A critique of definitions in economics from an Austrian perspective: macroeconomics

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Abstract

Purpose – The purpose of this paper is to clarify definitions in economics.

Design/methodology/approach – To apply the insights of Austrian economics to terms widely used in the profession.

Findings – The authors find that the Austrian approach brings clarification to communication.

Originality/value – The authors know of no other such attempt. Therefore this paper presumably has some originality.

Keywords Business education, Finance and banking

Paper type Conceptual paper

1. Introduction

In contradistinction to the neoclassical synthesis, the Austrian School does not rely on the inductive processes of empiricism, or attempt to explain the relations governing human action using mathematical equations. It rejects logical positivism. Instead, the Austrian method is a non-mathematical, causal-realist deductive approach that is based on the axiom of action. Mises (1949/1998) termed this analysis of the logical implications of action, praxeology. While the theorems of praxeology are a priori – that is, not based on empirical observation or experience – they nevertheless tell us something true about the real world, contrary to the charges made by the logical positivists. This is because praxeology's foundational premises are not arbitrarily chosen axioms that are mere tautologies, but rather self-evident truths based on inner experience. According to Mises (1962, pp. 5-6):

> The starting point of praxeology is a self- evident truth, the cognition of action, that is, the cognition of the fact that there is such a thing as consciously aiming at ends […]. The truth of this cognition is as self-evident and as indispensable for the human mind as is the distinction between A and non-A.

And as Rothbard (1997, p. 68) points out, one cannot deny this is true, because:

> […] the critic who attempts to refute it finds that he must use it in the process of alleged refutation […] He employs action in trying to refute the notion of action.

As Mises demonstrates, from this basic concept and two additional propositions – namely, that leisure is a good, and that original resources are not uniform in their type or distribution – all the laws of economic science can be deduced. And these laws are not subject to falsification or change; rather, they are absolutely true, and just as unchallengeable as the axiom of action itself. In this sense, and this sense only, they are similar to the propositions of mathematics[1]. However, while

mathematical theorems employ a conventionally agreed-upon symbolism and syntax, praxeology uses ordinary words. And herein lies a potential problem: words are subject to ambiguity and alternative meaning. So if Smith provides a definition of X to Jones, how can he know that Jones knows the meaning of the words Smith uses to provide the definition? Does not Smith have to define these words as well? And if he does that, must he not use even more words to explain the meaning of these? It would appear there is an infinite regress, in which case, unlike mathematics, praxeology lacks precision, leaving its deductive statements open to criticism or misunderstanding.

However, this is not the case. Provided certain conditions are met, there is no such ambiguity. Apodictic certainty can be achieved. With respect to the study of economics, Say (1821/1971, p. 26) states:

> [It can] be confined to the enunciation of a few general principles, not requiring even the support of proofs or illustrations; because these will be but the expression of what everyone will know, arranged in a form convenient for comprehending them, as well as in their whole scope as in their relation to each other[2].

The answer, as to why this is the case, lies in the axiom of action itself. Mises (1933/2003, pp. 24-25) writes:

> As thinking and acting men, we grasp the concept of action. In grasping this concept we simultaneously grasp the closely correlated concepts of value, wealth, exchange, price, and cost. They are all necessarily implied in the concept of action, and together with them the concepts of valuing, scale of value and importance, scarcity and abundance, advantage and disadvantage, success, profit, and loss.

To be sure, while the reflective reconstruction of the categories of action is not a simple task (Hoppe, 1995), and not as straightforward as the grasping of the concept of action itself, anyone who acts must be able to understand these terms at some basic level. Action is not mere behavior or instinct; rather it requires conscious thought (Mises, 1949/1998, pp. 11-29). All action involves means, ends, preference, choice, cost, exchange, profit or loss, and time. Anyone who acts in principle comprehends these categories in the context of their action. Their meanings are unambiguous, even if the names given to them are not immediately obvious or familiar to the actor.

This comprehension comes about not through outward experience – i.e. sensory experience of something physical – but rather through the inner experience of acting[3]. The process of understanding the categories of action is self-evident, because we all act, and therefore we do not have to describe actions in terms of something else to comprehend them, but they are not immediately evident. They have to be made evident. To use a figure of speech, instead of pointing to them physically, as we would with a concrete object, we point to them mentally, until the person "sees" them. A very good way to do this is by using the Robinson Crusoe scenario or something similar.

For example, when Robinson Crusoe decides to gather berries instead of lying on the beach – let us say the latter is his next best alternative – he cannot deny that he must use means (labor) to attain a specific end (the satisfaction of consuming berries), and that this has a cost (the satisfaction of lying on the beach). Moreover, in order to act, he must have a preference (the former over the latter), and that he must choose. When he does so, he is engaging in an exchange (giving up lying on the beach in exchange for berries) which results in an anticipated profit (the psychic difference to him in satisfaction between the two ends) realizable in a certain amount of time. The logical relations governing action – isolated action in this case – can all be explained in terms

of these words, for they are simply the names given to the variables that govern all human action. (In addition, Crusoe cannot deny the principle of causality or that the world is uncertain and that means are scarce. His action has consequences, and that the hoped-for profit, *ex ante*, is not always guaranteed, *ex post*.)

In interpersonal exchange, and in the catallactic context in particular, additional statements are needed in order to simplify and make comprehensible the laws which constitute the edifice of economic thought. But provided all of these are derived from the foundational categories of action, and the deductive process of formal logic is adhered to consistently, there can be no doubt as to their meaning. Concepts such as, the law of marginal utility, demand/supply schedule, pure interest, entrepreneurial profit, and rent, to name but a few, are all unambiguous and praxeologically useful when defined and deduced from the basic premises. Thus, for example, the law of marginal utility is derived from the categories of means, ends, and preference[4], the concept of the demand schedule follows from this law, and pure interest is derived from time and preference, abstracting from uncertainty, etc. The same is true for more general words such as, property, aggression, contract, socialism, and capitalism. As Hoppe (2010, pp. 17-18) reminds us, the concept of property arises in the social sciences because goods are scarce. Aggression is coercive action against property, and contract is voluntary exchange of property. When there exists institutionalized policies with respect to these, they are termed socialism and capitalism, respectively.

It is essential, however, that we guard against error, particularly because many of the words that are used in economic propositions have starkly different meanings in common parlance[5].

As Hoppe (2010, p. 17) stresses:

[…] starting from *imprecisely* stated or assumed definitions and building a complex network of thought upon them can lead only to intellectual disaster. For the original imprecisions and loopholes will then pervade and distort everything derived from them (Emphasis added).

The logical positivists claim that economics should use the same methodology as that employed in the natural sciences. They deride the Austrian School for being too literary. In particular, they contend that economic theorems should be described in terms of mathematical functions, because they are more "precise." For example, Krugman (1996) maintains that:

Academic economics, the stuff that is in the textbooks, is largely based on mathematical reasoning. I hope you think that I am an acceptable writer, but when it comes to economics I speak English as a second language: I think in equations and diagrams, then translate. The opponents of mainstream economics dislike people like me not so much for our conclusions as for our style: They want economics to be what it once was, a field that was comfortable for the basically literary intellectual.

However, while mathematical reasoning is extremely useful in the natural sciences, particularly physics and chemistry, it is wholly inapplicable to the social sciences[6]. In the natural sciences, a testable proposition or hypothesis is derived through inductive inference of empirical data, from which a theory can be developed that can be used to predict future events. Even though the propositions of pure mathematics are deduced a priori, many natural-science theorems can make use of mathematics if the variables concerned are governed by time- and place-invariant relations – that is, if they are not random and unpredictable – and if the relations are those of mutual determination. In these cases, mathematical equations can serve a theorem in giving it its predictive power.

An empirically derived theorem is falsifiable, however, because future data can contradict the mathematical prediction, in which case a new theorem, possibly involving a different equation, must be discovered and applied[7].

But as Mises makes clear, in economics precisely the opposite is true. Human beings are motivated; they have free will, and are very often unpredictable. Empirically acquired data cannot be used to make firm predictions of what people are going to do in the future. With regard to human action, there are no constant relations governing the relevant variables, and the relations are those of cause and effect, not mutual determination. Therefore, mathematics is completely unsuited for the theorems of the dismal science[8]. Moreover, the theorems – actually apodictic laws – of economics cannot be derived from testable propositions, using real experiments, where all but the variables to be studied are held constant. Instead, they must be deduced from thought experiments, using artificial constructions, in which all possible variables are imagined to be constant initially, and then one or more of them are changed mentally to understand the subsequent effects[9]. However, because these laws are deduced from a priori propositions using formal logic – and not semantic interpretation – and because they are hypothetical of the type *ceteris paribus* if A then B, they are never falsifiable; they are always apodictically true. They are certainly not a mere literary narrative as Krugman would have us believe.

But even if we accept, *arguendo*, the assertions of economists like Krugman that the use of mathematics is more "precise," the mainstream's underlying models still have to be described in verbal language. And because the propositions they use for this purpose are not defined in terms of the action axiom (and are thus invariably improperly defined), the models frequently include assumptions that are completely unfounded. According to Mises (1933/2003, pp. 127-128):

> Of primary importance is what is set forth in words in the preliminary statement that has to serve as the starting point for further mathematical elaboration. This statement, however, is always nonmathematical. Whether or not its further elaboration in mathematical terms can be useful depends on the correctness of this initial nonmathematical statement. To be sure, if the mathematical elaboration is itself incorrect, it will arrive at incorrect results even though it may start from a correct statement; but mathematical analysis can never expose an error made in an incorrect statement.

And as Rothbard (2009) states:

> The best readers' guide to the jungle of mathematical economics is to ignore the fancy welter of equations and look for the assumptions underneath. Invariably they are few in number, simple, and wrong. They are wrong precisely because mathematical economists are positivists, who do not know that economics rests on true axioms.

It is surprising, then, that even authors sympathetic to the Austrian School have suggested using mathematical notation in place of verbal definitions. They do so purportedly to simplify the task of praxeology, and to avoid confusion. Moorhouse (1993) claims there is no major gulf between praxeology and mathematics. According to that author, merely the form is different since both disciplines are a priori, and "using mathematical principles allows the scholar to cut into an economic problem with a minimum review of background principles." But Moorhouse overlooks the fact that mathematical equations are applicable only to variables that have constant relations and are mutually determinative. And of course translating the words of verbal logic into mathematical symbols simplifies nothing, for as Rothbard (2009) points out, these

meaningless symbols have to be translated back into words in order to have meaning again[10]. Far from avoiding confusion, mathematization creates it. Hudik (2015) recommends making Austrian economics more mathematical to make it "more appealing" to neo-classical economists[11]. Unlike Moorhouse, he admits that any economic analysis formulated mathematically has the potential to lose touch with reality and make it less intelligible. In which case one has to wonder what he hopes to achieve by this endeavor. Is Austrian economics really made more appealing, by destroying its methodological foundation, while at the same time making it incomprehensible? We cannot see our way clear to agreeing with this contention.

It is clear, then, that mathematical terminology is not a more precise method of analyzing human action. It is an incorrect method. On the other hand, when properly defined, the words used in praxeology are perfectly precise. Praxeology is not a literary exercise; rather, it is a process of formal logic that yields laws that are absolutely true and undeniable.

None of the foregoing should be interpreted as Austrians eschewing mathematics, or statistics, or econometrics from economic history. For example, suppose a cliometrician were to run an econometric analysis of rent control, or minimum wages. Posit that he found a correlation between these laws and reduced economic welfare. To wit, that they were followed by exacerbated housing shortages, or increased unemployment of unskilled labor. Would such an enterprise be inconsistent with Austrian economics? Not necessarily. It would all depend upon the interpretation placed on such findings. For example, if these statistical results were construed as illustrations of the underlying economic laws, all would be well and good. On the other hand, if they were understood as tests of the apodictic laws concerning minimum wages and rent control[12] this would certainly be incompatible with the teachings of the praxeological school.

What follows are a list of basic terms, commonly used in economics, that are often misinterpreted. In each case, we provide the Austrian definition, as deduced from the axiom action, and contrast it with alternative definitions. We show how the different meanings can lead to confusion and error. In the biblical story "The Tower of Babble" no one can speak the same language as anyone else. Our claim is that in the social sciences, in economics in general and macroeconomics in particular in the present paper[13], something of the same sort is occurring, albeit in a far less serious manner. The point is, if we all cannot agree to employ words in the same way, and/or their definitions are vague or imprecise, then we dismal scientists run into much the problem as did the biblical characters: lack of communication.

The present paper is dedicated to addressing definitional matters in macroeconomics. In Sections 2 and 3 we discuss in this regard demand and the demand for money. Section 4 addresses the supply of money and Section 5 interest. We conclude in Section 6[14].

2. Demand
The demand schedule is normally described by neoclassicists as a table of the quantity of a good that will be demanded by an actor (or group of actors) at different price levels. The relation between price and quantity demanded is represented by an abstract mathematical function, $Q_x = f(P_x)$, the graphical representation of which is normally a downward-sloping curve to the right, as dictated by the "law of demand." In any given instance, the price and quantity demanded are determined by the intersection of the demand and supply functions, but no cause and effect is referenced with respect to human action. The preferences of individual actors never enter the picture.

For Austrian economists, in sharp contrast, the demand schedule is derived from an individual's value scale, and represents the set of preferences to exchange certain quantities of one good in terms of another, as dictated by the law of diminishing marginal utility. Because preference is demonstrated only in action, the schedule is always hypothetical, at least until the moment of choice when exchange takes place[15]. Nevertheless, because the law of diminishing marginal utility is apodictically certain, it is always the case that the demand curve slopes downward and to the right, even if we cannot determine with certainty, *ex ante*, the actual shape of this curve. The actual quantity demanded ex post depends on both the demand schedule of the buyers and the supply schedule of the sellers. This quantity, and its price in terms of the other good, is determined by the marginal buyers and sellers.

The problem with the neoclassical economists' argument is that a mathematically precise formula, which has all the appearance of apodictic certainty, is applied to a mere conjecture; one that says there is a willingness to pay that can be demonstrated empirically. Of course this conjecture, being empirically derived, is not based on formal logic itself. In this act of legerdemain, the use of mathematics lends an aura of scientific respectability to an underlying supposition that is neither axiomatically deduced nor demonstrated to be governed by any of the universal rules of nature. This enables a mere conjecture to become a law; the so-called law of demand. But of course it cannot possibly be a law, unless one redefines that word in non-scientific terms. In contrast, the Austrians define demand in terms of a genuine law; the law of diminishing marginal utility, and, recognizing that mathematics adds nothing to the discussion, stop there. For Austrians, there is no need to use mathematics to create a "law," because all the underlying premises, down to their roots, are always demonstrated using formal logic.

The Austrian definition of the law of marginal utility and the description of the demand schedule are neither mathematical nor literary. Consider, however, the view of the neoclassical economist, McCloskey (1985), who contends that economic "proofs" are mostly literary[16]. According to that author, when the economist says the demand curve slopes down and to the right, this is a literary statement. To be sure, we can verify this empirically using statistical tests and mathematical reasoning, and this is certainly not incorrect, says McCloskey, but most of the really persuasive arguments that cause us to believe in the "law of demand" are literary in nature; that is, they involve rhetoric, in the true sense of the word, by creating a kind of word picture, using the same sort of language one might find in a novel or a poem or a play. Specifically, what kind of discourse is so convincing in this regard? Well, there is the lore of the market place, arguments from authority, symmetry with the "law of supply," and claims made by analogy.

If this is the case, then not only does McCloskey subscribe to the wrong kind of formal logic – mathematics – but moreover, she is convinced by a number of informal fallacies as well. Perhaps, her methodology can be rescued by the fact that she includes "introspection" and "thought experiments" as part of this discourse. This sounds more promising! But alas, in the event, it is not. For McCloskey is evidently unaware of the axiom of action and the method of praxeology. Her description is merely a hermeneutical exercise, with no attempt to find fundamental underlying truths. Indeed, according to McCloskey (1985):

Truth-pursuing is a poor theory of human motivation and nonoperational as a moral imperative. The human scientists pursue persuasiveness, prettiness, the resolution of

puzzlement, the conquest of recalcitrant details, the feeling of a job well done […]. If we decide that the quantity theory of money or the marginal productivity theory of distribution is persuasive, interesting, useful, reasonable, appealing, acceptable, we do not also need to know that it is True. Its persuasiveness, interest, usefulness, and so forth come from particular arguments.

With arguments like these, whether they be mathematical or literary, is it any wonder there is confusion, particularly among non-economists? A case in point is that some commentators – and even some economists (see below) – fail to recognize the difference between "demand schedule" and "quantity demanded." While the demand and supply schedules are obviously not the same, it is always true ex post that the quantity demanded equals the quantity supplied.

However, the word "demand" in common parlance is often used with reference to either the demand schedule or the quantity demanded, often without the user knowing the difference. A google search of the phrase "demand increasing" yields headlines such as "Increasing Water Demand," "Demand for Biofuels Increasing," and "Rising Worldwide Demand for Energy." These articles, written by supposedly well-informed analysts, start out by presenting historical data and charts to show how the quantities used of these materials have risen. Apparently, this needs to be addressed, they say, either because prices are set to rise or because shortages will be the result if nothing is done. Therefore, customers should find ways to reduce their "demand," by which these authors mean, presumably, that individuals should alter their value scales by lowering their preference for the good in question. The implication is that the two uses of the word demand are equivalent, which would mean the data are somehow indicative of a demand schedule that has shifted worryingly to the right. But of course, the two claims are not equivalent. The data do not necessarily indicate this at all; they are merely historical statistics. What is completely missing in these commentaries is any appreciation for both the demand schedule and the supply schedule, or stock (if no reservation demand is present). Indeed, these authors never consider that perhaps it is the supply schedule that has changed, and that this is the reason that the quantity demanded has increased. By using the word demand, without clarifying the sense in which it is being used, and by ignoring the supply schedule, they reach unjustified conclusions.

There are some Austrian economists who offer a very radical critique of the entire concept of the demand curve. According to Barnett and Block (2010): "this tool of analysis is fundamentally flawed in that it violates its own economic assumption of *ceteris paribus*, and also the mathematical requirement that only the proper number of variables may vary along a given graph in two-dimensional space." How so? *Ceteris paribus* is violated since as one moves along the demand curve, something other than price and quantity is also varying: wealth. That is, the lower the price, *ceteris paribus*, the greater the command over goods and services there is on the part of the consumer. Moreover, there are not two but rather three variables[17] operating in a two dimensional price and quantity space: price, quantity, and also wealth. It cannot be denied that one may (artificially) abstract from this phenomenon, but this comes with problems of its own. There is also the objection that human action in Austrian economics is essentially bi-modal. That is, the human actor is confronted with two and only two choices: do A or do B. Assuming that B is the single next best option to A, all other possible alternatives (C, D, E, etc.) are ruled out of court. This binary or singularistic way of looking at the matter thus precludes the infinite number of other possibilities on the demand curve.

3. Demand for money
Because there are a number of theories concerning money's demand, the term "demand for money" can have several different meanings. The differences are most apparent when the neoclassical and Keynesian versions of the term are compared to the Austrian definition.

The classical quantity theory of money demand is based on Fisher's equation of exchange, $MV = PY$. According to this theory, in equilibrium, the total demand for money M_D is equal to the supply M, and therefore $M_D = PY/V$. Fisher argues empirically that velocity V is relatively constant over time, at least in the short run[18]. This implies the nominal demand for money is proportional to nominal income PY, and assumes money is held only for transaction purposes and not for speculation.

In contrast, Keynes (1936) reasons that agents are more concerned with holding real money balances instead of nominal ones, and postulates that interest rates play a significant role in the demand for money. He argues that while money is held for the purpose of conducting transactions, people also do so as a precautionary measure against future unexpected emergencies, and for speculative purposes. The transaction and precautionary demand for money are directly related to real income, says Keynes, whereas speculative demand is inversely related to the interest rate, specifically the rate on bonds. From this, Keynes derives his liquidity preference function that relates the real demand for money to the interest rate and real income, $M_D/P = f(i,Y)$[19]. Like the classical theorists, Keynes assumes that in equilibrium the demand for money must equal the supply. However, Keynes' liquidity preference function means that M_D is affected by factors other than nominal income. Thus, velocity is not constant; rather, it is positively correlated to interest rates[20].

Friedman (1956) argues that a variety of assets besides bonds can serve as substitutes for money, and he derives a function for the real demand for money based on the difference between the return on these assets, and that of cash held in bank deposits. For Friedman, money demand is negatively correlated to the difference in these returns, and positively correlated to wealth[21]. Friedman's demand for money function implies that interest rates play a less important role than in Keynes' theory.

In contrast, Austrians do not attempt to derive mathematical equations that predict how individuals will respond to various events, such as changes in interest rates or the level of income. As Rothbard (1962/2004, p. 768) states:

> Economists have attempted mechanically to reduce the demand for money to various sources. There is no such mechanical determination, however. Each individual decides for himself by his own standards his whole demand for cash balances, and we can only trace various influences which different catallactic events may have had on demand.

But the greatest difference between the theories detailed above, and that of the Austrian school, is that the former view the demand for money as a quantity. By divorcing the macroeconomy from choice and action[22], mainstream economists ignore the fact that the demand for money in the economy as a whole is based on the preferences of individual agents, each of whom subjectively rank money as against all other goods[23]. And just as all other goods have a diminishing marginal utility with respect to money, so also the utility of each additional unit of money that is held diminishes with respect to other goods on the individual's value scale. And so when Austrians speak of the demand for money in the macroeconomy, they refer not to some quantity that can be expressed mathematically in terms of other variables, but rather to a schedule; or more precisely the combined demand schedules of all individual market participants.

When money is transferred from one person to another, it does not "circulate"; it is never in limbo, nor in no one's possession, nor does it disappear (Rothbard, 1962/2004, p. 265). Rather, it is always held by someone, either in his wallet or account. And because the supply and demand for money is simply another way of expressing the supply and demand of goods in terms of money, the money relation is not subject to disequilibria, other than those that exist from moment to moment when goods are traded – that is, between the plain states of rest. Therefore, the quantity of money demanded must always equal the quantity supplied, and stating this fact is nothing more than a trivial truism. From the Austrian perspective, theories that refer to money's demand as being a mere quantity convey no relevant information whatsoever. Relating this quantity to other variables, some of which do not even exist independently in the world of human action, merely confuses the situation even more. In the equation of exchange, for example, velocity is not an independent variable; it is simply a made-up term that allows the two sides of the equation to be equivalent (Rothbard, 1962/2004, p. 841). And while Keynes' liquidity preference function might have the veneer of legitimacy, it is based nevertheless on suppositions concerning the motivations of actors that cannot be supported praxeologically. As Mises (1912/1953, p. 190) states:

> […] in monetary theory, as in every other branch of economic investigation, it will never be possible to determine the quantitative importance of the separate factors. Examination of the influence exerted by the separate determinants of prices will never reach the stage of being able to undertake numerical imputation among the different factors. All determinants of prices have their effect only through the medium of the subjective estimates of individuals; and the extent to which any given factor influences these subjective estimates can never be predicted.

A person can allocate his money resources in one of three ways; namely, consumption, investment, or holding for future expenditures. Austrians realize that the latter is not systematically and mechanically related to the level of investment or to the interest rate. Interest is dependent on the social time preference, which is independent of liquidity preference. The rate of interest is determined by the supply of, and demand for, present money. It will be noted that this demand is not the same as the demand to hold money, but rather the demand for present money in terms of future money, consistent with the social time preference, another source of confusion when not properly stated as such.

There is one other important difference in the meaning of the terms used. When orthodox economists talk of the demand for money, they refer simply to money that is being held for future exchanges. But for Praxeologists, the demand for money has both a reservation demand and an exchange demand (Rothbard, 1962/2004, p. 756). The former is the post-income demand by those who already own money, while the latter is the pre-income demand of those who wish to sell goods and services in order to obtain money. Ignoring the exchange demand and focussing only on the demand for money already held is impermissible, and this is just as true for money as it is for any other good. Both must be considered. When combined, they create money's total demand schedule, as depicted graphically in the diagrammatic exposition adapted from Rothbard (1962/2004, p. 761) [24] (Figure 1).

The total demand curve D_T intersects the vertical line representing the money stock, and the ordinate A is the "price" of money in terms of other goods; its purchasing power (PPM). However, here again care must be taken to define the term. Since the price of money is the reciprocal of the price of all other goods in terms of money, the PPM cannot be a single number; rather it is an array of values.

4. Money supply

For most economists the terms "money supply" and "money stock" are synonymous. But should they be?

For any good that has a reservation demand, the stock, which can be represented diagrammatically as a vertical line, is not the same as the supply schedule, the graphical depiction of which is an upward sloping curve. It will be noted that the stock is always a certain quantity regardless of price. However, with regard to the supply schedule, the quantity supplied varies with price. A tabulation of the quantity difference between the stock and supply (as price varies) determines the reservation demand schedule. Therefore, in any standard supply demand diagram, the reservation demand is implicit in the supply curve, given a certain stock. The demand curve represents only the exchange demand. On the other hand, in the total demand-stock diagram, the reservation and exchange demand schedules are combined, which is then plotted against the stock. Both forms of diagrammatic representation convey the same information in different ways.

As discussed above neo-classical authors neither differentiate between the reservation and exchange demand for money, nor view this demand as a schedule. Indeed, for these economists, the demand for money is only a quantity, which in "equilibrium" is numerically equal to the stock. With this approach, there is no need to distinguish between the terms "supply" and "stock." They are synonymous. For Austrians, on the other hand, the demand for money is a schedule, which includes a reservation demand. This means money has a supply schedule, which is not the same as the stock. Therefore praxeologists should never use the term "money supply" when referring to the total quantity of money, M1, M2, MZM, AMS, etc. Unfortunately, however, they have inherited the same language as the neoclassicists. with the result that their insight and understanding of the money relation is sometimes overlooked or lost.

The ordinary way to depict the money relation, as per Rothbard, is by employing the total demand-stock diagram as discussed previously. But there is nothing to prevent this very same information from being represented by supply and demand curves, as shown below (Davidson, 2012) (Figure 2).

This somewhat unconventional type of analysis – unconventional only with regard to money, of course – more readily enables an understanding of money's connection to the goods for which it exchanges (Davidson, 2012). The exchange demand curve for money, D_E, is equivalent to the supply of all other goods in terms of money. And money's supply curve, S, is equivalent to the exchange demand for all these
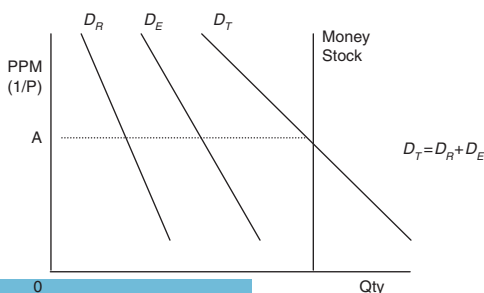
Figure 1.
Total demand
schedule for money
and money stock

other goods. Since S represents the money stock minus the reservation demand, it follows that if the reservation demand for money increases, then the money-supply curve S shifts left, which is the same thing as saying that the exchange demand for all other goods decreases. On the other hand, if the exchange demand for money D_E shifts right, then this is equivalent to the supply of all other goods increasing. In either case, *ceteris paribus*, money's "price" – its purchasing power – rises. (Mutatis mutandis, if the reservation demand or exchange demand for money decreases, then in either case, the PPM falls, *ceteris paribus*.)

It will be noted that, as with the total demand-stock analysis, this diagram is conceptual only, in that the PPM consists of an array of values. Moreover, since each good in the market has its own supply and demand schedule in terms of money, it follows that money has a partial supply and demand schedule with respect to each good. Nevertheless, in general terms – i.e. from a systematic point of view – changes in the social supply and demand for money can be represented as above, even though it must be remembered that such changes affect neither a single demand nor a single supply schedule of money[25].

Some authors have used the term "money flow"[26]. However, from an Austrian perspective, "money flow" is an inappropriate substitute for the term "money-supply schedule," first, because it implies money circulates – and therefore there are times when it is not owned by anyone, which is false – and second, because it implies money has a velocity associated with this flow. But money neither flows nor has a velocity, at least not in any meaningful sense. Rather it is exchanged, in the same way that all other goods are exchanged, according to the value scales of individual actors. The rate at which this happens tells us nothing in particular about the price.

Suppose the reservation demand for money decreases. In the analysis provided earlier, this means the money-supply schedule shifts right, and the exchange demand for goods increases. Prices in general of goods rise, and the PPM of money falls. According to the conventional wisdom, a fall in the PPM is indicative of an increase in velocity; i.e. market actors have increased their rate of spending. But why should more money spent per unit of time be related to more money spent per unit of good? It is not. Time is not a relevant variable. For example, when panic affects the stock market during a crash, millions of shares are traded every minute. The rate at which money and shares are exchanged increases dramatically – the "velocity" of money with respect to shares soars – but share prices do not rise; to the contrary, they fall. To take another example, the demand for Picasso paintings might sharply increase, causing their prices to rise, but the rate at which money is exchanged for Picassos can still fall if
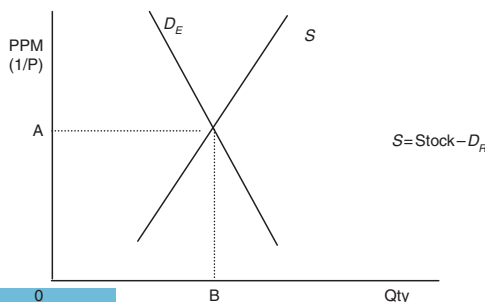

Figure 2.
Exchange demand and supply schedules for money

owners of Picassos are reluctant to sell. Velocity tells us nothing regarding the direction of prices. And what is true for individual goods is true for the economy as a whole. The entire concept of velocity is deeply flawed, for it concentrates only on the buyers of goods who want to lower their cash balances, and ignores the sellers of goods who wish to increase theirs.

5. Interest
The first part of this section discusses the definitions of interest associated with the theory of Mises and Rothbard. This is then contrasted with the definitions of others.

According to the Fetter-Mises pure time preference theory of interest, the rate of return that reflects the supply and demand of present money (in terms of future money) is a dependent on the social time preference. Mises (1949/1998, p. 238) calls this return originary interest and Rothbard (1962/2004, p. 441) terms it pure interest. However, because uncertainty is always and everywhere present, the total rate of return that exists in the time market as a whole tends to be at variance with the pure rate, the difference being entrepreneurial profit or loss. For Rothbard, this total return is the natural rate, a term which, as discussed later, has been defined somewhat differently by others. Because entrepreneurial profit or loss varies, depending on the individual uncertainty premiums and terms of trade, it follows there are multiple natural rates. In the real world, the pure return is always earned in conjunction with entrepreneurial profit or loss. Therefore, while it is possible to determine the total (natural) return at any given time or place, its components cannot be isolated from one another. Nevertheless, conceptually we know the pure rate exists, because we can imagine a world in which no uncertainty is present, where there is no profit or loss, and where all returns are uniform and equal. Mises (1949/1998, p. 247) terms this construct the evenly rotating economy (ERE).

In the ERE, the internal and external data are fully resolved with each other. However, it is possible to imagine another situation in which the supply and demand for present money are in equilibrium, but uncertainty abounds. In this case the natural rates differ, but the underlying pure return is still unchanging and uniform – it constitutes an intertemporal equilibrium. A fall in the social time preference lowers the pure rate, causing the production structure to lengthen. In this case, there is an intertemporal disequilibrium, *ceteris paribus*, until such time as the time market adjusts. Mutatis mutandis, a rise in time preference causes the production structure to shorten[27].

In his magnum opus, *Human Action*, Mises (1949/1998) makes clear that the originary rate in the loan market is the same as elsewhere in the time structure of production[28]. In the same vein, Rothbard points out that from the point of view of fundamental analysis, the pure rates of return that exist in the markets for loans, stocks, bonds, etc., are all determined in the same way. The total returns in these markets might vary according to the individual premiums associated with them, but the underlying pure rate is still uniform, and the total returns reflect the natural returns found everywhere in the economy, for they are all a part of the same time market[29].

According to Austrian business cycle theory (ABCT), injections of fiduciary media into the producers loan market cause market rates to be artificially lowered relative to those that would otherwise exist – and lowered relative to the natural rates in the production structure that initially do prevail – given the underlying social time preferences. It is as though time preference and the pure rate have fallen, when, actually, they have not. However, because there is only one time market, capitalist-entrepreneurs are encouraged by the erroneous interest rate to invest in longer term

production projects, in undertakings that are too long for the available resources given the level of genuine saving. These actions therefore are malinvestments. Because the time market must eventually revert back toward an intertemporal equilibrium based on an underlying time preference that presumably has not changed, the initial boom gives way to bust, and thus a business cycle.

Mises's and Rothbard's definition of the natural rate, which incorporates an underlying pure return, gives rise to the correct interpretation of changes in time preference in the capital structure. Moreover, it permits an accurate description of the effect of injections of fiduciary media into the producers' loan market in creating the ABCT.

However, Wicksell, who was the first person to use the term "natural rate of interest," defines it otherwise, and this has led to a number of different, and some would say erroneous, theories. In the Wicksellian framework, the "natural rate" is the equilibrium rate of interest that exists hypothetically in the production structure, assuming all goods are traded directly for one another without the existence of money. According to this notion, the interest rate on the loan market is governed independently by the supply and demand for loanable funds. Provided the two rates are the same, the market continues to be in equilibrium, and prices in general are not affected. Thus Wicksell (1898/1962, p. 102) states:

> There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them. This is necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were effected in the form of real capital goods (Wicksell, 1898/1962, p. 102).

> Now if money is loaned at this same rate of interest, it serves as nothing more than a cloak to cover a procedure which, from the purely formal point of view, could have been carried on equally well without it. The conditions of economic equilibrium are fulfilled in precisely the same manner. In such a case, there is no occasion for any alteration in the level of prices (Wicksell, 1898/1962, p. 104).

However, says Wicksell, if the loan market rate differs from the "natural rate," the economic equilibrium is disturbed, such that prices are affected. If too much money is lent, driving market rates lower, "entrepreneurs" gain greater "profits" relative to the "capitalists," encouraging a greater level of production. This leads to an increased demand for the factors, and higher prices. Conversely, a market rate of interest that is higher than the "natural" rate leads to fewer entrepreneurial opportunities and lower prices.

One clear outcome of this line of thought, generally accepted by the mainstream today, is that it is desirable to have a monetary policy administered by a central bank; one in which the interest rates on loan markets are adjusted to achieve price stability. For example, Anderson (2005) states:

> One widely discussed policy guide is the "natural," or equilibrium, real rate of interest. To use this guide, one compares the level of a medium-term financial-market real interest rate – such as the yield on a 10-year Treasury inflation-indexed bond – to an estimate of the long-term "natural," or equilibrium, rate of return on the economy's capital stock. The idea that inflation will be approximately constant when these two rates of return are equal is an extension of an idea advanced in 1898 by the Swedish economist Knut Wicksell.

But even within the Austrian School, Wicksell's definition has led to fallacious reasoning. Part of the problem in this regard may have been that in his earlier ground-breaking work, The Theory of Money and Credit, Mises (1912/1953) himself adopted the Wicksellian definition of the natural rate. Thus he states, it is "that rate of interest

that would be established by supply and demand if the real capital were lent *in natura* without the mediation of money" (pp. 306-307). Unlike Wicksell, Mises recognized that when interest rates in the loan market are driven down by an increase in the quantity of fiduciary media, it is not simply prices in general that are affected; rather, there is also a misallocation of resources that lengthens the production structure unsustainably, ultimately causing the business cycle. However, it was not until he published *Human Action* that Mises clarified his position as to where the real divergence in rates lay, by introducing and defining the originary (pure) rate.

Unfortunately, Hayek (1933) also adopts a Wicksellian definition of the natural rate in his description of the trade cycle, by treating it as a direct reflection of time preference, and ignoring the separate concept of the pure return. Later followers of Hayek, such as Kirzner and others, continue to define the natural rate in these terms, while at the same time seeing a disjunction between it and the loan market rate, inasmuch as it is subject to separate market forces. For example, Horwitz (2002, p. 56) states:

> The natural rate is defined as that rate which equilibrates the time preferences of savers and investors, while the market rate is the actual rate being charged by the banking system. If the banking system is accurately reflecting those underlying time preferences, then the two rates of interest should be equal.

The dichotomy between the "natural" and loan market rates, and the absence of an underlying pure return, are contributing factors to the erroneous notion that there exist both intertemporal disequilibria and monetary disequilibria. According to this line of thinking, intertemporal disequilibria affect actions in the production structure only, and are effected when the "natural" and loan rates diverge, whereas, monetary disequilibria affect all markets, and are caused by changes in the money relation. It is the latter, allegedly, that gives rise to a divergence in "natural" and loan rates. Therefore, business cycles are caused not simply by increases in fiduciary media that drive the market rate lower than that dictated by time preference as in the Misesean-Rothbardian framework; rather they are caused by monetary disequilibria that arise from uncompensated changes in either the supply of or the demand for money. Furthermore, according to this theory, in the absence of a central bank, the issuance of fiduciary media is entirely benign with respect to business cycles, because changes in supply automatically compensate for changes in demand, such that monetary equilibrium tends to be maintained. This in turn gives rise to the fallacious concept that it is only when the money stock is changed by central bank intervention that the market rate signals are erroneous and that business cycles are created.

6. Conclusion
Our conclusion is straightforward. To place macroeconomic studies on a firmer footing, clearer definitions are a necessary condition. We have attempted to move in this direction on several dimensions, in the hope that this type of analysis can help achieve that goal. It is very important that all economists, particularly those working in the vineyards of macroeconomics[30] strive mightily to cooperate one with the other, so that their work can be more efficient. For communication is the sine qua non of the cooperative venture of economics. To the extent we use words differently, or ambiguously, our productivity decreases. In the movie "Cool Hand Luke" the Paul Newman character says to one of the other members of the cast: "What we've got here is a failure to communicate." The same, unhappily, applies to macroeconomics. Hopefully, the present paper can move us at least a tiny bit in the direction of rectifying that situation.

Notes

1. Hoppe (1995) describes how both mathematics and praxeology yield synthetic a priori propositions, in the Kantian sense that is, propositions which require no prior experience, and yet tell us something true about the real world. Mises (1962, p. 5) also subscribes to the synthetic a priori nature of praxeology. Rothbard (1997, pp. 63-64), in contrast, as an Aristotlean/neo-Thomist, views the epistemological foundation of praxeology to be based on laws of reality that are broadly empirical. Nevertheless, his conclusions are identical.

2. Similarly, Senior (1836/1965, pp. 2-3) writes, "[economic] premises consist of a few general propositions, the result of observations, or consciousness, and scarcely requiring proof, or even formal statement, which almost every man, as soon as he hears them, admits as familiar to his thoughts, or at least as included in his previous knowledge; and his inferences are nearly as general, and, if he has reasoned correctly, as certain as his premises."

3. This is the case because unlike a concrete physical object, the definition of which can be established more-or-less unambiguously if either the object or its constituent parts are evident empirically, the categories of action are concepts, which have no physical reality.

4. See Polleit (2011) for a very clear exposition on how the law of diminishing marginal utility is derived.

5. This is particularly true when describing the objects of economic activity. For example, as Hayek (1955/1966, p. 31) reminds us, "Economic theory has nothing to say about the little round disks of metal as which an objective or materialist view might try to define money. It has nothing to say about iron or steel, timber or oil, or wheat or eggs as such." And according to Mises (1949/1998, p. 62), "The general notions as used in everyday language and mundane thought were not formed with regard to the requirements of praxeological and economic investigation. The early economists were mistaken in adopting them without scruple and hesitation."

6. According to Rothbard (1962, p. 327 fn. 5), "Training' in mathematics is no more necessary to the realization of its uselessness for and inapplicability to the sciences of human action than, for example, 'training' in agricultural techniques is essential to knowing that they are not applicable on board an ocean liner."

7. According to some claims, physics is less predictable than previously thought. It is beyond the scope of the present paper to judge whether this is true or not. However, hypotheses in this discipline, as in all empirical sciences, are still falsifiable. Not so in economics, at least not from the Austrian perspective.

8. Furthermore, the use of calculus is completely erroneous. As Rothbard (2009) points out, "Infinitely small steps may be fine in physics where particles travel along a certain path; but they are completely inappropriate in a science of human action, where individuals only consider matter precisely when it becomes large enough to be visible and important. Human action takes place in discrete steps, not in infinitely small ones."

9. As such, they are absolutely true. Mises (1949/1998, p. 234) states that these kinds of imaginary constructions are "the method of praxeology." Furthermore he states: "An imaginary construction is a conceptual image of a sequence of events logically evolved from the elements of action employed in its formation. It is a product of deduction, ultimately derived from the fundamental category of action […] The main formula for designing imaginary constructions is to abstract from the operation of some conditions present in actual action. Then we are in a position to grasp the hypothetical consequences of the absence of these conditions and to conceive the effects of their existence."

10. Thereby violating Occam's Razor (see Rothbard, 2009).

11. For a critique of Hudik on related grounds (see Block and Barnett, 2015).

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