

**Foundations in economic methodologies: The use of mathematics by mainstream  
economics and its methodology by Austrian economics**

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## Introduction

The implicit goal of mainstream methodology<sup>1</sup> is to measure and determine the relations between economic variables. Such a goal presupposes the existence of at least some constant variables making measurement and calculation possible.<sup>2</sup> It is believed that the achievability of this goal is only circumscribed by the bewildering number of affecting factors of economic activity rendering laboratory type experimentation in economics infeasible.<sup>3</sup> If experimentation was possible, it is believed that economics would be as practical and as successful as the natural sciences have been for the advancement of technology. This belief sustains mainstream methodology.

The implicit goal of Austrian methodology is the derivation of exact or universal laws of human action independent of time and place. Measurability and the existence of constant variables are denied. Money, prices, profit and loss all arise as a result of the human mind and would not exist without it. Prices are not *measured* in terms of money; prices are *expressed* in terms of money (Mises 1977). Purposeful behaviour involves attributing meaning to reality. Purposeful behaviour also has the power to lift man above biological and natural necessities. Man is capable of interfering with the course of nature, of adjusting his behaviour to greater advantage than can be achieved by means of co-operation and the division of labour. Even though man also has animal instincts, is also influenced by the environment and is thus also subject to the cause of his psychological dispositions, human consciousness places him in the unique position of being able to order and control his dispositions and shape his destiny.

This paper describes how the content of the objects of reality is shaped or unpacked and used in very different ways by the two methodologies. In the mainstream paradigm the objects of reality are essentially shaped into a form amenable to quantitative analysis, thereby trying to establish their measurable content whether real or in abstract terms. *Order* – “the very process of sorting out and

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<sup>1</sup> For the purposes of this paper, mainstream methodology is defined as the scientific empirical method based on positivism as encountered in economics textbooks and generally taught at universities.

<sup>2</sup> For example, to solve for a set of simultaneous equations requires a minimum number of exogenous variables, without which a solution would not be possible. In the natural sciences fixed relations of measure exist, such as the expansion of mercury in a thermometer or water always boiling at 100 degrees Celsius at sea level. In fact it is these fixed points of events (boiling and freezing in the case of water) that have been used to define measure. There are no such known constants in economics. For example, Solow growth models based on Cobb-Douglas production functions cannot account for differences in per capita capital and income over time or countries within any small margin of error or probability so as to prove useful for applications as in the natural sciences.

<sup>3</sup> Where experiments have been made, such as in behavioural economics, the results reveal explanatory power, but little quantitative or predictive power, as the results are time and place dependent (unlike natural science experiments which have far broader applications because of time and place independence).

analysing facts [involving the] simplification and removal of clutter” (McConnell and Brue 1995, p 8) – *is imposed on reality by the investigator.*

In the Austrian paradigm, the material content of the objects of reality is distinguished from the form of their relations in the context of purposive action. Only in this way is it possible to arrive at a general theory of human action that is independent of time and place and hence value-free and non-normative. *Order* – the attribution of meanings to phenomena such as money, capital, profit and loss, etc. as well as the subjective use values of material objects – *is imposed on reality by economic agents and is then to be found within reality by the investigator.* The removal of clutter involves isolating the material content of ends, which are time and place dependent in order to arrive at universal laws, which are related to means.

This way of removing clutter is fundamentally different to the omission of irrelevant variables in the construction of models by mainstream economists. By conflating action with the content of the related objects – such as the act of preference with the objects of preference further analysed in this paper – mainstream theory remains time and place bound. The conclusions of mainstream economics are therefore only ever ‘probable’ ones; that probability being based on past relationships continuing to hold or on guess estimates of future conditions. For this reason its theories are always subject to external conditions and therefore falsifiable. No attempt is and can in fact be made within the mainstream paradigm at the systematic derivation of universal truths.

The conclusions of Austrian economics are necessarily qualitative. However, the qualitative nature of Austrian economics differs from the probable or ad hoc time and place dependent kind one encounters under the scientific method of the mainstream paradigm. Qualitative conclusions are therefore less satisfying from a mainstream perspective. Whereas mainstream economics has therefore adopted the application of quantitative techniques as central to its exposition, Austrian theory has adopted the very *form* of mathematics or logic (to be understood in their pure a priori constructed forms) as central to its theory. Like mathematics and logic, the qualitative conclusions of Austrian economics represent exact laws that can be applied to reality.

Whereas there are many further aspects<sup>4</sup> that flesh out Austrian economics, this paper is only about the core structure of Austrian economics, as developed by the most prominent teachers of the Austrian school: Carl Menger and Ludwig von Mises<sup>5</sup>. The focus of this paper under the ‘Austrian methodological framework’ is therefore on praxeology.<sup>6</sup> This paper does not provide an extensive review of or build upon existing knowledge, whether of mainstream or Austrian literature, but attempts to unravel subtle distinctions and ways of interpreting at a rather basic and seemingly pedantic level in order to facilitate an understanding of the core methodological framework of Austrian economics.

This paper begins with a brief historical account of the development of scientific methods and how these arose, not as an evolution, but as a break in philosophical thought.

### **Brief history**

In his philosophy, Aristotle made a distinction between theoretical and practical reasoning. Theoretical reasoning dealt with positive laws regarding nature and formal logic. Practical reasoning, however, was more complex as it dealt with purposive choice, drawing certain distinctions between reason and will.<sup>7</sup> With this distinction Aristotle was able to establish the foundations for a theory of exact universal laws, i.e., laws independent of time and place for the social sciences. The Scholastics<sup>8</sup> of the Catholic Church adopted the philosophy of Aristotle and built upon these foundations.

A major break in philosophical thought can be seen to have occurred with the Reformation and the rise of mechanistic science corresponding with the period roughly between Copernicus in the 16<sup>th</sup> century and Newton. During this time science was defined by mechanical models that could provide explanations for all observable phenomena in terms of the size, shape and motion of physical

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<sup>4</sup> For example, the use of models in a purely abstract sense as mental constructs to aid understanding, such as Mises’ ‘evenly rotating economy’ for the determination of the nature of interest derived from time preferences. The use of such models is subsidiary to and does not enter praxeology as exogenous variables. Other aspects fleshed out by particular individuals include Hayek’s evolutionary theories of knowledge and the spontaneous order of society and Kirzner’s theories of entrepreneurial action.

<sup>5</sup> The most extensive development was carried out by Ludwig von Mises, who elaborated and extended the views of Carl Menger, the founder of the Austrian school.

<sup>6</sup> “The term praxeology was first used in 1890 by Espinas. Cf. his article “Les Origines de la technologies,” *Revue Philosophique*, XVth year, XXX, 114-115, and his book published in Paris in 1897, with the same title.” (Mises 1996, p 3). Praxeology defined as the general theory of human action is foundational to Austrian economics.

<sup>7</sup> Aristotle’s theory of practical reasoning (Kenny 1979) bears many resemblances to Mises’ science of human action and could be regarded as a forerunner to praxeology.

<sup>8</sup> Philosophical thought was monopolised by the Catholic Church up until the time of the Reformation.

particles. Regardless of whether a model was realistic or not, what counted was to shape reality into a mechanical form in an understandable way. The consequence of this paradigm was an obsession to develop mechanical models in all fields of enquiry in order to dispel superstitions. In the field of chemistry, for example, the operation of acid was to be accounted for by particles with dagger-like teeth that skewered particles composing metals and then carried them away. Descartes developed a mechanical model attempting to account for magnetic attraction, “in which the Earth and other magnetic bodies emitted streams of little screw-shaped particles, which, when they passed through the pores of any iron object, drew that object towards the magnet.” (Callahan 2005)

The arrival of Newton’s theory of gravitation, which did not meet the mechanical criteria for a proper scientific theory – as one body was somehow able to influence another body without any physical contact between the two – was widely derided by Cartesians as a return to the positing of ‘occult forces’ characteristic of the superstitious views of Renaissance naturalism.<sup>9</sup>

Callahan 2005 with regard to scientific methods concludes:

“Today, the prevailing belief is that any real science must be composed of mathematical models, models which yield quantitative predictions about some class of events based on particular, initial conditions, also specified numerically. Once again, the currently popular methodology has been imposed on diverse disciplines with little regard to whether it is suitable to their subject matter, but simply because it is thought to be the only respectable way to do science. The philosopher John Dupré calls this “scientific imperialism”, meaning “the tendency for a successful scientific idea to be applied far beyond its original home, and generally with decreasing success the more its application is expanded” ... Once again, we see a frantic effort to generate models fitting the accepted paradigm, with little regard for the realism of the assumptions and mechanisms from which they are constructed.” (Callahan 2005)

Anti-catholic sentiments of the Reformation<sup>10</sup> and the ridiculous position held by the Church in opposition to scientific progress led to the wholesale rejection of everything associated with the Church. This included the philosophy of Aristotle that formed the basis of Scholastic thought.

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<sup>9</sup> Newton attributed his mathematical advances to the revisiting of the works of ancient Greek geometers, and dismissed the recently developed Cartesian geometry as “the Analysis of the Bunglers in Mathematicks”. (Callahan 2005)

<sup>10</sup> This included persecution and violence of the Reformation as well as the Counter Reformation.

A new philosophy was thus redeveloped from first principles by ignoring Scholasticism and the ancient Greeks, one that was born out of the particular environment of the mechanistic age. In England, where the break with Catholicism and Latin (the language of the Scholastics) occurred relatively early and was most pronounced, philosophy developed along empirical lines by the English empiricists such as John Locke, Berkley, John Stuart Mill and David Hume amongst others. Oversimplifying for the purposes of this paper, the empiricists believed that all our knowledge begins with units of experience that Hume called impressions. Empiricism is thus based on a form of determinism, where everything we observe in reality has its source in sense-experience. On the basis of such 'impressionism', Hume developed his philosophy and ended up with his 'Problem of Induction'. He could not solve for the logical justification of the move from observed facts to laws. For example, "no amount of observation of white swans establishes that all swans are white (or the probability of finding a non-white swan is small)" (Corvi 1997, p 33). Yet we should know, for example, that the sum of the angles of a triangle are always and everywhere equal to 180 degrees. On the basis of 'impressionism', which essentially involves reference to common everyday observable experiences, the empiricists did not have a means of distinguishing between universal laws (independent of time and place) and how these related to the particular (the events we actually observe which are dependent on time and place). Hume attempted to account for this dilemma by explaining the existence of logical laws in terms of 'habit derived from experience' (Corvi 1992). Consequently the distinction between logic and causality or psychology became blurred. The failure to clearly distinguish between logical and psychological relations is what is referred to in the philosophical literature as psychologism and has been prevalent in many forms ever since.<sup>11</sup>

Vienna experienced an extreme reaction against the philosophy of the theologians much later than in England, between the 1860's and 1938. This reaction culminated in the logical positivism of Gustav Comte, who developed a philosophical system that rejected metaphysics and theism, recognizing only non-metaphysical facts and observable phenomena (Oxford dictionary 1995). This philosophy was further developed and debated by groups known as the Vienna Circle. The central principle of logical positivism was that all empirical statements about the world must be testable. If a statement cannot be tested, then it has no meaning. Consequently all necessarily true statements are vacuous and the existence of logically necessary truths is therefore to be dismissed as

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<sup>11</sup> Psychologism can also be defined as the doctrine whereby the principles of logic are reducible to the principles of psychology (Yates 2003, p 3). Husserl and Frege were two philosophers who attacked psychologism. Husserl writes: "...one should not confuse the *psychological* 'presuppositions' and 'bases' of the *knowledge* of a law, with the *logical* presuppositions, the grounds and premises, of that *law*: we should also, therefore, not confuse psychological dependence (e.g. dependence of origin) with logical demonstration and justification. The latter conforms to an insight into the objective relation of ground and consequence, whereas the former relates to mental links of coexistence and succession." (Husserl, 1913, p 108)

tautologies that cannot convey any new information about the world. After the German Anschluss of 1938, the Logical Positivists and those attending meetings of the Vienna Circle (including non Logical Positivists such as Karl Popper) were dispersed in educational institutions around the English-speaking world. Their philosophy was readily integrated with that of the empiricists as both philosophies implicitly shared the same basis: material determinism, i.e., that social phenomena will one day be capable of being explained by physiological and chemical processes effecting our behaviour and our actions and thus determinable solely on the basis of experience. Their influence at American universities was to reject Mises' praxeology as archaic and Scholastic (Gordon 1996).

Karl Popper, who can be regarded as having been most influential on mainstream economic methodology as it is practiced today, adapted the principle of verifiability of the Logical Positivists replacing it with his principle of 'falsifiability' serving as the distinction between science and non-science. Thus necessarily true statements such as the a priori statements of mathematics and logic are cast into the realm of non-science, leaving only falsifiable statements such as the hypotheses of economics within the realm of science. Praxeology, which adopts the same a priori 'non-verifiable' form as mathematics and logic, thus also becomes non-scientific.<sup>12</sup> Popper also maintained that verifying a model does not increase its chances of being true. No matter how many times a demand curve has been found to be sloping downwards and to the right, the probability that this statement is true has not gone up (Gordon 1996).

As testimony to the pervasiveness of ideas, the change in philosophy was also reflected in a change in common folk outlook. This can be illustrated by changes in the use and meaning of words and of particular relevance for the purposes of this paper: the word why.

In the interpretation of Aristotle's theory of practical reasoning, Kenny (1979) resuscitates an archaic word to help in the translation of Aristotle's accounts of purposive choice: the "wherefore". The relevant question in practical reasoning is not simply why (as translators under Humean<sup>13</sup> influence were apt to interpret Aristotle), but for what purpose: wherefore? "Why" is ambiguous because it can mean both from what cause and for what purpose.

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<sup>12</sup> Popper disclaims association with the Logical Positivists by stressing that his principle of falsification is a test for scientific statements and not as a criterion of meaning. (Gordon 1996)

<sup>13</sup> I shall refer to Humean perspective, with regard to positivism and empiricism, one which has implicitly adopted some form of exogenous assumption to Hume's Problem of Induction, one that overlooks the Aristotelian solution of the distinction between universals and essences. A Humean outlook tries to find a direct connection between the two and would consider a transcendent or animating (body soul) relationship as obfuscating. The exogenous assumption in Hume's case was psychology. For Popper it was a new demarcation between science and non-science.

From a historical perspective, I would conjecture that in the pre-mechanical age of superstitions and Catholic hegemony, where everything was to be interpreted as the result of some form of divine intervention, the “wherefore” must have been more in use than the causal reasons “why”. Only after the Reformation and with the rise of the mechanistic age, the “wherefore” was being driven out of circulation and replaced by the causal ‘why’. After the mechanical age, the psychological ‘why’ also became prevalent.

How different ones conclusions would be if instead of asking why for example did savings or house prices increase, one asked: wherefore did savings or house prices increase? The first question leads us down an empirical path of inference, the second a praxeological – requiring an intimate knowledge of causal processes further discussed in this paper.

A study of Aristotle still formed part of the core syllabus at educational institutions in Vienna when Carl Menger discovered marginal utility in 1871. In contrast to Menger, the two other independent founders of marginal utility, Jevons (1871) and Walras (1874), were educated at institutions where Aristotelian philosophy had long been discontinued, having been replaced by the new philosophy of the empiricists. Whereas Jevons adopted a hedonic approach, measuring utility in ‘utils’ of pleasure and Walras adopted the numeraire approach – both cardinal utility approaches, Menger adopted a strictly ordinal approach.

The adoption of the ordinal approach by later neoclassical economists could never quite rid itself of the implicit cardinal use made of utility functions or attempts by Lange and von Neumann and Morgenstern to cardinalise ordinal utility for interpersonal utility comparisons. Cardinalisation proves essential for the application of quantitative methods.<sup>14</sup>

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<sup>14</sup> The mainstream plays lip service to the fact that utility is ordinal, but by means of indexing implicitly adopts cardinal utility in its application to theory. For example, indexes of utility are derived from prices on the basis that  $MU1/MU2 = P1/P2$ . It is then maintained that a higher derived utility is merely expressive of a higher ranking (as opposed to adopting 1<sup>st</sup>, 2<sup>nd</sup>, etc for the MUs). But if this were true, then  $MU1/MU2 = 20/15$  is ‘ordinally’ equivalent to  $MU1/MU2 = 18/15$ ; but both ratios cannot be equated with a single cardinal ratio for  $P1/P2$ .

At higher levels of abstraction it is argued that the indexes of ordinal utility can be cardinalised. Lange tried to do this first by obtaining preferences not only of consumer bundles, but also of the movements between bundles. However, he was later to be proved wrong by Samuelson’s Revealed Preference Theory. From the Austrian perspective Samuelson conflates consistency with constancy in his transitivity assumption, which we shall see near the end of this paper is due to an ambiguous psychological conception of preferences. Later the Neumann-Morgenstern cardinal utility for interpersonal utility comparisons used in game theory was derived by the application of probability theory and the accounting of risk preferences. Willingness to pay for lottery tickets with different probabilities of different bundles containing an individual’s preferences are used to derive a cardinal measure of utility. Arrow finally proved all measures as problematic for welfare economics and the field has been in disarray ever since (Ross 1999).

## Conceptions of reality

Reality is interpreted in different ways by mainstream and Austrian economists. The mainstream generally sees reality in terms of complexity and comprehensiveness<sup>15</sup> of a multiplicity of effecting factors, influences and behaviours. A first year economics textbook by McConnell and Brue teaches its students:

“The full scope of economic reality is too complex and bewildering to be understood as a whole. Economists simplify – that is, develop theories and build models – to give meaning to an otherwise overwhelming and confusing maze of facts” (McConnell and Brue, 2005)

With the implicit belief that much of economic reality is in some way measurable, economic science becomes the quest for finding such measures. The main concern of mainstream economists becomes ‘correct’ model specification – the inclusion of all relevant variables and the exclusion of all irrelevant ones. At least all relevant variables must be measurable.

Mainstream economists therefore have a simple conception of a complex reality in contrast to the Austrian economists, who have a more complex conception of a relatively simpler reality comprised of essential natures or conceptual truths. Because humans attribute meaning to social phenomena, including subjective values placed on natural phenomena, reality is composed of composite objects with attributed meanings.

The following examples can be used to illustrate the nature of conceptual truths. Goods classified in conceptual terms comprise first order goods (consumer goods) and goods of higher orders (capital goods). The deeper the capital structure of an economy, the more orders of capital goods there will generally be and the further removed from final consumption they will be – both in time and in the chain of the production process. In physical terms the same good could be a consumption good or a capital good depending on its intended use. The value of capital goods is imputed from consumption goods and not the other way round, i.e., the labour theory of value of the classical economists is unfounded. Capital goods are by nature project and time specific, which renders substitution otherwise easily subsumed under a mathematical conception, problematic. One of the implications of the classification of capital goods into various orders is that changes in the money

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<sup>15</sup> As an example in ‘The methodology of positive economics’, Milton Friedman (1953) defends his use of unrealistic assumptions on the basis that to be realistic would imply taking into account all sorts of details such as the qualifications, place of birth and even hair color of individual traders on a commodities exchange.

rate of interest impact the structure of capital in an economy. A drop in interest rates generally leads to an increase in longer-term production, as projects at the margin for consideration become profitable at the lower discount rate. Should the interest rate be inconsistent with time preferences, a tension arises between producers and consumers over available resources. In the case where the money rate of interest is below consumer time preferences this will ultimately lead to over-investment, malinvestment<sup>16</sup>, dis-saving and inflation.<sup>17</sup> The above examples merely serve as rudimentary illustrations of what is meant by the perception of reality and is not meant as a comprehensive chain of reasoning or use of tools and connections with other concepts.

Different concepts also acquire a specific meaning when put in relation to other concepts. For example, in relation to income, capital is conceptualised as all objects fulfilling a specific role such as a level of income to be sustained, built up or drawn down as appropriate to consumer needs or in response to signals provided by the market. This can be contrasted to the simpler conception by mainstream economics of capital in physical terms such as plant and machinery and where a return on capital is considered automatic, usually due to exogenous factors such as a given return to capital. As noted above, for Austrian economists the value of capital goods are imputed from consumer goods. A return on capital cannot therefore be automatic. For mainstream economists, capital also has to be homogenous in order to facilitate their aggregation and mathematical tractability.

### **Methodological frameworks**

Mäki (1992) distinguishes Mainstream and Austrian theories as following two distinct philosophical methodological frameworks. Mainstream theory is essentially a model theory. Austrian theory conforms to a causal process theory. Mäki (1992) quotes from the philosopher Brian Ellis, his distinction between model theory and causal process theory:

“Causal process theories attempt to describe the basic causal processes of nature [... whereas] model theories define norms of behaviour against which actual behaviour may be compared and explained” (Mäki 1992, p 46).

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<sup>16</sup> Malinvestment is an Austrian term used to signify investment in projects undertaken by entrepreneurs due to false market signals as a result of inconsistency with time preferences and thus resulting in an inconsistency in the available stock of savings supporting a given level of investment.

<sup>17</sup> The above concepts (in rudimentary form) form the basis of the Austrian business cycle theory as developed by Hayek and von Mises.

As a causal process theory, Austrian economics meets both the requisites of processes as self-determining and capable of transmitting signals or information (Mäki 1992, p 40). Both prerequisites are necessary in order to arrive at a ‘perpetuum mobile’ of the processes, thereby being freed of causes external to the process.

Only by re-describing what one observes in reality such as simple acts of buying and selling does one arrive at the above two prerequisites. Mäki (1992) provides the following re-descriptions of what is really or ultimately taking place in the market place:

As causal agency (CA): “Selling and buying in the market *are* manifestations of the causal agency of entrepreneurship.” (Mäki 1992, p 45)

As Causal propagation (CP): “Selling and buying in the market *are* forms of causal propagation of information.” (Mäki 1992, p 45)

Statement CA is meant to refer to those forms of selling and buying that involve arbitrage or speculation which drive the market process (allowing for entrepreneurial innovation: new ways of putting factors together or feasibility of new technologies), whereas CP refers to “personal buying and selling where the exchange ratios approximately reflect the relative scarcities of goods” (Mäki 1992, p 46)

What makes comparison between the two methodologies incommensurable is that they differ in their ends. In his article, Mäki (1992) promotes an understanding of these differences – *what* those ends are and *how* they are pursued.

For example, Walrasian economics has been predominantly concerned with equilibrium end-states demonstrating under which conditions efficiency in the allocation of economic goods is to be obtained. The Walrasian perspective therefore also teaches us that the market cannot be efficient because the conditions are seldom, if ever met in the real world (complete information and perfect competition for example).

Austrian economics on the other hand is concerned with market processes, i.e., the mechanisms by which information is transmitted and the allocation of goods occurs. The existence of steady states of equilibrium, which can only be made under the assumption of complete information, makes such

processes redundant and a focus on such states cannot therefore show us what these processes are, nor can they teach us anything about what a more efficient process would look like or what happens with regard to the process when policy-makers try to impose the mathematically determined Pareto-optimal conditions considered to lead to a more efficient outcome. As Mäki (1992) points out, the assumption of full information subsumed under general equilibrium leaves “no room and no need for the notion of the market process as a learning or discovery process.” (Mäki 1992, p 46). Furthermore, the assumption that all exchanges take place at one equilibrium price also precludes the idea of process. “In the Austrian theory it is vital that the market envisage a multiplicity of prices for one good. It is these price differentials that provide entrepreneurs with opportunities for arbitrage gain and thus stimulate them to generate the market process.” (Mäki 1992, p 46).

Increased similarities have recently emerged between behavioural economics and Austrian economics. For example, Bowles (2004 p 63) states that “taking *explicit account of out-of-equilibrium dynamics* is a ... characteristic of evolutionary approaches” and the notion of ‘path dependence’ would be familiar territories for Austrian economists who have always eschewed the general or partial equilibrium or time simultaneity approaches of mainstream economics. These similarities, however, are only on the surface, as the two methodologies remain distinct. The methods of behavioural economics can be shown to represent an evolution of the mainstream paradigm based on advances in cognitive psychology, simulation programming techniques and the application of probability theory (as in game theory).<sup>18</sup> This evolution of mainstream methodology can be contrasted to the methodology of Austrian economics. This comparison is particularly stark, as will be shown in this paper, as these advances leave Austrian economics unchanged.

The purpose of the following section on the mainstream methodological framework, otherwise familiar to all economists, is to highlight the levels of abstraction involved in the application of quantitative techniques and the importance of and dependence on exogenous factors. This sets the stage for the contrast to praxeology, where abstraction involves an essential connection to reality and where all factors are endogenous.

For the section on Austrian methodology, mathematics (instead of logic) has been chosen as the foil against which to compare the a priori structure of praxeology.

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<sup>18</sup> See for example Camerer and Loewenstein (2002).

The following syllogisms of logic will be used in drawing out the distinction between the mainstream and Austrian methodologies:

- (1) If p is true, and p entails q, then it follows that q is true;
- (2) If p is merely assumed to be true, and p entails q, it does not 'rationally' follow that q is true.<sup>19</sup>

A valid argument (p entails q) is one in which the conclusion is correctly deduced from the premises. If the statements we started off with are true, then our conclusions are also true. If false, and the argument remains valid, our conclusions will also be false.

### *Mainstream methodological framework*

Mainstream economics is concerned with the correct specification of mathematically tractable models. A mainstream theory consists of a set of definitions of the variables to be employed, a set of assumptions under which the theory is meant to apply, and a set of hypotheses about how things behave. (Lipsey et al 1990)

All parts of the model are to be shaped into mathematical form. So for example, variables are numerical and deemed measurable, even where these cannot be directly observed such as in the case of utility. Even where utility has been recognized as ordinal in nature, sophisticated attempts have been made to cardinalise utility as described above (see footnote 14).

Assumptions may be qualitatively stated, such as perfect competition or complete information, but their importance is in isolating an aspect of reality that is amenable to mathematical modelling. Aspects of reality, such as the role of the entrepreneur, which up to now at least eludes amenability to mathematical techniques, are largely ignored. Modelling what are considered to be the essential features of economic reality therefore comes with the proviso that it be amenable to quantification.

Behaviour, such as optimising behaviour can be captured in production, marginal benefit and marginal cost functions, even though such functions are indeterminable in practice.<sup>20</sup> In more recent

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<sup>19</sup> Adapted from Long (2001). Reference also from Husserl (1913, p 105)

<sup>20</sup> This is because dimensional analyses, which always accompany mathematical applications in physics in order to ensure the consistency and validity of formulas (i.e. to ensure that dimensions such as meters on one side of an equation are equal to meters on the other and not centimeters, liters or meters/second) is not performed in economics, where dimensional analyses would generally not hold. See Barnett (2004) who performs dimensional analysis on the Cobb-

developments of game theory, behaviour can be captured in payoff matrices and functions, where extensive use is made of probability theory.<sup>21</sup>

The application of mathematics for any model requires the determination of exogenous variables. Without exogenous or fixed variables, there would be no solutions to any quantitative model. The number of endogenous variables capable of being supported by any model is based on the number of equations to be incorporated in the model and can be determined by matrix algebra techniques such as the computing of matrices in ‘row echelon form’.

A general ‘best practice’ principle for the development of theory is adherence to Occam’s Razor<sup>22</sup>, whereby the fewest possible assumptions are to be made in explaining a thing (Oxford Dictionary 2005), i.e., to account for the essential features (real or abstract) sufficient for the explanation of reality. The level of abstraction, i.e., how far from reality the underlying definitions of variables, assumptions or hypothesized behaviour may be or the use of quantitative techniques from their practical use or the determination of variables from their practical determination, is not relevant to the application of Occam’s Razor.

A model theory needs to be subjected to hypothesis testing, as the assumptions are not self-evident and often abstract. The assumptions are also always time and place dependent. The model is therefore only ever as good as the essential features captured by the model remain the essential features within the complex of reality modelled. For example, econometric models hold under the

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Douglass production function and a household macroeconomic model with micro foundations. This is because mathematics is applied at a higher level of abstraction in economics than in physics. Mainstream economics can aptly be defined as ‘relational science’ where what counts is the relation between variables, be they between incommensurables such as prices and quantities, and not a formula necessary for an output in the form of some technology, where dimensional analyses would be imperative. This higher level of abstraction, however, renders direct application to the real world impossible and is to be regarded as merely explanatory of optimizing behavior. Only in the case where there are missing markets, such as in environmental economics, are marginal cost and marginal benefit computations employed in practice. The implication is that one first has to have missing markets before one can do the computation – which only brings into question the nature of the assumptions underlying the derivation of the formulas or values used.

<sup>21</sup> Mainstream economists also apply probability theory at a higher level of abstraction that renders application in the real world impossible. The valid application of probability theory requires the existence of a practically unlimited sequence of *similar* observations and the existence of randomness. So for example we can validly use probability theory in the case of actuarial valuations for calculating life insurance premiums, where we can determine the probability of ‘a’ man aged 40 dying at age 41 on the basis of a large population sample of men insured, but would be incorrect to infer that probability to Mr. X, who is aged 40 dying at age 41 (Richard von Mises 1939, pp 1-24). In economics, in the case of game theory for example, inference is often made pertaining to particular individuals in calculating their payoffs in the latter manner. The application of probability is often made together with assumptions such as homogeneity and infinitely lived lives or played games. Application in the real world then becomes impossible, as one would have to drop the assumptions holding up the application.

<sup>22</sup> The principle is attributed to the English philosopher William of Occam (1350) (Oxford Dictionary 1995)

assumption that the historical conditions and relationships continue to hold. Adjustments for possible changes in exogenous conditions then become guess estimates.

In this manner, mainstream economists are trying to directly solve for the problems of entrepreneurs or governments – which provide them with their funding – as if the process of speculation itself could ultimately be done away with making the process of speculation effectively redundant for economics.<sup>23</sup>

Advances in economic theory generally go hand in hand with advances in quantitative techniques. The development of the Solow growth model with Schumpeterian R&D or oligopoly trade models, for example, were made possible with the advent of techniques for modelling increasing returns.

Making use of syllogism (2):

‘If p is merely assumed to be true, and p entails q, it does not ‘rationally’ follow that q is true’,

whereas in the past, most of the reformulation and expansion of mainstream theory has operated at the p entails q part of syllogism (2) as a consequence of the advances in more sophisticated quantitative techniques, behavioural economics is increasingly attacking the first part of syllogism (2): modifications to conventional assumptions of p. This is because many of the assumptions of economics are psychological and it is only right that advances in psychology should be able to contest the validity of those assumptions.

However, increased levels of abstraction, both in the application of quantitative techniques and in the assumptions of p, have often led to a q that is increasingly difficult to verify in the real world. The conclusions of behavioural economics are increasingly of the explanatory kind of how something could have come about, with far less predictive or quantitative power than would have been wished for.<sup>24</sup>

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<sup>23</sup> In the Austrian process theory, the activity of speculation with regard to the uncertain future has powerful implications and is pivotal for an understanding of how markets actually work.

<sup>24</sup> For example evolutionary simulation models can only provide explanatory power by showing how interactions between heterogeneous agents can lead to ‘emergent’ outcomes defined in the literature as ‘surprising’ in the sense that simple local micro-rules can lead to the macro-outcomes that resemble the ones observed in reality, such as skewed income distributions, pollution externalities or resource depletion (Epstein and Axtell 1996). The simulations themselves have no predictive or quantitative power. Simple evolutionary game theories can also help explain how a change in convention can occur, but cannot tell us if, when or in what direction a change in convention will occur.

So if  $p$  (a psychological assumption underpinning a model) is found wanting, then it brings into question the basis of the explanation provided for the outcome predicted by the model so far. The fact that the model has been tested and found to be empirically evident may have been due to a spurious correlation. A denial of the possible spuriousness of the correlation is a form of psychologism, the failure to distinguish between logical and causal relations.<sup>25</sup> The inability to distinguish logical from causal relations is, however, inherent in a methodology based on syllogism (2) above; as one can never be sure of the truth content of the premises, which are formulated as exogenous factors. Such factors are invariably also endogenous with regard to the variables modelled. For this reason economists have also moved away from notions of causality, referring rather to correlations. However, as soon as they enter the arena of policy-making, then any act of intervention implies a statement with regard to causality.

The assertion of Friedman that the realism of assumptions do not matter as long as the results of a model are verified, is without 'rational' foundation when seen across the whole (all three terms) of syllogism (2) and not merely on the basis of the last two terms, i.e., the validity of the argument (middle term)  $p$  entails  $q$  part together with the verification of  $q$ . The fact that a model corresponds to reality during a certain time period and in certain places could be the result of a spurious correlation (where other relevant factors outside the model are involved in influencing the variables within the model) or coincidence between the middle and final terms of syllogism (2).<sup>26</sup>

In his *Essays on positive economics*, Friedman provides many examples of the usefulness of unrealistic assumptions as applied by the physical sciences. Long 2004 manages to rebut many of Friedman's examples by showing that the physical sciences do not violate principles of realistic abstraction once we become familiar with Aristotelian principles of abstraction. In his paper he sets the foundations for understanding how the failure of economists to distinguish between platonic forms of abstraction and essential isolations of reality leads mainstream theorists astray in their modelling. Both forms of abstraction are useful, but they are to be used in different ways. For example, platonic abstractions such as the assumption of complete information which cannot conceivably exist in the real world (there will always be uncertainty and change), can only be used as a mental construct in aiding our understanding, whereas the assumption of perfect competition,

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<sup>25</sup> By psychological or causal relations in the above case can be understood a belief held merely on account of repetitiveness of past experiences. A change in experience, for example seeing a black swan, would then change a conviction that may have been held upon psychologistic premises that all swans are white (example from Corvi 1997 referring to a metaphor used by Karl Popper).

<sup>26</sup> A more complex form of psychologism is when we base our convictions in a model on a *belief* that  $p$  causes  $q$ , where in actual fact we know nothing of the truth of  $p$  entailing  $q$ . For example, a trade union economist building a model on the assumption that by increasing wages an increase in consumption will be induced.

which is conceivable as an existent part of reality, could be validly modelled as a representation of reality if that is what is regarded to be the essential feature of that part of reality which is to be explained.<sup>27</sup>

The Austrians are often charged that it is easy for them to criticize the unrealistic assumptions of mainstream theory, but difficult to offer an alternative. The truth is that understanding the framework of that alternative requires time and a willingness to work within the perspective of another paradigm. Making sense of the alternative within the mainstream paradigm is the problem.

### *Austrian methodological framework*

Whereas mainstream economic methodology is rigorous with regard to the use of mathematics, Austrian methodology is rigorous with regard to logic and its link to reality. For this purpose, Austrian economics has developed its methodology based on praxeology, otherwise defined as the ‘logic of human action’, the ‘logic of choice’ or ‘the general theory of human action’ (Mises 1996 p 3)

Instead of developing hypotheses, whether on the basis of mathematics or logic, praxeology is itself a branch of logic and as such is cast in the same *form* of mathematics and logic, i.e., as a pure *a priori* science, where conceptual truths or essences play the role as numbers do for mathematics. Praxeology is thus connected to syllogism (1):

‘If p is true, and p entails q, then it follows that q is true’

and is in this way to be interpreted as rigorous with regard to logic.

With regard to its link to reality, abstractions are universal ones in the Aristotelian sense, i.e., universals dealing in essences or essential natures that are independent of time and place and that can be related to a particular (observable phenomenon) by means of a complex chain of reasoning.<sup>28</sup>

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<sup>27</sup> This brief summary of abstraction and realism opens up a topic beyond the scope of this paper which would go a long way to understanding alternative methodological tools (see Long 2004)

<sup>28</sup> Aristotle provides us with the following analysis of the universal: “...we seek the reason why up to a certain point, and we think we know something when it is not the case that it comes about or exists because something else does – in this sense the last term is an end and a limit. E.g. with what purpose did he come? In order to get money. And that in order to pay back what he owed; and that in order not to act unjustly. Proceeding in this way, when it is no longer because of something else or with some other purpose, we say that it is because of this as an end that he came (or that it is or that it came about), and that then we best know why he came. .... And if this is no longer so because something

In substantiating these claims, Mises can be quoted:

“The science of human action that strives for universally valid knowledge is the theoretical system whose hitherto best elaborated branch is economics. In all of its branches this science is a priori, not empirical. Like logic and mathematics, it is not derived from experience; it is prior to experience. It is, as it were, the logic of action and deed. ... Only experience makes it possible for us to know the particular conditions of action in their concrete form. ...

However, what we know about our action under given conditions is derived not from experience, but from reason. What we know about the fundamental categories of human action – action, economizing, preferring, the relationship of means and ends, and everything else that, together with these, constitutes the system of human action – is not derived from experience. We conceive all this from within, just as we conceive logical and mathematical truths, a priori, without reference to any experience.” (Long 2001, p 15 referring to Mises ‘Epistemological Problems of Economics’ I.1.6)

Mises presents a radical anti-positivist approach that is just about inconceivable or ludicrous for application by the mainstream. Blaug in his critique of Austrian economics offers this view of such a position:

“Mises’ statements of radical apriorism are so uncompromising that they have to be read to be believed”; they “smack of an antiempirical undertone ... that is wholly alien to the very spirit of science,” and are “so idiosyncratically and dogmatically stated that we can only wonder that they have been taken seriously by anyone.” (Long 2001, p 3 referring to Blaug)

Mises’ insistence on the non-empirical nature of economics comes across as extreme, particularly when viewed from the perspective of Humean scepticism or its positivist variants. Thus Blaug interprets him as anti-empirical.

As a causal process theory, whereby “causal processes are self-determined in that they are not parasitic upon causal influences exterior to the process itself” (Mäki 1992, p 40), Austrian

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else is so, it is then that we know best. It is then too that it is universal. ... Again, the more particular a demonstration is, the more it tends to what is infinite, while universal demonstrations tend to the simple and the limit. But as infinite, things are not understandable, while as finite they are understandable. Hence they are more understandable as universal than as particular.” (Aristotle translated by Barnes, 1993)

economics is exactly *like* mathematics and logic. Mathematics and logic represent internally consistent systems whose rules (such as the rules of differentiation and integration) are derived a priori from central axioms and principles, which themselves are not dependent or contingent on any exogenous variables. In this sense, mathematics is not *dependent* on experience; it is *applied* to experience. “Experience makes it possible for us to know the particular conditions of action in their concrete form”(from Mises as quoted above) – for example, when wanting to count something, we apply rules of addition to that something.<sup>29</sup> Thus only once we understand the *form* of economics that Mises is talking about can we begin to understand the relevance of what Mises is saying.

In the same way that the rules of differentiation and integration are derived a priori from reason, so too the laws of praxeology are derived from reason. We do not create mathematics on the basis of empirical evidence (for example, rules of addition and subtraction are independent of singular experiences); we need mathematics in the application to make sense of empirical evidence. When people say that mathematics is based on experience, they can only mean so in the sense that a reasoning mind conceives of the usefulness of developing a method of counting or differentiating *for* experience or making sense thereof or providing order thereto. The distinction between what we *learn* from experience and what we *use to make sense of* experience is important if we are to understand what mathematics, logic and praxeology is about. It is in this sense that praxeology is, like mathematics and logic, non-empirical. To say of mathematics that it is anti-empirical would mean that it has no application *to any objects*.

Whether something is to be regarded as a priori or empirical can only be determined with regard to its dependence upon experience. All claims can be derived by reference to experience, but only a priori claims are independent of experience, i.e., apply to all related experiences and are therefore to be regarded as prior to experience. The following statements about which empirical claims could be made will help illustrate this point:

- A the sum of the angles of a triangle equals 180 degrees
- B the propensity to consume of a society is x% at a particular time and place
- C humans have time preference

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<sup>29</sup> This sense in which mathematics is not dependent on experience, but applied to experience can be illustrated by a quote from Long (2001) who quotes from Wittgenstein: “If 2 and 2 apples add up to 3 apples, i.e. if there are 3 apples there after I have put down two and again two, I don’t say: “So after all 2+2 are not always 4”; but “Somehow one must have gone.” In other words: mathematical concepts are applied in such a way that *nothing counts* as a falsification of mathematical law. We may *illustrate* mathematical claims by means of empirical experiments, but if the experiment goes wrong we revise not the mathematical claim, but rather the choice of illustration.” (Long 2001, p 38)

Each of these statements can be derived by reference to experience. However, A is an a priori statement as it is independent of experience. Only reason allows us to determine that A is a priori true and unlike model hypotheses, is to be regarded as universal of all triangles without the need to keep testing all various shapes of triangles to establish this fact.

B on the other hand is an empirical statement that needs to be constantly validated by experience and is therefore dependent on experience.

C unlike A has a social dimension to it as it is concerned with subjective human experiences. However, like A, C as stated above is universally valid and is in this sense a priori and to be regarded as before experience. Only the extent of a particular person's time preference in its concrete form is an empirical matter which is dependent on time and place of the individual. Austrian economics is foremost concerned with the universal aspect of time preference and the implications of an increase and decrease in time preferences in the same way that mathematics is concerned with the implications of increasing and decreasing functions on for example, the signs of various orders of differentiation for the determination of positive or negative semi-definiteness, i.e., local minima or maxima. Praxeology is not concerned with the actual measure of time preference, which would be regarded as empirical with regard to the past and speculative with regard to future uncertainty inherent in nature.<sup>30</sup>

Behavioural economics has recently uncovered situational dependence as an important component of the utility preferences of individuals. Adjustments are to be made to conventional utility functions of neoclassical economics for the asymmetry arising as a result of loss aversion. Situational dependence may recently have been uncovered as a result of advances in cognitive psychology or experiments by behavioural economists, but seen from the aspect of 'independent of experience', Austrian economists have always regarded situational dependence as self-evident and therefore as 'a priori' true for human action. When the concept of preference is combined with the concept of action, the decision as to whether to act or not to act is based on the preference of a new state of affairs over an existing state of affairs. The specific issue of loss aversion is not directly addressed by praxeology, as this would have more to do with the end of measure or the shape of the utility curve, the determination of which is a matter of empirical content and would be dependent on experience. Praxeology is concerned with universal knowledge, which serves the elucidation of

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<sup>30</sup> Speculation would be a topic that is extended and taken up by the theory of the entrepreneur within Austrian economics.

causal processes, and not with matters of empirical content. Empirical concerns only become relevant when we wish to clothe praxeology by framing it within a historical context in the real world.

Mainstream economists attach a different meaning to the word ‘a priori’. In deriving hypotheses, reference is made to general experiences of reality for the identification of relevant and essential features. The derivation of hypotheses *before testing* is what is referred to as ‘a priori’ theory. The universal concept of something being independent of time and place is meaningless in the context of positivism, where reference can only be had to observable experiences. No re-description is made in terms of the underlying essences of experiences, i.e., the essential meanings attributed to phenomena in the context of their relations with other phenomena.<sup>31</sup> The notion that only falsifiable hypotheses are scientific further supports the implicit conviction of mainstream economists that an ‘a priori’ independent of experience related to time and place simply couldn’t exist within the realms of science. Such a priori statements would generally be dismissed as tautological and thus are unlikely to make it to the mainstream model – such as acts of preference when conflated with its objects because of the adoption of a narrow definition of self-interest by mainstream economists.

The following taxonomy of behaviours from Bowles (2004, p 110), illustrates the distinction made by mainstream economists between narrow (right hand column) and broad (both columns) definitions of self-interest.

**A Taxonomy of behaviours: costs and benefits to self and others**

	Cost to self	Benefit to self
Benefit to other	Altruism	Mutualism
Cost to other	Spite	Selfish

*Source: Bowles 2004, p 110*

In his analysis of behavioural economics, Bowles (2004) restricts the term self-interested behaviours to the behaviours of the right hand column

“to avoid the tautological use of the term to mean any act that is voluntarily undertaken. The altruist may give pleasure, but clarity is not served by calling this self-interest.”

<sup>31</sup> See examples under conceptions of reality.

Behavioural economics uses the narrow definition (also the conventional mainstream definition) and adds on to the conventional formula of a utility function additional arguments to take into account other behaviours such as altruism and perceptions of fairness or modifies the curvature of indifference curves by taking into account situational dependence in the form of loss-aversion (Camerer and Loewenstein 2002 or Bowles 2004, chapter 3). Thus by using psychology, behavioural economics attempts to make the conventional model 'more realistic'.

Austrian economics, on the other hand adopts the 'apparently' tautological use of any act that is voluntarily undertaken, i.e., the broad definition of self-interest.

In order to understand how we can derive economic laws in the praxeological sense, namely, in an a priori form such as mathematics, a closer analysis of the word tautological is needed that will also serve to illustrate the use of necessarily true statements as first principles or axioms in deriving such a science. Tautology in the Oxford dictionary (1995) is defined in two ways:

1. the saying of the same thing twice over in different words
2. a statement that is necessarily true

To this I would add a third heuristic (rule-of-thumb) definition of the term when something is dismissed as tautological:

3. a statement for which there is perceived to be no implications (for theory for example)

According to the Logical Positivists all tautological statements are vacuous or meaningless and we cannot gain any new knowledge about the world from such statements.

The second definition is easily conflated with the first. But there is a distinction to be made which shall be drawn out by means of the following three statements:

- A. all bachelors are unmarried men
- B. the sum of the angles of a triangle is 180 degrees
- C. the sum of the angles of a triangle is equivalent to the angle represented by a straight line

A is clearly what is meant by definition 1, but whether it is necessarily true is contingent on the meaning attributed to the word bachelor in common usage. Whether statement B is necessarily true is contingent on how we have defined measure, i.e., if the degrees of a circle were divided into 400 as opposed to 360 degrees, then B would not be necessarily true in a strict literal sense. But B in the sense of C – i.e., independently of how we measure – is necessarily true and meets the requirements of definition 2.

Whereas we can dismiss statement A in the heuristic sense of definition 3, we cannot as easily dismiss statement B as B has powerful implications for the a priori derivation of other principles of geometry. In this sense B is ‘given to reason’ and is to be interpreted as prior to *all* experience (conceptually related to the angles of all triangles) and not as derived from singular experiences. Even if experience was once used to derive the axiom the first time, it is evidently not in the form of a hypothesis, which may one day be falsified. If we adopted the approach that it is derived from experience with no appeal to reason, then we would be in a state of constantly having to test B as a hypothesis and should be prepared for the possibility of one day experiencing a triangle whose angles did not add up to 180 degrees.

B (and C in its pure unmeasured form) is self-evident and is not contingent on any underlying assumption. It is in this sense that we can interpret Mises’ statement quoted on page 17 above “Like logic and mathematics, [economics defined as the science of human action] is not derived from experience; it is prior to experience.”

Returning to the taxonomy of behaviours provided by Bowles 2004, the broad definition of self-interest therefore leads to the following self-evident principle of praxeology: a higher state of affairs is always preferred to a lower state of affairs. When applied to the law of marginal utility: the first unit of a good will always be used to satisfy the most urgent want, the second unit to the second most urgent want, etc. What needs to be maintained in mind is the separation of the content (in the case of economics this will be the psychological content, i.e., the particular want) from the principle of action concerned (preferring in the above example) in the same way that the measure of degrees in statement B above can be isolated in order to arrive at the necessarily true part of statement C.

By applying the broader definition of self-interest a different meaning to the one generally held by the mainstream can be attributed to the ‘invisible hand arguments’ where it is shown that “the alchemy of good institutions can transform base motives into valued outcomes” (Bowles 20, p 57).

This difference in meanings can be illustrated by asking:

- (1) Is it 'base' to prefer a higher psychic state of satisfaction to a lower one? Or
- (2) is 'baseness' to be found in the preference of *something* as providing a higher psychic satisfaction compared to another?

If the answer to the first question was yes, then the implication of being not base would be that we should all be sadomasochistic in preferring the lower state of satisfaction! Altruism, if interpreted as something good done voluntarily, would also be a form of sadomasochism. For if being altruistic is not base, then it must be a lower psychic state of satisfaction that is voluntarily chosen.

The taxonomy provided by Bowles is therefore ambiguous. This is because the perspective of benefits and costs is that of the mainstream 'independent third party' point of view with regard to what is observed from the outside and not from a truly subjectivist point of view, where altruism, seen from the third party as having a cost, is actually an unseen benefit to the self. Austrian economics adopts the true subjective value point of view, which is ultimately also a driver of economic processes – not merely what a third party 'objectively' sees.

One ends up contradicting oneself by trying to answer yes to the first question and in this manner arrives at a self-evident principle that (1) cannot be base.<sup>32</sup> As soon as we recognize this self-evidence, we realize that we have been conflating the act of preferring (which is neutral) with the content of what we are preferring (which is not value free). It is this aspect of the act of preferring that Mises describes as one of the "fundamental categories of human action [that together with others], constitutes the system of human action" in the quote of Mises on page 17 of this paper. Only by isolating the fundamental category of human action (the act of preferring) from its content (the what is preferred), do we arrive at a value free form of economics. In the mainstream it is impossible to be value free, as the underlying assumptions or evidence of a model are invariably tainted by the values of the investigator.<sup>33</sup>

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<sup>32</sup> This is also the method used by Aristotle in order to arrive at self-evident truths, where the impossibility of the negation of a statement establishes its self-evidence. The meaning of self-evidence should not be confused with the psychologistic notion of self-evidence, which would be based on the 'certainty' of belief or conviction held and not on this principle of logic (the principle of contradiction).

<sup>33</sup> For example, with regard to models of externalities that are accepted by both pro-market and pro-government economists, pro-market economists will have the tendency of finding 'evidence' to support their hypothesis that the external costs of policy intervention outweigh the external benefits and visa versa for the pro-government camp.

The answer to question (2) above does not lead us into a quandary. The concepts “profit and loss” and “value”, which are instrumental in the market process for the efficient allocation of scarce resources, become neutralized and the question turns upon the *content* of the ends people choose. For Austrians, the content of peoples’ ends are the subject of psychological and ethical considerations. Praxeology itself does not specifically deal with such contents; it takes *any* content of a person’s chosen ends as a given and proceeds to draw out the formal implications of the means adopted to achieve them.<sup>34</sup> Quoting Rothbard from Long (2001):

“It is important to realize that economics does not propound any laws about the *content* of man’s ends. ... The concept of action involves the use of scarce means for satisfying the most urgent wants at some time in the future, and the truths of economics involve the formal relation between ends and means, and not their specific contents. ... Psychology [deals] with the content of human ends [and asks] *why* does the man choose such and such ends ...? ... Praxeology and economics deal with *any* given ends and with the formal implications of the fact that men have ends and employ means to attain them. (Long 2001, p 17)

In his introduction to *Human Action*, Mises (1996) writes:

“Choosing determines all human decisions. .... All ends and all means, both material and ideal issues, the sublime and the base, the noble and the ignoble, are ranged in a single row and subjected to a decision which picks out one thing and sets aside another.” (Mises 1996, p3)

The problems of economics or what can be referred to the science of exchanges<sup>35</sup> are ultimately based on acts of choice and are in this way connected to praxeology. However, one cannot simply regard economics as a segment of praxeology – though this is how Mises describes it (Mises 1996 p10) – with clear lines of demarcation between what constitutes economics within the more extensive field of praxeology.<sup>36</sup> Instead it is my interpretation that economics is to adopt the structure of praxeology in dealing with the problems specific to the field of economics, however

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<sup>34</sup> To assist in the concept of isolating the aspect of *any* content, Long (2001) quotes from Frege: “In human beings it is natural for thinking to be intermingled with having images and feeling. Logic has the task of isolating what is logical, not, to be sure, so that we should think without having images, which is no doubt impossible, but so that we should consciously distinguish the logical form from what is attached to it in the way of ideas and feelings.” (Long 2001, p 18)

<sup>35</sup> Mises uses the term *catallactics* to refer to the ‘science of exchanges’. *Catallactics* was first used by Whately. Cf. his book *Introductory Lectures on Political Economy* (London, 1831), p 6. (Mises 1996, p 3)

<sup>36</sup> For example, one could argue that whereas praxeology deals with all types of choices, economics deals with a restricted set of choices such as those related to the exchange of scarce economic goods between individuals.

these (the problems of economics) may evolve over time. This can be substantiated by Mises' claim that:

“It is necessary to build the theory of catallactics upon the solid foundation of a general theory of human action, praxeology.” (Mises 1996 p 7).<sup>37</sup>

St Thomas of Aquinas provides us with the following account of how to unravel the constituents of choice.

“Is choice an act of will, or of reason? ... Choice is neither appetite by itself nor deliberation alone, but something composed of these – for just as we say that a living thing is composed of soul and body, yet is neither body by itself nor soul alone, but is both, so it is with choice. ... But whenever two things come together to constitute some one thing, one of them is formal with respect to the other. ... It is evident that reason precedes the will in some way, and gives order to its act – insofar, i.e., as the will tends to its object in accordance with the ordering of reason, inasmuch as the cognitive power presents to the appetite its object. Therefore, that act whereby the will tends towards something that is put forward as good, from the fact that it is ordered to the end by reason, belongs materially to the will but formally to reason.”<sup>38</sup>,

Aquinas treats reason as transcendent to psychological wants, with reason ordering wants in a formal manner. This can be contrasted to the methods of cognitive psychology or neuroscience, which tries to establish a direct ‘linear’ connection between the affective and cognitive faculties. Our psychological propensities are to be seen as the sole motivating causes of our cognitive faculties in making our choices.<sup>39</sup> From Aquinas’s perspective, our choice of action is dependent on

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<sup>37</sup> The reason for this claim, was not that Mises disagreed with the endeavors of mainstream economics per se, but he lamented the position in which economics had become hostage to ideologies such as “irrationalism, historicism, panphysicalism, behaviorism and all forms of polyologism” (Mises 1996, p 7), i.e., that human action is different for different eras, races and social classes and one should therefore apply a different logic (and construct models accordingly) to these different situations. Mises believed that “this procedure [praxeology as foundation] will not only secure it against many fallacious criticisms but clarify problems hitherto not even adequately seen, still less satisfactorily solved.” (Mises 1996, p 7). With regard to the last phrase quoted, Mises was referring to the problem of economic calculation (an aspect of which is the relationship between subjective valuations of many individuals and how these manifest in objective prices). For the reader of this paper, the rudimentary examples provided under conceptions of reality show how much is missed under a Keynesian macroeconomic perspective. In general, all matters relating to processes otherwise not amenable to quantification are missed “as hitherto not even adequately seen” (as quoted above).

<sup>38</sup> Long (2001) p 115 originally from Thomas Aquinas, *Summa Theologiae* II 1.13.1

<sup>39</sup> See for example Camerer and Loewenstein (2005) who describe the various techniques of neuroscience for measuring activity of various regions of the brain as well as evidence that cognition always operates via the affective system in the

the interface between our internal valuation rankings (not based on experience, but which may change over time) and the external circumstances presenting opportunities for improving our state of affairs, which are situational dependent. This leaves open a window in our internal valuation rankings for ethics to play its own role in ordering our wants and in affecting our choice of means.

By drawing the distinction between the material content of the ends of action, which includes psychological factors, from the formal logical aspect of the means of human action, the path of economic inference (the implications to be drawn from means within the market process) becomes de-psychologised, i.e. neutralised and isolated from psychology, but not anti-psychologised or separated from psychology; psychology still plays a role in the *content* of the ends of human action and as explanations for concrete actions as they pass.

Long (2001) makes the following distinction between the praxeological and psychological conception of motives:

“[Motives] can, for example, be both *necessary* and *probabilifying* ones. Choices are something we *do* with the motives we already have. ... As constituents, motives necessitate choices but do not precede them; as causes motives precede choices but do not necessitate them. Praxeology concerns itself with constitutive motives; it need not have anything to say about antecedent motives.” (Long 2001, p 118).

Thus for praxeology, motives merely play an internal role in constituting choice; they are not causal to choice as they are for psychology. I may hate Joe and wish to murder him. My hatred as cause, however, merely represents a necessary or ‘probabilifying’ condition, not a sufficient or enabling condition for his murder. Should I actually murder him, it will be true to say that his murder was motivated by my hatred, but if reason interferes with my desire by placing his murder as an end very low in my ordinal ranking of wants or murder as a means against my ethical principles, then we would have nothing to say at all, whether in the psychological or praxeological sense with regard to any action.<sup>40</sup>

For this reason preferences have a different meaning with respect to praxeology than for mainstream economics, which adopts the ‘ambiguous’ psychological conception in its underlying

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brain. This would not be denied by Aquinas, but one questions how the ordering of the affective desires by the cognitive faculty is to be measured – for then we would have the clue to wisdom.

<sup>40</sup> For a more extensive argument with regard to the praxeological conception of motives see Long (2001).

theory of consumer preferences and therefore remains within the realm of time and place dependence. The ambiguity of whether or not an act will be performed on the basis of the psychological notion of preference is artificially overcome in the mainstream by the assumption of constancy, i.e., preferences of consumers do not change over time. Constancy is implicitly subsumed under consistency in the transitivity assumption of the Revealed Preference Theory of Samuelson. Thus for Revealed Preference Theory, to be inconstant is to be inconsistent.

Motives are therefore not modelled or assumed by praxeology, and by treating them as constitutive of action, praxeology is able to isolate both the necessary and sufficient or enabling conditions for a 'logic of action'. If a causal psychological interpretation was adopted, praxeology would not be possible as one could never tell for sure why certain dispositions lead to different actions or different dispositions to the same actions. This would be analogous to the case in mathematics where one would be in violation of the definition of a function because of an incorrect mapping of elements between sets.<sup>41</sup>

In addition to the interface between internal valuation rankings and external circumstances as described in reference to Aquinas above, a third element is required to trigger action from choice: the expectation that our action can make a difference in the cycle of nature; as Mises describes:

“the expectation that purposeful behaviour has the power to remove or at least alleviate the felt uneasiness. In the absence of this condition no action is feasible. Man must yield to the inevitable. He must submit to destiny.” (Mises 1996, p 14)

Such power to intervene in the course of events becomes more evident when we think in terms of enacting a complex plan undertaken for long term advantage (such as the accumulation of savings, skill or investing ultimately for higher consumption in the future or for greater job satisfaction even if that entailed lower present and future consumption). This is less evident for simple plans such as where one simply reacts by buying or not buying what is presented to one in the market place.

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<sup>41</sup> Formally stated: a function  $f$  from a set  $X$  to a set  $Y$  is a correspondence that assigns to each element  $x$  of  $X$  a *unique* element  $y$  of  $Y$ . (Swokowski 1984, p 26), i.e, no two elements in the image  $Y$  may correspond to the same element in the domain  $X$ .

## Conclusion

The methodology of mainstream economics remains time and place bound. The predictions of its models are dependent on future relations remaining the same as past ones. Its explanations too are only ever probable ones as its specifications cannot be comprehensive enough. Because of its implicit belief in measurability, a belief that correct model specification is ultimately possible, the mainstream economist believes that he or she only needs to overcome the difficulties presented in obtaining the requisite measures of data. If a prediction or explanation turns out to be false, the mainstream economist invariably points the finger to the specification of the model. He or she has not considered that if reality is not about measure, but about expression, then all exercises in model specification are exercises in alchemy – attempts to transform base metals into gold.

The possibility that universal knowledge can be obtained is overlooked by a mainstream paradigm based on the philosophy of positivism and which has adopted mathematical methods – which have otherwise proved so successful in the natural sciences where measures are readily found – as its foundation. The strength of mathematics, however, lies in its a priori methodological structure. That strength is weakened the further one abstracts away from reality in the quest for elusive measures.<sup>42</sup>

In contrast, Austrian economics has not adopted the methods of mathematics as foundational, but its a priori form in its methodology of praxeology. On the basis of necessarily true statements, which can be identified after a re-description of outwardly observable phenomena in terms of attributed meaning, Austrian economics is able to obtain a comprehension of the ‘endogenous’ market process. Like mathematics, praxeology can be applied to reality. Its qualitative explanations and predictions are independent of time and place.<sup>43</sup>

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<sup>42</sup> See for example, Ross 1999, who writes about the development of utility theory and Welfare economics from Bentham to game theory: “We learned that piling increasingly elegant mathematical proofs, conducted in a spirit of stubborn refusal to abandon the simplifying assumptions that both made it possible and *also* tended to make them impossible to usefully apply, was an enterprise of diminishing returns.” Ross, however, does not abandon mainstream methodology, he believes that the way forward is to fashion new and better tools (presumably also quantitative ones).

<sup>43</sup> In keeping with the task set at the beginning of this paper with respect to Austrian methodology – to facilitate an understanding of praxeology – I am prevented from illustrating how praxeology is applied to reality. This would involve what I referred to at the beginning as the ‘fleshing out’ of Austrian economics and furthermore showing the chain of reasoning required to move from universal laws to particular conditions encountered in the environment. Selgin (undated) provides a short summary on pp 26 and 27 of how this is done. I am not aware of a specific paper devoted to this matter.

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