

Publisher policy allows this work to be made available in this repository. Published in *Elgar Companion to Adam Smith* (ed. by JT Young), copyright Edward Elgar Publishing. The original publication is available at: http://www.e-elgar.com/bookentry_main.lasso?id=3586

The only uses of this work permitted are private study or research.

5 Smith's philosophy and economic methodology

Sheila C. Dow

Introduction

Adam Smith is a towering figure in the history of economic thought. While he was by no means the first to develop many of the ideas which underpinned the development of modern economics, nevertheless it is often the case that earlier thinkers are discussed in terms of the extent to which they anticipated Smith, or more directly influenced him. While others, such as Quesnay and Hutcheson, for example, developed ideas on the functioning of the macroeconomy and value respectively, there was something distinctive about the way in which Smith put his ideas together and communicated them which made such an impact on the development of economics. The purpose of this contribution is to put the focus on Smith's distinctive approach to economic methodology.

Just as Smith developed others' economic ideas, his methodology too has its own history. Smith's philosophical background, notably the Scottish Enlightenment and the work of his friend David Hume, is something I will explore first in order to understand the basis of his methodology. I will draw on his essay on the 'History of Astronomy' (Smith, 1795; hereafter HA), his *Lectures on Rhetoric and Belles Lettres* (Smith, 1762–63; hereafter LRBL) and the *Theory of Moral Sentiments* (Smith, 1759; hereafter TMS), for evidence of the philosophical background on which Smith drew. I will then consider three particular aspects of his methodology which arise from this philosophy: the analytical historical approach; the notion of system; and the nature and role of principles.

The nature of Smith's influence on the development of modern economics has been coloured by the ways in which his work has been interpreted. In particular, Smith has been widely seen as the inspiration for general equilibrium theory (Arrow and Hahn, 1971), an interpretation which has increasingly been challenged (for example by Winch, 1997). The possibility is explored in the concluding section that a significant element of such interpretive differences is methodological, including a lack of appreciation for the distinction between theory formulation and rhetoric.

Before I proceed, there is a reflexive need to be explicit about the interpretive approach being adopted in this chapter. The analysis of Smith's methodology owes much to the seminal work of Andrew Skinner (notably 1965, 1972, 1996). The particular historiographic approach that I adopt, further, is consistent with the Scottish historical approach. It has been developed most fully in modern discourse by Quentin Skinner (1969, 1988), who advocates a focus on the context of the author, and the author's intentions within that context. Thus the exploration of Smith's philosophical background is seen as a way of understanding why Smith approached his economic enquiries in the way that he did, as well as to understanding his methodology. It is to this exploration that I now turn.

Philosophical underpinnings

Smith's philosophical background in the Scottish Enlightenment is the subject of a vast literature (see most recently Broadie, ed., 2003). Here I attempt only to draw out those

features which seem to be of greatest relevance to Smith's methodology: those which influenced Smith's understanding of science, and those which influenced the emerging character of economics as a moral science. The influence of his mentors Francis Hutcheson and David Hume is evident throughout.

Scottish Enlightenment philosophy was the outcome of a range of influences within a particular context. Scotland's political distance from England until the Union of Parliaments in 1707 had encouraged strong connections with continental Europe. This had in turn encouraged the introduction of ideas from the Continent, both formally as a result of attendance at universities (such as Paris and Leiden), and informally, as a result of the convention of the European Tour.

But the blend of influences emerged as a distinctive philosophy in Scotland. This can be understood partly as a response to the needs of a small, relatively cohesive, society in the process of commercialization, grappling with the practical problems posed by new opportunities for economic development. In particular the union with England and the opening up of new territories in Central and North America created new trading opportunities, and thus a spur to capitalize on Scottish inventiveness. But in addition, the union with England posed challenges to the idea of Scottish nationhood and the involvement of Scottish thinkers in politics. Finally, there was an ongoing struggle for supremacy between Catholicism and Presbyterianism, which further raised issues of authority. Overall this context meant that practical issues were to the fore, and these were addressed with a perspective which had naturally absorbed a sense of 'otherness'; it was impossible for example, in adapting to the new political arrangements with England, not to be conscious that there was more than one perspective to be brought to issues, each of which could claim legitimacy. This was to foster a distinctive attitude to what was possible for science in terms of discovering truth.

Hume (1739–40 [1978]) took on the challenge addressed by the French Enlightenment of building a complete philosophy founded on reason. But he concluded that this was impossible without some proof of existence. While there were differences between Hume and the commonsense philosophy of Thomas Reid (1785 [1969]), both placed importance on belief derived from experience. For Reid, common sense was taken to mean something more than simply what is commonly known. It involved rather the argument that the mind brings an additional capacity to observation than the five senses. For Hume, belief in existence was a prerequisite for all knowledge, in particular being prior to reason. A theory of human nature was thus the foundation on which knowledge was to be built. He drew on natural law philosophy to identify belief (and conventions, including morals, more generally) as the outcome of a historical process. Common sense was thus to prove a key element of his philosophy, and in turn for Smith (Comim, 2006).

Hume's epistemology thus derived from his theory of human nature, with his emphasis on the human faculties of sentiment (or passion) and imagination, and their product, sympathy. These are required as the basis for building knowledge, together with experience; only then could reason be applied. The subject matter of science is too complex for us to be able to identify real causal mechanisms. But we have a starting point in that detailed observation of constant conjunctions of events gives us (through our imaginations) the idea of cause. We then bring this idea to our further observation, in order to begin to hypothesize about causation. These ideas are evident in Smith's study of the science of astronomy in HA, where he analyses the motivation for science ('philosophy')

in terms of identifying a system for connecting the chains of events which we observe: 'Who wonders at the machinery of the opera-house who has once been admitted behind the scenes? In the Wonders of nature, however, it rarely happens that we can discover so clearly this connecting chain' (HA II.9).

Since we cannot directly access the underlying causal powers, no hypothesis about the real world can be demonstrated to be true. It followed that science could not be an exercise in uncovering truth in any absolute sense. Nevertheless practical (provisional) knowledge is possible, and indeed is necessary when addressing the practical problems of a nation facing new challenges and opportunities. There is scope for argument as to whether some knowledge is more or less true, but no mechanism for settling on an absolute judgement on the matter.

According to Smith, the motivation for the development of new knowledge itself arises from human nature. A sense of unease ('surprise' and 'wonder') is created by experience which is in discord with accepted knowledge. The mind becomes accustomed to particular conjunctions and is surprised when one event is not accompanied, as expected, by another. Drawing on his theory of human nature, and in particular the power of the imagination, Smith (HA) argues that what is being sought is the tranquility of mind which comes from a system of thought which incorporates the new, disturbing, experience in a satisfactory manner, where what is satisfactory may be determined by aesthetic judgement as much as by reason and experience. When the conjunction of two events which has caused a sense of unease is connected by a chain of imaginary intermediate events, then the mind is set at rest.

It is important that these intermediate events are grasped by means of the imagination. Thus the concept of gravity may satisfy our psychological needs and appeal to our imaginations, but this does not make it 'true' in any absolute sense. Further, the new explanation must be plausible; thus, for example, the notion of planetary motion applied to the earth was initially regarded as implausible until an explanation was offered which connected with experience, such as Descartes's theory of fluxion (even though it would later be displaced as a satisfactory explanation). Also, what is plausible to one may not be plausible to another. Smith contrasts the wonder experienced by an outside observer of an artisan's work, on the one hand, with the easy familiarity with a sequence of events which seems 'natural' to the artisan himself, on the other (HA II.11). Further, the scientist may be attracted more than others to novel explanations. In discussing Copernicus's reluctance to put forward his new ideas, Smith refers to 'that love of paradox, so natural to the learned, and that pleasure, which they are so apt to take in exciting, by the novelty of their supposed discoveries' (HA IV.34). This is contrasted with the 'natural prejudices of sense, confirmed by education' which Copernicus would have feared from his audience (HA IV.35).

What ultimately persuades others that a new theory is satisfactory is a matter of rhetoric; if theories could not be demonstrated to be true, then some other criteria must be applied (LRBL). Smith discussed rhetoric as an exercise in persuasion, as one of the methods of discourse. Again his approach was psychological; persuasion required that an argument be tailored to the audience, and make some connection with what was already taken as known. Further, Smith noted that attention to aesthetic criteria, such as elegance and simplicity, as well as the portrayal of a system, might persuade regardless of other criteria for accepting an argument (Comim, 2006). While, as we shall see further

below, Smith did not share Descartes's deductivist methodology for formulating theory, he could nevertheless understand the psychological appeal of his work.

It gives us a pleasure to see the phaenomena which we reckoned the most unaccountable as deduced from some principle (commonly a wellknown one) and all united in one chain . . . We need not be surprised then that the Cartesian Philosophy . . . tho it does not perhaps contain a word of truth . . . should nevertheless have been so universally received by all the Learned in Europe at that time. The Great Superiority of the method over that of Aristotle . . . made them greedily receive a work which we justly esteem one of the- most entertaining Romances that has ever been wrote. (LRBL, p. 146)

Smith recognizes further that consciousness of the psychological, more than rational, basis for accepting or rejecting theories does not protect the philosopher from his own psychology:

[E]ven we, while we have been endeavouring to represent all philosophical systems as mere inventions of the imagination, to connect together the otherwise disjointed and discordant phaenomena of nature, have insensibly been drawn in, to make use of language expressing the connecting principles of this one, as if they were the *real* chains which Nature makes use of to bind together her several operations. (HA IV.76, emphasis added)

Indeed, even within a discussion of the appeal of theories to the imagination, Smith had earlier implied that the Newtonian explanation for planetary motion had uncovered the 'real' causal mechanism: 'Thus the eclipses of the sun and moon, which once, more than all the other appearances of the heavens, excited the terror and amazement of mankind, seem now no longer to be wonderful, since the connecting chain has been found out which joins them to the ordinary course of things' (HA II.10).

This self-awareness on the part of Smith with respect to the central role of the imagination, and thus of psychology, in the rhetorical power of theoretical explanation is important for our understanding of Smith's later exposition of his economic ideas. It is even more important for the way in which they have been interpreted. I will develop below more fully the argument that an understanding of the role of rhetoric is critical to our understanding of Smith's methodology with respect to systems and the role of principles. It is important to consider separately the psychology of the philosopher, the method of building knowledge, and the psychology of the philosopher's audience.

Finally, Smith's major work in moral philosophy, TMS, offered a fuller expression of his theory of human nature, showing the influence of Hutcheson (Skinner, 2006). It was here that some germs of Smith's ideas on economics were first aired in print. Here he discussed the individual's self-interest in the context of society, and specifically the concept of sympathy (which he drew from Hume) as the mechanism by which society constrains individual behaviour. Here we see the roots of economic questions being pursued by the building up of a moral science (see further Young, 1997).

Further, just as the scientist does not have access to truth, neither does man in general (indeed Smith makes a point of arguing in HA that there is no fundamental difference, other than inclination and subsequent specialization, between the philosopher and others). Indeed man is capable of self-deception as to the consequences of his actions. Smith illustrates the point by discussing 'the poor man's son, whom heaven in its anger has visited with ambition' (TMS IV.1.8). Here we have an example of the workings of

the invisible hand, a theme much more clearly evident in TMS than in WN. The invisible hand is a metaphor to capture the unintended consequences of human action, given the human incapacity to anticipate these consequences correctly. As Heilbroner (1986, p. 60) puts it: 'The Deity, when he created the world, gave to humankind a surer guide than reason. This was the call of its passions.' While the poor man's son is deceived in thinking that riches are the basis for happiness, his efforts to amass riches have the fortunate externality of generating growth in the economy. The faculty of imagination and the sentiment of the pursuit of happiness, combined with the human incapacity to know the future, can in turn provide a reasonable psychological explanation for self-deception. Thus Smith shows the limited role of the faculty of reason in an explanation of human behaviour, just as he (and Hume) showed the limitations to its role in science.

It is against this background of Smith's philosophy that I turn now to consider how this translated into the way in which he analysed economic questions.

Methodology

Analytical history

The way in which philosophy and science were used in Scottish society reflected both the nature of practical concerns and the nature of the education system (which undoubtedly were not independent factors). Students entered higher education in their early teens (Smith was 14 when he entered the University of Glasgow; Hume had entered university at age ten), and were exposed early to moral philosophy, which then provided a common background to the pursuit of all other subjects. Further, these subjects were approached from a historical perspective (Davie, 1961). Thus, for example, rather than learning only one mathematical system, students learned about a range of approaches to mathematics adopted over history.

This conventional historical perspective in Scottish education is thus clearly a reflection of the same philosophical background that I discussed above as providing a foundation for Smith's views on science and rhetoric. Knowledge was seen as being built using approaches which are psychologically appealing (in the light of prior conventional knowledge and experience), and no one approach could be demonstrated to be superior to others in any absolute sense. Further, the standards of judgement were relative to context. Thus it was important to be aware of a range of possibilities in order to form a view as to which was preferable in a particular context. (Indeed it can be argued that it was this which fostered the remarkable inventiveness of the period.)

This historically contingent approach to scientific knowledge is most evident in Smith's (HA) account of evolving ideas on astronomy. He discusses the growing search for scientific explanation rather than superstition (or reference to the actions of 'invisible beings') as society evolves beyond subsistence and with more order and security (HA III.3). What constitutes a satisfactory scientific explanation then itself evolves. In considering the sequence of ideas on astronomy, Smith discusses what we would now refer to as 'paradigm shifts' in the understanding of the physical workings of the universe, with an awareness of the context in which each understanding was sustained. In this historical account we find many of Smith's methodological views (especially about system, and the role of principles) made explicit, which I will explore further in the following two sections.

Against this background, it was therefore not surprising that Smith's approach to economics should also be historical, drawing on a massive range of examples from different times and places. The Scottish approach to science is often labelled 'empiricist' in direct contrast to French 'idealism'. But this is misleading, not least because of the commonsense view that additional capacities of the mind, drawing on past experience, are brought to observation. But more important, rather than being seen as mutually exclusive, in the Scottish approach, observation and analysis were complementary. Here we see the profound influence of Newton's experimental philosophy on the Scottish approach to science. Newton's experimental methodology was to combine analysis and synthesis: 'analysis consists in making Experiments and Observations, and in drawing general Conclusions from them by Induction . . . Synthesis consists in assuming the Causes discover'd, and establish'd as Principles, and by them explaining the Phaenomena proceeding from them' (Newton, 1979 [1704], pp. 404–5). Newton's scientific method of analysis and synthesis was first fully absorbed, applied and promoted in Scotland, notably by MacLaurin (1748). This method combined induction and deduction within one epistemological system, both being essential elements. It is notable that, in contrast to its ready reception in Scotland, Newton's philosophy of science was not well received in France, with its deductivist Cartesian tradition. As Montes (2006, p. 114) puts it: 'On the role of mathematics, the Scottish tradition interpreted Newton's underlying idea that mathematics is an instrument to describe nature, not a model of reality.'

This combination of induction and deduction is particularly evident in the Scottish Historical approach taken to history itself, which has been characterized as 'analytical history' (Skinner 1965). Historical facts themselves were organized in such a way as to aid analysis. Thus patterns emerging from detailed historical analysis would provide structure for future investigations, which in turn would suggest modifications to theory. Specifically, historical experience was organized into historical stages (the 'stadial approach'). This was of particular relevance to the development of an analysis of economic organization and behaviour at a time of tremendous change, notably in commercialization and the mode of production addressed to expanding markets. Smith first discussed the four historical stages in the *Lectures on Jurisprudence* (1762–63, 1766) (see further Skinner 1996, Chapter 4), identifying a different mode of economic organization (and mode of production) within each of the four stages: hunting, pasturage, farming and commerce. By understanding how these stages played out in different contexts (of time and place), Smith was able to infer some causal mechanisms at work in the development of civil society. Thus, the origins of property and authority are found in the first two stages, and the connection between economic organization and the changing nature of subordination are found in the third and fourth stages. Further, the progression through the stages was seen as a natural process. The fourth stage represented progress in the sense that natural liberty, which had been jeopardized in earlier stages, was regained with commercialization. But that development could still be eroded by the encroachment of government, and by the alienation brought on by the increasing specialization of work practices, with the progressive division of labour.

While Montesquieu was an important influence on the emphasis placed on historical evidence, it was in Scotland, and with Smith in particular, that history was used as a means of identifying causes (Skinner, 1965). On the basis of natural law philosophy and his theory of human nature, Smith drew these causal mechanisms out from actual

historical experience. ‘Natural history must concern itself with the problem of change in those conditions within which the constant principles of human nature operate’ (Skinner, 1965, p. 5). Change in turn was the unintended consequence of human action. This contrasted with the rationalist approach associated with Hobbes and Locke, whereby civil society was seen as developing as the result of the imposition of rational principles. Indeed Smith’s view was that the standards of judgement applied to analysis of historical episodes were relative to perspective, not the outcome of some process of pure reason.

The historical approach thus also influenced the way in which economic theories themselves were regarded, having been drawn from analysis of history. Theory itself was understood historically, as being developed in particular contexts to suit particular purposes. How far a theory was accepted depended on what appealed to the audience of the time, in particular what seemed both plausible and aesthetically appealing. Thus there was no expectation of identifying one theory which was ‘best’ in any absolute sense, but rather one which was more persuasive than others in a particular context. Reality was too complex to be sure of identifying ‘true’ causal powers.

But, further, changing circumstances often require changing theory. Thus for example, while Smith’s analysis of market behaviour was expressed in terms of competitive markets, he did warn of the possibilities of processes which would limit competition – the tendency for self-interested producers to combine (WN I.viii.13). Indeed increasing returns would inevitably threaten the competitiveness of markets. Similarly, both Hume and Smith struggled to provide coherent accounts of the evolving systems of money and banking. Both found it difficult to accept the rise in importance of inside money (bank notes) relative to outside money (specie) which went along with the rapid (and generally highly successful) expansion of banking in Scotland in the eighteenth century. But they were not consistent on this, at times expressing appreciation for the positive role of paper money, or the expansion of banking (see Murphy, 2006; Wennerlind, 2006). Hume in particular understood that the value attached to specie was in fact a sign of value, rather than purely intrinsic value. But we could look to a psychological explanation, to put alongside their expressed, reasoned explanations, for their anxieties about paper money. Hume and Smith’s own monetary theory was thus in a process of evolution in relation to a rapidly changing reality.

The notion of system

Implicit in the organization of historical evidence according to stages of history in Smith’s thought is the notion of system, that is, that there is some underlying regularity arising from human nature which can provide the basis for such organization. In line with natural law philosophy, this embodies the view that natural processes promote economic organization, and this organization can be understood as a system. And indeed it was the depiction of an economy as a system which marked out the greatness of Smith’s contribution, a point given great emphasis by Dugald Stewart. By providing a persuasive cohesive account of coordination in commercialized society, Smith was able to address any unease as to whether this relatively new system of economic organization was sustainable, just as Newton had addressed unease about the sustainability of the solar system. Smith in turn was a great admirer of Quesnay’s system (Skinner, 1996, Chapter 6).

Smith built up his theory of economic organization by means of connecting principles:

'Philosophy is the science of the connecting principles of nature' (HA 45). As Loasby (2003) points out, a system is defined not only by its connections, but also crucially by its lack of connections. While the market provides connections, the principle of the division of labour provides a crucial mechanism for limiting connections. Without some limitation on interconnectedness, a system cannot function (Potts, 2000). The division of labour segments sets of ideas, of production, and indeed of economic organization in general, so that they constitute systems. In Smith's terms, a theory is an 'imaginary machine':

Systems in many respects resemble machines. A machine is a little system, created to perform, as well as to connect together, in reality, those different movements and effects which the artist has occasion for. A system is an imaginary machine invented to connect together *in the fancy* those different movements and effects which are already in reality performed. (HA 19, emphasis added)

This was a metaphor which he used in a variety of contexts, as for example in discussing systems of moral approbation: 'Human society, when we contemplate it in a certain abstract and philosophical light, appears like a great, an immense machine, whose regular and harmonious movements produce a thousand agreeable effects' (TMS iii.1.2).

Smith wrote about the aesthetic appeal of systems in a variety of ways which suggest that he himself felt their profound psychological appeal at the level of ideas. For example when discussing the building up of natural philosophy in ancient times, he referred to '[t]he beauty of a systematical arrangement of different observations connected by a few common principles' (WN V.1.f). However we have seen above that he was aware of the dangers of seduction by aesthetic appeal, particularly of the type of formal, axiomatic, deductive system set out by Descartes. He warned particularly of treating intentional individual behaviour as being directed to market coordination, on grounds of aesthetic appeal of the theoretical system. He noted the tendency to ascribe causal power to human reason, when the consequences were in general unintended. 'We are very apt to imagine that to be the wisdom of man, which in reality is the wisdom of God . . . [T]he system of nature seems to be more simple and agreeable when all its different operations are in this manner deduced from a single principle' (TMS II.ii.3.5).

Others in the tradition of the Scottish Enlightenment too, such as Sir James Steuart, were wary of this phenomenon, which made deductive systems more persuasive. While also aiming to present a system, Steuart took care to emphasize the need to tailor theory to context; but inevitably the outcome is less aesthetically appealing as theory. Terence Hutchison (1988, p. 350) concluded that Steuart's stylistic faults were 'brought about by his intellectual virtues, and by his persistent resistance to oversimplification . . . It is easier to write clearly and engagingly when one has a simple system to expound.'

However aesthetics form only one element of persuasion. It is deductivist theory which appears to perform best on aesthetic grounds. But, particularly within a context where practical application (in such wide-ranging contexts as moral behaviour and mechanics) was seen as the purpose of knowledge, grounding in reality was also significant for persuasion. Thus, while Smith saw the aesthetic appeal of Descartes's purely abstract explanation for planetary motion, he found Newton's explanation more persuasive, based as it was on his experimental philosophy. Indeed Smith saw the persuasive role of grounding in reality more important for moral philosophy (including economic questions) than for natural philosophy. In his writing on rhetoric, Smith emphasized the persuasive

importance of connecting arguments to what is already accepted by the audience as knowledge. Persuasion required the explanation to be plausible to an audience who had direct experience of moral life (including commercial activity). It was less likely, by implication, that a purely abstract explanation of economic behaviour, however aesthetically appealing, would persuade an audience as readily as a purely abstract explanation of something of which the audience did not have direct experience.

Nevertheless, in weighing up aesthetics relative to grounding in experience, the persuasive power of a theoretical system would suffer if the system required ad hoc adjustments in order to maintain consistency with experience (Skinner, 1972). Where the prevailing theoretical system fails satisfactorily to explain new anomalies other than by ad hoc adjustment, there is a strong motivation to develop a new explanatory system. Here we find Smith anticipating Lakatos as well as Kuhn.

The nature and role of principles

How we understand Smith's notion of system depends in turn very much on how we understand the nature and role of principles, and here again we see the influence of Newton. Given Smith's explicit debt to Newton's methodology, Newton's principle of gravitation can be interpreted in the same way as Smith's principle of the division of labour, in relation to their respective systems. But how these systems in turn are interpreted depends on what is meant by a principle, and requires further exploration.

In the natural sciences literal experimentation is possible (in the sense of constructing a closed system for the purpose of isolating a causal mechanism). But for Smith (and Hume), experimentation took the form of historical observation of concrete episodes, out of which emerged principles which could then be considered for their explanatory power in other historical contexts. And both considered themselves as aiming to establish the 'unchanging principles' of human nature, which would provide the foundation of all knowledge. These principles refer to the human faculties, as Hume and Smith identified them: the passions, imagination (and thus sympathy), observation and reason. Thus, for example, Smith discussed 'the Principle of Self-approbation and of Self-disapprobation', such that sympathy meant that the reason for self-approbation accorded with the reason for our approval of others (TMS III.1).

In economics, the principle of the division of labour is the core on which his theoretical system is built. In accordance with the Newtonian methodology for formulating theory, this principle was the outcome of Smith's identification of a pattern from his detailed studies of history, and observation of economic life. In communicating this principle, like his principles of moral life, Smith (in accordance with his own principles of rhetoric) expressed them in terms of familiar examples, as well as using examples from history. The rhetorical power of the pin factory metaphor, with which Smith begins the *Wealth of Nations*, is attested to by the way in which it has stuck in the collective imagination. Later examples from older or remoter contexts served to illustrate the generality of the principle, often in intriguing ways.

Smith thus starts the exposition of his system with the principle. In Smith's own words:

in the manner of Sir Isaac Newton we may lay down certain principles known or proved in the beginning, from whence we count for the severall Phenomena, connecting all together by the same Chain. This latter which we may call the Newtonian method is undoubtedly the most

Philosophical, and in every science whether of Moralls or Natural Philosophy etc., is vastly more ingenious and for that reason more engaging than the other [Aristotle's]. (LRBL 145–6).

But if we take Smith's philosophy of science seriously, then we must take it that the principle of the division of labour is, like the principle of gravity, an appeal to the imagination rather than a 'real' phenomenon. For Newton, the principles on which the analysis is based were previously derived using the experimental method, and are thus provisional (Montes, 2006).

For Descartes, however, the principles on which analysis is based are axioms which, as in *cogito, ergo sum*, are arrived at through contemplation aided by classical logic. Because Descartes takes his axioms as true, the conclusions arrived at by applying deductive logic to the axioms were also true. Smith's principles of human nature were quite different. They were established by the 'experimental method', which involved detailed study of history. Further, for Smith, the principles appealed to the imagination as a way of explaining the diversity of human behaviour in different contexts in time and space. This diversity could be systematized according to the stages approach to history. Nevertheless, the emphasis was on the different forms which human behaviour can take, in spite of the unchanging principles of human nature. This approach is particularly understandable when we take account of Smith's social environment, where Highlanders could be classed as savages, and Scots were working alongside aboriginal peoples in North America.

Similarly the principle of the division of labour can be thought of as a way of organizing thought about causal powers at work in commercialized society. This is quite different from the role of an axiom in classical logic. We have seen that Smith was quite explicit that, while it is appealing to explain human behaviour in terms of deduction from one principle (referring only to human reason), this does not reflect the basis for human behaviour more in the passions than reason. While a rationalist account of society lends itself to a deductive axiomatic system, the more complex Scottish account of human behaviour, its determinants and its consequences, all referring to the particularities of the context in relation to the historical system, cannot be captured in a deductive system. In any case, the method of applying principles to new contexts might always lead to an evolution of theory, and thus a new mode of expression of the principles. Indeed, John Rae made exactly that argument in proposing that Smith's principle of the division of labour started too far along the causal chain. Rae argued instead that the division of labour followed from the human capacity for invention, so that that should provide the starting point (Mair, 2006).

The only common element, therefore, between the deductivist methodology of the French Enlightenment and the 'experimental' approach of the Scottish Enlightenment was that axioms in the first and principles in the second held a special place as the basis for deductive reasoning. There the similarity ended. While axioms are 'self-evidently true' by introspection, principles are derived from detailed observation. While the deduction of propositions from the axioms was the end of the matter for the deductivist approach, this was only one further step for the experimental approach, requiring also adaptation to the observed characteristics of the domain of application, with the possibility always of revision of principles. Smith's system ultimately was a mental construct designed for psychological appeal, but also for plausibility in the light of experience.

Nevertheless an experimental system might be expressed in an abstract form similar to a deductivist system (albeit communicated with a wealth of examples from history, of daily experience). Smith had noted the aesthetic appeal of an axiomatic system. But, as Skinner (1996, p. 21) has noted, Smith also distinguished between the formulation of theory (by the experimental method) and its communication (which started with principles), while the deductivist approach is the same in formulation as in communication, that is, by means of deductive logic.

It could be argued that this is an important factor in understanding later interpretations of Smith as inspiring general equilibrium theory. Smith's influence was so great because he offered such an appealing system, based on common principles of humanity. From a deductivist perspective, it was natural to confuse principles with axioms, and to confuse Smith's rhetorical system as being the sum total of his theory (rather than the outcome of application of the experimental method). This involved ignoring Smith's ideas on rhetoric, and the psychology of science, as well as the implications of his principles of human nature for how economic behaviour should be depicted. It is not uncommon for an idea developed within one methodology to inspire new developments within another methodology. Indeed this is evidence of exactly the kind of connecting principle which Smith himself had seen as the core of new knowledge. Nevertheless the outcome was very different from Smith's own system.

Conclusion

We have seen that Smith's methodology took much of its distinctiveness from the philosophy of the Scottish Enlightenment. Yet, in his hands, that philosophy allowed the building of a system of social science which was so masterful that Smith became commonly regarded as the father of economics. It was his capacity for analytical history which allowed him to build up a theory of human nature and apply that to formulate a theory of the social system. By attempting to explain the workings of commercial society in comparison with earlier stages, Smith's system provided an account of market behavior which drew on his understanding of human nature.

It is now conventional to note the disparity between Smith's system and references to it as the origin of general equilibrium theory. We have seen that this disparity can be understood in terms of the methodological differences between Smith's approach and the deductivism of general equilibrium theory. It has also proved important to be aware of Smith's distinction between the principles of discourse, where elegance and simplicity persuade, on the one hand, and the principles of scientific enquiry, on the other. Perhaps the way in which Smith's system was developed by others along deductivist lines can be understood partly as the result of later economists not taking this distinction on board. But this was just one consequence of discounting the significance of Smith's alternative methodology. That methodology in turn was founded on his theory of human nature, and its consequences both for economic theorizing and for the behaviour of economic agents. Consistent with that theory, the effect of Smith's ideas was unlikely to be what he had intended. As Hutchison (1988, p. 355) has noted, the unintended consequence of Smith's work was to establish political economy 'as a separate autonomous discipline'.

References

- Arrow, K. and F.H. Hahn (1971), *General Competitive Analysis*, Edinburgh: Oliver & Boyd.
- Broadie, A. (ed.) (2003), *The Cambridge Companion to the Scottish Enlightenment*, Cambridge: Cambridge University Press.
- Comim, F. (2006), 'Adam Smith: common sense and aesthetics in the age of experiments', in A. Dow and S. Dow (eds), *A History of Scottish Economic Thought*, London: Routledge, pp. 123–45.
- Davie, G. (1961), *The Democratic Intellect*, Edinburgh: Edinburgh University Press.
- Heilbroner, R.L. (1986), *The Essential Adam Smith*, Oxford: Oxford University Press.
- Hume, D. (1739–40), *A Treatise of Human Nature*, K.A. Selby-Bigge and P.H. Nedditch (eds) (1978), 2nd edn, Oxford: Clarendon.
- Hutchison, T. (1988), *Before Adam Smith*, Oxford: Basil Blackwell.
- Loasby, B.J. (2003), 'Closed models and open system', *Journal of Economic Methodology*, **10** (3), 285–306.
- MacLaurin, C. (1748), *An Account of Sir Isaac Newton's Philosophical Discoveries*, London: Printed for A. Millar.
- Mair, D. (2006), 'John Rae', in A. Dow and S. Dow (eds), *A History of Scottish Economic Thought*, London: Routledge, pp. 198–212.
- Montes, L. (2006), 'Adam Smith: real Newtonian', in A. Dow and S. Dow (eds), *A History of Scottish Economic Thought*, London: Routledge, pp. 102–22.
- Murphy, A. (2006), 'John Law', in A. Dow and S. Dow (eds), *A History of Scottish Economic Thought*, London: Routledge, pp. 9–26.
- Newton, Sir I. (1979 [1704]), *Opticks: or, a Treatise of the Reflections, Refractions, Inflections and Colours of Light*, London: William Innys.
- Potts, J. (2000), *The New Evolutionary Microeconomics*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Reid, T. (1969 [1785]), *Essays on the Intellectual Powers of Man*, B.A. Brody (ed.) (1969), Cambridge, MA: MIT Press.
- Skinner, A.S. (1965), 'Economics and history: the Scottish enlightenment', *Scottish Journal of Political Economy*, **12** (1), 1–22.
- Skinner, A.S. (1972), 'Adam Smith: philosophy and science', *Scottish Journal of Political Economy*, **19** (3), 307–19.
- Skinner, A.S. (1996), *A System of Social Science: Papers Relating to Adam Smith*, Oxford: Clarendon.
- Skinner, A.S. (2006), 'Francis Hutcheson, 1694–1746', in A. Dow and S. Dow (eds), *A History of Scottish Economic Thought*, London: Routledge, pp. 27–45.
- Skinner, Q. (1969), 'Meaning and understanding in the history of ideas', *History and Theory*, **8**, 3–53.
- Skinner, Q. (1988), 'A reply to my critics', in J. Tully (ed.), *Meaning and Context: Quentin Skinner and his Critics*, Oxford: Oxford University Press, pp. 231–58.
- Smith, A. (1759), *The Theory of Moral Sentiments*, Glasgow edition, D.D. Raphael and A. Macfie (eds) (1976), Oxford: Oxford University Press (TMS).
- Smith, A. (1762–63), *Lectures on Rhetoric and Belles Lettres*, J.C. Bryce (ed.) (1983), Oxford: Oxford University Press (LRBL).
- Smith, A. (1762–3, 1766), *Lectures on Jurisprudence*, R.L. Meek, D.D. Raphael and P.G. Stein (eds) (1978), Oxford: Oxford University Press (LJ).
- Smith, A. (1776), *An Inquiry into the Nature and Causes of the Wealth of Nations*, R.H. Campbell and A.S. Skinner (eds.) (1976), Oxford: Oxford University Press (WN).
- Smith, A. (1795), 'The history of astronomy', in W.L.D. Wightman (ed.) (1980), *Essays on Philosophical Subjects*, Oxford: Oxford University Press (HA).
- Wennerlind, C. (2006), 'David Hume as a political economist', in A. Dow and S. Dow (eds), *A History of Scottish Economic Thought*, London: Routledge, pp. 46–70.
- Winch, D. (1997), 'Adam Smith's problem and ours', *Scottish Journal of Political Economy*, **44** (4), 384–402.
- Young, J.T. (1997), *Economics as a Moral Science: The Political Economy of Adam Smith*, Cheltenham, UK and Lyme, NH, USA: Edward Elgar.