995). Theory such as that put forward by Giddens (1991) and Beck and Beck-Gernsheim (1995) relates modernity, or late modernity, to a narrative of choice whereby individuals reflexively, and self consciously, engage with a variety options available to them. The types of simplistic generalization available in the writing of the likes of Giddens (1991), Beck and Beck-Gernsheim (1995) seem attractive. It is a convention of grand sociological theory to project current circumstances as complex, compared to a simpler past. However, the findings of Rijken and Knijn (2009) suggests, the empirical reality does not necessarily match the general theorizing. They put forward that parenthood is implicit in a relationship, rather than explicit, contingent and negotiated, as would correspond with an idea called reflexive modernity.

In a review of writing upon the changing nature of relationships Sabotka (2004: 25) concludes in favour of the concept of the reflexive and negotiated relationship. In this view childbearing is no longer central to partnerships and the result of this is a delay in first birth which drives down TFR's. The concept of partnership as changing and negotiated is not restricted to Europe or the West, as similar arguments are made in respect of Japan (Bassani 2003), Korea (Suzuki 2008) or Singapore (Asher and Nandy 2008). However, there is evidence that points in another direction. Reproduction is fundamental to human existence. Rijken and Knijn (2009) show parenthood and reproduction as so central in the lives of people that it is largely implicit within couple relationships, and this finding is not unique (see, Morgan and King 2001). The social aspect of childbearing norms and the influences of wider social forces on timings of births are structures built upon the underlying biological necessity of life to reproduce itself (Voland 1998; Morgan and King 2001). There are, as yet, no childless societies of the type hypothesized by Lutz et al. (2006). There is alteration in how people experience childbearing, this is particularly stark in reference to the post World War II baby boom generation. However, delay and contingency associated with different forms of experience does not necessarily mean that the stability of family formation is no longer a central goal in the lives of people (Gross and Simmons 2002). The evidence suggests that, at the least, childbearing is an implicit general aim in peoples' lives and that individuals take actions that makes achieving this goal possible.

2.4 Attitudes and norms: the role of social convention

Woods (1987) offers an analysis of historical English data on fertility transitions in which he suggests that theories of fertility transition do not take adequate account of

ideational and attitudinal change as key factors driving fertility decline. Wood argues that the developments of new norms around childbearing were central to the demographic transition and that the immediate cause of fertility decline was a shift in thinking about fertility towards the acceptability of limitation. This was a shift in attitude that went along with modernity and is influenced by multiple factors and social feedback mechanisms that has been missing from economic or transition theories of fertility (Wood 1987: 309, 311). Nevertheless, as is pointed to above, an ideational shift influencing fertility decline is included in some generalist theories of fertility decline. For instance, Caldwell's (1976) wealth flows theory and the influence of overriding norms and attitudes is incorporated in Bagozzi and Van Loo's (1978) micro level theory of fertility.

Mitchell and Gray (2007) suggest that the examination of attitudes underlying fertility intentions is an under researched aspect of demographic trends. In a sense it may be easier or more appealing, to examine the structural context of childbearing and to undertake country level comparisons. Social group variation in fertility outcomes are relatively straight forward to capture in survey data. Putting aside questions of reliability, it is relatively simple to quantify childbearing and to examine these types of measures against socio-economic and demographic measures to assess the relationship between social structure and fertility. It may be a more convoluted task to assess what may be considered more subjective, attitudes and intentions (Schuman and Presser 1996).

The empirical relationship between attitudes and fertility is the focus of a recently concluded research project REPRO[9], *Reproductive Decision Making in a Macro-Micro Perspective* (Philipov, Thevenon et al. 2009). The aim of the REPRO project is to provide insights into the relationship between macro level trends in European fertility rates and micro level behaviour, along with policy recommendations arising from improved situational understanding of fertility. Aspects of interest include the difference between fertility intentions, which are consistently higher than the actual experience of childbearing, and the dynamic between fertility intentions as both a fixed and moving target (Philipov et al. 2009). It is suggested that intentions may represent a moving target as they can alter across the life course influenced by factors external to the individual (Morgan and Rackin 2010). They might also represent a fixed target, in that measured differences between ideals and expectations may be small.

Dey (2007) provide a recent analysis of attitudes to childbearing in Scotland based upon data from the *Scottish Social Attitudes Survey: Fertility Module* (SCOTCEN 2005). These data are also employed in analysis in chapter 5. Dey (2007) highlight an average actual level of childbearing within the cross-sectional sample to people of childbearing age (18-49) of 1.16, but an ideal fertility of 2.48 and suggest that this shows that below replacement fertility in Scotland cannot be linked to low aspirations. The relationship between socio-economic circumstances and fertility ideals are also examined. For example, it is shown that ideal, expected and actual fertility varies by age for those at

[9] http://www.oeaw.ac.at/vid/repro/

differing levels of educational attainment. In general the findings appear to confirm the ideal of the two child family that Coleman and Salt (1992) suggests characterises attitudes in the UK.

Dey (2007) point out that most of those who want more than two children had yet to achieve the goal. However, what the interpretation of these results should be, given the nature of the cross-sectional data, is not expanded upon. Without longitudinal data any gap between ideals and achieved fertility may misconstrue a longitudinal, cohort effect and Dey (2007) suggest that older people have lower childbearing ideals. Mitchell and Gray (2007) likewise show that fertility expectations vary with time. They examine the fertility attitudes and aspirations of childless Australians and specifically focus upon those who intend to have children versus those who do not. Interestingly, the results show that only 30% of those who stated they did not want a child in the first wave of data collection saw the ideal number of children as being zero by the second wave of data collection, three years later (Mitchell and Gray 2007). These findings suggest people actively revising their childbearing intentions across the life course, whilst Dey suggest people approaching the end of their childbearing potential reduce intentions/ideals accordingly. Both studies indicate the moving target nature of childbearing highlighted by Philipov et al. (2009)

There are some conflicting interpretations over the differential between ideals and expectations versus realized behaviour. At face value higher ideals than actual childbearing may indicate a latent desire for more children within low fertility nations that could mean that it is possible to increase fertility. McDonald (2006) suggests that the disparity between ideal and actual fertility is an indictment of current social policies

as people are effectively being frustrated from attaining life goals. However, Maher (2008) argues that ideals, or expressed attitudes, are related to social norms rather than specific intended goals. Also, Coleman and Salt (1992) put forward that failing to reach a level of childbearing expressed in intentions or ideals may not necessarily represent policy failure, as forecasting future circumstances exactly presents difficulty for people. The difference between ideal circumstances and actual circumstances in childbearing appears to capture alternative meanings. Questioning people about their preferences in perfect conditions would seem likely to lead to responses that are considerably different to those when the same people take account of real life circumstances (or when actual behaviour is measured).

The apparent desire for more children should be good news for policy makers interested in raising fertility. However, tapping into this desire is not straightforward. Indeed, the evidence is not clear as to what policies work to increase fertility, or how, and people deny policy will influence their actions anyway. Maher (2008) argues that this is a consequence of women, and presumably men also, internalising the work versus family dichotomy. Maher (2008) asserts that women are subject to a kind of false consciousness in seeing childbearing as a solely private decision and not an issue of wider public concern, or as an issue for policy makers. The arguments of Maher (2008) are similar to that of Ralston (2007) who examines the attitudes of parents in Scotland to childbearing. Here it is noted that parents deny financial or material aspect in the decision whether or not to have children. Similarly to Maher (2008) the explanation given by Ralston (2007) is related to social norms around children and childbearing, in

which children are regarded as incomparable to other experiences, or goods and belongings (Zelizer 1985).

Gauthier (2007) critiques the ideal versus expected fertility dichotomy, suggesting that the difference between ideal and actual/ expected fertility is typically a 0.5 differential. However multivariate analysis suggests the effects of policy provide only a 0.2 gain, at best. This appears to show that fertility ideals may not be attainable policy goals within real world circumstances. Coleman and Salt (1992) sees the discrepancy between ideals and actual fertility in the UK as representing social norms. When asked how many children they would ideally like to have people respond to the normative two or three. This is likely to be a reference to the idealized family unit of the post-World War II era baby boom when Britain briefly but famously experienced a level of total fertility of 2.4 (Coleman and Salt 1992). This number of 2.4 children still has some relevance as the respondents to the Scottish Social Attitudes Survey express a mean ideal of around 2.4 (chapter 5).

In contrast to the proposition that ideal childbearing represent abstract societal norms (Coleman and Salt 1992; Maher 2008), McDonald (2006) suggests that perhaps ideals could represent a latent unmet desire for children. McDonald (2006: 506) puts forward that the '*state… provide new and substantial priority to the support of family life*', and that a general strategy is all that can be recommended because of the complex way in which fertility is a function of wider society. Goldstein et al. (2009) show that attributing increases in fertility to policy is not a simple task, whereas Fagnani's (2010) research appears to suggests that a range of policy within varied institutional settings

results in broadly comparable completed fertility (although this is not Fagnani's (2010) interpretation, see below).

2.5 The Economics of below replacement fertility

Underpinning current research into fertility, family formation and childbearing is a worry regarding the economic sustainability of living standards and current models of welfare and services (Bengtsson and Scott 2009; Bloom and Sousa-Poza 2010). There is a school of thought that emphasizes the potentially negative outcomes for the Scottish economy associated with population ageing and low fertility (Boyes, Harris et al. 2007; Lisenkova, McGregor et al. 2007), and for Europe more generally (Bengtsson and Scott 2009; Bloom, Canning et al. 2010). The view that low fertility will lead to harmful impacts dominates literature on economic assessments of the effects of low fertility[10]. There is empirical evidence supporting both sides of the debate. Lee and Mason (2010a) provide a simulation analysis examining the necessary conditions in which growth can occur in an ageing population through capital accumulation and consumption. They argue that human capital investment and fertility are related, and that it is at least possible that productivity can rise in an inverse relationship to trends in cohort size. Although the consensus seems to be that rising age dependency ratios will outweigh any human capital gains (Bengtsson & Scott 2009, Zamac et al. 2010), Lee and Mason

[10] This issue receives a more extended discussion in a policy context in chapter 9. However a brief outline of the debate is necessary at this stage as it contextualizes the importance of empirical work which is presented subsequently.

(2010) speculate that if the rate of growth triggered by higher human capital is high enough, then transfers to the older dependant population need not increase by too much as a proportion.

In contrast Clark et al. (2010) analyze the economic effects of low fertility on Japan. They emphasize the consensus view of rising dependency ratios and increased social burden. This assessment goes hand in hand with a slowdown in economic growth as the working age population declines in contrast to an increasing older, dependent population. Clarke et al. (2010) point to a short term possibility of increasing employment rates amongst underemployed sections of the workforce; but, in the long term they project nothing but an inevitably shrinking Japanese economy. The analysis of Clark et al. (2010) on the prospects for the Japanese economy are mirrored in the analyses of Bloom et al. (2010) for the economy(ies) of Europe. Bloom et al. (2010) project a 25% reduction in the numbers of workers in most European countries. Indeed there is a general belief within the writing of economists that the formula of low fertility and ageing population will lead to poorer economic performance (Botman and Iakova 2007; Bloom and Sousa-Poza 2010; Clark, Ogawa et al. 2010). Those writing on Scotland suggest the same forecast (Joshi and Wright 2005; Boyes, Harris et al. 2007).

In the past writing on population as a field of study has projected catastrophe that failed to materialize. In the 1960s and 1970s the worry was in the increasing World population. In echoes of Malthus, this was typified in Ehrlich's (1971) publication *The Population Bomb*. The most apocalyptic type millennialism of the *Population Bomb* arguments has not (yet) come to pass and the current demographic situation of below replacement fertility has its equivalent publication in *The Baby Bust* (Harris 2005). It

may be that slow economic decline will follow low fertility, along with an associated drop in living standards. However, it could be that societies will make incremental adjustments, or unforeseen productivity gains that will offset this future (Ervik 2009). The current projection is economic decline, but far more people forecasting the future get it wrong than get it right. That being said, the probability of averting these problems is lessened without action. The earlier that Governments start to deal with the implications of increasing dependency and the spectre of falling numbers of workers, the greater the possibility that crisis will be averted by incremental action. As Botman and Iakova (2007: 5) suggest, the '*no policy action*' scenario may exacerbate uncertainty.

2.5.1 Some recent projections of Scotland's economic prospects

Low fertility levels are considered problematic for Scotland, Europe and much of the developed world. The alarm seems to be not so much that populations may fail to replace themselves over the long term, but rather, that there could be undesirable economic outcomes that may be associated with an ageing/naturally declining population (Bengtsson and Scott 2009; Bloom et al. 2010; Zamac et al. 2010). Recent economic projections for Scotland associated with low fertility anticipate a relatively dramatic decline of both Scotland's working age population and Gross Domestic Product (GDP) (Boyes, et al. 2007; Lisenkova et al. 2007). The projections of Lisenkova et al. (2007) illustrate that the percentage of adults of working age in Scotland may decrease by nearly 15% by 2040. This is accompanied by an overall reduction in the population of Scotland of 2.6%, from the base year of 2000. A fall in GDP of 8.2%, with a 9% fall in employment is also anticipated, modelling the contrast

between a population stable at 2000 levels and the current situation (in which the expectation is for medium to long term population decline).

Lisenkova et al. (2007) model varying fertility scenarios and argue that fertility is likely to have relatively little impact upon the general economic trends they forecast. To offset this situation, and increase the numbers in the working age population, an annual net immigration of 20,000 is estimated to be required, with 10,000 net immigrants needed each year just to break even. This level of sustained immigration would be historically unprecedented, since Scotland in the modern era is traditionally a net exporter of people (Anderson 1996: 368). However, in the decade following the turn of the millennium, for the first time in recorded history, Scotland became a net importer of people. This leads Boyes et al. to the confident statement that *'Scotland can be considered to have neutralised the long run net loss of migrants'* (2007: 6). Recent evidence appears to bear this out, because in 2004-2005 Scotland experienced a net immigration of 19,000, close to the level identified by Lisenkova et al. (2007) as required to sustain growth in the working age population, although whether this level of immigration will continue cannot be known.

The prediction of economic decline following population decline is well established (e.g. Joshi and Wright 2005; Bloom et al. 2010), but what can be done about it or whether anything needs done at all, is an open question. Making estimates far into the future is fraught with difficulty (Gardner 2010). For instance, McDonald (2002: 2) projects that a Total Fertility Rate of 1.3, sustained over a century, would result in a decline in population of 1.5% per year and that, by the end of the time period, a population would be only one quarter of the original starting size. It is pointed out that

this is the situation that several European countries were in at the early part of the 2000s. For example, Spain, Italy and Greece all experienced 'lowest, low' fertility at the time (Kohler et al. 2006). However, fertility rates have begun to rise again rendering the kind of worst case scenario analyses, such as McDonald's (2002), unlikely to come to pass.

The general consensus of those writing upon the economic prospects of Scotland in relation population and fertility is that the situation is problematic (Wright 2002; Joshi and Wright 2005; Boyes et al. 2007; Lisenkova, McGregor et al. 2007). The pessimism associated with those interested in Scotland's economy is shared by many writing generally regarding similar situations in other countries (Bloom et al. 2008). In contrast there are those who argue that the effects of population ageing and decline may well be offset by investment and policy change (Lee and Mason 2010). In the unlikely event that the population of Scotland were to decline by three quarters it is important to consider that it would affect different groups in different ways. For instance, increased demand for labour could decreases unemployment and increases real wages as a result of a shrinking working age population (Lisenkova et al. 2007). Therefore, the underskilled, who may under previous conditions have been unemployed or under employed, might be drawn into the labour marked in a more stable capacity; whilst the skilled may be able to demand a premium. Therefore an average increase of 7.7% in real wages is forecasted to go along with the increasing dependency ratio (Lisenkova et al 2007: 15). A rise in certainty of employment for people of childbearing age could itself increase fertility (Sabotka 2004).

2.5.2 Immigration as a solution to maintain dependency ratios

An increasingly unfavourable dependency ratio (the ratio of people in the working population compared to the non-working population) is of central concern to those interested in the economics of fertility decline (Bengtsson and Scott 2009; Bloom, Canning et al. 2010). Boyes et al. (2007) draw upon population projections to argue that the pensionable population in Scotland will account for 28% of the total by 2046. Within the European context this will place Scotland in a similar situation to many other European countries, with Spain, Italy and Greece projected as having 35.6%, 35.5% and 32.5% of their populations above 65 years of age by 2050, respectively; whilst countries with more balanced age structures and generally higher fertility, such as Luxembourg, Netherlands and Denmark, are estimated as having 22.1%, 23.5% and 24.1% of their population above 65 years of age by 2050, respectively (Boyes et al. 2007). Considering Scotland within this context shows that issues associated with low fertility are not unique to Scotland. However, the projected rising dependency ratio is cause for concern.

Given that the dependency ratio is expected to become more unfavourable throughout most of Europe, it seems sensible to question how realistic it is to expect the promotion of immigration as a solution (e.g. Boyes et al. 2007, Lisenkova et al. 2007). If immigration is seen as the solution to an ageing population it is possible that there will be substantial European wide competition to attract quality and quantity of immigrants. This would be something of a reversal from the current situation in which immigration into Europe is markedly controlled (Lindstrom 2005; Citrin and Sides 2008). Also, Bengtsson and Scott (2009) estimate that the numbers of immigrants required on a

European scale are vast. They project that 1.3 billion immigrants are required between now and 2050 just to keep the working age population in Europe steady.

The most realistic conclusion to draw from this line of reasoning is that immigration of this order of magnitude is not viable (Coleman 2002). The suggestion by Lisenkova et al. (2007) that Scotland should concentrate upon immigration to maintain its working age population is unlikely to be effective. In isolation Scotland could conceivably make itself more attractive to migrants, however, in competition with the rest of Europe this is likely to be unsuccessful. Policies that boost fertility are therefore the most practical way to improve the situation for Scotland and should not be discounted. Interestingly, in a relative perspective, the outlook for the UK in the long term does not seem to be as worrying as for other countries. In 1950 the UK had the 4th oldest population in the world, in 2000 it had the 11th oldest and by 2050 Bengtsson and Scott (2009) calculate that the UK will no longer be in the top 25 countries with the oldest population mean. Yet, the estimate that 28% of Scotland's population will be over 65 by 2046 could place it in the top 25 countries with the highest proportion of retired individuals (Boyes et al. 2007).

2.6 Religion

The research hitherto discussed rarely considers the effects that religion can have on fertility. Moulasha and Rama Rao (1999) argue that *'[r]eligion has a more significant influence on demographic behaviour in developing countries than in more developed countries'*. Yet there is at least a notional religious divide across Europe that characterises the experience of lowest, low fertility (Berman, Iannaccone et al. 2007).

For example, the traditionally Catholic countries of Southern Europe: Italy, Spain and Greece are often related together as linked by the similarity in timing of their shifts to lowest low fertility (Pla 2003; Adsera 2006). Also, there is a large body of literature that examines the relationship between fertility and religion at the micro level (Clegg and Cross 1995; Coleman 2004; Adsera 2005; Adsera 2006; Branas-Garza and Neuman 2007; Philipov, Thevenon et al. 2009).

McQuillan (2004) states that religion effects demographic behaviour for a number of reasons. These include general values around family, gender and sexuality as much as specific rules related to, for instance, birth control. Religion can impact on fertility if the religion privileges norms that influence childbearing, and is able to transmit values and norms; this includes mechanisms of social enforcement, even of the informal kind. Transmission of religious influence is effective if individual members are attached to the wider religious community, though attachments can be stronger or weaker (*ibid*). Gráda and Walsh (1995) provide some evidence of religion influencing fertility in Scotland's near neighbour, Northern Ireland and suggest that attitudes and behaviour vary between Catholics and Protestants.

Hayforth and Morgan (2008) use data from the United States to show that the religious have higher fertility and higher intended fertility than the non-religious. They suggest that it is not the religion per-se that influences fertility, rather religiosity is related to more traditional family and gender role attitudes, which influence the fertility of the sample. Mosher and Hendershot (1984) also examine fertility in the USA. Their study replicates that of Jones and Westoff (1979) into fertility differentials between Catholics and non-Catholics. Both studies found differences between Catholics and non-Catholics

that were converging. Clegg and Cross (1995) present an interesting historical analysis of fertility trends on two islands in the Outer Hebrides of Scotland. The islands present something of a natural experiment as Barra is predominantly Catholic, whilst Harris is similarly Protestant[11]. The study covers the period 1856-1985 and they suggest that religious difference had little impact in changes over the time observed. In contrast Adsera (2006a) shows that fertility levels declined in those who were practicing Catholic religion in Spain across the period 1985-1999, as compared those who are nominally Catholic, but non-practicing. She also finds that Protestants and Muslims have higher fertility. The omission of religion in many analyses means that religion as a potential structure influencing fertility in its own right, or an indicator of cultural and socio-economic differences between groups is missed. In sum research findings generally suggests that religion affects fertility (Adsera 2006a, 2006b). Measures of religious affiliation will therefore be incorporated into modelling and analysis where appropriate and possible.

2.7 Geography as a determinant of fertility

Consistently the effects of measures of social stratification such as educational attainment (e.g. Berrington 2004; Steele, Constantinos et al. 2005; Miranda 2006), occupational classifications (Ekert-Jaffe, Joshi et al. 2002; Steele, Constantinos et al. 2005) or housing tenure (Mulder and Billari 2010; Mulder and Lauster 2010) are found

[11] The predominant religions practiced on each of these islands is given the other way around in the Clegg and Cross paper, which states Barra a Protestant and Harris as Catholic, this appears to be an error.

to have a significant effect upon fertility outcomes and timings. There is also a body of literature which seeks to highlight the geography of fertility (Jones 1975; Lutz, Testa et al. 2007; Boyle, Graham et al. 2007a; Boyle, Graham et al. 2007b; Kulu, Boyle et al. 2009; Mulder and Billari 2010; Mulder and Lauster 2010) and Boyle (2003) argues that the study of human geography can enhance our understanding of fertility processes. In contrast, Wilson (1990) suggests that the relationship between small area geographies and fertility are rarely statistically significant, and even if they are found to be significant they explain only a small part of the overall variation. Writing on geography and fertility can be loosely placed into two categories, that which notes geographical variability in fertility requiring explanation, and that which incorporates geography itself as an explanation of fertility outcomes. Writing in respect of the former is common, in, for instance, the comparison of demographic differences such as fertility rates or mortality rates between nations. For example, Kohler et al. (2006: 9) argue that an individual's ability to delay childbearing is influenced at country level by macro structures such as the welfare regime, or characteristics of the labour market, and that this accounts for some of the variations in fertility rates that are observed between nations (see also, Holdsworth and Elliott 2001, Kholer et al. 2002, Mills et al. 2005).

Apart from research that takes a comparative approach to fertility there is also research which seeks to offer geographies as some form of explanation for fertility (Boyle et al. 2007b, Lutz et al. 2006). However, this is a less common focus in general. Recent academic research on fertility in Scotland incorporates geographical aspects to it. For example, Graham (2007) explicitly contrasts Scottish and English fertility using the BHPS, while Dey (2007) and Boyle et al. (2007a) examine local contexts and

geographical variation in childbearing. Boyle et al. (2007a) argue that the quality of localities could have a significant effect upon childbearing decisions and that people who are negative about their area as a place to bring up children were more likely to be from urban environments as opposed rural. In Dey (2007) and Boyle et al. (2007a) measures of geography are employed as explanation for diversity of fertility behaviour.

Table 2.1, birth rates by selected local authority

	Standardised Births per 1000	Age Specific Fertility Rate per 1000
City Cores	population, 2001-2005	population, age 30-34, 2001-2005
Edinburgh	8.6	82
Aberdeen	9.0	84
Dundee	9.8	71
Glasgow	9.5	74
Commuter Belts	-	-
East Renfrewshire	11.9	132
Aberdeenshire	11.8	101
East Lothian	12.1	99
Midlothian	11.8	97
West Lothian	11.9	91
Angus	11.9	92
Perth and Kinross	11.5	101
Rural Areas	-	-
Highland	12.1	87
Moray	11.8	81
Argyll & Bute	11.2	88
Orkney	11.1	84
Dumfries & Galloway	11.7	84
Scottish Borders	*11.7*	*99*
Eilean Siar	*11.4*	*101*
Scotland	**10.4**	**87**

Adapted from Scotland's Population 2006: The Registrar General's Review of Demographic Trends

The Registrar General's annual report for 2006 (GROS 2007) also highlights regional variation in fertility in Scotland. This is echoed by the ESRC which, in 2007, issued a statement on the then current priorities for research into low fertility in Scotland, suggesting: *'A deeper understanding of causes of significant spatial variations in fertility within Scotland is needed…'* (ESRC 2007). Whether geographical variation in

fertility should be explained away or whether geography itself is an explanation for variation has been a recurring ambiguity. Indeed the Registrar General's annual report for 2006 (GROS 2007) maintains this doubt arguing that there are distinct demographic regimes within Scotland, but that this may be related to socio-economic facets of people inhabiting the areas.

Table 2.1 presents an example of the manner in which the GROS relates fertility outcomes to geography (GROS 2007). The report picks out variation in categories of average age specific fertility for those aged 30-34 across 2001 to 2005 and standardised births per 1000 population. These measures are used to illustrate a geographical pattern between council areas. City cores exhibit relatively low standardised births and relatively low age specific fertility. This is contrasted with 'suburban and feeder' council areas (called commuter belts in Table 2.1 below) which exhibit relatively higher age specific fertility for 30 to 34 year olds and also relatively higher standardised births per 1000 population. 'Rural' council areas are also distinguished as constituting a differing demographic regime with these council areas exhibiting relatively high standardised births but with generally lower age specific fertility rates for the 30-34 year olds (although there are some outliers in the rural areas group, for example, Eilean Siar and the Borders). From the analysis presented by the GROS (2007) it is not necessarily clear whether regional difference in fertility is something to be explained or whether geography itself is an explanatory factor. At the very least the analysis encourages a geographical approach to fertility and their partitioning of the country by regions suggests that there is some difference between these council areas that might explain the variation.

Boyle et al. (2007b) seek to show that geographies enhance explanations of fertility processes at the level of the individual[12]. They convincingly demonstrate local clusters of fertility in Scotland using the Consistent Areas through Time (CATT) (Exeter, Boyle et al. 2005), small area geographies of 10,000 people. In this working paper they employ vital events data to explore levels of childbearing and argue that there are local clusters of high and low fertility not explained by ecological and socio-economic differences, and that this patterning is hidden if the wrong level of geography is employed. Boyle et al. (2007b) make the link between local variation in fertility and social feedback processes. This ostensibly suggests that people in CATT areas may influence each other to higher or lower fertility depending on area. Social feedback is a mechanism that has been more widely identified as potentially influencing fertility (Kohler et al. 2006; Lutz et al. 2006). As yet there is as yet no conclusive empirical evidence establishing social feedback generating localised cultures of fertility behaviour at sub-national levels, or at small areas, in the UK, although the possibility has been generally postulated (Montgomery and Casterline 1996). In their conclusions Boyle et al (2007b) argued that there are two possible explanations for the variation they find,

[12] The analyses of Dey (2007) and Boyle et al. (2007a) are undertaken using the Scottish Social Attitudes Survey: fertility module. This focuses upon the relationship between fertility ideals or intentions and socio-economic, demographic and geographical characteristics. An analysis of these data is conducted in chapter 5, where the influence of individual level circumstance on fertility intentions and ideal is questioned. Boyle et al. (2007b) use Census data combined with vital events data in this analysis. This is similar to the data employed in this chapter, although they also construct analysis around the Census of 1981 and build more sophisticated geographies than are included in the SLS. The construction of more complex geographies is possible using the SLS.

they may reflect either ‘context specific’ differences such as deviations in housing markets, or selection effects.

Fertility levels are shown to vary between nations because of the influence of interplay between cultural and structural factors (Mills et al. 2005, Kohler et al. 2006). Fertility difference at the sub national level may therefore simply reflect differences of general culture and individual agency within social structure (Smith 1989). Even if fertility or fertility intentions are demonstrated to be non-uniform by locality, this does not mean there are local cultures of fertility behaviour, and neither does it mean that geography influences fertility outcomes. Ultimately Boyle et al. (2007b: 22) only go as far as speculating that birth or family size may be related to ‘context-specific’ factors. The nature of housing markets or the perception of an area is a different proposition from claiming that there are distinct geographies of fertility within Scotland and in many ways geographies may be proxy measures for other socio-economic and socio-demographic factors that influence fertility (Mweemba and Webb 2008) . Even accepting local cultures of fertility the influence they would have on national trends may be questionable (Wilson 1990).

2.8 Policy to influence fertility

McDonald (2002) suggests that there are broadly three types of policy open to policy makers that may boost fertility. Each is loosely affiliated to differing theoretical outlooks. The policy areas are: 1) Financial incentives, 2) support for parents, and 3) policies that support social change (see also, Caldwell et al. 2002: 14). Policies based on financial incentives are most strongly related to rational choice theory; policy aimed to

improve conditions in which women can combine work and family are most strongly liked with gender equity theories; and support for social change is influenced by risk aversion theory. McDonald (2002) asserts that cultural and social-structural differences between nations mean that there can be no general model that will increase fertility across countries. The implication is that countries who intend to alter their own levels of fertility should understand the reasons for the levels of fertility they experience and build specific policies in reference to this; it is unlikely that policies cherry picked or sourced from elsewhere will be successful within a different context if they are not integrated into the wider social, cultural, political and economic setting.

A large number of policies have been suggested that may influence fertility (see below). This section synthesises different policy options open to Government and bodies interested in boosting fertility levels. This includes payments and incentives, legal measures and the provision of services and measures to inculcate a social pronatalism (Buttner and Lutz 1990). However, no consensus has emerged as to how below replacement fertility may be increased to replacement/above replacement and no country has transitioned from consistently below replacement fertility to consistently above replacement fertility - although a possible exception to this is the United States (Furuokata 2010).

2.8.1 Financial Incentives

Policies related to financial benefits designed to improve the lot of the family, or more directly intended to influence childbearing are widely implemented (Apps and Rees 2004; Milligan 2005; Goldstein, Sabotka et al. 2009). Financial benefits can include

means tested cash transfers; universal payment; or targeted bonus payments, tax reductions, or credits. McDonald (2002) suggests that instantaneous payments are more likely to affect fertility than postponed benefits but that tax breaks may be more politically expedient, as they are less visible, and therefore open to less criticism. Also, cash sums associated with having additional children are attractive to some as they may promote gender equality by helping meet the cost of raising additional children.

McDonald (2002) also includes the wider provision of goods and services as constituting a form of financial incentive. This includes policies related to healthcare, education, school benefits such as dinners, housing and childcare. In each domain numerous options are available. Possible relevant housing policies include grants, mortgage reductions, housing benefits and the provision of social housing (Mulder and Billari 2010, Mulder and Lauster 2010). In practice financial policies related to these areas may well impact upon fertility (see, Fanti and Gori (2010), who argue that investment in education increases fertility). However, policy enacted in these areas is not necessarily considered explicitly as policy designed to boost fertility levels. Policies related to education and healthcare, for instance, are far more likely to be advocated for other reasons with any impact on fertility rates an unintended consequence.

2.8.2 Work and Family

Legislation protecting employees' rights and ensuring childcare is a common form of labour force policy designed to integrate paid employment with family life (Kimmell 1990; Powell 1997; Blundell, Duncan et al. 2000; Lewis 2003; Viitanen 2005). The form and nature of leave that can be put in place with policy is very flexible, as is the

level and nature of compensation for time out of the workplace. Maternity and paternity leave varies across countries as does the amount of compensation, and whether it is provided by employers, the government or private insurance (Ruhm 1998; Bruning and Plantenga 1999). Bonoli (2008) presents Switzerland as an example where policy varies quite markedly within one country. Between Swiss regions child benefit varies between 150 and 300 Swiss Francs per month, whilst leave and childcare also vary considerably.

The provision of childcare is also a central tenet of policies designed to allow the integration of employment with family life (Viitanen 2005). This includes childcare for preschool children and before/after school care for school children. There are various options open to policy makers, including free or subsidised childcare. Subsidy may include cash or voucher transfers, or may come in the form of tax exemptions. France and Sweden are often given as examples of best practice in terms of childcare provision. For example, Bonoli and Reber (2010) highlight that affordable childcare is provided to most below school age children in Sweden, compared to only 10% of children in Southern European countries. Work hours and flexibility may also be important in influencing fertility and allowing parents to balance employment and family commitments (Shuzhuo, Feldman et al. 1997; Ariza, de la Rica et al. 2003). On the one hand legislation can help to make employment practices more 'child friendly' by allowing leave or a reduction of hours for parents with children. On the other hand long hours working practices might be discouraged, minimising practices that occur outside normal hours, or non child-friendly hours. Law that makes gender discrimination illegal and systems that provide incentives to couples rather than individuals might affect fertility. The failure of Japan to integrate policy designed to boost fertility, with long

hours working practices, is cited by Boling (2008) as a reason why Japans level of fertility remains low.

2.8.3 General social support for fertility

McDonald (2002) also identifies a range of general social changes that may make having and raising children easier. Examples include promoting more general acceptance of non-traditional family relationships (Ermisch and Francesconi 2000; Smith, Wasoff et al. 2005), or policy that helps women and young people into employment in non-traditional ways. For example Ariza et al. (2003) show that allowing for working part-time affects fertility positively across several European countries (see also, Brewster and Rindfuss 2000). This can be augmented with policy that maintains links between parents, usually mothers, and employment, whilst they are raising children (Chesnais 1996). This might include part time jobs or job related training and might be achieved through legislation protecting the rights of workers. For example Brewster and Rindfuss (2000) highlight the relationship between variable employment rights for part time workers and fertility levels, protecting the rights of part time workers appears to enable a greater proportion of women in Scandinavian countries to combine work with caring for young children (Brewster and Rindfuss 2000). These types of policy can help address the uncertainty experienced by young people, which can lead to postponement of childbearing (Sabotka 2004; Kreyenfeld 2010). Child friendly urban environments are also advocated (McDonald 2002; Boyle, Graham et al. 2007a). Proximity of schools and accessibility to labour markets is seen as important in this. For example Dey (2007) argue that whether a location is seen as desirable for having children influences childbearing intentions in Scotland. The

promotion of gender equity within the family and wider society may also support childbearing (Cooke 2008; Mills, Mencarini et al. 2008).

2.8.4 Education and Employment Policy and Fertility Rates

Apps and Rees (2004), amongst others, point out that a reversal has occurred in relationship between female employment and fertility within developed countries (see also, Ahn and Mira 1999; Castles 2003; d'Addio and d'Ercole 2005). Under previous circumstances there was a negative relationship between female employment and fertility, where women in employment were less likely to have children, or lager families. Therefore countries with high female employment had lower overall fertility. This situation has now reversed, and women with access to the labour market are more likely than women out-with the labour market to have children. At country level this means that countries with policies that may work to inadvertently restrict female access to employment, or fail reconcile paid employment with childrearing, experience lower overall fertility (Ahn and Mira 1999). For instance, the difficulty that women have in combining paid employment with childbearing has been related to low fertility in Southern European countries such as Spain (Pla 2003). Apps and Rees (2004) propose that the relationship between low fertility and the female labour supply can be influenced through tax and social security systems. Tax and child support systems either enable women to access employment, or frustrates access and they compare tax and welfare systems across the OECD and contrast the nature and availability of childcare in order to determine any trade-off between family size and female labour supply differential (Apps and Rees 2004). They find that countries with individual taxation, along with viable alternatives to domestic childcare, have higher numbers of women

participating in the labour market, and higher fertility. This suggests a relatively subtle shift in policy may boost fertility.

Castles (2003), like Apps and Rees (2004), points to the reversal trend in fertility, whereby labour market participation of women was previously a signifier of low fertility, but is now associated with higher fertility. However, unlike Apps and Rees (2004), Castles (2003) makes different assumptions as to what has driven of the reversal in the relationship. Whereas Apps and Rees (2004) emphasise the opportunity cost mechanism in the economics of tax and child support as defining difference between nations, Castles (2003) emphasises the cultural underpinnings of female labour market participation. In terms of specific public policy Castles (2003) finds that only childcare and flexible working are associated with fertility. This would suggest a far more holistic approach to policy is needed to yield results in terms of fertility levels, as opposed to the specific tax and care policies advocated by Apps and Rees (2004). The findings of Castles (2003) are based upon an analysis of OECD data of family friendly policy. This indicates that fertility is a function of the ability of women to combine employment and maternity. It seems that labour market policies which allow women to remain in steady employment, and education policies that improve the certainty of steady employment for women are likely to influence fertility.

Apps and Rees (2004) and Castles (2003) suggest an alteration in tax and benefit with the provision of childcare are measures that should be employed to boost fertility. However, Fanti and Gori (2010) advocate the increased funding of education and put forward an alternative policy direction, arguing that increasing resources in education, at the expense of child benefit, will improve both economic growth and fertility. The

rationale is that the promotion of schooling encourages the accumulation of human capital, which increases income across the long term, and at aggregate level. This is in opposition to child benefit, which may negate the accumulation of human capital through incentivising people to remain out with both employment and education. It is therefore suggested that capital transfers, in the form of child allowances, are detrimental to the cause of higher fertility levels. This may be seen as inefficient in any case because the reallocation of resources necessarily makes some people worse off, to the gain of others. Policies related to employment and education may affect fertility levels over the long term but there are no explicit examples of government enacting education or employment policy with the expressed aim to increase fertility. Educational policy is an area that devolved government in Scotland has control over, and the policy suggestions of Fanti and Gori (2010) seem disarmingly simple: increase investment in human capital and increase fertility along with economic performance. This is known as 'Pareto-efficient', or as non-economists might put it, 'win-win'. However, it also seems to contradict opportunity cost theorising that suggests that childbearing comes in a trade of made by women and their partners between the opportunities afforded in the labour market, or education, and costs associated with having and raising children.

Most empirical research suggests that the more education, or human capital that a woman has, the more likely it is that she will delay fertility. For instance chapter 4 discusses educational attainment in relation to postponement, whilst several other chapters show that higher educational attainment is related to delay in childbearing for women. Indeed, Bloemin and Kalwij (2001) argue that remaining in education results in

postponement in childbearing that may lead to lower completed fertility because of less recuperation. It is not clear how the empirical reality that higher attainment and careerism amongst women results in delayed fertility, driving down Total Fertility Rates, squares with Fanti and Gori's (2010) model. Yet, if it were the case that education policy can influence fertility as Fanti and Gori argue (2010) it would be somewhat reassuring to those concerned with social policy and fertility in Scotland.

2.8.5 Direct financial transfers

Spain, Australia, Singapore and Russia have all introduced baby bonus schemes to boost fertility. Goldstein et al. (2009) suggest that these types of initiative have small temporary effects, on balance. For example, the fertility rate in Spain rose by 5% the year following the introduction of the measure and Australia likewise experienced increasing fertility following the introduction of a bonus scheme; however lager upturns in fertility were only experienced following the adoption of an increasingly more generous series of measures *(ibid).* Milligan (2005) examines the case of Quebec, Canada, where a baby bonus type policy intervention may have increased fertility. In Quebec a baby bonus of up to C$8000s was paid to families upon the birth of a child. The results of analysis suggest that fertility increased by around 12% for those eligible for the program, and by a quarter for those eligible for the highest benefit. Also, families with a higher income are found to respond more strongly.

Goldstein et al. (2009) examine the effects of policy on fertility in a number of other countries. Estonia appears to have experienced an upturn in fertility following reorientation of policy. This included the introduction of compensation measures for

mothers looking after children along with an alteration to eligibility criteria for benefits. In the Czech Republic family friendly policy is a key electoral issue (see also, Förster and Tóth 2001) . However, a steady rise in fertility rates is observable that does not mirror increasing generosity of benefit. Russia also implemented policies to stimulate fertility as early as the 1980s which Goldstein et al. (2009) suggests had a temporary effect on fertility - see Notten and Gassmann (2008) for an evaluation of child-benefit in Russia. In 2007 further policies were enacted, increasing benefits and a policy of 'maternal capital'. Maternal capital involved a transfer up to 250,000 Roubles to women to used for specific purposes related to their child and childcare. Following the introduction of these measures fertility rose more sharply. However, a similar rise around the same period was also experienced in some of the ex-soviet countries where equivalent policies were not enacted. This coincided with a positive economic outlook at the time, which may explain the rising fertility levels rather than the policy change (Goldstein et al. 2009). In sum the evidence does not show direct financial transfer sustaining above replacement fertility.

2.9 East Asia and low fertility

Japan and Singapore are often put forward as examples of policy failure (Asher and Nandy 2008; Atoh 2008; Hara 2008). Low fertility has remained persistent in these nations despite enacting various policies intended to increase fertility. Japan has introduced and expanded policies related to childcare and parental leave. However, this is generally considered to have been ineffective and it is suggested that this is because of unwillingness to link fertility policy with labour market policy. A culture of long hours working practices makes it particularly difficult for women to combine family

and working life (Atoh 2008). The reasons underlying the failure of Singapore to increase fertility are considered to be slightly different than in Japan. Singapore instituted a dual policy whereby lower educated women are explicitly discouraged from having children, while the more highly educated are encouraged. This has been practically applied by offering sterilization and baby bonuses (Goldstein, Sabotka et al. 2009). In the assessment of Asher and Nandy (2008) Singapore has been unsuccessful at increasing fertility because the policy neglects to systematically address the structural issues. In their view lack of welfare support requires residents of Singapore to accept high individualised risks related to social security and retirement. This risky environment depresses fertility as people are less able or willing to have children under such circumstances.

Suzuki (2008) also examines the nature of low fertility in East Asia, but with the focus upon South Korea. As with fertility in other low fertility countries Suzuki (2008) identifies a shift in social and economic conditions at the micro level making it difficult to reconcile a traditional family with new circumstance. In the 2000s Korea put together quite a wide ranging shift in policy that was intended to raise fertility levels (Chung and Gupta 2007). This included supported childcare, tax and housing breaks, improving leave and services and helping mothers in employment (Suzuki 2008). However, it appears that funding is not in place to implement the whole program. Despite this a number of policies have been brought to bear. This included subsidies to bring women into the workforce and childcare leave, on full pay. Also large workplaces were required to provide childcare facilities, however results have been questionable. In a rather pessimistic outlook Suzuki (2008) suggests that the socio-economic factors

which coalesce to depress fertility are unlikely to be relaxed. This is because East Asian nations do not have the budget to promote family friendly policy, or the cultural history that allows women to participate effectively in non-traditional roles (Chung and Gupta 2007). That is, East Asia apparently remains within the ambit of traditionalism and conservatism, when it comes to the role of women and family formation (Lee and Paik 2006). The introduction of these polices seems to have had little discernible impact upon fertility in South Korea.

Japan has experienced low fertility, like much of Europe and the developed world. Atoh (2008) considers that the recent phenomenon of low fertility in Japan results from similar pressures to that which produces low fertility in Europe. Culture has shifted away from the post War norm of a nuclear type family, and the socio-economic systems that supported it *(ibid).* This has led to a situation whereby low fertility occurs in the tension between the pressures to adhere to some form of family norm, but also the reality that many of the institutions that supported such a norm have been swept away. The pressure to combine a family with a newer ideal if independent self-sufficiency drives fertility down as postponement and childlessness results in similar manner as exists in Europe. Atoh (2008) points out that this drives changes in the nature of family as different types of families have emerged as a result of the circumstance.

Like low fertility elsewhere, delay and postponement characterises low fertility in Japan (Hara 2008). Atoh (2008) advocates a general response to improve the economic circumstances of young people and egalitarianism for women. These types of policy may be necessary because the legal emancipation of women is not matched by gender role attitudes which can result in inequalities within relationships, for example, limiting

the capacity for women to make their own contraception decisions (Atoh 2008: 21). The result of this has been weak partnership formation and low fertility. This may make recuperation, or catch up in fertility more problematic in the Japanese case. Atoh (2008) promotes 'family policies' such as parental leave and childcare, which make it easier to combine work with raising a family as a solution to this.

Boling (2008) points out that Japan has already enacted a number of family friendly policies. Indeed Boling argues that, given the relatively generous expansion in childcare, family allowance and parental leave, these services cannot explain the persistent low fertility, below that of many other similarly developed nations. For Boling (2008) it is the cultural demands upon women as mothers, which are incompatible with long hour expectations of Japanese working practice. There is a sharp opportunity cost trade off to be made by women; working practice makes it very difficult to combine a career with raising a young family, and to stay on a career track requires women to eschew family formation. Boling (2008) therefore argues that policies to address how people participate in the labour force are required in order to make help for families more effective. According to Boling (2008) the failure of policy in Japan is not a result of cultural exeptionalism, or because the policies are entirely wrong, but because only part of the problem is addressed in policy.

2.10 Policy and Europe

Buttner and Lutz (1990) examine historical data in looking at the impact of policy on fertility in Germany. In 1976 the German Democratic Republic introduced an increased period of maternity leave up to 26 weeks with benefit equal to full pay. An extended

period of paid leave was also granted for mothers with two or more children. This allowed payment equivalent to sick pay, but with a fixed minimum level, up until the child turns one year old. Buttner and Lutz (1990) note that prior to 1976 the trend of the Total Fertility Rate in the German Democratic Republic had been that of decline, from around 2.4 in 1965 to around 1.6 by 1975. However, following the introduction of the above policies fertility recovered, to just below 2.0 in 1980, before beginning to fall again.

The approach of Goldstein et al. (2009), Milligan (2005), Buttern and Lutz (1990) and Suzuki (2008) is to examine whether fertility increases following the introduction of specific policy. Fagnani (2010) takes an alternative approach. She examines the nature of welfare regimes in a cross-cultural perspective and argues that regimes which focus resources into family friendly policy have higher fertility. Fagnani (2010) suggests that there are features common to countries with successful fertility policies. This includes the provision of good affordable childcare. Also, part of successful policy is legislation allowing the integration of paid employment with family life, such as parental leave and time off (see also, OECD 2007). These types of policy are advocated because Fagnani (2010) argues that where childbearing aspirations conflict with professional aspirations, there is a lack of social support in respect of combining work and family life which results in delayed childbearing and lower completed fertility.

It is suggested that France (Ekert-Jaffe, Joshi et al. 2002), Sweden (Walker 1992) and Norway (Lappegård 2009) are amongst the countries that provide the most effective system to integrate work and family life as these countries have adopted a ‘working mother’ model of welfare (Fagnani 2010). This is given in contrast to the United

Kingdom and the Netherlands where a relative lack of childcare facilities is seen as being associated with a part time working model for women who have children (Bonoli and Reber 2010). Whereas Portugal, the other nation examined by Fagnani (2010), experiences a 'dual earner model' as both partners in a couple in Portugal tend to work full time as part of a long hours working culture, in order to compensate for low wages. Fagnani's (2010) argument is compelling. However the empirical evidence seems less convincing. Fagnani (2010: 65) shows that France, Norway and Sweden have marginally higher total fertility rates (in 2004) than the Netherlands and the UK, with Portugal as something of an outlier. She also shows that France Sweden and Norway have a completed fertility, of just over 2.0, or at about replacement for of women born in 1961; whereas the UK, the Netherlands and Portugal are slightly below replacement. The differing welfare regimes seem to translate into broadly comparable fertility levels, regardless of the differences in social policy. It is fair to suggest, from the evidence presented, that some countries may support childbearing better than others, however the effect on TFR or completed fertility seems small.

Whether a completed fertility of 1.95 for the UK as compared 2.03 for Sweden really represents a substantively important difference is open to question. Both rates are below the nominal replacement level of 2.1. Yet the UK is characterised as having low public spending on support mechanisms such as childcare, compared with countries like Sweden, Denmark and France (Bonoli and Reber 2010). In sum, apparently quite marked differences between countries in terms of policy and social structure may result in broadly similar levels of fertility. This does not mean that policy should be disregarded, especially when very low fertility is the issue. As Goldstein et al. (2009)

point out, a country with a sustained total fertility rate of 1.3 would take 45 years for its population to halve, and a country with a total fertility rate of 1.6 would take 90 years: small differences might have big impacts.

Rijken and Knijn (2009) offer an interpretation of levels of fertility in the Netherlands at odds with that of Fagnani (2010). Both agree that the Netherlands can be characterised by a high incidence of women with children who work part time whilst their partners work full time. However, Rijken and Knijn (2009) argue that certainty associated with employment conditions in the Netherlands allows Dutch people to reproduce in relative confidence of their economic security (see also, Rijken and Knijn 2008). This leads to their assessment of Dutch fertility levels as relatively high, despite not having a Nordic style welfare model. In a similar manner Goldstein et al. (2009) also characterise the United Kingdom as a higher-fertility developed country. This is in contrast to Fagnani's (2010) exposition, which favors the Nordic welfare model as apparently providing the best way to maintain fertility. Clearly there is some difficulty in comparatively relating fertility levels with policy measures (Gauthier, 2007). Also, in the debate where the evidence is inconclusive, small differences between countries are magnified to epitomise exceptionalism.

Hoem (1990) also looks at the relationship between policy and fertility in Sweden, although based upon older data than presented by Fagnani (2010). Fertility in Sweden is more consistent than in many other nations, nether experiencing the dramatic highs in TFR of the 1960, nor the lowest troughs of the 1970's, 1980' or 1990's. Hoem (1990) attributes this to policy that, often indirectly, encourages pronatalism. It is suggested there is a consistent policy of enabling female employment in Sweden (Chesnais 1996;

Brewster and Rindfuss 2000), whilst, at the same time, facilitating childbearing. This may reflect success in mitigating the opportunity cost trade off that women face, reducing levels of role conflict, in comparison to other countries. However, the incremental expansion of welfare generally in Sweden, and elsewhere, means it is difficult to causally attribute broadly higher fertility as being a result of definite changes.

Bonoli (2008) examines fertility variation within Switzerland and highlights varying levels of sub-national, regional, fertility, along with a fair degree of political freedom to act within the regions. Differences in policy include uneven child benefit and child care provision, which, in some regions, is double that of others. Bonoli (2008) concludes that social policy does affect fertility levels in Switzerland as regions with policies which allow women to reconcile work and family life most smoothly have higher levels of fertility. Somewhat dramatically Bonoli (2008: 75) goes on to suggest that this finding provides evidence, '*for the first time in history*', that all that needs to be done to improve fertility is to allow women to work and have a family. What this actually means is less obvious than the hyperbole with which it is announced. It is shown that regions that invest more in childcare and child allowances have higher fertility. However, this kind of finding is widely reported at country level (e.g. Fagnani, above). What is more problematic is that none of the Swiss regions examined had a particularly high fertility level. Only four of the 26 regions analysed had a fertility rate above 1.5. The highest total fertility rates for the period across 2000-2003 were 1.62 and 1.81. Therefore the conclusion that it is subsequently possible to use policy to boost fertility is slightly overstating the case as all regions experience below replacement fertility.

Indeed, Gauthier (2007) argues that the impact of policy may be on timing rather than completed fertility in any case.

2.11 Its not just policy

McNicoll (2009) argues that policy is just one factor that influences fertility and that legacy and circumstance also play a defining role in fertility levels. 'Policy' is state action that may influence fertility, both directly and indirectly, whereas 'legacy' refers to the social and structural inheritance, as well as the social environment that also affects fertility. 'Circumstance' includes the wider social, economic and political situation that enables or prevents action. McNicoll (2009) refers to fertility transitions generally, and is particularly interested in the transition from high fertility towards low fertility in non-developed regions. However, the argument is just as pertinent to the current postponement transition as any other. The position of McNicoll (2009) is very similar to that of McDonald (2002) which has been cited above. Policy can affect fertility levels, but is unlikely to be effective if the cultural and social-structural context of the policy is not taken into account (McDonald 2002; McNicoll 2009; Rijken and Knijn 2009).

Policies directly intended to influence fertility are not the only drivers of fertility rates. Wider culture social structure also help determine trends in fertility, and even policies that are intended to affect other areas of social life are often likely to have unintended, or indirect impacts upon the total fertility rate and completed fertility. Indeed, evidence from more qualitative analysis suggests that parents deny that policy would directly influence their childbearing decisions (Maher 2008; Rijken and Knijn 2009). The

review above highlights the difficulty in attributing the reasons behind a rise in fertility and Goldstein et al. (2009) argue it is often impossible to divide up the effects of all factors influencing fertility in order to show specific causes. Despite the comprehensive synthesis of policy instruments collated by McDonald (2002) as potential supports for childbearing, he anticipates that good policy will maintain fertility at around a total fertility rate of between 1.7 and 1.9. However, as Goldstein et al. (2009) note, small increases in fertility may have large affects over time, maintaining a TFR at 1.9 as opposed to 1.5 can have large implications. Most commentators agree that policy does impact upon levels of childbearing therefore it is pertinent to acknowledge that policies that allow the integration of work and family life do appear to boost fertility (Moffitt 1997).

2.12 Limiting childbearing through policy

The discussion above highlights that it is not clear what policies are directly impacting to increase fertility and how. It is not a simple task to disentangle the effects of policy in terms of causality and timings (Goldstein et al. 2009). This is especially the case under current circumstances, when the policy differences between nations are complex and differences in TFR small. This is partly because factors unrelated to specific policies, such as wider economic conditions, also impacts upon fertility. In a previous public policy era it was high fertility in so called under developed regions of the world that was causing alarm (e.g. Ehrlich 1971). Policy interventions that have sought to persuade people to reduce their fertility have been considered to have been successful across many regions of the world. Robey (1989) attributes the fertility decline experienced in developing countries to family-planning programs, the introduction and expansion of

contraception and the influence and education associated with media culture. If it is not clear how successful policy has been at boosting fertility, there is a consensus in the literature that direct policy interventions designed to limit fertility are considered to have been successful (Cutright 1983). The most famous example (though morally questionable) of this is the one child policy in China (Yi 2007).

Empirically, policies that encourage people to place a cap on their own family size are shown to be effective (McNicoll 2006). For example, Jagannathan and Camasso (2003) examine the effectiveness of policy intended to influence people to limit their fertility in the United States. The research employs an experimental design which allows the comparison of the experimental group, who experience the capping policy measures, and the control group, who continue with their behaviour. The policy denies additional welfare benefits accruing to mothers who have children who are born 10 months or more after the mother starts receiving benefits. The policy is thus a disincentive to have children, or an incentive to avoid motherhood whilst in receipt of welfare benefits. The results suggest that altering benefits to create disincentives changes fertility behaviour. Those subject to alteration of welfare had fewer births and had higher contraceptive use, use of sterilization and abortion. The experimental design clearly suggests that social policy can influence fertility (Jagannathan and Camasso 2003). Lopoo and DeLeire (2006) also examine how policy implemented in the United States has influenced the fertility of social groups. In this case they examine how policy has been used to specifically discourage teenage childbearing. Policies were introduced that required mothers under 18 to attend school and to live with a parent or guardian, in order to be eligible to receive benefit. In contrasting 15 to 17 year olds prior to the implementation

of policy and following the implementation they conclude that the additional requirements asked of teenage mothers reduced fertility 22%. Again, empirical evidence suggests that it is possible to directly influence fertility downwards through policy.

2.13 Other research into fertility in Scotland

Most research covering the subject area of fertility within the UK samples England and Wales (e.g. Rosato 1999; Lewis 2003; Rendell 2003), and international research or national level comparisons usually compare the UK (e.g. Kohler, Billari et al. 2006; Fagnani 2010). However, Scotland differs from the other countries in the UK in terms of fertility rates and demographic trends (e.g. immigration, see Anderson 1996), and this has been the case for a while. Figure 2.1, below, highlights the contrast in Total Fertility Rates between the countries of the UK. It can be seen that Northern Ireland stands out in recent history as having a higher total fertility rate than any of the other countries of the UK. The total fertility rate of England and Wales is very closely matched across the period. However, the total fertility rate of Scotland drops from being above that of England and Wales, crossing over the level of England and Wales in the late 1970s and early 1980s and remaining lower than any other nation of the UK into the present. There is a small amount of variation in TFR's between Scotland and England. Figure 2.1 shows a difference of around 0.2 to 0.3 in the total fertility rates between the countries. Attributing specific causes for small amounts of variation in fertility between the nations is a difficult task as it is confounded by the complication of disentangling tempo and quantum effects and problems of comparative samples (Diprete, Morgan et al. 2003). It is conceivable that structural differences between

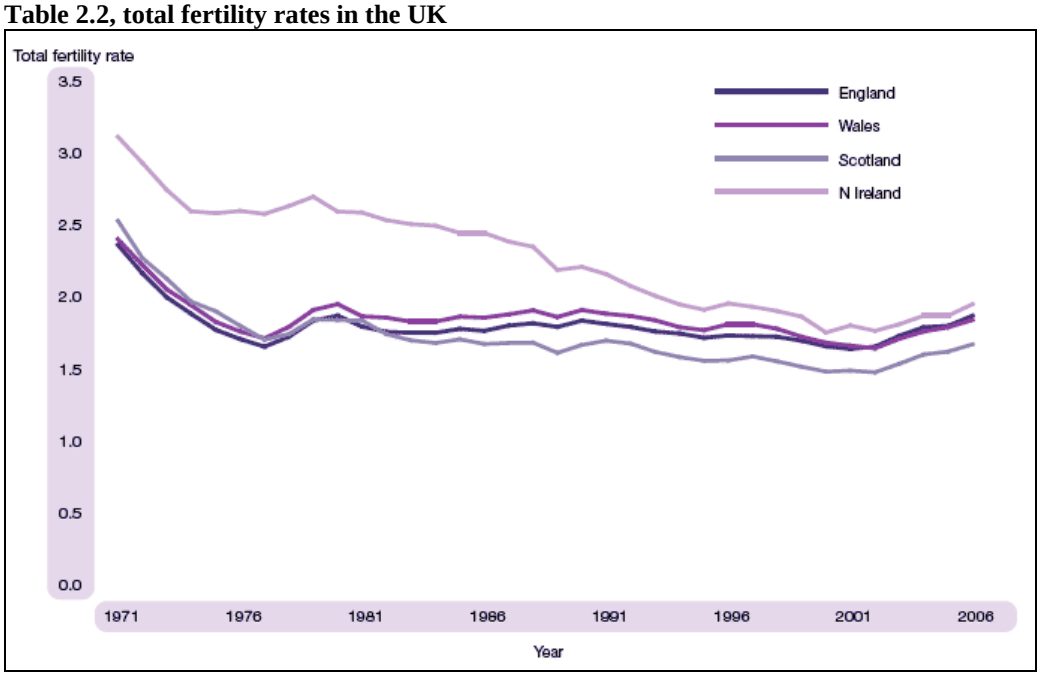
Scotland and the rest of the UK in, for example, the structure of the labour force, or differences in the size and fertility of migrant communities, and types of immigrants might also account the observed differences. However, research into these aspects of fertility remains to be done and may contingent upon the existence of relevant data.

The current decline in the fertility of Scotland can be traced back to the 1960s. However, the crossover between English and Scottish total fertility rates only occurred decisively in the 1980s, despite several upward and downward fluctuations. Surveying Figure 2.1, it is plausible to speculate that the social and economic restructuring of the late 1970s and 1980s, which was signified by the advent of a long period of Conservative government, had a detrimental effect upon Scotland's fertility. This would seem an obvious conclusion to draw. However, there is no general assertion of this within wider literature. The brief period during which Scotland's population was declining (Graham and Boyle 2003), triggered a rise in the amount of research into the demography of Scotland and the long term implications of below replacement fertility. Renewed interest in Scotland's population is epitomized by the Economic and Social Research Council (ESRC) who in 2007 issued a statement on priorities for research into low fertility in Scotland, suggesting: *'A deeper understanding of the causes of significant spatial variation in fertility within Scotland is needed. Variations:*

- *in different parts of Scotland (stemming perhaps from different economic environments, marital status, qualifications, educational opportunities, and deprivation),*
- *between other parts of the UK including the English regions,*

- *between Scotland and other European countries, particularly Sweden, France and Ireland, and also*
- *over time, within Scotland'* (ESRC 2007: 11)[13].

Table 2.2, total fertility rates in the UK



Note: Source: General Registrar of Scotland Annual Report, 2006: 24

The ESRC's comments on Scotland's fertility were part of a brief drive in research within the subject area initiated in the mid 2000s. This contributed to publications on various themes in respect of Scotland's apparently problematic population with, for example, research sponsored into examining ageing (Bell, Bowes et al. 2006), population economics (Lisenkova et al. 2007) and migration (Bond 2006; Findlay 2007). Of these studies two projects specifically dealt with the theme of fertility:

[13] ESRC (2007) *The Demographic Trends in Scotland: a Shrinking and Ageing Population*, ESRC Seminar Series: Mapping the public policy landscape, Swindon, ESRC.

(Graham 2007) explicitly contrasted Scottish and English fertility, whilst Dey (2007) examined how attitudes and social networks affect fertility. Graham (2007) show that the timing of second births is later in Scotland as compared to England. This accounts for some variation in the TFR that is observed between the two countries, thought there are apparently no significant differences in childbearing intentions between the nations. Dey (2007) found that a number of factors influence fertility aspirations and experience in Scotland, especially educational attainment and female employment. Also, in a briefing based on research using the same data as Dey (2007), Boyle et al. (2007a) argue that the quality of localities could have a significant effect upon childbearing decisions and that people who are negative about their area as a place to bring up children are more likely to be from urban environments as opposed rural.

A number of other studies and publications examine the population of Scotland. This is evident in academic work on Scottish demography (see, Anderson, Bechhofer et al. 2002) and from government sources such as the General Registrar Office Scotland (GROS 2002). The remit of GRO Scotland is descriptive statistical accounting of Scotland's demography rather than theoretical analysis or explanation. However, GROS report for 2006 (GROS 2007) incorporates a section examining regional level demographic trends in addition to the usual report on national level trends. Paterson et al. (2004) provide a synthesis that combines analysis of different trends in Scotland occurring since the 1980s, this includes a focus on population, demography, families and households. They chart the diversification of household and family formation, the shift of women into employment and regionally variable fertility, highlighting the complexity of this as an issue for policy makers (Paterson et al. 2004: 27, 40-41). In

explanation for low fertility generally they suggest shifting social aspirations, the advent of birth control and lengthening child dependency. Culturally they equate this to centralization of children within the lives of middle classes and the investment that is now made in children (Paterson et al. 2004: 29); as has been shown these explanations for Scotland's low fertility are not in general specific to Scotland, however.

In an interesting and unique piece of research Anderson et al. (2002) provide an empirical study into the confidence of a sample of young people in Scotland. They examine the commitment of the sample to planning for children and partnership. They conclude that the young people are committed to having children but that there is no systematic or planned entry into parenthood and that having children is seen as inhibiting other areas of life. This relates to discussion over whether childbearing is contingent and negotiated (Giddens 1991; Beck and Beck-Gernsheim 1995) or implicit within relationships (Holdsworth and Elliott 2001; Anderson, Bechhofer et al. 2002; Rijken and Knijn 2009) and indeed definitive of our biological existence (Voland 1998). The empirical work of Anderson et al. (2002) on their Scottish sample reinforces the findings of Rijken and Knijn 2009, and Holdsworth and Elliott 2001, that people take for granted that one day they will have children. There is also some historical writing and research on the nature of childbearing in Scotland. For example, Anderson (1998) compares the countries of the UK with Ireland. Using Census data around 1911 and the turn of century they outline practices of family limitation, especially within England and Wales, but also Scotland and Ireland. Smout (1986) also examines the nature of family formation and childbearing across the period from 1830 to 1950. He examines variation in levels of fertility by occupational groups, along with a

comparison of trends in illegitimacy across the whole period. Smout notes a high level of illegitimacy in Scotland generally, that is associated with certain social groups in particular. It is suggested that childbearing practices across this period varied by social class and geographical area therefore there is evidence of differing cultural behaviours within Scotland equating to geographies, at least historically.

Joshi and Wright (2005) present a wide ranging contemporary analysis of fertility and childbearing in Scotland. They point out variation in fertility trends by measures of relative advantage including employment status, income and educational attainment. As part of this analysis they compare the circumstances of mothers at different ages of first birth. They also compare Scottish mothers to the rest of the UK. In offering conclusions they question some of the received wisdom around immigration offsetting low fertility, suggesting that the scale required may be too large. On the other hand they speculate that policy designed to increase fertility rates could represent a viable option to reconcile the problem of unfavourable dependency ratios, but point out that there is little precedent of successful fertility policy (see chapter 9). Because of the uncertainty around the possible success of policies in the area of fertility and population aging Joshi and Wright (2005) conclude with the argument that we should invest generally to improve the lives of parents and potential parents, which in turn may boost fertility along with the general prospects of the offspring. Boyes et al. (2007) also reflect on effects that low fertility may have upon the economy. They conclude that policy focus needs to be on generational equity, and they suggest policies, such as, encouraging immigration, flexible working practices, increasing employment rates, '*less intensive [and] more productive*' working, letting people work past retirement and need for

higher quality jobs (although in reading these types of general recommendations it is worth reflecting whether anyone is advocating for fewer and poorer quality jobs!). Lisenkova et al. (2007) also consider the economic prospects of below replacement fertility in Scotland. They show that Scotland's GDP may be set to drop dramatically as the population ages. They offer no specific solutions, but suggest immigration of between 10,000 and 20,000 is required to offset a decline in the working age population (cf. Joshi and Wright, 2005).

2.13.1 Centres of Research and Sources of Data on Scotland

Most of the recent research into Scotland's fertility comes from three overlapping sources: the Centre for Research on Families and Relationships (CRFR)[14], which is based at the University of Edinburgh; clusters of academic research based at Universities in Scotland, and the General Register Office for Scotland. The CRFR is a research centre that conducts and disseminates research on families, relationships and the life course. The remit of the CRFR is collaborative and policy oriented. In the University sector, three clusters of research can be usefully highlighted: studies at the University of Edinburgh into fertility trends and the demography of Scotland (e.g. Anderson 1998; Paterson, Bechhofer et al. 2004); a number of studies from the department of geography at University of St Andrews (Graham 2007; Boyle, Graham et al. 2007a), with a focus upon spatial variation in fertility; and studies into the

[14] http://www.crfr.ac.uk/

economics of fertility decline in Scotland which are associated with the Economics department at the University of Strathclyde Business School (Joshi and Wright 2005; Lisenkova, McGregor et al. 2007). Finally, the General Registrars office for Scotland marks a focal point in the statistical accounting of Scotland's population.

There are several sources of large scale empirical data on Scotland's population that can be used in studying fertility. Firstly, the *Scottish Social Attitudes Survey's 'Fertility Module'*, collected in 2005, used by, amongst others, Dey (2007). *The Scottish Social Attitudes Survey* itself is an annual cross sectional random sample survey of attitudes in Scotland (Scottish Centre for Social Research 2010). The survey gathers information on political and social attitudes, together with demographic and socio-economic information. The 2005 edition of the survey included a module examining people's attitudes to issues around childbearing. This included questions on ideal levels of fertility, as well as expected levels of childbearing and current parities. Hitherto these have resulted in a couple of working papers available presenting analysis (Dey 2007; Boyle, Graham et al. 2007a).

The *British Household Panel Survey* (University of Essex. Institute for Social and Economic Research N. C. f. S. R. 2010a) , which has expanded into the *Understanding Society* study containing 40,000 households from the UK (University of Essex. Institute for Social and Economic Research, N. C. F. S. R. 2010b), is another major source of information on Scottish households, individuals and families. The survey provides longitudinal panel data following individuals and households across years. Originally the BHPS sample consisted of 10300 adult interviewee's representative of Great Britain in 1991. The sample was augmented in 1999 with an additional 1500

households from Scotland and Wales and in 2001 a sample of 2000 households were included from Northern Ireland. The inclusion of a Scottish boost sample in 1999 created additional potential for researchers interested in Scotland, or comparisons of Scotland with other areas of the UK. The BHPS currently has 18 waves of data available The BHPS contains socio-economic and demographic data and information is gathered upon family formation and childbearing, covering childbearing intentions, as well as actual birth. The quality of this data source means that it is often used by researchers interested in family formation and childbearing (e.g. Iacovou 2001; Aassve, Burgess et al. 2006; Booth and Kee 2006).

The *Scottish Household Survey* is a Scottish Government survey which commenced in 1999 (SGRS 2010). The 2006 survey contains over 30,000 cases although the response rate to the survey is 70%. The study aims to provide information on households in Scotland. The methodology employed is a repeated cross sectional design, with sampling organised to be representative of Scotland and at Local Authority level. The focus of this survey is not fertility, or related to fertility. However, information on households does allow the identification of families, and information is gathered on numbers of dependent children in households. Recent publications using the SHS include Smith et al. (2005), Parkes and Kearns (2006).

Growing up in Scotland (GUS) is a longitudinal study that follows a group of 3000 toddlers born in 2002/3 and 5000 babies born 2004/5 (Scottish Centre for Social Research 2010). A further sample of 6000 children born 2010/11 is also to be added to the study. The sample is followed up annually and information on the children and their families is collected. The remit of GUS is not to provide information on fertility *per se*.

However, the nature of the design of the study means that both cross-sectional and longitudinal data is collected. The GUS study is similar in concept to the *Millennium Cohort Study* (MCS). Anderson et al. (2007) reports on early results from the Growing Up in Scotland study. The initial findings presented offer some explanatory analysis. For instance, it is suggested that socio-economic and educational circumstance affects parents' access to, and awareness of, services and facilities. Also, that young mothers are more likely to report 'big problems' symptomatic of increased anxiety, perhaps reflecting access to support or knowledge.

The *Millennium Cohort Study* is a longitudinal study that follows around 19,000 children born in the UK in 2000/01(University of London 2010). Of this sample 2370 of the children were born in Scotland. The cohort has been surveyed at age 9 months, three, five and seven years and the next sweep are planned for 2012. The study is designed to be representative of the UK as a whole; however Scotland has been specifically over-sampled to enable independent analysis. Data is collected upon aspects of parenting, health employment and education amongst other topics. Again, fertility is not the specific focus of this survey however information on families and family life can provide context to analyses more interested in childbearing (e.g. Joshi and Wright 2005). The survey also has the potential to incorporate sub-studies. In 2003 those who received assisted fertility treatment were issued with an additional questionnaire. This examined women's experience of fertility treatment. Joshi and Wright (2005) have published on childbearing in Scotland examining this resource, discussed above. The MCS is also widely used to ecamine public health and development (see, Hawkins, Cole et al. 2011; Skafida and Stout in press).

The majority of the empirical work undertaken in this thesis uses the Scottish Longitudinal Study[15]. The SLS provides a representative 5.3% sample of the population of Scotland, based on 20 semi-random birth dates. The dataset is an anonymised sample of 1991 and 2001 Census records which are linked to vital events registrations occurring to the SLS sample members. The dataset includes a wide range of Census and vital events variables, plus derived variables constructed from a number of sources. The data available includes measures of occupational categorization, educational attainment, geographies and many other socio-demographic variables. Data on over 250,000 people present in Scotland at 1991 are recorded and have been traced between the censuses of 1991 and 2001. SLS members are also tracked between and beyond these points in, for instance, vital events data and health records. For analysts interested in fertility, registration of births means that it is known if an SLS member experiences a birth whilst under observation in the data. Data on births experienced outside the SLS aperture is not ordinarily available. Recent studies using the SLS include Van Ham and Manley (2009) and Clements et al. (2009)[16].

[15] http://www.lscs.ac.uk/

[16] These studies are out with the substantive subject area of childbearing and birth order. However, at the time of writing, these are the only two peer reviewed papers to have been published using the SLS. Since this was first written (end 2010) several more peer reviewed publications have come forth using the SLS http://www.lscs.ac.uk/sls/publications.htm.

Considering Scotland's status as a sub-national region within the UK there is a considerable amount of research and data sources relevant to the study of fertility. However, there is also substantial potential to expand upon what has been done both in the use of data and in addressing substantive issues.

Chapter 3 -Theory and Methodology

This chapter outlines the theoretical and methodological approach taken within this thesis. The chapter begins by laying out the theoretical underpinnings of the analysis. The chapter then goes on to expand upon the methodological approach.

3.1 The underlying theoretical approach

> *'A focus on the macro determinants of fertility does not imply that fertility outcomes are determined at the institutional macro level. Instead, there remains some process whereby systemic properties are translated into individual behaviours'* (Smith 1989: 171).

Chapter 2 reviews literature offering theoretical explanations for contemporary fertility patterns. Many can be characterised as acting either at the 'macro' or the 'micro' level. Representing the former, Irwin (2000) puts forward a framework for interpreting demographic change. Irwin (2000: 1.4) argues that fertility decline needs to be understood in relation to *'shifting patterns of interdependencies across generations and between men and women'*. Part of this draws upon wider social and demographic theory which suggests that fertility decline was part of the reshaping of relationships between men and women, the idea that changes in fertility are related to social structural changes that alter social ties at the micro level. This locates fertility rates within the social structures of relations and obligations between social groups. This could be read as an attempt to theorise the fertility behaviour of individuals in relation to the social context. More convincingly however, the theme of Irwin's piece restates the importance of the

social structure in interpreting fertility and fertility change, particularly changes in gender relations. This seems to make an argument similar to that of MacInnes (2007) who suggests that a decline of patriarchy was major part of the shift to low fertility that has been ignored. However, transformation in gender relations is a macro level social change and not easy to reconcile directly with empirical research limited in measures of both time and explanatory variables.

Irwin (2000) sees a shift in the structures of the relationship between men and women as instrumental in fertility decline. This specifically foregrounds structures of gendered inequality in the examination of fertility. However, it is a conceptually small step to articulate fertility as arising from the micro level relations between *a man* and *a woman* within wider social structure, as between structures of masculinity and femininity. This shifts the focus to the micro level whilst retaining structures of gendering and gendered social relations along with all other aspects of social stratification. There is precedence for this in micro sociological theory such as that of Berger and Luckmann (1966) or Goffman (1959), who seek to locate action within social structure.

In contrast to the theme of large scale social change impacting on fertility are micro level social theories of fertility based upon models of individual choice. Becker (1991) and Easterlain (1975) explicitly theorize individual level action, but arguably to the detriment of wider social structures or macro social change. In this type of theorising there is some need to conceptually locate individual level social action, related to fertility, within wider social structures (Demeny 2003). The importance of both the micro and the macro in attempting to understand fertility is highlighted in the mission statement of the REPRO project (Philipov, Thevenon et al. 2009). They employ the

theory of planned behaviour to examine attitudes related to fertility throughout Europe. The theory of planned behaviour explicitly accounts for the roles of attitudes norms, behavioural controls and how these aspects may coalesce in intentions which ultimately result in observed behaviour (Ajzen 1991). The theory has previously been used to examine the relationship between intentions and fertility outcomes (Schoen, Astone et al. 1999; Dommermuth, Klobas et al. 2009). It is specifically reference as underlying the REPRO project and their intention to bring together the micro and the macro in analysis. This thesis similarly represents an attempt to describe and interpret micro level action and understand its relationship with and within social structure and macro-level changes. The theory is not too dissimilar conceptually to that put forward by Bagozzi and Van Loo (1978) to explain fertility (chapter 2).

It is suggested in this thesis that low fertility in Scotland is a consequence of normative fertility aspirations to have two or three children only (chapter 5, Coleman and Salt 1992). This is partly in reference to theory which suggests the primacy of an ideational shift and changes in norms as underlying overall fertility declines. Ideational and normative shifts are fore-grounded in theories such as Caldwell's (1976) wealth flows theory. The primacy of norms and attitudes is also central to Woods (1987) interpretation of fertility decline, and is a feature of MacInnes and Díaz's (2009) reformulation of demographic transition as the reproductive revolution.

The data incorporated in this analysis does not track variation in norms across the period of declining fertility during the second half of the last century. Therefore no evidence is presented which shows progressively declining intentions and ideals either paralleling or presaging falling levels of fertility (which would go towards validating

the relationship between fertility norms and fertility change). However, recent data regarding childbearing norms, ideals and intentions are examined for Scotland. It is argued that low levels of childbearing intentions are related to current low fertility in Scotland. This is based upon findings which show that fertility ideals do not vary between social groups or by social stratification (chapter 5). However, fertility outcomes, such as timings of first birth, do vary by such factors (chapters 6, 7 and 8). The data used in the analysis of fertility ideals and expectations from the SSAS shows fertility ideals in Scotland as at a level below a mean of 2.5. It is hypothesised that this underlies low fertility as social structures and circumstance then come into play to result in fertility below the ideal.

The model of a threshold of fertility may be posited as the existence of a certain set of social circumstances in which childbirth is likely to occur. A threshold effect may be related to social normative type behaviour such as similarity in fertility ideals. Setting this within the terms of Bagozzi and Van Loo's (1978) theory, norms seem to exist in ideal numbers of children; they also exist in the circumstances in which childbearing occurs. This being the case normative type behaviour is defines similarity in the social circumstances that people have children. The impacts of structures of social stratification related to economic constraint would therefore influence differences in fertility between people and groups. Analyses of such patterns feature in several forthcoming chapters, where the structural effects of education; housing tenure and occupation are shown to relate to the timings of first birth. The concept is inspired by Gauthier's (2007) article. However, Gauthier (2007) does not consider the possibility of a threshold of childbearing in the manner in which it is laid out within this work. Her

article is concerned with reviewing the effect of policy on fertility, and it is briefly mentioned that state allocation of benefits may have a linear or threshold impact upon childbearing (Gauthier 2007: 341).

A further way to examine threshold effects is to compare birth cohorts. The hypothesis is that different types of people, or different social groups, experience fertility from similar circumstances, characterising a threshold. This is partly because of different actions taken by people and partly because of social, normative, economic and structural constraints upon actions (Goffman 1959; Berger and Luckmann 1966; Bagozzi and Van Loo 1978; Becker 1991). People in different positions within the social structure act in different ways and it is assumed that this, at least partly, represents how those in different social locations experience constraint or how their situation enables action. This is part of what the fertility threshold is hypothesised to represent; it highlights circumstances and structural contexts in which people experience fertility, which define and contribute to that experience. That is, people will in general begin to have children, signified by first birth, when they occupy a certain set of circumstances. There are likely to be differing indicators of timings in reproduction contingent upon social structure and circumstance.

The most obvious example of a threshold is the relationship between education and the tempo of fertility outcomes. As is shown throughout this thesis, people who remain in education longer delay childbearing and first birth (Berrington 2004; Bavel 2010). People in education normally behave as if they make a decision to forgo childbearing until a point in the future. In general being in education is not part of the set of circumstances in which people choose to reproduce (Black et al. 2008). The same can

be said in respect of relationship status. People are unlikely to become a parent whilst outside a more formalised relationship, signified by marriage, and increasingly co-habitation (Holdsworth and Elliott 2001; Becker and Jakubowski 2008). The reasons why people do not have children whilst in education and the reasons why people generally do not have children out-with of a committed relationship may not necessarily be equivalent. However, they are part of a set of common circumstances in which childbearing tends to take place. In contemporary developed countries, people who do not inhabit these circumstances tend not to begin childbearing.

The concept of a fertility threshold is here integrated with wider theoretical approaches that attempt to reconcile fertility outcomes, especially low fertility. It is contended that overall low fertility results from low ideals and norms, see chapter 5 (Caldwell 1976; Woods 1987; Coleman and Salt 1992). However, experienced fertility is still influenced by social and economic structures. This is shown above as timings of first birth are affected by factors such social stratification and the uneven experience of risk and uncertainty (Bloemen and Kalwij 2001; Mills, Blossfeld et al. 2005; Da Rocha and Fuster 2006; Kohler, Billari et al. 2006; Black, Devereux et al. 2008). Re-conceptualising Irwin (2000) and drawing upon theory such as Bagozzi and Van Loo's (1978) it is argued that micro level interactions between a man and a women within a childbearing relationship influences fertility outcomes and that couple action and individual action is constrained and enabled by social structure. This is the hypothesis of constrained action. Constrained action in childbearing is considered to manifest in the threshold effect discussed above. These concepts frame the analysis throughout this thesis.

3.2 Methodology

Quantitative, statistical methodologies are employed to analyse pattenrs of births in Scotland[17]. The data used in the analysis is longitudinal and cross-sectional survey data. These types of data have the benefit of being representative data that allows empirical analysis of trends and processes that can be generalised to the wider population (Siedler and Sonnenberg 2010). The main sources of empirical data used in this study are the BHPS, the SSAS and the SLS. Each of these sources represents a different type of survey data. The BHPS is a longitudinal panel survey, where the same individual is re-interviewed at different time points in waves of the survey. The SSAS is a cross-sectional survey. These types of data allow analysis of cross section of the population of the sampled in each wave of the survey. Data collected in this way is usually constructed to be representative of a general population at each wave of collection. The SLS is based upon Census data. Censuses are intended to survey entire populations rather than to provide a representative sample. The SLS constructs a sample from Census data by extracting a semi-random sample based upon birth dates.

Most of the empirical analysis undertaken in this study employs the SLS. This is a relatively new resource and therefore presents considerable scope to add to current knowledge on fertility trends in Scotland. A key benefit of using the SLS in analysis is its sample size: surveying over 5% of the Scottish population the SLS data may be disaggregated in analysis to quite detailed levels. However, the data available in the SLS is complex. The main time points in which much of the explanatory information is

[17] The algebraic expressions of the main models applied in this work may be found in Appendix 2

available on individuals is at the Censuses of 1991 and 2001, but many measures that are available across these time periods. For instance vital events records attached to SLS members means that whether an individual experiences a birth is known - when the data extract upon which the analysis within this study was constructed births experienced between 1991 and 2006 were known.

3.2.1 Studying the timing of births

Particular interest in the analysis of current trends in fertility is related to the timing of birth events (chapter 2). It is shown above that the postponement transition (Goldstein et al. 2009) and the move towards lowest, low fertility (Kohler et al. 2002, 2006) is related to the timing of births and particularly the postponement of first birth. The postponement transition occurs when the decline in total fertility rates associated with an increasing age at birth, and especially first birth, reverses. The transition has been particularly associated with delays in first birth (Goldstein et al. 2009). Data available in the SLS captures the time period across which the postponement transition occurred in Scotland. There are a number of appropriate ways that the circumstances of birth within Scotland can be examined. The primary methodology employed in this research is Event History analysis using the Cox Proportional Hazard model (Cox 1972). Formally the models estimate the hazard function, which, in the case of continuous time hazard rate models, is the probability an individual will experience an event in the interval from time t to t + s, given that the individual has not experienced the event up until that point, and is at risk of the event in question (Allison 1984; Yamaguchi 1992)In this case the event being measured is first birth. The Cox Proportional Hazard model allows the measurement of the effects of various explanatory variables on the hazard rate of first

birth. It is thus possible to estimate the effects of geography, occupational stratification and educational attainment on the hazard of first birth, for example[18].

Event history analysis allows the study of timing or speed to the first birth event (Allison 1984; Yamaguchi 1992; Vermunt 1997a; Steele 2005). Using control for the effects of various explanatory variables in regression style modelling allows the characteristics of those likely to experience relatively early first birth and the characteristics of those likely to delay can be identified. This is interesting in itself as variation in the timing of first birth has not been researched in Scotland. Moreover, the data captures fertility across the period when the TFR dropped to its lowest level in recorded history. Therefore the factors which underscore delay in first birth are the factors which may be considered to define the nature of the postponement transition.

Logistic regression models are also employed to analyse the first birth outcome in relation to the timing of the event (chapter 8). Logistic regression is appropriate in the analysis of binary discrete categorical outcomes (Rabe-Hesketh and Skrondal 2008).In these models the experience of first birth is treated as a discrete outcome with a value of 1 for those who experience a first birth during a period of observation and 0 if they do not. A cohort approach is taken controlling for age at different stages of the life course and the addition of explanatory variables enables the analysis of the circumstances of first birth to people at different ages. A cohort approach with comparison of the effects of differing explanatory factors between life course stages indicates how the variables

[18] See Appendix 2

included in modelling are related to first birth in different ways to different types of people, defined largely by life course stage.

Other methods employed within this thesis include multi-nomial logistic regression (Kohler and Kreuter 2009; Trieman 2009), ordinary least squares regression (Blaikie 2003), poisson regression (Long and Freese 2005) and latent class analysis (McCutcheon 2009). OLS regression is appropriate with the use of linear outcomes. Multi-nomial logistic regression is suitable for categorical outcomes of more than two categories that are non-ordered (Trieman 2009: 336). Poisson regression is used in the case where the outcome is count data (Rabe-Hesketh and Skrondal: 375). Latent class analysis is also an approach to the analysis of categorical data. This method allows the identification of latent variables that account for the distribution of cases in cross tabulated data (McCutcheon 2009: 58).

3.2.1 Social Groups: constrained choice and the fertility threshold

Chapter 2 lays out a hypothesis of constrained choice accounting for variation in experienced fertility. The hypothesis is based upon interpretation of generalist theories of fertility and fertility decline, together with theories of action. The hypothesis is linked to the concept of a fertility threshold. It is posited that choice within the constraining and enabling aspect of social structures acts to affect timing of fertility events given the capacity of an individual to act which is influenced by their position within social structure. Measures locating people within social and occupational structure are incorporated in modelling approaches to assess how the position of people within the hierarchy of social stratification influences childbearing. The main measures

of occupational stratification incorporated into analysis are NS-SEC[19] and RGSC (Szreter 1984). The standard RGSC 7 fold classification is used and compared with results using the standard NS-SEC 8 fold classification. The CAMSIS social interaction and occupational stratification scale (Bottero 2005) is also adopted in chapter 5.

Measures of **occupational classification** fit well with the idea of constrained choice structured by relative advantage. Devine and Savage (2000) argue as to the mutual constitution of the economic and social suggesting that there are *'work rich and consumer rich households that exercise power and choice and work and consumer-poor households who are constrained and penalized'*. However, this is only part of how constrained choice is considered to operate. There are work rich and consumer rich households that exercise power and choice but which are also constrained and penalized; and there are work poor, consumption poor households that exercise power and choice and are also constrained and penalized, only to different extents and in different ways. In relation to fertility this is observable in the delay in childbearing experienced by economically advantaged women (Brewster and Rindfuss 2000; Bloemen and Kalwij 2001; Berrington 2004). Women in say, professional occupations, have the power and choice to act and consume that women in routine occupations do not. However in childbearing their choice to act appears constrained in contrast to those in routine occupations as women from less advantaged occupational categories can be observed as experiencing first birth events prior to the more advantaged (*ibid*). This is an example of how macro level measures, such as occupational categorisation, relate to

[19] http://www.ons.gov.uk/about-statistics/classifications/current/ns-sec/index.html

micro level processes Smith (1989: 171).

Educational attainment is also used as a measure of relative advantage. Categorical measures of educational attainment are available and employed within the study. These measures are considered to capture the *type* or *kind* of education an individual has undertaken (Schneider 2007). This can help to address substantive interest in the experience of people with different levels of education (Kerckhoff 2001). Measures of educational attainment are likely to correlate to other measures that capture aspects of social advantage, such as measures of occupational categorizations where he highly educated are more likely to be in more economically advantaged occupations[20]. This association will mediate the results of either measure in modelling giving a potentially misleading impression of overall effects.

A similar issue arises in respect of measures of **relationship and marital status**, excluded from some analyses, such as Miranda (2005), because relationship is endogenous to the process under analysis. However, most studies include controls for relationship status as it is a consistent predictor of fertility (e.g. Berrington 2004; Steele, Constantinos et al. 2005). A purist approach to statistical modelling would omit endogenously related variables. However this thesis generally adopts the pragmatic position of Allison (1984); that the benefit of incorporating substantively important variables outweighs other considerations.

[20] A problematic interpretation of educational attainment arises where people of different ages as younger people may have a high educational level but may have a lower level occupation, indicating their stage of career progression. Most of the analyses presented below control for this issue by restricting analyses to specific age cohorts.

Differing levels of education indicate different probabilities of first birth at different points in the life course. Theoretically, why this is the case is often related to opportunity cost (Bagozzi and Van Loo 1978; Becker 1991; Robinson 1997). However, it is not necessarily a direct opportunity cost trade off at work. It may be that individuals delay/abstain from early childbearing because those who are most relatively advantaged, signified by higher educational qualifications or higher income, have most to give up when having children, but it may also represent a normative social convention to finish one stage of the life course prior to embarking upon another. The potential influence of overarching norms which prescribe action related to childbearing is outlined in chapter 5. It is put forward that norms of appropriate action exist that are related to financial independence (Sabotka 2004). A norm of economic independence also influences childbearing decisions (chapter 5) and this could be one reason that people tend to avoid having children whilst in education. An understanding of the correct life course stage in which events should occur may well combine together with the perceived importance of nominal economic independence.

The alternative datasets used in this analysis have various measures of educational outcomes which, along with substantive reasoning, leads at times to differing operationalisations of educational attainment. Research into childbearing outcomes employs various operationalisations of measures of educational attainment. Hoem and Kreyendfeld (2006) apply a tertiary measure controlling for those with a degree, those with vocational qualifications and all others. Operationalising educational attainment as a binary classification is also common practice (Chanfreau and Cebulla 2009). Expanded measures are preferred, although collapsed categories are also employed for

substantive purposes.

Another measure of social structure incorporated into modelling throughout this paper is raised religion. As discussed above research suggests that religion can be seen to have significant effects upon fertility outcomes. **Religion** may affect fertility because of specific beliefs and teachings that influence actions of individuals from certain religious denominations (MacQuillan 2004; Hayford and Morgan 2008). However, measures of religion may also be acting proxies of social stratification related to economic advantage, picking up variation in socio-economic status between religions (Welsh 2010).

Housing tenure is also incorporated as a measure of stratification (Blaauboer 2010). This has precedence in recent work upon fertility. For example Strom (2010) measures housing tenure and how this may relate to constrained first birth. Barlow and Duncan (1988) issue a word of caution about the simplistic application of housing tenure as representing substantively meaningful and discrete difference between categories of people. They do, however, state that *'in defining social relations of occupancy and ownership – tenure…should be expected to have certain social and political effects'* (Barlow and Duncan 1988: 229). Additionally, in an analysis of the housing tenure and the generational transfer of advantage Smits and Michielin (2010) argue that housing value represents a complete socioeconomic history of older parents. Measured housing status can relate to the process of birth directly as housing moves might indicate setting up a 'family home' (Holdsworth 2004). Also, Mulder and Billari (2010) compare the relationship between fertility and housing regimes in Western countries. Owner occupation, and a high degree of this tenure within a nation, is equated to problematic

entry into parenthood and lower fertility levels. The relationship between housing tenure and fertility is examined in chapter 8 where the expectation is that owner occupation indicates delay in first birth as it represents the problematic of attaining ownership. Similarly to educational attainment and occupational categorization, owner occupation is also deemed to be a signal of a position of relative advantage which links to differing aspirations and access to assets. Furthermore, the home is also linked symbolically to ideals of family, parenting and motherhood (Lauster 2010). Therefore there are a number of empirical and substantive reasons to examine the relationship between childbearing and fertility.

Social processes related to childbearing and especially the timing of first birth are shown to be related to an individual's involvement in education, their occupational status, housing tenure and partnership formation (Kohler et al. 2006). In relation to the hypothesis of constrained choice the position that people occupy in relation to these circumstances indicate a likelihood as to whether they will have children or not. The data and measures employed in the analysis of fertility and first birth within this study relate imperfectly to the processes that result in births. Kohler et al. (2006: 16) describe fertility as '*a dynamic process over the life course*'. The longitudinal data employed in the forthcoming investigation captures some aspects of the dynamic nature of childbearing. For example the first birth outcome used in analysis of the SLS provides the point in time when an individual becomes a parent. The explanatory measures incorporated in modelling are also considered as representative of aspects of the dynamic process of childbearing, especially related to facets of constrained choice that may be attributed to an individual's location on certain measures. However, the

explanatory variables in the SLS are relatively limited, being generally fixed in time at census time points.

Most of the analysis and data management tasks within this study were undertaken using Stata version 10. The latent class approach, presented in chapter 5, was performed using the freeware program lEM (Vermunt 1997a; Vermunt 1997b). Microsoft Office, Excel 2003 and 2007 were also employed to construct several of the graphical outputs presented herein.

Chapter 4 - Postponement of Childbearing: A Replication and Extension of Berrington's (2004) Analysis

4.1 Introduction

The survey of literature in chapter 2 highlights that postponement has come very much to the forefront of thinking and research in respect of low, below replacement, fertility. Postponement has been shown to underlie the phenomena of low, and lowest low fertility (Bongaarts and Feeney 1998; Sabotka 2003). This is partly because of the discrepancy between the TFR as a period measure whereas postponement as a cohort effect (Goldstein et al. 2009). Goldstein et al. (2009) argue that, following the postponement phenomenon, completed fertility is likely to be closer to the replacement total fertility rate of 2.1 than the 'lowest low' fertility of below 1.3. However, there is some suggestion that postponement may lead to lower completed fertility for those who delay childbearing (Leader 2006).

Berrington's (2004) analysis examines the concept of perpetual postponement. This is the idea that postponement of childbearing transforms over time into a permanent state of childlessness, or a revision of childbearing intentions resulting in lower completed fertility. Berrington (2004) provides an analysis as to whether childlessness is the result of planning or perpetual postponement. In this case Berrington (2004) concentrates upon women who are childless into their 30's in contemporary Britain. The focus of the analysis is childbearing intentions and the link between intentions and subsequent birth

outcomes in relation to wider socio-economic influences. The relationship between partnership and partner's intentions in respect of childbearing are also examined.

The analysis here replicates and generally verifies much of Berrington's (2004) analysis. The study is also extended in several places. The relationship between occupational position and childbearing intentions is examined. It is also shown that altering the reference category in multinomial logistic regressions presented can expand substantive findings; and, relating to the general focus of the PhD, a descriptive difference in the intentions of postponers who are resident in Scotland, with the intentions of those from other counties of the UK is highlighted. The chapter also functions as a case study in replication. Freese(2007) argues that, despite the importance of replication and the apparent commitment of sociology to openness, the discipline of sociology lies behind other areas of social science, such as economics, in terms of the commitment to producing replicable work. This chapter therefore offers something of an examination in replication as well as verification and extension of many of Berrington's (2004) findings.

4.2 Data derivation and preliminary analysis

The analysis was conducted using the British Household Panel Survey. This is an annual panel survey based with a sample of over 5000 households at the first wave. The survey has been ongoing since 1991 and, at time of writing there are 18 waves of data available to researchers. The survey includes questions related to the socioeconomic and demographic circumstances of individuals and households. The analysis here is based upon the information available in the second wave of the survey. At this wave

participants were specifically questioned regarding their childbearing intentions. In the course of the second wave adults of childbearing age were asked whether they indented to have children, or more children, and how many. Other studies to use the BHPS to examine fertility or patterns of preferences include Graham (2007), Ohinata (2008), Schober (2007), and Booth and Kee (2009).

Table 4.1, number of children intended by childless women within different age cohorts

Age of Woman in 1992	0	1	2	3+	Sample Giving an intention	Sample Reporting "don't know"
18-24	6.7	4.3	61.4	27.6	326	51
25-29	17.0	9.9	57.3	15.9	173	37
30-34	37.5	14.4	35.0	13.2	93	37
35-39	81.3	7.6	9.7	1.4	57	21

Percentage distribution of number of further children intended by childless women, by current age n= 795, source Berrington (2004: 11)

Table 4.1 includes the results of one of the cross tabulations featured in Berrington's (2004: 11) analysis. The table reports the number of children intended by childless women within different age cohorts. Table 4.2, below, attempts to replicate Table 4.1, utilizing the variables Berrington reports incorporating into the analysis. As in Table 4.1, Table 4.2 reports the frequencies of intended number of children by women who are childless taking account of age cohorts (according to the variable *'blprnt'*) and including pregnancy as an intended child (using variable *'blchmor'*). In terms of the reported frequencies, Table 4.2 is close but not identical to Table 4.2 contains a total of 863 cases, this is in contrast to Berringon's version which contains a total of 795 cases. This has implications for the ideal of replication as a scientific aim. Why it proved impossible to replicate exactly the descriptive aspects of Berringtons (2004) paper is not clear as the replication seems to incorporate the same variables as Berrington identifies. It may be that Berrington employed a specifically derived sample provided by BHPS

administrators in this analysis or is selecting cases based upon additional unidentified criteria.

Despite problems associated with reproducing the descriptive analysis, it was possible to substantially replicate the general results of the statistical models incorporated in the paper. Multinomial logistic regression models were the primary method employed to assess variation in the childbearing intentions of childless women, aged 30-39. The outcome variable used in this was the response to the question 'do you think you will have any more children?' the response to which could be '*yes*' *'no'* and *'don't know'* (*'blchmor'*).

Table 4.2, number of children intended by childless women within different age cohorts

Age of Woman in 1992	0		1		2		3+		Sample Reporting *don't know*		**Total**
	%	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	***Total***
18-24	7	(34)	3	(15)	51	(235)	31	(143)	7	(32)	**459**
25-29	13	(31)	7	(20)	52	(120)	19	(44)	7	(17)	**232**
30-34	34	(37)	14	(15)	32	(35)	16	(17)	4	(4)	**108**
35-39	80	(51)	8	(5)	11	(7)	2	(1)	0		**64**
Total	18	(153)	6	(55)	46	(397)	24	(205)	6	(53)	863

Attempt to replicate Berrington's descriptive analysis, presented in Table 4.1, distribution of number of further children intended by childless women, by current age, frequencies in brackets, rounded up to nearest whole number source BHPS, wave 2,

The sample size used by Berrington in modelling the fertility intentions of women was 199. This was the number of women in the dataset who are aged between 30 and 39 years old and who have not become a parent by wave 2 of the survey. However, in trying to create an identical sample for replication, controlling for the same characteristics, a sample of 227 was identified. This incorporates the age variable, *'bage'*, the sex variable, *'bsex'*, and the variable identifying whether the individual is

the natural parent of a child, *'blprnt'*. Removing all those currently pregnant from the analysis would result in a sample of 217 ('*blchmorn'*). Again, it is possible that selection criterion was applied to the sample in Berrington's analysis, which has not been detected from reading the paper; since this is an important concern the following paragraphs elaborate on some discrepancies.

Several explanatory variables were constructed for this analysis. The variable construction was guided by the information provided by Berrington (2004). Age was included in the models as a metric variable, controlling for the effects of being a year older upon the probability of responding in a certain manner, in respect of the intention to have a child. Educational attainment was also controlled for. The summary measure of highest educational attainment (*wQFEDHI*) was collapsed into three categories, those with degree level qualifications and above, those with O-level qualifications and above, and those with below O-level qualifications and no qualifications (Table 4.3).

Table 4.3 reports frequencies of those from the sample controlling for the alternative educational attainment categorization. As can be seen 70 women aged 30-39 have degree level qualifications and above, 120 women have O-level qualifications and above, whilst 37 have below O-level qualifications and no-qualifications. As an interesting point of comparison Table 4.3 also reports the frequencies for women aged 30-39 who do have a child, or children. As can be seen, those with degree level qualifications and above account for only 12.4% of those who do have a child, whereas women with degree level qualifications and above account for over 30% of those without a child.

Table 4.3, educational attainment of postponers and parents

	Postponers		Parent	
Educational Attainment	*n*	*%*	*n*	*%*
Degree and above	70	30.8	90	12.4
O-level and above	120	52.9	339	46.8
Below O-leve/ no qualifications	37	16.3	296	40.8
Total	**227**	**100**	**725**	**100**

educational attainment of women aged 30-39, and who have either postponed a first birth or are a parent, source wave 2 of the BHPS

Analysis also controls for earnings. Pursuing a career is widely linked to postponement (e.g. Mills et al. 2005) and socio-economic measures are relevant to opportunity cost theories of childbearing and fertility (e.g. Becker 1991). Berrington's approach to this is to partition an income variable into a binary variable, with the top 25% of earners compared with the rest. A binary variable of the top 25% of earners was reproduced using variable '*bfimn*' – total income in the previous month. Berrington (2004: 15) states she identified *'those as having net earnings in highest quartile'*. The measure here splits the income variable, which includes men and women earning at all ages, at the 25th percentile. The 25% threshold was £1050.75. This does not control for hours worked as (it may have been preferable to exclude non-full time workers, for example, but, Berrington does not state this was part of her approach). It can be seen from Table 4.4 that close to 50% of women who have not had a child, and are aged in their 30s, are in the top quartile. As a point of comparison, of the women aged 30 to 39 who have had a child, only around 11% are in the top earning 25%.

Table 4.4, income distribution

Adult income distribution	*n*	*%*
Lower 75%	117	51.5
Upper 25%	110	48.5
Total	227	100

women aged 30-39 who do not have a child and their distribution in relation to the top earning quartile, source wave 2 of the BHPS

The outcome variable measures childbearing intentions. Table 4.5 reports the frequencies of the responses of women in the sample who do not have children to the question as to

whether they intend to have more children, or not, or whether they do not know. As can be seen the cases are quite evenly distributed between those who intend to have a child and those who do not, which account for around three quarters of the total, whilst those who do not know account for around a quarter. For comparative purposes, the distribution of frequencies of women aged 30 to 39 who already have at least one child are provided in brackets; less than 15% of women who have a child, or children, and are in their 30s intend to have another child, or more children, compared to 37% of women of the same age who do not yet have a child. It also appears that those who do not have children are more likely to be ambivalent about having children, as fewer than 10% of those who have a child/ children say the do not know whether they will have more children. As may be expected women who already have a child, or children, are more likely to say they do not want another child.

Table 4.5, childbearing intentions

	Postponers		Parent	
Is it likely you will have more children / a child	*n*	*%*	*n*	*%*
Yes	84	37	105	15
No	88	39	557	77
Don't Know	55	24	59	8
Total	**227**	**100**	**721**	**100**

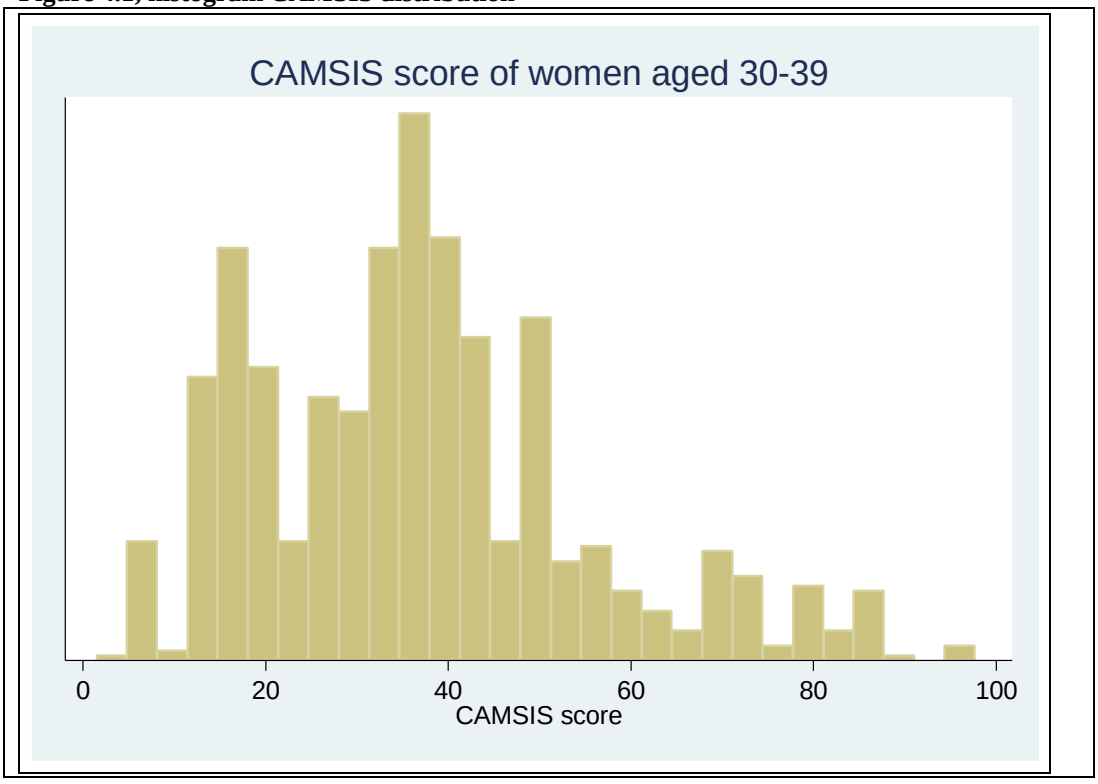
Childbearing intentions of women aged 30-39 who are either postponers or who are already a parent, source, wave 2 BHPS

The analysis here also examines whether occupational stratification is related to the intentions of women to have a child. Berrington does not report whether she checked for effects related to the occupational structure in her paper. However there are reasons to suspect that occupational position may have an effect upon intentions – as theories related to the opportunity cost might lead to a hypothesis that women who postpone may be pursuing more advantaged occupations than women who have children younger

(Easterlin 1975; Becker 1991; Berrington 2004)

Tables 4.3 and 4.4 appear to suggest that this may well be the case. Figures 4.1 and 4.2 graph the distribution of women from the sample aged 30 to 39, on the CAMSIS[21] (Bottero 2005) measure of occupational advantage. The distribution shows a wide spread of occupational positions. However, the mean CAMSIS score of women who have not had a child is 45 whereas the mean score for the equivalent group with children is 34. There is a difference in the average occupational position of postponers and non-postponers.

Figure 4.1, histogram CAMSIS distribution



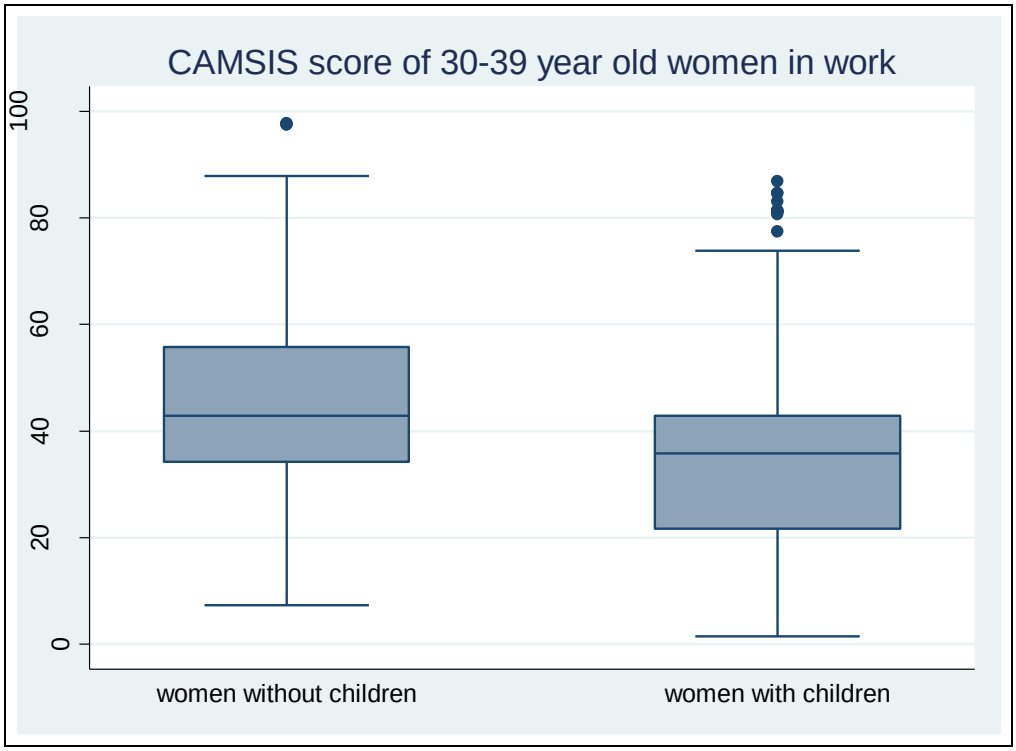
The distribution of women who are 30 to 39 years old at wave 2 of the BHPS by the CAMSIS measure of occupational stratification, n=943

[21] http://www.camsis.stir.ac.uk/

Berrington also constructs a scale of egalitarianism. This is intended to control for effects that egualitarian values may have upon the intentions to have a child. This is based on research suggesting that women who postpone are likely to believe in equality of gender roles[22]. There is some discrepancy between how Berrington describes constructing this variable and its measurement and the attempt here to replicate it. The scale is constructed by combining likert style response on a number of questions pertaining to the roles of men and women in relationships. Berrington finds a mean of 17.98 in respect of the sample of women who have not had a child. A cut off point of 20 was used to denote egalitarian attitudes and this corresponded to around 13% of women. However, a mean 20.77 resulted from the attempt made to replicate the construction of the variable following Berrington's directions. A cut off point of 20 resulted in 62.19% of women from the childless sample being in the more egalitarian category. This does not interfere with the comparison between the results of the statistical modeling presented by Berrington and here. Again, as a point of comparison, the scores for women who are in the 30s and both do, and do not have children were compared. The mean score for women who have had children is around 19. However, only 42.25% of women from this group have a score of 20 or more.

[22] See Berrington (2004: 15) for a description of her operationalisation, and see Appendix A for the macro used to create this operationalisation.
The variables identified by Berrington as used to construct the scale of egalitarianism are:
** wOPFAMA Pre-school child suffers if mother works
** wOPFAMB Family suffers if mother works full-time
** wOPFAMC Woman and family happier if she works
** wOPFAMD Husband and wife should both contribute
** wOPFAME Full time job makes woman independent
** wOPFAMF Husband should earn, wife stay at home
These variables are not available in wave 2 of the survey; therefore the variables at wave 1 were used to construct the scale for this analysis.

Figure 4.2, box plots CAMSIS of postponers and parents



A comparison distribution of women who are 30 to 39 on the CAMSIS measure, between those who have children and those who do not in wave 2 of the BHPS

4.3 Modelling

Berrington (2004) employs multinomial logistic regression to analyze patterns of responses in the intention of women aged 30 to 39, to have a child, amongst women who have no children. This allows analysis of the relationship between various socio-economic characteristics and the intention to have a child. Along with the variables outlined above, age (BHPS variable *bage*) and partnership are also incorporated into the analysis. Partnership is constructed as married or cohabiting[23]. Of the 227 in the sample

[23] The partner variable was constructed from BHPS variable bmlstat denoting marriage and bivmb denoting cohabitation

used here, 124 are married or co-resident, whilst 103 are not at least living with a partner. The variable denoting gender egalitarianism used in the models is slightly different from the construction outlined above. In the formulation of the gender egalitarianism variable used in modelling the cases are split more evenly between the two categories denoting egalitarian views, and less egalitarian thinking. This is marginally closer to how Berrington describes the construction of the egalitarianism variable, and avoids the more egalitarian category being so top heavy with cases.

Table 4.6, age of postponers

Age at Wave 2	*n*	*%*
30	33	14.5
31	38	16.7
32	29	12.8
33	26	11.5
34	15	6.6
35	22	9.7
36	17	7.5
37	16	7.1
38	12	5.3
39	19	8.4
Total	**227**	**100**

frequencies of Postponers
by age, source BHPS wave 2

The reference group is those who do not intend to have a first birth. The models report the log odds coefficient in respect of the explanatory variables, relative to those who do not intend to have a birth, taking into account any reference categories on explanatory variables. The findings here correspond quite closely to those presented by Berrington in terms of sign, significance, and magnitude of the effects. (It can be noted that Berrington adopts a significance level of $p<0.10$. The reason behind the adoption of a non-conventional significance level is unclear. With such a small sample, divided across a number of variables and a multinomial outcome, statistical power is likely to be an issue in the analysis. If this level of significance was not employed, only age and level of education would be statistically significant in the model).

Table 4.7, multinomial logistic regression reported by Berrington (2004)

Variable	Intends to have a child		Does not know	
	β	*s.e.*	*β*	*s.e.*
Age	-0.48***	(0.07)	0.23**	(0.07)
Has partner	0.14	(0.42)	-0.19	(0.38)
Education	-	-	-	-
Higher	1.50**	(0.76)	0.33	(0.57)
O-level and above	2.12***	(0.74)	0.34	(0.55)
Earnings	0.87*	(0.52)	0.66	(0.5)
Gender Egalitarianism	1.12*	(0.61)	-0.31	(0.54)
Intercept	14.21	(2.25)	7.27	(2.40)

Berrington's (2004: 16) results, as reported in the paper, sample **199** childless women aged 30-39 at wave 2 *0.10 **0.05 ***0.01 (s.e.), source BHPS wave 2, the base category are those who do not intend a birth

Table 4.8, multinomial logistic regression replicating Berrington

Variable	Intends to have a child		Does not know	
	β	*s.e.*	*β*	*s.e.*
Age	-0.54***	(0.08)	-0.22**	(0.07)
Has partner	0.41	(0.37)	-0.16	(0.36)
Education	-	-	-	-
Higher	.97**	(0.66)	-.05	(0.55)
O-level and above	1.52***	(0.60)	0.09	(0.49)
Earnings	0.79*	(0.47)	0.74	(0.46)
Gender Egalitarianism	-1.26**	(0.43)	-0.16	(0.39)
Intercept	17.03	(2.81)	6.84	(2.40)
Pseudo-R²	.18			
ll	-201			
BIC	478.7			

Replication of Berrington's (2004) results, sample **227** women aged 30-39 at wave 2, *<0.10 **<0.05 ***<0.01 (s.e.), source BHPS wave 2 the base category are those who do not intend a birth[24]

The results of the replication, presented in Table 4.8, correspond quite closely to Berrington's, presented in Table 4.7. Basically, everything that was significant remains significant. In general the results for the replication are marginally different with smaller standard errors and most differences overlap in the range of the standard errors between the models. For those who intend a birth being one year older has a larger

[24] The Pseudo-R² value reported throughout this thesis is McFaddens's Pseudo-R², this is given as analogous to R², as McFadden's Pseudo-R²= $\frac{\ln L_0 - \ln L_k}{\ln L_0} = 1 - \frac{\ln L_k}{\ln L_0}$ where L_0 is the null model and L_k is the full model (Kohler and Kreuter 2009: 268). However interpretation of the Pseudo-R² is difficult because the values do not correspond to percent of variance explained. McFadden's R² indicates an increase in the log likelihood function Hoetker, G. (2007). "The use of logit and probit models in strategic management reaserch: Critical issues." Strategic Management Journal **28**: pp. 331-343..

negative effect in the replication. However, the effects of having a higher level of education, and O-levels, and above, appear considerably reduced in the replication, compared to the reference category. The categorization adopted here for education mirrors that adopted by Berrington. The effect of being in the top earning quartile has also reduced in the replication. However, the effects of gender egalitarianism appear to have increased and are significant at a higher level. As with Berrington's reported model, the only variable that is significant in terms of the contrast between those who do not intend to have children and those who do not know, is age, and the results are very similar between models.

In general the replication approximates the published model well. The effects tell broadly the same story. Older women are less likely to intend to have a child. Those who are more highly educated are more likely to intend a birth than those who are in the lower qualifications reference category. The effect of education also appears to be non-linear. The middle category containing those with O-level and further educational qualifications have a higher probability of being an intender than those with degrees, in comparison to the reference. Those with higher earnings are more likely to intend to have a child, whilst those who hold more equalitarian type gender attitudes are less likely to intend to have a child than those who hold less egalitarian beliefs.

The sharp increase in significance between the models in terms of the results for gender egalitarianism may well be a consequence of the differing categorization, which has been summarized above. A far larger proportion of women appear in the egalitarian category of the replication (62% in the replicated variables as compared to 13% in the original). Examining postponers, it would be expected that they have a higher level of

educational attainment than the general population, and that they are higher earners. This is because women who postpone are likely to be pursuing careers and to have remained in education longer to do so. These are the types of women who might be expected to hold egalitarian attitudes. However, Berrington finds just 13% of her sample score 20 or more on the scale she constructs. The difference in the distribution on the scale may explain why results are more likely to be significant on the replicated model.

4.4.1 A Logistic Functional Form

Table 4.9, mean scores of several variables

	age	earnings	egalitarian	CAMSIS
Is it likely you will have more children/a child				
Yes	32.0	.27	.45	44.8
No	35.2	.18	.57	45.0
Don't know	33.5	.31	.67	46.5

mean score of each category of the dependent variable on a number of explanatory variables, wave 2 of the BHPS, sample 227 women aged 30-39 at wave 2

In both models the only variable that reports significance in the contrast between those who do not intend to have a child and those who do not know is age. It seems that younger women are less likely to know if they will have a child as compared to being sure that they do not want a child. Given that there are few important differences between those who do not know whether they will have a child, and those who say they will not have a child, it seems reasonable to combine these categories. This makes particular sense in terms of the statistical power of the analysis. As discussed earlier Berrington's models split quite a small sample of 199 across a multinomial dependent variable into models with various categories. As shown above, the 'don't know' category only has 55 cases in the sample for replication, which is slightly larger than

Berrington's sample.

Table 4.10, logistic regression

Variable	Intends to have a child	
	β	*s.e.*
Age	-.36***	(.06)
Has partner	.06	(.31)
Education	-	-
Higher	.40	(.50)
O-level and above	.65	(.45)
Egalitarianism	-.51	(.32)
Intercept	12.06	(2.10)
R2	.18	
ll	-124.7	
BIC	287.7	

results of a logistic regression estimating the effects of a number of explanatory variables where the comparison is between the probability of intending or not knowing whether they will have a child versus not intending to have a child in the BHPS at wave 2; childless women, n= 227 (s.e.)

Table 4.9 reports the mean score, for those in each of the outcome variables categories, of some of the main explanatory variables used in analysis. As can be seen the mean age of those who report 'don't know' as to their intention to have a child is closer to those who report *'yes'* than to those who report *'no'*. In terms of the earnings, again, the 'don't knows' appear closer to the *'yes's'* than to the *'no's'*. Both the *Yes's* and the *Don't Knows* are more likely to be in the higher earning category, coded 1, than the lower earning category, coded 0. However, the 'don't knows' score higher on gender egalitarianism than both the 'no's' and *'yes's'* and *'no's'* and *'don't know's'* are slightly closer together in this case. In terms of occupational position those who do intend to have a child and those who do not intend to have a child appear more closely matched than those who do not know. In sum, on earnings and age, *'don't know'* appears closest to the *'yes'* category, on egalitarianism the difference between the categories are all relatively evenly spaced, and on the CAMSIS occupational stratification measure the yes and no groups are matched. On balance therefore the *'don't know's*' appear to be more reasonably combined with the yes category, although both ways of partitioning the outcome were tested in modelling.

Models were estimated on this binary outcome ('yes' or 'don't know' compared with

'no'). The results of one of the models are reported in Table 4.10, above. Despite the increased statistical power associated with a reduction in categories age is the only significant variable. This was the case for every model estimated using the binary outcome. The binary outcome appears to be masking the patterning in these data picked up by the multinomial categorization, and the binary outcome appears to be of little substantive interest. However, this sensitivity analysis does highlight that the results of the multinomial logistic models need to be treated with some circumspection. The results reported in Tables 4.7 and 4.8 employ non-conventional levels of significance which 'boosts' significant findings. Altering the outcome to a binary functional form, in a manner that, ordinarily, might be thought to increase sample power leads to no significant differences.

4.4.2 Occupational Stratification

The chapter here attempts to extend Berrington's analysis by assessing whether occupational categorization may be related to the intentions of postponers to have children. There are strong empirical reasons to consider that occupation may impact upon childbearing decision making. For instance, Bloemen and Kalwij (2001) suggest that career women/postponers are likely to end up with lower overall completed fertility.

Table 4.11, multinomial logistic regression of intentions of have a child incorporating CAMSIS

Variable	**Intends to have a child**		**Does not know**	
	β	*s.e.*	*β*	*s.e.*
Age	-.53***	(.08)	-.22***	(.07)
Has partner	.35	(.38)	-.23	(.36)
Education	-	-	-	-
Higher	1.15*	(.69)	.17	(.60)
O-level and above	1.54**	(.6)	.13	(.50)
CAMSIS	.004	(.01)	.003	(.01)
Gender Egalitarianism	-1.3***	(.39)	.17	(.38)
Intercept	16.9***	(2.79)	6.72	
Pseudo-R^2	.18			
ll	-202			
BIC	478			

Model including women aged 30-39, who do not have a child along with the CAMSIS measure of occupational stratification at wave 2 of the BHPS *0.10 **0.05 ***0.01 (s.e.), n=227, the base category are those who do not intend to have a child

Table 4.11 includes the results of a multinomial logistic regression incorporating the CAMSIS measure for those of the sample in work only[25]. In the model reported below the variable controlling for earnings has been dropped from the analysis, however, a number of models were estimated, using various combinations of the explanatory variables, and including several measures of occupational stratification. The introduction of CAMSIS does appear to have the effect of reducing the significance of the educational attainment categorizations, in contrast to the reference, as occupation and education both measures aspects of stratification and relative advantage. Other occupational measures were also tested. This included the Hope-Goldthorpe scale (Goldthorpe and Hope 1974), the Registrar Generals Social Class and measures, relating to last employment. However, no measure of occupational stratification disclosed significant results at the individual level, net of the other explanatory measures incorporated in the analysis.

[25] Including only those in work in the model results in an n=208 but no alteration in the substantive interpretation.

There is some evidence of a stratification effect related to relative advantage being captured in the measure of father's occupation. These effects appear to share variance with the education categories measured. Table 4.12 reports the results of two models including fathers CAMSIS score. As can be seen, CAMSIS is significant at p0.10 level of significance in both models. The first model in Table 4.14 includes the educational measure categorization. It can be seen that the level of significance of the education categories has diminished substantially. Dropping education from the estimation increases the significance of the CAMSIS measure, but does not appear to affect the magnitude of the coefficient. In sum the effects of occupational measures of stratification on the intentions of postponers to have a child are, at best, extremely limited when education is already controlled, but there is some evidence of occupational stratification operating through intergenerational advantage. It seems that a postponer whose father scores higher on CAMSIS is more likely that to intend to have a child rather than not, if she has postponed childbearing into her 30s. This could be because an extended family in a more advantaged position could support; alternatively a more advantaged background may indicate transmission of postponement behaviour between generations (though it must be borne in mind that father's CAMSIS is only just significant when controlling for individual educational attainment and with a non-conventional significance level). Therefore there is weak evidence as to the intergenerational transmission of relative advantage influencing childbearing intentions amongst postponing women.

Table 4.12, multinomial logistic regression of intentions of have a child incorporating fathers CAMSIS

Variable	*Model 1* Intends to have a child		Does not know		*Model 2* Intends to have a child		Does not know	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Age	-.56***	(.09)	-.24***	(.07)	-.55***	(.09)	-.24***	(.07)
Has partner	.59	(.43)	-.09	(.40)	.62	(.42)	-.10	(.40)
Education	-	-	-	-	-	-	-	-
Higher	.77	(.75)	-.12	(.64)	-	-	-	-
O-level and above	1.19*	(.67)	-.01	(.56)	-	-	-	-
Fathers CAMSIS	.021*	(.01)	.011	(.01)	.02**	(.01)	.01	(.01)
Gender Egalitarianism	-1.41**	(.47)	.25	(.46)	-1.28**	(.45)	.25	(.45)
Intercept	17.46	(3.16)	7.34	(2.6)	17.99	(3.10)	7.32	(2.61)
Pseudo-R^2	.19				.18			
ll	-161.4				-163.6			
BIC	396				379.3			

*0.10 **0.05 ***0.01 (s.e.) Models including women aged 30-39, who do not have a child along with the measure of fathers CAMSIS, BHPS wave 2, n=227, the base category are those who do not intend to have a child

4.4.3 Weighting and altering the reference category

The analysis presented so far is based upon wave 2 of the BHPS, with no weighting applied. Taking account of the sample weighting has little impact upon the results. Table 4.13 contains models in which the cross sectional weights have been applied (*bxrwght*). It is apparent that there is consistency in the levels of significance. *Model 2* in Table 4.13 switches the reference category from those who do not intend to have children to those who do intend. This aspect of the analysis is not reported by Berrington (2004). As can be seen there are significant differences between those who do not know if they will have a child and those who intend to have a child on a number of the main explanatory variables. The only variable that proved significant in the comparison between those who do not know, and those who definitely do not intend to have a child, was age, which was negative and significant. This suggests that being older lowers the likelihood of a person not knowing if they will have a child in comparison to those intending to have a child. Unsurprisingly, this coefficient remains

significant and reverses its sign when the reference is switched to those who intend to have a child.

However, altering the reference category has the potential to lead to a different set of conclusions about. Both level of educational attainment and gender egalitarianism elicit significant difference between those who intend to have a child and those who do not know. The effects of education are negative and significant in comparison to the reference category of those with low attainment; and the effect of gender egalitarianism appears to be positive in contrast to those with less egalitarian views. These results suggest that a higher level of educational attainment seems to signify that a woman is less likely to be undecided in her childbearing intentions in comparison to those who intend a birth; and more egalitarian views appear to indicate that a women is more likely not to know whether she will have a child in contrast to those who do intend to have a child. What is more, most of these effects are significant at the conventional p0.05 level. This is therefore an arguably more sensible operationalisation of the model than the published version.

4.4.4 A brief examination of intentions amongst people in Scotland

Scotland's experience of the recent fertility decline, and the postponement transition, is comparable to most other countries in a similar situation (chapter 2). The insulation that social structure provides to its potentially childbearing population can be either a facilitator or barrier to relatively early childbearing (e.g. Mills, Blossfeld et al. 2005; Kohler, Billari et al. 2006; Fagnani 2010). The exact structural differences and mechanisms that result in varying fertility between Scotland and the rest of the UK, or

other nations have not yet been empirically demonstrated. Yet given the difference in fertility between Scotland and other parts of the UK it seems plausible that the intentions of those who postpone may be different between nations and this may be related to the differing social structural context in which decisions are made.

Table 4.13, multinomial logistic regression including residence in Scotland

Variable	Does not Intend to have a child		Does not know	
	β	*s.e.*	*β*	*s.e.*
Age	.53***	(.08)	.32***	(.09)
Has partner	.39	(.38)	-.56	(.39)
Education	-		-	
Higher	1.18*	(.69)	-1.41**	(.69)
O-level and above	1.58**	(.6)	-1.65**	(.63)
Scottish	.54	(.66)	1.52**	(.62)
Gender Egalitarianism	1.3***	(.39)	1.54***	(.42)
Intercept	-17.15	(2.8)	-10.53	(2.9)
Pseudo-R^2	.19			
ll	-198.4			
BIC	483.5			

Notes:*<0.10 **<0.05 ***<0.01 (s.e.), Multinomial model contrasting with reports that does intend to have a child, including women aged 30-39, who do not have a child, controlling for whether the woman is resident in Scotland, BHPS wave 2, the reference category are those who intend to have a child

The size of the sample of Scottish residents in the BHPS at the time of Berringtons study[26] is small, however, and with so few cases, lack of statistical power may render productive modelling impossible. However, adding a simple control for whether a postponer is resident in Scotland or, not to the above models, produces interesting

[26] This analysis was repeated at wave 11 of the BHPS, when there was a Scottish boost sample introduced to the study. However, constructing an outcome identical to that described in the main analysis resulted in a sample of just 80 (44 resident in Scotland and 36 non Scottish residents). The contrast between those who intend to have children and those who do not intend to have children, age remains significant at the p<0.001 level. Contrasting those who 'intend' and those who 'don't know', having higher education is significant in comparison to having a-levels and below, at p0.05. Also, in the contrast between the 'intenders' and those who 'don't know' the only other effect of note is the variable controlling for residence in Scotland versus others, which is significant at a p0.07 level. This is without switching weights on. Switching on cross-sectional weights increases the level of significance slightly.

results. Table 4.14 reports the results to a model controlling for those who are living in Scotland at the time of interview. As with *Model 2* in Table 4.13, the contrast category has been set as those who intend to have a child (the significant effect remains when the reference category is set at those who do not intend to have a child), since this brings to the fore significant effects in respect of the contrast between the reference category and the *'does not know'* category. Throughout Berrington's analysis the reference category is those who do not intend first births. This masks the significant contrasts between the 'intenders' and the 'do not knows'.

It can be observed that signs reverse as a result of altering the reference category. Of note is that a number of variables that were non-significant in relation to the 'does not know' category have become significant at the introduction of a variable controlling for women who are in Scotland at wave 2 of the survey. Not only this, but the variables are significant at the p0.05 level, which is not the case in much of Berrington's analysis. Substantively it is difficult to reconcile these results. Table 4.15, below, highlights how few cases are being dealt with in the model. There are only 27 women from Scotland in the analysis, and a small descriptive difference in how they respond to the question regarding their childbearing intentions carries over into significant differences in modelling. Given the significant results it seems reasonable to suggest that the introduction of the Scottish variable into the model may be causing a moderating effect upon the other variables.

Excessive leverage of a few cases may be an issue in these models. A Cook Statistic (Long and Freese 2005: 151, 246) was derived on the logit model estimating the difference between those who intend to have a child and those who *'do not know'*,

controlling for the factors present in Table 4.14, to examine the leverage exerted by each observation. The results suggest there are six cases potentially determining the result of the model. In examining the six cases exerting the highest leverage all are non resident in Scotland and report they 'don't know' whether they intend to have more children. Doing the same in respect of the *'don't know', 'no'* contrast there are two cases which may be exerting excessive leverage, they are also non-Scottish residents who 'do not know' their intentions, whilst on the yes/no contrast there is one case with slightly higher leverage. Removing these cases from the multinomial logit does not alter the substantive findings. This suggests the model is behaving acceptably, an interpretation supported by running a Hosmer and Lemeshow tests upon the logit models (Long and Freese 2005: 156). Highly non-significant Hosmer and Lemeshow tests imply that the models fit the data well[27].

Table 4.14, intentions amongst Scottish residents

Is it likely you will have more children/a child		
	n	*%*
Yes	7	25.9
No	9	33.3
Don't Know	11	40.8
Total	**27**	**100**

number of women from Scotland, aged 30 to 39 and who do not have a child, and their responses to the question of childbearing intentions, source BHPS wave2

However, it is possible that childbearing intentions do vary between Scotland and England and Wales. If the significant results in Table 4.14 were to be accepted then they would suggest that the childbearing intentions of women in Scotland vary systematically from women in England and Wales. This would suggest that women in Scotland who postpone having children into their 30s are more likely to be ambivalent

[27] The yes/don't know, the don't know/no and the yes/no logit models score a p<= .97, .33 and .76 respectively on the Hosmer and Lemeshow Goodness of Fit test.

about their prospects of having a child. The models that do not control for being in Scotland highlight a statistically significant disparity between the characteristics of those who intend to have a child and those who do not. However, controlling for being in Scotland suggests significant difference between those who do not know if they will have a child, and both of the other categories of the outcome. These possibilities may be worth further investigation; given the variation in fertility between Scotland and the rest of the UK, it is conceivable that these effects may reflect genuine differences in childbearing intentions.

4.5 Conclusions

As a case study in replication this chapter encountered difficulties in replicating aspects of the work of Berrington (2004) exactly. It did prove possible, however, to replicate the findings of her modelling, in terms of sign, significance and magnitude of effects, and modelling of intentions. This was despite some disparity in how variables were constructed. It is argued that the ability to reproduce results is a central tenet of science and should also form a *viable* part of social science (Freese 2007; Trieman 2009). The published availability of syntax files would go a long way towards making the work of social scientists replicable. Syntax need not be printed within journal articles, but could be submitted along with papers and, once accepted for publication, published online as part of a journal. In all likelihood this would have the effect of both enabling replication

and making more transparent the research process[28].

The chapter is also successful as an extension of previous work and the results also add to findings in a number of ways. On average those who have not had a child occupy positions within social structure that are comparatively more advantaged. The descriptive comparison between women aged 30 to 39 who have a child compared to those who do not shows that, on average, those who do not have a child are more highly educated, are more likely to be in the top quartile of earners, score higher on CAMSIS and are more likely to intend to have a child. In the view of Leader (2006), Bloemin and Kalwij (2001) or Harper (2003) this represents women exercising choice to get ahead. However, it is difficult to disentangle causation. It is not clear whether women postpone 'positively' because they prefer to achieve career and educational goals, or whether they postpone 'negatively' because having children feels incompatible with careerism.

The findings suggest that socio-economic structural differences intersect with attitudes amongst postponers in a manner that could indicate perpetual postponement. All models imply significant differences between those who intend to have a child and those who do not. Increased educational attainment can be seen to have a negative effect on the probability of being ambivalent about the prospects of having a child. The evidence also appears to show that more educated women who postpone have a higher probability of intending to have a child than women with lower educational attainment, who have also postponed. Why this would be the case is unclear. Perhaps there is a peer effect.

[28] The syntax for analysis of this chapter is provided in Appendix 1. Word count restriction prevents the attachment of additional syntax files. However, they are available upon request, although syntax files in respect of analysis of the SLS may be subject to restricted access.

Women who leave education relatively early start families sooner on average. Perhaps, if a woman from this peer group does not start a family within a certain window of opportunity she is more likely to consider that she will not have children. Alternatively, it may be the case that women who achieve lower educational attainment, and by their 30s have not had a child, are simply more likely to have decided not to have children regardless of peers. These scenarios suggest that women in certain situations are more likely to consider that they have missed their chance in respect of childbearing. This belief could result in 'perpetual postponement'.

Research suggests that women who pursue careers are postponers (Brewster and Rindfuss 2000; Caucutt, Guner et al. 2002; Benzies, Tough et al. 2006). Mills et al. (2004) go as far as to argue that there are two types of women, those who pursue careers and those who have children early. Bloemin and Kalwij (2001) take this further arguing that women who postpone childbearing to pursue careers may end up with lower overall fertility. That postponers score higher on CAMSIS and earnings measures seems to confirm the opportunity cost hypothesis associated with postponement. However, within the postponers group, there is no discernable skew towards the more advantaged careers. Modelling CAMSIS produced no significant results at the individual level. This appears to suggest that if women who pursue relatively advantaged careers end up with reduced overall fertility this is not related to intentions not to have children, as occupational advantage does not appear to influence intentions to have a child net of differences in educational level.

Other aspects of the investigation unique to this chapter are the examination of the effects of regional variation on the childbearing intention and findings associated with

altering the reference category. In recent history Scotland has lower levels of fertility than the rest of the UK. Controlling for the effects of whether an individual is in Scotland at the time of the survey suggests that those in Scotland are more likely to be ambivalent in respect of their childbearing intentions, in answering *'don't know'*. The numbers in the analysis are small, however the results are significant at the $p<0.05$ level. Therefore further investigation into the apparent disparity in childbearing intentions between the nations of the UK may be worth considering. Altering the reference category of the multinomial logistic regression to those who intend to have a child brings to the fore a number of interesting results in contrast categories. With the reference category set as '*do not intend*' only age is significant as compared with the do not know category. However, setting the contrast as the *'intenders*' produces significant contrasts in all the explanatory variables for the '*don't know'* category, apart from earnings. What is more the results are significant at the $p<0.05$ level. This allows it to be seen that having a partner reduces the probability that a woman postponer will be ambivalent (answering don't know) about whether she will have a child. Somewhat intriguingly, having a partner is only significant in respect of the '*don't know*' category, and only with the base category set as intenders. This is interesting as it appears that having a partner makes postponers less likely to be ambivalent about their intentions to have children, but not actually more likely to intend to have a child. Being in a relationship does not appear to be related to whether a woman who has postponed childbearing intends to have a child. Although none of these differences (between models using different contrast categories) are statistically inconsistent, the differences in the interpretation, or emphasis, of model results that can potentially emerge is noticeable. These results serve to re-emphasise the considerable challenges of drawing

consistent conclusions from multinomial measures in statistical models (cf. Hardy and Reynolds 2004).

Chapter 5 - Attitudes: Ideal and Actual Fertility

5.1 Introduction

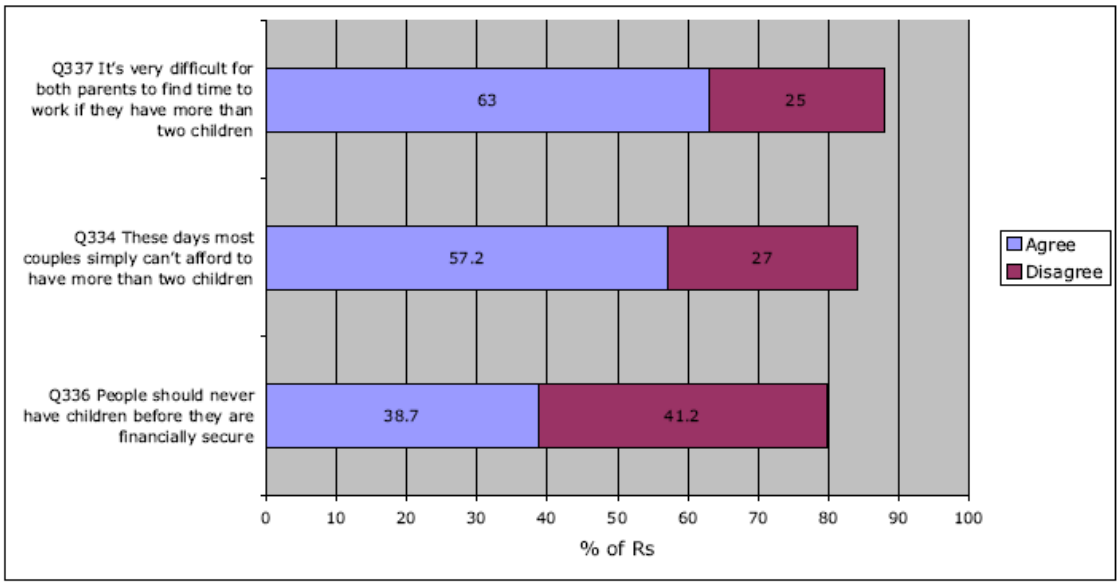
This chapter examines social group variability in attitudes and intentions related to childbearing. This expands upon the analysis of the *Scottish Social Attitudes Survey: Fertility Module* by Dey (2007). The analysis below moves away from the descriptive style of Dey towards multivariate and latent class modelling approaches. The first part of the chapter examines disparities in actual, expected and ideal levels of childbearing. It is argued that questions pertaining to ideal numbers of children result in responses which reference the social norm of the nuclear family, 2.4 children (Girard and Roussel 1982; Coleman and Salt 1992). The second part of the chapter elaborates a latent class approach to the analysis of attitudinal variables which indicate differing aspects of peoples thinking in relation to having children. Variables are available which have been designed to measure attitudes in respect of opportunity cost and financial constraint on childbearing. This is interesting and important as opportunity cost (o/c) and economic theories and models have been criticised as failing to represent how people actually conceptualise having children (Demeny 1981; Robinson 1997). Indeed, the concept of economic rationality as defining human action is widely –although arguably unfairly- criticised (e.g. Hechter and Kanazawa 1997; Zafirovski 2003). The latent class approach taken below is designed to test whether there are distinct groups of people (latent classes) who may answer the attitudinal indicators of o/c and financial constraint in a systematic way. Evidence of latent classes may be taken as support for the criticised o/c theorising. If how people respond on measures of o/c and financial

constraint is seen to be defined by latent attributes then it may be considered that peoples thinking can be measured as systematically relating to aspects of o/c even if, in general, people deny that cost plays a part in childbearing decisions.

5.2 Preliminary analysis and variable operationalisation

Figure 5.1 is an example of the type of univariate analysis that Dey (2007) perform on the attitudinal variables available in the SSAS. As can be seen they bring together three variables constructed as indicators of attitudes in respect of finance and work, related to childbearing. They suggest that those concerned about financial constraint are more likely to want smaller families than those who are less worried about this issue. People who consider that work and earnings may be problematic in terms of childbearing were also likely to want fewer children. It is also reported that responses to these attitudinal variables were linked to low, below replacement fertility ideals, although these results are not presented in the working paper (Dey 2007).

Figure 5.1, responses to attitudinal indicators of financial constraint



Source Dey (2007) p.25, original source SSAS 2005, fertility module

In examining these variables there is no evidence of below replacement ideals related to those who have attitudes denoting concern over childbearing as Dey (2007) present. Indeed, the modelling below suggests fertility ideals may not be systematically related to any measurable socio-economic or demographic factors. Table 5.1 reports frequencies along with the mean ideal number of children of respondents who replied to the statement: *'these days couples can't afford to have more than two children'*. As can be seen, regardless of whether individuals agree or disagree to the question, no category corresponds to an idealized mean of below replacement fertility. The same is the case for responses to the statement: '*it is difficult for both parents to work if they have more than two children'*.

Table 5.1, mean number of ideal children by attitudinal indicators of opportunity cost and financial constraint

	These days couples can't afford to have more than two children		It is difficult for both parents to work if they have more than two children	
	mean	*n*	*mean*	*n*
Agree Strongly	2.52	98	2.52	64
Agree	2.30	282	2.23	353
Neither agree nor disagree	2.3	153	2.43	78
Disagree	2.45	134	2.55	172
Disagree strongly	3.08	12	-	11

source SSAS 2005, n=680 adults of childbearing age, men aged 18-49 and women aged 18-45

The Scottish Social Attitudes Survey records the actual number of births along with the number of children expected, whilst also asking about ideals. The questions on actual and ideal fertility in Table 5.4 (below) are asked to all those of childbearing age, whereas the question on expected childbearing was asked only to those who do not yet have children. The SSAS contains a sample of around 1500 cases. However this reduces considerably once the data begins to be disaggregated. For instance, questions related to

fertility were asked only to women who were aged 18-45, and men aged 18-49. This results in a total sample of 671 responses to the SSAS question regarding ideal numbers of children that individuals would like to have, whilst the question: 'how many children have you borne?' results in 680 responses. These are the two main outcome variables examined in this section. The outcomes used in modelling are expressed in Table 5.3. There is clear skew to both outcomes, and the range of values is not continuous. An appropriate modelling technique for such outcomes is Poisson regression which takes account of the non linearity of the count outcomes (cf. Rabe-Hesketh and Skrondal, 2008). For information, the results of R^2 to linear regressions are reported alongside the results to the Poisson modelling and Pseudo R^2. Generally the results of the equivalent linear regression were close to the results for the corresponding Poisson that has been reported in terms of sign and significance.

Table 5.2, frequencies of ideal and actual numbers of children people would like to have

	Ideal Children	Actual Children
0	50	21
1	55	18
2	320	11
3	141	77
4	71	31
5	17	9
6	10	3
7	7	-
Total	**671**	**680**

source SSAS 2005 , n=680 adults of childbearing age, men aged 18-49 and women aged 18-45

The SSAS Fertility Module also asks about expected levels of childbearing, as well as ideals and actual. Mean total expected fertility appears to be more closely related to the below replacement levels of fertility that have pervaded recent demographic history in Scotland and elsewhere. However, the measure is not directed at the same sample group as the ideal and actual measures which are asked of all people of childbearing age (18-49, for men and 18-45 for women). The measure of expected fertility included in the dataset is asked only of those within these age ranges

who have no children but think that they will have children. This results in an n of 150 on this variable. This is problematic as it excludes those who have no children and may expect to have no children, thus, potentially, inflating the expected level of childbearing by excluding those who do not intend to have children.

Table 5.3, descriptive statistics

(column %, rounded up to whole number)

Variable				
	n	*%*		
Men	302	44		
Women	378	56		
Marital Status				
Married/ living as married	407	58		
Separated/divorced	74	11		
Widowed	6	1		
Never married	193	28		
Level of Attainment				
Degree and above	152	22		
Further qualifications	125	18		
Higher/alevel	148	22		
sg 1-3/gcse or equivalent	128	19		
sg 4-7/gcse or equivalent	49	7		
No quals	76	11		
NS-SEC - occupational categorisation				
Higher Managerial	31	5		
Higher Professional	43	7		
Lower professional and higher technical	108	18		
Lower Managerial	33	5		
Higher Supervisory	43	7		
Intermediate Occupations	71	12		
Employers in small organisations	16	3		
Own Account Workers	24	4		
Lower Supervisory Occupations	63	10		
Lower Technical Occupations	14	2		
Semi-routine occupations	93	15		
Routine occupations	74	12		
Urban-rural 6-fold classification				
Large Urban Areas (population over 125k)	232			
Other Urban Areas (population 10k-125k)	182			
Accessible Small Towns (3k-10k)*	72			
Remote Small Towns (3k-10k)**	49			
Accessible Rural (3k people)*	93			
Remote Rural (3k people)**	52			
Metric Measures	*n*	*mean*	*min*	*max*
Age	680	34.9	18	49
Population density	680	14.5	.04	85.7

* within 30 minutes drive of a settlement of 10,000 or more

** over 30 minutes drive to a settlement of 10,000 or more

n=680 adults of childbearing age, men aged 18-49 and women aged 18-45

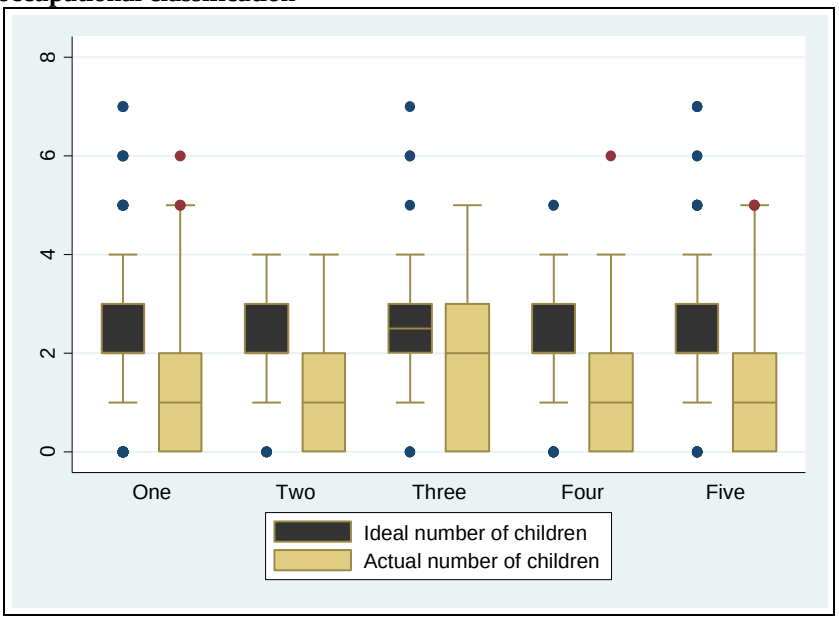
Of those who have no children but think that they will the mean expected number is 1.99. Disaggregating this by men and women the mean number of children the men expected to have is 2.03 and 1.93 for women. The reason that the expected fertility of men is slightly above that of women could be that more women who intend to have more children will already have a child and will therefore have been excluded from the sample - since men delay first birth longer than women (Zhang 2011). Accordingly the measure of *expected fertility* could underestimate overall levels, as many who expect to have higher fertility will already have become parents. This is somewhat confirmed in controlling for expected fertility to 18-24 year olds. The expected mean level of childbearing to people aged 18-24 who have no children is 2.15, slightly higher than the 1.99 of expected fertility of all those who have not had a child but expect to do so. The disparity may be further demonstrated in examining mean ideal childbearing to those in the 18 to 24 year old age group: men in this group have a mean of 2.24, compared to women with a mean of 2.27.

Table 5.4, summary statistics of the outcomes used in modelling

	Question	*Sample*	*Mean (SD)*	*Mean if aged 40-45 (SD)*
Actual Childbearing	Can I just check, how many children, if any, have you ever fathered/ given birth to?	680	1.36 (1.3)	1.86 (.09) n=198
Ideal Childbearing	Thinking in general and regardless of your present circumstances, how many children would you ideally like to have?	671	2.38 (1.26)	2.42 (.09) n=198
Expected Childbearing	How many children do you think you will have/ give birth to in total?	150	1.99 (0.7)	-

source SSAS 2005, n=680 adults of childbearing age, men aged 18-49 and women aged 18-45

Figure 5.2, box plots of ideal and actual childbearing by the NS-SEC occupational classification



source SSAS 2005, n=680 adults of childbearing age, men aged 18-49 and women aged 18-45

The mean overall *ideal number* of children that people would like to have is 2.38. Breaking this down by gender the mean of the ideal number that men would like to have it 2.30, whilst the mean ideal number that women would like to have is slightly higher at 2.41. Table 5.5 disaggregates this further to examine social group variation in mean ideal numbers of children by a variant of the NS-SEC[29] measure of current or last job. There is no obvious pattern in the table of means. The small employer/own account worker category has the highest ideal children number. However, this category includes

[29] A sensitivity analysis was undertaken using various measures of occupational stratification available in the SSAS. The results are similar for each measure. In the absence of a compelling reason to choose a particular measure the NS-SEC measure is used. Other measures of occupational classification available in the SSAS include Registrar Generals Social Class and the Goldthorpe schema. Other measures from which classifications may be derived are also available along with measures of economic status. Included are measures of standard industrial classifications and socio-economic group along with several classifications of economic status. NS-SEC five fold derivation can be found here: http://www.ons.gov.uk/about-statistics/classifications/current/ns-sec/cats-and-classes/ns-sec-classes-and-collapses/index.html

the fewest cases, therefore the confidence intervals are wide. The mean numbers of children that the managerial/professional and the intermediate occupational categories would ideally like to have are slightly larger than the bottom two categories of lower supervisory to routine occupations, but the confidence intervals overlap.

The mean number of children that people from the sample actually have is, as would be expected, substantially lower than their professed ideal fertility. The mean number of children to the sample is 1.34 (and 1.89 for those aged 40-45). The mean number of children to the men in the sample is 1.26, whilst the mean number of children to the women in the sample is higher at 1.44. Table 5.5 also shows the mean number of children for each group in the NS-SEC measure of occupational stratification. As is the case with childbearing ideals there is no obvious pattern to the data. The small employer group 3 of the 5-fold NS-SEC have a considerably higher mean than the other groups; however there are few cases in this category and the confidence intervals are large.

Tables 5.5 to 5.9 compare alternative measures and operationalisations of the main socio-economic indicators of childbearing outcomes taking into account the demographic indicators of childbearing in age, gender and marital status. Table 5.6 compares how different constructions of NS-SEC are related to variation in respect of ideal and expected fertility. The first point of note is that there are no significant differences in childbearing ideals reported on any of the explanatory variables. This is the same across all the models (Tables 5.5 to 5.9). A second point of interest is that collapsing NS-SEC from the expanded 12-fold classification to the five fold measure reduces the explanatory power of the variable. This is apparent in the reduction in R^2 values and in the masking of significant differences between categories of NS-SEC 12-

fold and the higher managerial reference category that are hidden in the 5-fold measure. In general, across Tables 5.5 to 5.9, it is apparent that using more simplified measures reduces the explanatory power in terms of R^2 or Pseudo R^2, and potentially covers significant variation between categories.

Table 5.5, Poisson regressions modelling ideal and actual fertility

	Ideal n=671		Ideal		Actual n=680		Actual	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-	-	-	-	-	-	-	-
Women	.06	(.05)	.07	(.05)	.34***	(.07)	.35***	(.07)
Age	-.001	(.003)	-.001	(.003)	.05***	(.01)	.05***	(.005)
Married/ divorced	-	-	-	-	-	-	-	-
Single	-.05	(.06)	-.04	(.06)	-.43***	(.08)	-.4***	(.08)
Managerial and Technical	-		-		-		-	
Intermediate Occupations	-.05	(.09)			-.01	(.12)		
Small Employers	.12	(.1)			.27*	(.13)		
Lower Supervisory	-.11	(.09)			.05	(.12)		
Semi-Routine & Routine	-.04	(.06)			.11	(.09)		
Higher Managerial			-				-	
Higher Professional			.04	(.11)			-.16	(.16)
Lower professional and higher technical			-.12	(.09)			-.44***	(.12)
Lower Managerial			-.25	(.14)			-.41*	(.17)
Higher Supervisory			-.15	(.12)			-.34*	(.16)
Intermediate Occupations			-.13	(.1)			-.26*	(.13)
Employers in small organisations			.09	(.16)			.017	(.2)
Own Account Workers			.01	(.14)			.043	(.17)
Lower Supervisory Occupations			-.19	(.11)			-.25	(.15)
Lower Technical Occupations			-.19	(.2)			.07	(.25)
Semi-routine occupations			-.12	(.09)			-.16	(.12)
Routine occupations			-.1	(.1)			-.08	(.13)
Constant	.93	(.14)	.98***	(.15)	-16	(.21)	-1.44***	(.22)
Pseudo R^2	0.003		0.006		0.0897		0.098	
R^2 of the equivalent regression model	0.0143		0.028		0.21		0.23	

The models take account of demographic factors alongside the NS-SEC 5-fold and NS-SEC 12- fold occupational classification minus the unemployed, students and non-classified measure of occupational stratification:*<0.10 **<0.05 ***<0.01 (s.e.), source SSAS 2005, adults of childbearing age, men aged 18-49 and women aged 18-45

There are many analyses that highlight the importance of the relationship between setting up home and fertility (Holdsworth and Elliott 2001; Kohler, Billari et al. 2006; Mulder and Billari 2010). Barlow and Duncan (1988) argue that housing tenures do not represent discrete categories of people. The implication of this is that these measures should not be simplistically employed or interpreted as shorthand as something necessarily substantively meaningful. However, Mulder and Billari (2010) show owner

occupation may hinder childbearing because of difficulty in acquiring a family home. It may, therefore, be reasonable to expect that in these cross sectional data a rented tenure will correspond to a higher level of achieved family size, as those who aspire to home ownership delay first birth. The housing tenure variable available in the SSAS makes distinctions between an owning category, local authority renters, housing association renters, other renters and rent free/squatting tenures. There is a slight descriptive difference in the ideal number of children in contrasting renters with owners. The mean number of children that those in rented accommodation would ideally like to have is 2.46 children. However, the mean of those in owned tenure housing would ideally like is only 2.34 children and the confidence intervals overlap. The mean number of children that those who live in owning tenured accommodation have had is 1.34, whereas the mean number of children for those who live in rented accommodation have had is 1.43[30].

Table 5.6 models the more expanded version of the tenure variable and a dichotomised construct comparing owning tenure status with renting tenure status. There are clear highly significant effects associated with the housing tenure measure as those in renting tenures are associated with higher actual childbearing levels.

[30] There is a potentially endogenous relationship between tenure and current levels of childbearing, with factors that influence housing tenure relating to factors that influence childbearing ideals. However, overlapping similarity in mean ideal numbers to people in differing tenures suggests that this is not the case and that ideals a more general.

Table 5.6 poisson regressions modelling ideal and actual fertility and housing tenure

	Ideal n=671		Ideal		Actual n=680		Actual	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-	-	-	-	-	-	-	-
Women	.05	(.05)	.05	(.05)	.31***	(.07)	.31***	(.07)
Age	-.0003	(.003)	-.0003	(.003)	.05***	(.005)	.05***	(.005)
Married/ divorced	-		-		-		-	
Single	-.08	(.05)	-.09	(.06)	-.53***	(.08)	-.56***	(.08)
Owns			-					-
Rents local authority			.1	(.07)			.52***	(.09)
Rents housing association			.08	(.1)			.6***	(.13)
Rents 'other'			.01	(.09)			.003	(.14)
Owns	-				-			
Rent	.07	(.06)			.4***	(.07)		
Constant	.86***	(.14)	.86***	(.14)	-1.8***	(.21)	-1.78***	(.21)
Pseudo-R^2	0.0094		0.0022		0.1006		0.1082	
R^2 of the equivalent regression model	0.0019		0.0112		0.2266		0.2433	

Poisson regressions modelling ideal and expected fertility taking account of demographic factors alongside the housing tenure measure and dichotomised version of the variable, men aged 18-49, women aged 18-45:*<0.10 **<0.05 ***<0.01 (s.e.), source SSAS 2005

Educational attainment is one of the variables most strongly associated with fertility outcomes (Kerckhoff 2001; Bongaarts 2003). As is the case in respect of housing, the association is potentially conflated with age effects, as highly educated young people are less likely to have started a family in the past, whereas young people who have left education early, or older generations who have lower average levels of education, are more likely to have begun family formation and childbearing. Extended longitudinal data offers the most complete control for ageing effects, but limited controls can be achieved for cross-sectional studies by restricting the age range analysed. An alternative explanation of observed variation in fertility outcomes related to education could be related to ideals. It is possible that people at different levels of educational attainment have significantly differing childbearing goals. Descriptively, those with degree level attainment and above indicate that the mean *ideal* number of children they would like is 2.48, whilst those with no qualification at all indicate a mean number of 2.38, suggesting little difference. In contrast, those with higher attainment have slightly fewer children on average. Those with no educational qualifications have a mean *actual*

number of children of 1.78, whilst those with degree level and above have 1.23. This is despite the observed similarity in ideals, and this difference is consistent both for the entire age range and within restricted age groups (see the third column of Table 5.7).

Table 5.7, mean ideal and actual childbearing by dichotomised educational attainment

	Mean Ideal Number of Children		Mean Actual Number of Children		Mean Actual Number of children to 40-45 year olds	
	mean	*confidence interval*	*mean*	*confidence interval*	*mean*	*confidence interval*
Degree	2.48	(2.3-2.7)	1.23	(1.0-1.4)	1.64	(1.3-1.98)
All other qualifications	2.34	(2.2-2.5)	1.34	(1.2-1.46)	1.87	(1.7-2.1)
No qualification	2.38	(2.0-2.7)	1.78	(1.4-2.1)	2.17	(1.6 - 2.7)

source SSAS 2005, n=680, people of childbearing age, men 18-45, women 18-49

Research into childbearing outcomes employs various operationalisations of measures of educational attainment. Hoem and Kreyendfeld (2006) apply a tertiary measure controlling for those with a degree, those with vocational qualifications and all others. Operationalising educational attainment as a binary classification is also common practice (Chanfreau and Cebulla 2009). The educational attainment variable available in the SSAS distinguishes those with no qualifications; people with lower standard grade level and equivalent; people with higher standard grade level and equivalent; people with qualifications at the university entry level; people with further educational qualifications, below degree; and those with degree level attainment and above. Table 5.8 compares the fuller educational attainment variable with a collapsed 3-fold version in a Poisson regression. Interestingly, in a comparison of R^2 or Pseudo R^2's between educational attainment and housing tenure suggests that housing tenure has the greater explanatory power. Additionally there are clear significant differences in levels of actual childbearing net of the demographic effects, as lower levels of qualification corresponds to higher numbers of children.

Table 5.8, poisson regressions modelling ideal and actual fertility- educational attainment

	Ideal n=671		Ideal		Actual n=680		Actual	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-	-	-	-	-	-	-	-
Women	.06(.05)	(.05)	.05	(.05)	.30***	(.07)	.3***	(.07)
Age	-.001(.003)	(.003)	-.001	(.003)	.05***	(.005)	.05***	(.005)
Married/ divorced	-		-		-		-	
Single	-.06(.05)	(.05)	-.06	(.05)	-.47***	(.08)	-.46***	(.08)
Degree			-				-	
Further educ below degree			-.05	(.08)			.1	(.11)
higher/ alevel			-.15	(.08)			-.04	(.11)
sg 1-3/gcse or equiv			04	(.08)			.38***	(.1)
sg 4-7/ cse or equiv			-.01	(.1)			.42**	(.13)
no quals			-.031	(.09)			.46***	(.11)
Degree	-				-			
all other qualification	-.05	(.06)			.2*	(.08)		
no qualifications	-.031	(.09)			.46***	(.11)		
Constant	.93***(.14)	(.14)	.94***	(.14)	-1.7***	(.22)	-1.7***	(.22)
Pseudo-R^2	0.0015		0.0041		0.0947		0.1039	
R^2 of the equivalent regression model	0.0075		0.02		0.2191		0.2281	

Poisson regressions modelling ideal and expected fertility taking account of demographic factors alongside full and collapsed measures of educational attainment, men aged 18-49, women aged 18-45:*<0.10 **<0.05 ***<0.01 (s.e.), source SSAS 2005

Chapters of this thesis show that measures of geography elicit significant effects on fertility outcomes (chapters 6 and 7) although there is some debate over the utility of geographical measures in this context (Wilson 1990; Boyle 2003). Measures of geography available in the SSAS include indicators of Local Authority council areas; the Scottish Household Survey's urban rural measures (Granville, Mulholland et al. 2009); and population densities. The urban/rural measures and the population density measures are incorporated into the analysis below in various forms (Table 5.9). Population density is included as a linear variable and as categories of quartiles. Urban/rural distinctions are examined as a six-fold categorical classification and as a collapsed three category variable; the three-fold urban/rural measure distinguished 'city/large urban', 'town' and 'rural' areas. Table 5.9 compares the performance of various measure of geography that are available in a Poisson model. Despite some differences in the R^2 values no significant effects are noted in respect actual or ideal

childbearing on any of the geographical measures tried, net of the demographic indicators (although Table 5.9 only reports results for actual levels of childbearing).

Table 5.9,poisson regressions modelling actual childbearing - and standard geographies

n=680	Actual		Actual		Actual		Actual	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-	-	-	-	-	-	-	-
Women	.31***	(.07)	.31***	(.07)	.31***	(.07)	.31***	(.07)
Age	.05***	(.005)	.05	(.005)	.05***	(.005)	.05***	(.005)
Married/ divorced	-		-		-		-	
Single	-.39***	(.08)	-.	(.08)	-.41***	(.08)	-.4***	(.08)
Large urban							-	
Other urban							..1	(.09)
Small town							.14	(.11)
Remote town							.24	(.13)
Accessible rural							.1	(.1)
Remote Rural							.06	(.13)
Urban					-			
Town					.14	(.09)		
Rural					.04	(.08)		
Population band 1			-					
Population band 2			-.02	(09)				
Population band 3			-.11	(.09)				
Population band 4			-.17	(.1)				
Linear population density	-.003	(.002)						
Constant	-1.5***	(.21)	-1.4***	(.21)	-1.6***	(.21)	-1.6***	(.22)
Pseudo-R^2	0.084				0.0883		0.0891	
R^2 of the equivalent regression model	0.1977				0.2022		0.2038	

Poisson regressions modelling actual childbearing taking account of demographic factors alongside measures geography: Urban rural 6-fold, Urban rural ad-hoc 3-fold, Population density quartiles, Linear population density:*<0.10 **<0.05 ***<0.01 (s.e.), source SSAS 2005

5.3 Examining the combined effects of socio-economic and demographic variables and their relationship to ideal and actual levels of childbearing

Tables 5.10 to 5.12 combines a number of the explanatory variables outlined above in modelling ideal and actual fertility. There are no significant effects evident in respect of ideal levels of childbearing on any of the independent indicators (Table 5.11). However, the models predicting the effects of the explanatory variables upon the actual level of childbearing experienced by the sample report many significant differences. For reasons of presentation the more concise operationalisations of the variables are reported in Tables 5.10 and 5.11, however the final models are also presented at the more differentiated variable level, Table 5.12.

Tables 5.10 and 5.11 build the models contrasting the effects of adding and removing independent variables and the explanatory power of the models fluctuates depending upon the variable introduced. Again, housing tenure accounts for the greatest additional amount of variation explained of all the socio-economic variables tried (net of the demographic factors included). The model incorporating a version of all socio-economic indicators (model 6) reports the largest Pseudo R^2; however there are is no significant influences of the NS-SEC measure or population density in this model. Model 7 removes these variables and the loss of overall explanation is minimal. Table 5.10 suggests that combining the socio-economic indicators into one model reduce the significant effects reported. As discussed in chapter 4, instruments capturing education, occupation, housing tenure and geography may be considered to overlap in what they are measuring. Tables 5.5 to 5.9 show that the expanded versions of the categorical socio-economic indicators contribute most to explain the number of children that individuals have. Table 5.12 therefore presents the expanded version of the variables in combined models along with a control for age-squared. The models in Table 5.12 represent a relatively substantial improvement upon the models in Table 5.10, not only in Pseudo R^2 values but also in significant effect.

It can be seen in Table 5.12 that the demographic indicators of age, age-squared, sex and marital status are highly significant. Women have a higher number of children in contrast to men. This is likely to represent later childbearing amongst men (Zhang 2011). The quadratic effect of age suggests that actual numbers of children increase with age but the rate declines at older ages. Renting is positive and significant in comparison to owning, as is having a lower overall level of educational attainment in

comparison to those with degrees and above. In an obvious disparity between the more succinct variable operationalisations and the more expanded version, the full NS-SEC measure elicits a number of significant results that are completely masked using the 5-fold edition of the measure. The contrasts with the higher managerial reference category this suggest fewer children to those in occupations below the highest occupational category, net of the effects of the other explanatory factors included. This is somewhat against a perception that people who are relatively less economically advantaged have higher numbers children[31].

5.4 Discussion

In their analysis of the SSAS data Dey (2007: 30) argue that below replacement fertility *'cannot be attributed to low aspirations or ideals'*. However, this chapter interprets the measures in a different manner. It is argued here that that the ideal measure is an indicator of the *maximum* ideal level of completed fertility that may be expected to people in Scotland. However, the meaning of the significant differences in actual childbearing highlighted in modelling is open to debate. In a cross-sectional analysis variations in the numbers of children that are apparent to people in different social groups may be conflated with age and year of birth differences, especially since other

[31] This is a commonly expressed belief amongst members of the public and can also find political credence alongside arguments around levels of benefits. For instance a google search *'do poor people have more children'* will turn up many blogs and forum debates where the belief is expressed (e.g. http://answers.yahoo.com/question/index?qid=20090609083123AAp0sOm). A similar well publicized view was recently expressed by ex-MP and Conservative Party peer, Howard Flight, who suggested that welfare cuts 'incentivise the poor to breed' (http://www.channel4.com/news/tory-peer-welfare-cuts-encourage-poor-to-breed). This controversy has been ongoing at least since Malthus' Glass, D. V. (1953). Introduction to Malthus. London, Watts&Co. essays on population.

chapters of this thesis show that timings of births are related to social stratification (chapters 7 and 8). The cross sectional survey mode does not allow a full control for possible cohort effects: older people are more likely to be close to completed fertility and those most likely to experience early childbearing may well bias the measured socio-economic effects. However, the models still suggest cross sectional differences in levels of childbearing to those of childbearing age in Scotland[32].

This difference between ideals/expectations and realized fertility within the UK has been noted before, for example by Coleman and Salt (1992). Of principal interest here is that socioeconomic differences result in differences in outcomes, at least in terms of timing of births. However, the same differences appear unrelated to fertility ideals. The results above show that there are no social group differences in ideal childbearing but that difference in outcomes may be related to socio-economic circumstances. The fertility ideals identified by respondents to this survey are not enormously high, comfortably above replacement (at around 2.3), but well below levels of fertility that people have historically experienced (Smout 1986). The interpretation of the fertility ideal measure is also open to debate. It is interpreted here as intending to capture the imagined level of childbearing that would occur if there were no constraints on actions. However, given that people are asked to imagine fertility in idealized circumstances and they respond with an aggregate level mean of around 2.3, it should not be surprising that real world total fertility rates struggle to remain close to 2.0. This would indicate

[32] From the cross sectional data it is impossible to disentangle whether this is tempo or quantum. However, it is very likely that the differences captured here refer largely to tempo effects that conflate with age. Analysis presented later in the thesis further asses tempo of births using longitudinal data.

that ideal fertility levels of around replacement are the result of social norms to aim for a relatively modest family size (Woods 1987; Coleman and Salt 1992), whilst total fertility rates, or completed fertility rates below this level are due to the effects of socio-economic or individual real world circumstances which influence how far people achieve ideals.

Table 5.10, poisson regressions modeling actual childbearing

Actual number of children	**1**		**2**		**3**		**4**		**5**		**6**		**7**	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-		-		-		-		-		-		-	
Women	.32***	(.07)	.34***	(.07)	.30***	(.07)	.31***	(.07)	.31***	(.07)	.31***	(.07)	.3***	(.06)
Age	.05***	(.004)	.05***	(.01)	.05***	(.004)	.05***	(.005)	.05***	(.005)	.05***	(.006)	.05***	(.005)
Married/ divorced	-		-		-		-		-		-		-	
Single	-.42***	(.08)	-.4***	(.08)	-.47***	(.08)	-.4***	(.08)	-.53	(.08)	-.52***	(.08)	-.55***	(.08)
Managerial and Technical			-								-			
Intermediate Occupations			-.01	(.12)							-.08	(.12)		
Small Employers			.27*	(.13)							.18	(.13)		
Lower Supervisory			.05	(.12)							-.1	(.12)		
Semi-Routine & Routine			.11	(.09)							-.07	(.09)		
Degree +					-						-			
Other qualification					.2*	(.08)					.16	(.09)	.16*	(.08)
No qualifications					.46***	(.11)					.35**	(.13)	.33**	(.12)
House Owner									-		-		-	
House Renter									.40***	(.07)	.37***	(.07)	.35***	(.08)
Pop Density							-.003	(.002)			-.003	(.002)		
Constant	-1.54***	(.21)	-1.6***	(.21)	-1.67***	(.22)	-1.49***	(.21)	-1.8***	(.21)	-1.79***	(.23)	-1.87***	(.22)
Pseudo-R^2	0.087		0.09		0.095		0.088		0.10		0.107		.104	

*<0.10 **<0.05 ***<0.01 (s.e.), source SSAS 2005, n=680, people of childbearing age, men aged 18-49, women aged 18-45

Table 5.11, poisson regressions modelling ideal childbearing

Ideal number of children	**1**		**2**		**3**		**4**		**5**		**6**	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-		-		-		-		-		-	
Women	.06	(.05)	.06	(.05)	.06	(.05)	.05	(.05)	.05(.05)	(.05)	.05	(.05)
Age	-.001	(.003)	-.002	(.003)	-.001	(.003)	-.001	(.003)	-.0003	(.003)	-.001	(.003)
Married/ divorced	-		-		-		-		-		-	
Single	-.07	(.05)	-.05	(.05)	-.06	(.05)	-.05	(.05)	-.08	(.06)	-.05	(.06)
Managerial and Technical			-								-	
Intermediate Occupations			-.05	(.08)							-.04	(.09)
Small Employers			.12	(.1)							.14	(.11)
Lower Supervisory			-.11	(.09)							-.12	(.09)
Semi-Routine & Routine			-.04	(.06)							-.04	(.07)
Degree +			-		-						-	
Other qualification					-.05	(.06)					-.06	(.07)
No qualifications					-.03	(.09)					-.06	(.1)
House Owner									-		-	
House Renter									.07	(.06)	.09	(.06)
Pop Density							-.002	(.001)			-.003	(.002)
Constant	.89***	(.13)	.93***	(.14)	.93***	(.14)	.92***	(.14)	.86***	(.14)	.96***	(.15)
Pseudo-R^2	.0012		.0029		.0015		.002		.0019		.0055	

*<0.10 **<0.05 ***<0.01 (s.e.), source SSAS 2005, n=671, people of childbearing age, men 18-45, women 18-49

Table 5.12, poisson regressions modelling actual childbearing

Actual number of children	**1**		**2**		**3**	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Men	-		-		-	
Women	.23***	(.07)	.23**	(.08)	.24***	(.08)
Age	.27***	(.05)	.29***	(.05)	.28***	(.05)
Age²	-.003***	(.001)	-.003***	(.001)	-.003***	(.001)
Married/ divorced			-		-	
Single	-.36***	(.08)	-.45***	(.08)	-.47***	(.08)
Owns			-		-	
Rents local authority			.44***	(.1)	.44***	(.1)
Rents housing association			.58***	(.13)	.55***	(.13)
Rents 'other' (inc' rent free/squatting)			-.07	(.14)	-.07	(.14)
Higher Managerial			-		-	
Higher Professional			.08	(.16)	.06	(.15)
Lower professional and higher technical			-.29*	(.12)	-.29*	(.12)
Lower Managerial			-.28	(.17)	-.31	(.17)
Higher Supervisory			-.31	(.16)	-.31	(.16)
Intermediate Occupations			-.25	(.13)	-.26	(.13)
Employers in small organisations			.04	(.2)	.06	(.2)
Own Account Workers			-.05	(.18)	-.07	(.18)
Lower Supervisory Occupations			-.43**	(.15)	-.42**	(.15)
Lower Technical Occupations			-.05	(.26)	-.07	(.26)
Semi-routine occupations			-.29*	(.13)	-.28*	(.12)
Routine occupations			-.27*	(.14)	-.28*	(.14)
Degree			-		-	
Further educ below degree			.17	(.11)	.17	(.11)
higher/ alevel			.06	(.12)	.08	(.12)
sg 1-3/gcse or equiv			.36**	(.12)	.38**	(.12)
sg 4-7/ cse or equiv			.44**	(.15)	.43**	(.15)
no quals			.41**	(.14)	.4**	(.13)
Large urban			-			
Other urban			.1	(.1)		
Small town			.21	(.12)		
Remote town			.1	(.14)		
Accessible rural			.18	(.11)		
Remote Rural			.1	(.13)		
Constant	-5.2***	(.83)	-5.8***	(.88)	-1.75***	(.24)
Pseudo-R²	0.0979		0.1397		0.1375	

source SSAS 2005, *<0.10 **<0.05 ***<0.01 (s.e.), n=680, people of childbearing age, men aged 18-49 women aged 18-45

What is perhaps most interesting about these results is that it is argued that fertility goals are revised with age (Mitchell and Grey 2007). These models suggest that there is no significant revision in fertility ideals with age. Ideals are not expectations however; expectation implies that there is a belief that the level of childbearing will be met, while ideals suggest the perfect number of children that would be liked. Although Coleman and Salt (1992: 130) use data from the General Household survey to show that expectations, like ideals, remain consistently above replacement across a period of declining fertility. Of further note is the relatively large explanatory value associated

with housing tenure as indicating the number of children people have. Research often incorporates educational attainment as a stratification measure strongly associated with childbearing (Cleland 2002; Bongaarts 2003; Fanti and Gori 2010); however the findings above suggest that housing tenure is a measure more strongly related to the outcome than educational attainment. Also, no significant effects were reported on any measure of geography incorporated into modelling and any increase in R^2 or Pseudo R^2 at the introduction of a geographical variable was marginal. Finally, the use of expanded categorical indicators as opposed to ad-hoc approaches to collapsed variables and even officially recommended collapses such as the NS-SEC 5-fold are seen to be sub-optimal in terms of explanatory power.

5.5 A Latent Class approach towards reconciling opportunity cost and attitudes related to childbearing

> *'Children are clearly an important household asset but the demand theory approach fails to take account of several unique features of children'*
>
> (Robinson 1997: 67)

The preceding section examines the outcome measures available in the SSAS related to ideal, expected and actual experienced fertility. This section examines some of the wider attitudinal variables captured in the SSAS. Economic, and versions of rational choice explanations of childbearing have had a large theoretical and empirical impact in the study of fertility (Demeny 1981). However there has been criticism of this type of approach as it seems to equate children with goods and services (Demeny 1981; Cleland and Wilson 1987; Robinson 1997). This is coupled with more general criticism that

economic rationality does not define human action (Hechter and Kanazawa 1997; Zafirovski 2003). In terms of meanings, parents generally disagree that money or income should, or does, play a role in deciding to have a child (Ralston 2007). This can be seen in the SSAS where people aged 18-49 without children were asked if they would delay having children until they have a higher income; a three quarters majority said they disagree that they would (see table 5.13).

'Meanings' in childbearing do not square particularly well with rational choice or economic explanations of fertility. The interpretation of the types of binary response presented in table 5.13 is not straightforward. It is often not exactly clear what attitudinal indicators are capturing (Schuman and Presser 1996). For instance, that three quarters of the sample deny that they would wait until they earn more money before having children seems likely to relate to a social norm noted by Zelizer (1985), that children should not be equated or related directly to financial resources, as children may be supposed to be considered priceless. This normative convention explains why potential parents might deny that money plays a direct role in childbearing decisions.

It can also be seen in Table 5.13 that over half the sample agree that it costs too much to have more than two children. However, most prospective parents say they would not wait until they have a higher income before having a child. There is a slight inconsistency in these responses. A tabulation of these variables suggests that those who say *they would not wait* until they have a higher income to have a child agree that couples *cannot afford more than two* (table 5.14, below). More than half of those who say they would not wait until they have higher income to have their first child agree that people cannot afford to have more than two children. This inconsistency may represent

a qualitative difference in how people enter parenthood, as opposed to extending their families. The decision to have a first child may genuinely not involve an economic calculation, whilst the decision to stop at two may well involve money. However, it is likely that these types of attitudinal questions also capture aspects of normative responses; especially around such a sensitive subject such as childbearing (Schuman and Presser 1996; Ralston 2007).

Table 5.13 frequencies of responses to attitudinal questions around the issue of childbearing

	Can't afford <2 children		People should not have a child until they are financially secure		Would you delay having a child until you have a higher income?		
	n	*%*	*n*	*%*		*n*	*%*
Disagree	146	22	238	35	Yes	46	24
Neither agree or disagree	36	5	138	20	No	147	76
Agree	498	73	304	44			
Total	**680**	**100**	**680**	**100**	**Total**	**193**	**100**

Notes: % rounded up to nearest whole number, source SSAS 2005, men aged 18-49, women aged 18-45

Table 5.14, cross-tabulation of responses to attitudinal questions around the issue of childbearing

	Would you delay having a child until you have a higher income?	
These days couples can't afford more than 2 children?	*Yes*	*No*
Agree /agree strongly	33	78
neither agree nor disagree	8	36
Disagree/disagree strongly	5	32

chi square 2.87 p=<0.09, n=193 men aged 18-49 and women aged 18-45 who have not had a child source SSAS 2005

The denial of financial calculation seems likely to represent an unwillingness to equate finance directly with having children. However, the question on whether people should wait until financially secure allows parents to suggest that financial calculations do occur in relation to childbearing. This may be partly because they are not being asked to directly relate to their own experience, they are being asked in generality. The responses show that around 35% of respondents disagree but around 45% agree that people should have a certain financial wherewithal in terms of childbearing. This distribution sits

somewhere between the response distributions for whether people would delay having a child until they have a higher income and whether couples can afford to have more than two children these days. The indicator may well cut across norms of perceived appropriate action. The question plays upon an ideal of financial independence and contrasts this to the norm that children and money should not be part of the same consideration. In this sense this question arguably indicates which social norm is stronger. If this is the case then the belief that money should not be related to childbearing is well tested.

In order to deny that finances should be related to children people disagree that you should be financially secure when you have a child. Financial security means different things to different people, yet, in a sense, this question asks respondents whether they consider it okay for people to have children who may not be able to afford to provide for them, and a large minority agree that this scenario is okay. This does not seem logical but is explicable in terms of competing social norms related to priceless children (Zelizer 1985) and the importance of financial independence (Sabotka 2004). However, implying an inability to provide for children, as the question does, is not the same as flatly stating that parents cannot afford to provide. This ambiguity may well explain the relatively even distribution of responses to the question. In any case the responses to these measures are taken as capturing, in a complex manner, the ambiguity across the issues of the material and opportunity costs of childbearing. Seemingly conflicting responses represents a tendency to suggest that *other people think about money when having children but I don't* (Ralston 2007).

5.5.1 Latent Class Analysis

The preliminary analyses of the cross tabulations above seems plausible (see also Dey, 2007). However, there are a large range of attitudinal variables in the SSAS and analysis in this manner is rather unsophisticated. The forthcoming analysis attempts to extend the descriptive exploration by taking a latent class approach to the examination of these responses. McCutcheon (1987) describes latent class analysis as enabling '*the researcher to identify a set of mutually exclusive latent classes that account for the distribution of cases that occur within a crosstabulation of observed discrete variables'.* This offers potential to expand upon previous analyses of these data using an appropriate and interesting methodology. For instance, it has been argued in this chapter that overall fertility ideals are normative social values. However, moving towards childbearing goals is affected by individual and socio-economic circumstances. It is possible that people are also defined by their attitudes to childbearing.

There are many potential categorical indicators of fertility attitudes available in the SSAS. Some variables are associated with the perception of the strengths and weaknesses of the local area for bringing up children. Other variables are associated with perceptions of the opportunity versus cost of bringing up children, whilst others are designed to measure gender role attitudes. There are, at least, twenty variables available that attempt to capture different attitudes and perceptions related to childbearing. However, this type of method becomes impossible when many categorical variables are employed that incorporate relatively few cases, since there will be sparsity in a matrix of all possible combinations of response, making statistical modelling unreliable. Limiting the number of variables and their numbers of categories is only a

partial resolution to this. The use of too few variables can result in estimation problems as parameters can easily outnumber degrees of freedom in models incorporating only few variables (Goodman 2009). This is quite limiting in terms of the practical application of latent approaches to categorical data: too many variables lead to sparseness, but too few may mean there is not enough information to estimate a model.

Table 5.15, latent class model estimating a two class model on three indicators of financial constraint upon having children

Observed Variables	Probability of response Response type *Latent Class 1*	*Latent Class 2*
Difficult for both parents to work if you have children	0.9878	0.4406
Can't afford <2 children	0.6907	0.3973
Should not have children until financially secure	0.9155	0.6381
Relative Class Frequency	0.5305	0.4695

X-squared = 0.0004 (0.0000)
L-squared = 0.0004 (0.0000)
BIC(log-likelihood) = 2426.3331
AIC(log-likelihood) = 2394.6785

n=680 men and women of childbearing age, men aged 18-49, women aged 18-45, source SSAS

Results from a latent class model, incorporating the variables identified by Dey (2007) as defining financial constraints, is shown in Table 5.15 (The financial constraint variables are displayed in Figure 5.1). This model tests the hypothesis that there are 2 latent classes underlying the pattern of responses to the financial constraints variables included in the SSAS. As can be seen, a significant chi square value is reported which shows that the variables are related in a structured and systematic manner, and not wholly predicted by the two latent classes. The hypothesis that there is one latent class was also tested, with the same result. It proved impossible to test for more than two latent classes without restricting response probabilities because there are too few degrees of freedom (Goodman 2009: 18).

The two class model estimated in Table 5.15 can be rejected. However, analyzing it as if it were a valid model, the relative class frequency cells estimate the size of each class. This would suggest that 53% of respondents are in latent class one with 47% of respondents in latent class two. The estimated probabilities reported in respect of each variable predict the probability that those in each class will respond a certain way to each question. In this case it is the probability that the respondent does not disagree with the question statement, as opposed to explicitly agreeing. Therefore those in latent class one would have a probability of .99 of agreeing to the statement that it is '*difficult for both parents to work if you have children*'; a .69 probability of agreeing to the statement that '*these days couples can't afford to have more than two children*'; and a .92 probability of agreeing to the statement that '*couples should not have children until they are financially secure*'. The probabilities of those measured in latent class two of agreeing with these statements are far lower, at .44, .40 and .64 respectively. However these interpretations are questionable as the variables are not independent.

That the variables are not independent is sensible given that each attempts to measure the same underlying concept. All of the indicators are formulated to capture attitudes to financial constraint upon childbearing. Therefore how people respond to one of the questions predicts how they will respond on another. This provides some evidence of validity that the variables may be capturing the concept as intended. However, there are variables designed to capture differing attitudinal concepts related to childbearing. For example, there are several other variables that can be considered to measure opportunity cost in relation to childbearing, of which financial constraint is only a part. Table 5.17, below, reports the result of a latent class model including two of the variables outlined by Dey (2007) as indicating financial constraints on fertility along with two variables

considered to indicate opportunity costs of childbearing. This includes the variables *'children are dependent too long these days'* and *'the stress and worry of bringing up children is enough to put people off having children at all'* (see Table 5.16).

Patterns of responses to indicators of attitudes related to fertility are complex. The indicators capture differing underlying beliefs and attitudes. Also there are relatively clear normative attitudes, such as denying financial or material motives in one's own childbearing. In contrast, responses on other indicators of financial cost are more evenly distributed. This suggests there may be differences in attitudes underlying responses. This can be tested in the manner outlined above using a latent class approach. The model in Table 5.17 combines attitudinal indicators constructed to capture two differing concepts, financial constraint and opportunity cost. On the one hand differing types of people may respond in differing ways to the questions as social differences influence timing of birth in a manner related to opportunity cost. However, people tend to respond to questions related to attitudes in childbearing normatively, by, for instance, denying the importance of direct financial implications in having children.

Table 5.16 distributions of responses to the variables included in the latent class model

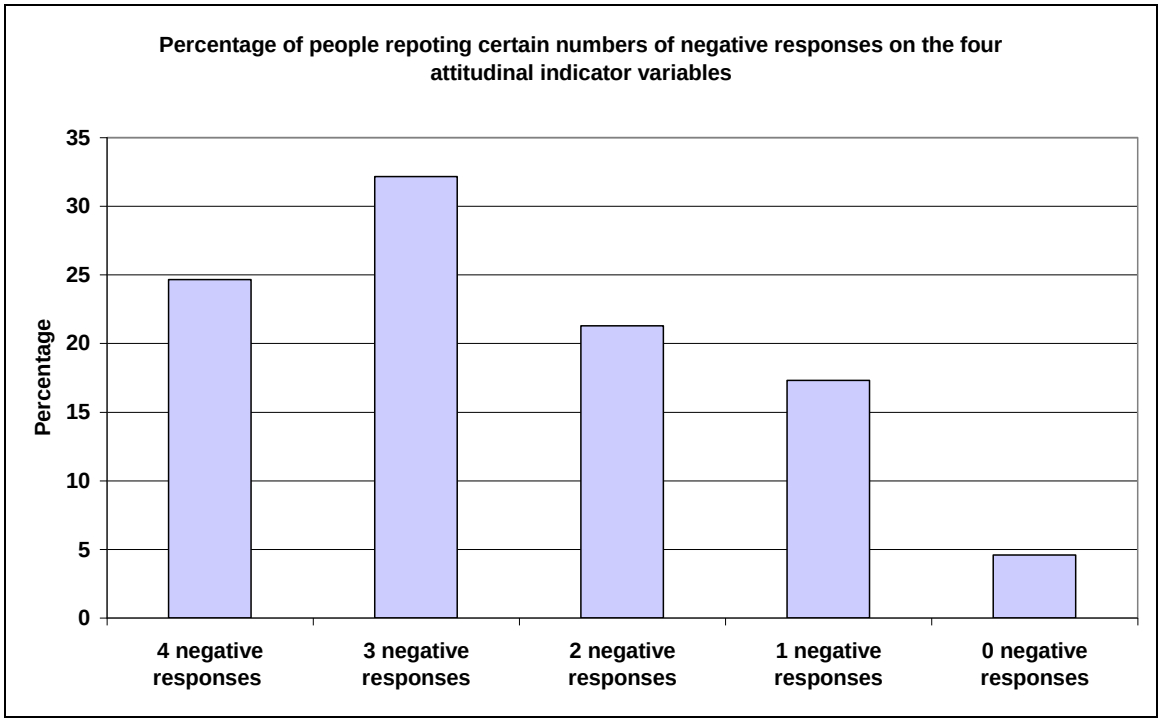
	Financial Constraint		*Opportunity Cost*	
	Can't afford >2 children	Difficult for both parents to work if you have children	Children are dependant too long	Stress puts people off children
Disagree	146 (21.5%)	497 (73.1%)	191 (28.1 %)	323 (47.5%)
Don't Disagree	534 (78.5%)	183 (26.9%)	489 (71.9 %)	357 (52.5%)
Total	**680**	**680**	**680**	**680**

People of childbearing age, men aged 18-45, women aged 18-49, see Dey (2007) for further introduction to the variables, source, SSAS 2005

Table 5.16, reports distributions of responses to the variables included in the latent class model in Table 5.17. The indicators are collapsed from the five categories of the likert response into dichotomies. Those who explicitly disagree with the statements are

contrasted with those who do not disagree[33]. The responses to the two measures of financial constraint have a reversed distribution in degree and do not disagree categories. The final two responses to the indicators are split about 70% - 30%, the response and 50%-50%. There is not necessarily an obvious overall pattern across the responses. Fitting a latent class model to these data is testing the hypothesis that there is an underlying latent variable which would explain the pattern of measured responses.

Figure 5.3, percentage of negative responses



Source: SSAS 2005, Graph reports the percentage of the sample of 680 who respond negatively on the indicators outlined in Table 5.16 along with the number to which they respond negatively.

[33] The 'do not disagree' category is made up of those who agree, strongly agree or do not know in replying to the statement. The category has been labelled the do not disagree category for the sake of accuracy as it contains both those who agree with statements but also do not know whether they agree or disagree. The 'disagree' category is made up of those who disagree and strongly disagree with the statement. The do not disagree category is also referred to as the agree category, this may be slightly confusing; however it is done to avoid a double negative.

Figure 5.3 reports the percentage of the sample of 680 who respond negatively on the indicators outlined in Table 5.16, along with the number they respond negatively to. Each of the indicators specifies some potentially off-putting aspect of having and raising children, related to finances or non monetary costs. For the first 3 statements a negative response is therefore taken as not explicitly disagreeing with the statement, and a 'do not know' response is also characterized as negative. This is done so that only an affirmative disagreement with each statement is distinguished as positive, whereas a *do not know* response does not count as a firm disagreement. The final statement, '*it is difficult for both parents to work if you have children*', is more ambiguous. In continuity with the other variables a *'don't disagree'* response was treated as representing a negative outcome in terms of gender equality (having children generally being associated with women taking time out of the workplace [Brewster and Rindfuss 2000]). Arguably, however, the *'disagree'* response could be taken as negative here as implying that having children requires both parents to work. The requirement of two working parents would therefore be a negative as the choice to stay at home and look after children is denied by financial/opportunity cost constraints. Figure 5.3 shows that only a small percentage respond positively to all four indicators, giving no negative responses. However, over 50% respond negatively on three or all four indicators.

The model (Table 5.17) combines the measures of attitudes related to the opportunity costs of having children and attitudes considered to relate to the financial costs of children. The results suggest that there may well be differing latent classes underlying the responses on the indicators. Unlike the model reported in Figure 5.16, a non significant chi-square, and likelihood ratio chi-square, suggests that the variables are

formally independent of one another. This result confirms there are two distinct latent classes underlying the pattern of responses. There is one class in which there is a higher probability of respondents explicitly **disagreeing** with the statements denoting some difficulty in having and raising children ("*Positive about the impacts of childbearing")*. In the other class there is a lower probability of **disagreeing** with the statements regarding the difficulty of having children ("*Negative about the impacts of childbearing")*.

Table 5.17, latent class model estimating a two class model to indicators measuring the financial constraints and the opportunity cost of having children

Observed Variables	Probability of response Response type *Latent Class 1* Positive about the impacts of childbearing	 *Latent class 2* Negative about the impacts of childbearing
Can't afford <2 children	0.67	0.29
Stress puts people off children	0.77	0.26
Children are dependant too long	0.44	0.16
Difficult for both parents to work if you have children	0.49	0.11
Relative Class Frequency	0.41	0.59
X-squared = 10.2629 (0.1140) L-squared = 10.3528 (0.1106) BIC(log-likelihood) = 3441.9306 AIC(log-likelihood) = 3401.2318		

The probabilities reported to each of the latent classes refers to the likelihood of providing a 'disagree' response to the attitudinal indicators, n=680 men and women of childbearing age, men aged 18-49, women aged 18-45, source SSAS

The relative class frequencies suggest that the more positive class accounts for 41% of respondents whilst the more negative class accounts for 59%. The response probabilities reported refer to the probability of a respondent from each class providing *'disagree'* response on each of the indicators. The results suggest that the first class has a higher probability of disagreeing with the statement that *people cannot afford more than two children* and that *stress puts people off having children* than the second class. However, both classes have probability of lower than .5 of disagreeing that *children are*

dependant too long and that *it is difficult for both parents to work if they have children*. The second latent class has a considerably lower probability of responding in disagreement to the same indicators, a probability of below 0.2. There is a clear difference between how the two classes are likely to respond to the statement indicators. This is particularly interesting as they represent differing underlying concepts. The first statement measures financial constraint whilst the second measures opportunity cost. Therefore there is a group of people who are far more likely to disagree with the statements '*these days couples can't afford more than 2 children'* and '*stress puts people off having children'*, when an examination of the distributions alone would lead to a conclusion that the minority of people disagree that couples can not afford more than two children and 50% disagree that stress puts people off having children. There is a sizable minority who are likely to answer these questions in a consistently more positive manner.

The work of Dey (2007) examines attitudinal variables related to fertility outcomes available in the SSAS. In so doing they offer a comprehensive breakdown of responses and frequencies of response. The analysis above offers a direction in which the study of the attitudinal variables related to childbearing and available can be expanded. This research suggests that, in principal, a latent class style approach has something to add to the study of attitudes around childbearing. The latent variable approach suggests that differences between people that may underlie patterns of response on differing attitudinal indicators can be brought to the fore. This can potentially help to disentangle complex patterns of responses on a large range of categorical indicators. An analysis of frequency distributions (Table 5.17) alone leads to no obvious conclusions. Whereas, people appear to respond to variables measuring financial constraint in a particular, and

often negative, way (see Table 5.16 above). However, modelling the distribution of cases results in identification of a latent class which is more positive and a latent class which is more negative and this latent class approach cuts across the different concepts underlying the indicators included in the model. This is empirical evidence that people respond systematically to indicators of o/c and financial constraint in childbearing. Contrary to criticisms that attitudes in childbearing do not correspond to economic rationality (Demeny 1981; Robinson 1997) this shows that attitudes to parenting might be reconciled with economic theorising.

5.6 Conclusions

Dey (2007: 30) argue that *'low fertility in Scotland cannot be attributed to low aspirations or ideals'*. The mean ideal number of children that the sample of 18-49 year olds in the SSAS would like to have is 2.38. However, in historical terms, a total fertility rate of 2.4 would be quite low (see, Smout 1986). For this reason, and in some contrast to the analysis of Dey (2007), this chapter explicitly characterizes fertility ideals in Scotland as relatively low. Thus people in the UK generally aim for and expect to have around 2 children (Coleman and Salt 1992). This gives primacy to the role of social norms, in a similar manner to that defined by Caldwell (1976) and Woods (1987) in determining fertility. However, within overall ideals there are differences between expected and actual levels of fertility, and the tempo and quantum levels of these are influenced by socio-economic and demographic circumstances. Therefore theories of action take affect within the overall norms of childbearing but the norms ensure, or define, overall levels of low fertility, whilst socio-economic processes and

circumstances of childbearing influence timings (tempo), and to what degree idealized norms will be reached (quantum).

This chapter also offers support for rational choice explanations of fertility. Becker (1991: 145-149) posits that there is a direct relationship between quality and quantity that can explain demand for children. Therefore, according to Becker (1991), the interaction between the economic cost of having and raising children and their quality in terms of time and money invested in them can be used to directly predict fertility. Easterlin (1975) expresses this relationship between quality and quantity in childbearing in terms of consumer behaviour theory. That is, parents maximize satisfaction given a range of goods, their prices and their own tastes and income (Easterlin 1975: 54). The assumed equivalence between children and general finances or consumption has been a critique of this type of theorising (Demeny 1981: 314-318). As highlighted above, people will generally deny any financial calculation in their childbearing intentions. However it is also suggested that people agree in principle that finances may play a role in some circumstance and will explicitly attribute financial motive in *others* (Ralston 2007).

This chapter employs latent class analysis to examine patterns of responses on measures of attitudes of people of childbearing age in relation to indicators of financial constraint and opportunity cost. The findings offer support for rational choice frameworks or explanations of fertility, with complex distributions of responses belying a normative response to refute a financial calculation in childbearing. This is what Zelizer (1985) refers to as the priceless child. Simply examining frequencies of univiraiate, or bi-variate, responses to opportunity cost indicators and financial constraint indicators

presented may lead to the conclusion that economic theorising does not relate to childbearing attitudes. Incorporating the same variables capturing aspects of opportunity cost and financial constraint into a latent class model suggests there are two classes of people, one likely to systematically respond to the questions more positively, and the other to respond more negatively. This is evidence that, contrary to the view that people's attitudes to childbearing are incompatible with economic/opportunity cost theorising (Demeny 1981; Robinson 1997; Zafirovski 2003), people engage with measures of attitudinal o/c in a systematically measurable manner. However, rational action/choice frameworks need to take cognizance of overall normative structural processes in which action is taking place.

Chapter 6 - First Birth in Scotland: An Examination of the Scottish Longitudinal Study

6.1 Introduction

This chapter along with chapters 7 and 8 presents an extended examination of evidence on family formation from the Scottish Longitudinal Study (SLS). The SLS is a dataset particularly suitable for analysts interested in childbearing. It offers great potential given the large sample available, the data from multiple points in time, and the variety of explanatory variables captured in these data. In terms of the effects of socio-economic or socio-demographic circumstances on fertility related outcomes in Scotland, the SLS offers unrivalled potential to disaggregate the data by social groups of interest; there is no other dataset of comparable size that contains equivalent information with such a large Scottish sample. SLS data includes measures of occupational position, educational attainment, geographies and many other potentially relevant and interesting measures, together with important indicators of childbearing such as relationship status and age.

The research presented across the chapters where the SLS is examined seeks to elaborate a number of research themes. The general aims are to assess the effectiveness of standard measures of geography in explanation of individual level processes of first birth and to examine how social structure may be considered to influence the timing of first birth in Scotland. The concept of a threshold of fertility that may explain deviations in tempo of first birth between different social groups is also put forward. This is outlined as the culmination of thinking arising from the thesis and as a potential focus

for future investigation. Each chapter also elaborates a different research design adopted to work with the structure of the SLS. This chapter begins the analysis of these topics by first outlining the data examined in this chapter. Some of the potentially limiting aspects of these SLS data are then looked at, and different research strategies are put forward which seek to manage the structure of the data to achieve the research goals. Analysis is undertaken, and initial conclusions offered in light of limitations.

6.2 Data Derivation

The sample drawn in this chapter includes all those aged 15-25 in 1991. The dataset extract contains data for individuals across 15 years, between the Census of 1991 and 2006. Those who are 15 years old when first observed at Census 1991 will be approximately 30 years old by the end of the observation period in 2006. Likewise, those who are 25 when first observed are 40 by the end of the period of observation. The outcome variable used for this analysis is a measure of whether and at what time an individual had what is presumed to be a first birth (see further discussion below) during the period. In this case Census 1991 until 2006 is the time period for which vital events data was available at the commencement of this project. This outcome was generated with information regarding the timing of the birth from vital events records to create an outcome appropriate for event history analysis[34].

[34]The duration outcome is a measure of months since age 15 until first recorded birth. It is calculated as the year of the event (minus the uncompleted year in which the event occurred) multiplied by 12 (to change the time into months plus the month of the event); the year of birth of the case is subtracted along with the uncompleted year of their birth, this is also multiplied by 12, with month of the cases birth

The analysis includes explanatory variables at Census time points, 1991 and 2001. Relationship status is controlled for. The Census variable upon which this is based does not distinguish within the category 'single' between those in a cohabiting relationship. The initial analysis is therefore undertaken using the relationship status variable categorizing single, married and in post marriage states of widowed, divorced and re-married.

Variables that measure geography, occupational category and educational attainment are incorporated into the analysis. There are two main measures of occupational categorisation available in the SLS, the Registrar General's social class (RGSC) and National Social Economic Classifications (NS-SEC). Standard Occupational Classifications (SOC codes) are also available from which other measures of occupational classification can be derived. There are also measures of relative deprivation or housing tenures which provide alternative measures of social stratification. The analysis reported in this chapter is conducted using RGSC. Educational attainment is also modelled. The measures available at 1991 and 2001

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added; I then subtract 180 months as representing the 15 years that the individual was not at risk of first birth between the ages of 0-14. This is augmented with a censor coded 1 if the individual experiences a first birth and 0 if no first birth is experienced whilst under observation. The duration works so that those who experience a first birth are given the duration from the start of the risk period until the event, whilst those who do not experience a first birth are given a value denoting the start of the risk period until the time last observed in the data. These measures were constructed following Blossfeld (2007: 42-46) on how to structure event history data for analysis in Stata.

differ in some respects. At 1991 the Census form specified that a respondent should indicate their level of further and higher education along with professional qualifications. This excludes the possibility of measuring variation associated with school level qualifications. However the 2001 variable is more differentiated and makes further distinctions between school level qualifications.

There are various measures of geography in the SLS, for example, the Scottish Household Study's 6 fold urban rural classification, politically defined regional councils, population densities and Townsend Deprivation measure are included. The urban rural classification allots an SLS member to a category based on the size of population of their place of residence and proximity to other conurbations. The urban/rural classification is employed in the analysis in the first instance as a systematic measure of geography (Granville et al. 2009), however population densities and Townsend Deprivation measures are also modelled in chapter 7. The models also control for raised religion in order to test whether religious upbringing may relate to differing timings of first birth, perhaps related to socio-economic status or religious teaching (Gráda and Walsh 1995, Hayford and Morgan 2008, MacQuillan 2004). The reference category is set as non-religious contrasted with those from a Church of Scotland background, those who are other Christians and those with no religion. The 'other' categories do not add substantively to the analysis as they are an amalgam of a number of religions which are less widely practiced in Scotland.

6.3 First birth outcome

Data on births parities are not widely available for Scotland. Information on numbers of births, or whether a woman has experienced previous childbearing, is not officially

collected when births are registered. The study here employs a proxy, based upon co-residence with children as a control for previous childbearing. This is constructed from two minimal household unit (Ermisch and Overton 1985) variables *(MHUPOS# and MHUTYP#)* available in the SLS at Census time points. The first of these variables identifies the composition of a family unit; the second identifies the position of an individual within a family. The sample is constructed to contain only those identified as living in family units with no dependent children. The sample also contains SLS members who are identified as being dependent children in the family. Anyone who is 15 to 25 years old and who does not live with a dependent children, or who is a dependent child, and within that age range is included in the models.

This approach treats a birth to an individual who is identified as not living with a dependent child or children within the minimal household unit as childless. Anyone who has a birth, or becomes a father, subsequently is treated as experiencing a first birth. Anyone who is co-resident with children is considered to have already become a parent and is excluded from the sample.

This means of controlling for previous childbearing according to current co-residence is imperfect. However, there are reasons to believe it to be an adequate proxy for previous childbearing. The *one child method* (OCM) uses a similar technique by matching individuals to children within households based upon criteria such as age, residential status and relationship to the head of household (Coleman and Dubuc 2010). The OCM is a reverse survival method primarily applied to construct fertility rate measures. Matching on head of household is undertaken to minimise the opportunity of associating a child with the wrong mother in accommodation where more than one

household resides. The OCM is often applied to survey or Census data to construct fertility rates for minority groups when more exact data is unavailable (Dubuc 2009; Coleman and Dubuc 2010). Using the minimal household unit variables to control for previous childbearing should similarly ensure that an adult who is resident with a child in the same household, but is not the parent of the child, is not removed from the analysis. This is because the minimal household unit is based upon different families that reside in a residence (Ermisch and Overton 1985). Families who reside in the same household are treated separately when categorised by minimal household unit.

The weaknesses of this method are that the co-residence proxy cannot exactly control for the previous childbearing of an individual. Childbearing is known to be underreported in Census and survey data (Dubuc 2009). Where parents are non-resident or do not report residence with their children they are treated as having no children. This may occur because children are moved to care, or because of adoption. Child mortality could also affect the figures (Coleman and Dubuc 2010). This could affect men more than women. Men who father children out with a stable relationship, or whilst very young, or who have split from a partner after having children are less likely to be resident with those children than women in the same situations (Manning, Stewart et al. 2003). However, men are less likely than women to become a parent at a young age (Cannon 2009). Where children have been previously adopted out then these cases may be treated as having no-children. Although, (Murphy and Berrington 1993) suggests that the numbers of adopted children and step children are small in the UK.

The cohort chosen limits the numbers of people who will have experienced previous childbearing. It can be expected that negligible numbers of 15 or 16 year olds will have

experienced births/parenthood prior to their incorporation in the Census 1991. Equally it can be expected that there will be non-negligible numbers at the older age groups who will have had a child previously. An example of this can be seen from Figure 6.1 charting frequencies of births to the 1975 birth year cohort by age. Most of these will be removed from the analysis by the co-residence proxy. Table 6.1 below, shows an equivalent sample of 15-25 year olds at 1991 drawn from the British Household Panel Survey (BHPS) (more details in Appendix 3). The table shows whether they have a child of their own within their household. 85% of 18-25 year olds do not live with their own child and 15% do. Only 8% of men from this age group identify themselves as living with their own children and 22% of women. The sample includes those from England and Wales and is not restricted to Scotland.

Table 6.1, frequencies of people aged 15-25 living with their own children

	Men	**Women**	**Total**
No children	843	693	1536
Co-resident children	72	194	266
Total	*915*	*887*	*1802*

Source, BHPS, data from wave a

Using BHPS data it is also possible examine the accuracy of the co-residence proxy. An analogous co-residence proxy was constructed from a variable denoting household type (*ahhtype*) and another variable denoting individual location within the household (*ahgr2r*). This was applied to the sample of all those aged 15-25 at wave a 1991, n=1802, and compared to the measure where the actual residence with own children is captured (*anchild*). In this comparison the proxy places 93% of cases in the correct category, see table 6.2. This suggests that the proxy constructed in this manner using the SLS will closely reflect the actual level of parenting and wrongly assign very few cases.

Table 6.2, comparison of co-residence proxy with the actual reported measure of residence with children to men and women aged 15-25

	No children proxy	Has children proxy	Total
No children	1500	15	1515
Has children	19	247	226

Source, BHPS wave a n=1781 (21 missing cases), phi=0.92, chi sq=0.000

A second check of the first birth outcome was undertaken using the BHPS. Individuals are asked whether an individual lives with their own children. It is also asked whether an individual has ever had children (*blnprnt*)[35]. In principle this includes children that the respondent is a parent of, but does not live with. However, this is only asked from the second wave of data collection. The total number of 15-25 year olds the first wave is 1802. This reduces to 1398 who respond to the question on ever having a child. This is primarily the result of data missing on the variable captured at wave 2. 32 cases who are not classified as co-resident with children at wave 1, but who are at wave 2 are removed from the analysis (*anchild==0 & bnchild>=1*). Similarly to the comparison provided in Table 6.2 there appears to be very few cases misclassified. In sum the measure of co-residence is not an exact control for previous childbearing. However, there is precedence in methodology of using similar controls to link children to parents (Dubuc 2009, Coleman and Dubuc 2010). Also, analysis of an equivalent sample using the BHPS shows the method to be a reasonable proxy. Some further evidence is presented in Appendix 3. The data are there modelled using the proxy and comparing this with the actual control measures. It is shown that the proxy results match very closely to the results when the actual measure is used.

[35] Documentation on the BHPS including variable names and descriptions are hosted at the Institute of Social and Economic Research web pages.
http://www.iser.essex.ac.uk/bhps/documentation/volb/allwaves.html

Table 6.3, comparison of co-residence proxy with the actual reported measure of previous parenthood to men and women aged 15-25, reported at wave 2

	Parent	Not a parent
No children	29	1140
Co-resident children	216	13
Total	245	1153

Source, BHPS wave a and b, phi=0.89, chi sq=0.000, n=1398

6.4 Further Limitations

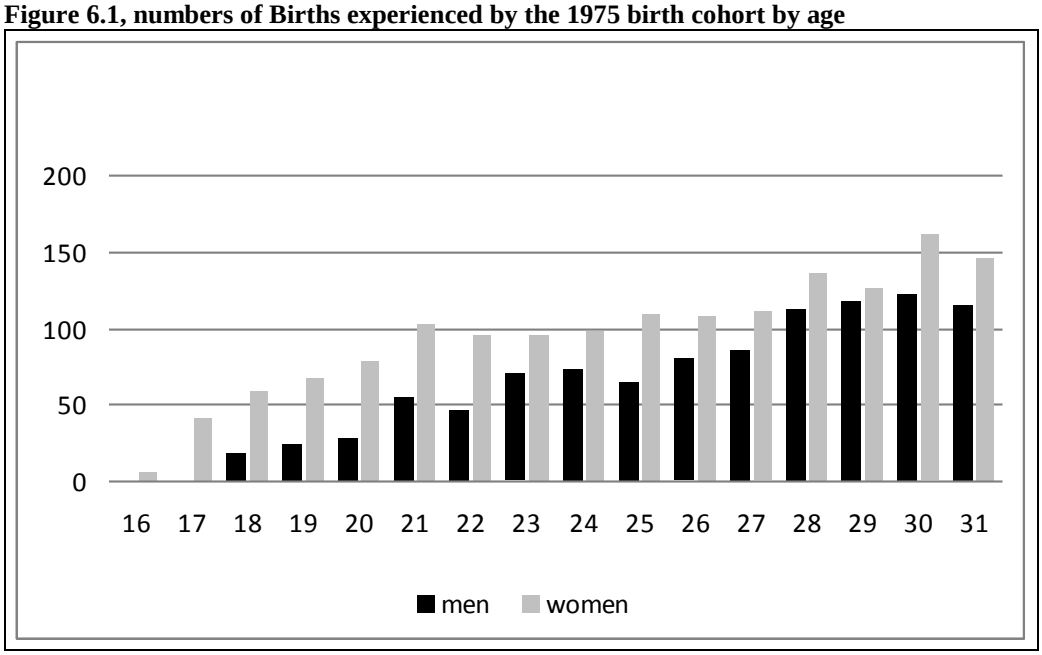
This analysis may be limited in a number of key ways and differing strategies are adopted across chapters 6, 7 and 8 do deal with this. The issues of censoring are amongst the most problematic to event history analyses. These data, like much event history data, are right censored (Blossfeld, Golsch et al. 2007). It is not known whether, or when, an event occurs after the period of observation ends. Conventional estimation techniques for event history models as employed do control for the distributional problems of right censoring, but they cannot adjust for major unanticipated empirical patters of right-censoring (Allison 1984). The analyses in this chapter are also subject to left censoring which is correlated to other explanatory variables, whereby, for some cases, it may not be known if, or when, a first birth event occurred prior to the period of observation. These differences can be expected to correlate to age and other variables such as education and marital status (themselves variables that correlate to age). As discussed above, left censored cases are generally removed using the co-residence proxy. Despite this problem several of the findings presented in the following chapters prove robust across several different research designs.

The data that are right censored are '*missing by a known mechanism for right truncated observations*' (Yamaguchi 1991:5). This is similar to the concept of '*Missing at Random'*, because the timing of the end of observation is independently determined

from the hazard rate (ibid). Left censored cases may be more problematic. In the case of full left censoring, because the mechanism whereby the data are missing is unknown and because this is an unknown function of the hazard rate a selection effect occurs which may seriously bias parameter estimates (Yamaguchi 1991:7). The average age of first birth for women in 1991 was 27.4 in Scotland; the average age for fathers was 30.0 (GROS 2008). The cohort used in this analysis samples all people aged between 15-25 in 1991. It can be hoped that the volume of left censored cases may be reasonably small and that the relationship between year of birth and likelihood of left-censoring may be inconsequential to other analysis.

A number of cases will also be partly left censored. This occurs to individuals who are not fully observed in the data at the start of the risk period, although the timing of the onset of the risk period is known (Yamaguchi 1991:5). They then go on to experience a first birth whilst under observation, or they remain in the data until the time of right censoring. The main problem with these cases is that the values of explanatory variables are unknown at the onset of the risk period. The cohort of those aged 15-25 years old is chosen to render analysis employing variables captured at 1991 and 2001 meaningful. An alternative to this is to use explanatory variables available at 2001, or to choose a birth year cohort where measures available are entirely applicable. Variables available at 2001 are employed on birth year cohorts from 1975 and 1976 in the following chapter, this ‘resolves’ the problem of left censoring but an issue of causal inference remains. Adopting older birth year cohorts introduce furthers left censoring.

Figure 6.1, numbers of Births experienced by the 1975 birth cohort by age



The y axis denote the frequencies of births n=4884, number of births= 2548, source SLS

The critical question is whether censoring undermines the interpretation of results. The models may deal adequately with the problem of right censoring. The concern is whether any bias introduced by full left censoring renders conclusions drawn invalid. A large majority of cases are not fully left censored whilst many are partly left censored, however the numbers of cases fully left censored are non-trivial, and there is a relationship between left-censoring probabilities and other key explanatory variables (Fig 1). The analysis presented in this chapter is therefore sub-optimal.

The analyses in chapters 7 and 8, along with this chapter, represent differing approaches to work with the structure of SLS data. A longitudinal outcome is available; the timing of birth, if experienced, during the period of observation. This is an outcome appropriate for event history analysis (Allison 1984, Blossfeld et al. 2007, Yamaguchi 1992). Yet analysis of this type may be rather limited. As has been shown, caught

between a rock and a hard place, the analysis can be either subject to left censoring, biasing parameter estimates, or have difficulty incorporating explanatory variables sensibly.

Table 6.4, total sample sizes

	Men aged 15-25 years in 1991	Women aged 15-25 years in 1991
Total	30458	33257
Minus those co-resident with dependent children at 1991	24108	24135

Source, SLS

6.5 Analysis of the Main Effects

Separate Cox proportional hazard models estimating the effects of the key explanatory variables on the timing of first birth to men and women are outlined below. The models also control for relationship status and age. Table 6.5 shows results from models which feature women of whom roughly two thirds experience a birth during the period of observation. Marital status and educational attainment are particularly widely incorporated as predictors of childbearing generally (e.g. Lillard et al. 1994, Smith and Ratcliffe 2009). Relationship status is included as dummy variables, the contrast category being the relationship status single in 1991. Age is included as a metric variable. Examining relationship status coefficients for model 1, it can be seen that all the dummy categories have positive coefficients except widows, who have negative. A positive coefficient reflects the hazard of first birth being higher for those in the category as compared to the reference category (Blossfeld et al. 2007, Yamaguchi 1992). Substantively, those with positive coefficients are quicker on average to experience first birth than those of the reference category, though formally it is the hazard function that is estimated.

Table 6.5, Cox models measuring the main effects of RGSC, educational attainment and the urban/rural 6-fold classification on that birth outcome to women aged 15-25 in 1991

Women		Model 1		Model 2		Model 3	
		β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Marital status at 1991	**Single 91**	-	-	-			
	Married 91	.83***	(.03)	.81***	(.03)	.82***	(.03)
	Remarried 91	1.34***	(.24)	1.38***	(.24)	1.34***	(.24)
	Divorced 91	.68***	(.11)	.62***	(.11)	.65***	(.11)
	Widowed 91	-79	(.7)	- .81	(.7)	-.86	(.7)
	Age	-.16***	(.008)	-.13***	(.005)	-.13***	(.003)
RGSC at 1991	**Professional**	-					
	Managerial Technical	.25**	(.08)				
	Skilled non-manual	.18*	(.08)				
	Skilled Manual	.5***	(.08)				
	Partly Skilled	.25*	(.08)				
	Unskilled/forces	.14	(.09)				
	Not in work	-.07	(.08)				
Educational Attainment at 1991	**Degree or Higher**			-			
	Further Qualification			.14*	(.05)		
	No Higher or Further Qualifications			.27***	(.04)		
	Not Stated			.11	(.06)		
	Not Completed U-18, in			.27***	(.05)		
Urban rural geography at 1991	**City**					-	
	Town					.06**	(.03)
	Small Accessible					.02	(.03)
	Small Remote					.08	(.04)
	Accessible Rural					-.03	(.02)
	Remote Rural					-.03	(.04)
Log likelihood		-155058.86		-156298.83		-156320.31	
births		16552		16657		16657	
n		23982		24135		24135	

* p< 0.05 **p<0.01 ***p<0.001, source SLS

It can be seen below that the coefficients for the married status dummy category is positive as compared the single reference category (Table 6.5). There are negative coefficients, for the widowed category but as none of these are significant for any of the models the coefficient cannot be usefully interpreted (given the age range of the sample it is reasonable to that this may have a negative impact upon their hazard of first birth). The differences between the categories themselves are not of great substantive interest. For instance, that women who are remarried or divorced at Census 1991, from a sample which contains only those aged 15-25 at this time point,

have a higher probability of first birth than singletons is to be expected. However, many of those legally single in 1991, who experience a first birth during the period of observation measured in these models may well have married (or cohabited) prior to this birth; the data available in the extract upon which this analysis was done did not allow marital status at time of birth to be measured, and accordingly it is likely that the true effect of marital status may be attenuated by measuring it in terms of status in 1991 only. The measures are suspect because the mean age of the married group can be expected to be higher than the singletons. Women in a relationship are in general more likely to experience a first birth, this contributes to the chance that the coefficient is biased because the singleton category is bound to contain people who subsequently got married and had children. The variable is an imperfect control of the effect of marital status on the timing of the measured birth.

Women within education are more likely to delay first birth and marriage until they have finished school, college or university (Berrington 2004, Mills et al. 2005). However, the measure of education at 1991 is a limited control for this as those with higher attainment are likely to be older, conflating age and educational attainment. There are some significant comparative effects evident on the RGSC measure. For women, being in the professional category seems associated with delay in birth. The manual working category suggests a positive contrast with the reference, whilst not being in work is negative and significant. There are also some significant effects evident relating to urban/rural geography measured at 1991 (see Models 3, in Tables 6.5 and 6.6). However the process whereby this differentiation occurs is not necessarily clear in terms of geography affecting first birth. It may be the case that people from different areas have children at different times, resulting in different

likelihoods of first birth; or it may be the case that people from different areas have varying probabilities of first birth because the geographical variable captures individual level socio-economic differences between the types of people living in different areas. Examining these main effects controlling for age and marital status it would appear that measures of occupation, educational attainment and urban/rural geography may each influence the hazard of first birth for women within the limits discussed above.

Table 6.6, Cox models measuring the main effects of RGSC, educational attainment and the urban/rural 6-fold classification on that birth outcome to men aged 15-25 in 1991

Men		Model 1		Model 2		Model 3	
		B	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Marital status at 1991	**Single 91**	-	-	-			
	Married 91	.98***	(.03)	.98***	(.03)	.98***	(.03)
	Remarried 91	-.38	(.7)	-.61	(.7)	-.61	(.7)
	Divorced 91	.07	(.17)	.09	(.17)	.07	(.17)
	Widowed 91	-	-	-	-	-	
	Age	-.1***	(.004)	-.1***	(.005)	-.1***	(.003)
RGSC at 1991	**Professional**	-					
	Managerial Technical	.009	(.06)				
	Skilled non-manual	-.07	(.06)				
	Skilled Manual	.21***	(.06)				
	Partly Skilled	.06	(.06)				
	Unskilled/forces	.06	(.06)				
	Not in work	-.3***	(.06)				
Educational Attainment at 1991	**Degree or Higher**			-			
	Further Qualification			.25***	(.06)		
	No Higher or Further Qualifications			.30***	(.04)		
	Not Stated			.08	(.06)		
	Not Completed U-18, in			.25***	(.06)		
Urban rural geography at 1991	**City**					-	
	Town					.07**	(.02)
	Small Accessible					.09**	(.03)
	Small Remote					.02	(.05)
	Accessible Rural					.02***	(.03)
	Remote Rural					-.05	(.04)
Log Likelihood		-132126.17		-133489.35		-133512.69	
births		14045		14155		14155	
n		23904		24108		24108	

* p< 0.05 **p<0.01 ***p<0.001, source SLS

The main effects models controlling for age and marital status for men yields a similar general interpretation to the equivalent models for women. There are significant positive effects evident on each of the explanatory variables as compared to the reference. The only significant relationship category (compared to single) for men is married. Systematic differences between those single and those who are married in 1991 are to be expected. It may be relevant that men marry later than women (Wilson and Smallwood 2008) and are also more likely to have children at a later age than women. Certainly there are fewer birth events recorded to men aged 15-25 (over 16000 for women whilst over 14000 for men). It is plausible to interpret part of this as being due to men becoming fathers at later ages than women become mothers, and therefore the younger men may be less likely to become fathers whilst observed. However it may also be the case that parenthood for men is under reported. Vital events data is drawn from the collection and registration of life events, and where a man is uninvolved in the birth of his offspring, or where the mother has decided to omit the father from registration, then he will not be linked to the birth. Thus some first births to some men may be omitted from the outcome. However, registration records are almost certainly as close as it is possible to get to the true numbers of births to men.

There is a negative effect associated with age for men in the same manner as for women. The measure remains problematic for men as age is associated to educational attainment and employment. How left censoring comes into play in the interpretation of results is difficult to say as it is reasonable to expect that, because men are more likely to have births at later ages, the male risk-set experiences substantially different volumes of left censoring. If this is the case it would mean that estimates in respect of men are less affected by the omission of those who are thought to be parents.

Most of the significant coefficients are positive for all explanatory variables as compared with the reference categories controlling for age and marital status. This is the case for men and women. The only exception to this is the not in work category for men. This indicates structured differences between those in the reference categories who would be likely to delay first birth and those of the other categories who are relatively quick to first birth and thus have a higher probability of experiencing a first birth whilst observed. It is possible to take the exponential of the log of the natural hazard reported here (Allison 1984), which will provide the hazard ratio and may add some more colour to the interpretation. Thus, women with no qualifications at Census 1991 have a hazard ratio of experiencing a first birth in the interval between time *t* and *t + s,* 31 per-cent higher controlling for age and marital status than women with degrees at Census 1991. Likewise unskilled men have a hazard 23 per cent higher than professional men of experiencing a first birth in the interval between time *t* and *t + s* given that they have not experienced the event until that point controlling for the other factors.

6.6 Variables at the 2001 Census time point

Findings referred to above are generally borne out when employing the variables available at the 2001 Census. Levels of significance increase using variables from 2001, as does the amount of variation on indicator variables between dummy and reference categories. Many of the cohort, who at 1991 were in the younger age categories, will have transitioned through school, into work and relationships by this time point. The overall sample size has fallen, however. There are more cases missing using data from this time point.

Table 6.7, Cox models measuring the main effects of RGSC, educational attainment and the urban/rural 6-fold classification on that birth outcome to women aged 15-25 in 2001

Women		Model 1		Model 2		Model 3	
		β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Marital status at 2001	**Single 01**						
	Married 01	1.04***	.02	1.02***	.02	97 ***	.02
	Remarried 01	1.04***	.06	.95 ***	.06	.95 ***	.06
	Divorced 01	.89 ***	.03	.85 ***	.03	.89 ***	.03
	Widowed 01	.85 ***	.17	.92 ***	.17	.88 ***	.17
	Age	-.16***	.003	-.17***	.003	-.16***	.003
RGSC at 2001	**Professional**	-					
	Managerial Technical	.23 ***	.05				
	Skilled non-manual	.55 ***	.05				
	Skilled Manual	.69 ***	.05				
	Partly Skilled	.86 ***	.05				
	Unskilled/forces	1.12***	.06				
	Not in work	.97 ***	.07				
Educational Attainment at 2001	**Degree or Higher**			-			
	Further Qualification			.19 ***	.03		
	High School 2			.39 ***	.03		
	High School 1			.66 ***	.02		
	No Quals			.89 ***	.03		
Urban rural geography at 2001	**City**					-	
	Town					.13***	.02
	Small Accessible					.16***	.03
	Small Remote					.19***	.05
	Accessible Rural					.1 ***	.03
	Remot Rural					.18***	.04
Log likelihood		-128878.24		-129488.33		-133109.18	
births		14393		14467		14765	
n		18902		18974		19369	

* p< 0.05 **p<0.01 ***p<0.001, source SLS

As above, those who have been married are more likely to experience a birth. The occupational measure elicits interesting significant effects. People who are in the less advantaged occupational categories appear more likely to experience earlier childbearing. There are also differences between men and women. The results for women suggest a linearly increasing effect on the RGSC measure comparing each occupational dummy category with the reference. For men, there appears to be either no significant difference, or a very small effect between the professional reference and the managerial technical and skilled non-manual classes. In contrast the skilled manual, partly skilled and unskilled categories report differences that are similar in magnitude and significantly different from the reference.

The relationship between time to first birth and education is as would be expected for men and women. There are significant contrasts between the dummy categories and the degree and above reference category, and the contrast effects appear to linearly increase with lower levels of education. Of some note is the significant relationship between the urban/rural geographic measure and the timing of birth. The level of significance is larger incorporating the measure at 2001, as are the magnitude of the effects captured. This is the case for both men and women.

6.7 Modelling the Combined Effects: Occupational Stratification, Attainment and Geography

Table 6.9, below, combines the measures of occupational category, attainment and geography outlined above. In this way it is possible to examine whether urban/rural geography accounts for variation in the hazard of first birth when individual level factors are controlled for. Examining the effects of the indicator variables controlled for at the 1991 Census there is little evidence of a significant relationship between a birth and urban rural/geographical location. The only contrasts that show significant variation are between the city reference and the town and small accessible categories. However, the socio-economic indicator variables of occupation and educational attainment do not report much significant variation either.

Of the indicators incorporated marital status and raised religion provide the most explanation. The importance of marital status as a predictor of childbearing has been discussed and the interpretation of the effects of marital status on the hazard of first birth should be circumspect. What is controlled for is the effect of marital status at Census 1991 on the hazard of first birth. Some will go on to marry subsequent to 1991

and then have a child, but these people are in the single category. The results show that those who are married in 1991 have a higher hazard of first birth than those who are single at 1991. This is the direction of effect that would be expected, as are the positive significant effects in respect of women who are re-married or divorced. The ones who are re-married are known to be within a potentially childbearing relationship, those who have already experienced a first birth are left censored and removed, the rest are more likely than singletons to have a first birth. Those who are divorced and have previously experienced a first birth are excluded, and the rest have a higher hazard of first birth than singletons. For men none of the contrasts with the single reference category are significant other than being married.

Table 6.8, Cox models measuring the main effects of RGSC, educational attainment and the urban/rural 6-fold classification on that birth outcome to men aged 15-25 in 2001

Men		Model 1		Model 2		Model 3	
		β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Marital status at 2001	**Single 01**	-		-		-	
	Married 01	1.4 ***	.02	1.4 ***	.02	1.4 ***	.02
	Remarried 01	1.3 ***	.08	1.3 ***	.08	1.3 ***	.08
	Divorced 01	1.1 ***	.04	1.1 ***	.04	1.1 ***	.04
	Widowed 01	1.1 ***	.27	1.1 ***	.27	1.1 ***	.27
	Age	-.16***	.004	-.16***	.004	-.16***	.004
RGSC at 2001	**Professional**	-					
	Managerial Technical	.09 *	.04				
	Skilled non-manual	.04	05				
	Skilled Manual	.35***	.04				
	Partly Skilled	.38***	.04				
	Unskilled/forces	.38***	.05				
	Not in work	.03	.09				
Educational Attainment at 2001	**Degree or Higher**			-			
	Further Qualification			.16 ***	.04		
	High School 2			.23 ***	.03		
	High School 1			.43 ***	.03		
	No Quals			.48 ***	.03		
-Urban rural geography at 2001	**City**					-	
	Town					.14 ***	.02
	Small Accessible					.2 ***	.03
	Small Remote					.26 ***	.06
	Accessible Rural					.11 ***	.03
	Remote Rural					.09 *	.04
Log Likelihood		-100104.24		-99172.251		-102992.04	
births		11321		11225		11595	
n		17149		17063		17622	

* p< 0.05 **p<0.01 ***p<0.001, source SLS

The combined effects model also controls for the impact of raised religion on the hazard of first birth. The reference category is those who report no raised religion. The results suggest that, in general, being raised as a member of a religion reduces the hazard of first birth across the period of observation. The most meaningful contrasts are between those from the non-religious reference category, the Church of Scotland and with those from the Catholic Church. The other categories are a somewhat arbitrary amalgam of disparate minority religions collapsed because of lack of cases. It is possible to be more confident in the interpretation of the effects of raised religion on the hazard of first birth. It is reasonable to assume that this is a prior effect. Unlike the marital status variable, the measure of occupational stratification and educational attainment, some people in the cohort will not go on to alter their status of raised religion. Individuals cannot alter the religion they were raised in, although they may switch practicing religions. It seems to be the case that those raised religiously may delay first birth as compared the reference (Gráda and Walsh 1995, Hayford and Morgan 2008, MacQuillan 2004, Welsh 2010). The exception to this incorporating variables at the 1991 time point is the non-Christian religious category for men, which reports as positive effect. This category includes Buddhist, Muslim, Jewish, Hindu and Sikh religions.

Another effect that is of interest in Table 6.9 is the negative effect associated with the not being in work category in contrast to the reference. This suggests that men and women who are not in work are less likely to start a family. However, one reason for this result could be that it is confounded by age. Those who are younger are less likely to be employed at 1991 and therefore this group contains both those too young to have started work and those who are out of work and seeking employment.

Table 6.9, cox models measuring the combined effects of RGSC, educational attainment and the urban/rural 6-fold classification and raised religion on that birth outcome to samples of men and women aged 15-25 in 1991

		Men		Women	
		β	*s.e.*	*β*	*s.e.*
Marital status at 1991	**Single 91**	-		-	
	Married 91	1.0***	(.03)	.8***	(.03)
	Remarried 91	-	-	1.2***	(.25)
	Divorced 91	-.36	(.26)	.48***	(.12)
	Widowed 91	-	-	-.52	(.7)
	Age	-.12***	(.006)	-.15***	(.005)
RGSC at 1991	**Professional 91**	-	-		
	Managerial Technical 1991	-.02	(.07)	.14	(.09)
	Skilled non-manual 1991	-.1	(.07)	-01	(.09)
	Skilled Manual 91	.13	(.07)	.3**	(.09)
	Partly Skilled 91	.01	(.07)	.09	(.09)
	Unskilled/Forces 91	.03	(.07)	.01	(.1)
	Not in Work	-.35***	(.07)	-.2*	(.09)
Educational Attainment at 1991	**Degree or Higher 91**	-	-		
	Further Qualification 91	-.01	(.07)	-.01	(.06)
	No Higher or Further Qualifications 91	-.02	(.05)	.11*	(.05)
	Not Stated 91	-.15*	(.08)	.04	(.07)
	Not Completed U-18, in 1991	.01	(.07)	.18**	(.06)
Urban rural geography at 1991	**City 91**	-	-		
	Town 91	.08**	(.02)	.03	(.02)
	Small Accessible 91	.12***	(.03)	.005	(.03)
	Small Remote 91	.05	(.06)	.07	(.04)
	Accessible Rural 91	.02	(.03)	-.04	(.02)
	Remote Rural 91	-.03	(.04)	-.07	(.04)
Raised Religion	**None**	-	-		
	Catholic	-.01	(.02)	-.08**	(.02)
	Church of Scotland	-.09***	(.02)	-.2***	(.02)
	Non-Christian	.33**	(.06)	-.18	(.1)
	Other-Christian	-.08	(.04)	-.21***	(.04)
	Another-Religion	-.3	(.16)	-.65*	(.27)
Log likelihood		-104939.		-134860	
births		11621		14856	
n		17665		19458	

*p< 0.05 **p<0.01 ***p<0.001 (s.e.), source SLS

The models outlined above were also repeated using the variables available at the 2001 Census (Table 6.10). This refines the interpretations presented above. There is a trade off in using the variables at 1991 and 2001 Census points. We can be relatively sure that the position of an individual at 1991 is causally prior to the subsequently measured birth. However, this position can also change prior to the birth and there is a confounded relationship between age and explanatory variables. Using the variables available at the 2001 Census offsets this. The younger members of the cohort have had

an opportunity to pass through education into work, relationships, marriage and to set up their own home. However, causal direction cannot be inferred from data incorporated from the 2001 time point using this design.

Table 6.10, cox models measuring the combined effects of RGSC, educational attainment and the urban/rural 6-fold classification and raised religion on that birth outcome to samples of men and women aged 15-25 in 2001

		Women		Men	
		β	*s.e.*	*β*	*s.e.*
Marital status at 2001	**Single 01**	-	-		
	Married 01	1.04***	.02	1.4 ***	.02
	Remarried 01	1.0 ***	.06	1.3 ***	.08
	Divorced 01	.85 ***	.03	1.1 ***	.04
	Widowed 01	.9 ***	.17	1.1 ***	.27
	Age	-.16***	.003	-.16***	.003
RGSC at 2001	**Professional 0**	-	-		
	Managerial Technical 2001	.1 *	.05	-.02	.04
	Skilled non-manual 2001	.26 ***	.05	-.13 **	.05
	Skilled Manual 2001	.34 ***	.06	.09 *	.04
	Partly Skilled 2001	.48 ***	.05	.1 *	.05
	Unskilled/Forces 2001	.65 ***	.06	.08	.06
	Not in Work 2001	.6 ***	.08	-.27 **	.1
Educational Attainment at 2001	**Degree or Higher 01**	-	-		
	Further Qualification 01	.07 *	.03	.12 ***	.04
	High School 2	.25 ***	.03	.18 ***	.03
	High School 1	.45 ***	.03	.34 ***	.03
	No Quals	.55 ***	.04	.37 ***	.04
Urban rural geography at 2001	**City 01**	-	-		
	Town 01	.06 *	.02	.11 ***	.02
	Small Accessible 01	.11 ***	.03	.16 ***	.03
	Small Remote 01	.08	.05	.17 **	.06
	Accessible Rural 01	.07 **	.03	.09 **	.03
	Remote Rural 01	.13 ***	.04	-.0003	.05
Raised Religion	**None**	-	-		
	Catholic	-.05*	.03	-.02	.03
	Church of Scotland	-.15***	.02	-.1 ***	.02
	Non-Christian	-.16	.11	.07	.1
	Other-Christian	-.14***	.04	-.15 **	.05
	Another-Religion	-.37	.27	-.38 *	.19
Log likelihood		-127192.78		-97741.194	
births		14255		11092	
n		18704		16814	

*p< 0.05 **p<0.01 ***p<0.001 (s.e.), source SLS

The design incorporating explanatory variables at 2001 is the more illuminating of the two approaches. This provides increased differentiation on the explanatory variables. The effects of being married or post marriage as opposed to single are as would be expected. Also, as suggested by the main effects, educational attainment shows that

men and women who leave school early are likely to experience earlier first births. The relationship between occupational category and the timing of birth again offers interesting and gendered contrasts. For women, the effect of earlier births associated with less advantaged careers is evident. The story is not the same for men however. Here there is a mixed picture of negative and positively significant effects related to Registrar General's Social Class. Also the magnitude of the contrasts between the dummy categories and professional reference category is smaller for men than for women. This appears to show that men who are pursuing advantaged careers do not delay childbearing in a similar manner to which women do. There is a further difference of note. In these models the relationship between a birth and the not in work category is negative and significant for men but positive and significant for women.

The effects associated with the raised religion variable are similar to those discussed previously. Negative effects generally suggest that those raised religiously delay birth in comparison to the non-religious. Also the non-Christian category that was positive and significant when including variables included at 1991, is no longer significant when incorporating the variables at 2001. As this is not a coherent group then this should not be over interpreted. It may be that the 2001 variables better capture socio-economic differences that may relate to variation in the timing of first birth amongst this heterogeneous group. In contrast to urban rural geography included at 1991 the inclusion of the measure at 2001 yields effects that are significant and that are of a relatively larger magnitude. In general the suggestion is that people located in the cities delay childbearing in contrast to their peers in less populated and more remote conurbations.

6.8 Altering Assumptions: Differing Time Dependencies

Table 6.11, models with differing distributions measuring the combined effects of RGSC, educational attainment and the urban/rural 6-fold classification and raised religion on that birth outcome

WOMEN aged 15-25 in 1991
Number of cases: 19458
Number of first births: 14856

Distribution	Model 1 Exponential		Model 2 Gompertz		Model 3 Weibull		Model 4 Cox	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
None	-		-		-		-	
Catholic	-.04	(.02)	-.07**	(.02)	-.2***	(.02)	-.08**	(.02)
Church of Scotland	-.12***	(.01)	-.19***	(.02)	-.2***	(.02)	-.2 ***	(.02)
Not Christian	-.15	(.1)	-.17	(.1)	-.18	(.1)	-.18	(.1)
Other Christian	-.13**	(.04)	-.2***	(.04)	-.2***	(.04)	-.21***	(.04)
Other religion	-.5	(.26)	-.7*	(.27)	-.65*	(.03)	-.65*	(.27)
Single	-		-		-		-	
Married	.4***	(.03)	.84***	(.03)	.8***	(.03)	.8 ***	(.03)
Remarried	.6*	(.25)	1.2***	(.25)	1.2***	(.25)	1.2***	(.25)
Divorced	.27*	(.12)	.48***	(.12)	.47***	(.12)	.48***	(.12)
Widowed	-.3	(.7)	-.48	(.7)	-.5	(.7)	-.52	(.7)
Age	-.06***	(.006)	-.18***	(.005)	-.15***	(.005)	-.15***	(.005)
Professional 91	-		-		-		-	
Managerial Technical 1991	.07	(.09)	.14	(.09)	.14	(.09)	.14	(.09)
Skilled non-manual 1991	-.01	(.09)	-.01	(.09)	-.01	(.09)	-01	(.09)
Skilled Manual 91	.16	(.09)	.28**	(.09)	.27**	(.09)	.3**	(.09)
Partly Skilled 91	.05	(.09)	.09	(.09)	.09	(.09)	.09	(.09)
Unskilled/Forces 91	-.02	(.1)	.01	(.1)	.009	(.1)	.01	(.1)
Not in work	-.17	(.09)	-.23*	(.09)	-.2*	(.09)	-.2*	(.09)
Degree + at Census 91	-		-		-		-	
Further Qualifications at 91	-.04	(.06)	-.01	(.06)	-.01	(.06)	-.01	(.06)
No Higher or Further Qualifications 91	.04	(.05)	.12*	(.05)	.11*	.05)	.11*	(.05)
Not Stated 91	-.004	(.07)	.07	(.07)	.05	(.07)	.04	(.07)
Not Completed U-18, in 1991	.02	(.06)	.13*	(.05)	.16*	(.06)	.18**	(.06)
City in 1991	-		-		-		-	
Town in 1991	.01	(.02)	.03	(.02)	.03	(.02)	.03	(.02)
Small accessible in 1991	.01	(.02)	.03	(.03)	.02	(.03)	.005	(.03)
Small remote in 1991	.03	(.04)	.07	(.05)	.07	(.05)	.07	(.04)
Accessible Rural in 1991	-.02	(.02)	-.01	(.03)	-.02	(.03)	-.04	(.02)
Remote Rural in 1991	-.01	(.04)	.01	(.04)	.002	(.04)	-.07	(.04)
Constant	-4.4	(.14)	-4.4	(.14)	-15.0	(.18)		
Gamma			.02(.0001)					
Ln P					1.19	(.01)		
p					3.09	(.02)		
1/p					.3	(.002)		
Log likelihood	-20869.576		-12233.9		-11698.618		-134860.1	

*p<0.05 **p<0.01 ***p<0.001(s.e.), source SLS

The models were also run with different distributions of time dependency. Tables 6.11 and 6.12 below, reports the results for models incorporating the same explanatory

variables as the Cox proportional hazard models reported in Tables 6.9 and 6.10, however model 1 in each of the tables reports the results using an exponential distribution, model 2 reports the results from a Gompertz distribution and model 3 reports the results from a Weibull distribution. In the exponential model the hazard rate is treated as constant over time (Allison 1982: 24). In the Gompertz model the log of the hazard can vary linearly with time (ibid). In the Weibulls model the log of the hazard is allowed to vary linearly with the log of time. The Cox models, used above, assume time dependence without specifying the form (Yamaguchi 1991: 101). The values of most coefficients are very close across the models.

Only in the case of the exponential model does how time dependency is specified seem to alter substantive findings. Given the wide sample included in the analysis the rate of first birth may not be stable over time. Overall the number of births in the data extract is steady at around 4500 per year. The rate of first birth for those in the sample who are 15 in 1991 rises until they are around 21 and continues to rise, although less quickly, until they are 30 years old. However the rate of first birth for those who are 25 in 1991 may well rise steadily until they are around 30 before falling, this could potentially moderate any dramatic overall increase in the rate of birth to the 15 to 25 age group. However, across the period of observation, the rate appears to rise. This is suggested as the results to the models specifying a Gompertz and Weibulls distribution match closely to one another and to the results of the Cox models. However, results to the models incorporating the exponential distribution vary markedly from these specifications. More formally, a likelihood ratio test suggests the Weibulls, Gompertz and Cox models fit the data better.

Table 6.12, models with differing distributions measuring the combined effects of RGSC, educational attainment and the urban/rural 6-fold classification and raised religion on that birth outcome

WOMEN aged 15-25 in 2001
Number of cases: 18704
Number of first births: 14255

Distribution	Model 1 Exponential		Model 2 Gompertz		Model 3 Weibull		Model 4 Cox	
	β	*s.e.*	*B*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
None	-		-		-		-	
Catholic	-.01	.03	-.05	.03	-.05 *	.03	-.05*	.03
Church of Scotland	-.09 ***	.02	-.15***	.02	-.15***	.02	-.15***	.02
Not Christian	-.16	.11	-.15	.11	-.17	.11	-.16	.1
Other Christian	-.08 *	.04	-.15***	.04	-.14***	.04	-.14***	.04
Other religion	-.27	.27	-.4	.27	-.36	.27	-.37	.27
Single	-		-		-		-	
Married	.69 ***	.02	1.1 ***	.02	1.0 ***	.02	1.04***	.02
Remarried	.69 ***	.06	1.1 ***	.06	1.0 ***	.06	1.0 ***	.06
Divorced	.59 ***	.03	.86 ***	.03	.85 ***	.03	.85 ***	.03
Widowed	.58 ***	.17	.86 ***	.17	.89 ***	.17	.9 ***	.17
Age	-.05***	.003	-.19***	.003	-.16	.003	-.16	.003
Professional 01	-		-		-		-	
Managerial Technical 01	.05	.04	.1 *	.05	.1 *	.05	.1 *	.05
Skilled non-manual 01	.13 **	.05	.27 ***	.05	.26 ***|	.05	.26 ***	.05
Skilled Manual 01	.2 ***	.06	.35 ***	.06	.34 ***	.06	.34 ***	.06
Partly Skilled 01	.26 ***	.05	.49 ***	.05	.48 ***	.05	.48 ***	.05
Unskilled/Forces 01	.34 ***	.06	.65 ***	.06	.64 ***	.06	.65 ***	.06
Not in work	.36 ***	.07	.57 ***	.08	.6 ***	.08	.6 ***	.08
Degree + 01	-		-		-		-	
Further Qualifications at 01	.05	.03	.06	.03	.07 *	.03	.07 *	.03
High School 2	.16 ***	.03	.25 ***	.03	.25 ***	.03	.25 ***	.03
High School 1	.29 ***	.03	.44 ***	.03	.45 ***	.03	.45 ***	.03
No quals	.35 ***	.04	.54 ***	.04	.55 ***	.04	.55 ***	.04
City in 2001	-		-		-		-	
Town in 01	.04	.02	.06 **	.02	.06 **	.02	.06 *	.02
Small accessible in 01	.06 *	.03	.12 ***	.03	.11 ***	.03	.11 ***	.03
Small remote in 01	.02	.05	.08	.05	.08	.05	.08	.05
Accessible Rural in 01	.04	.03	.08 **	.03	.07 **	.03	.07 **	.03
Remote Rural in 01	.06	.04	.14 ***	.04	.13 **	.04	.13 ***	.04
Constant	-5.2	.07	-5.6	.07				
Gamma			.02 (.0001)					
ln P					1.27	(.01)		
p					3.57	(.03)		
1/p					.3	(.002)		
Log likelihood	-19258.465		-9768.7738		-9356.6358		-127192.78	

*p<0.05 **p<0.01 ***p<0.001(s.e.), source SLS

One objective of this chapter is to test whether there is evidence that urban-rural geography influences fertility when controlling for individual level indicators of fertility outcomes. The results presented above suggest that urban rural geography may have use as an indicator of first birth even when individual level factors are controlled for. A large degree of variation is also captured in the demographic and socio-economic characteristics measured. The results in Tables 6.11 and 6.12 back this interpretation. The contrasts between city and less populated and more rural areas remains significant when measured at 2001 and this suggests and alteration from the generally non-significant effects noted for 1991.

In sum the models allowing for differing distributions of time dependency support the findings associated with the Cox Proportional Hazard model. The results suggest that the hazard rate may be increasing with time. However, this does not alter the general interpretation, and geographical effects upon the hazard of first birth remain.

6.9 A Last Specification of the Model

This final specification of the model includes the variables discussed previously measured at 2001. The measure of urban/rural geography at 1991 is also included. This makes it possible to assess the relationship between location in 1991 and the socio-economic position that people are in at 2001. The results both confirm and refine the findings reported above. Contrasting the geographical effects from models above, those at 1991 suggest little or no relationship to the outcome, whilst the models controlling for position at 2001 report significant positive effects. The effects that shift between time points seems to indicate an aspect of mobility and/or location influencing birth. The results below confirm this somewhat. Including the urban/rural

measures at both time points in the model, the positive significant effects evident at 2001 remain in place whereas the non-significant effects at 1991 have become negative and significant. Being in a city at 1991 seems to relate to an early first birth and being in a city 2001 is associated with a later birth.

Table 6.13, cox models measuring the combined effects of RGSC, educational attainment and the urban/rural 6-fold classification at 1991 and 2001, and raised religion on that birth outcome to samples of men and women aged 15-25 in 2001

		Women	**Men**		
		β	*s.e.*	*β*	*s.e.*
	None				
	Catholic	-.06 *	03	-.03	.03
	Church of Scotland	-.15 ***	.02	-.09 ***	.02
Raised Religion	Non-Christian	-.18	.1	.04	.1
	Other-Christian	-.14 ***	.04	-.14 **	.05
	Another-Religion	-.36	.3	-.39 *	.19
Marital status at 2001	**Single 01**	-		-	
	Married 01	1.0 ***	.02	1.4 ***	.02
	Remarried 01	1.0 ***	.06	1.3 ***	.08
	Divorced 01	.85 ***	.03	1.1 ***	.04
	Widowed 01	.9 ***	.17	1.1 ***	.27
	Age	-.17 ***	.003	-.17 ***	.004
RGSC at 2001	**Professional 01**				
	Managerial Technical 2001	.1 *	.05	-.03	.04
	Skilled non-manual 2001	.26 ***	.05	-.14 **	.05
	Skilled Manual 2001	.35 ***	.06	.09 *	.04
	Partly Skilled 2001	.49 ***	.05	.1 *	.05
	Unskilled/Forces 2001	.66 ***	.06	.07	.06
	Not in Work 2001	.59 ***	.08	-.28 **	.1
Educational Attainment at 2001	**Degree or Higher 01**				
	Further Qualification 01	.07 *	.03	.12 ***	.04
	High School 2	.25 ***	.03	.18***	.03
	High School 1	.45 ***	.03	.34 ***	.03
	No Quals	.55 ***	.04	.37 ***	.04
Urban rural geography at 1991	**City 91**				
	Town 91	-.14 ***	.03	-.05	.03
	Small Accessible 91	-.09 **	.04	-.07	.04
	Small Remote 91	-.15 *	.06	-.23 **	.08
	Accessible Rural 91	-.15 ***	.03	-.16 ***	.04
	Remote Rural 91	-.17 ***	.05	-.23 ***	.06
Urban rural geography at 2001	**City 01**				
	Town 01	.15 ***	.03	.15 ***	.03
	Small Accessible 01	.18 ***	.03	.21 ***	.04
	Small Remote 01	.2 **	.07	.36 ***	.08
	Accessible Rural 01	.16 ***	.03	.18 ***	.04
	Remote Rural 01	.25 ***	.05	.17 **	.06
Log likelihood		-127174.48		-97725.599	
births		14255		11092	
n		18704		16814	

*p< 0.05 **p<0.01 ***p<0.001 (s.e.), source SLS

This final specification of the model includes the variables discussed previously measured at 2001. The measure of urban/rural geography at 1991 is also included.

This makes it possible to assess the relationship between location in 1991 and the socio-economic position that people are in at 2001. The results both confirm and refine the findings reported above. Contrasting the geographical effects from models above, those at 1991 suggest little or no relationship to the outcome, whilst the models controlling for position at 2001 report significant positive effects. The effects that shift between time points seems to indicate an aspect of mobility and/or location influencing birth. The results below confirm this somewhat. Including the urban/rural measures at both time points in the model, the positive significant effects evident at 2001 remain in place whereas the non-significant effects at 1991 have become negative and significant. Being in a city at 1991 seems to relate to an early first birth and being in a city 2001 is associated with a later birth.

6.10 Conclusions

This chapter examines the effects of measures of socio-economic position and geography upon the timing of first birth when controlling for demographic and socio-demographic characteristics. However, the interpretations of the models presented above are circumspect because of possible bias due to issues of left censoring. One general aim is to examine the usefulness of standard measures of geography as an indicator of a first birth in the context of other individual level controls. The results show significant geographical effects when using the Scottish Household Survey Urban Rural measure. What is more the effects appear to alter significance and sign between Census time points 1991 and 2001. This implies a certain relationship between location and birth timing at 1991 that is no longer in place, and indeed, may reverse by 2001. At 1991 city living is associated with earlier births, or at least birth

timing that does not vary significantly from other urban/rural contexts. However, at 2001 city living is associated with later birth timing. This is slightly in contrast to Boyle et al. (2007b) who argue that urban rural geographies are often too crude to capture geographies of fertility and Wilson's (1990) assertion that small area measures have little to no explanatory power.

It is interesting that geographical effects remain even when controlling for individual level indicators of fertility outcomes. It is important to be specific about the nature of geographies of fertility. It is highly unlikely that, at sub-national levels in Scotland, there are distinct cultures of fertility that are geographically separate and have a large effect on total fertility rates (Wilson 1990). The findings above imply that a change of location may be systematically associated with individual level processes of becoming a parent. The effect may be consistent with a move amongst people of childbearing age to more rural or town contexts, perhaps representing a desire to live somewhere considered suitable for having or raising children (Dey 2007), or maybe also associated with access to labour market opportunities and housing markets (Boyle et al. 2007b: 14, 20). This highlights the potential to integrate geographies with measures of social stratification to enhance understanding of individual level processes relating to fertility outcomes. Nevertheless, where variables exist that more adequately represent these aspects of fertility processes, they may be preferable to geographic proxies.

As would be expected the results also indicate that timing of first birth is associated with socio-economic structures. The potential measures of social stratification, such as educational attainment and occupational categorisation along with the raised

religion variable all report significant effects. Because of the issues affecting estimation it is inadvisable to draw definite conclusions regarding the nature of the relationship between first birth and social structure based on the analysis presented above, and how social structure may be considered to influence first birth a is theme returned to in the following two chapters. The relationship between geography and first birth in Scotland is also further examined in the next chapter. Despite problems of analysis, one interesting finding that remains in following chapter is the association at 2001 between 'not being in work' and timing of first birth, which is different between men and women. Women who are not in work have a higher probability of first birth than the reference category, whereas the contrast is negative for men. This gendered relationship between employment and first birth is also evident in the following chapter. The next chapter also incorporates alternative standard geographies and the data is structured to better control for issues of full left censorship. Pre-empting the findings, the results appear to confirm those presented above: that standard geographies are of some explanatory power in examining individual level processes of first birth. Also, there is gendered relationship between occupational position and the timing of birth. Women exhibit a delay effect related to occupational advantage, but men do not.

Chapter 7 - First birth to the 1975 and 1976 birth year cohorts: An analysis of the structural context of first birth in Scotland

7.1 Introduction

The analysis in this chapter also employs the SLS to examine first birth in Scotland, and the investigation presented extends, and attempts to verify, the analysis put forward in the previous chapter. Concerns were highlighted over any possible conclusions drawn in chapter 6 because of likely bias introduced, particularly related to the issue of left censoring of the first birth event and those co-resident with children are removed from the models. As in Chapter 6, the birth events focussed upon are the first occurrence of a birth to the sample members recorded since 1991. Unlike in chapter 6, however, by restricting attention to those born in 1975 and 1976, it is likely to be a reasonable approximation that the first birth since 1991 is indeed the first birth ever experienced by the respondents. Therefore, in this chapter, the event being studied can reasonably be described as the event of the 'first birth', whereas, as discussed above, in chapter 6 there was some potential for left censoring of the first birth event (insofar as some of the subjects analysed in chapter 6 may have had births prior to 1991 which were not detected by 1991 co-residence patterns).

The analysis in this chapter solves this issue by examining first birth to those born in 1975 and 1976. People born in these years are unlikely to be left censored as they are 15 and 16 years old when first observed in these data in 1991. It is therefore possible to be more confident that estimates in modelling are not seriously compromised by left

censorship. However, as shall be seen, 'solving' the issue of left censorship in this manner may be understood to further exacerbate the problem of having explanatory variables available at only Census time points.

This chapter follows the 1975 birth cohort from the age of 15 until they are in their early 30s and examines the influence of social structure and context upon the prevalence of first birth within these years. This allows the examination of processes that lead to first birth and factors that influence delay or facilitate early childbearing, during a historically important time period. In line with findings elsewhere it is shown that those who stay in education delay childbearing, relative to their peers (see Smith and Ratcliffe 2009), and women who pursue careers also delay (see Berrington 2004). However occupational structure is shown to intersect with first birth in a more specific and gendered manner. For women more advantaged economic situations are associated with later first births, yet it appears the men who are from the notionally most advantaged 'higher professional and managerial' NS-SEC category have their first child at around the same time as men in moderately less advantaged occupational categories. It also appears that men and women who are own account workers or small business owners may be less likely to delay fertility. This suggests that the first birth and Scotland, and the processes whereby this cohort come to have children, is intimately related to the social structural context (Smith 1989, chapter 3).

The total fertility rate in Scotland reached a historical low in 2002 (chapter 2). Those born in 1975 were reaching the age of 27 in 2002, when Scotland's overall fertility bottomed out; and as fertility had been falling in Scotland consistently across the 1990s (GROS 2007) people from the 1975 birth cohort might be considered to define

Scotland's generation of low fertility. It is likely that this group are amongst those who have delayed family formation and first birth longer than almost any other cohort in recent Scottish history. The investigation examines the measures of social stratification outlined earlier, including measures of occupational categorisation and educational attainment, along with a measure of raised religion and relationship status. To extend the analysis of geography presented in the previous chapter the effects of several geographies are also incorporated: these are population densities, urban/rural measures and the Townsend deprivation measure.

7.2 Life course transitions – Education, Work, Marriage and First Birth

Recent scholarship has examined how processes of family formation and fertility intersect with social structure (Sabotka 2004; Kreyenfeld 2010). Previous chapters have incorporated measures of social stratification and demographic measures to situate childbearing behaviour and attitudes. This chapter attempts to move the research on from the more circumspect analysis of chapter 6, and the cross-sectional analysis presented in chapter 5, by more adequately assessing the longitudinal data available in the SLS. Smith (1989: 171) conceptualises macro measures of social stratification as systematically related to individual level processes and behaviours. The analysis below links measures that contextualise the social situation of individuals on the first birth outcome to relate structural location to the experience of childbearing. The research applies the type of empirical work presented by Kohler et al. (2006) and Mills et al. (2005) to the situation of Scotland across a generation of delayed fertility.

Table 7.1, Position of the 1975 birth cohort on socio-demographic variables by the 2001 Census

(column %, rounded up to one decimal place) *Variable*	*Men*	*Women*
	%	*%*
Marital Status		
Unmarried in 1991 - Unmarried in 2001	81.1	67.5
Unmarried in 1991 - Married in 2001	17.6	25.5
Unmarried in 1991 - Post marriage 2001	1.4	7.4
Level of Attainment		
Degree and above	22.8	22.8
Further qualifications	14.5	11.6
High school 2- university entry level	17.8	18.2
High school 1	44.8	47.4
NS-SEC - occupational categorisation		
Professional and managerial	9.9	5.9
Lower professional	16.5	21.2
Intermediate occupations	9.8	20.8
Own account workers	5.5	1.4
Semi routine occupations	16.9	5.8
Lower technical occupations	15.5	21.5
Routine occupations	17.3	10.6
Long term unemployed	3.7	3.7
Student	4.8	6.4
Raised Religion		
Catholic	17.4	17.5
Church of Scotland	39.3	35.3
Non-Christian	3.1	1.8
Other-Christian	8.0	8.6
Other-religion	0.7	0.6
No religion	31.5	36.3
Births	655	1130
n	1307	1632

All variables taken from the 2001 Census, Source SLS,

Table 7.1 shows the transitions to various levels of attainment achieved by the cohort by 2001. It is reasonable to assume that the 10 years between 1991 and 2001 is the time in which most of those in the 1975 cohort will have completed a formal education. Less than less than 5% of men and less than 7% of women are noted as being in students in the NS-SEC category by around age 26. Although these data do not support differentiation by detailed results, or subject area within the levels of attainment, a general equality in attainment levels between men and women is suggested using the measures. On the other hand, 22.8% of both men and women report attaining a degree, or higher degree, as their highest level of attainment by 2001. This suggests broad

gender equality in educational outcomes for this cohort (although a difference would be expected in subjects studied).

Table 7.2, descriptive statistics of geographies presented in analysis

(% rounded up to one decimal place)

Variable	*Men*		*Women*
	%		*%*
Urban Rural Classification at 2001			
Large Urban Areas (population over 125k)	36.9		40.7
Other Urban Areas (population 10k-125k)	24.9		28.3
Accessible Small Towns (3k-10k)*	9.6		8.9
Remote Small Towns (3k-10k)**	3.0		2.3
Accessible Rural (3k people)*	10.1		10.4
Remote Rural (3k people)**	3.5		2.2
Urban Rural Classification at 1991			
Large Urban Areas (population over 125k)	29.3		29.0
Other Urban Areas (population 10k-125k)	27.6		26.3
Accessible Small Towns (3k-10k)*	10.1		9.9
Remote Small Towns (3k-10k)**	3.5		3.0
Accessible Rural (3k people)*	11.3		12.6
Remote Rural (3k people)**	4.3		3.9
Metric Geographical Measures	*mean*	*min*	*max*
Population density men 1991	1751.5	1.2	11817.6
Population density women 1991	1703.6	.4	11829.4
Population density men 2001	2502.2	1.5	12929.1
Population density women 2001	2445.0	.7	12929.1
Townsend deprivation men 1991	.6	-9.2	10.1
Townsend deprivation women 1991	.9	-6.5	10.4
Townsend deprivation men 2001	.7	-7.7	10.7
Townsend deprivation women 2001	1.1	-9.5	10.2

Notes:* within 30 minutes drive of a settlement of 10,000 or more
** over 30 minutes drive to a settlement of 10,000 or more
The population density variables is measured at postcode level. Source SLS

Table 7.1 also highlights the transitions to various occupational positions that the 1975 birth cohort has undergone by 2001. Over 60% of women are engaged in occupations within the three NS-SEC categories of lower professional, intermediate and lower technical occupations, whereas men are more evenly distributed across the categories. Almost 10% of men were in the higher professional and managerial occupations by 2001, however fewer than 6% of women are in these types of occupation by around age 26. The most populated categories for men are the semi-routine and routine occupations. 34.2% of men are in routine or semi routine occupation; however only

16.4% of women are in these categories at age 26. This highlights differences in occupational outcomes for the cohort, and suggests that the cohort continues the long-observed patterns of gendered occupational segregation (Blackburn, Racko et al. 2009).

By age 26 most of the cohort remains unmarried. As may be expected a gender divide is apparent with less than 20% of men married by 2001, but just over a quarter of women. There are also a number of people who have passed through a first marriage, and are either remarried, widowed or divorced. Less than 2% of men from the cohort have transitioned beyond marriage by 2001, however over 7% of women have passed through their first marriage by 2001. Nearly a third of women born in 1975 had been married, at some stage, by 2001. That 81% of men remained unmarried by around 26 years of age, whilst just over 2/3^{rds} of women were still unmarried is not surprising given the increasing propensity toward delay in major life course events that has defined recent social change in Scotland (Paterson et al. 2004: 37).

Table 7.1 also reports the number cases that experience a first birth whilst observed in these data, between 1991 and 2006 (and who are not subject to missing data). The average age at first birth for a mother in Scotland in 2006 was 29.5, as compared to 27.4 in 1991 (GROS 2006). By 2006 the individuals in the cohort were in their early 30s; and as can be seen, nearly 70% of women have experienced a first birth by this time, however only 50% of men seem to have become a father by 2006. The frequencies reported here for births to men might be slightly inaccurate as men are known to under report their parenthood under some circumstances, such as following divorce (Greene and Biddlecom 2000). In the case of these data, where the information on first birth is based on birth registration data, were SLS members missing from

registration data they would not be linked to the birth. There is also no control for immigration or emigration - the cohorts represent those present in Scotland at both Census 1991 and 2001. Births to those that leave Scotland or arrive in the period between 1992 and 2006 are omitted[36].

The transitions that the cohort undergoes across the period from 1991 to 2001, and beyond, are influential in terms of first birth and family formation. How people experience the transitions from education into work, to marriage and to childbearing both defines, and is an indicator of, their position within social structure. When people exit education, illustrated here by level of attainment, impacts upon what position they will take up in the occupational structure (Brand and Davis 2009). It also influences when an individual is likely to have children of their own (Mills, Blossfeld et al. 2005; Smith and Ratcliffe 2009). Where people transition to in the occupational structure also has an effect upon when people have children (Ekert-Jaffe et al. 2002). This may be because certain occupational trajectories appear to be more compatible with early childbearing (see below). To this extent the nature of transitions described in the table above signifies position within social structure which is associated with processes of first birth and family formation (Smith 1989).

Table 7.1 suggests that men and women of the 1975 birth cohort have a roughly similar experience within education. However general equality in broad levels of educational attainment belies different gendered processes that occur in other major life course transitions. Equivalent attainment levels by this cohort do not result in matching

[36] At the time of this analysis there was no mechanism to trace emigrants, and the relevant explanatory factors are not known in respect of immigrants at 1991, as they were not there to respond to the Census.

occupational outcomes by around 26 years of age. This hints at gendered processes at play in how men and women enter and experience work and education. The same can be said of marriage and first birth. Given the similar levels of attainment that men and women in this cohort achieve, those who were born in 1975 seem to be in the same position from which to embark into paid employment, family formation, and childbearing. However men in general delay family formation and first birth relative to their female peers (Paterson et al. 2004).

7.3 Analysis

In this section how the transitions into work, education and marriage, outlined above, play out upon the process of first birth for this cohort are examined. Those born in 1975 and present in Scotland in 2002 belong to Scotland's generation of low fertility[37]. In these terms the factors that influence early or late childbearing for this cohort are the factors that underlie low fertility in Scotland[38].

The analysis incorporates the National Statistics Socio-economic Classification (NS-SEC) eight fold measure of occupational stratification. An additional category to the standard classification is included for students. This is because people are less likely to start families whilst in education (Cleland 2002). The NS-SEC measure is also

[37] The effects of immigration and emigration on fertility levels in Scotland require research. Prior to 2002 Scotland was a net exporter of people, which is likely to have contributed to decreasing overall fertility rates. Subsequently Scotland has become a net importer of people and fertility rates have increased (Boyes et al. 2007).

[38] From the most recent quarterly sweep of the LFS (Autumn 2010) the mean number of dependent children under 16 within an individuals household in Scotland is 1.15 for men aged 35 (n=54) and 1.43 for women (n=56) aged 35, who were therefore born in 1975Office (for National Statistics. Social Survey Division 2011). Quarterly Labour Force Survey Household Dataset, October - December, 2010. Colchester, Essex, UK Data Archive .

compared to Register General's Social Class measure. Findings appear similar when RGSC is used (results using RGSC are reported in Table 7.5). The NS-SEC measure employed in this analysis is a composite variable, as outlined in Table 7.1; which controls for the transition from no occupation in 1991 to various levels of occupational status by 2001. Dummy category coding is utilised, with the reference category combining the NS-SEC occupations denoted as employers in large organisations, higher managerial and higher professional occupations.

The marital status variable outlined in Table 7.1 takes account of the categories of those who were single in 1991, but married, and in post marriage states of divorced, widowed and separated, by 2001. Dummy coding is employed and the reference category contains those single at time points, 1991 and 2001, contrasted with those single in 1991 but married, or post marriage, in 2001. Geography is represented in the modelling below using the Scottish Household Surveys 6 fold urban rural classification. Again, dummy coding is employed and the reference category is those from cities. Other geographies were also modelled; this included the Townsend deprivation scale and population densities. The effects of geography were checked at both time points 1991 and 2001.

The education measure incorporated in the models here is a composite variable that covers a range of educational attainment levels by 2001. Using dummy coding, the contrast category is set as those with degree level attainment and above, this is compared to those whose highest attainment are further educational qualifications, those with upper high school level qualifications (e.g. University entry level qualifications) and those with lower high school qualifications (high school graduate

level). The models also control for raised religion. The reference category is set as the non-religious contrasted with those from a Church of Scotland background, Catholic, those who are other Christians and those with non-Christian religion. Because of small numbers of cases the other categories do not make much substantive contribution as they are an amalgam of a number of religions which are less widely practiced in Scotland.

As discussed (above and at some length in chapter 6), parameter estimates are unlikely to be seriously biased in this analysis due to left censoring. However the substantive contribution that this research can make is determined by explanatory factors measured at 2001 Census. In this extract the SLS members are traced from Census 1991 until 2006. It is known whether a first birth occurred at any time during this period. The main issue is in assessing causal inference. A measured birth to a person in the sample can occur at any time, but their socio-economic circumstances are only known and meaningful at 2001, when the sample was aged around 26 years old. Therefore it is unknown whether a birth event occurs prior to entering the socio-economic 'state' in which an individual is measured at 2001. It would be better if a neater causal relationship could be established. However, the influence of social structure and social stratification on first birth is inferred in the manner described by Smith (1989); that the connection between the individual and social structure is indicative of their experience of social processes. This design allows use of the very rich data upon the timing of first birth to people across a 15 year time span.

7.3.1 The process of first birth to the 1975 Cohort

Table 7.3, cox models estimating the hazard of first birth to women born in 1975

	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
none					-	-	-	-	-	-
Catholic					-.23**	(.08)	-.06	(.09)	-.04	(.09)
Church of Scotland					-.4***	(.07)	-.2*	(.08)	-.22**	(.08)
Not Christian					-.84*	(.36)	-.84*	(.4)	-.86*	(.39)
Other Christian					-.33*	(.13)	-.09	(.18)	-.1	(.18)
Other religion					-1.2	(1.0)	-.66	(1.0)	-.73	(1.0)
Single to single	-	-	-	-	-	-	-	-	-	-
Single to married	.74***	(.07)	.75***	(.07)	.74***	(.06)	.77***	(.07)	.76***	(.07)
Single to post married	.84***	(.10)	.79***	(.1)	1.0***	(.1)	.79***	(.1)	.8***	(.11)
Degree and higher			-	-				- - - -		
Further education			.23*	(.11)			-.004	(.12)	-.01	(.12)
High School 2			.52***	(.1)			.27**	(.11)	.27**	(.1)
High School 1			1.0***	(.08)			.55***	(.1)	.55***	(.1)
Higher Professional	-	-					-	-	-	-
Lower professionals	.55**	(.17)					.49**	(.18)	.47**	(.18)
Intermediate occupations	.82***	(.18)					.59***	(.19)	.6***	(.19)
Own account workers	1.4***	(.3)					1.2***	(.3)	1.19***	(.3)
Semi routine occupations	.97***	(.21)					.7***	(.21)	.68***	(.21)
Lower technical occupations	1.4***	(.18)					1.0***	(.19)	1.0***	(.18)
Routine occupations	1.5***	(.19)					1.0***	(.2)	1.0***	(.20)
Long term unemployed	1.7***	(.2)					1.2***	(.21)	1.2***	(.21)
Student	.41	(.23)					.31	(.24)	.31	(.24)
City in 2001									-	-
Town in 2001									.04	(.07)
Small accessible in 2001									-.06	(.10)
Small remote in 2001									-.17	(.18)
Accessible Rural in 2001									-.02	(.12)
Remote Rural in 2001									-.12	(.16)
City in 1991	-	-	-	-	-	-	-	-		
Town in 1991	-.08	(.07)	-.01	(.07)	.01	(.07)	-.07	(.07)		
Small accessible in 1991	-.18	(.1)	-.16	(.1)	-.01	(.1)	-.13	(.1)		
Small remote in 1991	-.31	(.17)	-.22	(.17)	-.16	(.16)	-.29	(.17)		
Accessible Rural in 1991	-.27*	(.11)	-.17	(.1)	-.14	(.1)	-.2	(.1)		
Remote Rural in 1991	-.26	(.14)	-.13	(.14)	-.12	(.14)	-.18	(.14)		
n	1653		1666		1722		1632		1632	
First births	1147		1158		1194		1130		1130	
Log likelihood	-7509		-7606		-7965		-7351		-7353	

models controlling for the effects of raised religion, marital status, educational attainment, occupational stratification and urban rural geography on the hazard of first birth to women born in 1975 SLS * p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

As would be expected, having been married by around 26 significantly increases the probability of experiencing a first birth in the time observed for both men and women, relative to those who have not been married by 26. The effects for men are larger than

the effects for women. This may indicate that marriage is more important for men if they are to experience a first birth. However it might also partly represent single men from the samples that are not attached to the birth records for their child (see, Greene and Biddlecom 2000). Also men marry later than women; therefore any interpretation must take account of this biasing in the parameter estimates. Births are becoming more common outside marriage (Kohler et al. 2006), however the outcome here suggests that the tempo of first birth is still strongly related to marriage in Scotland.

It seems that men who are higher professionals have a likelihood of first birth that does not differ significantly to most of the other occupational categories, controlling for the other factors in the model (Table 7.4, models 9 & 10). The exception to this are the small employers and own account workers who have significant and positive effects. Both the long term unemployed/never in employment and students seem to have a lower hazard of first birth than the reference category, however neither is significant. In contrast to men, all occupations elicit significantly positive results to the reference category, for women (Table 7.3, models 4 & 5). Like their male counterparts, women small employers and own account workers seem to stand out as experiencing amongst the quickest births (this is despite small numbers in the categories).

Table 7.4, cox models estimating the hazard of first birth to men born in 1975

	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
none					-	-	-	-	-	-
Catholic					-.2	(.1)	-24*	(.12)	-.19	(.11)
Church of Scotland					-.4***	(.09)	-43***	(.09)	-.41***	(.09)
Not Christian					-.54	(.41)	-.77	(.43)	-.66	(.43)
Other Christian					-.51**	(.18)	-.33	(.19)	-.38	(.2)
Other religion					-1.5	(1.0)	-1.0	(1.0)	-.9	(1.0)
Single to single	-	-	-	-	-	-	-	-	-	-
Single to married	1.32***	(.08)	1.34***	(.09)	1.3***	(.9)	1.35***	(.09)	1.35***	(.9)
Single to post married	1.41***	(.26)	1.56***	(.26)	1.6***	(.26)	1.56***	(.26)	1.54***	(.26)
Degree and higher			-	-			-	-	-	-
Further education			.45**	(.15)			.39*	(.16)	.36*	(.16)
High School 2			.62***	(.14)			.42**	(.15)	.38*	(.15)
High School 1			.82***	(.07)			.55***	(.14)	.53***	(.14)
Higher Professional	-	-					-	-	-	-
Lower professionals	-.03	(.18)					-.22	(.19)	-.21	(.18)
Intermediate occupations	-.07	(.21)					-.26	(.22)	-.27	(.22)
Own account workers	.92***	(.20)					.51*	(.23)	.46*	(.23)
Semi routine occupations	.61***	(.17)					.2	(.19)	.16	(.19)
Lower technical occupations	.57***	(.17)					.18	(.19)	.18	(.19)
Routine occupations	.72***	(.17)					.32	(.19)	.31	(.19)
Long term unemployed	.28	(.27)					-.1	(.29)	-.06	(.28)
Student	-.36	(.36)					-.58	(.37)	-.59	(.37)
City in 2001									-	-
Town in 2001									.09	(.1)
Small accessible in 2001									.28	(.14)
Small remote in 2001									.27	(.25)
Accessible Rural in 2001									.02	(.14)
Remote Rural in 2001									.03	(.19)
City in 1991	-	-	-	-	-	-	-	-		
Town in 1991	.01	(.1)	.1	(.1)	.05	(.1)	.04	(.1)		
Small accessible in 1991	-.02	(.14)	-.00	(.14)	-.02	(.14)	-.02	(.14)		
Small remote in 1991	.07	(.23)	.13	(.24)	.1	(.23)	.05	(.25)		
Accessible Rural in 1991	-.18	(.12)	-.05	(.12)	.03	(.1)	-.15	(.13)		
Remote Rural in 1991	-.2	(.18)	-.04	(.18)	-.08	(.18)	-.13	(.19)		
n	1329		1328		1383		1307		1307	
First births	665		661		687		655		655	
Log likelihood	-4222		-4416		-4420		-4124		-4123	

models controlling for the effects of raised religion, marital status, educational attainment, occupational stratification and urban rural geography on the hazard of first birth to women born in 1975 SLS * p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

The findings seem similar to those reported on NS-SEC when using the RGSC measure of occupational stratification, see Table 7.5. There are non-significant effects associated with men in skilled non-manual occupations as compared to the professional reference category. This parallels the results evident using NS-SEC in respect of the contrast

between and the higher professional reference category and other occupations. Like the NS-SEC measure, there is one positive significant contrast for men on RGSC, the contrast between skilled manual and professional. The significant positive effect in the contrasts for women in Table 7.5 mirrors the positive contrasts on NS-SEC in Table 7.3. In sum results using RGSC broadly support the models using NS-SEC. However, NS-SEC reported is operationalised at a more expanded level.

Table 7.5, cox models estimating the hazard of first birth to men and women born in 1975 including the RGSC occupational categorization measure

Variable	*Men born in 1975* Number of cases: 1281 Number of first births: 651		*Women born in 1975* Number of cases: 1546 Number of first births: 1057	
	β	*s.e.*	*β*	*s.e.*
Catholic	-	-	-	-
Church of Scotland	-.31**	(.1)	-.22**	(.08)
Not Christian	-.47	(.42)	-.69	(.39)
Other Christian	-.18	(.2)	-.13	(.19)
Other religion	-.81	(1.0)	-.7	(1.0)
None	.07	(.1)	.1	(.09)
Single to single	-	-	-	-
Single to married	1.3***	(.09)	.79***	(.07)
Single to post married	1.6***	(.26)	.75***	(.12)
Degree and higher	-	-	-	-
Further education	.45**	(.16)	.1	(.12)
High School 2	.58***	(.15)	.4***	(.1)
High School 1	.79***	(.13)	.77***	(.09)
Professional	-	-	-	-
Managerial Technical	.21	(.19)	-.29	(.23)
Skilled non-manual	-.21	(.14)	.18*	(.07)
Skilled manual	.19*	(.1)	.37***	(.09)
Partly Skilled	.2	(.16)	.37*	(.19)
City in 2001	-	-	-	-
Town in 2001	.11	(.1)	.1	(.07)
Small accessible in 2001	.27	(.14)	.02	(.1)
Small remote in 2001	.44	(.25)	-.15	(.19)
Accessible Rural in 2001	-.004	(.14)	.03	(.12)
Remote Rural in 2001	.16	(.19)	.05	(.16)
Log likelihood	-4090.953		-6850.33	

models controlling for the effects of raised religion, marital status, educational attainment, occupational categorization upon the hazard of first birth to men and women born in 1975* p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

The differing results between men and women appear to reflect different gendered processes in respect of becoming a parent within Scotland (Paterson et al. 2004). This is perhaps most apparent in the large significant effect evident for long term

unemployed/never in work females in contrast to a non-significant negative effect for men. It seems likely that this, at least partly, represents women who are not in employment specifically in order to have and raise children (Brewster and Rindfuss 2000). Whereas unemployed men have a lower probability of first birth than the higher professional reference category, hinting that long term unemployment for men may be problematic in terms of starting a family, although the result is not significant (Kohler et al. 2002, 2006, Sabotka 2004). That there is a non significant difference between the reference category and most other occupations for men also seems telling. This suggests that occupational advantage by age 26 seems to have little effect on the timing of first births to men[39].

For women the relationship between occupation and the timing of first birth contrasts markedly with those of men. All occupational groups exhibit significant effects in contrast to higher professionals and managers. Also, these significant categories exhibit positive likelihoods, which suggest earlier first births. This is consistent with much research showing that women pursing more advantaged careers are likely to postpone childbearing (Adsera 2005; Han, Ruhm et al. 2009). Thus women who have transitioned to these notionally less advantaged occupations are less likely to have postponed family formation to remain in education or to pursue a more advantaged career.

[39] NS-SEC is not strictly an ordinal measure of occupational categorization. However, there is an ordinal quality to the first three categories of the 8-fold classification. The first category contains Employers in large organisations, higher managerial occupations and higher professional occupations; by contrast the second category holds lower professionals, higher technical occupations, lower managerial and higher supervisory; the third category contains intermediate occupations. See, http://www.ons.gov.uk/about-statistics/classifications/current/ns-sec/cats-and-classes/analytic-classes/index.html

Men who are small employers and own account workers seem to be in a position to have a child early. Converting the coefficient for men who are own account workers into a hazard rate (Allison 1984: 28), men in this category have a 58% higher hazard of first birth than the higher professionals (model 10). The effect for women who are own account workers is even larger in contrast to the reference category. Own account workers may inhabit a set of circumstances that allows them to focus on aspects of their life, such as childbearing and family formation, relatively early on. However, it may be that the types of people who are own account workers at the age of 26 are those who are likely to have a child early. In any case the implication is that an individual's location within the occupational structure relates to first birth in Scotland in a nuanced manner (a finding also suggested in cross-sectional data in chapter 4).

The effects of educational attainment on the hazard of first birth are as may be expected. The magnitudes of the coefficients are slightly larger for women, in contrast to the reference, than they are for men. Substantively, this confirms that women with university education delay first birth relative to women who achieve only high school qualifications (Brewster and Rindfuss 2000; Smith and Ratcliffe 2009). The same can be said of men, however, men delay first birth relative to women generally (Paterson et al. 2004). Controlling for religion also elicits significant, negative, differences particularly between those from the Church of Scotland and the non-religious reference (models 4 and 5 Table 7.3, 9 and 10 Table 7.4). This may suggest that religious pro-family doctrine, or perhaps additional variation in socio-economic circumstances of people in different denominations (not being adequately measured in other controls) has some effect on the timing and circumstances of childbearing in Scotland, net of the other factors modelled (Moulasha and Rama Rao 1999; Philipov and Berghammer

2007). Although not much else is significant, most of the non-significant dummy categories are also negative in comparison to the non-religious reference.

There are almost no significant geographical effects apparent using the urban/rural measures and net of the other explanatory variables in the models. There appears to be little significant difference in how people enter parenthood that relates to whether they are from an urban or rural context at onset of their main reproductive years. Other standard geographies are tested below and non-significant geographical effects also bear out the findings of chapter 6.

7.3.2 Population Density

Table 7.6, cox models estimating hazard of first birth to men and women from the 1975 and 1976 cohorts

Variable	1976 Cohort				1975 Cohort			
	Model 1 Women n=1411		Model 2 Men n=1120		Model 3 Women n=1621		Model 4 Men n=1302	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Catholic	-	-	-	-	-	-	-	-
Church of Scotland	-.05	(.09)	-.28**	(.12)	-.21**	(.08)	-.28**	(.1)
Not Christian	.04	(.5)	-.74	(.39)	-.85*	(.38	-.94*	(.45)
Other Christian	.35*	(.18)	-.25	(.25)	-.11	(.18)	-.16	(.2)
Other religion	.76	(.46)	--------	-	-.66	(1)	-.95	(1)
None	.23*	(.09)	-.06	(.12)	.1	(.08)	.11	(.11)
Single to single	-	-	-	-	-	-	-	-
Single to married	.68***	(.08)	1.2***	(.1)	.77***	(.07)	1.4***	(.09)
Single to post married	.56***	(.17)	1.3***	(.29)	.81***	(.1)	1.6***	(.26)
Degree and higher	-	-	-	-	-	-	-	-
Further education	.4**	(.13)	.39*	(.19)	-.004	(.12)	.4*	(.16)
High School 2	.49***	(.13)	.41*	(.18)	.28*	(.11)	.42*	(.15)
High School 1	.87***	(.12)	.79***	(.16)	.54***	(.1)	.53***	(.14)
Higher Professional	-	-	-	-	-	-	-	-
Lower professionals	.55*	(.27)	.22	(.25)	.46*	(.18)	-.21	(.19)
Intermediate occupations	.7*	(.27)	.07	(.27)	.59**	(.19)	-.23	(.22)
Own account workers	.58	(.36)	.41	(.31)	1.2***	(.3)	.56*	(.23)
Semi routine occupations	.86**	(.3)	.25	(.25)	.67**	(.21)	.23	(.19)
Lower technical occupations	1.1***	(.28)	.46	(.25)	1.0***	(.19)	.18	(.19)
Routine occupations	1.3***	(.28)	.28	(.26)	1.0***	(.2)	.37	(.19)
Long term unemployed	1.4***	(.29)	.61	(.31)	1.2***	(.21)	-.09	(.28)
Student	.36	(.3)	.17	(.32)	.24	(.24)	-.57*	(.36)
Population Density 1991 (divided by 1000)	0.01	(.01)	.00	(.02)	.02	(.02)	.05**	(.02)
Log likelihood	-5801.87		-3795.1599		-7276.62		-4089.43	

models controlling for the effects of raised religion, marital status, educational attainment, occupational stratification and population density on the hazard of first birth to men and women from the 1975 and 1976 cohorts* p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

This section seeks understanding of whether there may be something measurable going on using alternative standard geographies. The models below incorporate population densities and the Townsend deprivation index. The reported tables of results also include equivalent models run on the 1976 birth year cohort. As has been shown urban/rural measures are of limited utility in measuring variation in first birth when individual level factors considered to account for fertility outcomes are included in modelling (above and chapter 6). A full Townsend scale and population density measures are incorporated into models, alongside the other explanatory variables in order to further test whether geography can be seen to relate to childbearing. Both

measures are incorporated as linear variables. This may render interpretation of results difficult, especially in respect of population density. However, any patterning in the data will show in significance levels, and indeed Lutz et al. (2007) argue that population density should be routinely incorporated in modelling fertility.

Table 7.7, cox models estimating hazard of first birth to men and women from the 1975 and 1976 cohorts

Variable	1976 Birth Cohort				1975 Birth Cohort			
	Model 1 Women n=1411		Model 2 Men n=1120		Model 3 Women n=1621		Model 4 Men n=1302	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*B*	*s.e.*
Catholic	-	-	-	-	-	-	-	-
Church of Scotland	-.04	(.09)	-.28*	(.12)	-.25***	(.07)	-.30**	(.1)
Not Christian	.05	(.5)	-.73	(.38)	-.88*	(.38)	-.43	(.43)
Other Christian	.34	(.17)	-.26	(.23)	-.18	(.18)	-.21	(.20)
Other religion	.76	(.45)	-45	(.18)	-.72	(1)	-.79	(1)
None	.24*	(.09)	-.06	(.12)	.07	(.08)	.12	(.12)
Single to single	-	-	-	-	-	-	-	-
Single to married	.67***	(.08)	1.2***	(.1)	.74***	(.07)	1.3***	(.09)
Single to post married	.63***	(.17)	1.3***	(.28)	.77***	(.1)	1.5***	(.26)
Degree and higher	-	-	-	-	-	-	-	-
Further education	.37***	(.14)	.38*	(.18)	-.01	(.12)	.36*	(.15)
High School 2	.47***	(.13)	.4*	(.18)	.26*	(.1)	.4**	(.15)
High School 1	.84***	(.12)	.78***	(.16)	.52***	(.1)	.53***	(.14)
Higher Professional	-	-	-	-	-	-	-	-
Lower professionals	.55*	(.27)	.21	(.25)	.43*	(.18)	-.26	(.19)
Intermediate occupations	.69*	(.27)	.06	(.28)	.56**	(.19)	-.29	(.22)
Own account workers	.59	(.37)	.39	(.31)	1.1***	(.3)	.38	(.23)
Semi routine occupations	.85**	(.30)	.24	(.25)	.63**	(.21)	.11	(.19)
Lower technical occupations	1.1***	(.27)	.45	(.26)	.97***	(.19)	.13	(.19)
Routine occupations	1.3***	(.28)	.27	(.26)	.95***	(.19)	.25	(.19)
Long term unemployed	1.4***	(.29)	.6	(.31)	1.2***	(.21)	-.13	(.29)
Student	.37	(.31)	.18	(.32)	.24	(.24)	-.63	(.37)
Population Density 2001 (divided by 1000)	-.29	(.16)	-.005	(.2)	-.28*	(12)	-.36*	(18)
Log likelihood	-5800.62		-3035.19		-7275.68		-4091.07	

models controlling for the effects of raised religion, marital status, educational attainment, occupational stratification and population density on the hazard of first birth to men and women from the 1975 and 1976 cohorts* p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

Table 7.6 contains models controlling for the explanatory variables already discussed along with the population density variable at 1991. Population density is incorporated as a scale measured at postcode level. The range of the scale can be seen in Table 7.2, with the higher the number representing increased density. There are dummy variables

specifying raised religion, marital status, educational attainment and NS-SEC in 2001. The results on most of the main explanatory variables generally echo those discussed above. The variable controlling for population density is not significant for men from the 1976 birth cohort. This contrasts with the men from the 1975 cohort where the population density variable is both positive and significant. The male 1975 cohort result would indicate that a 1 point increase in the population density increases the hazard of first birth slightly. This is not a particularly meaningful insight; however, incorporating population density in this manner does allow the observation of significant effects. Again, this suggests that little is going on that is at this geographical level that is not being captured in the individual level variables.

Table 7.7 reports results incorporating the explanatory variables along with population density at 2001. The coefficient for population density at 2001 describes the effect of where people live at 2001 on the hazard of first birth across the period 1991 to 2006. As can be seen the coefficient is negative, although only significant in respect of the 1975 cohort. An increase in the population density reduces the hazard that an individual has had, or will experience, a first birth whilst under observation. This is in contrast to the effects of population density at 1991, which are positive and generally non-significant. In sum Tables 7.6 and 7.7 could be interpreted as weak evidence of geographical mobility related to when people have children, or intend to have children. At 2001 a higher population density may be associated with a negative hazard for first birth (results are only significant in respect of the 1975 cohort). Those from more urbanized areas when first observed do not appear to be more likely to have a first birth. Therefore the relationship between population density and birth seems to alter between

time points (from a non-significant positive effect to negative effect, showing some significance). It is speculated that this pattern of spatial alterations might reflect changes over the life-course related to the capacity and/or preference of potential parents to live in less densely populated areas, but more complete longitudinal data would be required to further assess the nature of the relationship between location and fertility.

7.3.3 Townsend Deprivation Measures

The Townsend measure of deprivation is a scale indicator of the level of deprivation associated with the area an individual inhabits (e.g. McCulloch 2001). This links geography with socio-economic characteristics. The measure takes account of car ownership in an area, overcrowding, unemployment and the level of owner occupation. A low, or negative score, denotes that an individual resides in an area described as relatively affluent, whilst a higher score denotes relative deprivation. Table 7.8 presents the models controlling for the Townsend deprivation measure at 1991. As can be seen the results reported on the main explanatory variables are broadly in line with what has been presented above. In respect of the Townsend measure it can be seen that results are positive but are not consistently significant between models. The sign of the effect would suggest that and increase in the level of relative deprivation increases the hazard of first birth significant, although, as the significance levels are variable there is (at best) weak evidence of a small effect net of the other measures in the models. Table 7.9 presents the models controlling for the Townsend deprivation measure at 2001, which is generally not significant. The results are similarly small and not consistently significant.

Table 7.8, cox models estimating the hazard of first birth to men and women from the 1975 and 1976 cohorts

Variable	1976 Birth Cohort				1975 Birth Cohort			
	Model 1 Women n=1411		Model 2Men n=1121		Model 3 Women n=1632		Model 4 Men n=1307	
	B	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*B*	*s.e.*
Catholic	-		-		-		-	
Church of Scotland	-.04	(.1)	-.23	(.12)	-.16*	(.08)	-.28**	(.1)
Not Christian	.002	(.51)	-.8*	(.39)	-.78*	(.39)	-.60	(.42)
Other Christian	.36*	(.18)	-.17	(.25)	-.05	(.18)	-.17	(.2)
Other religion	.76	(.46)	-35		-.69	(1)	-.87	(1)
None	.20**	(.09)	-.01	(.13)	.16	(.08)	.14	(.1)
Single to single	-		-		-		-	
Single to married	.69***	(.08)	1.6***	(.1)	.8***	(.07)	1.3***	(.09)
Single to post married	.55***	(.17)	1.3***	(.29)	.8***	(.11)	1.5***	(.26)
Degree and higher	-		-		-		-	
Further education	.39**	(.13)	.34	(.18)	-.02	(.12)	.38*	(.16)
High School 2	.56***	(.12)	.37*	(.18)	.26*	(.1)	.42**	(.15)
High School 1	.84***	(.12)	.71***	(.16)	.5***	(.1)	.52***	(.14)
Higher Professional	-		-		-		-	
Lower professionals	.55*	(.28)	.24	(.25)	.47**	(.18)	-.22	(.19)
Intermediate occupations	.71*	(.27)	.03	(.27)	.58**	(.18)	-.27	(.22)
Own account workers	.59	(.36)	.41	(.31)	1.2***	(.3)	.48*	(.22)
Semiroutine occupations	.84**	(.03)	.25	(.25)	.64**	(.21)	.18	(.19)
Lower technical occupations	1.1***	(.28)	.45	(.25)	1.0***	(.19)	.17	(.19)
Routine occupations	1.3***	(.28)	.26	(.26)	.98***	(.19)	.31	(.19)
Long term unemployed	1.4 ***	(.29)	.62	(.31)	1.2***	(.21)	-.15	(.29)
Student	.35	(.31)	.16	(.32)	.31	(.24)	-.61	(.37)
Townsend deprivation 1991	.005	(.01)	.04*	(.02)	.04***	(.01)	.02	(.01)
First birth	921		497		1130		655	
Log likelihood	-5852.2974		-3032.8495		7347.1521		-4125.1891	

models controlling for the effects of raised religion, marital status, educational attainment, occupational stratification and Townsend deprivation on the hazard of first birth to men and women from the 1975 and 1976 cohorts * p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

The findings confirm the argument of Boyle (2007b), that the urban/rural geographies may be too crude to capture variation in fertility trends. The results also suggest that population densities and measures of geographical deprivation provide relatively inconsistent explanatory power in respect of first birth, when individual level factors are taken into account. Effects of these variables are positive and largely non-significant. The exception to this is population density at 2001 which is negative (but positive at 1991), however the results are not consistently significant when the other explanatory variables included.

Table 7.9, models estimating the hazard of first birth to men and women from the 1975 and 1976 cohorts

Variable	1976 Birth Cohort				1975 Birth Cohort			
	Model 1 Women n=1419		Model 2 Men n=1121		Model 3 Women n=1632		Model 4 Men n=1302	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Catholic	-	-	-	-	-	-	-	-
Church of Scotland	-.04	(.09)	-.25*	(.12)	-.21**	(.08)	-.28**	(.01)
Not Christian	.-007	(.5)	-.77 *	(.38)	-.82*	(.38)	-.06	(.42)
Other Christian	.36	(.17)	-.19	(.23)	-.11	(.18)	-.18	(.2)
Other religion	.76	(.46)			-.71	(1)	-.82	(1)
None	.4	(.09)	-.04	(.12)	.11	(.08)	.13	(.1)
Single to single	-	-	-	-	-	-	-	-
Single to married	.69***	(.08)	1.2***	(.1)	.77***	(.07)	1.3***	(.09)
Single to post married	.55***	(.17)	1.3***	(.29)	.79***	(.11)	1.5***	(.26)
Degree and higher	-	-	-		-	-	-	-
Further education	.39**	(.13)	.37*	(.19)	-.02	(.12)	.38*	(.16)
High School 2	.51***	(.13)	.41***	(.18)	.26*	(.11)	.42**	(.15)
High School 1	.84***	(.12)	.76***	(.16)	.52***	(.10)	.52***	(.14)
Higher Professional	-	-	-	-	-	-	-	-
Lower professionals	.55*	(.27)	.24	(.25)	.47**	(.18)	-.22	(.19)
Intermediate occupations	.07**	(.27)	.06	(.27)	.59***	(.19)	-.27	(.22)
Own account workers	.6	(.36)	.41	(.31)	1.17***	(.3)	.49*	(.22)
Semi routine occupations	.84**	(.3)	.26	(.25)	.67**	(.21)	.18	(.19)
Lower technical occupations	1.1***	(.27)	.44	(.25)	1.0***	(.19)	.17	(.19)
Routine occupations	1.3***	(.28)	.61	(.31)	.98***	(.19)	.32	(.19)
Long term unemployed	1.4***	(.29)	.14	(.32)	1.2***	(.21)	-.11	(.28)
Student	.35	(.31)	.13	(.32)	.3	(.24)	-.61	(.37)
Townsend deprivation 2001	.003	(.01)	.04*	(.01)	.01	(.01)	.02	(.01)
Number of birtrhs	921		497		1130		655	
Log likelihood	-5852.3714		-3033.1872		-7353.8394		-4125.4455	

models controlling for the effects of raised religion, marital status, educational attainment, occupational categorization and Townsend deprivation on the hazard of first birth to men and women from the 1975 and 1976 cohorts * p<0.05; ** p<0.01; *** p<0.001 (s.e.)

It is put forward that people move location as a facet of a process of 'settling down' to have and bring up children (Kohler 2002, 2006). This is likely to include seeking housing and localities considered suitable for young families, incorporating assessments of local labour market and schooling opportunities (Boyle et al. 2007a, 2007b). The evidence suggests that these variables capture this process weakly, at best. To take understanding of the relationship between geography and fertility forward the next step required is analysis that explicitly takes account of the dynamic nature of processes of family formation and first birth. This section, along with the previous chapter, suggests that the use of longitudinal data appropriate for event history analysis

may be particularly useful in this as it could allow the analysis of the timing of birth in relation to timing shifts in location. On the other hand, these chapters also show that information from a limited range of time points (such as the two Census occasions) has the potential to mislead as well as inform about the effects of geography.

7.4 Further evidence from the 1976 cohort

The 1976 birth cohort elicits similar results to the 1975 birth cohort. A key difference exists, however, in the number of cases in the cohort. The 1976 cohort has 1419 women and 1121 men (excluding those with missing data). This is compared with 1632 women from the 1975 cohort, and 1302 men. The samples available for the 1976 cohort are smaller and the numbers of first births reduced quite considerably. It is plausible that this could lead to a loss of significance related the reduced sample size. Right censoring is another feature of the data that could influence the results. Those from the 1975 birth cohort are right censored in these data in 2006 aged 31. Those born in 1976 are right censored aged 30. This extra year of potential childbearing might influence how the timing of first birth relates to structures of social stratification which are captured only at one point in time.

The 1976 cohort turned 15 years of age in around 1991 and was around 25 when observed in the 2001 Census. Examining Table 7.10, it can be seen that, like the 1975 cohort, the 1976 cohort appears to transition to broadly equivalent levels of attainment, and if anything there is even less difference between men and women in this cohort. None of the cohort is reported as achieving no qualifications, and, 21.3% of men and 22.1% of women from the cohort achieve degree level or higher degrees by 2001.

Table 7.10, descriptive statistics

Variable	*Men*		*Women*	
		%		*%*
Marital Status				
Unmarried in 1991 - Unmarried in 2001		85.7		76.9
Unmarried in 1991 - Married in 2001		12.6		19.55
Unmarried in 1991 - Post marriage 2001		1.5		3.6
Level of Attainment				
Degree and above		21.3		22.1
Further qualifications		14.0		14.7
High school 2- university entry level		18.6		18.1
High school 1		46.2		45.1
NS-SEC - occupational categorisation				
Professional and managerial		8.1		5.2
Lower professional		15.3		19.0
Intermediate occupations		9.6		21.0
Own account workers		4.2		2.3
Semi routine occupations		16.2		5.1
Lower technical occupations		16.2		20.9
Routine occupations		17.8		11.2
Long term unemployed		4.26		7.5
Student		8.4		7.8
Number of first births	497	44.3	921	64.9
Total	**1121**		**1419**	

key socio-economic variables for the 1976 birth year cohort, source SSAS

Table 7.10 reports the distribution of men and women on the NS-SEC measure of occupational stratification. As with educational attainment, the percentages of cases by categories on the NS-SEC measure of occupational stratification are similar for the 1976 cohort as compared the results for 1975. Just over 8% of men are in the professional and managerial category by 2001 and only 5.2% of women. Again, the major categories in which women are engaged are lower professional, intermediate occupations and lower technical. 60.9% of women with an NS-SEC category are engaged in these occupations. Again, men from the 1976 cohort, like men from the 1975 cohort, are more evenly spread across the NS-SEC categories. However, one

contrast to the 1975 cohort is that relatively more of this cohort appears to be in education in 2001, particularly for men.

As may be expected fewer people from the 1976 cohort have undergone marriage by 2001 than the 1975 cohort. The difference is relatively large: as can be seen in table 7.10 only 12.6% of men are married by 2001, aged around 25, this compares with 17.6% of men from the 1975 cohort, and a comparable difference is observed for women. Similarly to the 1975 cohort the numbers of men who have passed through marriage to post-married states (widowed, divorced or remarried) in the 1976 cohort are negligible, frequencies of 19 and 18 respectively. The numbers are slightly higher for women, with 3.6% of the 1976 cohort having a post-married state 2001, aged around 25 years old (compared with 7.4% of the 1975 cohort).

Substantial differences in the level of childbearing across the period 2001-2006 are evident between the birth cohorts. For instance, table 7.10 describes the frequencies of people from the 1976 birth cohort who experience a first birth by the end of the period of observation in 2006 (excluding missing). The comparison with the equivalent frequencies for the 1975 birth cohort illustrates the importance of timing across these key years of childbearing. Just fewer than 65% of women and just over 44% of men from the 1976 cohort experience a first birth whilst under observation. This compares with just under 70% of women who experience a first birth from the 1975 cohort and around 50% of men from this cohort who experience a first birth. Although the percentages are comparable and represent the difference in being a year older in relation to childbearing, the frequencies experiencing the first birth event are lower, and this also relates to the relative size of the cohorts and the prevalence of missing data.

7.5 Modelling the 1976 Cohort

Table 7.11, cox models estimating the hazard of first birth to men and women from the 1976 birth cohort

Variable	WOMEN born in 1976 Number of cases: 1419 Number of first births: 921 Model 1		Model 2		Men born in 1976 Number of cases: 1121 Number of first births: 497 Model 3		Model 4	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Catholic	-		-		-		-	
Church of Scotland	-.2*	(.08)	-.26**	(.08)	-.28**	(.1)	-.3**	(.11)
Not Christian	-.85*	(39)	-.86	(.39)	-.6	(.4)	-.54	(.43)
Other Christian	-.09	(.18)	-.1	(.18)	-.18*	(.2)	-.26	(.2)
Other religion	-.67	(1)	-.73	(1)	-.9	(1)	-.83	(1)
None	.1	(.08)	.08	(.08)	.12	(.1)	.09	(.11)
Single to single	-		-		-		-	-
Single to married	.78***	(.07)	.77***	(.07)	1.4***	(.1)	1.4***	(.1)
Single to post married	.8***	(.11)	.81***	(.11)	1.6***	(.26)	1.5***	(.26)
Degree and higher	-		-		-		-	
Further education	.004	(.12)	.004	(.12)	.38*	(.16)	.36*	(.16)
High School 2	.28**	(.1)	.28**	(.11)	.41**	(.15)	.37*	(.15)
High School 1	.55***	(.1)	.54***	(.1)	.55***	(.14)	.53***	(.14)
Higher Professional	-		-		-		-	
Lower professionals	.47**	(.18)	.46*	(.18)	-.2	(.19)	-.2	(.19)
Intermediate occupations	.59**	(.19)	.59**	(.19)	-.25	(.2)	-.25	(.2)
Own account workers	1.2***	(.3)	1.2***	(.3)	.52*	(.22)	.47*	(.23)
Semi routine occupations	.69**	(.21)	.68**	(.21)	.2	(.19)	.17	(.19)
Lower technical occupations	1.0***	(.18)	1.0***	(.18)	.17	(.19)	.18	(.19)
Routine occupations	1.0***	(.2)	1.0***	(.2)	.33	(.19)	.33	(.19)
Long term unemployed	1.2***	(.21)	1.2***	(.21)	-.12	(.29)	-.08	(.29)
Student	.25	(.24)	.25	(.24)	-.57	(.37)	-.58	(.37)
City in 2001			-				-	
Town in 2001			.03	(.07)			.09	(.1)
Small accessible in 2001			-06	(.1)			.28*	(.14)
Small remote in 2001			-.17	(.18)			.28	(.25)
Accessible Rural in 2001			-.03	(.12)			.02	(.14)
Remote Rural in 2001			-.12	(.15)			.03	(.2)
City in 1991	-							
Town in 1991	-.13	(.1)			.03	(.1)		
Small accessible in 1991	-.29	(.17)			-.02	(.14)		
Small remote in 1991	-.3	(.1)			-.06	(.2)		
Accessible Rural in 1991	-.19	(.1)			-.14	(.13)		
Remote Rural in 1991	-.17	(.14)			-.13	(.19)		
Log likelihood	-7275.11		-7276.95		-4019.78		-4090.67	

models controlling for the effects of raised religion, marital status, educational attainment, occupational stratification and urban rural geography on the hazard of first birth to men and women from the 1976 birth cohort* p<0.05; ** p<0.01; *** p<0.001 (s.e.), source SLS

Modelling first birth patterns for the 1976 cohort substantially reproduces results that are reported in respect of the 1975 cohort. Table 7.11 reports the results to Cox Proportional Hazard models incorporating the 1976 birth cohort sample along with the explanatory variables used in modelling the 1975 cohort, above. Models 1 and 2 in Table 7.11 include the results for women from the 1976 cohort, under two similar specifications with differences in the geographical measures considered. For raised

religion, the effects in respect of the contrast between those raised Catholic (here the reference category) and those raised in the other categories are consistent with the findings reported in chapter 7. The coefficients remain negative apart from the non-religious dummy category. This is equivalent to what is seen in chapter 7 examining the 1975 birth year cohort although the reference category used there is the non-religious. These findings are also consistent with the hypotheses (proffered for the 1975 cohort) that socio-economic or cultural differences of denominations influence timing of first birth.

The effects of the contrast between being single by 2001 with being married, and post marriage at 2001, are similar for both the 1975 and 1976 cohorts. The effect of educational attainment on the hazard of first birth is as would be expected. The contrasts between the dummy categories are negative and significant compared with the degree and higher degree reference category. The effects of educational attainment on childbearing to the 1976 cohort reported in the models in Table 7.11 still suggest that men and women with degrees delay first birth in comparison with those with lower levels of attainment and the results broadly correspond to other models and to the known pattern of delay in fertility of those who remain in education.

There is a similar association when comparing the effects of the measure of NS-SEC between the 1975 and 1976 cohorts. Results are generally non-significant for men (apart from the small business owner and small account holder category). For women the results repeat the findings for the 1975 birth year cohort. There are positive and significant effects for the occupation dummy categories compared to the higher professional reference. On the other measures used to model first birth the 1976 cohort

suggests effects similar to the 1975 cohort. This is not the case in respect of occupational stratification. The models confirm both the literature, which suggest 'career women' delay first birth (Mills et al. 2005) and findings presented in the previous chapters.

The SHS urban/rural measure also suggests the same results to those reported in the he previous chapters. Results for this cohort suggest no consistent significant effects for men or for women at either time points 1991 and 2001. The results in Table 7.11, model 1, suggest that the urban/rural context of people at the age of 15 does not directly influence when they will have their first child.

7.5 Conclusions

This chapter examines factors influencing first birth to the 1975 cohort in Scotland. This cohort were in their mid to late 20s as Scotland experienced its lowest ever fertility levels. The research aims; to assess the effectiveness of standard measures of geography in explanation of individual level processes of first birth and to scrutinize how social structure influences the timing of first birth in Scotland are examined throughout this chapter and chapter 6. In this vein, Kohler et al. (2006: 42) argue that delay in first birth characterises low and lowest, low fertility (see also Goldstein et al. 2009). Smith (1989: 171) conceptualises macro level institutions and structures of social stratification as systematically related to individual level processes and behaviours in childbearing. Both Kohler et al. (2006, 2002) and Mills et al. (2005) show something akin to Smith's (1989) perception, in, for example, the effects of economic uncertainty; or the relationship between gendered patterns in the pursuit of

careers, labour market participation, and fertility. The analysis above illustrates similar variation in childbearing related to structures of social stratification in Scotland.

Overall levels of fertility in Scotland are broadly in line with general trends of below replacement fertility (Joshi and Wright 2005; Kohler, Billari et al. 2006). Like people elsewhere in Europe, people in Scotland delay childbearing whilst in education (Cleland 2002; Mills, Blossfeld et al. 2005). This is evident in the significant effects associated with lower levels of attainment as compared the reference category of degree and above (see, Tables 7.2 and 7.3) and the negative coefficients associated with being a student.

The relationship between occupational categories and the timing of first birth is as would be expected for women and is in line with research showing that higher earning women delay or opt out of parenthood (Berrington 2004; Mills, Blossfeld et al. 2005; Smith and Ratcliffe 2009). Of further note is the relatively high hazard of first birth for both men and women who are in the own account workers and small business owners category. It seems that types of occupation associated with own account working are particularly related to early childbearing. These effects may indicate that the compatibility of types of occupation with having a child affects the tempo of first births in respect of men and women, or that people who are likely to start families early select themselves into these occupations. This reinforces the core finding that social structure intersects with childbearing in a nuanced and subtle manner. The gender contrast is also interesting. Men in the *higher professional* group do not have a significantly higher hazard of first birth than the other occupational categories (own account working excepted), net of the effects of education. However, the corresponding results for

women are positive and significant, and this relationship is generally known. That there appears to be no corresponding delay in childbearing related to an advantaged occupation for men has been less widely publicised.

The weight of evidence presented indicates that the usefulness of standard measures of geography in explanations of individual level processes of childbearing may be limited in the context of other individual level controls. Friedman et al. (1994) put forward that geographical mobility is generally associated with lower fertility. The shifting sign of the population density variable between the 1991 and 2001 time points presents some weak evidence that there could be a certain relationship between the timing of birth at the start of childbearing that is different by around age 26 This finding might be in keeping with Chesnais (1998) who refers to increasing mobility influencing fertility. However, neither the population density variable nor the Townsend measure or the SHS Urban Rural measure is consistently significant. In any event it is not an easy task to interpret or analyse the meaning of geographical effects even when using more complex geographies (see, Boyle et al. 2007b). In general, occupational categorizations (Smith 1989) and educational measures (Kerckhoff 2001) suggest effects which are strongly related to the individual level processes of childbearing, and are therefore much more readily interpretable in respect of fertility outcomes. However analysis at a more detailed geographical level may be fruitful in interpreting micro level processed of childbearing if it is believed that they proxy socio-economic status (Mweemba and Webb 2008), or can capture shifts towards areas considered desirable for having and raising children, either for normative or opportunity cost reasons (Dey 2007; Lutz, Testa et al. 2007; Boyle, Graham et al. 2007a).

Chapter 8 - Fertility Threshold: An alternative approach to considering fertility

8.1 Introduction

> *'Demography is a science short on theory, but rich on quantification'* (Kirk 1996: 361)

This chapter has two aims. The chapter outlines the concept of a fertility threshold as a potential explanation for variation in timing of first birth. The chapter also aims to outline an alternative research design that takes account of the structure of the SLS. The chapter begins with a section introducing the idea of a fertility threshold that relates to the social setting and circumstances in which people have children. This ends with an explanation that the SLS is not a dataset that enables an analysis that test a complex concept like the threshold. The following section begins the analyses of the SLS. This starts with an explanation of the construction of the data and moves on to examine the bivariate relationship between explanatory variables and a first birth outcome. The final two sections report the result to multivariate models. The first of these describes the relationship between the explanatory variables included in the models and the outcome. The second of these sections expands discussion of the results in the context of the threshold concept.

8.2 The concept of a 'Fertility Threshold'

This chapter puts forward the model of a 'Fertility Threshold' as explanation for the social group variation in the timing of first birth that has been described throughout this

thesis. The concept is inspired by Gauthier's (2007) article. However, Gauthier (2007) does not consider the possibility of a threshold of childbearing in the manner in which it is expressed here. Her article is concerned with reviewing the effect of policy on fertility, and it is briefly mentioned that state allocation of benefits may have a linear or threshold impact upon childbearing (Gauthier 2007: 341). In contrast this chapter applies the idea of a threshold to how social circumstances relate to timing in childbearing[40].

Kohler et al. (2006: 16) characterise fertility as '*a dynamic experience across the life course*'. Empirical evidence suggests that the processes of childbearing relate to other life course transitions and socioeconomic circumstance. Summarizing socioeconomic influences on postponement, Kohler et al. (2002) put forward that unemployment, human capital investments and the availability of housing may determine fertility outcomes, and particularly timings (Kohler et al. 2002: 655-657). There is empirical research that attempts to take account of this dynamic nature of childbearing. For example Steele et al. (2005) model the process of partnership and transitions from marriage and co-habitation to childbearing. Aassve et al. (2006) likewise examine union formation and how shifts in employment relate to fertility. This is conceptually akin to the study of Mills et al. (2005) who assess how uncertainty (primarily operationalised as economic uncertainty) impacts upon partnership formation and births amongst young people. Holdsworth and Elliott (2001) similarly examine the process of childbearing in relation to the sequence of leaving the parental home and forming partnerships. These

[40] There is some empirical precedence for this. For example Das (2004) examines the literacy threshold that relates to falling fertility rates in India.

studies each examine aspects of childbearing in relation to changes in the social setting through time.

The research cited above relates childbearing to wider socioeconomic processes. However, in each article an aspect is examined separately or in varied combinations. This chapter proposes the indicators and processes referred to above could be considered together as forming an 'ideal type' of situation in which childbearing happens. Each aspect of the social setting, such as the formation of an independent home (Holdsworth and Elliott 2001), the transition to secure employment (Mills et al. 2005, Aassve 2006), an exit from education, or partnering (Kohler et al. 2006), might be considered *sufficient* to trigger a birth event, but none are a *necessary* facet of the process, without medical intervention. Also, it may be that where these circumstances coalesce childbearing is more likely. In this situation the effect may act more like a threshold, with, perhaps, entry into a final aspect of the social setting precipitating childbearing. In this event it may make sense to talk of a perceptible *social threshold* after which childbearing is more likely. If this is the case then a threshold may be a viable way to conceptualise the linked processes and life course transitions which relate to socioeconomic circumstances, and which the research above shows are associated with birth events. In this manner the *threshold* is an attempt to conceptually unite the influence of several aspects shown to empirically relate to childbearing.

Operationalising the threshold concept empirically is a complicated task. Exit from education, steady employment, the formation of a partnership or a combined household, often signified by marriage, might for some proceed in a linear process prior to having children (e.g. Figure 8.1). However, in practice, one stage can quite easily precede

another and people with differing access to resources might affect transitions at differing times and perhaps with different aims. Measuring this is also problematic. For example, there are potentially confounding endogenous relationships between levels of education and occupational position (Miranda 2006; Mookherjee, Prina et al. forthcoming) , and also between levels of education and the timing of relationship formation (Neilsen and Svarer 2006) (the model might more realistically resemble the depiction in Figure 8.2). Confounding in this manner could also be exacerbated in the presence of different age cohorts. The experience and effect of mass education or macro-economic circumstances also varies over time for different cohorts (Blundell, Dearden et al. 2000).

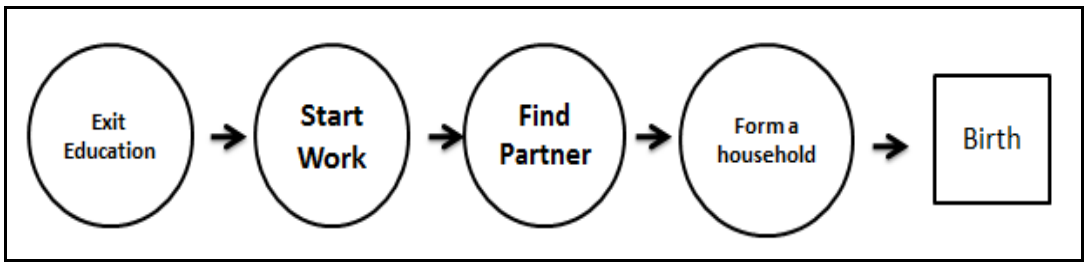


Figure 8.1, ideal type linear process leading to a birth event

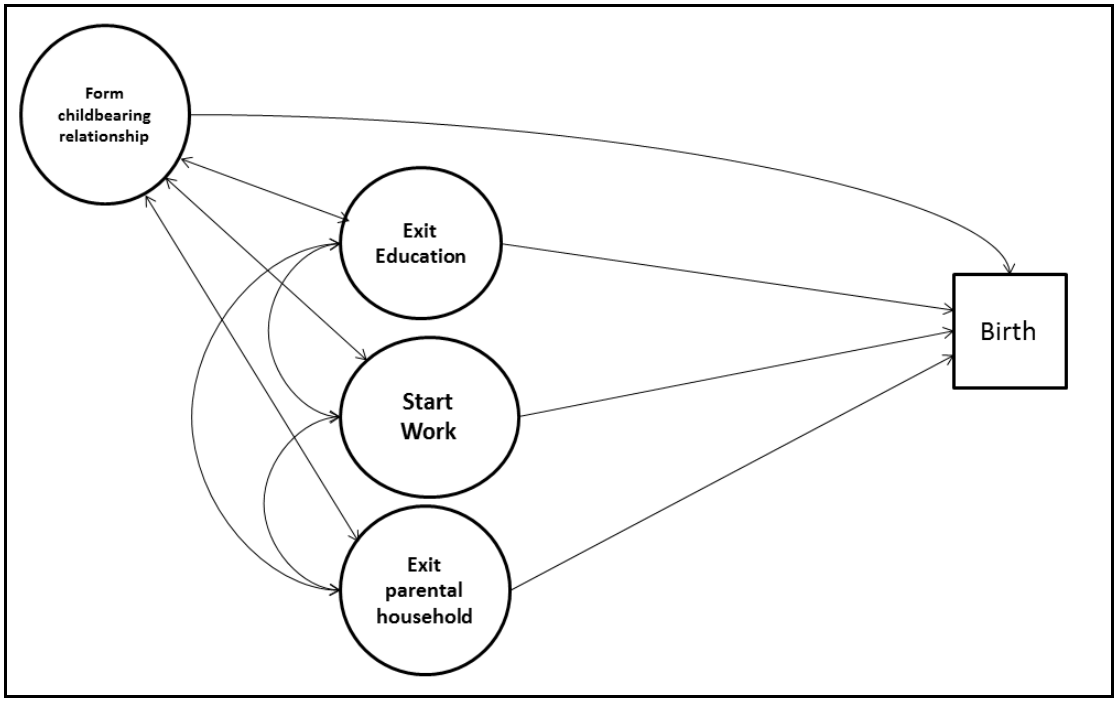


Figure 8.2, a depiction of the endogenous inter-relationships between explanatory factors leading to a birth event – the childbearing relationship bubble has been set apart from the other indicators as it is a distinctly *necessary* facet of childbearing, whereas the other indicators each may be considered potentially *sufficien*t triggers of a birth event individually. However, where they all come together it might be considered an ideal type and might possibly act in relation to birth events in a threshold manner.

In addition to drawing together empirical work the concept of a fertility threshold also attempts to unite theoretical positions. The concept could work to unify opportunity cost thinking (Becker 1991, Easterlin 1975) with perspectives which stress the influences of social norms in the timing of first birth within a life course perspective (Coleman and Salt 1992, Woods 1987, Sabotka 2004). Since social norms influence the circumstances in which people seek to become parents (Maxwell 1987; Davis 1997; Munshi and Myaux 2006) and socioeconomic position relates to timings of births and first births (chapter 6 & 8), then we would see a link in terms of how people's socioeconomic position in the social stratification system would influence whether they pass the threshold circumstances where people are likely to begin having children. People experience different constraints to their choices and opportunity cost trade offs related to their social position (Devine and Savage 2000) and depending upon their time of life

(Lillard et al. 1994, Sabotka 2004). The relationship between social stratification and the timing of birth events is a potential indication of how processes of opportunity cost and norms manifest in people's lives.

In the previous chapter it was argued that factors related to relative advantage may operate in relation to concepts such as risk and uncertainty to influence the timing of first birth (Kreyenfeld 2010, Sabotka 2004: 19). It is put forward that increased uncertainty leads to lower total fertility rates because people in uncertain situations delay births. It is also argued that people with varied access to resources experience uncertainty differently (Beck 1998, Kohler et al. 2006, Mills et al. 2005). In Beck's (1998) generalist exposition of risk theory, risk is conceptualised as disproportionately affecting the relatively less advantaged. In the empirical evaluation of childbearing behaviour in relation to youth and uncertainty of Mills et al. (2005), it is similarly asserted that the disadvantaged are excessively affected by risk. It may therefore be expected that those who occupy situations signified by variables associated with less advantage delay childbearing or first birth. However, people in positions that would normally be considered relatively less advantaged can often be shown to experience a first birth before people in more advantaged situations (Wellings, Wadsworth et al. 1999; Skirbekk 2008; Mulder and Billari 2010). This would suggest that people occupying differing positions in the social structure may find themselves in 'uncertain' or risky situations at different times and for different reasons.

The fertility threshold can also potentially incorporate this risk theory approach. In the threshold approach, opportunity cost style trade-offs, and the influence of risk and uncertainty, are understood as occurring within social norms. Norms relate to aspects

such as overall aims and ideals (of quantity, as well as of how people want to bring children up, and under which conditions). Evaluations of opportunity cost and risk vary by positions within the social stratification structure. The impact of stratification position therefore interacts with norms as people dynamically assess life goals in reference to their current socioeconomic position and in assessment of their future socioeconomic status.

The threshold concept therefore represents the culmination of insights drawn from analysis, and the review of the empirical and theoretical literature, presented above. The threshold can be considered a working hypothesis, although the SLS does not encapsulate the data to adequately test it. To undertake a test, or even a description, then data on the timing of shifts in employment, the exit from education, partnership formation and house moves are required. This detailed data on state change is not present in the SLS, and fully assessing the usefulness or validity of the threshold concept is a future research aim arising from this work, but beyond the scope of the thesis, although the research presented below begins to examine aspects of the relationship between SLS measures in the context of the threshold concept. Panel data such as the BHPS could be used to explore many of these patterns, although the volume of cases may prove limiting for many comparisons.

8.3 Analysis

This chapter takes an alternative approach to the event history methods applied in the preceding chapters.. Concerns over bias introduced by left censoring in chapter 6 were improved in chapter 7 by taking a more restricted age cohort; however issues of partial left censorship remained, as meaningful explanatory variables are only available (ten

years) after the start of the risk period. This chapter takes birth cohorts of different years, using the explanatory variables available at Census 2001 and estimating the probability (using logistic regression) that an individual will experience a first birth in 2001, or the years immediately following. This offsets partial left censoring as the 'state' an individual occupies is known at 2001 prior to first birth, and whilst the circumstances may alter in the few years in which birth is measured following 2001, it is still possible to relate circumstance at 2001 to a subsequent birth in the short 4 year window after observation. This approach counteracts issues of left censorship and causal inference described in chapters 6 and 7; however it is not a complete panacea. Managing the data in this manner has the consequence of discarding a lot of the data available in the SLS. For example, this approach only makes limited use of the rich information regarding the timing of birth events from 1991 until the present.

The analysis in this chapter takes birth year cohorts as the basis for the examination. First birth to the birth year cohorts of 1981, 1976, 1971 and 1966 is described and modelled. The research considers the probability of whether individuals experience a first birth in the period following 2001. The outcome constructed for this analysis is whether an individual experiences a first birth whilst within a certain time period following observation in 2001. Similarly to chapters 6 and 7, if an individual experienced a first birth prior to 2001 then they are not included in the analysis. This is controlled for in two ways. The co-residence measure described in chapter 6 is applied using data included from Census 2001. Birth event data from vital events records is also employed to exclude from analysis those who are recorded as experiencing a birth between 1991 and 2001. This dual control is applied to enable an analysis of those who experience a first birth compared with those from each cohort who do not, and who

have not previously had a child. A discussion of the validity and accuracy of the co-residence proxy is given in chapter 6. The additional control for previous childbearing in the nine year period 1991 to 2000 enhances the effectiveness of the measure. The co-residence measure used in chapter 6 was tested using the BHPS, where an equivalent proxy was compared to actual measured prior childbearing, and found to provide very similar and highly correlated results. The same was done using the BHPS to test the co-residence proxy with prior births in the period 1991 to 2000. This measure was again found to closely proxy actual levels of childbearing (appendix 3). The comparison to between co-residence and prior childbearing 1991-200 and actual childbearing is presented in Appendix 3 for women only. This is because the relevant data are only available for women in the BHPS. It may be that men are more likely not to be associated with children by a co-residence measure, as discussed in chapter 6, and this may vary depending on age and relate to socio-economic circumstances. However, it is hoped that the additional control for known childbearing 1991-2000 strengthens the robustness of the co-residence proxy in this respect. In any case this must also be explicitly acknowledged as a limit of these analyses.

The outcome takes account of whether an individual experienced a birth in the period between 2001 and 2004. Variables measuring the circumstances of people at Census 2001 are used to predict the probability of first birth between 2001 and 2004. This alters the relationship between explanatory variables measured at 2001 and subsequent outcomes, as compared to the analysis in chapter 7 where Census 2001 variables are used to capture the socio-economic position of people who may experience a first birth at any time across the period 1991 to 2006. A more definite relationship is established which helps address a problem of causal ordering (although it is still possible that

people may alter their 'state' following Census 2001 and prior to the experiencing a first birth in the period 2001-2004).

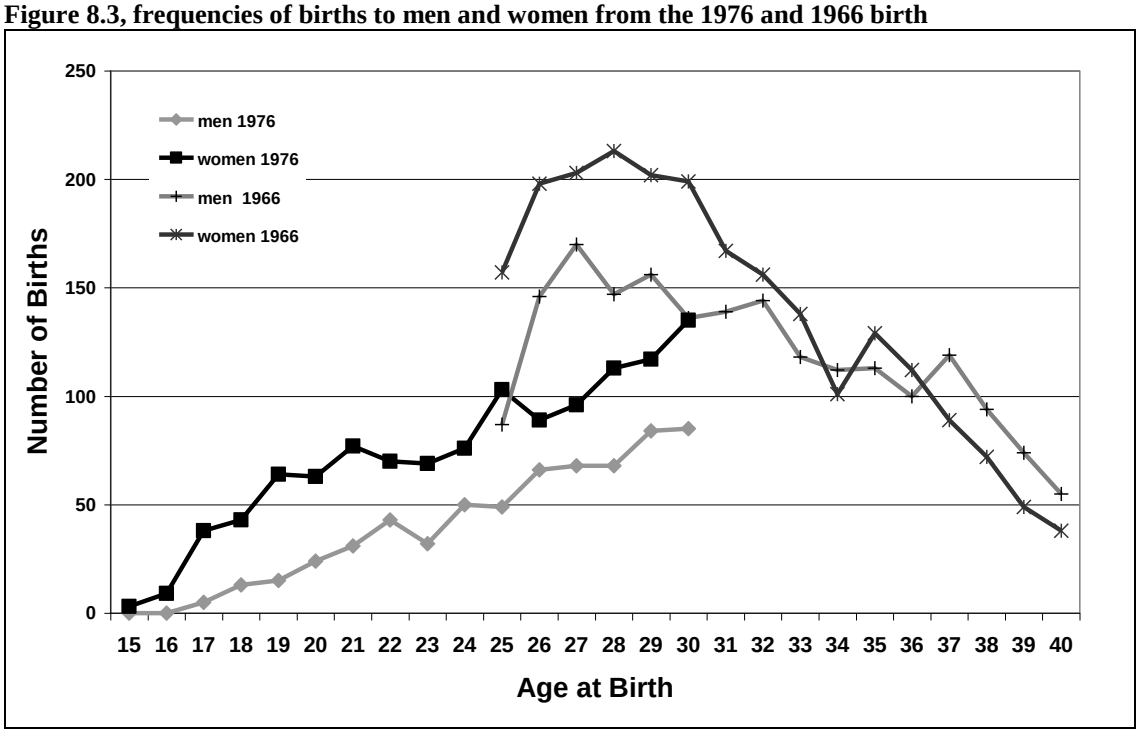
Unfortunately data measured at one point in time, Census 2001, and used to indicate a probability of subsequent first birth provides only a very limited descriptive examination of the relationship between the variables included and the dynamic process of first birth. However, in light of the theoretical discussion above one aspect of interest in particular is examined. In contrast to the preceding chapters this chapter includes an economic activity indicator, as opposed to an occupational categorization, with housing tenure included as a control for socioeconomic status. The use of the economic activity variable, although a relatively crude control, is intended as an indicator of economic uncertainty, If decreased certainty of economic circumstances means that people are less likely to start a family it may be expected that on average those who are not in full time employment may be less likely to have a first birth (Sabotka 2004). This might especially be expected of men (Kohler, Billari et al. 2006). If this is the case it would be expected that full time working is associated with a positive significant association across each of the cohorts. This relationship is examined below, along with the effect of other explanatory variables.

8.3.1 General Trends

Figures 8.3 and 8.4 chart the frequency of total births to men and women from the 1966 and 1976 birth year cohorts. This is given across the full period of observation in these data, 1991 to 2006. People born in 1976 turn 15 years old in the year in which they are first observed in these data, at 1991, and turn 30 years old in the year they are last observed. They approach the highest point whilst under observation. In contrast, people

from the 1966 cohort turn 25 in the year when they are first observed and turn 40 years old in the year last observed. It is therefore possible to see the numbers of births occurring to this group peak in the early 1990s, before declining towards the turn of the century. It can be seen from Figure 8.3 that women from the 1976 cohort generally experience more births than men whilst observed. However, for the 1966 cohort there is a cross over point, which occurs when the cohort are in their mid 30s when men start to experience more births than women.

Figure 8.3, frequencies of births to men and women from the 1976 and 1966 birth

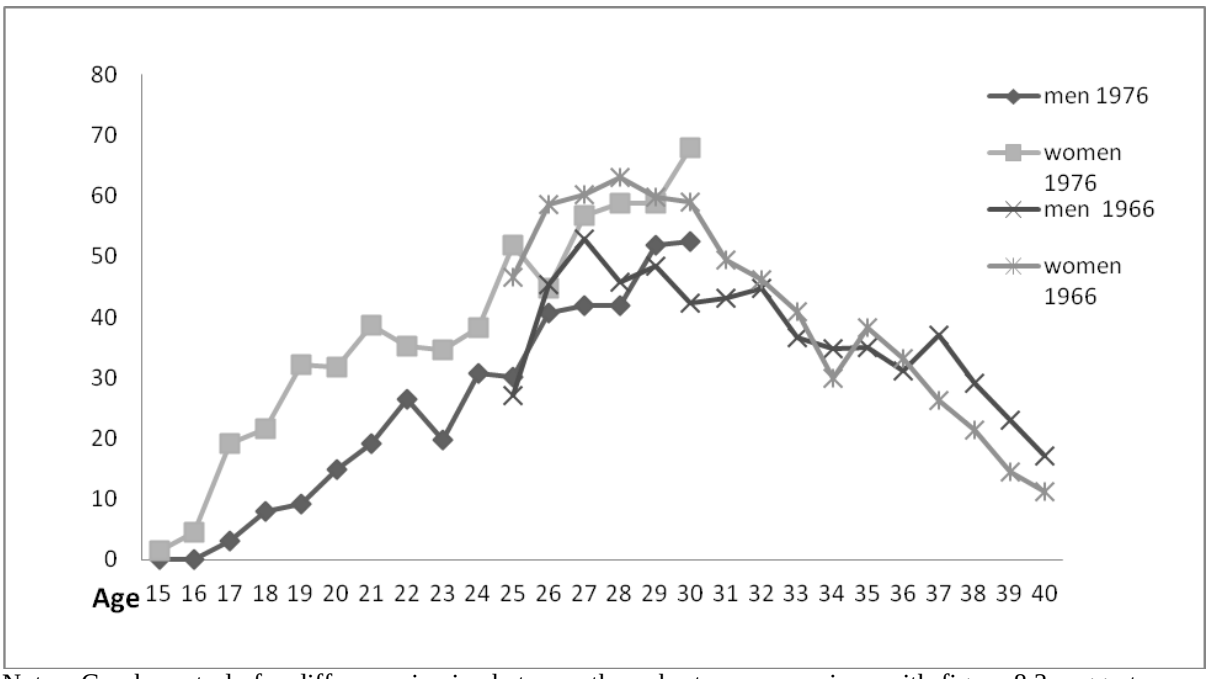


Notes: Graph takes no account of the relative size of the cohorts; source: SLS.

Figure 8.4 controls for differences in cohort size by standardizing the birth rate (to number of births per 1000). Those from the 1966 cohort turned 25 in 1991 when first observed in these data, whereas those from the 1976 cohort turned 25 in 2001. The 1966 birth cohort can be seen peaking in births between the ages of 27 and 28 years old. Yet, the rate of births to the 1976 cohort may still have to peak by 30 years old. The 1976 cohort do not appear as though they will peak at a level below the 1966 cohort in

relative terms (though in absolute terms they are likely to, because there are fewer people in the 1976 cohort as compared 1966).

Figure 8.4, births per 1000 men and women from the 1976 and 1966 birth cohorts



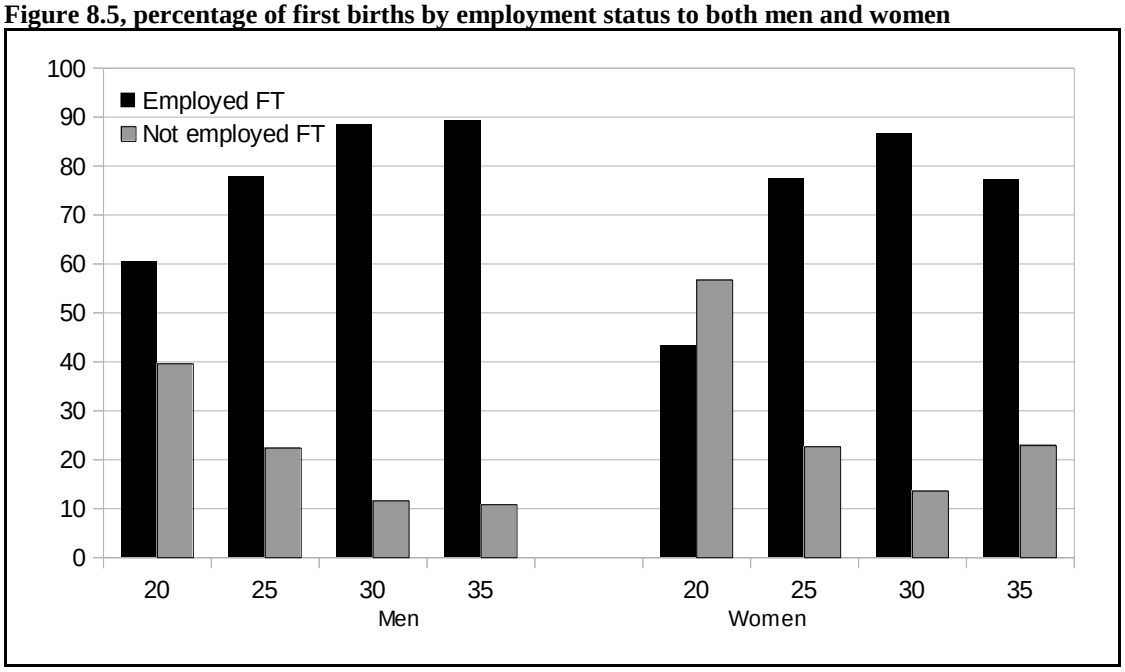
Notes: Graph controls for difference in size between the cohorts, a comparison with figure 8.3 suggests that a lot of the difference in the numbers of first birth between the cohorts is due to the different volumes of people in the cohorts; source: SLS.

8.3.2 Economic Activity

The variable graphed in Figure 8.5 is a collapsed version of the economic activity indicator available in the SLS data extract. The 'not employed full time' category contains individuals classified as unemployed, starting work, student, economically inactive and looking after the home and the family, as well as part time workers. The 'not in work' classifications are separate categories in the original format of the variable. However, the numbers of cases in many of the categories are very small in many instances. Full time employment is a limited proxy for a more economically certain position. It is limited as it is possible to be in full time employment on short term contracts or working on notice of redundancy. However, full time working of any

variety is generally a more economically advantaged position than unemployment or the economically inactive (Yates 2008).

Figure 8.5, percentage of first births by employment status to both men and women



Notes: Percentage of men and women from each birth cohort who experience a first birth, who have not previously had a child and who are employed or out-with paid employment prior to the birth, men n, 20=1217, 25=987, 30=1107, n=791, women n, 20=1240, 25=977, 30=946, 35=539; source: SLS.

It is suggested that, in general, people do not embark upon childbearing whilst not in receipt of a regular income via paid employment (Aassve et al. 2006), especially men (Sabotka 2004; Astone, Dariotis et al. 2010). The majority of first births to people from these cohorts occur to those who are employed, either full time, or part time. Women and men appear more likely to work full time prior to the birth of their first child (Hansen, Hawkes et al. 2009), although there are more births to younger women who are not employed full time. Figures 8.5 graph the percentages of those from each cohort who are working and those out-with full time employments. The outcome is whether they experience a first birth within the specified time period. This shows the percentages of men and women who are employed or not employed full time and go on to experience a first birth. Slightly higher percentages of women than of men who are

not in paid employment in 2001 go on to have first births in every cohort. Relatively large numbers of men and women from the younger 20 year old cohort are not in full time employment when having their first child. Indeed the numbers of women in the 20 year old cohort and not employed full time exceed those employed full time.

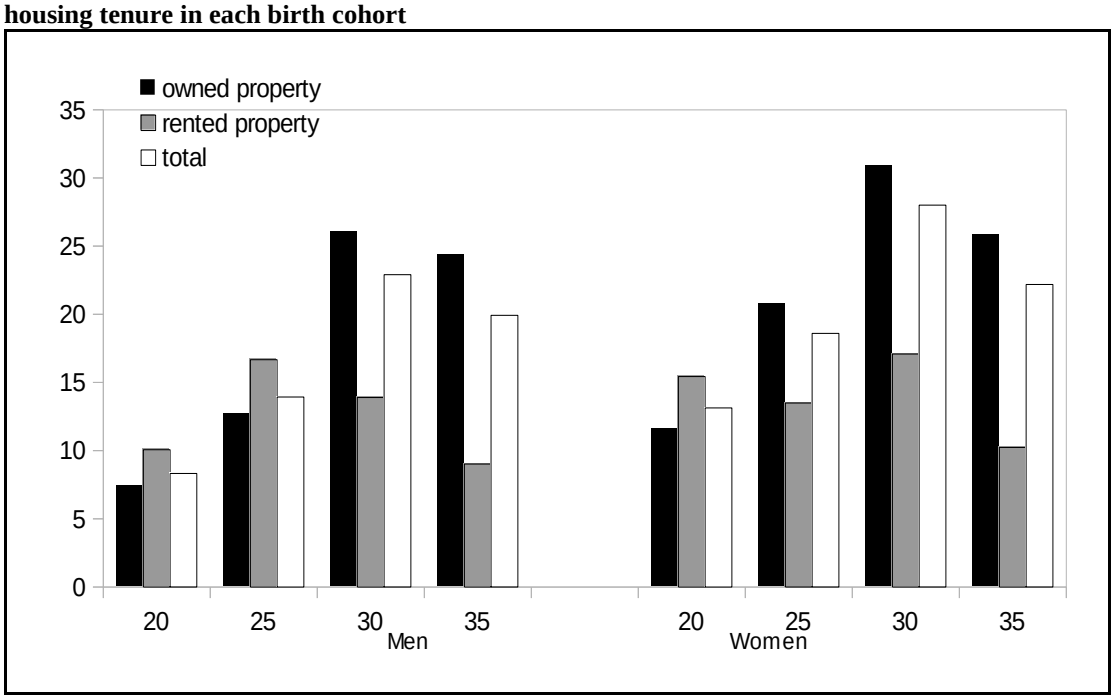
8.3.3 Housing Tenure

Housing tenure is included in this analysis as an indicator of socio-economic status and is considered here primarily in this context. The housing tenure variable records distinction between home ownership, social and private renting, and whether the SLS member is living rent free. The measure is collapsed into an owner versus renter dichotomisation in modelling because of low numbers of cases (e.g. private renting). Studies have shown that leaving the parental home is often a prerequisite to embarking on ones own family formation (Holdsworth 2004, Holdsworth and Elliott 2001, Kohler et al. 2006). These data do not allow the measurement of when individuals leave parental homes and form family homes of their own. The confounding of age and tenure means that those in the older cohort are more likely to have acquired an owned tenure status. The tenure status of many of the young cohort will be that of their parents' home, whereas relatively few from the oldest birth cohort are likely to be living with their parents by 2001 (Jones 1987; Murphy and Duolao 1998).

The use of housing tenure as an indicator in the analysis of first birth has been employed by Strom (2010), and prevalence of home ownership has been associated with low fertility (Mulder and Billari 2010). In Chapter 5 it is shown that housing tenure contributes a valuable amount of explanation along with a number of socioeconomic variables available, net of demographic factors included in modelling

current parity. Similarly, it is shown here that there is some evidence property ownership characterises the circumstances in which people experience relatively late first birth. In reference to the theoretical discussion it may be expected that ownership tenure be associated with later first birth at this implies an opportunity cost trade off as people delay childbearing to save a for a house purchase. Also, renting tenure could be considered to imply a more risky situation as it may be associated with less settled circumstances or access to fewer material resources with which to purchase a property (Dieleman and Everaers 1994). Relatedly this could also feed into norms and an ideal of owning a family home. Therefore ownership tenure would be associated with delay in childbearing for those who would like to own their own home (Chapman and Hockey 1999).

Figure 8.6, first birth rates per 100 men and women who have not previously had a child by housing tenure in each birth cohort



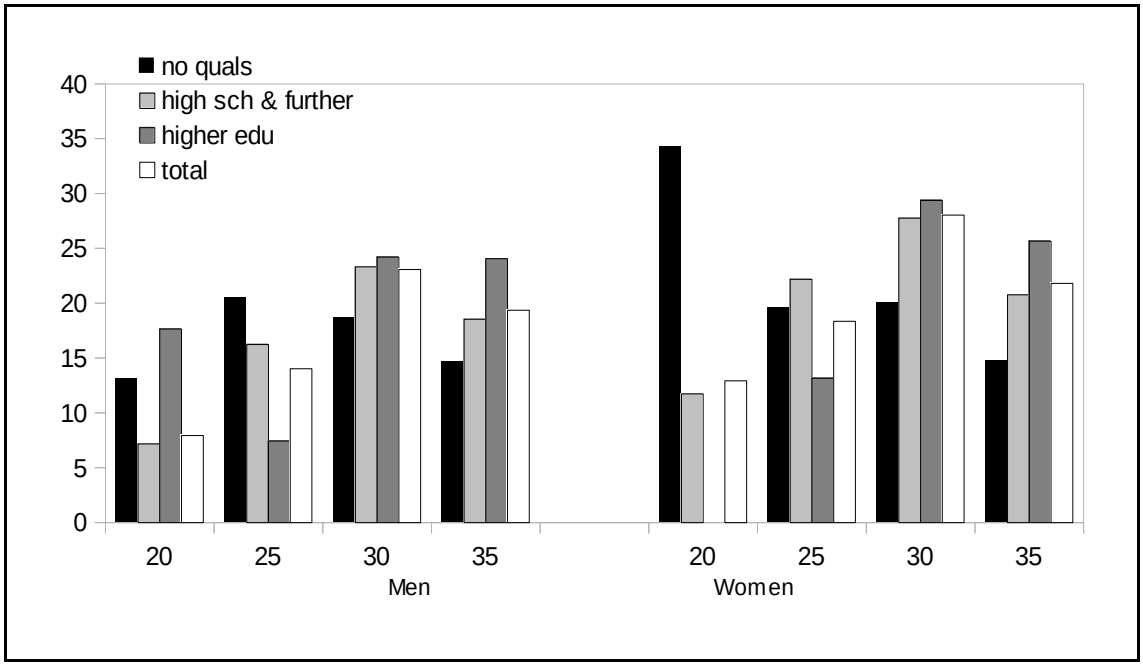
Men n, 20=1261 25=1019 30=1148 35=813; Women n, 20=1264 25=984 30=964 35=550, source SLS

Figure 8.6, reports birth rates per 100 men and women associated with renting and owner tenures, along with the total births per 100 for each cohort. The birth rate of the renter category exceeds that of the owner category for men and women to the younger 20 year old cohort and men of the 25 year old cohort. In the other cohorts the magnitude of the difference in numbers experiencing a first birth in the ownership category is higher than for the renter category. The 'owning' tenure descriptively appears to characterise first births in later years, suggesting later first births may be associated with a relatively advantaged tenure position (Strom 2010).

8.3.4 Educational Attainment

It is shown in earlier chapters of this thesis that education is strongly linked to the tempo of first birth (Bongaarts 2003). Those who progress in education are likely to delay first birth relative to those who exit education early.

Figure 8.7, first birth rates per 100 men and women who have not previously had a child by educational attainment in each birth cohort



Men n, 20=1248 25=999 30=1127 35=806; Women n, 20=1262 25=981 30=956 35=541, source SLS

Purely in terms of frequencies it is difficult to observe patterning in these data regarding any relationship between educational attainment and first birth. Figures 8.7 compare the birth rate per 100 of those at differing levels of educational attainment to men and women within the age cohorts. One point of note is that the 'large' results for men and women in the 20 year old cohort are being excessively driven by few cases. This can be seen by the total column which is very close to the level of the high school and further level group where most of the cases and births occur. The numbers of first births being experienced by the more highly educated is larger in the older age cohorts of 30 and 35 year olds. In these cohorts the graduates have a higher number of births per 100. This again suggests both men and women delaying first birth whilst in higher education and the phenomenon is particularly well documented for women (Berrington 2004). This could indicate a substantial amount of recuperation, as men and women with degrees catch-up with having children in their 30s.

Theoretically, educational attainment can also operate to influence first birth via mechanisms associated with risk, opportunity cost and norms. There is an opportunity cost trade off to be made in deciding whether to remain in education (e.g.Bauer and Riphahn 2007) and this could influence timing of first birth if education is completed prior to family formation (Kantorová 2006) . Relatedly it could also be considered a risky time to have a child whilst in education, as this could limit access to material resources and jeopardise successful completion of education (Fessle 2003). Similarly this might reference a norm to wait until finished in education prior to having a child. For example, Rindfuss & St John (1983) suggest that there are most likely explicit and implicit justification and encouragement: *'to allow the daughters time to complete their education; thus, the effect on age at first birth would be indirect. It also might be*

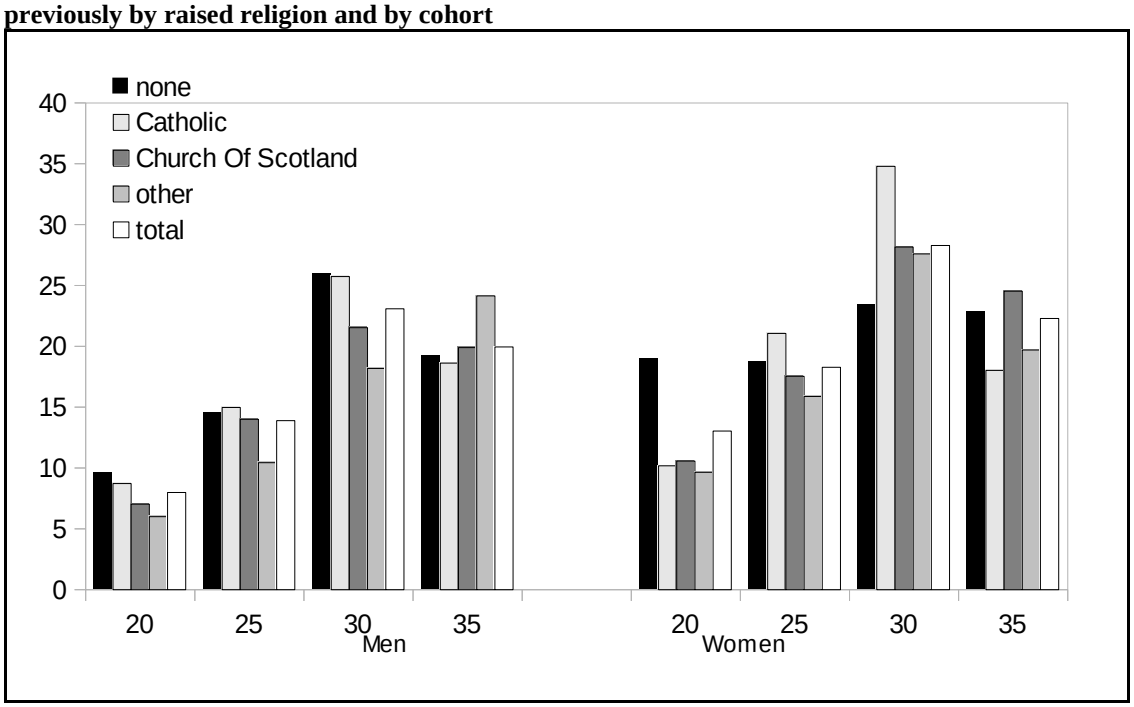
argued that there is an intergenerational transmission of norms regarding age at first birth' (p. 555).

8.3.5 Raised Religion

Modelling in chapters 6 and 7 shows that religious affiliation is related to timing of a first birth event in Scotland (Gráda and Walsh 1995, MacQuillan 2004). It has been suggested that this could represent the effects of religious cultural teaching, or a relationship between religious affiliation and socio-economic status (Hayford and Morgan 2008, Welsh 2010).

Figure 8.8 reports the rate of birth per 100 by classification of raised religion. If anything, a pattern of religious upbringing appears to underlie fewer early first births. For instance, examining the 20 year old cohort in respect of both men and women, it can be seen that the numbers of first births to those from the Church of Scotland is moderately lower than the first births to those who are raised with no religion, standardizing for the numbers in each category. This effect seems to be somewhat reversed for the cohort of women who are 30 years old in 2001, with those who have been raised religiously appearing to experience a higher instance of first birth at this stage. There are also gender differences in how religious and non-religious upbringings influence first birth. For instance there is a relatively higher number of first births to non-religious women from the 20 year old cohort than to men. There are likewise differences for the 30 year old cohort with religious women exhibiting higher levels of birth per 100 in comparison to the non-religious, whereas this is not the case for men.

Figure 8.8, rate of first birth per 100 for men and women who have not experienced a first birth previously by raised religion and by cohort



Men n, 20=1193 25=965 30=1096 35=782; Women n, 20=1212 25=941 30=930 35=534, source SLS

Interpretation of the relationship between religion and a fertility threshold is not the same as with other socioeconomic indicators of first birth. The association between an individual and housing tenure, educational attainment, economic activity and relationship status are all circumstances that alter across the life course. Religious belief (and especially an indicator of raised religion) does not alter in a similar manner, but can potentially influence first birth timings.

In summary, there appear to be some descriptive differences in the circumstances from which people experience first birth related to the age they are when they experience a first birth. There is some evidence that people who are younger when they experience a first birth appear to do so under varying circumstances to those who are older. Relatively small numbers of people experience a birth in their teenage years (less than 6% of those from the 1971 birth year cohort, for example). People who have their first child in their early 20s seem to do so in different circumstances from the rest, being

apparently more likely to be in rented tenure accommodation, for instance. There may also be a relationship between early first birth and religion. The non-religious seem to experience a slightly higher incidence of first birth within the 20 year old cohort than other religious categories – particularly women. There are various mechanisms postulated in theories to explain these descriptive variations.

8.4 Modelling first birth to the cohorts

The next section uses multivariate models to extend the descriptive examination outlined above. As above, the outcome remains whether an individual from a birth year cohort experiences a first birth themselves within a four year period between 2001 and 2004. The analysis employs logistic regression to assess the probability of whether an individual experiences a first birth. Under examination are the circumstances that define childbearing, in order to shed light on social group differences in the experience of becoming a parent.

Tables 8.1 and 8.2 report the results to models combining the explanatory variables outlined above. Also included is a relationship status variable contrasting those married, and post-married or widowed, with those who are single. Of special interest is the relationship between economic activity and subsequent first birth. This is a relatively crude proxy for economic uncertainty. However, it links to the threshold concept as it is suggested that the stable circumstances associated with full time employment and access to regular income may characterise first birth as a defining feature of how people have children. If this is the case then it would be expected that a positive association with first birth and full time working would be evident in the models across the cohorts (net of the other factors).

The first thing of note is that there are relatively few significant effects evident on any of the models. Although the Pseudo-R^2 values are not slight (the comparability of a Pseudo-R^2 value is open to question (Kohler and Kreuter 2009) however as a minimum these values suggest that the models also have some descriptive utility). In comparison the effects of being in employment full time, as opposed to the contrast category (containing those working part time, students, economically inactive, unemployed, looking after home and family and starting work), is significant only in respect of the 20 year old male cohort, although the signs of the non-significant effects are as would be expected if an uncertain economic situation caused people to delay having children. However, full time employment at 2001 appears to be a relatively limited predictor of subsequent first birth for men and women, net of the effects of the other explanatory factors.

Table 8.1, logistic regressions estimating probabilities of first births to men

Age in 2001 men	20		25		30		35	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Single	-	-	-	-	-		-	-
Married or post marriage	1.4***	.4	1.6***	.21	1.8***	.19	2.1***	.3
No quals	-	-	-	-	-	-	-	-
Degree+	.74	.73	-1.2**	.39	-.37	.37	.21	.39
HNC/HND lev4	-.82	.6	-.67	.41	-.4	.4	.09	.44
Highers and above	-.99**	.38	-.6	.4	-.48	.34	.14	.41
Standard grade and below	.08	.34	-.21	.36	-.25	-.32	-.13	39
Employed Full time	-	-	-	-	-	-	-	-
Employed part time, unemployed, inactive, student and looking after home	-.6*	.25	-.36	.26	-.07	.25	-.48	.34
No Religion	-	-	-	-	-	-	-	-
Roman Catholic	.07	.33	.3	.3	-.006	.23	-.1	.32
Church of Scotland	-.3	.3	.28	.24	-.26	.2	-.07	.26
Another Christian	.002	.5	-.21	.42	-.76*	.34	-.00	.39
Another religion	...	...	-.74	.81	-.4	.5	-.04	.73
Owning Tenure	-	-	-	-	-	-	-	-
Renting	.26	.24	.19	.32	-.49*	.22	-.62*	.31
Constant	-1.9***	.38	-1.9***	.39	-1.7***	.34	-2.8***	.48
Pseudo-R^2	.09		.12		.12		.15	
n	1071		914		1031		724	

Notes: models measuring the probability that men will experience a first birth in 2001 and the years following 2001 on a number of explanatory variables. p<0.05; ** p<0.01; *** p<0.001, source: SLS.

Table 8.2, logistic regressions estimating probabilities of first births to women

Age in 2001 - women	20		25		30		35	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*	*β*	*s.e.*
Single	-	-	-	-	-	-	-	-
Married or post marriage	1.0***	.23	1.7***	.2	1.7***	.2	2.3***	.36
No quals	-	-	-	-	-	-	-	-
Degree+	-1.8	1.08	-.68	.54	-.11	.4	-.33	.5
HNC/HND lev4	-1.5***	.42	-.08	.55	.16	.46	-.39	.57
Highers and above	-2.0***	.35	-.75	.56	-.35	.4	-.5	.54
Standard grade and below	-.22	.33	.14	.54	.04	.4	-.77	.52
Employed Full time	-	-	-	-	-	-	-	-
Employed part time, unemployed, inactive, student and looking after home	.03	.21	.23	.22	-.07	.24	-.18	.29
No Religion	-	-	-	-	-	-	-	-
Roman Catholic	-.45	.28	.4	.27	.5*	.24	-.28	.4
Church of Scotland	-.46*	.22	.00	.23	.16	.2	.28	.32
Another Christian	-.56	.43	.23	.32	.1	.29	.05	.45
Another religion	.06	.76	-.62	1.1	.06	.72	-.1	1.2
Owning Tenure	-	-	-	-	-	-	-	-
Renting	-.02	.2	-.46*	.23	-.43	.23	-1.3***	.42
Constant	-.77***	.37	-2.1***	56	-2.2***	.4	-2.4***	.57
Pseudo-R^2	.15		.13		.11		.17	
n	1141		910		900		498	

Notes: models measuring the probability that women will experience a first birth in 2001 and the years following 2001 on a number of explanatory variables $p<0.05$; ** $p<0.01$; *** $p<0.001$, source: SLS.

Looking at the other explanatory factors there is some evidence that leaving school early relates to early first births. There are significant negative effects associated with higher levels of qualification to the 20 year old cohorts for men and women, in contrast to the 'no qualification' reference category. There is also a negative effect associated with those men in the 25 year old cohort, with degrees, in contrast to the reference category. Some literature generalizes that a lack of investment in childcare and family friendly policy leads to circumstance whereby women in the UK work part time to resolve family life with work (Fagnani 2010). This may be the case. However, the descriptive and modelling analysis suggests that working full time prior to a first birth predicts neither a higher nor lower probability of experiencing a first birth for women (or men). This would suggest that women are adopting a range of economic activities that reconcile life circumstances *prior* to first birth. Indeed, that women in Scotland occupy a range of economic activities before first birth suggests that part time working

is more than a solution to reconcile paid-employment with raising children; it could be a far more general strategy for women. However, whether this represents active choice by women, or a constraint, which excludes them from full time paid employment, is unclear (cf. Hakim 2009). The same could be said of men although there is less literature available upon men in the context of childbearing.

Being raised religiously seems to have relatively little effect upon the probability of experiencing a first birth. Only a few effects show as significant and there is no clear pattern distinguishable. As has been discussed above religion could capture aspects of socioeconomic status, alternatively religious teaching and culture could influence first birth. A relationship between first births to those in religious categories could just as easily represent an association with early marriage and a belief in the importance of family and children within marriage (Adsera 2006b, Hayford and Morgan 2008). However, there is little evidence of this in these models.

The housing tenure indicator of first birth is also significant in several of the models, net of the effects of the other variables included. There are negative significant effects reported to men from the 30 and 35 year old cohorts. This is in some contrast to the positive coefficients reported for men from the 20 and 25 year old cohorts, although these results are not significant. For women there are negative significant effects to the 25 and 30 year old cohorts, here the other cohorts also show non-significant coefficients which are negative. The significant results suggest those who experience first birth between 2001 and 2004 from these cohorts have a lower probability of coming from a rented property. This finding for men is on the whole consistent with an interpretation that those from a more advantaged background have a higher probability of

experiencing first births at later ages (assuming renting indicates a socioeconomic disadvantaged position compared to owner occupier status). These negative significant effects may be indicative of people waiting until they have acquired a mortgage before starting a family, as discussed above. This could be interpreted in terms of an opportunity cost trade off negotiating a more risky renting tenure for a potentially more settled owning tenure that references a norm of a family home.

8.5 Further discussion: Evidence of a threshold effect?

This chapter has two main aims. Firstly, the analysis is set out to account for the survey mode of the SLS adequately. This builds upon analyses in chapters 6 and 7 where concerns are explicitly outlined regarding issues of left censorship and causal direction, respectively. The findings across chapters 6, 7 and 8 are intended to be complementary. The investigation in this chapter is neither biased by left censoring (although left censoring remains in a strict sense) or limited by measurement instruments that are available at a point in time only after an outcome of interest may have occurred (chapter 7). The modelling in this chapter takes Census 2001 as the start point, for which information on individuals within the dataset is available, and then models the probability of whether an individual within a birth year cohort experienced a first birth in the period between 2001 and 2004. However, controlling for censoring in this way means that much of the interesting information available within the dataset is ignored. For example, rich information on timing of the first birth event across the entire period of 1991 to 2006 is mostly discarded by the approach. This appears to be to the detriment of the statistical power of the models presented in this chapter, as constructing the data in this manner leads to few significant effects.

The chapter is also intended to introduce the concept of the fertility threshold as a potential explanation of the variation in tempo of first birth between social groups. The concept postulates a hypothesis that there may be commonality in the set of social circumstances which defines childbearing, but that socio-economic status relates most strongly to timing. It was expected that the threshold could be characterized by a positive association between first birth and paid employment. This would represent part of the stable social circumstances in which people tend to reproduce. Stability as a facet in the process of childbearing has been particularly noted in terms of relationships (Lillard and Waite 1993; Manning, Stewart et al. 2003). The threshold extends this idea of the influence of stability to the wider social setting in which childbearing occurs. Other socio-economic variables included in the models are expected to indicate a relationship with timing of first birth. Lower qualifications or a less advantaged position is expected to indicate a higher probability of first birth to the younger age cohorts, and vice versa.

Kohler et al. (2006) and Holdsworth and Elliot (2001) point out that leaving the parental home can have an influence in the timing of family formation. However, further information on relationship formation, especially the timing of cohabitation and marriage (Leridon 1990) is necessary to model exactly the normative set of circumstances in which people are likely to reproduce. The analysis here is unable to disentangle the effects of living arrangements in relation to childbearing, as data on timings of state changes in relationships or living arrangements are not available within the SLS, or the SSAS, which are the main sources of records on Scottish childbearing. The data here are available at one point in time. Therefore the analysis is limited in

what can be deduced in terms of the dynamic processes of childbearing in relation to social setting.

The models only show whether tenure status at a point in time is associated with a subsequent birth to different age cohorts. Whether raised religion has an effect on if an individual from each cohort is likely to experience a first birth is also controlled, net of the effects of the other variables. Marital status at Census 2001 is also included. The economic activity of an individual is incorporated as an imperfect measure of economic security. Economic uncertainty is thought to influence timings and likelihood of birth (Kohler, Billari et al. 2002; Mills, Blossfeld et al. 2005; Kohler, Billari et al. 2006). Those in less certain situations, such as those who are out with full time employment, might be expected to be less likely to have a first child than those who work full time. This might especially be the case for men in Scotland as women might take part time work in anticipation of forthcoming childcare responsibilities (Fagnani 2010) .

The descriptive analysis above shows that a father and mother is generally employed full time whilst a mother may occupy a range of economic activities prior to first birth. However, modelling the relationship between full time employment and first birth is less clear for fathers (Table 8.1). The signs are as would be expected, but there is little significance. The majority of first births observed to the men included in the cohorts examined above occurred to those in paid employment at Census 2001. Further evidence of this may be seen in Table 8.3. Here the relationship contrast between full time employment and first birth is positive and significant across the cohorts for men. However the models do not control for marital status. Full time employment appears to be a robust predictor of first birth for men, but not net of the influence of marriage. The

correlated relationship between marriage, employment and the process of childbearing seem to mask the effects of employment on first birth in Table 8.1.

The tempo of the entry into the workforce is defined by issues such as the exit from education and is influenced by factors such as economic conditions (Madouros 2006). It is widely noted, particularly for women, that the rhythm of first birth is related to educational attainment (Cleland 2002, Kerckhoff 2001, Lillard et al. 1993, Smith and Ratcliffe 2009). This is shown in other chapters of this thesis. However, there is only limited evidence of this found by this research design. Significant effects in the educational attainment categories are only reported in the two youngest cohorts (Tables 8.1 and 8.2). Given the complex processes at play a more sophisticated analysis is possibly required to capture the effect.

The idea of a *fertility threshold* combines distinct theoretical positions. Opportunity cost (Becker 1991, Demeny 1981, Robinson 1997) theory is linked to the influence of social norms (Coleman and Salt 1992, Woods 1987) to explain timings of first birth within a life course perspective (Sabotka 2004). Norms are considered to influence the circumstances in which people seek to become parents (Maxwell 1987, Munshi and Myaux 2006, Woods 1987) whilst relative advantage would influence when people at different levels in the social stratification structure pass the threshold circumstances where people are likely to begin having children. Economic rationale is considered to operate within defining parameters of social norms. Culture influences idealized numbers of children people would like to have (chapter 5) and the circumstances in which they would like to have them. Differential access to resources underscored by social stratification and life course stage impacts upon the timing of birth events

directing when people are most likely occupy the social position considered appropriate for childbearing.

Table 8.3, logistic regressions estimating the probability that men will experience a first birth

Age in 2001 - men	20		25		30		35	
	β	*s.e.*	*β*	*s.e.*	*β*	*s.e.*		*s.e.*
Highers and above	-	-	-	-	-	-	-	-
Standard grade and below	.08	(.41)	.72***	(.2)	-.06	(.15)	-.19	(.2)
Employed Full time	-	-	-	-	-	-	-	-
Employed part time, unemployed, inactive, student and looking after home	-.9***	(.24)	-.56**	(.24)	-.50**	(.23)	-.7**	(.32)
No Religion	-	-	-	-	-	-	-	-
Roman Catholic	-.1	(.32)	.22	(.29)	.08	(.22)	-.06	(.3)
Church of Scotland	-.44	(.27)	-.01	(.23)	-.32	(.19)	.01	(.24)
Another Christian	-.2	(.47)	-.17	(.4)	-.51	(.33)	.18	(.36)
Another religion	…	…	-.5	(.76)	.06	(.5)	.3	(.7)
Owning Tenure	-	-	-	-	-	-	-	-
Renting	.47*	(.23)	.2 6	(.2)	-.65***	(.2)	-1.0***	(.29)
Constant	-2.1***		-2.29***		-.85***		-1.03***	
Pseudo-R^2	.03		.03		.02		.05	
n	1071		915		1032		730	

models measuring the probability that men will experience a first birth in 2001 and the years following 2001 on a number of explanatory variables In contrast to table 8.12 marital status is not included * p<0.05; ** p<0.01; *** p<0.001, Source SLS

This interpretation of fertility trends in Scotland implies that delay in first birth may be more of a negative constraint than a positive choice. Chapter 5 of this thesis shows that childbearing intentions, and the ideal numbers of children that people would like to have, are relatively stable regardless of social stratification. However, following the line of reasoning above proposes that those who delay first birth may be partly constrained in meeting these ideals or intentions by an inability to enter the circumstances associated with childbearing.

The idea that first birth may be typified by continuity of circumstance is somewhat in contrast to arguments that family form has broken down (e.g. Beck 1998). Much has altered since the brief heyday of the male breadwinner model in the 1950s. However, the evidence presented generally in this thesis suggests that people tend to enter into childbearing in circumstance broadly corresponding to what might thought of as traditional. Different social forces are at play that impacts the timing of birth events and

there are a range of possibilities available in family formation that may not have been available in the recent past (Hofferth 2010). For instance, the ease of legal divorce has shifted for currently living generations (Smith 1997). Also, social opprobrium for out of wedlock births is not the same (Ermisch and Francesconi 2000). These factors all contribute to an array of circumstances in which people have and raise children today. However the evidence throughout this thesis suggests the stability of something close to a traditional family form still constitute the general circumstances in which people have first births in Scotland.

The concept of a fertility threshold would also have implications for policy. It may be difficult to focus policy to directly increase fertility (McDonald 2002; Caldwell, Caldwell et al. 2006; McNicoll 2009; Rijken and Knijn 2009). This is partly because the childbearing decisions of people do not exist in conditions where the application of a single policy will have a linear effect upon the number of children people have and when. Childbearing decisions are influenced by numerous factors, including employment, housing and education (Kohler et al. 2006). The concept of a threshold takes account of the multidimensional influences affecting childbearing. However, it may be unrealistic to consider that Government can formulate policies in these other areas with the express intention of boosting fertility (or even whether the electorate would want this). Also, clearer evidence that the social setting in which childbearing occurs affects childbearing in a threshold manner would be required before policy recommendations and be made in the context of the threshold.

Chapter 9 - Conclusion

9.1 Introduction

The aim of this research is to provide a strong statement upon patterns of childbearing in Scotland. Sabotka (2003) and Goldstein et al. (2009) characterise delay in childbearing as definitive of postponement and lowest low fertility. Several chapters of this thesis clearly demonstrate a relationship between measures of social stratification and childbearing within Scotland. There are groups of people in Scotland who are likely to experience early births and this is evident in differences in timing of childbearing and family formation by socio-economic circumstances. This is apparent using longitudinal data, examining timings of first birth (chapters 6 to 8), and in cross-sectional data (chapter 5), comparing childbearing ideals and intentions with currently achieved numbers of children. The evidence suggests subtle inequalities may be at play on parenthood. Those relatively less advantaged on measures that capture aspects of social stratification may be considered economically disadvantaged compared to those who measure lower. However, women who are the least advantaged educationally, or occupationally, can be observed as experiencing earlier first births than those more educationally or occupationally advantaged[41]. Whilst attaining a qualification in further education is, on average, an economic advantage (Brunello and Comi 2004), in terms of starting a family early it is a disadvantage. Also those who postpone childbearing may

[41] Earlier first birth is observed longitudinally in the SLS, and those who attain relatively lower qualification are measured as having had more children in cross section (SSAS).

do so under less favourable biological conditions involving increased health risks (Leader 2006).

In the end it is only possible to speculate, given the weight of evidence, for the reasons that fertility in Scotland, and elsewhere, remains at below replacement level. No definitive proof has emerged and there is no generally accepted model. It is argued herein that childbearing occurs in reference to cross cutting social norms which influence aims and timings. The empirical analysis also shows how socioeconomic factors come into play to influence the timing of first birth. This work has been one of the first sociological examinations of these phenomena to be undertaken on Scotland, and certainly the first using SLS data. A broad part of the research that has been presented can be characterised as exploratory and descriptive. The use of new and underutilized data sources (the SLS and SSAS) makes this a valid and valuable academic contribution in itself. In addition a number of research hypotheses were put forward. For example, whether, and how, standard measures of geography relate to fertility outcomes in the context of other individual level controls was examined across several chapters incorporating different measures, variable operationalisaions and research design. Chapter 5 outlined a latent class approach to test whether economic theories of fertility (that have been very influential in the field) can be reconciled with attitudinal indicators of opportunity cost and financial constraint, which may seem to deny that this type of consideration plays a role in childbearing. In addition, chapter 8 introduced the concept of a social threshold of first birth as a useful way to unite theory and empirical strands of research into fertility. The threshold represents a culmination of thinking in how to conceptualise childbearing arising from this thesis and is put forward as a potential avenue through which to frame future research arising from this

thesis. The thesis therefore offers both a case study on Scotland and examines generally applicable hypotheses and suggests possible avenues for future research.

9.2 Strengths and Weaknesses

The thesis contains many achievements but is also limited in a number of ways. Most of the longitudinal empirical analyses examines a first birth outcome. However, first birth and the timing of this aspect of childbearing is not completed childbearing. Only cohort complete fertility allows the assessment of social group variation in family size and whether socio-economic circumstance relates to overall levels of fertility (Ekert-Jaffe 2002). Much of the empirical work presented in the thesis examines first birth related to postponement and issues of timing. This is neither *total fertility*, nor *completed fertility*. However, first birth is particularly considered a facet of postponement which relates to low west, low and below replacement fertility (Sabotka 2004; Kohler, Billari et al. 2006; Goldstein, Sabotka et al. 2009). Cohort delay in births and first births drives down TFRs as this is a period measure that does not take account of this cohort effect. In this manner the examination of the timing of first birth feeds into wider issues of below replacement fertility. For example, people in differing occupational or educational positions are shown to be more likely to postpone or experience an early birth related to that position. Groups of people in different socioeconomic circumstances therefore contribute differently to the TFR.

A further weakness of the work is that a theoretical framework is developed in the *fertility threshold.* This is elaborated in chapter 8 but a comprehensive test is not achieved. The fertility threshold represents the culmination and synthesis of insight gained throughout the course of the study. The fertility threshold posits that the

empirical relationship between house moves, exiting education, partnering and forming relationships and employment can be linked in understanding as constituting measurable ideal type circumstances in which childbearing is likely to occur (Holdsworth and Elliott 2001; Brunello and Comi 2004; Holdsworth 2004; Steele, Constantinos et al. 2005; Aassve, Burgess et al. 2006; Kohler, Billari et al. 2006). Each aspect could individually constitute a *sufficient* facet to *trigger* a birth event, although having some form of a relationship that can result in conception is a *necessary* facet of this. Also, when a number of the factors come together the likelihood of childbearing could increase in a way that could usefully be measured as a threshold effect. The threshold represents an avenue for the development of future work. This was touched upon in chapter 8 where it is put forward that panel data, such as the BHPS could enable analysis of the timing of state shifts required assess the viability of the fertility threshold. This could also allow a more sophisticated methodological approach to be taken that perhaps would better allow for the endogenous and confounded relationship between explanatory factors.

The almost exclusive empirical focus on Scotland could be thought of as a further weakness of the thesis. The initial research goal was to provide understanding of childbearing in the context of below replacement fertility in Scotland. This aim could further benefit from a more systematic comparative approach incorporating the other nations of the UK and the wider European and World perspective, historical comparison would also be of interest. Much contextualisation is provided by the wider discussion within individual chapters and by the review of literature. However, further analysis could be done with research examining international data and historical data in relation to current below replacement fertility in Scotland.

The analysis of first birth may be considered to be problematic because of the use of a proxy measure of prior childbearing based upon co-residence with children. This is potentially misleading as those who are not resident with their children would be classed as childless and this may be likely to apply even more to men than to women. However, work to test the validity of the co-residence measure undertaken using the BHPS suggests that co-residence is a robust predictor of prior childbearing for the age groups analysed. The control is also augmented in chapter 8 by removing those who have had a birth 1991 to 2000 as this is known in the SLS. Although the proxy controls are not perfect, the BHPS comparator shows they reproduce results that closely parallel findings when actual measures of previous childbearing are used.

As well as a number of weaknesses the thesis also has several strengths. The work presented extends what had been done previously with the data sources employed. The sociological examination first birth in Scotland has not been undertaken previously and this is also one the first studies to use the SLS. New analysis of the SSAS is presented and previous work using the BHPS is extended. One of the most notable contributions the thesis makes is by incorporating systematic analyses of men alongside that of women. Men have been under researched in the context of childbearing (Zhang 2011). The analysis of the SLS brings to the fore relations between socio-economic indicators and the timing of birth for men. This is provided in comparison to the effects of the same socio-economic factors for women. One core finding is that there appears to be a different relationship between occupational position and the timing of first birth for men compared to women.

9.3 Analysis of first birth in relation to socio-economic status

Data from both the SLS and the SSAS is used to contextualise the experience of first birth and childbearing in relation to social structure. The SLS extract made available for this analysis follows people from the period from 1991 until 2006 (chapters 6, 7 and 8). This is particularly interesting as this time represents the period when Scotland underwent what has become known as the postponement transition (Goldstein et al. 2009). This occurs when fertility rates, which have been falling, partly because of delays associated with postponed childbearing, start to rise again as a result of parents catching up (recuperating) births. It was therefore possible to isolate birth year cohorts and examine timing of first birth between the ages of 15 to 30 years old, across the phase when fertility rates dropped to their lowest, and started to rise again. This clarifies social group variation in the social circumstances of people who experience early, or late, first births within this historically interesting time period.

Measures of socio-economic status integrated in modelling are considered to represent individual level processes that relate systematically to social structure (Smith 1989). The connection between the timing of first birth and occupational structure is suggested to be nuanced. Occupational position is considered to indicate ability to act related to access to resources (Devine and Savage 2000) and occupational position may also indicate differing types of people with varying goals. This is particularly pertinent when analysing childbearing, where the pursuit of employment goals may thwart or delay childbearing aspirations (Sabotka 2004). The results show a different relationship between timing of first birth for men and women in the observed data. The results from chapter 7 appear to show that men in the managerial and technical category of NSSEC

do not experience first birth differently to the other occupational categories. This is in contrast to women where it is well documented that women pursuing careers delay first birth, a finding that is reproduced in this thesis. However the result for men is original and contributes to a literature on the relationship between men and childbearing that now is beginning to expand.

Educational attainment is widely reported as a key determinant of fertility outcomes (Klepinger, Lundberg et al. 1995; Smith, Ratcliffe et al. 2007; Brienna 2009; Chanfreau and Cebulla 2009; Fanti and Gori 2010). The research here confirms that Scotland is similar to many other developed countries that experience below replacement fertility, as higher levels of educational attainment are shown to be related to delay in first birth. The effect of education on childbearing is considered to be multifaceted. Remaining in education could be associated with delay in first birth for normative reasons (Rindfuss and St. John 1983: 555) and because it indicates a position of relative advantage (Kerckhoff 2001). Exit from education is also suggested to be one of the threshold social circumstances which define when childbearing is likely to occur (chapter 8). Again the thesis covers new ground in examining men in this context. Men who remain in education appear to delay first birth similarly to women. This makes the different way that occupation relates to first birth for men compared to women all the more intriguing.

Housing tenure is less widely incorporated as a possible determinant in studies of childbearing than measures of occupations or educational attainment. Here owner occupation is also here deemed to be a signal of a position of relative advantage which links to differing aspirations and access to assets (a home possibly being a key asset in

childbearing). Barlow and Duncan (1988: 229) discuss the difficulties of treating housing tenure status as representing discrete classifications of people. However, housing tenure is seen to be a potentially useful measure in analysing the timing of first birth (chapter 8), it is also shown that housing tenure increases the performance and explanation associated with models in the SSAS cross sectional data. This suggests that housing tenure might be more regularly incorporated into studies of childbearing as the measure has the potential to capture information on the direct experience of childbearing. At the individual level this may relate to setting up a family home (Holdsworth 2004) and alternative ambitions relating to relative advantage, with delay in childbearing representing the 'problem' of becoming a home owner (Mulder and Billari 2010). More complex data including house moves would allow better examination of this.

There is a large body of work which shows that religion has an influence on fertility within Europe (Coleman 1994; Clegg and Cross 1995; Adsera 2006b; Branas-Garza and Neuman 2007; Philipov and Berghammer 2007). Yet analyses often do not include measures of religion as a possible determinant of fertility. Chapter 7 indicates that religion is associated with a delay in first birth to a cohort across the period 1991 to 2006. This may indicate the combined effects of ideational influence and socio-economics. A focus on family and community by those who are religious could be the reason that leads to an overall higher likelihood of becoming a parent across the time period of observation shown in chapter 7 (Alagarajan 2003; MacQuillan 2004; Hayford and Morgan 2008).

9.4 Geography

Advocates of incorporating geographical measures in analyses of fertility suggest that geographies built in to analysis should be more complex than the standard measures readily available (Boyle 2007b). This places considerable demand upon researchers in the field and there is dispute over whether small area geography is effective as an indicator of variation in fertility outcomes (Wilson 1990). Standard measures of geography are incorporated into analysis here and it is shown it is possible to find significant effects using conventional geographies (chapters 6 and 7). However, whether employing complex geographies or not, the interpretation of small pockets of variation is not straightforward (see, Boyle 2007b). The cross sectional models estimated using the SSAS suggests no effects between geographies and the number of current children, yet the balance of evidence from the SLS shows a significant relationship between geographies and the timing of first birth that is different at alternative time points (chapters 6 and 7).

The interpretation of the geographical effects remains open to question. In general, occupational categorizations (Smith 1989) and educational stratification (Kerckhoff 2001) suggest effects which are strongly related to the individual level processes of childbearing, and are therefore much more readily interpretable in respect of fertility outcomes. Yet the findings suggest that geographies may be integrated to interpret micro level processes of childbearing if it is believed that they proxy socio-economic status (Mweemba and Webb 2008), or are related to moves towards areas considered desirable for having and raising children, either for normative or opportunity cost reasons (Boyle et al. 2007a, Dey et al, 2007, Lutz et al. 2006). In the end there are

unlikely to be differing childbearing cultures within Scotland that are spatially discrete (Wilson 1990), therefore variation measured by these types of explanatory variables capture aspects of the process not fully measured in other explanatory factors. Where variables exist that more adequately represent these features of fertility processes, they may be preferable to geographic proxies.

9.5 Attitudes

There is both research and theory to link low fertility intentions and ideals to low, below replacement fertility levels (Caldwell 1976; Woods 1987; Coleman and Salt 1992; Sabotka 2004). Coleman and Salt (1992) show that people in the UK commonly suggest a mean ideal level of childbearing of 2.4 in survey research. Sabotka (2004) suggests a similar mean ideal level prevails throughout Europe, whilst chapter 5 of this thesis and Dey (2007) draw upon Scottish data which shows the same to be the case in respect of Scotland. The shortfall between fertility ideals and actual observed levels of fertility is explicable as real world circumstances impact upon professed childbearing in ideal conditions. Dey (2007: 30) argues that *'low fertility in Scotland cannot be attributed to low aspirations and ideals'.* Although, Coleman (1992: 130) points out that ideal and expected levels of childbearing have been at above replacement levels of 2.1 since before the 1970s and that the ideal family size was recorded as 2.4 in the 1967. Ideals seem to have remained relatively constant at above replacement across the period of declining TFR's. The interpretation placed on fertility ideals in this thesis is that they represent a perception of childbearing under conditions that will not be met and that may reference an ideal family norm rather than a life goal. Taking a historical perspective it could also be argued that current childbearing ideals are low (given

historical TFR's), although a TFR of 2.4 would seem high in the context of below replacement fertility.

A latent class approach is also elaborated which seeks to reconcile attitudes to childbearing with economic and opportunity cost theorising. One of the fundamental criticisms of economic theories of fertility is that childbearing is not conceptualised or articulated in economic terms by parents and potential parents (Demeny 1981: 314-318, Robinson 1997: 64, Zafirovski 2003). The latent modelling approach is used to indicate evidence of distinct classes of people that respond systematically on indicators constructed to measure opportunity cost and financial constraint in relation to childbearing. This is evidence of consistent, but complex, responses to attitudinal variables which indicate that childbearing may be defined by how people hold beliefs in respect of finance and cost in having children, although they explicitly deny financial calculations in having children. That people are found to answer systematically to these indicators is evidence in support of economic theory.

9.6 A threshold effect?

Theories of fertility and childbearing behaviour have attempted to reconcile a cost-benefit conundrum (Robinson 1997). A synthesising argument is put forward that cost benefit calculations may play out across people's lives today and affect things like timing and/or the possibility that someone may reach the end of their fecundity without reaching their goals. It can be argued that people are able to choose to have children, or not, subject to a balance of considerations. In this account individuals are 'free' to choose, within parameters, but socioeconomic and normative/cultural demands make it more likely that people will experience birth events at certain times, or complete

fertility at a certain level. Therefore people today can choose whether to have children or not, and contemporary fertility patterns emerge from contemporary economic forces and social systems which neither encourage nor require high fertility.

The concept of a fertility threshold attempts to combine distinct theoretical positions, unifying opportunity cost thinking (Becker 1991, Robinson 1997) alongside the influences of social norms (Coleman and Salt 1992, Woods 1987). Norms influence the circumstances in which people seek to become parents (Adsera 2006b, Munshi and Myaux 2006) whilst relative advantage relates to the timing of when people at different levels of social stratification are likely to begin having children. Differential access to resources underscored by social stratification and life course stage impacts upon the timing of birth events directing when people are most likely to occupy the social position they consider appropriate for childbearing (Lillard et al. 1993, Sabotka 2004).

Considering fertility as a threshold has the potential to recognise the intricate association between relative advantage, life course and fertility. People who would be considered relatively less advantaged seem enabled to have children prior to those who are measured as occupying a more advantaged position (Caucutt, Guner et al. ; Kantorová). At face value this is somewhat contrary to Devine and Savage's (2000 184, 190) formulation as to the mutual constitution of the economic and social suggesting that there are *'work rich and consumer rich households that exercise power and choice and work and consumer-poor households who are constrained and penalized'*. However, this is only part of how constrained choice is considered to operate. There are work rich and consumer rich households that exercise power and choice, but which are also constrained and penalized: and there are work poor, consumption poor households

that exercise power and choice and are also constrained and penalized, only to different extents and in different ways. In childbearing the actions of economically advantaged people may appear constrained in contrast to those who are less advantaged as they experience first birth events later in life, in circumstances which maybe biologically less favourable (Leader 2006). In these terms the economically more advantaged would be penalised in the opportunity cost trade off.

It is put forward in chapter 8 that a threshold model may be a useful way to conceptualise the relationship between key demographic and socioeconomic determinants of first birth. The description and models presented are a first step in applying this type of thinking to a first birth outcome. A potentially fruitful next step could be to examine the plausibility of the 'threshold' as a viable empirical concept using the BHPS. This would allow the measurement of the timing of birth events in relation to when people enter 'states' of marriage, or employment or when they move home or leave education. This could also be preceded by a descriptive examination of the circumstances in which people reproduce and whether the distribution of people by sets of circumstances would match the threshold. Composite variable categorisations of differing combinations of social setting could be created and this would allow modelling to test whether the probability of inhabiting a certain set of circumstances is a function of socio-economic status, educational attainment and demographic characteristics[42].

[42] The author is grateful to acknowledge this suggestion as contributed by a thesis examiner.

9.7 Final Remarks and General Speculation

> '*In characterizing a society, whether ancient or modern, there are two elements, rather closely inter-connected, which are of prime importance: one is the economic system, the other the family system*.'
>
> Bertrand Russell (1929: 7)

It seems (to the author at least) that fertility levels in Scotland (and elsewhere) are below replacement because most people who intend to have children are aiming to have around two offspring. Some are falling short, or delaying in meeting this aim and this is exacerbated by those who do not intend to have children. Shortfall and delay relates to socio-economic circumstance as people attempt to reconcile opportunity cost trade-offs, life goals and happenstance (the contingent nature of love relationships). Social norms define overall goals (quantum), but relative advantage defines when (tempo) and if people reach these goals (quantum again). Arguably a recent generation reconciled childbearing and socio-economic circumstance in a different manner - the post-World War II generation put in place social and institutional supports that centralised family and community to a degree that does not exist today. In terms of the hypothesis of constrained choice, which has been suggested in this thesis as a useful heuristic device for thinking of these things, there are freedoms *from* and freedoms *to* (Berlin 1969). People in the past may have been more constrained to follow specific careers or perform certain roles, such as housewife and mother, or breadwinner; however this appears to have made them *'more free'* to reproduce. The certainty created by the establishment of welfare state(s) and wider social forces that influenced and sustained, for a generation, relatively stable (nuclear) family units, freed people to reproduce and

have children at a level that is not supported at present. Today people in Scotland, and elsewhere, may be '*more free'* to follow individual aims, such as career goals and alternative forms of partnering and sexual relationships. However, they appear less *'free'* to meet childbearing aspirations than their grandparents generation. Every social structure has its constraining and enabling aspects. People today generate society and are shaped by it, as did people of the past. People continue to trade off and alter their circumstances to meet their aspirations within the limits of their situation. It is a value judgement to consider whether the ways in which people in the past squared the economic system with the family system was better or worse.

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Appendix 1: Syntax in respect of the analysis presented in chapter 4

Box 1, syntax to run the analysis presented in chapter 4. The syntax runs on the BHPS wave 2.

```
*Generating Table 4.2


**************

**************

** creating age cohorts for women

**************

**************

capture drop agef

gen agef=bage if bsex==2



recode agef 18/24=1 25/29=2 30/34=3 25/39=4 else=.

label define agefl 1 "18-24" 2 "25-29" 3 "30-34" 4 "35-39"

label values agef agefl



tab agef



*************************************************************************
**

*************************************************************************
**

*************************************************************************
**

/*

berringtons first tables also take account of identified childbearing
intentions this is the variable, blchmorn, which identifies the number
of further children that individuals intend, assuming that they have
```

```
answered yes to a question will you have a child/ more children,
variable blchmor

*/

*****************************************************************
**

capture drop morchlda

gen morchlda=blchmorn



recode morchlda 0=0 1=1 2=2 3/15=3 -1=4

label define morchldal 0 "0 children" 1 "1 child" 2 "2 children" 3 "3+
children" 4 "don't know"

label values morchlda morchldal



mvdecode morchlda, mv(-9, -8, -7, -2)



tab morchlda



*****************************************************************
**



************

************

*** tidying the variable blprnt

************

************

* blprnt natural parent of a child yes/no



tab blprnt
```

```
capture drop ruaprnt

clonevar ruaprnt=blprnt

mvdecode ruaprnt, mv(-9, -7, -2)


* taking out the missing -9, proxy respondents -7 and, refused -2

tab ruaprnt


*************************************************************************
**


*****************************

** incorporating pregnant into my morchlda measure


clonevar morchldz=morchlda

replace morchldz=0 if blchmor==3

replace morchldz=blchmor+1 if blchmor==2

tab morchldz


*** incorporating those pregnant

tab morchldz if blprnt==2


*** TABEL 4.1b


tab agef morchldz if blprnt==2, row


**************

**************
```

```
** creating the female sample

**************

**************



capture drop thrtyf

gen thrtyf = bage if (bsex==2 & bage <=30 & bage =39) & (blprnt==2)

gen thrtyk = bage if (bsex==2 & bage <=30 & bage =39) & (blprnt==1)



tab thrtyf

tab thrtyk



* bage is age; if bsex ==2female and age more of equal to 30 and less
than or equal to 39 and they are not a a natural parent (blnprnt)

*

* n=227  (berringtons n is 199)



**********************************************************************

**********************************************************************

**********************************************************************

**********************************************************************

**********************************************************************



/*



Creating the outcome variable
```

```
this is multinomial logit based upon whether a woman intends to have a
child, intends not to have a child, or does not know



this is variable blchmor, which identifies whether more children are
intended, not intended, dont know or currently pregnant



*/



tab blchmor

tab blchmor if thrtyf ~=.



capture drop morch

clonevar morch=blchmor



mvdecode morch, mv(-9, -8, -7, -2)



recode morch 1 2=1 3=2 -1=3

label define morchl 1 "yes" 2 "no" 3 "don't know"

label values morch morchl



tab morch




*************************

*************************

** Married or Partnered

*************************

*************************
```

```
capture drop mrd

capture drop chbt


gen mrd = bmlstat == 1

gen chbt = bivmb ==2


tab mrd

tab chbt


replace chbt= mrd if mrd==1


tab mrd

tab chbt


/* these commands create a binary variable that shows when and
individual has identified as either married or partnered */


**********************************************************************

**********************************************************************


/* Berrington includes age as a continuous variable! well there are
only 30-39 years olds in the sample. */


capture drop age

gen age = bage if (bage <=30 & bage =39)
```

```
tab age



*** there it is age 30-39 continuous



**********************************************************************

**********************************************************************

**********************************************************************



**** Education



/*



Higher qualifications, O Levels and above, below O level or no
educational qualifications



tab bqfachi, this is the qualification variable I think that
Berrington uses



*/



capture drop hiqual

gen hiqual=bqfachi



tab bqfachi

tab bqfachi if age <= 30 & age = 39



tab hiqual
```

```
recode hiqual 1/3=1 4/5=2 6/7=3

label define hiquall 1 "higer qual" 2 "O level & above" 3 "below O
level & noquals"

label values hiqual hiquall

tab hiqual

mvdecode hiqual, mv (-7, -9)

tab hiqual

*************************************************************************

*************************************************************************



**** Earnings

* binary variable highest quartile versus the rest



* bfimn total income last month



capture drop income

gen income=bfimn

tab income in 1/10

mvdecode income, mv (-7)

summarize income

**********************************

centile income, centile(25 75 100)

*recode income 0/1050.75=0 1050.76/18332.25=1

* Same as above but fully automated:

replace income = 0 if income <= 0 & income = r(c_2)

replace income = 1 if income < r(c_2) & income = r(c_3)
```

```
**********************************************************************


capture drop income2

gen income2=bfimn if thrtyf ~=.

tab income2 in 1/10

mvdecode income2, mv (-7)

summarize income2

*********************************

centile income2, centile(25 75 100)

replace income2 = 0 if income2 <= 0 & income2 = r(c_2)

replace income2 = 1 if income2 < r(c_2) & income2 = r(c_3)


label variable income2 "Upper 25% in 30's postponers income
distribution"

*********************************


**** Egalitarianism


/*


** Berrington constructs a composite variable to represent
egalitarianism


** wOPFAMA Pre-school child suffers if mother works wINDRESP

A - C - E - G - I - K - M - O - Q

** wOPFAMB Family suffers if mother works full-time wINDRESP
```

```
A - C - E - G - I - K - M - O - Q

** wOPFAMC Woman and family happier if she works wINDRESP

A - C - E - G - I - K - M - O - Q

** wOPFAMD Husband and wife should both contribute wINDRESP

A - C - E - G - I - K - M - O - Q

** wOPFAME Full time job makes woman independent wINDRESP

A - C - E - G - I - K - M - O - Q

** wOPFAMF Husband should earn, wife stay at home wINDRESP

A - C - E - G - I - K - M - O - Q ]



on issue  is that these variables are not collected at wave B as the
others have been? Berrington goes not mention this or which wave she
used



I will in the first instance use data from wave A as they have
answered prior to their responses to wave 2



*/



*********************************************************************

*** Var controlling for whether they are in work or not



gen job = bjbhas if (bjbhas==1 | bjboff==1)

tab job

recode job 1 2=1

tab job



*********************************************************************
```

```
*************************************************************************


*** I want to begin to add stratification to my analysis

*** bmrjcssf is the cambridge scale for women based on most recent job


tab  bmrjcssf


capture drop camsisf

gen camsisf = bmrjcssf


mvdecode camsisf, mv (-9, -8, -7, -3)


sum camsisf

*************************************************************************

*************************************************************************

/*


this is a macro program that creates a scale of egalitarianism, this
is done in macro because I construct

the scale in wave A and merge it to wave B as the variable is not
available at wave B


use $path1\aindresp.dta


keep pid aopfama aopfamb aopfamc aopfamc aopfamd aopfame aopfamf


*************************************************************************
```

```
*************************************************************************


**** I need to recode these variables and combine them into a 30 point
scale

**** Berrington then converts the scale into a binary variable of
egalitarian vs non egalitarian

**** people scoring <= 20 are classed as egalitarian


*************************************************************************

*************************************************************************


numlabel _all, add




*** dealing with missing


tab aopfama


capture drop mwrks

clonevar mwrks=aopfama


mvdecode mwrks, mv(-9, -7)


tab mwrks


*************************************************************************

*************************************************************************
```

```
tab aopfamb

capture drop mwrksa
clonevar mwrksb=aopfamb

mvdecode mwrksb, mv(-9, -7)

tab mwrksb

*************************************************************************
*************************************************************************

tab aopfamc

capture drop mwrksc
clonevar mwrksc=aopfamc

mvdecode mwrksc, mv(-9, -7)

tab mwrksc

recode mwrksc 1=5 2=4 3=3 4=2 5=1

tab mwrksc
```

```
*******************************************************************************
*******************************************************************************

tab aopfamd

capture drop mwrksd
clonevar mwrksd=aopfamd

mvdecode mwrksd, mv(-9, -7)

tab mwrksd

recode mwrksd 1=5 2=4 3=3 4=2 5=1

tab mwrksd

*******************************************************************************
*******************************************************************************

tab aopfame

capture drop mwrkse
clonevar mwrkse=aopfame

mvdecode mwrkse, mv(-9, -7)
```

```
tab mwrkse


recode mwrkse 1=5 2=4 3=3 4=2 5=1


tab mwrkse


**********************************************************************
**********************************************************************


tab aopfamf


capture drop mwrksf
clonevar mwrksf=aopfamf


mvdecode mwrksf, mv(-9, -7)


tab mwrksf


**********************************************************************
**********************************************************************


gen egalite = mwrks + mwrksb + mwrksc + mwrksd + mwrkse + mwrksf


tab egalite


** This will work though:
```

```
* use $path9\m1.dta, clear

* merge pid using $path9\m2.dta, sort

* drop _merge

* merge pid using $path9\m3.dta, sort

* summarize


save $path2\k1, replace


use $path2\k1.dta, clear

merge pid using $path2\logit_k1b.dta, sort


tab _merge

keep if _merge==2 | _merge==3

drop _merge

summarize


save $path2\logit_k1c, replace

*/


*********************************************************************

*********************************************************************

keep pid thrtyf thrtyk mrd chbt age hiqual income morch camsisf
bjbgold /// bjbsec bjbrgsc bjbseg hiqual2 income2 bmrjsoc bage bsex
bregion bxrwght /// bxewght blewght blrwght job


summarize

* line 1566 file matching techniques on lab0
```

```
sort pid

sav $path4\temp.dta, replace




**********************************************************************

/*


** Father's job and CAMSIS


use pid pasoc pacssm using $path1\xwavedat.dta, clear

sort pid

sav $path4\m1.dta, replace

use $path4\temp.dta, clear

sort pid

merge pid using $path4\m1.dta

tab _merge

keep if _merge==1 | _merge==3

drop _merge

summarize

save $path2\logit_k1b, replace


*/

**********************************************************************

**********************************************************************

do $path5\egalitarianism2.do
```

```
dir $path2\*.dta

use $path2\logit_k1c, clear


**************

** age goes in as a metric



**************

** chbt - no partner is the reference category


gen hsptnr=chbt==1


**************

** hiqual - qualifications; below o-level is the reference category


numlabel _all, add

tab1 hiqual


capture drop dgre

capture drop olevl

gen dgre= hiqual==1

gen olevl= hiqual==2




**************

** income - earnings - reference category is the bottom 75%


capture drop hiern
```

```
capture drop hiern2

gen hiern = income==1

gen hiern2 = income2==1

**************



** egalite - gender role attitude - score 20+ = egalitarian, ref cat =
=19



gen egalite2=egalite

recode egalite2 0/19=0 20/30=1



tab egalite2

gen equal= egalite2==1

/*


I need to restrict the sample to women aged 30-39 using the variable
thrtyf



*/

capture drop samp

gen samp=thrtyf

recode samp 30/39=1

tab samp



***



tab morch
```

```
capture drop morch1

gen morch1= morch if (samp==1)

label define morch1l 1 "yes" 2 "no" 3 "don't know"

label values morch1 morch1l



tab morch1

**********************************************************************

**********************************************************************

***

tab1 hiqual if thrtyk ~=.            /* Table 4.4 */

tab1 hiqual if thrtyf ~=.      /* Table 4.3 */

tab income if thrtyf ~=.       /* Table 4.5 */

table morch if thrtyf ~=.            /* Table 4.6 */



histogram camsisf if (bsex==2 & bage <=30 & bage =39), title ("CAMSIS
score of women aged 30-39") ///

xtitle("CAMSIS score") ytitle ("") ylabel(none)        /* Table 4.7 */

***



capture drop prntz

clonevar prntz = thrtyf

recode prntz 2/40=1



tab prntz, missing



replace prntz=2 if (thrtyk<=2 & thrtyk =40)

tab prntz, missing
```

```
label define prntzl 1 "Women without children" 2 "Women with children"

la val prntz prntzl



tab prntz, missing



graph box camsisf if (bsex==2 & bage <=30 & bage =39 & job==1), ///
over(prntz) ytitle("") ///

title("CAMSIS score of 30-39 year old women in work")



/* table 4.8 */



tab thrtyf          /* table 4.9 */



table morch1, c(mean age mean hiern2 mean equal mean camsisf)

/* Table 4.11 */



*** MODELS



mlogit morch1 age hsptnr dgre olevl hiern2 equal  /* model 4.1b */



mlogit morch1 age hsptnr dgre olevl camsisf equal if job==1, base(2)

/* model in respect of footnote 13 */



tab morch1 if job==1

tab morch1

capture drop morch2

gen morch2=morch1
```

```
recode morch2 1 3=1 2=0

tab morch1 morch2, missing


logit morch2 age hsptnr dgre olevl hiern equal    /* model 4.12 */


mlogit morch1 age hsptnr dgre olevl camsisf equal /* model 4.13 */


mlogit morch1 age hsptnr dgre olevl pacssm equal  /* model 4.14 1 */


mlogit morch1 age hsptnr pacssm equal             /* model 4.14 2 */

tab bregion


capture drop reg1,

gen reg1= bregion


recode reg1 1/17=1 18=2

label define reg1l 1 "Eng&wales" 2 "Scotland"

label values reg1 reg1l


tab reg1, missing


tab reg1, missing

gen scot= reg1==2

replace scot=. if (reg1==.)


gen eandw= reg1==1
```

```
replace eandw=. if (reg1==.)


tab eandw

tab scot


svyset, clear

svyset bxrwght

svydes


svy: mlogit morch1 age hsptnr dgre olevl hiern equal, base(1)

/* model 4.15 1 */


svy: mlogit morch1 age hsptnr dgre olevl hiern equal, base(2)

/* model 4.15 2 */


mlogit morch1 age scot hsptnr dgre olevl hiern equal, base(1)

/* model 4.16 */
```

Appendix 2: Statistical Models

Box 2, statistical models

Below are the general algebraic expressions of the main models estimated in the thesis:

$$h_i(t) = h_0(t)\exp[\Sigma_k b_k X_{ik}(t)]$$

Figure a.1, Cox proportional hazard model (Yamaguchi 1991: 103-104)

$h_i(t)$ is the hazard rate value for person *i* at time *t*. $h_0(t)$ is the baseline hazard function, the Cox model does not specify this. $X_{ik}(t)$ it the value of the *k*th covariate for person *i* at time *t*.

$$\Pr(y_i = 1 \mid \chi_i) = \text{logit}^{-1}(\beta_1 + \beta_2\chi_i) \equiv \exp(\beta_1 + \beta_2\chi_i) \Big/ 1 + \exp(\beta_1 + \beta_2\chi_i)$$

Figure a.2, Logit model (Rabe-Hesketh and Skrondal 2008: 232)

The first expression of the logit link function in Figure 2 shows that the odds of having the value 1 $(y_i = 1)$ on a binary outcome is given by the inverse logit function given the value of an independent variable x_i. See also (Agresti 1990).

$$\pi_{ijklt} = \pi_t^X \pi_{it}^{A|X} \pi_{jt}^{B|X} \pi_{kt}^{C|X} \pi_{lt}^{D|X}$$

Figure a.3, Basic Latent Class Model (McCutcheon 2009: 58)

π_t^X is the probability that an observed case falls in latent class t, and a series of conditional probabilities (e.g. $\pi_{it}^{A|X}$) estimate the probability that a member of latent class *t* will respond in a certain manner to an indicator variable. Where $A_i, B_j C_k D_l$ are categorical indicator variables.

$$\Pr(\gamma \mid \mu) = \frac{\exp(-\mu)\mu^{\gamma}}{y!}$$

Figure a.4, Poisson Model (Rabe-Hesketh and Skrondal 2008: 375)

In the analysis presented in chapter 5, y is the probability of experiencing a certain count value (achieved number of children) given μ which is the rate of count at observation.

$$\ln\left(\frac{P(Y=m\mid X)}{P(Y=0\mid X)}\right)=a_m+\sum_{k=1}^{K}b_{km}X_k$$

Figure 5, Multinomial logit model (Treiman 2009: 336)

The multinomial logit estimates the log odds of a case being in a specific category, as opposed to the reference category. The reference category is one of the values of the dependent variable which is absented, and values are reported only in respect of the other included categories of the dependant variable. Therefore the *'estimation procedure yields, for a set of m +1 categories of some dependent variable, m logistic regression equations'* (Treiman 2009: 336).

$$\pi_{ij}=\frac{\exp\{\eta_{ij}\}}{\Sigma_{k=1}^{j}\exp\{\eta_{ij}\}}$$

An alternative expression of the multinomial logit model.

Appendix 3: Analysis of the co-residence proxy using the BHPS

Question: Is co-residence an adequate measure of previous childbearing in the absence of a direct measure of parity?

Problem: The SLS has rich longitudinal data on timing of births to its sample from 1991 until the present. However, there is no direct information on parity. For a researcher interested in first birth it is not known whether an individual has already had children.

There is no measure of party in the SLS, but there is in the BHPS. The BHPS is used to examine whether it can expected that findings are accurate when using the proxy measure of co-residence for previous childbearing.

Using the BHPS I constructed a dataset with a similar structure to the SLS, which covered the same period 1991-2006. The outcome I examine is the timing of first birth using event history analysis on the first birth outcome. Data on timings of births is drawn from the British Household Panel Survey Consolidated Marital, Cohabitation and Fertility Histories, 1991-2006, data set.

Two outcomes are compared below, and outcome employing the co-residence proxy controlling for previous childbearing is compared with the actual known childbearing measure. Matching the sample employed in chapter 6, the sample here includes women aged 15-25.

The outcome measures the timing of a birth if the birth occurs 1991-2006. This is the same time frame as available in the SLS. The timing of births 1991-2006 is known in both the SLS and the BHPS. Whether it is a first birth or not is known in the BHPS and information on timing is collected retrospectively. However, this is not the case in the SLS. To replicate this the outcome is augmented so that where childbearing occurs from 1991 to someone from the proxy sample it can take the value of the timing of birth for a second, third, fourth child etcetera. Where the value of the first child is less than equivalent to January 1991 the case is given the value of either a subsequent birth or the censoring time. This is equivalent to the SLS data structure and how a comparable case would be measured in the SLS.

The models contain several explanatory variables which are here employed illustratively rather than substantively. This includes housing tenure, comparing an all renting category with an ownership category. Never married compared with a married and post married category. Resident in Scotland is compared to England and Wales and CAMSIS occupational classification is included. The explanatory variables are drawn from the 2001 wave of the BHPS, which corresponds to the Census data available in the SLS at Census 2001.

The event history outcome applies only to women. The data available on the timing of the birth from the BHPS fertility file pertains only to women. Descriptive comparisons of distributions of men are given by various variables comparing parity with the co-residence proxy are given in chapter 6. There is a lot of missing data associated with

drawing the information about the sample from across multiple waves of panel data, because of attrition. This results in the small sample. A comparison of the actual reported childbearing measure and where co-residence is controlled is reported in Table A.1, below. The missing column and row in the table shows that the proxy includes some cases that are not incorporated by the actual measure and excludes others that are included by the actual measure. However, this is not equivalent to the SLS as attrition to the panel data means that there is a reduced number of cases available for analysis.

Results:

The findings appear to show that co-residence may be an acceptable control for previous childbearing when applied in modelling. The method is not 100% accurate and a number of cases appear to be wrongly assigned, as we would expect. However, estimates and substantive conclusions match very closely between the different outcomes.

Table A.1, **Actual measure and proxy measure of prior childbearing to women aged 15-25 in 1991. 1= no child in 1991 but experience a first birth 1991-2006. 0= no child in 1991 and no observed first birth.**

	Actual measure			
Co-res, proxy	0	1	*Missing*	Total
0	142	0	*16*	158
1	0	215	*46*	261
Missing	*5*	*4*	*71*	
Total	**147**	**219**		**540**

Pearson chi2(4) = 718.5186 Pr = 0.000
Cramér's V = 0.8157
gamma = 0.8773

Table A.2, Cox proportional hazard models examining the timing of 'first birth' to women who were aged 15-25 in 1991. The covariates measure circumstances at 2001 (Equivalent to SLS Census time points 1991 and 2001). Outcome 1 controls for actual measured timing of first birth and whether an individual had a child prior to observation in 1991. Outcome 2 controls for prior childbearing using Co-residence.

	(1) actual b/se	(2) co-res b/se
age at date of interview	-.004267	.01083
	(.02453)	(.02222)

All renting	.5099	**	.5285	***
	(.1869)		(.1586)	
Never married	-1.583	***	-1.409	***
	(.1796)		(.1591)	
Resident in Scotland	.05823		.03972	
	(.1972)		(.1869)	
Camsis (most recent)	-.01465	***	-.01897	***
	(.004283)		(.004001)	
ll	-1153		-1409	
n	366		419	

Source, BHPS

Chapter 8 Outcome Comparisons:

These variables are generated using the BHPS 1991-2004
The proxy measure records 0 where individuals were co-resident with children at 1991 and did not have a child 1991-2000, and 1 if they had a child 2001-2004. This is equivalent to the measure used in chapter 8 of the thesis. There is a lot of data missing from the BHPS through attrition therefore the comparison is only indicative and not exact. The samples include only those present at the first wave 1991have values on the

Table A.3, co-residence proxy including information on recorded childbearing within a ten year time period compared with a measure of actual recorded childbearing, women aged 30-40 in 2001

	No children proxy	Has children proxy	Total
Has children	7	1	8
No children	128	34	162
Missing	6	1	7
Total	141	36	177

Source, BHPS, waves 1991-2004, Chi² p=0.00

Table A.4, co-residence proxy including information on recorded childbearing within a ten year time period compared with a measure of actual recorded childbearing, women aged 20-30 in 2001

	No children proxy	Has children proxy	Total
No children	144	0	144
Has children	128	34	162
Missing	15	2	17
Total	159	36	323

Source, BHPS, waves 1991-2004, Chi² p=0.00
At both age groups in Table A.3 and Table A.4 the proxy measure appears to be a robust control for prior childbearing.

Table A.5 models comparing a co-residence outcome constructed to approximate that used in chapter 8 with an actual reported measure of previous childbearing for women aged **25-40** in 2001

	(1) actual b/se		(2) co-res b/se	
CAMSIS	.02291	*	.02125	*
	(.009)		(.0096)	
Renting	-.4568		-.6891	
	(.5041)		(.5251)	
Income	-.000206		-.000194	
	(.00017)		(.00017)	
Age at date of interview	-.12	**	-.1	*
	(.04)		(.041)	
Never married	-.89	**	-.89	**
	(.3137)		(.3181)	
Constant	2.472		1.648	
	(1.31)		(1.356)	
PR2	.08		.08	
N	268		277	

Source, BHPS, waves 1991-2004

The co-residence method, also controlling for 10 years of know childbearing matches very closely for those aged 15 or under when observed in the data

For those older, 25-40 in 2001, the co-residence method seems to be a robust proxy; it provides very close results in modelling to the actual known measure of childbearing and misclassifies a small number of cases; although the younger cohorts will be more accurately observed.