

## RESEARCH ARTICLE

# Methodological Developments in Economics: The Microeconomic Foundations of Macroeconomics

Dobrescu M\*

*Faculty of Economics, Academy of Economic Studies, Bucharest, Romania.*

\*For correspondence: E-mail: [monicam\\_dobrescu@yahoo.com](mailto:monicam_dobrescu@yahoo.com)

## Abstract

Up to the '70s we can talk of an apparent consensus in economics – in both theory and practice – a consensus much along the lines of the Keynesian doctrine. Since the early '70s, however, a state of turmoil has characterized economic science, due to the gap between macroeconomic practice and microeconomic principles and to the economic imbalances of the 8<sup>th</sup> decade, which the mainstream view could not handle anymore. The present paper aims to investigate whether recent research has managed to successfully reconcile micro and macroeconomic analysis. We assert that the reunification of the two fields was rendered possible either by adapting macroeconomics to microeconomics – the New Classical approach, or the other way round, by adapting microeconomics to macroeconomics – the New Keynesian approach. We use qualitative analyses to assess the methodological progress in economics, using such methods as logical inference, formal analysis and synthesis, but also comparison and interpretation of recent theoretical contributions. We find that recent research has indeed managed to provide solid micro foundations for economics – particularly through the rational expectations assumption – which is one of the very few hypotheses almost unanimously accepted by economists. Today the axiom of rational expectations is firmly established in both economic methodology and economic policy. Despite this theoretical progress, however, in practice, economists have not substantially changed the way they analyse the economy.

**Keywords:** *Macroeconomics, New Classical School, New Keynesian Economics, Rational expectations.*

## Introduction

During the '60s, the large macroeconomic models used by economists would describe the economy through a system of equations – one for consumption, one for investment, one for the money demand etc. – each of these being derived from the decisions adopted by firms or individuals. This approach was attractive because the models were explicit and clear from a mathematical point of view, and the equations parameters could be estimated using the solid econometric tools constructed and perfected during the post war period. They were considered unanimously as fitting the US economy model and were used to solve economic policy problems, primarily the influence of monetary policy on production, inflation and unemployment. At the same time though, economic research had created a gap between macroeconomic analysis and microeconomic principles and it was universally acknowledged that economists needed to investigate the relationship between the micro and macro levels, in other words, to provide solid microeconomic foundations for macroeconomics. The main theoretical difficulty encountered in this process was that macroeconomic problems

require a *dynamic approach under uncertainty*. When choosing a certain level of present consumption, individuals must necessarily make a decision about future consumption, too. Similarly, the decision to make an investment is based on anticipations of future earnings. These and many other decisions are made under risk and uncertainty; moreover, they are based on anticipations about future prices, so that it becomes necessary to model the decision-making process and the way individuals formulate and revise their expectations. Creating the framework to analyze the situation is the task of economic theory, and modern economic models do use economic theory to a large extent. In this context, the New Classical School's contributions – primarily Robert E. Lucas, Jr., Robert Barro, E. Prescott, Th. Sargent and N. Wallace – [1-7] initiated the reformulation of the “eternal” macroeconomic problems in the language of economic theory. Within this undertaking, theoreticians first formulated the research agenda where macroeconomic models could provide viable solutions. Moreover, these models have the ability to reflect a series of observations traditionally

considered incompatible with the concept of equilibrium, regarding unemployment, underutilization of capital or the fluctuations in economic aggregates. The foundations of these models rely on two fundamental postulates: first of all, individuals act consciously and deliberately to achieve their goals and this characteristic is best illustrated by models in which economic agents seek the maximization of well-defined functions of objectives. Secondly, since the results of an action or decision depend upon the actions of all individuals, economic agents must formulate anticipations about other people's actions, as well as anticipations of other people's anticipations etc. The '60s macroeconomic models were opposed to the assumption of agents' maximizing behaviour, and their rejection was due, in part, to their incompatibility to high, persistent unemployment.

One of the most important microeconomic foundations is the formulation of rational expectations by economic agents; generally speaking, the RATEX hypothesis postulates that economic agents make use of the available information in the best possible way. The generalization of the RATEX hypothesis took quite some time, but once it started to be applied, it proved its feasibility and utility in at least three ways: firstly, rational expectations do not add free parameters to the models' systems of equations, but on the contrary, they impose restrictions, which make the models easier to work out. In this respect, rational expectations differ essentially from adaptive expectations, which introduce free parameters in order to explain the formulation and revision of expectations. Thus, the advantage of the RATEX hypothesis is that it restricts the number of possible solutions. Secondly, rational expectations are perfectly consistent with the principle of maximizing behaviour; last, but not least, the current approaches of macroeconomic models – in terms of general equilibrium – cannot leave out the RATEX hypothesis and necessarily require its incorporation.

Here is how Robert Barro [1], an outstanding New Classical economist, comments on the necessity of founding macroeconomics on microeconomic principles. In constructing useful macroeconomic models, strong emphasis must be placed upon economic theory, particularly in what regards their rationality and internal consistency. But we must bear in mind that the decisive test of the model lies in its ability to account for the evolution of macroeconomic variables in real economies. Consequently, once the basic theoretical framework has been constructed,

economists must undertake to test the implications of the theory against economic reality, that is, against empirical data. The construction of such a model starts with the formulation of a price theory, which constitutes the micro foundations of the model and will serve as basis for the macroeconomic analysis of the aggregate variables in the economy. In this respect, Barro's approach represents but an extension of the logical inferences used in the explanation of entrepreneurs' and individuals' behaviour; the author uses the same method in the analysis of macroeconomic variables, such as gross national product, employment and unemployment, the general price level and inflation, wages, interest rates, the exchange rate etc. In this way, the theoretical models constructed in close connection to the notions and methods of microeconomic analysis are more satisfactory, in that they avoid internal inconsistencies and offer a better understanding of economic realities. In constructing his model, Barro starts from an isolated Robinson Crusoe and extends the analysis; this primitive environment contains however, the very essence of individuals' *choice* in real economies, so that the conclusions drawn remain valid when the analysis is extended to modern industrial economies. At this level, *making a choice* only refers to the amount of labour, which in turn, determines the level of production and consumption. The basic theoretical model comprises a type of economic unit imagined as a combination between a household and a firm, hence the name Robinson Crusoe: the unit – generically referred to as *household* – combines the consumption activities of households with the production activities of firms. The way Barro imagines this simplified model is based on a series of assumptions, briefly summarized below:

- Each economic unit uses exclusively its own work effort as input into production – to simplify the model, capital stocks are not taken into consideration as inputs: the purpose in this initial stage is to point out the factors which determine households to choose the optimal ratio between work effort – leisure.
- Economic units' actions are guided by personal interest, thus exploiting the central economic postulate of optimizing behaviour.
- The production of goods during a given period is a function of the amount of work effort:  $y = f(n)$ .

- The model includes solely one type of good, in order to enable the measurement of each household's output.
- Each economic unit consumes everything it produces during a given period, because output cannot be stored over time and the units are isolated from each other.
- From the previous assumption we can deduce the form of the production function is  $c = y = f(n)$ ; this means that in order to increase utility through additional consumption, units must produce more; and since production is dependent upon work effort, it follows that the key decision within the model refers to choosing the amount of work effort that provides satisfactory utility.

Individuals' preferences can be expressed in terms of utility – of consumption and of labour – and the result of combining preferences with production opportunities determines the choice of work effort, production and consumption. These choices are analyzed in terms of income effects and substitution effects. Thus, an improvement in the production function induces a higher consumption level and lower work effort, by determining an increase in individual wealth; this is the income effect, and it has a positive influence on both consumption and labour. By improvement in the production function, Barro understands a constant marginal product of labour, implying that the new production curve is higher and parallel to the previous one. In what regards the wealth increase, this is defined in terms of utility increase; we cannot properly speak of income in the case of isolated economic units which consume everything they produce; the increase in wealth only occurs when they are able to produce – and consume more – with the same amount of work effort.

If the marginal product of labour also increases, then the substitution effect occurs, through an increase in both consumption and labour; in other words, the substitution effect has a positive influence on consumption and a negative influence on leisure. Cumulated, the two effects lead to an increase in consumption, but the influence on work effort is unsure: since the two effects have an opposite influence on the amount of labour, the latter will increase if the substitution effect is stronger, and will decrease if the income effect is stronger.

By extending the analysis at the macroeconomic level and supporting the theoretical arguments

with statistical data, Barro claims that the choice regarding work effort depends on countries' development levels: in less developed countries, people tend to work more to maintain consumption levels, even though the marginal product of labour is low and the work effort is already high. As the economy develops, the increase in wealth motivates people to consume more and work less, and when it develops even further, the substitution effect induced by the high marginal product of labour tends to offset the income effect: in this case, the change in work effort is very low, but consumption continues to rise.

Further on, the author develops the model, by introducing the goods market and monetary market. Now, households can exchange part of their own production on the goods market, which leads to increased efficiency through agents' specialization; they can also lend and borrow money on the monetary market, and thus choose a temporal consumption model that differs from the path of their income. In other words, unlike, or in addition to the Robinson Crusoe model, individuals express their preferences towards present or future consumption, preferences which may depend decisively on the interest rate of the monetary market. Similarly, they can choose between working in the present and working in the future. Further on, the author introduces the labour market, arguing that in order to simplify the basic model, we do not introduce this market from the outset; instead, we imagine that individuals are involved in their own production processes – in other words, each individual possesses their own business and is their only employee. For many purposes – such as analyzing the determinants of aggregate supply and of work effort, the general price level or the interest rate – we notice that this simplification is very useful. But for other analyses – such as the unemployment level or the determination of wages – we must explicitly approach the labour market. All throughout the analysis, it is necessary to emphasize the role of budgetary constraints: along one or more periods, there must be a balance between each individual's sources of funds and the uses of these funds. Many serious errors in macroeconomic research are made precisely because theoreticians forget to impose the proper budgetary constraints in the models they build. These conditions are extremely important in evaluating permanent or temporary changes in income, but also in studying the effects of the interest rate on borrowers and lenders, to name but two situations.

These are just a few instances illustrating the way microeconomic principles are incorporated into macroeconomic analysis – the author builds the entire economy starting from an isolated Robinson Crusoe, guided by personal interest and acting rationally; maintaining all the initial assumptions, the author gradually develops the model, by introducing the goods market, the monetary and capital markets, and finally the labour market, accompanied of course by all the specific macroeconomic aggregates as well.

It was also Barro [2] that emphasized the essential role of rational expectations among the microeconomic principles underpinning macroeconomics. In this respect, Barro says, the evidence points out that the RATEX hypothesis has been accepted by and large, by most economists. Its decisive victory is attested by the fact that many of the new Keynesian models have incorporated it, while maintaining wage or price rigidities. The use of rational expectations in macroeconomics is closely connected to one of the most controversial issues debated by economists – monetary neutrality. The most relevant example is the New Classical business cycle theory, which postulates that the incomplete information available to economic agents about the money supply and the general price level can lead to monetary non-neutrality.

All economists agree that one of the most important features of the new macroeconomics is the emphasis on the role of expectations, and more specifically those expectations which are not mere extrapolations of past experiences. Particularly in the field of political science, the use of expectations is not new, but in economic science, it has been introduced for a relatively short period.

While the microeconomic foundation of macroeconomics is one of the few accepted postulates in current economic science, there are however, economists who prefer to take a rather neutral position: without rejecting this hypothesis, they plead for open-mindedness in economic research and for the simultaneous exploration of other hypotheses, because we don't know exactly either what determines individuals' expectations, or how they can be influenced.

One of these economists is Herbert Stein [8], who takes a rather cautious position on rational expectations: according to Stein, at present, economists believe that it is the microeconomic foundations that give the new macroeconomics its authority; this seems reasonable enough: even

macroeconomics deals with individual behaviour; therefore we should seek the formulation of a consistent theory of individual behaviour. This is not to say that macroeconomics consists exclusively of microeconomic principles and concepts: individuals' behaviour may not be the same when they are part of an aggregate. Yet, it seems much more convenient to found economic science on a hard core of laws about individual behaviour, maybe owing to the conviction that this hard core remains constant through time and space; we must not forget, however, that this stable core of principles might actually be quite small. But there is yet another reason behind the assumption that macroeconomics has microeconomic foundations, namely the postulate that individual behaviour is rational.

All economic research tries on the one hand, to explain individuals' behaviour as rational; and on the other hand, to deny the existence of observed behaviour which cannot be deemed as rational. However, even a superficial introspection will demonstrate that rationality does not characterize all human action. And this is not a new idea: according to Frank Knight, not only do people fail to behave rationally, but sometimes they don't even want to. In reply to Stein's arguments, economists replied that they relate to sociologic motivations, rather than economic ones. But even if such an evasive reply could be relevant for the academic distinction of the two research fields, in real life, it has no importance whatsoever. The author concludes that he has no objection to the in-depth investigation of the implications of the RATEX theory, but he believes this should not be the only theoretical model explored. He believes research in the field of rational expectations is still rather confused and ambiguous, despite years of study by psychologists, sociologists, and even historians, which have not revealed much. In addition, this formal model is still in need of a rigorous scientific foundation and the progress is not fast enough to afford omitting other alternatives. The author himself still has difficulties in understanding this hypothesis, despite serious efforts to comprehend it; moreover, in dealing with real macroeconomic problems, the use of the RATEX assumption has usually led to different – even diverging – opinions by different economists. And this was due to the difficulty of quantifying the RATEX model and to the subsequent lack of accurate quantitative information, as well as the lack of a common scientific base that would lead to similar conclusions. The use of rational expectations only led economists to “grope in the dark”, without reaching a feasible, generally accepted solution to

real economic problems. One possible solution would be the adoption of firm rules of economic policy, but that would not solve the issue of scientific rigor surrounding rational expectations. The solution is to figure out how to actually learn more about expectations and so far, economic science has neither found a clear answer to this problem, nor made significant progress.

Last, but not least, if macroeconomics is to be grounded on firm microeconomic principles, the author suggests that economists obtain more statistical microeconomic data. This is because economists are trying to deduce macroeconomic implications starting from the micro level, whereas they only have data for macroeconomic aggregates, and these data are, in addition, old and outdated.

By contrast to the widely accepted idea of grounding macro-analysis on microeconomic theory, there still are a few economists who believe that macroeconomics can develop without microeconomic foundations; to sustain their position, they refer to the correlation between economic theories and their empirical confirmation, arguing that we cannot possibly build models inconsistent with economic realities, just because they fit a certain theory. In such instances, it is the theory that needs to be revised or even replaced, and, from this perspective, the microeconomic grounding of macro theory should be researchers' top priority. One of the most important opponents to the use of microeconomic principles – particularly the rational expectations assumption – is New Classical economist and Nobel Prize winner Edmund Phelps [9]. The author argues that two of the new and important directions of research are so full of flaws, that they are very unlikely to survive, let alone function properly. The first direction of research refers to the rational expectations hypothesis – a “movement” that has become a sort of religion among economists and has survived so far as some sort of ecclesiastical institution. Each new adept converted to this religion enhances the institution's power to control both the academic environment, and the public opinion. To sustain his statements, Phelps claims that neither theory, nor empirical evidence seem to confirm the rational expectations hypothesis. From a theoretical point of view, economic agents acting individually and separately cannot possibly determine prediction rules accurately. Even admitting that various groups of individuals were to calculate regressions – which is very unlikely – each of these groups focusing on the theory subject to anticipations, the equations of each

group may indeed converge to a common result; this result however, does not reflect the forecasting equations constructed under the rational expectations regime, but, in the best scenario, some sort of sub-equilibrium where the overestimation errors compensate the underestimation errors on the whole. And even though this compensation does take place, we must take into account that the errors are worse than the RATEX assumption entails at first glance. In what regards empirical evidence, the most recent and relevant example is that of the “Black Monday” in October 1987, when the New York Stock Exchange collapsed: analysts failed to identify – using the rational expectations theory – any change in the fundamental factors that might have determined the crash. Later on, analysts became more inspired, the author states sarcastically. On the whole, in order to decide if we are on the right path, we must take into account recent experiences; and the 9<sup>th</sup> decade is abundant of such failures of this direction of research; two notable recent examples include the extremely high dollar exchange rate in the early '80s, as well as its steep decline in the late '80s – and these examples seriously question the predictive capacity of rational expectations theory.

By contrast to Phelps' view, George L. Perry [10] – an opponent of the New Classical School – declares his firm position in favour of the micro foundations of macroeconomics. In his view, one of the main features of macroeconomics is that prices and wages are rigid – a fact used in macroeconomic models long before economics was founded on individual behaviour, which had a much higher predictive value than the assumption of rapid price adjustment put forward by the *market-clearing* models. Macroeconomic models should continue to use this supposition, but the understanding of individual behaviour and of its relationship to macroeconomic variables is just as useful. Moreover, economic science lacks a solid theory of inflation, and its micro foundations are in a position to produce such a theory. And if we accept that agents' reactions depend directly on their operating environment, a valid set of microeconomic principles could reveal the possibilities of changing economic agents' behaviour. In addition, it could provide an answer to the question whether and how we can change agents' reactions to different stabilization policies; last, but not least, it would enable us to formulate and evaluate a series of policies firmly directed towards changing economic agents' reactions.

Beside the numerous theoretical achievements, the micro foundations of macroeconomics—particularly the rational expectations assumption—have had a great influence on economists' empirical endeavours. By concentrating on agents' behaviour under uncertainty, the RATEX "revolution" radically changed both the way researchers formulate their theories, and the way they use statistical data to test these theories.

One such example refers to a long-debated issue that has been subject to repeated reconsiderations – namely the *permanent income* theory, initially formulated by Milton Friedman. However, using the rational expectations model, Robert Hall [11] formulates a simple, yet surprising implication of this theory: changes in individuals' consumption patterns are unpredictable. The argument underlying this inference is apparently as simple as the conclusion: according to the permanent income theory, consumers – confronted with intertemporal budget constraints – try to level out their consumption over time. As a consequence, consumption also reflects consumers' anticipations of future income and, under these circumstances, it only changes when consumers revise their anticipations. Admitting that consumers make the best use of all the available information, the revisions of their expectations will naturally be unpredictable, and so will changes in consumption. Formulated in such a manner, the permanent income hypothesis can be easily tested using econometric methods; moreover, it has already been successfully tested, at least as a first approximation: statistical data confirm that changes in consumption are, to a

large extent, unpredictable, and the consumption curve typically has a random evolution. The originality of Hall's theory lies in the specific approach of consumption theory: if 3 or 4 decades ago, empirical research was directed primarily towards the estimation of consumption functions, Hall's methodology focuses on a different goal; it concentrates on the research of intertemporal consumption behaviour of a representative consumer, in order to assess whether this consumer makes systematic mistakes in the optimization process.

Subsequent empirical studies however, some of them following Hall's own approach, have revealed that current income has a stronger influence on consumption than the permanent income theory postulates. The controversy around the validity of the permanent income hypothesis still remains quite lively today, but Hall's approach has decisively changed the terms of the dispute.

To conclude, we can rightfully claim that today the rational expectations hypothesis is the standard approach in both theoretical and empirical research, and is used in the analysis of numerous and various problems – such as the study of labour demand and supply, of consumption, of investment and stock accumulation, to mention just a few. And even though the new techniques are rather unlikely to replace the outdated econometric approaches completely, they have earned a well-deserved place in the economists' research toolkit [12-17

## References

1. Barro, Robert J (1984) Rational expectations and macroeconomics in 1984, AEA Papers and Proceedings, 74(2).
2. Barro Robert J (1987) Macroeconomics, John Wesley & Sons, New York
3. Lucas Robert E, Jr (1972) Expectations and the neutrality of money. Journal of Economic Theory, no.4, April
4. Sargent Thomas J, Wallace Neil (1975) Rational Expectations, the optimal monetary instrument and the optimal money supply rule. J. Political Economy, 83:241-254.
5. Sargent Th (1996) Expectations and the nonneutrality of lucas. J, Monetary Economics, 37.3, June
6. Piroșcă G (2012) Doctrina liberală în viziunea Școlii austriece, ed. ASE, București
7. Piroșca G (2011) Economic crises and the complexity of animal spirits modeling. Theoretical and Applied Economics, XVIII(2):(555):153-170
8. Stein H (1988) Comment on recent developments in macroeconomics: a very quick refresher course. J. Money, Credit and Banking, 20(3).
9. Phelps Edmund S (1988) Comment on recent developments in macroeconomics: A very quick refresher course". J. Money, Credit and Banking, 20(3):456-58.
10. Perry George L (1984) Reflections on the Current State of Macroeconomic Theory, AEA Papers and Proceedings, May 1984
11. Hall, Robert E. (1978). Stochastic implications of the life cycle – Permanent income hypothesis: theory and evidence. J. Political Economy, 971-87.
12. Dobrescu M, Badea L, Paicu C (2012) Business cycle theories and their relevance to the current global

- crisis, *Procedia Social and Behavioral Sciences*, Elsevier, Vol. 62/2012
13. Dobrescu M, Paicu C (2012) New approaches to business cycle theory in current economic science. *Theoretical and Applied Economics*, XIX(7):572
14. Grellet G (1979) *Tendances Nouvelles de L'economie Politique*, Editions du Centurion, Paris.
15. Mankiw, N Gregory (1988) Recent developments in macroeconomics: a very quick refresher course. *J. Money, Credit and Banking*, Part.2.
16. Mankiw N Gregory (1990) A quick refresher course in macroeconomics. *J. Economic Literature*, 28.
17. Muth J (1961) Rational expectations and the theory of price movements, *Econometrica*, July.