

Cognition, Market Sentiment and Financial Instability:

Psychology in a Minsky Framework

Introduction

‘We can model the euphoria and the fear stage of the business cycle. Their parameters are quite different. We have never successfully modelled the transition from euphoria to fear.’

Alan Greenspan, *Financial Times*, 27 March 2009

Quantitative models have been a central part of the story of the present financial crisis. It was the models used in financial markets which provided the basis for an assessment of risk exposure which went so badly wrong (see eg Haldane 2009). But economists’ models too failed to capture the systemic risk which resulted from market behaviour (see eg Colander et al. 2009). Alan Greenspan’s remark, quoted above, is thus interesting in two respects. First, he identifies the problem as a failure to model the turnaround at the peak of the cycle. Second he depicts the cycle in psychological terms, such that the turnaround is one from greed to fear. The task for economists would appear to be to incorporate psychology more successfully in economic models so that financial instability can in future be predicted and understood better.

The focus of this paper is therefore on how, and in what way, psychology can contribute to our understanding of financial instability, as input to modelling by the monetary authorities or otherwise. It will be argued that there is a correspondence between the view taken of modelling on the one hand and the way in which psychology can be incorporated on the other. The argument has been made (Dow 2004) that formal modelling (and particularly the search for the single best model) cannot be the full answer to understanding the economy, far less prediction. Any one model can only provide partial knowledge, to be supplemented by other forms of knowledge, including judgement (an argument expressed most recently in relation to the present crisis by Lawson, 2009). Indeed Downward and Mearman (2008) have argued that this process can usefully be understood as the application of the method of triangulation. In contrast, the behavioural finance literature aims to adapt rational choice models using inputs from psychology. Was the failure of most economists to anticipate the crisis due, as Alan Greenspan suggests, to insufficient development in the capacity to model changes in sentiment?

In exploring the use of psychology in behavioural finance, the focus will be on the distinction drawn between cognition and emotion (sometimes expressed as the distinction between rationality and irrationality). This distinction itself is then probed in order to discuss the limitations of the behavioural economics approach, and then to develop an alternative approach which draws more on social psychology and feeds into a (Minskyan¹) structural explanation of financial instability.² According to this alternative

¹ For surveys of Minsky's thought, see Dymski and Pollin (1992), Papadimitriou and Wray (1998, 2009), Fazzari and Papadimitriou (1992), Dymski and Pollin (1994), Bellofiore and Ferri (2001) and de Antoni (2006).

approach, there is no sharp division between cognition and emotion; indeed cognition rests on emotion, and both have an important social dimension. Decisions can be more or less reasonable (in relation to reality) but always involve some sentiment or emotion. The implications of the two (behavioural finance and Minskyan) approaches are then drawn for macroprudential regulation. It is argued that the corresponding role of modelling will be critical to how this policy will work. In general, then, policy prescription depends on how the economy is understood and therefore framed (see further Dow, forthcoming b). But first we explore the different leading explanations for the current instability, in order then to consider how each can incorporate psychology.

Different frameworks for explaining the crisis

There are different ways of explaining the current financial crisis which reflect different methodological approaches to economics and indeed different ways of understanding and categorising knowledge about financial markets, and which allow for different relationships with psychology. The roots of these differences lie in different understandings, implicit or explicit, of the nature of the economic system

The first we will consider is an approach which identifies economics with rationality, according to the particular definition of mainstream economics: individual choice is based on optimization of utility defined in terms of complete, consistent preferences. According to this approach, markets are efficient in maximising social welfare as the outcome of the unintended consequences of rational choice. Optimising behaviour ensures that market prices embody all available information, with any

² Pech and Milan (2009) focus on the extent and way in which Keynes anticipated many of the key empirical findings of behavioural economics. Our focus here is rather on how the mainstream separation of emotion from cognition limits behavioural economics theorizing.

deviations from equilibrium being arbitrated away. In financial markets, this pricing includes the pricing of risk attached to the future value of assets (including the risk of default). This optimising behaviour is regarded as a good model of reality for predictive purposes (Lucas 1980); and financial markets are generally regarded as where the model can most closely be approximated.

According to the efficient markets hypothesis, markets are normally stable. There is motion as new information emerges, but market behaviour ensures stabilisation of markets around equilibrium. However sometimes there is instability, in the form of rational bubbles. The instability arises from some initial imperfection in the market process which becomes amplified. These imperfections might reflect the logistics of the market process (such as the length of the working day, differences in time zone, regulatory restrictions etc) which prevent perfect arbitrage, particularly where arbitrage is the function only of a subset of market players. Then the information conveyed by market prices might mislead traders, such that an inadvertent rise in price might be misinterpreted as indicating a rising trend, which trading then brings about (rational herding), as in the dot.com bubble. This misinterpretation can be regarded as rational if the presumption is that market prices normally reflect full information. The bubble bursts once full information is restored and assets return to 'correct' pricing. Valuations are based on subjectively rational expectations. But in an efficient market environment, there are forces driving valuations towards the correct levels, which at least can be identified *ex post*.

In the current crisis, the imperfection on which most emphasis has been placed is asymmetric information in the form of opaque structured products whose 'true' risk was

concealed (although these products found willing buyers). This problem was compounded by the misinformation on risk provided by credit rating agencies, which were induced by market incentives to understate risk. This New Keynesian explanation accounts for a protracted bubble, since the asymmetry of information was endemic and took a long time to unwind, though the slow pace of learning is harder to explain.

These explanations provide no active role for psychology. Indeed this approach reflects the conventional distinction between economics as being concerned with rationality and psychology with emotion. The emphasis is on cognition as embodied in rational optimizing behaviour with respect to an information set. Sentiment is not explicit in the account, although arguably it is embodied in preferences. But preferences are distilled into income maximization, subject to constraints, qualified by degree of risk-aversion; they are not a matter for enquiry. The implicit understanding of reality (ontology) is that (rational) economic behaviour is separable from other behaviour. Further, financial markets, being both thick and innovative, are regarded as the archetypical competitive market of mainstream theory.

But other approaches to analysing financial markets have made more active use of psychology, such that both (rational) economic behaviour and psychological factors together are seen to determine market processes and therefore outcomes, including financial instability and its consequences for the real economy. These approaches draw on evidence which appears to raise questions about the efficient markets approach.³ As Tuckett (2009) points out, the ontology of financial markets is unusual in that activity is based on valuations which are bound up with expectations as to price movements rather

³ However there has been extensive discussion as to the robustness of experimental evidence, and thus of experimental design; see for example the symposium in the February 1999 issue of the *Economic Journal*.

than the experience of 'real' consumption and production. Psychology (and in particular cognitive psychology) therefore potentially has particular purchase.

Behavioural economics emphasises cognitive limitations which impede fully rational choice. (This is one strand of the older behavioural economics spearheaded by Simon, 1955.) Thus for example herd behaviour may not be fully rational but rather puts undue emphasis on past trends (Bikhchandani and Sharma 2001). Similarly, some representative agent models incorporate biased beliefs about market values as a source of instability. On the other hand, heterogeneous agent models may capture cognitive limitations in that inferences about other agents may not be perfectly updated. Further, Kahneman and Tversky (1974, 1979) introduced the idea that agents may not frame choice in a rational way, a different form of cognitive limitation. All of these limitations on rationality hold the potential for amplified movements away from equilibrium which may take a long time to correct. But instability is framed as an aberration, with respect to an equilibrium path.

Psychological factors also enter into behavioural finance in the form of the preferences with respect to which agents optimise. Within representative agent models in prospect theory, scope is given for unconventional preferences, such as loss aversion, which generate apparently irrational behaviour (Kahneman and Tversky, 1979). Instability can follow when markets experience falling values. Also, heterogeneous agent models may allow for different groups of market participants with different preferences. In particular, non-professionals may be guided by sentiment, while professional arbitrageurs are guided by rationality. Instability may emerge if sentiment drives markets in a particular direction, although arbitrageurs will normally ensure a return to

equilibrium (Baker & Wurgler 2007). But, as advocated by Robbins (1932), the source of preferences is not explored; it is taken as given.

The third category of explanation for financial instability is based on a quite different ontology, in that an understanding of the economic process as an open system underpins the view that the *potential* for crisis is the norm rather than an aberration and is just part of a more general, and normal, potential for economic instability in an open system. This instability can be understood in a positive light, in terms of Schumpeter's theory of growth by means of successive waves of innovation. Similarly there may be waves of innovation in the financial sector. The theory of the business cycle which incorporates a mutually-reinforcing real and financial instability is most fully expressed in the form of Minsky's financial instability hypothesis (Minsky 1982, 1986). But the instability is not pervasive, not is it necessarily explosive – it is more a potential which builds up during periods of apparent stability (see Kregel, 2008, Whalen, 2008, and Nesvetailova, 2008, for Minskyan analyses of the current crisis).

At the heart of Minsky's explanation for financial instability is a distinctive epistemology which accords with the distinctive ontology of an open system (Chick and Dow 2005). If economic systems (and financial markets within them) evolve, interactions within them change, and there is human agency in the form of innovative behaviour, then there is no natural tendency towards equilibrium. Thus, for example, there is scope for major unanticipated developments, like globalisation which created a new dynamic in financial markets which was not reflected in risk measures based on historical data. The notion of a true price, or a true risk, therefore becomes tenuous. Instability is not inevitable or continuous, since institutions and behavioural conventions develop in order

to provide a relatively stable backdrop for decision-making under uncertainty. Even if there is little basis in general for quantitative risk measurement (because of fundamental uncertainty), nevertheless prices are normally set, and action is taken; decision makers do the best they can in the face of uncertainty. And conditions may be such that expectations are held with a high degree of confidence, *as if* knowledge were certain. Thus market players may believe that conventional valuations are in some sense ‘true’ valuations.

But the implication of financial markets being open systems is that pricing (including pricing of risk) is subject to the potential for discrete and unpredictable shifts, both because of revision of expectations and because of revision of confidence in expectations (eg when challenged by an influential figure, or by contradictory evidence from real economic developments). As long as valuations are not determined by true risk, there is scope for them to change discretely. Minsky’s theory addresses the scope for asset valuation, and confidence in this valuation, to evolve at the social level according to a general pattern and the associated changes in financial structure whereby the potential for crisis can emerge. The process is not deterministic: different cycles are propelled by different innovations with different characteristics, and their timing can vary according to a variety of factors, such as the point at which conventional judgement is recognised to be challenged. Nevertheless Minsky’s theory allows the process to be understood, something in general lacking during the recent crisis.

Rising markets encourage increased leveraging which increases the fragility of the financial structure, systemically increasing the potential for instability. As asset prices rise in an upturn and confidence in continuing rises becomes more established, companies are more willing to borrow to finance investment, households to spend on

consumption and financial assets, and banks to lend. The increasing degree of leverage seems justified by the associated rise in asset prices, but at the same time the financial system became increasingly fragile. In particular, if borrowing costs rise, households, companies and banks become increasingly vulnerable to interruptions to cash flow, borrowing becomes more difficult and asset sales realise lower-than-expected gains. In the meantime, the systemic nature of these market developments confounds normal diversification and hedging strategies based on correlations presuming normal distributions, reducing confidence in conventional pricing techniques. Thus, given the fragility, any shock can lower prices of some assets below expectations and puncture expectations about the prices of other assets. Given the fragile structure of finance, cash-flow problems spread through the system, requiring asset sales, which put further downward pressure on asset prices, and increasing default risk. As banks, firms and households respond by reducing expenditure and its finance, the economy goes into a downturn.

Minsky gave market sentiment a key role in driving both the upturn and the downturn, in a way which seems to be distinct from the individualistic psychology of behavioural finance. And the core of Minsky's theory lies in cognitive issues, but with a very different understanding of rationality from mainstream finance and even behavioural finance (Dow, forthcoming a). We will explore further here an integration in economics of both cognition and emotion. But first we explore in more detail how psychology has been used in behavioural economics in order then to clarify the distinctiveness of Minsky's integrative approach

Psychology in ‘new’ behavioural economics⁴

The way in which psychology has been used in behavioural finance accords with the methodological individualism of mainstream economics. Indeed key figures within the field have explicitly stated that the aim is to develop theory which is consistent with the evidence from experiments but which also fits in with the conventional theoretical approach. As Kahneman (2003: 1469) put it, for example, ‘Theories in behavioural economics have generally retained the basic architecture of the rational model, adding assumptions about cognitive limitations designed to account for specific anomalies’ (see further Sent, 2004: 749). Indeed the latest survey of empirical work in psychology and (behavioural) economics (DellaVigna 2009) describes the field in terms of ‘deviations from the standard model’. Since psychological elements are introduced as amendments to the rationality axioms, or as exogenous shocks, the closed-system nature of standard theory is retained (shocks being random, their distribution is presumed known). The resulting theory must therefore presume a closed-system ontology, such that the separation of rationality and irrationality, cognition and emotion, is justified as a simplification of reality.

The psychology which is used is the private psychology of atomistic agents, which is represented in the separable functions of setting preferences and then choice with respect to those preferences. The preferences themselves are not explored but are understood to be standardised sufficiently for representative agent analysis, or at least heterogeneous agent analysis with respect to a limited number of categories. While non-standard preferences may produce explanations for non-standard outcomes, the focus is

⁴ The older behavioural economics associated with Herbert Simon took a more integrated approach to cognition and emotion than the ‘new’ behavioural economics associated with Kahneman and Tversky which we explore here (Earl, 1990; Sent, 2004).

on choice, where psychological factors may also be active. Choice is analysed in terms of rationality with respect to achieving the optimal outcome as defined by the preferences (whatever they are). There is scope for some conflict however between a normative and a descriptive approach to instrumental rationality. Where experiments reveal non-standard behaviour, should the response be to accept this as rational and amend theory accordingly, or should it be to classify this behaviour as irrational? This ambiguity in mainstream economics is of long standing, going back at least to the nineteenth century (Drakopoulos 1991).

Recourse has been made to neuroscience for insights in theorising about apparently irrational behaviour, in terms of both cognitive limitations and the influence of emotions (or affect). Neuroscience focuses on the physical functioning of the brain. The argument that the functions of reasoning and emotion are physically separate in the brain has encouraged the analytical separation between the two. One strand of literature focuses on the role of heuristics and intuition in relation to reason. Taking cognitive limitations as a starting-point, this literature considers heuristics and intuition as mechanisms for dealing efficiently with these limitations; they act as ‘as if’ they were equivalent to rational thought (Gigerenzer 2000, 2007).

Another strand of literature focuses on the role of sentiment (or affect, or emotion) in relation to rationality. Some argue that sentiment can limit rationality and even override it. But it is also argued that sentiment is necessary for rationality. For example, being motivated to maximise pleasure requires the capacity to imagine pleasurable emotion. While this might be seen to reinforce the focus of choice theory on rationality, at the same time it raises the issue of motivation for action, implying that

action, even the action of reactive choice, requires emotion. Neuroscientific evidence shows that someone without the physical capacity for emotion is unable to make decisions (Gigerenzer and Selton 2001: 207). Thus deductive reasoning is not in general enough. It may be sufficient for resolving closed-system problems, as in a game of chess, but most choice situations have some open-system characteristics. Indeed neuroscience suggests both that emotion is necessary for motivation, and also that the supporting reasoning needs to be inductive, thus lacking demonstrable certainty (Klein and d'Esposito, 2007).

In considering the role of cognitive limitations and emotion in unstable financial markets, this input from psychology leaves important gaps. How are we to understand action, even rationally-grounded action, or reaction, without some theory of emotional drivers? How are we to understand action which is not apparently rationally grounded? How are we to understand changes in emotional states, as in the changeover from greed to fear which Greenspan referred to? Indeed, if we are to understand by 'greed' something other than self-interest, how are we to incorporate a moral dimension to the analysis?

And finally how are we to understand the role of the individual? As Davis (2003) points out, mainstream theory lacks a theory of the individual in relation to tastes. If, as he suggests, individuals understand themselves in relation to others (something which methodological individualists would dispute), and thus knowledge, sentiment (including moral judgement) and action all have fundamentally social content, then the mainstream,

atomistic, self-interested individual may not be the most useful basis for analysis.⁵ Therefore, just as Minsky analyses financial instability in structural terms, so the role of market sentiment may require something other than individualistic psychology. Social psychologists have identified the same part of the brain which registers experience of emotion (the medial prefrontal cortex) is also the location of the formation of attitudes and inferring the contents of others' minds which are essential features of social cognition (Mitchell 2009). Even in physical terms, then, cognition and emotion are interrelated.

In the following sections we explore alternative approaches to incorporating psychology into economics, in order to suggest an approach which accords with Minskyan theory of financial instability. In the process, an attempt is made to move away from the dualism inherent in the mainstream account: rationality/irrationality, cognition/emotion, individual/social etc (see further Dow 1990).

An integrated account of cognition and sentiment (and economics and psychology)

The integrated approach to cognition and emotion we will now explore has ontological foundations in an understanding of actual behaviour within an open social system, rather than a conceptual privileging of 'rational' economic behaviour. Its roots lie in the Scottish Enlightenment, when Hume and Smith developed a theory of human nature (see eg Dow 2009). Being sceptical about the usefulness of deductive rationalism, they sought instead to ground knowledge in human nature, where sentiment was the necessary starting-point. Thus the cognition/emotion dual is particular to rationalism. But they

⁵ Indeed we really need to incorporate more insights from sociology in order to understand social framing (see Klaes, 2008, for a compatible discussion of economics and sociology in relation to behavioural economics), but our primary focus here is on psychology.

argued that, without access to demonstrable truth, we rely on conventional belief in relation to experience. As Hume (1739-40: 183, emphasis in original) put it: '*all our reasonings concerning causes and effects are deriv'd from nothing but custom; and that belief is more properly an act of the sensitive, than of the cogitative part of our natures*'. New knowledge requires agency on the part of the scientist but becomes the basis for conventional belief through rhetorical persuasion, aided by sympathy facilitated by the imagination. Individual agency in this case derives from the psychological motivation of seeking to relieve what we would now refer to as cognitive dissonance. Thus knowledge has a fundamentally social aspect and fundamentally involves sentiment, such that, just like the individual/social dual, the cognition/emotion dual is not helpful.

Hume in particular was a powerful influence on the thought of Keynes (Carabelli, 1988), who in turn was the primary influence on Minsky (1975). Keynes's (1921) *Treatise on Probability* was an exercise in establishing grounds for belief under conditions of uncertainty. As with Hume, Keynes had an open-system ontology whereby he saw the social system as open and organic, precluding certain knowledge (Chick and Dow, 2005). Knowledge, and the basis for prediction, are developed inductively using a range of methods: different forms of evidence, reason, conventional judgement, heuristics and intuition. This process is not an individualistic process, but involves intersubjective group expectations (Gillies 2006). The greater the weight of evidence, the greater the confidence in the knowledge (which could be knowledge of ignorance). But quantified probability is not in general feasible; arguably the *General Theory* is general in applying to the general case of uncertainty rather than the particular case of certainty (Chick and Dow, 2001).

According to this theory of knowledge, stability and instability have different causes from those given in mainstream theory. Since indirect knowledge is non-demonstrable, it is subject to discrete shifts as conventional judgement changes. Thus for example conventional assessments of risk went through dramatic revisions over the last two years, with key markets (notably the interbank market) failing precisely because the confidence in the ability to price risk collapsed. Thus the pricing process, and the uncertainty surrounding it, can be a major source of instability. However, the regulations, institutional practices and inflexible prices which are seen in mainstream theory as the source of instability, in the Keynesian system promote stability (see eg van der Lecq, 1998). In an uncertain environment, some provisionally fixed points provide some secure knowledge on which to base decision-making.

This approach to knowledge was echoed in what Sent (2004) refers to as the ‘old’ behavioural economics of Herbert Simon. Like Keynes, he focused not only on the cognitive limitations, and consequent bounded rationality with which his work is normally associated, but also on the open nature of social systems, which precludes the possibility of certain knowledge (Simon 1955, 1986). Crucially, unlike mainstream theory, he enquired into mental processes, rather than just outcomes. He also developed a theory of decision-making based on heuristics rather than conventional rationality. Others have applied his work on heuristics to financial behaviour, demonstrating how decision-rule cascades can explain financial instability (Earl, Peng and Potts 2007).

Keynes had himself addressed the issue of the apparent rationality/emotion dual in an essay based on an encounter between Bertrand Russell, D H Lawrence and himself (Keynes 1949). Referring to the rationalism he had earlier shared with Russell, Keynes

(ibid.: 448) remarked as follows: ‘The rationality which we attributed to [human nature] led to a superficiality, not only of judgment, but also of feeling’. Indeed psychology became increasingly evident in his economics, not least with the three psychological propensities in the *General Theory*. As Winslow (1995) argues, Keynes discussed the motivation for financial accumulation itself in Freudian terms, although, as Dostaler and Maris (2000) argue, Keynes and Freud arrived at similar ideas on money independently.⁶ Finally Keynes’s theory of financial markets gave a primary role for market sentiment as a contributor to asset valuation.

But of Keynes’s psychological ideas, it is his concept of animal spirits which has resurfaced most noticeably in the current crisis (see in particular Akerlof and Shiller 2009), not his theory of uncertainty within which animal spirits reside as a part.⁷ For Keynes, animal spirits referred to the urge to action in spite of uncertainty (Dow and Dow 1991). For Keynes, as for Hume, cognition involves sentiment, but also, consistent with modern neuroscience, action requires an emotional driver. It also requires a facilitator, in the form of the capacity to imagine the future without access to demonstrable proof (see further Shackle 1979). Keynes argued that reason alone could never justify an active decision to invest, since the probability of the outcome could not be quantified. After all the gathering of evidence and the drawing on different types of reasoning, there is always a gap to be filled if action is to be taken. Thus there is a contrast between chapter 11 of the *General Theory*, which posits the investment choice in terms of a rational comparison

⁶ This focus on the lure of money itself has been revived in modern discussion by behavioural economists of the much narrower concept of money illusion, where choices appear to be made regardless of the real value of money (see eg Akerlof and Shiller 2009), a phenomenon identified with the medial prefrontal cortex, the seat of the emotions.

⁷ Pech and Milan (2009) demonstrate how many of the contributions in behavioural economics were anticipated by Keynes.

of *mea* and the interest rate, and chapter 12 which argues that the state of long-term expectations can never provide the certainty required for rationally-grounded action (see Dow 1991). Where confidence in expectations is high enough, it is animal spirits which encourage action; but when confidence in expectations is low, there is a withdrawal from action.⁸ Thus, while mainstream theory in Bayesian form posits (subjective) measurement of probabilities such that choices may always be made, Keynesian theory suggests that there are times of low confidence in expectations when no assessment may be made, and there is a withdrawal from choice, reflected in high liquidity preference (Runde 1994).

In Keynes's terms, animal spirits play a specific role in a general scheme of cognition/emotion, and thus Keynes's usage differs from Akerlof and Shiller's (2009) usage, which seems to include anything which falls outside conventional (for mainstream economics) rationality. For rational choice theory, the distinction between economics and psychology mirrored the distinction between rationality and emotion/irrationality. But in the absence of perfect knowledge or calculable probabilities as the basis for rational choice, ie the impossibility of rationality in the sense understood by rational choice theory, these distinctions break down. Economic action in the face of uncertainty requires some supportive state of market sentiment and urge to action, while reasons can always be produced for behaviour which might be classified as emotional (indeed this is the basis for psychoanalysis). Indeed Keynes (1938: 300) makes the centrality of psychology under conditions of uncertainty clear in a letter to Harrod, where he explains his critique of Tinbergen: economics 'deals with motives, expectations and psychological uncertainties.

⁸ Note that confidence is a characteristic of expectations, while the expectations themselves may be optimistic or pessimistic; see Dequech (1999) for an elaboration of the distinction and its significance.

One has to be constantly on guard against treating the material as constant and homogeneous’.

Drawing on more modern literature, we can see that the concept of the individual developed here involves reflexivity in that the individual understands herself in relation to society, rather than as an isolated atom. So knowledge and behaviour also are reflexive with respect to socially-conventional knowledge and behaviour. Learning itself is understood as a social process, rather than the stimulus-response process of mainstream theory. But this does not mean that all behaviour is socially determined or that the individual is *only* a member of society. As structure-agency theory puts it, given a social convention, we can always choose otherwise (Lawson 1997). There are social pressures on the one hand (within the society of financial traders, for example) and socially-conventional knowledge in the absence at times of anything more reliable. But given that, individuals can choose to go against the grain. Thus some market leaders are prepared to strike out while others hold back, possibly because they have different knowledge or because they have strong animal spirits. This account is supported by Dolfsma’s (2009: ch. 4) discussion of agency and structure in interrelated terms: change (particularly institutional, but in this case behavioural change) arises from the tension between individual valuations and social valuations. Indeed one such is someone who has contributed himself to the literature on reflexivity: George Soros (2008). He is a market leader who reflects on the capacity for reflexivity between cognition and action, such as buying an asset in the confident expectation that its price will rise (even though the grounds for such an expectation may be weak) will set in train forces which bring about the rise in price.

There is a recent development in the psychology literature, emotional finance theory, which illuminates the role of market leadership and its part in financial instability (Tuckett and Taffler 2008). This approach provides elaboration on the psychological motivation for behaviour in financial markets. A critical element, which makes it difficult to incorporate in more mainstream economic accounts, is that, being psychological, the motivation is largely unconscious. Further, as a Freudian psychoanalysis, the account emphasises unconscious conflict, in a way which is not amenable to capture in an optimising framework. Behaviour is depicted as being driven by conscious reason grounded in experience and by unconscious phantasy (wishful fantasies).

Taking the dotcom bubble as a case study, Tuckett and Taffler argue that bubbles follow an emotional sequence as follows: some novelty induces patchy excitement, which takes hold in growing excitement which focuses on exceptional expectations and then manic/euphoric excitement; but then when the bubble bursts the emotional state becomes one of panic and then blame. There is the potential for conflict, between judgement based on managing emotion (broadly, trying to feel good and avoid feeling bad) and that based on cognition (normal asset valuation), which increases as the excitement builds up. To the extent that participants are conscious of this conflict, they experience anxiety and refrain from action. But as the phantasy takes hold, they avoid the anxiety by increasingly ignoring the reality-based reasoning. This continues even into the downturn, such that, when the bubble bursts, participants panic as their expectations are confounded by reality, and they then engage in blame rather than the more reasonable emotion of guilt.

This analysis is supported by Pixley's (2004) study of *Emotions in Finance* which explicitly explores the role of emotion in financial markets as a necessary adjunct to

decision-making under uncertainty. She focuses on the unwillingness to face up to grounded reasoning as ever-higher capital gains are expected, the breakdown of trust when expectations are disappointed and, like Tuckett and Taffler, the subsequent ascribing of blame. Indeed she offers a complex analysis of the role of trust and distrust at the institutional (rather than individual) level throughout the process.

We have here a specific agency-structure framework, in that the market tends to be dominated by those willing to act, ie those who resolve the tension between reason and phantasy by privileging phantasy. As long as some market leaders allow their phantasy to dominate on a rising market, the market rise will be reinforced (given Soros's reflexivity) and others will be encouraged to allow their phantasy also to dominate, and so the boom builds up, with the financial structure becoming ever more fragile. Following Pixley, this phantasy may operate at a company level as well as the level of individuals. Further, while phantasy may be subconscious and involves an emotional response to a wished-for outcome, it also involves cognition. It would be possible to use emotional finance theory within a mainstream cognitive framework, with reality-based reasoning providing 'correct' risk assessment and phantasy providing an irrationally biased risk assessment. It is also open to interpretation from the point of view of bubbles being caused by exogenous shocks disturbing an otherwise stable system. But the theory makes more sense in an open-system, Keynesian/Minskyan environment where there is no demonstrably correct risk assessment, only conventionally-established assessments based on reason and evidence (the best that can be done in the circumstances) which are vulnerable to shifts. The reality-based reasoning therefore has a weaker hold, and wishful thinking becomes a different form of market-conventional assessment.

We can therefore summarise this different contribution from psychology to a structural theory of financial instability as follows. First, sentiment underpins both cognition and action and cannot easily be separated from them, so that no theory is complete without it. This is inevitable given the understanding of the open-system nature of the subject matter, which precludes ‘true’ risk assessment. Reason and evidence (understood in a way conditioned by social convention) can only go so far, and market participants must rely also on (socially-conventional) heuristics and ‘market sentiment’. Euphoric market sentiment is applied to the pursuit of financial gain builds on the dominance of phantasy on the part of some market leaders. As asset prices rise, confidence in (over-optimistic) expectations grows, reducing uncertainty and the anxious emotional state which that produces. But that anxiety increases after the bursting of the bubble: conventional expectations are confounded, increasing uncertainty and distrust increases. The turnaround requires enough of a willingness to act in spite of that uncertainty – an expression of animal spirits.

It is worthwhile to return to the beginning of this account, to the theory of human nature in the Scottish Enlightenment, where the self-interest of Adam Smith’s (1776) *Wealth of Nations* was tempered by the social awareness of his (1759) *Theory of Moral Sentiments*. Smith’s view that individual identity was tied up with society and with moral judgement put the emphasis on that aspect of sentiment. There was great concern with the effect of increased commercialisation on moral sentiments, and some might argue that the further march onwards of commercialisation in the subsequent two and a half centuries has completely eroded moral restraints, with self-interest being expressed as greed. But the emotional response of many to the current crisis has been one of moral outrage.

Clearly moral sentiments are still an important element in our sense of identity even in modern societies. But this is in fact evident even in more normal times. The market process requires moral standards in order to function at all. Trust in the behaviour of other individuals, and of institutions, is necessary for everyday transactions in a way which cannot be accounted for by the mainstream notion of rational self-interest. Even remote social contact, as between financial traders whose dealings are all electronic, involve conventions (eg over speed of response) which, if flouted, lead to ostracism.

If we accept the interactions between behaviour, cognition and sentiment in our analysis of financial instability, we also need to allow for some of those sentiments to be moral sentiments. But if we continue with the mainstream frame, which distinguishes in a dualistic manner between rationality and irrationality, cognition and preferences, and so on, then it is not clear how to incorporate such notions as fairness or greed into a reductionist model of individual behaviour. Akerlof and Schiller (2009) include the notion of fairness in their discussion of animal spirits, as a preference which departs from standard rational self-interest. But the fact that they group together such a diverse collection of factors which don't accord with rational economic man in their discussion of animal spirits implies that the concept is being taken to incorporate all 'irrational' behaviour.

Policy implications

We have explored a different, structural, explanation for financial instability and the way in which psychology can be incorporated in a non-dualistic manner. Which approach we choose is determined by our ontology – how we understand the real world. So others

prefer the conventional approach which sees the crisis as an aberration. Which approach we choose has policy implications, and we explore these here. We will focus particularly on the proposal to regulate for systemic risk: macroprudential regulation. Here we will see that it is fundamental whether emotion is something separable from cognition or not.

Macroprudential regulation, to address systemic risk, is an idea with widespread support. It follows naturally from Minsky's analysis that attention needs to be paid to systemic risk and the factors which feed it. The key development has been a more widespread recognition of the importance of systemic risk. From a more mainstream perspective, Brunnermeier et al (2009), for example, have supported the idea, on the grounds that individual actors in the financial system cannot price in risks which arise elsewhere as the unintended consequences of their actions. Such risks, which are endogenous to the system, have the potential (in mainstream parlance) to drive the system from equilibrium. A bank, for example, protects its assets, if asset prices are falling, by calling in potentially bad loans, or selling bonds, which causes asset prices to fall and thus defaults elsewhere in the system. While rational at the micro level, such actions create a crisis at the macro level as asset prices fall, defaults rise, spending falls, borrowing becomes more difficult, and so on. In particular, the failure of one financial institution which might seem justified at the micro level (on moral hazard grounds) can spread panic through the rest of the financial system. This contagion of course is what the Minsky approach has always analysed as the outcome of the normal process of financial instability, and for which regulation has been advocated as a way to moderate the process.

The mainstream approach, which has stable markets as a benchmark, presumes that complete prices (including pricing of risk) are feasible, allowing rational choice. Psychology, as we have seen, only enters into preferences and cognitive limitations, and there only in a limited way. There is a normative approach to instrumental rationality, which means that there is a tendency to design policy in such a way as to facilitate rational choice and to discourage emotional/irrational behaviour. Thus Thaler and Sunstein (2008) for example have proposed a policy of ‘nudging’ individual behaviour towards the rational self-interest which would allow markets to produce the socially-optimum outcome. Macroprudential regulation would nudge banks towards more rational behaviour from the perspective of the system as a whole, by varying capital ratios pro-cyclically, and changing mark-to-market practices, for example. But there is a danger that this approach is seen as requiring calculation of systemic risk, and prediction of market valuations, by the authorities in order to introduce the regulator as an additional rational agent which would then attempt to alter market relations through regulation in such a way as to price in systemic risk. The difficulties of achieving this through regulation are well-known; what we focus on here is the knowledge base on which this policy is to be built. The most likely implication for the development of the theoretical literature would be to aim to incorporate these complex interactions which lead to systemic risk (the unintended consequences of rational behaviour) into the existing formal models.

But Minsky himself argued against the suggestion that he capture his theory within a single large model (rather than the illuminating collection of partial models he offered), on the grounds that structural cycles follow a general path which is predictable but that their timing is not determinate (Foley 2001). This follows from the absence of

true asset prices by which to judge actual prices, the role of conventional judgement, and the scope for that judgement to shift. Market sentiment plays a fundamental role in the valuation of assets, and can cause price increases, which are the unintended consequences of others' asset purchases, to be exaggerated and a euphoric boom to build up. Similarly falls in valuations which are the unintended consequences of others' sales can fuel panic selling. This behaviour is not purely rational in the mainstream sense, nor purely emotional, but the way in which individuals in a social market setting act under uncertainty. But because market sentiment is not determinate, neither the forces which ultimately cause it to change, nor the timing and severity can be predicted. According to this approach, therefore, focusing attention on (albeit more sophisticated) mathematical models to the degree that policy-makers relied on models before the crisis, could distract attention from other sources of knowledge and create a false sense of security. Effective macroprudential regulation designed to reduce systemic risk would need to be supported, not only by partial models of different aspects of the system, but also by attention to the indicators of fragility within a particular institutional environment.⁹ It would also require attention to new developments (in products and practices) which might create financial stress in the future. Above all macroprudential regulation would therefore require vigilance.

As Minsky (and Keynes) argued, models are good ways of depicting and analysing mechanisms within parts of the economic system segmented off for analytical focus (Chick and Dow, 2001). Thus agent-based models which simulate the consequences of particular representations of behaviour, network analysis which focuses on interconnectedness, and stress-testing to estimate the impact of a range of eventualities

⁹ The Bank of Canada has been developing a Financial Stress Index; see Illing and Yu (2003).

(see eg Haldane 2009) are potentially all valuable sources of guidance. But they are all partial, and not sufficient for prediction, other than of multiple tendencies. It is the creative innovations designed to evade regulation, and completely unforeseen developments such as the freezing-up of the interbank market in 2007, and the point at which market sentiment shifts, which defy prediction. A focus on rational behaviour within an efficient-markets framework instead focuses attention on (predictive) modelling of behaviour within the current financial structure as a basis for policy. But we have seen that this framework is grounded in a conceptual separation of cognition from emotion which makes it difficult for behavioural economics to incorporate the richness of their insights about financial behaviour. A focus instead on the interaction between reason and sentiment within particular institutional arrangements in an uncertain environment seeks guidance from models but puts the emphasis much more on the limitations to modelling. Within such an approach, the primary focus of macroprudential regulation should be vigilance to change outside the models.

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