

Institutional and Evolutionary Economics

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1 Introduction

Institutionalism is a school of economics founded by Veblen, Mitchell and Commons in the late nineteenth and early twentieth centuries. The central contention is that formal and informal rules (institutions) are central to understanding economic and social phenomena. Behaviour and thinking are not only institutionally constrained but are also significantly institutionally formed. Institutionalism, while not currently a dominant school in economics, is an approach that has always had direct appeal for many economists who view economics as a social science rather than a form of social physics. Steinmo explains it thus: “if you think history and ideas matter, institutions structure actors’ choice but are subject to change by actors themselves, and real people make decisions that are not always efficient or purely self-interested, then you are probably an institutionalist” (Steinmo 2008 p.136).

Institutionalism rejects methodological individualism, optimisation, and neoclassical conceptions of rationality. It assumes we both make and follow rules, but also, that the rules we make partially make us. In other words, they shape our preferences, beliefs and habits of thought. Institutionalism has clear links to other disciplines, particularly other social science fields such as politics, history, sociology and anthropology. It is sometimes referred to as ‘economic sociology’ — though within mainstream economics this is not usually meant as a compliment (Myrdal 1976). Institutionalism has a level of internal diversity. A key strand, and the strand focused upon in this paper is that of Veblenian institutionalism. Veblenian institutionalism is explicitly Darwinian in nature. However, it should also be noted that there are other contemporary strands of institutionalism such as the more Schumpeterian ‘evolutionary’ approach that, while having much common ground with Veblenian institutionalism, eschews its comprehensive embrace of Darwinian evolution (Witt 2008).

Institutionalists also reject the idea of an objective, value-free ‘positive’ economics. Indeed, one of the most famous institutionalists, Gunnar Myrdal, was co-awarded a Nobel Prize in 1973 for explaining why values are always with us (Boumans et al. 2010 pp.169-184). What this means for the researcher is that rather than assuming they are producing value-free

analysis, they should be aware of their own values and how these values influence their research. However, they should still seek to be factually accurate, open to different ways of understanding and to not intentionally mislead (Stretton 1999: 19-29; 1969).

There is ongoing debate within institutionalism concerning the precise definition of an institution (Potts 2007; Searle 2005; Nelson 2003). Nonetheless, there is a common core understanding that institutions can be defined as the rules of economic and social life (Nelson 2003). There are formal institutions such as property rights or contract law, but equally there are informal institutions such as customs, traditions and social mores. Institutions are many and varied, ranging from a national constitution to table manners (Gardner 1998). The sheer breadth of what an institution is can sometimes be a burden when trying to theorise about institutions. However, it is still possible to generalise. Institutions provide the shared expectations as to what is proper, and usually contain some level of social or legal sanction if these expectations are breached (Neale 1993). Institutions provide social interaction with some level of predictability; as they help us to anticipate the reactions of others and vice-versa. Interaction and collective action cannot occur without them (Neale 1993).

An institution does not usually operate as a discrete entity: it generally operates in connection with other institutions. In particular, informal institutions are often necessary to give formal institutions practical effect and can be the precursor to the development of a formal institution (Hodgson 1998). North (2005) points out that transplanting an institution from one culture into another is likely to transform its character and effectiveness. For example, the Philippines constitution is tightly modelled on the US constitution, yet because it sits in an entirely different institutional setting it is a very different entity in practice (Chavance 2009).

Walton Hamilton, who coined the term institutional economics in 1918, provided a useful analysis of institutions. Hamilton (1932) asserts that institutions are subject to inertia and persistence and can often outlive the conditions that brought them into existence. Hamilton also points out that institutions are as capable of embodying ignorance and fear as they are of embodying knowledge and hope: they can define and sustain the very best and the worst of human endeavour. Hamilton also points out that institutions can end up playing roles that are quite different to their original roles.

Veblen made a useful distinction between instrumental versus ceremonial institutions. Instrumental institutions were seen as making a positive contribution to the task of social

provisioning. By contrast, he saw ceremonial institutions as being primarily orientated to upholding status and privilege. Later institutionalists, particularly Clarence Ayres, made too much of this distinction, arguing it constituted a fundamental dichotomy (see Hodgson 2004). However, the distinction between instrumental versus ceremonial institutions is still a useful one, as long as it is not applied too dualistically and simplistically.

While the focus in this paper is on original 'old' institutional economics, it is worth briefly explaining the nature of new institutional economics (NIE). Oliver Williamson, Douglas North and others developed NIE in the 1970s and 1980s. It should be stressed at the outset that its boundary with the old institutionalism is not entirely clear-cut,¹ but roughly one can say that NIE is different from institutionalism because it often adopts many of the key features of neoclassical economics: given preferences, optimisation, rationality, and in particular, methodological individualism. NIE recognises that we make institutions, yet gives little or no recognition to the fact that institutions (partially) make us. For many in NIE, institutions (beyond the institution of the market itself) arise primarily because markets suffer from information problems whenever they are not perfectly competitive and goods are not homogeneous (Douma and Schreuder 2008). From an NIE perspective, institutions are primarily concerned with providing external constraints and opportunities to given rational individuals who then optimise accordingly.

2 An idiographic school of economics

Because institutionalism has always acknowledged how the existing institutions of a particular society shape the preferences and beliefs of the individuals within that society, it has consequently acknowledged the importance of historical, social and political context. This makes institutionalism a more idiographic, rather than nomothetic, undertaking. A nomothetic approach is concerned with the study or discovery of underlying general laws that are assumed to lie below the surface. It is "looking to establish the general law, principle, or theory. The fundamental assumption in the sciences is that behind all the blooming, buzzing

¹ The boundaries between NIE and OIE have become more blurred over time: see for example North (2005). Furthermore bounded rationality (albeit of an incoherent sort) can sometimes feature in transaction cost economics (Douma and Schreuder 2008)

confusion of the real world, there are patterns or processes of a more general sort, an understanding that enables prediction and explanation of the particulars" (Bates 2005 p.9). By contrast, an idiographic approach stresses the unique context and processes that are seen as decisive in understanding any given situation. Knowing the particular circumstances is seen as the cornerstone of building a genuine understanding. The end result is "a nuanced description and assessment of the unique facts of a situation or historical event, in which themes and tendencies may be discovered, but rarely any general laws" (Bates 2005 p.9). Orthodox economics has adopted a notably nomothetic approach. For example, Lawrence Summers has argued, "spread the truth – the laws of economics are like the laws of engineering; one set of laws works everywhere" (cited in Klein 2007 p.218).

3 Cognition, instincts, habits and institutions

An important aspect of contemporary Veblenian institutionalism is its understanding of the relationship between, cognition, instincts, habits and institutions. The initial work in this area was done by Veblen (1898), yet for a long time this part of his work was either ignored or misunderstood (Hodgson 2004; O'Hara 2002, 2000). It is only quite recently that the recovery, refinement and extension of this aspect of his work has been undertaken. The scholar most active in this area is Geoffrey Hodgson (Hodgson 1988, 1993b, 1999, 2001, 2006a) and this section of the paper (Section 1.2) draws heavily on this scholarship.

A distinctive aspect of the following set of ideas is that they posit a particular response to the structure-agency problem. The structure-agency problem centres on the difficulty of developing theoretical explanations that can meaningfully account for the relationship between the individual and society: does society make the individual or do individuals make society? The structure-agency problem is a manifestation of a more common challenge of accounting for the relationship between the part and the whole: does the part make the whole, or does the whole make the part? Is causation upwards or downwards? Within economics, the relationship between microeconomics and macroeconomics is an obvious example of this general problem.

One response to the structure-agency problem is to acknowledge co-determination between structure and agent. This is helpful to a degree, but it elides the actual causal processes by which such co-determination occurs. Another response is to simply ignore the problem, in which case one is forced towards either methodological holism (the whole makes the part) or

methodological individualism (the whole is simply the sum of the parts). Mainstream theory almost exclusively opts for the latter, severely limiting its capacity to explain real-world phenomena such as the evolution of the economics curriculum. There is an obvious benefit in transcending both methodological individualism and methodological holism.

3.1 Cognition

To explore institutionalism's understanding of the structure-agency relationship, it is useful to outline the cognitive processes of the human brain as it receives the inputs that flow from the senses of sight, hearing, touch, taste and smell (Hodgson 1993a). For this vast amount of sensory data to be of any use to us at all, our brain must impose some meaning and order. It can only manage this by drawing upon its previously established understandings of the way the world works: its prior conceptual frameworks (Hodgson 2006a). These conceptual frameworks should not be understood as coded into our DNA; they are primarily the product of past socialisation:

Perception is an act of categorisation, and in general such categories are learned. It involves our acquisition of language and our education and socialization in early years. These processes are social and institutional rather than purely individual, involving socially formed signs and meanings and habits of thought (Hodgson 1993a pp.58-59).

Human cognition is a path-dependent process: incoming data is made sense of through a conceptual framework that is the result of historical experience. Beinhocker picks up on this point arguing that people learn within the context of a mental model and that established mental models can often get in the way of gaining new understanding and insights. One of the consequences of this is that resistance to change is "a deep feature of human cognition" (Beinhocker 2006 p.357).

These understandings of human cognition help explain why people can hold tenaciously to established ideas, even in the face of new evidence that would otherwise suggest these established ideas warrant modification, or even outright rejection. The path-dependent nature of cognition helps explain the existence of intellectual paradigms, including economic paradigms (discussed in Section 2.13). It is also helpful in explaining the pervasiveness of habits and institutions in social and economic life.

Of course, new incoming sense data can potentially change an established conceptual framework. Even so, rapid change is unlikely. This strong path-dependency in our cognitive processes helps to illuminate why “economists need to explain their theories in terms which are already somewhat familiar to the audience” (Dow 2002 p.15). It also suggests that even if there is good theory to replace bad theory, the established mental framework may prevent economists from recognising the need to discard the old and embrace the new. The strong social component of our cognitive processes means that, from a structure-agency perspective, the direction of causation runs largely, but not entirely, from structure to agent.

3.2 Instincts

While the gaining of a conceptual framework via social means is important, the human mind is not a blank computer hard drive, ready for its cognitive processes to be entirely programmed via social institutions. Biological evolution has provided us with instincts. Instincts can be defined as biologically inherited chemical and neural responses that predispose, but do not entirely dictate, a particular response to certain external stimuli (Hodgson 2004):

Many general human behaviours, including social behaviour, such as a predisposition to cooperate in groups, engage in sexual and other forms of display, territoriality, selfishness and altruism, as well as an ability to formulate and follow ethical rules may have at least some instinctual basis that resides in the way the human brain is structured (Hodgson 1999 p.97).

It is important to emphasise that instincts are about tendency or inclination and can thus be overruled.

While instincts are biological in nature, they co-evolve with social institutions. To be more specific, productive institutions enhance human survival, so this means that there is a premium placed on instinctual propensities that can efficiently internalise productive institutions (Clifford 2008).

Veblen argued that there are four instincts: the parental bent, the predatory bent, the instinct of workmanship and idle curiosity. But the seeming precision of his list is largely undercut by his argument that instincts never appear in single and pure form; we have multiple instincts

that overlap, cut across one another and compound one another (Chavance 2009). Veblen conceded that his assertions concerning instincts were scientifically imprecise, but he defended them as being philosophically and methodologically strong (Jennings 1999). To this one could add that modern cognitive psychology has verified that “human behaviour, though irreducible to biology, has fundamental moorings in some (more or less) universal psychological predispositions” (Jennings 1999 p.520). Nonetheless, contemporary institutionalists tend to refer only to instincts in broad and general terms, rather than trying to name particular instincts as Veblen did (Hodgson 2010). From a structure-agency perspective, the existence of instincts sets up a path of causation that runs largely from agent to structure.

3.3 Habits

A habit can be defined as a “self-actuating disposition or tendency to engage in a previously acquired form of action” (Hodgson 1993d p.60). Habits are not only largely ignored in orthodox economics, they are somewhat neglected across all the sciences (Fuller 2010). It has not always been so. Early work in psychology focused on habits. For example, William James’s 1890 Principles of psychology stated that “when we look at living creatures from an outward point of view, one of the first things that strikes us is that they are bundles of habits” (James 1950 p.104). Similarly, Veblen argued that fully deliberative decision-making is the exception: it is habits that are ubiquitous and central to human thoughts and behaviour (Veblen 1898). The pragmatist philosopher W S Pierce (who with other pragmatist philosophers, influenced Veblen) also made an insightful point about the connection between habit and belief, arguing that the “essence of belief is the establishment of habit” (Pierce 1878 p.29).

To focus on habits is very appropriate when it is considered that we have known since the 1950s that fully rational calculation on most matters is well beyond the computational abilities of the human mind (Simon 1957). We cannot generally compute the optimum solution, and therefore opt to satisfice, which is to find a good enough solution, usually arrived at via a rule-based procedure that is itself deemed as ‘good enough’ on the basis of historical experience. Such rules are a basic constituent of habits. While it is true that habits are required because of the limited computational capacity of our brains, they are also required because often the information we most need for truly rational calculation does not even exist. This is because it resides in a yet to be determined and fundamentally uncertain future (Knight 1921; Keynes

1936). One's own habits, and the habits of others, assist in managing this uncertainty via making human behaviour somewhat more predictable.

Habits and routines (firm-level habits) are also a necessary requirement for workplace productivity, and are particularly important in retaining and transferring tacit knowledge: knowledge that is difficult to codify or explain and which is often held collectively, rather than individually, within an organisation (Douma and Schreuder 2008). As explained later in this chapter, habits and routines supply the necessary fixity and cohesion for organisations such as economics departments, to function. Habits also allow us to avoid psychological distress as individuals, stopping us constantly appraising and reappraising and thus allowing the mind to function effectively and to engage in learning, expedite tasks and cope with incoming sense data.

Fuller (2010), drawing on the literature of contemporary neuroscience (Lally 2009; Graybiel 2008), explains that as a habit is acquired, it transitions from largely conscious processing in the cerebral cortex to less conscious, deeper structures of the brain. The process of habituation can vary (depending on the habit and the context) from between as little as 18 days up to 250 days. The key point is that once this process is complete, habits can be strikingly automatic, constant and resistant to revision (Graybiel 2008).

Within economics, the difficulty in shifting habits of thought is recognised. In the preface to the *General Theory*, Keynes talks about his own long and difficult path of escape from established habits of thought; indeed his *General Theory* is sometimes accused of failing to truly break free from such habits. Given that Keynes was such an agile and creative thinker, such an admission of the difficulty of breaking free from habitual thoughts might offer sobering implications for the rest of us.

The neurological research on the fixity of habits helps explain the previously mentioned point that habits are such an important source of economic and social stability, ensuring that the world of tomorrow is not completely different from the world of today. Habits are so powerful in this role that the habitual is commonly understood as natural or 'common sense'. Economic theory itself is one example of this:

...economic theory explores the logic of assumptions and models that seem natural. These constructs are not invented anew with each article and monograph, but are partly conventional; they derive their plausibility from the past practices, or perceived practices, of the discipline (Mandler 1999 p.13).

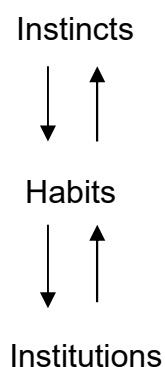
From a structure-agency perspective, habits are a two-way link between instincts and institutions. Causation in matters habitual clearly runs upward, in that habits can give expression to our instinctive dispositions. However, causation also runs downwards, in that habits can modify or attenuate our instinctive dispositions (Chavance 2009 p.12).

3.4 Institutions

As discussed, institutions are the formal and informal rules that exist in a particular society. How are they formed, and what is their relationship to habits and instincts? Habits exist at the level of the individual, not society. However, over time, through a process of emulation and selection, the habits of individuals can give rise to social and economic institutions. Veblen went so far as to argue that institutions are a collective habit of thought. Individuals observe and then repeat the habits of others for various reasons, including the pursuit of social acceptance and gain; the avoidance of social sanction; or because, in the absence of full information about the alternatives, following an established institution seems the safest thing to do.

From a structure-agency perspective, causation in matters institutional runs upwards, in that institutions emerge from individual habits. Causation also runs downwards, in that institutions influence habits and thus instincts and our cognitive processes. The relationships between instincts, habits and institutions is summarised in Figure 1.

Figure 1 Relationship between instincts, habits and institutions



The various two-way causations offer a psychologically and socially plausible solution to the structure-agency problem that avoids the limitations of either methodological individualism or methodological holism. It also avoids privileging either side of the 'nature versus nurture' debate (as the institutionalism framework spans the biological and the social world). Inherited dispositions are necessary for socialisation to occur, yet socialisation will exert a profound effect on whether, and in what way, our instinctual proclivities play out.

4 Circular and cumulative causation

Circular and cumulative causation (CCC) is another important concept in institutionalism, though it is not a specifically institutionalist concept.² CCC stresses that it is instability, rather than equilibrium, that characterises many economic and social processes. In CCC, change, rather than bringing forth countervailing changes, usually produces supporting changes in the direction of the initial change, but in a way that is stronger and more accelerated than the initial change. Positive feedback is at work: a disturbance in A prompts a change in B, which then prompts an even larger disturbance to A, and so on (Schmid 1999). A microphone 'feeding back' through a public address system is a good example of CCC in action. CCC can be contrasted with the concept of equilibrium via metaphors:

The metaphor of equilibrium is often compared to a ball rolling round in a saucer that will tend towards coming to rest at the centre of the saucer. By contrast the metaphor for circular and cumulative causation would be like a snowball rolling down a hill, gathering in size and speed at an increasing rate (Stilwell 2011 p.223).

Unlike the equilibrium approach, CCC recognises the concept of historical time, and the cumulative and transformative nature of change.

CCC is usually understood as an agent of change, but it can also be used to explain inertia and stagnation (Argyrous 2011). Consider the idea that theoretical advance cannot, of itself, necessarily force the required institutional changes that are necessary to remake the economics curriculum. Further, consider the idea that significant theoretical advances may be as much dependent on institutional reforms as institutional reform is dependent on

²The origins of CCC can be traced back as least as far as Adam Smith and while institutionalists such as Veblen and Myrdal are often associated with it, so too are figures such as Kaldor, Verdoorn and Young.

theoretical advances. In such a situation the elements would be feeding upon themselves, but not in a way that brings change.

5 Power

Power can be defined in a number of different ways, and perhaps no single definition is entirely adequate (Rothschild 1971). However, in a broad sense one can opt simply to define power as the ability of person A to make person B do something they would not otherwise do (Robertson 1993). Power might be exercised through various methods, such as (a) coercion (b) enticement or (c) the ability to alter the person's underlying preferences or beliefs. The last option is concerned with changing what people believe and want, rather than just what they do (Bartlett 1993).

It is often said that 'knowledge is power', yet this elides something quite important: knowledge only becomes power when there is an asymmetry of knowledge between parties (Bartlett 1993). For example, the power and benefits that might accrue to Party A in telling a lie are most probably contingent on Party B not being in a position to really know if Party A is lying (or is deluded). Similarly, if the general public is not in a position to understand an explanation for a given phenomenon, or to have knowledge of a rival explanation, it has much less power than if it had a good working knowledge of the main ideas behind any given explanation. This point has obvious relevance to economics; indeed, Earl explicitly points out how the profession is utilising "the growing information asymmetry between itself and the wider public about what it does to put 'spin' on its contributions and deny it is failing" (Earl 2010 p.222).

In neoclassical economics, power is understood solely as market power (the ability of a firm to raise its price without losing all its sales). Every market exchange is seen as a solved political problem (Bowles 2005). People's behaviour is primarily changed via the changing of marginal benefits and costs. To change behaviour simply involves changing the combination of carrots and sticks to instantly elicit the desired behaviour. This is clearly a very limited and reductionist concept of power. Institutionalism subscribes to a much deeper, broader and more critical concept of power, whereby power relations are exercised through institutions and the exercise of power occurs not just in market exchange, but in all human interactions (Bartlett 1993). Power in the economy and in society is primarily channelled through institutions; indeed, one can conceive of the economy not primarily as a system of markets, but as a system of power (Samuels and Tool 1988).

6 Evolution

Institutionalism has traditionally been accused of lacking a clear theoretical foundation, of being merely 'description economics'. Such criticisms are exaggerated and do not acknowledge the various conceptual and theoretical contributions made by institutionalism (Hodgson 1998). However, it is also true that institutionalism is a relatively under-theorised branch of economics (Hodgson 1998). Under-theorisation is a problem because analysis without theory, or 'pure empiricism' is not possible. Theory (or at least a prior mental framework of some type) precedes observation. Given that we 'see' with our mind as well as with our eyes, a coherent and defensible framework of inquiry is a basic and important requirement.

The response of Veblenian institutionalists to the problem of under-theorisation in institutionalism has been to explicitly base institutionalism on a Darwinian evolutionary foundation. Before examining whether economics can be an evolutionary science, it is necessary to specify exactly what evolution means, as it is subject to multiple interpretations (Vromen 2004). Darwin, drawing on an idea of Malthus, explained evolution as a three-step process of variety, replication and selection.

The generating of variety is the first step in the evolutionary process. Variety creates a range of choices from which the environment can select. The variation in the population can result from chance mutation (for example, to the DNA of a particular organism), though it should be stressed that it can also involve a degree of intentionality. For example, individuals may change their behaviour or thinking on the basis of their personal motivations, intentions or hunches based on induction (Beinhocker 2006). In summary, both the intentional and unintentional can be consistent with an evolutionary process (Nelson and Winter 1982).

Replication is the second step of the evolutionary process. It is necessary so that successful variations can pass on their characteristics through time. In the biological sphere, replication is achieved via the passing on of DNA during sexual reproduction. In the social sphere, institutions can reproduce themselves because they are relatively stable and can be replicated by the coming generation via a process of emulation that occurs through socialisation (Hodgson 2008).

Selection is the final stage of the evolutionary process. Selection becomes inevitable because of super-fecundity: more variations exist than the environment can support. This means that variations that are more environmentally fit persist, and the variations that are less so, die out (Hodgson and Knudsen 2010). Note that 'environmentally fit' simply means 'fit enough to survive for the moment', rather than the fittest (or most optimum) of all possible designs.

The Darwinian triple of variety, replication and selection is, in essence, straight-forward. However, Darwinian evolution has been subject to much confusion and misuse. In particular, it has a very unfortunate history of being twisted to support racist and anti-egalitarian ends (Hodgson 2006a). Such confusion and misuse has given evolutionary theorising in the social sciences a bad name and contributed to its marginalisation (Hodgson 2004). A key interpretative error is that evolutionary processes produce optimum outcomes. Such thinking can be seen in Spencer's ideas of social Darwinism, or more recently among some on the far-right to justify extreme laissez-faire public policy (Krugman 1997).

This teleological conception of evolution as optimisation is demonstrably erroneous. Evolutionary change can be idiosyncratic and perverse: something can be reproduced as long as it is not so dysfunctional as to prevent survival (Hodgson 1994, 1993c; Gould and Lewontin 1979). Further, what is environmentally fit is always something that can only be determined relative to a particular environment: something advantageous today may be disadvantageous tomorrow (Beinhocker 2006). It is also true that something that is favourable can become the victim of its own success, in that it can change the nature of the environment so that its favourable adaptation becomes a liability (Douma and Schreuder 2008).

Optimisation is also limited by the fact that evolution is also an inherently path-dependent process: the input for the next round of the process is the output of the previous round (Beinhocker 2006). What this means is that evolution is intrinsically historical, thus to understand any phenomena (for example the economics curriculum) in evolutionary terms needs to have a strong historical component. Evolution happens in historical time: the clock cannot be wound back so that something different can be trialled, or as Hardy (1999) puts it, natural selection can never start from scratch to produce the perfect solution. Evolution is best understood as the relentless grinding out of a three-step process of variety, retention and selection: it is a race going in an unspecified direction that has no finish line and many dead ends (Beinhocker 2006; Hodgson 1993c).

This Darwinian conception of reality has much to recommend it. It is compatible with many ideas that have long been important in political economy such as path dependency, lock-in effects, increasing returns, learning and adaptation. It can also span our biological and social selves. Furthermore, it is not trapped in either methodological individualism or methodological holism (Hodgson and Knudsen 2010). By contrast, neoclassical economics is narrowly mechanistic and struggles to capture many important processes that characterise economic and social reality.

For all its appeal, the Darwinian conception and approach has its own challenges. Evolutionary systems are not like the gearbox of a car (or like the general equilibrium of Walras). Evolution, despite being a simple three-step process, can generate complex outcomes that are difficult to predict. Temporal differences within the system are important in explaining why this is so. For example, in economic and social systems, instincts evolve biologically over a very long period of time, while habits evolve more slowly, and institutions more slowly still (Hodgson 1998). A further complication is that there can be co-evolution between levels (for example, the co-evolution of instincts and institutions discussed earlier in this chapter).

7 Emergence

Evolutionary systems are also usually characterised by emergence.³ Put most simply, the idea of emergence is that entities are more than the sum of their parts. An emergent entity is composed of its constituent parts, but also the interaction of its constituent parts (Beinhocker 2006). The novel properties that emerge from the interaction of the constituent parts (whether these are novel structures, novel properties or novel patterns) could not have been foreseen by simply examining the constituent parts. What results from an emergent process is not reducible to, or explicable in terms of, the underlying component parts (Goldstein 1999). Attempts at such reductionism run up against the fallacy of composition problem.

The idea of emergence initially sounds rather abstract but can be easily grounded by looking at an example. Consider the human brain. While it is primarily composed of neurons, it cannot

³ This section on emergence was greatly improved by reading King (2012) and the associated literature on emergence that it drew upon.

be sensibly understood as merely an accumulation of neurons. Rather, the essence of the brain is in the ever-changing networks of interaction between its neurons.

Emergence suggests a layered ontology. A layered ontology is where there are succeeding levels of reality: the physical, molecular, organic, mental, individual, human and the social. The interaction at the preceding level of reality is central in giving rise to the next level of reality (Hodgson 2004). Within economics, the most crucial levels of reality are between microeconomic and macroeconomic phenomena. While microeconomic phenomena give rise to macroeconomic phenomena, macroeconomics is not reducible to microeconomic foundations. Macroeconomics is understood as a distinct entity in its own right that has its own properties and characteristics; indeed, there is clear scope for macroeconomics to exert downward influence on microeconomic phenomena.

Over the last two decades, the concept of emergence has become a fashionable topic in the philosophy of science. However, it is not a new idea, going back as far as Aristotle who argued in chapter six of his *Metaphysics* that “the whole is not, as it were, a mere heap, the totality is something besides the parts” (Aristotle in Ackrill 1986 p.320). Emergence has also been advocated (albeit, often in fragmented form) by economists such as List, Mill, Veblen, Hobson and Hayek, sociologists such as Talcott Parson and Emile Durkheim and philosophers of biology such as Lloyd Morgan (King 2012; Hodgson 2000, 2004).

Emergence has very direct relevance to issues of structure and agency, as it is antithetical to the idea of methodological individualism. If methodological individualism’s central premise is “the doctrine that all social phenomena (their structure and their change) are in principle explicable only in terms of individuals – their properties, goals, and beliefs” (Elster 1982 p.453 emphasis added), then it is at loggerheads with emergence, which argues that the properties of group phenomena may be quite different to the properties of the individuals that make up a group.

Emergence also has clear implications for the structure-agency problem because it provides support for the idea of downward causation in social and economic explanation. Specifically, emergence allows for something new to emerge from the interaction of the constituent parts that can then potentially affect the constituent parts. The idea of downward causation becomes harder to countenance if nothing new has emerged from the interaction of the constituent parts.

Emergence, particularly in a strong form that allows for downward causation, would appear more easily applicable to the social sciences than the natural sciences. As Gordon (1991) has pointed out, when hydrogen and oxygen combine to form water, new properties do indeed emerge, yet the properties of hydrogen and water are not dependent on the existence of water (Gordon 1991; King 2012). By contrast in the social world, the nature of individuals is very dependent on the society in which they are enculturated.

How does the concept of emergence sit within traditional notions of science? Within the philosophy of science emergence, particularly in its strong form, has been criticised as being mysterious, somewhat mystical or even magical and non-scientific (King 2012; Gordon 1991; Kim 1999). However, the concept is something with which many philosophers of science and many natural scientists are actively engaged. Many of the advances in areas such as complexity theory cannot help but engage and wrestle with emergence, even if there is not yet much consensus about how best to do this.

How does emergence sit with traditional views of what constitutes a scientific economics? The will to appreciate and internalise a concept like emergence would not appear very strong. To accept the concept of emergence challenges the mainstream's view of economic phenomena being mechanical and simple. This belief can be seen in the currently dominant dogma that macroeconomics must have rigorous microfoundations and the general orientation towards methodological individualism.

8 The challenge of an evolutionary economics

To move away from a simple mechanistic view of economic phenomena and to see the economy as an evolutionary system characterised by emergence is confronting. As Nelson explains, the evolutionary approach leads to a more modest, cautious and idiographic economic analysis:

There is no question that, in taking on board this complexity, one often ends up with a theory in which precise predictions are impossible or highly dependent on particular contingencies, as is the case if the theory implies multiple or rapidly shifting equilibria, or if under the theory the system is likely to be far away from any equilibrium, except under very special circumstances. Thus an evolutionary theory not only may be more complex than an equilibrium theory. It may be less decisive in its predictions and

expectations. To such a complaint, the advocate of an evolutionary theory might reply that the apparent power of the simpler theory in fact is an illusion (Nelson 1995 p.85).

An evolutionary system characterised by emergence is one that is not amenable to easy prediction or explanation. There are temporal differences between the different levels in the system, non-linearities and co-evolution between the components. Evolutionary systems may be gradual and orderly for a time, yet they are also prone to periods of punctuated equilibrium: sudden great leaps which interrupt periods of slow change. The sudden leaps might be caused by external disturbances outside the system, or more probably, evolutionary processes within the environment lead to a tipping point that then prompts radical change within the system⁴.

All these aspects of an evolutionary economics do not fit well with the neoclassical view of the world. As such, they are confronting to habits and institutions that exist within traditional centres of economics teaching. Given that Section 2.5 has just outlined how powerful habits and institutions can be in preventing new thinking and behaviour, it is hard to imagine that the economic mainstream will embrace an evolutionary economics any time soon.

9 Applied Institutional and Evolutionary Theory

Evolutionary theorising in the social sciences is still only at an early stage of development (Hodgson 2004). While current evolutionary theorising is useful in prompting lines of inquiry and providing guidance to empirical analysis (Hodgson and Knudsen 2010), it is not a theory of everything (Hodgson 1998). Applied analysis in institutionalism actually requires the addition of more context specific (mid-range) theorising (Hodgson 2006b). This combination of general and specific theorising is used in other sciences such as evolutionary biology, where context-specific theories and concepts that relate to the particular environments and organisms under investigation are nested inside more general laws and principles (Hodgson 1998). Such an approach should not be seen as a weakness; by contrast, this combination of general versus specific theorising provides a useful reconciliation of the idiographic and

⁴ The cyclical growth models of Goodwin (1990) and Kalecki (1937) are good examples of attempts to come to terms with an economy characterised by these features.

nomothetic. On one hand, it recognises the idiographic via its acceptance of the importance of particular and unique circumstances. On the other hand, it recognises the nomothetic in that it asserts that there are some general relationships that we can look to in guiding our analysis of specific phenomena.

For the economist doing applied work, an evolutionary approach does not provide a treasure map that instructs us exactly where and how to dig for every truth we are seeking. Instead, it informs research with general guidance, prompting questions to ask, suggesting batteries of possibilities to look for and lines of inquiry that may be fruitful (Hodgson and Knudsen 2010). It does not indicate what should be happening, but offers tools to assist in finding out what is happening (Stretton 1999). This approach to inquiry recalls the introduction to Hare and Hare's 1838 work *Guesses at Truth*:

If I am addressing one of that numerous class who read to be told what to think, let me advise you to meddle with this book no further. You wish to buy a house ready furnished, do not come to look for it in a stone quarry. But if you are building up your opinions for yourself, and only want to be provided with the materials, you may meet with many things in these pages to suit you (Hare and Hare cited in Grayling 2001 p.1)

What, then, is the context-specific (or mid-range) theory and concepts at our disposal if we want to do institutionalism applied analysis? Two examples are Freeman and Hannan's work in organisational ecology (Hannan and Freeman 1989) and Nelson and Winter's theory of the firm (Nelson and Winter 1982). The theory and concepts in both these research programmes are broadly compatible with an evolutionary institutionalism as they emphasise (either explicitly or implicitly) the importance of habits, routines and institutions as being central in understanding social and economic processes. Furthermore, both identify patterns of circular and cumulative causation, path-dependence, variety, replication and selection that unite them as being broadly evolutionary in nature.

It is not argued that every aspect of each of the frameworks just mentioned integrates perfectly with the other. Nor is it argued that every aspect of each theory integrates perfectly back into an evolutionary ontology. There are three lines of reasoning to explain this lack of integration. First, no one has yet developed a mid-level theory that is fully evolutionary in every respect (Hodgson and Knudsen 2010). Second, whether any mid-level theory can ever be completely compatible with an evolutionary ontology is doubtful, given that any operational

theory has to make simplifications, abstractions and partial closures. It is hard to imagine how such simplifications, abstractions and partial closures would not partially violate the evolutionary purity of the theory in question. Third, it can be desirable to employ different theories if each can help in informing and illuminating particular aspects of a complex situation. Such theories need not always be fully integratable.

9.1 Freeman and Hannan

Freeman and Hannan (1989) have developed a theory of the firm known as organisational ecology. Crucial to this theory is the double-edged nature of inertia. On one hand, firms require high levels of inertia to function effectively, but such a high level of inertia means that firms are unable to adapt to changing circumstances. Following Stinchcombe (1965), they argue that:

Cohorts or organizations are 'imprinted' with the social, cultural, and technical features that are common in the environment when the cohort is founded. Because imprinted characteristics are highly resistant to change, the current characteristics of populations of organizations reflect historical conditions at the time of founding rather than recent adaptations (Hannan and Freeman 1989 p.xiii).

The implication is that economic change will be driven more by the birth and death of firms rather than by the adaptation of individual firms. While firms have some scope to change, inertia is the dominant characteristic. Even when firms might recognise that rapid or radical change is required, they will have difficulty responding, so that attempts at change are often unsuccessful (Hannan and Freeman 1989).

Hannan and Freeman argue that firms take an organisational form; which can be likened to a membership of species (Hannan and Freeman 1977; Hannan and Freeman 1989). Firms that have a common organisational form are classed as organisational populations that exist in a particular time and space (like populations of particular species of an animal in particular regions). It is argued that firms are slow to respond to a changing environment in no small part because they need to be reliable and accountable (Douma and Schreuder 2008). Reliability and accountability require routines: established rules, practices and processes of work. Routines are the organisational equivalent of a habit. Continuity and reproducibility of these routines are essential, otherwise the firm cannot function efficiently and it will

essentially have to define and create itself anew every day. It will also have trouble generating internal cohesion and effective communication. Because high inertia provides the firm with the reliability, accountability and reproducibility that it needs, environmental selection pressures will favour organisations with structures that exhibit high inertia (Douma and Schreuder 2008). In other words, inertia enhances evolutionary fitness, or at least it enhances fitness when the environment is relatively constant. The key point is that firms are not just beset by inertia; they require some level of inertia to function effectively.

Inertia only becomes a net liability once there is significant change in the environment, as inertia makes it difficult for firms to adapt (Douma and Schreuder 2008). Beinhocker's findings that "the deck is stacked against organisational change" (Beinhocker 2006 p.333) and that market signals are "distorted like a fun house mirror within firms" (Beinhocker 2006 p.341) is consistent with Freeman and Hannan's arguments. These arguments are also in concert with Round and Shanahan's observations that, when faced with the need for real change, economics departments have generally failed to notice or adapt and have instead committed "academic suicide" (Round and Shanahan 2010 pp.425-426).

9.2 Nelson and Winter's theory of the firm

The work of Nelson and Winter (1982) is recognised in institutional economics for its notable embrace of evolutionary thinking. They put forward a general theory of economic change focused at the level of the firm. The origins of their work can be found in Cyert and March's behavioural theory of the firm (1963) and the work of Schumpeter. Their work is also consistent with some key ideas of Veblen (Hodgson 1999). Like Freeman and Hannan, Nelson and Winter stress how firms are constrained by their past and that "changes in organizational innovation may be much more difficult than technological innovation" (Nelson 1993 p.246).

In Nelson and Winter's theory, firms with differing capabilities and technologies primarily compete on processes and products, rather than price. These processes are contained within routines which are subject to evolutionary selection. Routines are best understood to be collective habits that exist within a firm, Nelson and Winter define a routine as follows:

Our general term for all regular and predictable behavioural patterns of firms is 'routine.' We use this term to include characteristics of firms that range from well-specified technical routines for producing things, through to procedures for hiring and firing, ordering new inventory, or stepping up production items in high demand, to policies regarding investment, research and development (R&D), or advertising, and business strategies about product diversification and overseas investment. In our evolutionary theory, these routines play the role that genes play in biological evolutionary theory (Nelson and Winter 1982 p.14).

It should also be noted that even innovation is done in a way that has its own routines that are specific to the individual firm. Routines are particularly important as carriers of tacit knowledge (Hodgson 1999). Tacit knowledge is knowledge that is difficult to codify and write down (for example information that cannot be easily written into an instruction manual). Tacit knowledge is often gained or transferred via 'learning by doing'; this is a significant dynamic in organisations. In such instances skill acquisition is slow at first, but eventually second nature and efficient (Hodgson 1999).

While in Nelson and Winter's theory there is recognition that there are rigidities that stifle desirable change, they are more open than Freeman and Hannan in conceding that firms can adapt via learning and imitation (Nelson 1993; Nelson and Winter 1982). Over time, the firm interacts with its customers, other firms and the general environment. It is this interaction that drives change and adaptation within the firm. However, change is still seen as being path-dependent, as existing routines constrain what is possible in the future.

Nelson and Winter argue that environmental selection will progressively favour successful routines. This suggests that a collection of reasonably well-integrated and successful routines will be able to give rise to monetary profits; which in turn provide signals and incentives for the firm to persist with these routines (Douma and Schreuder 2008; Nelson and Winter 1982). A firm's profits may also provide signals and incentives for other firms to try to replicate the successful routines, though the initial firm may have a decisive head start in incorporating the routine amongst its other routines, and some of its routines may be difficult to replicate because of issues such as tacit knowledge (Douma and Schreuder 2008; Nelson and Winter 1982).

Firms are still quite constrained. Routines that have received prolonged selection from the environment can generate very high levels of inertia that make change within the firm very difficult (Douma and Schreuder 2008 p.297). In general, firms are “much better at the tasks of self-maintenance in a constant environment than they are at major change, and much better at changing in the direction of ‘more of the same’ than they are at any other kind of change” (Nelson and Winter 1982 pp.9-10). As Dosi explains:

A firm's previous investments and its repertoire of routines (its 'history') constrain its further behaviour. This follows because learning tends to be local. That is, opportunities for learning will be 'close in' to previous activities and will thus be transaction – and production – specific. This is because learning is a process of trial, feedback and evaluation. If too many parameters are changed simultaneously, the ability of firms to conduct meaningful quasi-natural experiments is attenuated. Thus, if many aspects of a firm's learning environment change simultaneously, the ability to ascertain cause-effect relationships is confounded because cognitive structures will not be formed and rates of learning diminish as a result (Dosi 1993 p.233).

Here we see an emphasis on the path-dependence of cognition itself; routines are dependent on a prior framework of understanding. Moving to an entirely new set of routines will likely involve unlearning the old framework and learning a new one (Douma and Schreuder 2008). It must be remembered that this unlearning and learning has a strong collective dimension to it (Hodgson 1999). This suggests that to completely and quickly change routines en-masse across an entire organisation may be a very difficult, if not impossible, thing to do (Douma and Schreuder 2008; Nelson 1993).

Another source of inertia comes from the idea that existing routines are, among other things, a source of ‘organisational truce.’ What is meant here is that routines stipulate the existing power balances and boundaries. Changing routines will upset these existing political balances, and thus “fear of breaking the truce is, in general, a powerful force tending to hold organisations on the path of relatively inflexible routine” (Nelson and Winter 1982 p.112). Furthermore, it is argued that it may be the case that “routines of the organisation as a whole are confined to extremely narrow channels by the dikes of vested interest. Adaptations that appear ‘obvious’ and ‘easy’ to an external observer may be foreclosed because they involve a perceived threat to internal political equilibrium”(Nelson and Winter 1982 p.111). In

summary, change, if it occurs at all, will probably be constrained by the existing balances of power between self-interested parties within the organisation.

Given the type of problems Nelson and Winter identify, new firms have some clear advantages when genuine change is required. There is no past by which to be constrained, no organisational truce to break, and cognitively, “new entrants are, in essence, starting with a clean sheet and do not have the problem of having to climb up an unlearning curve before being able to run down a new learning curve” (Douma and Schreuder 2008 p.296). Douma and Schreuder go on to note that firms that recognize the need for real change have increasingly located new activities away from their current operations. They cite the example of when IBM sought to move from making mainframe computers to personal computers, it both geographically and managerially separated the fledgling personal computer division. Similarly, when General Motors needed innovative production techniques for its new Saturn model of car, it established a separate organisation (Douma and Schreuder 2008).

10 References

- Ackrill, J. L. (ed.). 1986. *A New Aristotle reader* (Oxford University Press: Oxford).
- Argyrous, George. 2011. 'Cumulative Causation.' in George Argyrous and Frank J. B. Stilwell (eds.), *Readings in political economy: economics as a social science* (Tilde University Press: Prahan).
- Bartlett, Randal. 1993. 'Power.' in Geoffrey M. Hodgson, Warren J. Samuels and Marc R. Tool (eds.), *Elgar companion to institutional and evolutionary economics* (Edward Elgar: Aldershot).
- Bates, Marcia J. 2005. 'An Introduction to Metatheories, Theories, and Models.' in Karen E Fisher, Sanda Erdelez and L E F McKechnie (eds.), *Theories of Information Behavior* (Information Today: Medford).
- Beinhocker, Eric D. 2006. *The origin of wealth: evolution, complexity, and the radical remaking of economics* (Harvard Business School Press: Boston).
- Boumans, Marcel, John Bryan Davis, Mark Blaug, Harro Maas, and Andrej Svorencik. 2010. *Economic methodology: understanding economics as a science* (Palgrave Macmillan: Basingstoke).
- Bowles, S. 2005. *Microeconomics: Behavior, Institutions, and Evolution* (Princeton University Press: New Jersey).
- Chavance, Bernard. 2009. *Institutional economics* (Routledge: London).
- Clifford, S Poirot Jr. 2008. 'Eat Grubs and Live: The Habit-Instinct Problem in Institutional Evolutionary Economics', *Journal of Economic Issues*, 42: 407-13.
- Cyert, Richard Michael, and James G. March. 1963. *A behavioral theory of the firm* (Prentice-Hall: Englewood Cliffs).
- Dosi, G. 1993. 'Firm, Boundaries of the.' in G.M. Hodgson, W. J. Samuels and Marc R. Tool (eds.), *The Elgar Companion to Institutional and Evolutionary Economics* (Edward Elgar: Aldershot).

- Douma, S. W., and Hein Schreuder. 2008. *Economic approaches to organizations* (Prentice Hall: Harlow).
- Dow, Sheila C. 2002. *Economic methodology: an inquiry* (Oxford University Press: Oxford).
- Earl, Peter E. 2010. 'Economics fit for the Queen: a pessimistic assessment of its prospects', *Prometheus*, 28: 209-25.
- Elster, Jon. 1982. 'Marxism, functionalism, and game theory', *Theory and Society*, 11: 453-82.
- Fuller, Jack. 2010. "Promoting Good Choices: patterns of habit and the role of government." In. Melbourne: Per Capita.
- Gardner, S. H. 1998. *Comparative Economics* (Dryden Press: Forth Worth).
- Goldstein, Jeffrey. 1999. 'Emergence as a Construct: History and Issues', *Emergence: Complexity and Organization*, 1: 49–72.
- Goodwin, Richard M. 1990. *Chaotic economic dynamics* (Oxford University Press: New York).
- Gordon, S. 1991. *The History and Philosophy of Science* (Routledge: London).
- Gould, S. J., and R. C Lewontin. 1979. 'The Spandrels Of San Marco And The Panglossian Paradigm: A Critique Of The Adaptationist Programme', *Proceedings Of The Royal Society Of London*, 205: 581-93.
- Graybiel, A.M. 2008. 'Habits, rituals, and the evaluative brain', *Annual Review of Neuroscience*, 31: 359-87.
- Grayling, A. C. 2001. *The meaning of things: applying philosophy to life* (Weidenfeld and Nicolson: London).
- Hamilton, Walter. 1932. 'Institutions.' in Edwin R Seligman and Alvin Johnson (eds.), *Encyclopedia of the Social Sciences* (Macmillan: New York).
- Hannan, M.T., and J Freeman. 1977. 'The population ecology of organizations', *American Journal of Sociology*, 82: 929-64.
- Hannan, M.T., and J. Freeman. 1989. *Organizational ecology* (Harvard University Press: Cambridge, MA).
- Hodgson, Geoffrey M. 1988. *Economics and institutions: a manifesto for a modern institutional economics* (University of Pennsylvania Press: Philadelphia).
- . 1993a. 'Cognition.' in Geoffrey Martin Hodgson, Warren J. Samuels and Marc R. Tool (eds.), *The elgar companion to institutional and evolutionary economics* (Edward Elgar: Aldershot).
- . 1993b. *The Economics of institutions* (Edward Elgar: Aldershot).
- . 1993c. 'Evolution and optimisation.' in Geoffrey Martin Hodgson, Warren J. Samuels and Marc R. Tool (eds.), *The elgar companion to institutional and evolutionary economics* (Edward Elgar: Aldershot).
- . 1993d. 'Habits.' in Geoffrey Martin Hodgson, Warren J. Samuels and Marc R. Tool (eds.), *The elgar companion to institutional and evolutionary economics* (Edward Elgar: Aldershot).
- . 1994. 'Optimisation and evolution: Winter's critique of Friedman revisited', *Cambridge Journal of Economics*, 18: 413.
- . 1998. 'The approach of institutional economics', *Journal of Economic Literature*, 36: 166-93.
- . 1999. *Evolution and institutions: on evolutionary economics and the evolution of economics* (Edward Elgar: Cheltenham).
- . 2000. 'From micro to macro: the concept of emergence and the role of institutions.' in L. Burlamaqui, A.C. Caastro and H.-J. Chang (eds.), *Institutions and the Role of the State* (Edward Elgar: Cheltenham).

- . 2001. *How economics forgot history: the problem of historical specificity in social science* (Routledge: New York).
- . 2004. *The evolution of institutional economics: agency, structure, and Darwinism in American institutionalism* (Routledge: New York).
- . 2006a. *Economics in the shadows of Darwin and Marx: essays on institutional and evolutionary themes* (Edward Elgar: Cheltenham).
- . 2006b. 'Why We Need a Generalized Darwinism: and Why a Generalized Darwinism is Not Enough', *Journal of Economic Behavior and Organization*, 61: 1-19.
- . 2008. 'How Veblen Generalized Darwin', *Journal of Economic Issues*, 42: 399-406.
- . 2010. 'Choice, habit and evolution', *Journal of Evolutionary Economics*, 20: 1-18.
- Hodgson, Geoffrey M, and Thorbjørn Knudsen. 2010. *Darwin's Conjecture The Search for General Principles of Social and Economic Evolution* (The University of Chicago Press: Chicago).
- Hrdy, Sarah Blaffer. 1999. *Mother nature: a history of mothers, infants, and natural selection* (Pantheon Books: New York).
- James, William. 1950. *The principles of psychology* (Cosimo: New York).
- Jennings, Ann. 1999. 'Instincts.' in Phillip Anthony O'Hara (ed.), *Encyclopedia of political economy* (Routledge: New York).
- Kalecki, Michal 1937. 'A Theory of the Business Cycle', *Review of Economic Studies*, 4: 77-97.
- Keynes, John Maynard. 1936. *The general theory of employment, interest and money* (Macmillan: London).
- Kim, J. . 1999. 'Making sense of emergence', *Philosophical Studies*, 95: 3-36.
- King, J. E. 2012. *The Microfoundations Delusion: Metaphor and Dogma in the History of Macroeconomics* (Edward Elgar: Cheltenham).
- Klein, Naomi. 2007. *The shock doctrine: the rise of disaster capitalism* (Allen Lane: Camberwell).
- Knight, Frank Hyneman. 1921. *Risk, uncertainty and profit* (Hart, Schaffner & Marx: Boston).
- Krugman, Paul R. 1997. 'New-Age Market Theory is Bio-Babble: Pseudo-Economics Meets Pseudo Evolution', *Ottawa Citizen*.
- Lally, P., van Jaarsveld, C.H.M., Potts, H.W.W. & Wardle, J. . 2009. 'How are habits formed: Modelling habit formation in the real world', *European Journal of Social Psychology*, 40: 998-1009.
- Mandler, Michael. 1999. *Dilemmas in Economic Theory: Persisting Foundational Problems of Microeconomics* (Oxford University Press: Oxford).
- Myrdal, Gunnar. 1976. 'Crises and cycles in the development of economics.' in E. L. Wheelwright and F. J. B. Stilwell (eds.), *Readings in Political Economy* (Australia and New Zealand Book Company: Sydney).
- Neale, Walter C. 1993. 'Institutions.' in Geoffrey Martin Hodgson, Warren J. Samuels and Marc R. Tool (eds.), *Elgar companion to institutional and evolutionary economics* (Edward Elgar: Aldershot).
- Nelson, Richard R. 1993. 'Theory of the Firm (2).' in, *The Elgar Companion to Institutional and Evolutionary Economics* (Edward Elgar: Aldershot).
- . 1995. 'Recent evolutionary theorizing about economic change', *Journal of Economic Literature*, March.
- . 2003. "Physical and social technologies and their evolution." In. Piazza Martiri della Liberta: Sant'Anna School of Advanced Studies.
- Nelson, Richard R., and Sidney G. Winter. 1982. *An evolutionary theory of economic change* (Belknap Press of Harvard University Press: Cambridge, MA).

- North, Douglass Cecil. 2005. *Understanding the process of economic change* (Princeton University Press: Princeton).
- O'Hara, Phillip Anthony. 2000. *Marx, Veblen, and contemporary institutional political economy : principles and unstable dynamics of capitalism* (Edward Elgar: Cheltenham).
- . 2002. 'The contemporary relevance of Thorstein Veblen's institutional-evolutionary political economy', *History of Economics Review*, 35: 78-103.
- Pierce, Charles Sanders. 1878. 'How to Make Our Ideas Clear', *Popular Science Monthly*, 12.
- Potts, Jason. 2007. 'Clarence Ayers Memorial Lecture', *Journal of Economic Issues*, 41: 341-50.
- Robertson, David. 1993. *The Penguin dictionary of politics* (Penguin: London).
- Rothschild, Kurt W. 1971. *Power in economics: selected readings* (Penguin: Harmondsworth).
- Round, David K. , and Martin P. Shanahan. 2010. 'The Economics Degree in Australia: Down but Not Out?', *The Journal of Economic Education*, 41: 425-35.
- Samuels, Warren J, and Marc R Tool. 1988. *The economy as a system of power* (Transaction Books: New Brunswick).
- Schmid, A. Allan. 1999. 'Circular and cumulative causation.' in Phillip Anthony O'Hara (ed.), *Encyclopedia of political economy* (Routledge: New York).
- Searle, John R. 2005. 'What is an institution?', *Journal of Institutional Economics*, 1: 1-22.
- Simon, Herbert Alexander. 1957. *Models of man: social and rational - mathematical essays on rational human behavior in a social setting* (Wiley: New York).
- Steinmo, Sven. 2008. 'Historical Institutionalism ' in Donatella Della Porta and Michael Keating (eds.), *Approaches and methodologies in the social sciences: a pluralist perspective* (Cambridge University Press: Cambridge, UK).
- Stilwell, Frank J. B. 2011. *Political economy: the contest of economic ideas* (Oxford University Press: South Melbourne).
- Stinchcombe, Arthur L. 1965. 'Handbook of organizations.' in James G. March and Dorwin Cartwright (eds.), *Rand McNally sociology series* (Rand McNally: Chicago).
- Stretton, Hugh. 1969. *The political sciences: general principles of selection in social science and history* (Basic Books: New York).
- . 1999. *Economics: a new introduction* (UNSW Press: Sydney).
- Veblen, Thorstein. 1898. 'Why is Economics Not an Evolutionary Science?', *Quarterly Journal of Economics*, 12: 373-97.
- Vromen, Jack J. 2004. 'Taking evolution seriously: what difference does it make for economics?' in J. B. Davis and A. Marciano (eds.), *The Elgar Companion to Economics and Philosophy* (Edward Elgar: Northampton).
- Witt, Ulrich. 2008. 'What is specific about evolutionary economics?', *Journal of Evolutionary Economics*, 18: 547-75.