1 Introduction

The research in which I have been engaged for many years has made me increasingly dissatisfied with conventional approaches within social policy studies to the conceptualisation and measurement of dynamic change. In complex and rapidly changing societies we are not well equipped as researchers to offer critical illumination and advice for policy-makers and the wider public.\(^1\) However, my wider reading suggests that there are approaches in adjacent fields of enquiry that can and should be harnessed to policy analysis in general, social policy analysis in particular, and it is to this task that this book is devoted.

This opening chapter summarises my dissatisfaction in relation to mainstream social policy research; indicates in what sense we need a new policy analytics; and anticipates some of the intellectual tools and resources on which the study as a whole will draw.

1.1 THE UNSATISFACTORY STATE OF POLICY ANALYSIS

1.1.1 Poverty and Social Exclusion

I have over a long period undertaken research in the area of poverty and social exclusion, including involvement in various European programmes of research and evaluation. Recent decades have seen an impressive body of such research: all, to a greater or lesser extent, undertaken in the context of global economic restructuring, welfare ‘recalibration’ and concerns about social polarisation. This is a turbulent world that calls for appropriate tools of dynamic analysis.

For many scholars, the way forward, in terms of dynamic analysis, lies in the longitudinal analysis of household circumstances through cohort and panel studies (Leisering and Walker, 1998; Goodin et al., 1999). Sustained investment in such data sets – and ensuring their comparability cross-nationally – has been a major achievement of the social science community and government during recent decades. They can tell us how far household circumstances at one period are associated with household...
circumstances at some earlier period. Nevertheless, if such associations exist, they are mediated by the institutions and policies that are operative in the society concerned. Thus, for example, it is easy to demonstrate that redundancy and unemployment are in general associated with subsequently lower levels of income. However, redundancy is not a randomly distributed event; it is the result of a decision by an employer who is pursuing certain strategic goals, within particular labour market conditions and employment regulations. The consequences of redundancy for household financial circumstances then depend on the rules governing redundancy payments, the generosity of social security benefits and the opportunities for retraining (Gallie et al., 1994).

If such data sets, referring to persons and households, allow inferences to be drawn about these institutional processes, in general they are no more than that: intuitively plausible inferences. Yet to understand these processes is of central importance, if we are to draw policy lessons, because public policy reform typically involves re-shaping the strategic environment of key institutional actors. We need to understand how the strategies of key institutional decision-makers are shaped by public policy, and how these then affect particular categories of individuals and households.

This is not all. Individuals and households themselves pursue active strategies vis-à-vis these various institutions: shaping them, resisting them, by-passing them, extracting benefit from their operations. They may also mobilise and form alliances, so as to give their individual strategies greater chance of success. Those who are victorious on one institutional terrain – education, housing, labour market and so on – are then in a stronger position to continue the struggle on other terrains. They are also better placed to challenge the welfare settlements that protect the circumstances of different categories of household. This is of course the familiar ‘Matthew principle’. It tends to produce self-reinforcing feedback loops: these may be of particular significance for processes of social inclusion and exclusion, if they enable some social groups to prosper while sending others along catastrophic downward trajectories. William Julius Wilson’s studies of urban disadvantage in Chicago provide a classic example (see, for example, Wilson, 1987).

We need to study the strategic goals of the individual and the household, the resources and techniques at their disposal, the investments they make in new skills and resources, and relevant aspects of the broader environment on which they depend. We need to model and to measure the interactions of strategic decision-makers and households within institutional contexts that are themselves contested. These interactions may involve feedback loops and cumulative change: these require analysis as dynamic systems. This may be of particular significance for investigations into social inclusion and exclusion, where these dynamic interactions send
some households and communities along catastrophic downward trajectories, with the institutions that support them being progressively degraded.

In general, the longitudinal national data sets that have been established do not allow us to say much about these social, political, economic and institutional dynamics and the larger changes in political economy within which they unfold. As a tool for analysing the dynamics of social change they are therefore of rather limited value. So are the policy recommendations that researchers can derive from them, except insofar as they draw also on other qualitative studies, and studies at the local level, so as to provide additional insights into the institutional dynamics to which I have referred.

1.1.2 Social Dynamics of the Knowledge Economy

During 2001–04 I led a team within the EU Framework 5 research programme. This was concerned with evaluating the statistical indicators being used to track the development of the new ‘knowledge economy’: ranging across its social, technological, economic and organisational aspects (Room, 2005a). Here again, it seemed necessary to recognise the dynamic and turbulent processes involved and to select indicators accordingly.

One thing was immediately apparent. Policy-makers place great weight on indicators that track the diffusion of the new information technologies across a society (Rogers, 2003): for example, the proportion of enterprises, or universities or households who have adopted a particular technology (Figure 1.1). These indicators show how far a given technology has reached even the least reachable. Far fewer indicators are available of the ‘leading edge’ of innovation: the entrepreneurs or ‘first movers’ who forge

![Figure 1.1 Diffusion of technologies](image-url)
new combinations of technology, organisation and skill within enterprises and who provide the impetus to wider socio-economic transformation. From a social policy standpoint, maybe this does not matter. Maybe we are not interested in the first movers, only in the ‘last movers’: in this particular case, the contours of the so-called digital divide, regularly re-shaped by new waves of technological change, and threatening new lines of social polarisation. However, this would surely be short-sighted. Social, economic and technological processes are dynamically coupled systems: if we do not understand the dynamics of the first movers, neither will we understand the fate of the last movers.

So what of these first mover processes? This research revealed inter alia that processes of ‘take-off’ into the new knowledge economy cannot be triggered solely by particular levels of research and development (R&D) expenditure or by the application of particular investments in information and communication technology (ICT). Dynamic innovation is a more complex process, involving interactions between technological investment, organisational change, entrepreneurship and workforce development at the level of the enterprise (Pettigrew et al., 2003: Part 2). It also depends upon the impetus and support offered by national – and international – ‘innovation systems’. Nevertheless, indicators of these first mover processes – the dynamics that generate innovation – are as yet only rudimentary. So also are the indicators that policy-makers might use to track the consequences of these first mover processes for last movers and for social polarisation across the wider society.

These observations are not new. For example, the Organization for Economics Cooperation and Development (OECD, 2003: Ch. 3) provides a review of recent studies which demonstrate the importance of these firm-level interactions for innovation and take-off: it suggests how data sets may be linked so as to developing appropriate indicators. Such indicators could illuminate more adequately the trajectories of socio-economic transformation along which policy-makers aspire to direct their societies. For the moment, however, this remains largely unexplored territory.

1.2 A NEW POLICY ANALYTICS

From these two strands of my previous work there arise the central questions with which I seek to engage in this book. First, how can we best conceptualise these dynamic processes of socio-economic change: processes that involve interactions between agents (households, enterprises and so on) and institutions: processes that may result in ‘downward’ trajectories of exclusion but also those which catalyse ‘upward’ trajectories
of ‘take-off’? Second, how can we model these dynamics empirically, as processes that are endogenous rather than merely the response to exogenous shocks? Third, what analytical tools – including indicators – can be made available to policy-makers for the purpose of monitoring and steering these processes of transformation? The book is ultimately to be judged by reference to these latter, policy-related questions, even if, in order to answer them, I devote the initial chapters to problems of conceptualisation. I therefore start with some comments about the world of the policy-maker.

How can public policy-makers make good decisions? What counts as a good decision? And having made it, how can they check just how good it turned out to be? There are of course many answers to these questions. In some form or other they are at the centre of most books on policy-making. One answer that is current today is that good policy decisions are evidence-based decisions. Such decisions are good in two senses. First, they select policies that are likely to be effective. Second, with evidence to back them up, they can expect to command public support.

The paradigm case of evidence-based intervention is that of the randomised controlled medical trial. On the basis of this gold standard, a spectrum of methodologies and approaches has been elaborated to cope with less controllable interventions. The gold standard assumes that evidence about interventions can be gathered and analysed on the basis of *ceteris paribus*: other things are equal or unaffected and serve as no more than context to the intervention itself. Insofar as the intervention has side effects, these are limited in scope and identifiable and can thus be included in the evaluation of the evidence. Equipped with such evidence, the public policy-maker can institute an appropriate intervention in the socio-economic functioning of society.

However, the appropriateness of this approach depends on how we conceive of the terrain on which public policy-makers find themselves. If the gold standard is the controlled medical trial, one metaphor that may be useful is that of the putting green. On this uniform terrain, where all local perturbations have been flattened, the golfer can apply the putter to the ball in a simple expression of Newton’s laws of motion. True, the eye may reveal that there is a gentle slope, although in any self-respecting golf club this will be a uniform one, for which a slight angling of the stroke will suffice to compensate. The golfer may also misjudge the degree of friction that the well-manicured grass offers: but in this case some increase or decrease in the force with which the ball is struck will again suffice. The policy-maker, equipped with reliable evidence and the mantra of *ceteris paribus*, can confidently institute an intervention with a force and towards a target that can similarly be expected to be a winner.
However, the real world of policy-making is perhaps less like a putting green than a game of crazy golf: and a game of crazy golf, moreover, that is played on the ‘bouncy castles’ that are now commonplace in children’s playgrounds. Now the landscape is far from uniform: there are hills, valleys and obstacles; worse still, as the ball is struck and proceeds on its course, its weight modifies the topology of the golf course itself. In such a world, is evidence-based policy-making even possible? If not, what answers can be given to the questions with which we started, concerned with good policy decisions?

One way to summarise this world of valleys, hills and malleable topographies is to say that it is non-linear. However, there are many types of non-linearity and not all of them pose major problems for evidence-based policy-making.

A medicine which has proved effective in clinical trials may nevertheless have non-linear effects on patients. There may be a threshold effect: below a certain level of dosage, the medicine has no beneficial consequences. At the opposite end of the scale, it may be that increasing the dose beyond a certain point fails to increase the benefit to patients: it reaches a plateau. The medicine in question thus has a non-linear profile in relation to dosage and effectiveness. This does not, however, affect the \textit{ceteris paribus} assumption, nor does it undermine the ability of the experimentalist to pronounce on the effectiveness of the medicine at various levels of dosage.

A second medicine may have various side effects – physical, motivational and so on. These may in turn have consequences for the medical outcomes of interest, reducing or reinforcing these outcomes. These secondary effects mean that the relationship between intervention and particular outcomes is no longer a simple and direct one. Nevertheless, providing that these secondary effects follow reliably from the initial intervention, and do not spill out in ways that undermine the broader \textit{ceteris paribus} assumptions within which the clinical trial is nested, evidence-based assessment of the medicine in question again remains possible.

A third medicine may, however, set a variety of secondary effects in motion, whose effects on the outcomes of interest depend also on other factors that are outside the control of the experimentalist: for example, the attitudes and actions of family members of the trial subjects, in relation to these secondary effects. If such family members respond in predictable ways and if these responses are such as to dampen down the secondary effects, the validity of the clinical trial is to some extent restored. If, however, family members respond in a variety of different ways, which for the moment at least are beyond the capacity of the experimentalist to understand or predict, and if, moreover, these responses affect the secondary effects in quite different ways, then the clinical trial is seriously undermined.
This is the type of non-linearity with which I am concerned in this book. It involves feedback loops which bring into play a variety of actors who set about re-shaping the policy intervention in light of their own strategic objectives. I do not say that such non-linearity is a significant feature of all policy domains, only that it is true of some: including, I suggest, those with which this chapter started. This is policy-making played out on a bouncy castle, whose topography is itself being continually transformed, as a result of these policy interventions and the efforts of a wider array of actors to anticipate and re-shape the policy terrain.

However, non-linearity is not the only problem. On each putting green, the contest is renewed as though for the first time. True, the player who, on reaching the final green, lags many holes or strokes behind, may feel so demoralised as to be unable to summon up a final display of competitive courage. Nevertheless, the topography of the final green is not itself affected by the unequal struggles on the preceding holes. The same is hardly true in public policy-making. No policy is made on a tabula rasa: any policy is an intervention in a tangled web of institutions that have developed incrementally over extended periods of time and that give each policy context its own specificity. This history shapes the constraints and the opportunities within which policy interventions can then unfold. Policy terrains and policy effects are path dependent.

Nevertheless, to acknowledge non-linearity and path dependency does not necessarily mean that good policy decisions based on sound and reliable evidence are impossible under these conditions. On the contrary, it is precisely to assess the scope for such policy-making, even off the ‘gold standard’ of the controlled medical trial, that this book has been written.

1.3 PATH DEPENDENCY AND POLICY ANALYSIS

This book will have much to say about path dependency. For the moment we offer just a few comments (for a good overview, see Mahoney, 2000).

One commonly used illustration of path dependency couches it in terms of probabilities. An urn (the so-called Polya urn) contains balls of two different colours. Each time a ball of one colour is drawn out, slightly more of the other are left in the urn, and so it is slightly more likely that one of the other colour will be drawn next time. The cumulative numbers resulting from successive withdrawals are likely to approximate the initial proportions in the urn. If, however, the ball initially drawn is returned to the urn, along with an additional ball of the same colour, before the whole process is repeated, the chances of the same colour being drawn a second time are reinforced, as are the chances that this colour becomes progressively
dominant. Thus the initial random draw tends to send the contents of the urn along a self-reinforcing course: we have path dependency and ‘first mover’ advantage. This is a ‘random walk’ but on a surface where the initial choice ‘tilts’ the topography and makes more likely continuing movement in the same direction (Crouch, 2005: 76).

Ebbinghaus and Crouch explore such path dependency in directions that are central to our own endeavour. Ebbinghaus (2005) distinguishes what he sees as two very different forms of path dependency: on the one hand, the ‘road juncture’, the fateful choice between alternative paths at a road junction; on the other hand, the ‘trodden trail’, the pathway that by virtue of repeated use becomes the ‘taken for granted’ low cost option for everyone. However, while these are indeed logically distinct, they correspond to the two elements that together make for path dependency in the case of the Polya urn. On the one side there is first mover advantage: which colour is drawn out first. On the other is the process of reinforcement, as additional balls of that same colour are added to the urn. As we shall argue in later chapters, while these two forms of path dependency may, as Ebbinghaus argues, be quite different in principle, it is when they co-exist in practice that processes of path dependency become particularly powerful. This key insight underpins the analytical toolkit that we seek to build in the course of this study.

The Polya urn involves some simple algorithms. The person who draws the successive balls is neither required nor allowed to make any strategic judgements and choices. However, Crouch – whose studies of ‘institutional entrepreneurs’ (Crouch, 2005) will be at the centre of our attention in a later chapter – develops a series of modifications of the Polya urn that allow for such strategic judgements and the processes of reflection that they involve. He asks how, under conditions of uncertainty, actors expect their world to work: what judgements they form as to the contents of the Polya urn, based on the colours of the balls they have already drawn. He asks what search strategies actors may be able to follow in order to locate balls of a preferred colour, rather than simply taking whichever comes blindly to hand. He models actors as agile path creators, able to explore distant hills and valleys, rather than moving myopically along merely local contours. Our own aim is similarly to develop models of agile action on complex terrains that can inform a new policy analytics.

1.4 CONCEPTUAL AND METHODOLOGICAL BASE

How far is it possible to provide analytical tools for policy-makers in a world of non-linearity and path dependence? This is the central question
of this book. Can we, in particular, equip policy-makers with the tools they need if they are to spot the feedback loops and ‘tipping points’ where new and dynamic trajectories of socio-economic change are set in motion, for better or worse, and illuminate the ways in which their own interventions can shape and steer these trajectories?

We must establish an appropriate conceptual and methodological basis. From a variety of different theoretical standpoints, a number of literatures have developed in recent decades that are concerned with such non-linearity and path dependency. This book focuses on two in particular. Both give pride of place to the self-reinforcing feedback loops which can drive socio-economic systems along distinctive but path dependent trajectories. One starts with agents and examines how, from their local interactions, larger and more complex patterns emerge. The other starts with institutions and examines how these delimit the scope for interaction by agents.

The first literature is complexity science, bringing to the social sciences insights and methods that have been developed largely in relation to physical and biological processes. Complexity science typically starts with particles, cells or organisms. It posits some simple rules of local interaction. It then demonstrates – often using computer simulations – that under certain environmental conditions (‘control parameters’) these local interactions will set up positive feedback loops from which complex patterns emerge at a global level, in processes of ‘self-organisation’. For many of these phenomena – especially the biological – there has then been a further level of conceptualisation and analysis, involving mechanisms of evolution and adaptation to new niches, within an environment that is itself re-shaped in the process. These are ‘complex adaptive systems’ (Waldrop, 1992: Ch. 3; Kauff man, 1993: Ch. 7).

These perspectives have already been applied by a variety of social scientists, in two principal ways. As we shall see, some sociologists and social policy writers have used complexity as a fertile metaphor, generating new questions for social science at a general level (Urry, 2003). Sociologists and economists have also used complexity in the form of agent-based modelling, involving computer simulation: there has been an enormous expansion in such work during the past decade (Gilbert, 2008). Nevertheless, neither of these applications has generated a commensurate array of novel empirical enquiry, nor are corresponding instruments and indicators for use by policy-makers well developed. This gap is evident, not least, in social policy and related fields of study: but see Byrne (1998), Barnes et al. (2003), Blamey and Mackenzie (2007) and Sanderson (2006).

The second literature is institutionalism, especially ‘historical institutionalism’. This starts with the choice of institutions by social, economic and political actors: it then examines how these institutions produce
patterns of interests and normative commitments which constrain and shape the courses of action – and the types of institutional development – that are subsequently likely to take place. The legacy of institutions thus sets up positive feedback loops, locking actors into a particular range of likely institutional innovations and locking out others. As in complexity science, there is path dependency.

Aggregation of particles or cells: aggregation of interests and commitments. In both cases the aggregation creates a new and constraining world as far as the individual particle or social actor is concerned: a set of structures which constrain agency. However, that world also opens up new opportunities for agency and new niches that can be exploited by the ‘first mover’. This latter aspect, a central feature of the complexity literature (especially with its interest in co-evolution and complex adaptive systems), has also become a central preoccupation of the institutionalist debate, as we shall see.

This book seeks to develop a conceptually coherent and methodologically novel synthesis of these two literatures, which serves then as the basis for a new policy analytics. It will not overlook adjacent strands of enquiry which resonate with the arguments developed here: these include the long-standing debates on agency and structure; the system dynamics literature; contemporary debates around rational action; social applications of Darwinism and evolutionary theory. Nevertheless, in any project, focus is everything and ours must be selective, if we are to develop a genuinely novel approach to policy analysis.

1.5 CONCLUSION

I began this chapter by referring to my own research and the dissatisfactions which have prompted this book. I have sought to explain in what sense the world of the policy-maker is complex and why our conventional methods of illuminating that world, as policy analysts, may have their limitations.

It is not just that the policy world is complex, however, it is also turbulent; and that turbulence has become only too apparent during the period that this book has been in the writing, with the international financial and economic crisis spilling over to affect central areas of social policy. The bouncy castle seems to have gone wild. Government leaders warn that conventional methods of policy intervention – the accumulated wisdom of our collective path dependent journeys – seem no longer to work. New models of a dynamically interconnected world are needed, so as to anticipate, steer and control this turbulence, but are as yet lacking. What therefore started out as an attempt to offer guidance to social policy-makers
may perhaps have some wider interest, in the collective endeavour to understand and manage a complex and turbulent world.

We start in Part 1 with the problem of conceptualising social dynamics, weaving together perspectives taken from complexity and institutionalism. Chapter 2 offers an overview of recent writing in complexity; Chapter 3 is concerned with complex adaptive systems and with evolutionary models in particular; Chapter 4 with the application of these models to economic dynamics. Chapters 5, 6 and 7 are concerned with institutionalist writings. Chapter 8 integrates the two. In Part 2 we consider the methodological and modelling challenges that follow from this conceptual integration. Finally, Part 3 sets out new directions for policy analysis.

It may finally be worth offering some cautions as to what the book is not trying to do. It might have limited itself to reviewing the models of dynamic systems that are current in the natural sciences and exploring how these can be applied to the social world. It could have done the same in regards to agent-based modelling and simulation. These are, however, tasks already undertaken by others, with a rather impressive level of competence (Ball, 2004; Gilbert, 2008). I build on their work in Parts 2 and 3, and in a small way seek to extend it, but to tread in their footsteps is not my primary task.

Rather, the first concern of the book is conceptual and ontological, integrating complexity science and institutionalism. I argue that each is in need of the other, as far as social science is concerned. Complexity science is bereft of an adequate treatment of institutions; institutionalism needs the formal dynamic modelling of complexity science. More than this, however, I argue that there are remarkable – but so far I think largely unremarked – convergences between the two, which make plausible the project of integrating them. Part 1 builds the integrated conceptual vantage point from which Parts 2 and 3 then deal, respectively, with methods and policies.

The book is thus addressed to those who have a foot in both of these worlds or who wish to do so. It requires the reader to immerse him or herself in salient elements of each. This makes, no doubt, for what is at times a rather demanding journey. I have tried to make it as comfortable and simple as possible, but was unable to make it simpler.