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Microeconomics, Meso-economics and Macroeconomics

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1 Introduction

I have long been puzzled over the accusation that macroeconomic analysis (of the Keynesian and Kaleckian forms) suffers from a lack of microeconomic foundations. The founders of macroeconomic analysis clearly provided microeconomic behaviour: Kalecki specifically in terms of pricing (based on the degree of monopoly) and investment, though there was a lack of explicit household behaviour with regard to consumption (most or all of wage income taken to be consumed) and labour (where the available labour force was treated as socially determined and little influenced by the level of real wages). Keynes provided an analysis of investment decisions, price setting and labour supply at the micro level. But, what Kalecki, Keynes and many others did not conform to was the acceptance of the dominance of a microeconomic analysis based on utility optimisation over a well-known future, and they focused on some essential macroeconomic relationships (in a way which is indicated below).

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For some, macroeconomic analysis sits uneasily with the idea of what economics covers. The well-known view of Lionel Robbins (1933) is that “Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses” (p. 15). I do not intend to get into issues of whether economics is or could be a science (or what is meant by being a science). This definition focuses on human behaviour without mention of the interactions between individuals nor of how co-ordination between individuals is achieved. It says nothing about the overall levels of economic activity or of any macroeconomic relationships. As Joan Robinson (1972) observed, “It was just a coincidence that the book (Robbins 1933) appeared when means for any end at all had rarely been less scarce” (p. 1).

The American Economic Association cast the net a little, but not much, wider:

Economics can actually be defined a few different ways: it's the study of scarcity, the study of how people use resources, or the study of decision-making. Economics often involves topics like wealth, finance, recessions, and banking, leading to the misconception that economics is all about money and the stock market.... One of the central tenets of economics is that people want certain things and will change their behavior to get those things – in other words, people will respond to **incentives**. ... Lower wages in another country provide an incentive for a factory to relocate overseas to cut down on costs. High taxes provide an incentive for people to look for ways to hide their income because they want to keep more of their money. [However] Economic study ranges from the very small to the very large. The study of choices by individuals (like how someone decides to budget their paycheck each month) is called **microeconomics**. ... The study of governments, industries, central banking, and the boom and bust of the business cycle is called **macroeconomics**. (available at: <https://www.aeaweb.org/resources/students/what-is-economics>; bold in original) Macroeconomics is largely seen as relating to specific institutions (government, central bank).

It is necessary to locate macroeconomics within a much broader and inclusive perspective on economics—perhaps political economy would be a more appropriate term. Political economy would cover, inter alia, the generation and use of the surplus, the dynamics of capitalism, income

distribution, growth and development. Within that perspective, the overall aim is to understand and analyse the workings of an economic system. Any system is based on how the individual components make decisions and seek to implement those decisions, and what motivates behaviour and decisions. At various levels within the system, individuals interact, and their interactions help to settle the outcomes. This may be undertaken at the level of a market, industry, and so on. The outcomes may be analysed in terms of a consistency analysis of some form; but at a minimum, there has to be mechanisms which in some sense reconcile the decisions of the individuals, even if that means some individuals not being able to fully implement their decisions. Individual behaviour is socially influenced and constrained. Individuals interact economically in many different ways, and notably through market interactions but also (and predominantly) within organisations and institutions—households, corporations, for example. Within organisations, economic (and other) activities are organised and co-ordinated, and economic power exercised. Economic analysis then involves investigations of individual behaviour, and (more importantly) the ways in which individuals interact and co-ordinate at what may be termed the meso level and the macro level.

This chapter has three main sections, in addition to the introductory and concluding sections. In Sect. 2, the focus is on what have been termed ‘microeconomic foundations’ of macroeconomics, and it presents a critique of that approach and indicates severe shortcomings. In Sect. 3, the nature of macroeconomic relationships is discussed—namely, the general (and obvious) proposition that there are macroeconomic conditions, which are not immediately derived from microeconomic considerations alone, but where consistency and sustainability considerations have to be brought in. In Sect. 4, some of the problems of undertaking macroeconomic analysis are considered. Section 5 summarises and concludes.

2 Microeconomic ‘Foundations’

The relationships between microeconomics and macroeconomics are often discussed using the phrase ‘microfoundations’ of macroeconomics. As King (2012) remarks, “‘Microfoundations’ is a spatial analogy, taken from architecture, from the building trades or from constructional

engineering. ... Foundations have to come first, they must be solid and they must be reasonably extensive” (p. 22).

King’s (2012) Chapter 2 has the title ‘Microfoundations as a (bad) metaphor’. He argues that there are two essential reasons why the “microfoundations dogma” is “nearly all wrong” (p. 9). Also, “In sum, ‘microfoundations’ is a very bad metaphor, which has caused considerable confusion and has been used to justify some very bad decision by macro-economic theorists” (King 2012, p. 26). These are the fallacy of composition and downward causation. “The fallacy of composition entails that an entire economy may behave in ways that cannot be inferred from the behaviour of its individual agents” (King 2012, p. 9). The best-known example relates to the ‘paradox of thrift’ in which it is argued that a decision by a single individual to seek to increase their savings may well lead higher savings by that individual, but a comparable statement does not hold for an increase in the overall level of savings. In the context of a given intended level of investment (in the context of a closed economy), and the consistency requirement that overall savings = overall investment, then overall savings would not increase. This conclusion is drawn within the context of a specific model, and one may query the workings of that model; for example, actual investment may differ from intended investment through inventory changes, or it may be argued that investment intentions alter in the face of changes in savings intentions.

“The principle of downward causation states that, in economics, causal processes operate in both directions, not only from the behaviour of individual agents to the behaviour of the entire economy, but also from the economy to the tastes, beliefs, expectations and actions of the individual agents” (King 2012, p. 9). This is a view, which I would share, but there is a line of argument, which can be further developed. There are many ‘layers’ within the overall economy, and it is often ‘useful’ to proceed through those ‘layers’—engaging in what would often be regarded as ‘partial equilibrium’ analysis, though there is no presumption that equilibrium has to be involved. This could involve the grouping of individuals into a household and analysis of intra-household behaviour, the grouping of individuals within a set of employment relationships with corporations and other organisations, the ways in which producers and consumers interact within a market and an industry and so on. It has to be recognised,

though, that these units of analysis, for example, a market and an industry can be constructs of economic theorising.

There has to be analysis of behaviour at the level of the individual, which could be labelled microeconomic. Using the term 'foundations' suggests essential building blocks, whereas behaviour and decision-making at the level of the individual is merely one component. Further, the term 'micro-foundations' suggests that the direction of causation runs from the individual level to the aggregate level, whereas relationships and causation run in both directions. There are issues (as discussed further below) of how individual behaviour and decision-making is to be analysed and how extensive has to be the recognition that there is heterogeneity of behaviour within and between economic groups. There are two ways in which the analysis of individual decision-making has to incorporate what may be termed macroeconomic and systems influences. First, individuals are often portrayed as able to buy or sell what they wish at the parametric prices; and then mesoeconomic and macroeconomic complications arise since in general terms the amount demanded will not equal the amount which could be supplied. But there are many other influences, which reflect the macroeconomic conditions, such as the levels of employment and income, and the degree of credit rationing. Second, there are social influences, which mould individual decision-making. In the macroeconomic context, important influences here come from relationships between individuals and the degree to which relative income (whether relative to the income of others or to previous income levels) has influence on consumer behaviour.

The analysis of decision-making and activities at the isolated individual level would be rather uninteresting from an economic and social perspective. Indeed, it is difficult to think of many decisions and activities which do not have ramifications for others. It becomes rather like the 'economics of playing solitaire'—a solo activity but even then one with 'rules of the game', which are socially defined. A thought experiment such as how does an individual respond to different relative prices and so on in order to map out a demand curve is not of a great deal of interest. To use such information to make comments on economic events would require first some aggregation of the demand curves of relevant individuals and then understanding of how come price is now one unit lower,

how do producers respond to wishing to buy more what are the interactions between sales and subsequent production decisions and so on. In a number of respects, economic analysis pays rather little attention to individual decision-making—though the development of behavioural economics and of experimental economics has led to more attention. A quick look at text books with microeconomics in the title would reveal much focus on markets and industries in which there are interactions between the decisions of individuals (broadly defined). Further, in this approach, decision-making is approached at the individual level, although there are often slippages into treating decision-making at the household level. In so far as individuals live in households with some sharing (e.g. of domestic arrangements) and some elements of joint decision-making, issues of aggregation from the individual to the household level are involved.

It is clear that using this metaphor of microeconomic ‘foundations’ and its implications are severely misleading. While much analysis starts from the micro level, it cannot finish there, and there are feedbacks from the meso level and the macro level, which have to be fully acknowledged. Denis (2016) raises the question as to whether macroeconomic analysis must be reducible to and derivable from microeconomic behaviour, and identifies such an approach as “expressing a reductionist or atomistic standpoint, such that the whole is just the sum of its parts” (p. 150).

The appeal for ‘microeconomic foundations’ is often associated, implicitly or explicitly, with the assertion that those foundations should be clearly based on the forward-looking utility-maximising individual operating with rational expectations, and then the ‘representative agent’ is invoked to enable a form of macroeconomic analysis to be conducted based on such microeconomic ‘foundations’.

Modern macroeconomics seeks to explain the aggregate economy using theories based on strong microeconomic foundations. This is in contrast to the traditional Keynesian approach to macroeconomics, which is based on ad hoc theorising about the relations between macroeconomic aggregates. In modern macroeconomics, the economy is portrayed as a dynamic general equilibrium system that reflects the collective decisions of rational individuals over a range of variables that relate to both the present and the future. These individual decisions are then co-ordinated through markets to produce the macroeconomy (Wickens 2008, p. 1).

As King (2012) notes, after citing this quote, “the reference that Wickens makes to ‘the collective decisions of rational individuals’ unwittingly points to the difficulty: it is, of course, *individual* and not collective decisions that are, supposedly, being aggregated. If they really were *collective* decisions, the aggregation would be unnecessary” (p. 1). It is also asserted that the co-ordination of those individual decisions has been effected: yet a part of macroeconomic analysis relates to whether decisions are indeed co-ordinated and the consequences of failures of co-ordination.

This use of utility-maximising individual as *the* acceptable foundation is presented as being unproblematic. Yet as Denis (2016) argues, “the assumptions which microfounded approaches make in connection with the representative agent and the notion of equilibrium at the heart of DSGE show a striking degree of ad-hocery—a failure to ground key assumptions required for tractability” (p. 150).

It must be recognised that invoking a utility analysis for the individual provides apparent links with the evaluation of changes and policies in economic welfare terms. Woodford (2003) argued that “an advantage of proceeding from explicit microeconomic foundation is that in this case, the welfare of private agents – as indicated by the utility functions that underlie the structural relations of one’s model of the transmission mechanism [of monetary policy] – provides a *natural* objective in terms of which alternative policies should be evaluated” (p. 12; quoted by Denis 2016, p. 137; emphasis added). The limitations of this have to be acknowledged. The welfare criteria are built up from individual utility functions, and hence welfare is deemed to be enhanced if (using the Pareto criteria) some individuals’ utility is increased, while the utility of others is not diminished. Using a representative agent approach, economic welfare is deemed to be enhanced if the utility of that agent increases. However, that means economic variables, which do not contribute to individuals’ utility, are omitted from consideration in terms of economic welfare. Macroeconomic policies are then to be evaluated in terms of individual utility, and broader concerns are not considered. A notable omission would be inequality and the distribution of income. Wren-Lewis (2011) comments that “such derivations may result in policy objectives that are highly unrealistic, because the

models from which they derive generally contain no unemployment and no bankruptcies” (p. 131).

The RARE (representative agent rational expectations) approach has three key elements: first, the use of the notion of representative agent—that issues of aggregation can in effect be ignored in that there is an agent, which is representative of all. Second, the representative agent is a forward-looking utility maximiser, subject to lifetime budget constraint. Third, the agent holds ‘rational expectations’ on the future—the future is essentially knowable such that the agent can foresee the probabilistic future. This RARE approach has come to dominate ‘modern’ macroeconomics notably in the dynamic stochastic general equilibrium (DSGE) framework and the ‘new consensus in macroeconomics’. It can be critiqued in many ways, and here the focus is on three:

- (i) It is a surprising feature that mainstream macroeconomic analysis relies entirely on utility maximisation over an indefinite time horizon with information on the future path of income and so on. Although utility maximisation still plays a significant role in microeconomic analysis, other forms of motivation and decision-making are frequently considered. It is also the case that corporations and firms are regarded in the mainstream macroeconomic analysis as expressions of the interests of their shareholders, who are in turn individuals. Thus, a corporation is the agent of individuals and is treated as maximising profits in the interests of its shareholders. There is then assumed to be a consensus of interests amongst a corporation’s shareholders focused on profit maximisation. Further, there is no sense that the corporation, being a ‘legal person’ and an organisation, develops its own interests (such as survival, expansion) or that the key decision-makers within the corporation pursue their own interests.

With the representative agent approach, corporations and other organisations ‘do not exist’ as entities which have their own interests—it is rather that corporations are merely the agents of household and reflect the interests of the representative households. The representative agent approach is essentially based on an individualistic approach, albeit one in which the actions of diverse individuals can be summarised in terms of a

single representative agent. What role is there then for organisations and institutions in this set-up? Implicitly (if not explicitly) a corporation is run in the interests of its shareholders; and a trade union in the interests of its members. Yet, a corporation is a legal person with rights and obligations.

As agents of households, firms do not act as employers of individuals. As King (2012) notes, “neither employment nor unemployment plays any significant role” (p. 1), in the model, and there is no index entry for unemployment in Wickens (2008). In a similar vein, firms make investment decisions as agents of households, and as such their investment decisions reflect the savings intentions of households and the inter-temporal allocation of income desired by households (Blanchard and Fischer 1989; Woodford 2003).

The ‘power’ of the RARE approach is that (as exemplified by the representative agent) is based on its adoption of an institutional approach focused on the individual and where all individuals adhere to a uniform behaviour (that is utility maximisation). Economic system analysis has to include theorising on individual and institutional behaviour (as well as macroeconomic considerations). It can be readily recognised that industries, markets and corporations operate in diverse ways, which change over time and differ between countries. In the macroeconomic context, the ways in which price setting and determination, investment, production and employment decisions are made differ between industries, markets and so on. In a similar vein, wages are determined in a variety of ways through the economy. Wage determination can be used here to illustrate the issues involved. A first point to make is to what the wage determination relates. It has been a basic postulate of the mainstream models that in effect it is real wages, which are settled in the labour market; the demand for and the supply of labour are deemed to be functions of the real wage, and the interaction of demand and supply would settle the real wage in equilibrium. However, it is a general view of post-Keynesian economics that it is the money wage which is settled, though influenced by perceptions of what that money wage means in real terms. For workers, the real wage is their money wage adjusted for the price of goods and services which they buy, whereas for firms it is the relationship between money wage and price received for the goods produced. The

second point is that it is generally recognised that there are different ways in which wages are settled, and economists and other social scientists have analysed and modelled wage determination in many ways such as bargaining models, efficiency wage considerations and competitive market determination, and within each of those types of models, there are many variants. The varieties of models and approaches illustrate issues of aggregate relationships which are returned to below and also illustrated the roles of institutions and departures from the utility-maximising approach of RARE.

- (ii) Paradoxically, the sort of macroeconomic models which claim to give a picture of economic reality (albeit a simplified picture) have almost no activity which needs coordination. This is because typically they assume that the choices of all the diverse agents in one sector – consumers for example – can be considered as the choices of one ‘representative’ standard utility maximizing individual whose choices coincide with the aggregate choices of the heterogeneous individuals. My basic point in this chapter is to explain that this reduction of the behaviour of a group of heterogeneous agents *even if they are all themselves utility maximizers*, is not simply an analytical convenience as often explained, but is both unjustified and leads to conclusions which are usually misleading and often wrong. Why is this? First, such models are particularly ill-suited to studying macroeconomic problems like unemployment, which should be viewed as coordination. (Kirman 1992, p. 117)

Kirman (1992) provides four reasons why it is untenable to argue that models using a representative agent “are not intended to study those problems which involve, in an essential way, questions of coordination but are designed to examine some central macroeconomic phenomena” (p. 118). First, “there is no plausible formal justification for the assumption that the aggregate of individuals, even maximizers, acts itself like an individual maximizer ... Secondly, ... [t]he reaction of the representative to some change in a parameter of the original model may not be the same as the aggregate reaction of the individuals he ‘represents’. ... Thirdly, ... it may well be the case that in two situations

of which the representative prefers the first to the second, every individual prefers the second to the first. Lastly, trying to explain[sic] the behavior of a group by that of one individual is constraint[sic]. The sum of the behavior of simple economically plausible individuals may generate complicated[sic] dynamics, whereas constructing one individual whose behavior has these dynamics may lead to that individual having very unnatural characteristics”.

- (iii) The system analysis also has to be based on views on the ‘human condition’. The RARE approach is based on a probabilistic view of the future in which the underlying forces of the economy operate. The alternative (post-Keynesian) ‘vision’ is based on fundamental uncertainty. Keynes (1937) drew the distinction between risk and uncertainty: “The sense in which I am using the term [uncertainty] is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth-owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know” (p. 214). Taking that view seriously (which I do) completely undermines the RARE approach—calculating expected utility in an uncertain world is not feasible and cannot be used to analyse individual behaviour. Further, as the future is uncertain, future outcomes will be moulded by actions and decisions en route to that future; in other words, there will be path dependency.

Within mainstream macroeconomics, notions of path dependence and hysteresis have been flirted with—notably with regard to the effects of the experience of unemployment on future labour supply and employment decisions. Growth models within the mainstream have been dominated by neo-classical and endogenous growth theories, which share the feature that growth is viewed in terms of supply side. In some contrast, heterodox economics has generally been aware of hysteresis.¹ The demand-driven approach lays down a path-dependency approach as compared with the mainstream supply-side approach as the path of

demand and its structure impacts on investment, capital formation and sectoral developments.²

There is then a stream of macroeconomic analysis, which is focused on issues of co-ordination—how are economic activities co-ordinated? And why and how does co-ordination fail? Within macroeconomics, unemployment (of labour) has often been viewed as a failure of co-ordination—there are people willing to work, and there are people wishing to buy what could be produced. The literature coming from the ‘re-appraisal of Keynesian economics’ through ‘temporary equilibrium’ emphasises this co-ordination approach. In effect a set of perfectly competitive and clearing markets would ensure full employment—after all the demand and supply of each type of labour would be brought into equality. But the question was posed as to the effects of trading out of equilibrium: there would still be a co-ordination of demand and supply, but that would be through the short side of the market dominating (actual trade = minimum of ex ante demand and ex ante supply). There is a failure of prices to adjust and ensure full employment equilibrium.

If by microeconomic foundations is meant the implementation of individual decision-making, then there is an obvious and immediate issue. Namely, that one individual’s decision is not compatible with others’ decisions in the sense of leading to inconsistent outcomes (e.g. the individual wishes to buy X, but the other individual is not willing to sell X). The analysis of perfect competition raised two related issues. First, as Arrow (1959) pointed out, if as assumed in the perfectly competitive model all economic agents are price takers, the question is: how do prices change? Attempts were made to overcome that issue ranging from invoking a Walrasian auctioneer whose role was to adjust prices through to some economic agents exploiting a limited monopoly to vary prices.

Second, how could the ability of economic agents to buy and sell as much as they wished at the prevailing price be compatible with economic agents being demand constrained as envisaged in the basic Keynesian macroeconomics story? This was in effect resolved by looking at a situation of non-market clearing where the minimum of demand and supply would be the amount traded. In a situation where the market price was above equilibrium, supply would exceed demand and suppliers (firms) would find themselves demand constrained.

These issues were often approached in the context of macroeconomics, and finding a consistency between microeconomics (as represented by individuals being price takers) and macroeconomics (where individuals are often seen as demand constrained). It should also be considered in terms of the relationship between microeconomics and mesoeconomics—decisions made by individuals (in this context with respect to relative prices) cannot in general be fully implemented and the effects of that have to be further considered.

Economic analysis operates at a number of levels: here the individual level of decision-making (what is often referred to as microeconomic foundations), the meso level (such as market, industry) and the macro level are distinguished. Although the question has been raised on the microeconomic foundations of macroeconomics, many of the issues also arise in relation with the microeconomic foundations of mesoeconomics. A pertinent example here concerns what is termed price rigidity/inflexibility. It is individual prices rather than the price level, which is deemed to be rigid/inflexible. Firms set prices at which they are willing to trade: the reassessment of price takes place non-instantaneously—it may be a matter of days or of months. Price flexibility is a meso-level issue though it can have macroeconomic implications on the path of the economy. At the level of the market/industry (and indeed firm), there is a question of how prices change, how frequently and in response to which forces. Similarly, there are ‘fallacy of composition’ issues at the meso level, which reflect that what may be (approximately) true at the individual level does not hold at the meso level (and then by extension at the macro level). An individual may be portrayed as able to purchase what she wishes at a prevailing market price. But, of course, there has to be a corresponding willing and able seller(s).

At the meso level, there are tests of consistency to apply—in a market, is there a consistency between what individuals wish to buy and what other individuals wish to sell? If there is not, what are the margins of flexibility (e.g. are sellers able to run down stocks)? In this example, which side of the market determines the outcome—a usual assumption being that the ‘short side’ of the market prevails and that it is the minimum of desired demand and desired supply which determines the amount actually traded.

3 Nature of Macroeconomic Relationships

There are clearly relationships which apply at the macroeconomic level (and similar remarks would apply to the mesoeconomic level), which do not have microeconomic underpinnings. The requirement for savings = investment is a notable one. Pasinetti (1974) argues that his investigation

is not ‘macro-economic’ in the sense of representing a first simplified rough step towards a more detailed and disaggregated analysis. It is macro-economic because it could not be otherwise. Only problems have been discussed which are of a macro-economic nature; an accurate investigation of them has nothing to do with disaggregation. They would remain the same – i.e. they would still arise at a macro-economic level even if we were to break down the model into a disaggregate analysis. (p. 118)

King (2012) argues that there “are *macroeconomic* theories, which are consistent with a very wide of assumptions about individual behaviour and therefore also with a considerable variety of microeconomic models” (p. 24).

There is a partial but incomplete truth here; notably the relationship of the equality (in a closed private economy) between savings and investment (in terms of outcomes, and in terms of an equilibrium condition). Further, there is a ‘split’ between those who envisage that investment ‘causes’ savings (which may be termed the general Keynesian/Kaleckian approach) and those who envisage that there is a pool of savings which lead to investment (the neo-classical approach, now in the DSGE models). Within each of these broad groupings, there will be differences of view on how savings and investment are to be modelled. The ways in which savings and investment are approached will have implications for macroeconomic behaviour even though it is constrained by the requirements of savings equals investment as an outcome. Further, there have to be assumptions made on the way in which banks and the financial system operate—after all investment expenditure has to be financed.

There are relationships that hold at the macroeconomic level, which may involve individual behaviour and constraints, but which crucially involve a consistency requirement. The most well-known of these is the equality between savings (S) and investment (I) (for a closed private economy taken for simplicity). For any individual (person, corporation), considered as a balance-sheet constraint, borrowing/lending = savings minus investment. The requirement that one person's borrowing is another person's lending means that, in total, net borrowing/lending equals zero. Summing over individuals yields aggregate savings equals aggregate investment. Simply adding together the individual-level constraint would merely total borrowing/lending = savings minus investment. To arrive at the macro relationship requires noting a consistency requirement (one person's borrowing is another's lending) to yield savings equals investment. This is an aggregate/macro relationship. To add to it requires saying something on the determinants of savings and investment. The determinants of savings and investment may form a long list, and this part of the 'model' can make only a small contribution. If, for example, we have $s.Y = I$, with I given, which provides the determination of Y, there is then an associated adjustment mechanism where Y adjusts to fulfil that equilibrium condition. When there is a much longer list, all that can be said is that the equality between savings and investment has to be assured but how and when is left open.

Depending on how aggregate savings equals aggregate investment has been built up sets how the equality is interpreted. If at the level of the individual, borrowing/lending = savings minus investment is a balance-sheet outcome, then aggregate savings equals aggregate investment is the national income accounts identity. On the other hand, putting 'desired' into the equation at the individual level and combining a balance requirement (borrowing = lending) yields desired savings equals desired investment.

This relationship can then go on to provide the 'paradox of thrift', as mentioned above, in which from a simple representation of desired savings and investment, $sY = I$, a higher propensity to save does not lead to a higher level of savings. This 'paradox of thrift' is the best known of the paradoxes, which arise in post-Keynesian economics, as

listed by Lavoie (2014). Other paradoxes including the ‘paradox of costs’ (higher real wages lead to higher rate of profit), paradox budget deficits (raise profits), paradox of debt (efforts to de-leverage might lead to higher leverage ratios), paradox of tranquillity (stability is destabilising), paradox of risk (‘availability of individual risk cover leads to more risk overall’), paradox of liquidity (‘new ways to create liquidity end up transforming liquid assets into illiquid ones’) and paradox of profit-led demand (‘generalized wage restrictions lead to a slowdown in growth even when all economies seem to be profit-led’).³ These ‘paradoxes’ are representative of macroeconomic relationships in the sense that they are not derived merely by the summation of an individual-level relationship. As illustrated by the ‘paradox of thrift’, interactions between the behaviour of individuals and adjustment processes have to be taken into account which cannot be solely the summation across individuals.

Money is a generally accepted means of payment, which is a credit relationship that depends on trust (notably that a ‘piece of paper’ will be accepted by others in payment). It is a macroeconomic concept in two ways. First, individuals accept money in payment only because they believe others will do so from them. Money is a social construct and one which could not yield any benefit to an isolated individual. Second, there are significant macroeconomic relationships involving money. A monetarist approach would invoke some form of $MV = PT$ relationship. A post-Keynesian approach would note that the amount of money in existence has to be held by people and that stock of money becomes demand determined in the sense of the willingness of people to hold money.

Macroeconomic analysis also contains relationships and concepts which are macroeconomic in nature (in the sense of the quote from Pasinetti 1974, as above) and which are derived from some form of sustainability. The non-accelerating inflation rate of unemployment (NAIRU) provides an example. The NAIRU is a level of unemployment at which (according to the theory at hand) the rate of inflation would be constant. The rate of inflation and the rate of unemployment are macro concepts, and the NAIRU cannot be derived from summing individual experiences.

The NAIRU is a concept which I have found to be problematic (Sawyer 1999) and I prefer to refer to an inflation barrier (as in Arestis and Sawyer 2006). It should be noted that the NAIRU is a property of a specific theoretical model, and as such may not be a property of the real world. The NAIRU may not be a level of unemployment at which the economy generally operates—it may be a ‘weak attractor’. There may also be forces at work which lead the inflation barrier to be being path dependent (Sawyer 2001). The NAIRU is a macroeconomic concept—that is, it only arises at the economy-wide level, and is more akin to a sustainability condition—if unemployment (according to the model) deviates from the NAIRU, then inflation will rise or fall continuously, imposing that sustainability condition of constant inflation yields the NAIRU. This is not to say that the NAIRU will be realised as it may not act as a ‘strong attractor’ for economic activity.

The ‘natural rate of interest’ provides a further example. The ‘natural rate of interest’ is again a macroeconomic phenomenon in the sense that it has no microeconomic counterpart, and is intended to correspond to a balance between savings and investment. It is also model dependent, and only has meaning in a group of models, but not in others. For example, a post-Keynesian/Kaleckian model of the economy in which savings and investment are insensitive to rates of interest would not generate a ‘natural rate of interest’.

There are the many concepts and relationships which are macroeconomic in nature in the sense that they cannot be derived by the summation of individual microeconomic behaviour. These concepts and relationships are widely recognised even in mainstream economics and serve to show that macroeconomic analysis cannot be approached through mere aggregation from the individual.

4 Undertaking Macroeconomic Analysis

Macroeconomic analysis, whether in theoretical terms, for empirical forecasting or for pedagogical reasons, has generally proceeded by invoking relationships between macroeconomic aggregates. The use of aggregate functions could be seen as a reflection of a lack of human computing

power. It is possible to shift the IS and LM curves around and derive predictions from them with a piece of paper. As individuals, there is a lack of computational ability to deal with say ten consumption functions and so on, though computer power would be able to do so. The IS-LM analysis, for example, is based on equations, which map equilibrium positions in terms of income and rate of interest based on an aggregate savings function (savings based on income), aggregate investment as a function of rate of interest and demand for money (function of income and rate of interest) and a given stock of money. In each case, the assumption made is that there is individual-level behaviour (in respect of savings, investment and demand for money) which can be aggregated to provide comparable behaviour at the aggregate level. But, as hinted at when discussing the representative agent above, the conditions under which the aggregate functional relationship exists and mimics the individual functional relationship are likely not to be met. The question then arises whether attempting the simplification of invoking an aggregate relationship may mislead.

First, consider the case of the consumption function. Take the simplest of consumption function $c_i = a_i + b_i \cdot y_i$ for individuals $i = 1, 2, \dots, n$; then summing across individuals yields $C = \sum_1^n c_i = \sum_1^n a_i + \sum_1^n b_i y_i = A + BY$; the last term equals $\sum_1^n B \cdot (b_i / B) \cdot Y \cdot (y_i / Y)$, which can be written as $B \cdot Y$ if b_i / B , y_i / Y are constants. Specifically, if there are variations in the distribution of income (and hence y_i / Y vary), then there will be shifts in the consumption function. Introducing further variables would serve to complicate the picture. For example, the inclusion of individual wealth would involve similar distributional issues as those from income, but also raises issues of wealth valuation. Households whose consumption plans would exceed their income would be faced by credit constraints on their ability to borrow. The overall availability of credit (a macroeconomic phenomenon) would also need to be introduced.

The first conclusion to be drawn from this would be that the use of macroeconomic aggregate relationships, which mimic an individual-level relationship, may be misleading if some of the aggregation assumptions do not hold. In the example above, that could be if the distribution of

income (between individuals) was also changing. A further example is coming from Steedman (1992), where he questioned the move from a relationship at the level of an industry under which it was postulated that the markup of price over unit costs depends on the 'degree of monopoly' to a comparable one at the macroeconomy. Thus, a rise in the degree of monopoly may not lead to a rise in the profit share.

A more severe example comes from the use of aggregate production functions (at the core of which aggregate output is related to aggregate employment and aggregate capital). Felipe and McCombie (2013) derive the subtitle of their book from "scientific idea is 'not even wrong' if it is so incomplete that it cannot be used to make predictions that could be compared to observations to see if the idea is wrong" (Peter Woit 2006, referring to some remarks by Wolfgang Pauli). Their book "shows that the aggregate production function suffers from this same problem, namely it is 'not even wrong'" (p. vi).

After noting the widespread use in macroeconomics and neo-classical growth theory, Felipe and McCombie (2013) state that there are numerous methodological problems in the use of aggregate production functions. Notable amongst these are the Cambridge 'capital controversy' issues ("theoretical problems of aggregating heterogeneous capital goods into a single index that could be taken as a measure of 'capital' as a factor input", p. 3) and general aggregation issues ("this shows that the conditions under which it is possible to sum micro-production functions to give an aggregate production function are so restrictive as to make the concept of the aggregate production function untenable", p. 4).

The work of Felipe and McCombie (2013) raises some significant issues. They show that the econometric estimation of what appears to be an aggregate production function (e.g. regressing output on labour, capital stock) may well provide satisfactory estimates (relationship statistically significant). Yet, the regression estimates do not represent an aggregate production function. Insofar as the distribution of income between wages and profits is little changing, then a Cobb-Douglas production function will appear. The first derivatives of the production function cannot then be used to provide estimates of the marginal productivities of the factors.

This discussion suggests that the uncritical use of aggregate functions, which mimic corresponding micro/meso functions, can often lead to

misleading conclusions. In the case of the aggregate production function, not only is there the problematic nature of ‘aggregate capital’ but also the assumption being made that there is technical efficiency assumed, whereas it is well-known that firms differ substantially in terms of technical inefficiency. For the aggregate consumption function, it is often forgotten that households differ in terms of how far they are credit constrained. Using a set of aggregate functions may be the first convenient step for macroeconomic analysis, but it has to be backed up through using relationships, which hold at the individual or group level. The developments of simulation and agent-based modelling now provide ways of undertaking such analysis.

There is, though, a further issue, namely, that important relationships arise at the aggregate level, which must be captured in the analysis. The particular example would be the equality between savings and investment at the aggregate level (for closed private economy). However savings decisions and investment decisions are arrived at, there is still that requirement. This may though only be a reinforcement of issues at say the market level. It may not be possible to derive a demand for X curve and a supply of Y curve summed from individual demand and supply curves. Yet it would still be required that demand equals supply (whether as an actual equilibrium condition or in terms of outcomes).

5 Summary and Conclusions

I conclude by echoing the sentiments of Vercelli (2016) when he writes that

the only way to reduce macroeconomics to *Homo-economicus* microeconomics is to kill macroeconomics as an autonomous discipline, denying its inner life rooted in its emergent properties. We believe, on the contrary, that a vital and lively macroeconomics is needed: autonomous but with sound methodological and institutional foundations. To this end, we need non-dogmatic microfoundations in the sense – different from that supported by the MIF [microfoundations of macroeconomics] – of a clarification to assumptions about individuals’ features and behaviour and how the interaction between individuals causes emergent properties. (p. 164)

The interpretation here is that macroeconomic analysis requires a pluralistic and realistic microeconomic basis—that is not one based on utility-maximising individuals with rational expectations. The microeconomic basis has to reflect the institutional arrangements in the economy being analysed—how do corporations behave particularly with regard to investment, pricing and employment? How are wages determined, and how to incorporate the heterogeneity of institutions and their behaviour? Simple aggregate relationships are unlikely to exist, which poses major issues for the techniques to be deployed by macroeconomic analysts. There has to be full respect for consistency and sustainability criteria, which provide much of macroeconomic analyses. There has to be behavioural underpinnings of individuals and organisations where the interactions between individuals and organisations set the path of the economy. The macroeconomic conditions in turn mould the behaviours of individuals and organisations.

Notes

1. For discussion, see Arestis and Sawyer (2008), Sawyer (2010).
2. See, for example, Setterfield (2002).
3. Quotes in this paragraph are from Lavoie (2014, p. 18).

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