New approaches to business cycle theory in current economic science

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Abstract. *In modern economies, current research generally acknowledges that the central issues in macroeconomics are essentially the same as those identified by Keynes in the General Theory of Employment, Interest and Money. One way or the other, economists are trying to address the same macroeconomic issues that they did seven decades ago: How can we account for the different growth rates and various fluctuations observed in national economies? Which are the economic policies most suitable to solve the issues of growth and cyclic behavior? Both the new classicals and the new Keynesians have made considerable progress within their research paradigms: to explain economic fluctuations, the new classicals focus on technological perturbations, the intertemporal substitution of leisure and real business cycles; on the other hand, the new Keynesians speak in terms of monopolistic competition, menu costs or efficiency wages. On the whole, the new classicals believe that the business cycle can best be understood within the market-clearing model, whereas the new keynesians believe that business fluctuations are due to certain market failures of various sorts.*

The present paper focuses on the main directions of research of the new classical school on the business cycle, given that the theoretical progress in this field has been significant and relevant for economic policy during the past four decades.

Keywords: monetary business cycles; real business cycles; sectoral adjustment theory; monetary neutrality; market-clearing models.

At the heart of the *rational expectations* theory and New Classical Economics lie Friedman and Phelps' predictions regarding the inflation – unemployment tradeoff: the two economists argued that sustained inflation can have no effect whatsoever, since individuals are concerned with real, rather than nominal variables: once they anticipate sustained inflation, they will adjust their decisions on prices and employment levels accordingly, which means that inflation cannot incur a permanent reduction in unemployment. They have set the ground for Lucas' monetary theory of the business cycle (Lucas Jr., 1972, pp.103-124). Thus, Friedman pointed out that agents' expectations adjust gradually to permanent shifts in inflation; still, this adjustment implies the possibility of a temporarily low unemployment rate, when the economy is stimulated say through expansionist monetary policy. In the long run however, monetary expansion will result in higher price levels and unemployment will go back to its original level.

In this context, Lucas' innovative contribution (1972) addresses a question almost as old as economic science: How do shifts in monetary policy influence inflation, production and unemployment? And though the answer to this question is still subject to lively debates, there is however an observation which seems confirmed beyond doubt by empirical evidence: during expansions, the growth rate of monetary aggregates is above average, whereas in recessions the growth rate is below average. Lucas' contribution is twofold: at the theoretical level, he formulated and analyzed a specific mechanism in which monetary instability leads to fluctuations in output and inflation rates. Within this mechanism, individuals – who possess limited information – identify monetary perturbations as shifts in relative prices, which leads to aggregate output fluctuations.

Lucas' model relies on the premise that individuals are more informed about the prices of the goods they produce than the price of the goods they purchase. Consequently, they tend to mistake movements in the general price level – which are irrelevant in the model – for movements in the relative prices – which are relevant for economic agents. In the case of unanticipated inflation, individuals infer that the relative prices of the goods they produce are temporarily high, and thus decide to increase output.

Lucas constructs his model within a framework initially developed by Paul Samuelson (1958, pp. 467-482) – where we find two generations of people, young and old, and only one commodity which cannot be stored. In this stylized model, both current and future generations must find a way to transfer part of each period's output to the old generation. For the purpose of the analysis, Lucas is interested in another instrument that can perform the same function, namely money. In this situation, the old pay the money they possess in

exchange for the goods they consume. The young, on the other hand, are willing to sell part of their production, with a view to buying goods from the future generations when they are old. In choosing the amount of output supplied, they will have to anticipate the value of money at the time they are old. And the value of money, in turn, depends on the next generation's decisions and thus on their anticipations. This means that making rational decisions by the present generation implies anticipating the anticipations of others.

In this economy, the notion of equilibrium implies that the anticipations or forecasts of future prices coincide with the actual prices prevailing over the next period; in other words, equilibrium implies such a price and such a quantity of goods supplied that the amount of money supplied by the old equals the amount of money that the young wish to possess in the future. The main feature of this market-clearing model is that monetary units have no effect on real variables, in other words, money is neutral.

Other types of monetary injections may or may not be neutral. Suppose, for instance, that the central bank decides to expand the money supply at a constant growth rate and does so by continuously giving the old generation money in a lump sum, that is independently of the amount of money each of them possesses. Such an injection will naturally have inflationary effects, leading to a constant price increase. Lucas, however, is looking for a framework in which a monetary expansion initially creates an increase in economic activity – as evidence points out – but to this aim, the above mechanism is not satisfactory.

On the other hand, there are ways of injecting money which do not alter decisions on real variables, even though they generate continuous inflation. In the above example, if the old receive the money in proportion to the amount of money they possess, money is neutral, because this type of injection preserves the purchasing power that the young will have when trey retire.

In order to ground his model on the information mechanism, Lucas assumes that transfers are proportional, and therefore neutral at the real level; he constructs a model made up of two islands, each having the same number of old people. The number of the young people is fixed, but they are distributed randomly between the two islands. In addition, money supply is constant. On the island having few young people, prices will be high, since there are few producers, which will signal that they should produce more; conversely, on the island with many young people, prices will be low, which will make them produce less. In this economy, production is above average on one island and below average on the other. In this case, total output on the two islands fluctuates over time in line with the distribution of the young over the islands,

but these fluctuations have no connection to the business cycle: one of the main features of business cycles is that all economic sectors have similar evolutions.

If we go on to add monetary perturbations, then an injection of money in the economy incurs a rise in prices. For a young person, this rise can have two explanations: (i) prices may be high due to monetary perturbations, in which case the optimal decision is to maintain current production levels or (ii) prices may be high due to the low number of producers, in which case the optimal decision is to increase production. If the producers do not know for sure, then the best decision is a tradeoff between the two extremes, so that production rises on the whole. Therefore, in this economy, prices exceed their average level precisely when production is above average, and when the money supply growth rate is above average. If the extent of the monetary perturbation is known, there are no reasons for confusion about the origin of the price increase and monetary perturbations are neutral. In other words, the model implies a clear distinction between anticipated monetary fluctuations – which are neutral – and unanticipated monetary fluctuations – which influence real variables, and this is precisely the reason why the information mechanism plays the central role in the model.

Finally, Lucas' business cycle model has, at the same time, an important consequence at the policy level; in essence, this consequence is not new, it was initially formulated by Milton Friedman and it finds confirmation in Lucas' model: thus, starting from the implications of the model, the author argues that the best monetary policy rule is to fix an annual constant growth rate for money supply; this is to be accompanied by a series of rules in the fiscal and public expenditure fields, but they are necessarily minimal rules. In a way, the best economic policy, in the new classical view, is the absence of monetary policy.

This presentation of Lucas' model also requires a possible comparison with the Austrian business cycle theory, based on several similarities between the two theories; moreover, some Austrian economists argue that Hayek's theory represented the source of inspiration for the new classical model. Thus, in both Lucas' (1981) and Barro's (1981) approaches, as well as Mises' and Hayek's models, at the origin of the business cycle lie agents' difficulties in interpreting price signals. The similarity ends here though, since the two programmes of research are aimed at different goals: Hayek explains the business cycles in terms of the inconsistency of the numerous individual plans of producers; Lucas, on the other hand, attempts to make predictions about the behaviour of the representative individual agent throughout the business cycle.

Generally speaking, the business cycle can be described in a manner that corresponds to both theories, but at the same time differentiates them from Keynesian or Marxist theories. The common denominator can be identified in

the participants' reactions to a price change, whose origin may be of monetary, real or combined origin. Even though the Austrians take into consideration the price of credit, whilst the new classicals analyze the price of goods, the two theories converge to a common point: economic agents are not able to discern easily – that is costless – the real from the monetary component in the overall change.

In both theories, the way economic agents will react depends in the origin or cause of the change in prices: if this change reflects a change in economic circumstances, then a corresponding adjustment of real variables is required; if, on the contrary, the price change results from monetary perturbations, then such an adjustment is not only useless, but can also be harmful. However, until they determine the actual nature of price changes, agents will react – at least in part – as if it were real. If the price change has only monetary causes, agents will readjust their activities to their previous level, as soon as they realize the true cause. In this way, both schools admit the existence of a significant systematic non-neutrality during the period the economy adjusts to the increased money supply.

One important difference between the two theories relates to the specific pattern of the business cycle mechanism; simply put, according to the new classicals, agents' initial reaction consists of an increase in output and employment due to the increase in the nominal prices of goods. In the Austrian approach, agents are determined to start an unsustainable amount of investments in response to the artificially lowered interest rate. Once they learn the true nature of the price increase, agents either return to the initial level of employment – in the new classical vision, or they liquidate the excess malinvestments – according to the Austrian theory.

Moreover, the two theories differ in the specific way they approach the concept of equilibrium. The new classicals demonstrate that the cyclical evolution of the macroeconomic variables is consistent with the general equilibrium framework all throughout the business cycle. From a methodological point of view, the model complies with the market-clearing hypothesis: in order to be analyzed and interpreted, every phase of the cycle must be represented as a set of equilibrium prices and quantities.

The new classicals' market-clearing approach is opposed to the Austrian model, which assumes that the business cycle is precisely a form of systematic intertemporal disequilibrium. In the Austrian approach, the very language used to describe the business cycle is that of disequilibrium, and the concept of equilibrium itself is defined against the initial conditions – prior to the expansion phase – and enables the analysis of the disequilibrium induced by cheap credit.

These are the main similarities and differences between the two models. There exists, indeed, a certain resemblance – even in what regards policy implications; however, this does not mean that we can label the Austrian theory as a source of inspiration for the new classicals: not only do the two models differ in their approach, but, more importantly, in the methodological approach, which clearly distinguishes them.

To conclude, the first new classical models tried to construct a monetary business cycle and to this goal, they somewhat departed from the Walrasian paradigm, by assuming imperfect information regarding prices. In this context, new classical models postulate that supply depends upon the deviation of real inflation from its anticipated level, an assumption that Friedman and Phelps used in order to incorporate anticipations in the Phillips curve. Although this type of models generated a lot of interest in the `70s, more recently it has attracted very few supporters for reasons not altogether clear. Its opponents claim that the confusions about the price level cannot be so important as to generate the large shifts in output and employment observed over the business cycle. Moreoever, empirical evidence generally infirmed the monetary models, but there is no firm proof to assert the reasons for its decline.

Barro (1984, pp. 179-182) asserts that this theory based on the rational expectations hypothesis, as well as the empirical research in the field have not offered a clear analysis in what regards either monetary non-neutrality, or business cycles in general. The main shortcomings of this theory arise in the attempt to explain monetary non-neutrality, which is the most important issues in macroeconomics, still triggering lively debates.

Once monetary models were abandoned, in the `80's most new classical economists undertook several analyses that attribute cyclical fluctuations to certain real perturbations in the economy. These real business cycle theories (Long, Plosser, 1983, Barro, King, 1984, Prescott, 1986) postulate that fluctuations in the real economic activity are based on shocks in the existing technology – to this aim, they rely on the assumption that the rate of technological change is subject to large and random fluctuations. And since these technology fluctuations lead to fluctuations in relative prices, individuals rationally adjust their labour supply and consumption levels. In these conditions, the business cycle is nothing but the natural efficient reasponse of the economy to the shifts in the existing production technology.

Real business cycles are focused on technological shocks or other types of supply-side perturbations as central determinants of cyclical behaviour and assign an important role to the dynamic elements that influence the pattern of shock propagation. As in all new classical models, these models incorporate competitive markets and agents driven by optimizing behaviour. And even

though these theories ignore monetary shocks, the analysis of the propagation patterns of business cycle phases can be successfully applied to both real business cycle models and the initial monetary models. The difference is that, in real models, any positive correlation between output and money supply reflect endogenous responses of monetary aggregates.

In what regards the empirical confirmation of these theories, the results are in many respects consistent with the observed patterns of business cycles, according to Robert Barro. For instance, real business cycle theories are able to estimate accurately the relative variations of consumption, investment, capital stocks and labour in the economy, and at the same time account for the pro-cyclical behaviour of these variables. However, they tend to exaggerate the pro-cyclical evolution of productivity, real interest rates and real wages.

In order to explain recessions in real business cycle theories, we must admit the existence of technological – or other type – shocks on the supply of goods, both favourable and unfavourable. In this context, some critics of these theories claim that technological regress is not possible, but this statement is easily opposable. Apart from technological shocks, other circumstances generating negative shocks on output include the cartelization of markets, failure of crops or strikes. The collapse of the financial system in the US during the Great Depression may also be regarded as a negative shock.

The initial versions of real business cycle theories reflect the Pareto optimum and demonstrate that economic fluctuations are not a feasible reason for state intervention through stabilization policies. Negative shocks and recessions are merely unfortunate or unfavourable events and public authorities cannot do anything to correct the situation.

One of the strengths of this type of theories is its firm grounding on microeconomic principles. Real business cycle models are usually standard intertemporal models of general equilibrium, traditionally used in the analysis of economic growth and adapted only slightly to incorporate random changes in technology.

In a study of real business cycle theories, Mankiw (1989, pp. 79-90) asserts that a lot of the new classical initial contributions tried to break down the classical dichotomy, without abandoning the fundamental market-clearing hypothesis (Lucas, 1973, pp. 326-334). These models – whose central element is the assumption of imperfect information regarding prices – exerted a real fascination in the `80s, but attracted relatively few adepts. The main reason identified by Mankiw: it is hard to believe that agents' confusions regarding prices are strong enough to generate the large fluctuations of real variables identified during the business cycles.

In opposition to both the Keynesian models and the initial new classical models, real business cycle theories subscribe to the classical dichotomy; first of all, they postulate the absolute irrelevance of monetary policy, thus rejecting a principle almost unanimously accepted at the end of the `70s; in addition, real business cycle theories do not assign nominal variables – such as money supply or the price level – any role in explaining fluctuations in real variables. In this manner, real business cycle theories push the walrasian model further than any previous models.

In evaluating the validity of this theory, two main questions emerge: How can we account for such large fluctuations in production and employment? and Why do changes in some nominal variables – such as the money supply – seem to be connected to the movements in real variables?

According to the real business cycle theory, the only forces triggering fluctuations are those affecting Walrasian equilibrium – namely the set of relative prices and quantities that equate demand and supply on all markets at the same time. Consequently, in order to understand the business cycle mechanism, we must analyze the fundamental factors influencing demand and supply for different categories of goods and services. In real models, fluctuations seem to be generated in principle, by numerous types of macroeconomic disturbances, but the technological type is the most common.

One of the obvious empirical observations that the real cycle theory had to account for is that during the economic cycle consumption and leisure move in opposite directions: when recession starts, consumption decreases and leisure increases and the other way round during the expansion phase. The explanation appeared rather problematic for real cycle theorists: consumption and leisure should – at least in principle – move in the same direction, since both are normal goods. In these circumstances, the new classicals tried to explain why during recessions, individuals find it rational to increase leisure and at the same time reduce their demand for goods: the price of leisure relative to goods – namely the real wage – decreases during recessions. In this way, an essential implication of real business cycle theories is the procyclical evolution of real wages.

In the event that the production function remained unchanged and at the origin of fluctuations lay demand shocks, then generating the implication of a procyclical wage would pose serious problems. Since employment is low during recessions, we would expect the marginal product of labour and the real wage – to be high; in the situation of a constant production function, decreasing marginal returns of labour would generate a counter-cyclical real wage – as is necessary to explain fluctuations in consumption and leisure.

Under these circumstances, the new classicals start from the premise that in the rate of technological change there exist substantial fluctuations; during the recession, the available production technology is relatively unfavourable and the marginal product of labour and, implicitly, the real wage are low. In response, individuals choose to reduce consumption and increase leisure

An interesting conclusion of this type of models is that – since economic fluctuations represent a disruption in Walrasian equilibrium – these fluctuations are actually characterized by efficiency. In equilibrium, when technological possibilities and preferences are given, the levels of employment, output and consumption cannot be improved. At the same time, public authorities' attempts to influence allocative processes on private markets – such as employment stabilization policies – are, at best, inefficient, but more likely even harmful, since they obstruct the „invisible hand" mechanism.

Of all the implications of the real business cycle theories, the „optimality" of fluctuations is probably the most astonishing: there is no doubt that during a recession, the level of welfare decreases compared to the preceding expansion. Keynesian theories explain the reduction in welfare as a coordination failure: since wages and prices do not adjust instantly to equilibrate supply and demand, some mutually advantageous exchanges do not take place during recessions. By contrast, the real business cycle theories reject this hypothesis, by motivating the decline in welfare through a decline in the technological capacities of the society.

Real cycles theories' supporters rely on the premise that employment fluctuations are entirely voluntary, in other words, that the economy is at all times positioned on the labour supply curve. However, throughout the business cycle, employment varies substantially, whereas labour supply determinants – the real wage and the real interest rate – fluctuate only to a small extent. To comply with this observation, real business cycle models bring forward the premise of individuals' inclination towards an intertemporal reallocation of leisure. Under these circumstances, individuals will substantially reduce the labour supply in response to small and temporary reductions in the real wage or the real interest rate. This hypothesis, however, is not feasible, since empirical evidence documents a low inclination of individuals to substitute leisure in time. If leisure had a high degree of substitutability – as assumed by the real business cycle models – then individuals anticipating a real wage increase should work less now and more in the future and the other way round when anticipating a real wage decrease. But studies on individual labour supply show that anticipated shifts in the real wage only lead to small shifts in the amount of labour supplied: individuals do not react to anticipated shifts in real wages through a substantial reallocation of leisure in time (Ball, 1985, Altonji, 1986).

Real business cycle theories contrasts strongly with the consensual vision of the `60s regarding a series of assumptions almost ridiculous 30 years ago, and still extremely controversial in our days. First of all, the theory relies on the premise that the economy experiences sudden and large shifts in the existing production technologies. Many such models regard recessions as periods of technological regress, as declines in the technological abilities in society. Their opponents (among them we mention N. Gregory Mankiw and L. Summers) argue that the assumption of large shifts in technology – particularly in what regards technological regress – is not plausible; on the contrary, they assert that knowledge accumulation and technological progress usually occur gradually. Secondly, real business cycle theories assume that employment fluctuations reflect shifts in the amount of labour that individuals are willing to supply. Since employment varies considerably, whereas the real wage and the real interest rate – only vary slightly, these models require that leisure be highly substitutable in time. This hypothesis is inconsistent with numerous econometric studies of labour supply, which evidence a low elasticity of intertemporal substitution during recessions; moreover, it is also inconsistent with economists' belief that high unemployment during recessions is to a large extent involuntary. Thirdly, real business cycle theory assumes that monetary policy is irrelevant in alleviating economic fluctuations. Previous to its formulation in the early `80s, most economists agreed on the non-neutrality of money; and even though the ability of systematic monetary policy was a controversial issue, it was at the same time generally acknowledged that an inadequate monetary policy can destabilize the economy. In this context, real cycle theorists brought up a new challenge, by using the old Keynesian argument that any correlation between money supply and output derive from the fact that money supply is an endogenous factor.

The opponents of the theory have at the same time proved skeptical to the possibility that aggregate real shocks have such a large amplitude and frequency to trigger and account for economic cycles. In this respect, they posit that concrete examples are limited to the oil shocks and harvest failures, but subsequent empirical research demonstrate that a large dispersion of shifts in preferences and technology can lead to persistent significant effects on aggregate output and employment (Lilien, 1982, pp. 777-793). On the whole, this research points out that real cycle theories are promising in explaining sudden fluctuations in real economic activity and the tendency of rising unemployment starting with the `70s.

Another important objection to real business cycle theories is that they do not address the link between monetary and real variables appropriately (Barro, 1984, pp. 179-182). According to Barro, during the `30s, the main empirical

association between monetary aggregates and real variables derives not from the shifts in the monetary base, but rather from fluctuations in the volume of financial intermediation, namely the size of credits and of deposits. A reduction in the volume of financial intermediation is not, in essence, different from shocks on the production function, in that it may have adverse real consequences on the economy; therefore, the issue to be solved does not concern the reason why these crises had serious consequences on production and employment; rather, we need to find an explanation for the reason why occasional crises occured during that period. Even for the post-war period, a lot of empirical data suggest that the link between money and real economic activity reflects fluctuations in the aggregate volume of loans and deposits, and not the monetary base. Under these circumstances, money appears more of an indicator of shifts in the business climate rather than an exogenous factor with major influence on real variables. However, statistical data on the interaction between the monetary base and the real variables suggests a certain monetary non-neutrality which requires further explanation. Thus, this type of connection between real and monetary variables is consistent with those rational expectations models focusing on the role of incomplete information on prices and money, and therefore it could be accounted for on this basis. A strong supporter of monetary neutrality, Barro asserts that by judging in such a manner, we could actually solve this puzzle of neutrality: thus, on the one hand, many of the empirical associations between real variables and money do not represent in themselves proofs of monetary non-neutrality and on the other hand, the remaining circumstances considered as examples of monetary non-neutrality can be explained by existing theories.

In approaching the business cycle mechanism, real models usually take into account technological changes at the macroeconomic scale, as if these occured in a single sector. There are however, theories focusing on the technological shifts occurring in different sectors (Long, Plosser, 1983, pp. 39-69). All these models rely on an essential premise: even though shocks on different sectors are independent, the outputs of these sectors evolve together throughout the cycle. For instance, a negative shock on a sector will reduce the level of welfare for all individuals, which incurs a demand decrease for all the goods in the economy.

Theoretical research of multi-sector models have revealed a very interesting premise: in order for these models to function, it is necessary that the number of independent sectoral shocks be relatively low, and those sectors be subject to large technological fluctuations; if the number of sectors is large and labour is mobile between sectors, the aggregate effect is almost null. Thus, multi-sector models are similar to one-sector models and, in addition,

experience the same weaknesses: lack of any direct empirical evidence attesting the existence of large technological shifts, as well as lack of feasibility of the strong substitutability of leisure in time.

Finally, another multi-sector approach of the business cycle is the *sectoral shifts theory,* which focuses on the cost of labour adjustment across different sectors of the economy (Lilien, 1982, Black, 1987). Similar to the real business cycle theory, the sectoral shifts theory observes the classical dichotomy, by ignoring the role of monetary perturbations; but unlike real business cycle theory, it departs to a certain extent from the walrasian paradigm, by assuming that when workers move from one sector to another, a certain period of unemployment is inherent, while they are searching for new jobs. According to this theory, recessions are periods in which sectoral shocks are more numerous than usual, and, as a consequence, a larger sectoral adjustment is required.

This real business cycle type of models seems more plausible than those based on substantial shocks of aggregate productivity and on intertemporal substitution. In this respect, the assumption that recessions require an intersectoral re-allocation drastically seems more realistic than that of recessions being the result of a major technological regress, which renders leisure completely unattractive.

Numerous empirical studies are carried out at present in order to confirm the validity of this theory, but the available data do not seem to support the sectoral shifts theory. To the extent that during recessions we are confronted with voluntary unemployment caused by the transfer of labour to other sectors, we would expect to see high unemployment in some sectors of the economy and excess labour demand in other sectors. But in real economies, fluctuations occur in a completely different manner: the rise in unemployment in some sectors is not accompanied by vacant jobs in others (Abraham, Katz, 1986, pp. 507-522). Moreover, even though the sectoral shifts theory asserts that workers move between sectors during recessions, empirical studies point out that their movement is procyclical (Murphy, Topel, 1987, pp. 11-58). All these empirical findings suggest that a plausible reconciliation between economic realities and the theory of sectoral adjustment is rather unlikely. The supporters of the theory argue that this kind of empirical evidence is not convincing. Since the sectoral adjustment process implies a period of high unemployment and low income, there exists the possibility of a demand decrease in all sectors of the economy. Thus, it is possible to notice high unemployment in some sectors and, at the same time, few available jobs in others, despite the fact that initially the recession was caused by the necessity of labour re-allocation between sectors. To the extent

that we admit the validity of this argument, it becomes unclear how we can distinguish empirically the real business cycle theories – which focuses on technological fluctuations at the macroeconomic level – and even Keynesian theories – which bring forward fluctuations in the aggregate demand.

On the whole, we can conclude that these real business cycle theories have generated a new perspective and novel techniques for modeling the macroeconomic area and constructing economic policy. However, it is not yet very clear to what extent these theories contribute to an effective understanding of the business cycle mechanism or to the formulation of economic policy

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