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A SHORT REVIEW OF MACROECONOMICS DEVELOPMENT¹

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Resumen

El objetivo de este documento es entender, clasificar y proporcionar un importante resumen de los rasgos fundamentales de la macroeconomía con fundamentos microeconómicos y la macroeconomía como soporte de la microeconomía. Este documento puede ser interesante para aquellos que desean entender como estas dos escuelas macroeconómicas se han desarrollado.

Macroeconomía con fundamento microeconómicos presenta cuatro ramas: la Síntesis Neoclásica, Monetaristas, Nuevos Clásicos y Real Business, mientras la macroeconomía como soporte de la microeconomía solo presenta la rama de los Nuevos Keynesianos. Aunque estas escuelas tienen sus ideas particulares, cada rama las usa con diferentes propósitos.

Aunque el desarrollo del pensamiento macroeconómico ha mostrado diferentes puntos de vista que han generado debate dentro del campo, los economistas, con el tiempo, han tomado en cuenta estas diferencias para generar nuevas ideas. Por ejemplo, actualmente la mayoría de los economistas han escrito economía aplicada y teórica teniendo en cuenta la noción de equilibrio y fallas del mercado.

Abstract

The aim of this paper is to understand, classify and thus provide an important summary of fundamental features of Macroeconomics with microeconomics backgrounds and Macroeconomics as a background of microeconomics. It could be particularly interesting for those who wish to understand how these two macroeconomics schools of thought have developed.

Macroeconomics with microeconomics backgrounds has four branches: Neoclassical Synthesis, Monetarist, New Classical and Real Business, whereas Macroeconomics as a background of microeconomics just has the New Keynesians branch. Even though these schools have their own particular ideas, each branch uses them for a different purpose.

Although the development of macroeconomic thought has shown different views what have arisen interesting debates in economic field, economists have taken into account these different views to come up with new ideas throughout time. For instance, now days most economists have written applied and theory work bearing in mind equilibriums and fails of the market.

Keywords: Macroeconomics, Macroeconomics schools of thought, Microeconomics, Expectations.

JEL- Classification: B22 , B23, N1

¹Most of ideas which are in this paper are result of my studies on economics while I was undergraduate and postgraduate student. Some thoughts in each school were no clear to me till I read the brilliant book Modern Macroeconomics: Its Origins, Development And Current State written by Brian Snowdon and Howard R. Vane.

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1. Introduction

Macroeconomic development can be categorised into four main groups. These categories are defined according to Keynesian ideas and the use of microeconomic concepts. Table 1 shows these macroeconomics schools of thought. The first is macroeconomics school which draws ideas from microeconomics. The second is when macroeconomics concepts are used in microeconomic framework. The third is orthodox macroeconomics. The last is new tendencies of macroeconomics.

Table 1

Key Macroeconomics Schools of Thought:

Macroeconomics with microeconomics backgrounds <ul style="list-style-type: none">-Neoclassical synthesis.-Monetarist.- New classical.-Real business.
Macroeconomics as background of microeconomics <ul style="list-style-type: none">-New Keynesians.
Orthodox macroeconomics <ul style="list-style-type: none">-Post Keynesians.-Austrian economics.
New tendencies of macroeconomics <ul style="list-style-type: none">-New political macroeconomics.-The renaissance of economic growth.

Compiled by Humberto Bernal

The aim of this paper is to understand, classify and thus provide an important summary of the fundamental features from the first two schools³. It could be particularly interesting

³ Orthodox macroeconomics, new tendencies of macroeconomics and new synthesis of new classics are worked roughly in Bernal (2003)

for those who wish to understand how these two macroeconomics schools of thought have developed.

Macroeconomics with microeconomics backgrounds has four branches: Neoclassical Synthesis, Monetarist, New Classical and Real Business, whereas Macroeconomics as a background of microeconomics just has the New Keynesians branch. Even though these schools have their own particular ideas, each branch uses them for a different purpose.

The analysis of aggregate economics is believed to have started after the publication of Keynes' major book, "The General Theory of Employment, Interest and Money", however, before this publication, aggregate economics was studied in terms of economic cycles and monetary trends⁴. Some of the key economists who worked on these issues were Hume, Irving Fisher, Knut Wicksell and the Cambridge Classic School, the latter school had huge influence from Alfred Marshall and Leon Walras.

Although the word macroeconomics appeared in 1946⁵, its main concepts were properly being considered during the Great Depression. The economists who were asked to find a solution to the high unemployment rate during the Great Depression were unable to do so and therefore Keynes introduced his thoughts about macroeconomics which critiqued the methods used by these Classical Economics. Although Keynes' work was used by a new generation of economists such as Hicks, Samuelson, Maden and Tobin, these economists still used marginal analysis in their works. Their writings provided the basis for underpinning Neoclassical Synthesis' thoughts.

⁴ These trends were difficult to understand in the context of existing economic theory. Economic theory was analysed in terms of static equilibrium by that time, however, rational expectations theory help to develop the basic ideas about understanding of economic cycles in terms of equilibrium and dynamics after 60'.

⁵ Macroeconomic word was uses by Klein (1946) for first time. Blanchard (2000) mentioned it.

2. Macroeconomics with microeconomics backgrounds

Neoclassical Synthesis

Neoclassical Synthesis is in the first group, this branch drew on and linked Classical, Marshallian and Walrasian economical concepts. Adam Smith, Robert Malthus and David Ricardo are classed as classical economists, whilst Marshallian and Walrasian economists used marginal analysis of Alfred Marshall and Leon Walras. The Neoclassicals however drew upon concepts from both the utilitarian approach and hedonistic psychology. The principal economists that helped to develop this Neoclassical thoughts were John Hicks, Paul Samuelson, James Meade and James Tobin. A mathematical model of Neoclassical thought can be:

1. $Y = F(K, L^d)$
2. $Y = C + I + G$
3. $L^s = L^d(w/p)$
4. $Y = C + I + G$
5. $C = C(Y, r)$
6. $I = I(r)$
7. $M^o = M^d(Y, r)$

- Where Y is the product,
- K is the physical capital.
- L^s is the labour force supply.
- L^d is the labour force demand.
- w is the nominal wage.
- p is the price of the only product that the economy produces.
- I is the investment.
- G is government spending.
- M^o is the monetary supply.
- M^d is the monetary demand.
- r is the interest rate.

This model is in equilibrium, this means that all aggregate quantities are equal to the quantities that agents produce. In other words, this model does not face problems of wasting resources or market failures. For example, in the equation 2, the level of production is equal to the amount of production that agents supply.

The sorts of questions that this model answers are, for example, how can changes in exogenous variables affect endogenous variables? When the model follows a continuous structure, then the answer is found by differential calculus. The consumption function is an example.

8. $C = g(G, M, K, r)$, then

$\frac{\partial C}{\partial G} = \frac{\partial g}{\partial G} < 0$ or $\frac{\partial C}{\partial G} = \frac{\partial g}{\partial G} > 0$, the answer depends on the sort of model that the researcher is working on i.e Keynesian or Classic⁶. Whilst the consumption in the Classic model has a negative change, it has a positive change in Keynesian model. The negative change in the classical model has the following explication: first, due to the production of the economy is the maximum level that it can reach and the level of unemployment is just voluntary, then, government spending pushes down private investment and therefore the interest rate goes up and consumption goes down because it depends directly on the interest rate.

On the other hand, the change in consumption under the Keynesian model is positive. In this case, the level of production of the economy is not at the maximum that the economy can reach and the labour market shows rigidity on the wage. This rigidity implies that equation 3 is eliminated. The adjustment in the economy is as following: the government spending forces factories to produce more output, causing prices to rise, while the real wage decreases and the consumption increases due to increase of the income⁷.

⁶ In literature, neoclassical's fellers developed a classic model which is based on full use of economical resources and they also performed a model called Keynesian model which shows market rigidities such as salary rigidities.

⁷ In economics, income is considered to be equal to production.

A key characteristic of the Neoclassical model is that it is static⁸. Economists use Static Comparative method because it is easy to deal with. They can also get results from it which go with the environment. In static Comparative Method is just one exogenous variable that can change, nevertheless all endogenous variables could also move as a result of moving this exogenous variable. In addition, in order to do a Static Comparative analysis economists use the mathematical method showed by Hicks (1937) which is called the IS – ML model.

These models need to have a stable equilibrium in order to make sense in comparative analysis. To assure that this equilibrium is stable, the model ought to satisfy the principle of correspondence's prove, Samuelson (1947). As long as this criterion is satisfied, a *force* mitigates perturbations that push the variables away from their equilibrium and thus the variables go back to their equilibrium. Although the final result is known, variables' paths are unknown.

Monetarist School

The second economic branch which is considered is the Monetarist School, who the most relevant fellers are Milton Friedman, Anna Schwartz, Philip Cagan and Edmund Phelps. The Monetarist School uses ideas from Quantity Theory in order to explain why the use of discretion policy, either fiscal or monetary, can bring unexpected change to the main macroeconomic variables. Monetarist also thought of growing monetary supply as a quantitative target; they said that economics agents have to know this target in order to be able to make decisions about maximizing their utility. Monetarist views also criticize the Orthodox Keynesian⁹ school, as they claimed Keynesians' work is based on scenarios

⁸ The key difference between static and dynamic models is that the latter takes people expectations about main variables as endogenous, therefore it is a dynamic view as long as the expectations uses information from the past and from the future, of course the information should be in the model. To clarify this issue, statics just views the economy in a t moment where the values of the variables must be stable in order to work out on comparative analysis.

⁹ Orthodox Keynesian School was performed by Neoclassicals when they used a Keynesian model.

where monetary policy does not have an effect on the economy i.e. Liquidity Trap¹⁰ and Investment Traps.

Other main points of debate between these two branches were the delay of the impact on the economy due to either monetary or fiscal policy. The Monetarists suggested that when governments use these economic instruments, the effect that they want on the economy takes long time to reach. In this case, while governments wait for getting this equilibrium, other shocks can strike the economy and the result is not that wishes.

It is justified to say that Patinkin (1948) and Tobin (1958) were closed to certain issues of monetary ideas such as wealth effect and portfolio analysis but their ideas about the relationship between income and monetary policy were too far from Monetarists' ideas.

In order to make clear monetarist's thoughts, the next points to discuss are the specific issues that the Monetarist worked on. The first one is the theory of demand of money (Theory of Permanent Income) and then the Curve of Phillips under Rational Expectations.

The Theory of Permanent Income of consumption is linked to both the nominal sector and real sector. This theory suggests that economic agents look after their consumption in the present and in the future. In order to reach this consumption, they assign wealth to shares, bonds, options, foreign currencies and local currency. Although Neoclassicals also worked on portfolio analysis, they bore in mind the instability of demand for money¹¹. This was the focus of debate between these two schools. Whereas the Keynesians worked out the solutions of these issues using the instability of money

¹⁰ The liquidity trap happens when the economic agents have unstable preferences for money, then the velocity of transactions and the portfolio components change often, thus monetary policy fails its purpose. Investment traps is a concept what is related to monetary policy effect on economic. In this case, although monetary policy has effect on interest rate, it is not enough to reach full employment economy. This reason lets Neoclassicals argued against monetarist.

¹¹ Tobin (1957) analysed portfolio theory on view of liquidity preferences and speculative demand of money. A feature of this analysis is that economic agents face future uncertain, where seasonal economic effect is relevant for setting up their portfolios. Although it is difficult to illustrate a model through this scenario, that paper was worked out following exogenous expectations about interest rates and variance of rate of returns, where the variance is statistical estimator of uncertain (in this case risk). In addition, if economic agents are frequently changing portfolio shares, monetary policy could be a bit difficult to deal with.

demand, the monetarists used the stability of money demand. In summary, these two schools and finance economists, such as Harry Markowitz, Robert Merton, Jonh Lintner and William Sharp identified key issues for underpinning the modern theory of portfolio¹².

The Expectations Augmented Phillips Curve was the other issue considered by the Monetarist School. This model is based on the concept that the relationship between nominal wage and unemployment changes do not happen in the long run but they can happen in the short run, the latter is known as trade-off between unemployment and wage change rate.

Fridman (1968) showed that the long run trade off between unemployment and wage change rate can not be reached if economics agents make their decisions based on Rational Expectation concepts. The Central Bank and economic agents take Rational Expectations concepts to determine how long takes the monetary policy to have effect in the real sector and realise the level of the real wage. Monetarists bore in mind that the economy has a natural rate of unemployment, this means when the economy is producing with all its resources, it just faces voluntary unemployment.

Monetarists encouraged the reduction of unemployment with an increase in money supply in the short run, nevertheless this reduction of unemployment have a cost which is an increase on prices. When agents realise that their real wage has fallen, they reduce their labour supply. In this case, if monetary authorities want to keep unemployment low, they have to increase monetary supply again, but the cost of this action is a permanent increase in the level of prices. That scenario was called Inflation Acceleration and the model was called NAIRU (Non Accelerating Inflation Rate of Unemployment).

At the end of 1970's, economists realised that monetary policy was often rather unsuccessful. Business activity, which can be random, did not allow a successful

12 This subject shows a relevance today in pensions systems around the world, where these concepts are in use to enable economics agents to obtain the maximum consumption constraint to their wealth.

monetary policy. Monetarists considered that the money demand function depended on the rate of interest, income, expected inflation¹³ and individuals' tastes and preferences, but they did not consider business cycles. Due to the lack of business behaviour information, monetary policy became ineffective in some instances. Nevertheless, in the short run, as mentioned previously, either contractions or expansions of monetary supply or / and government spending can affect the economy. The latter allows economists to introduce a new concept, which is called "short run interest rate". However, they can use monetary policy for relevant short periods¹⁴, but the effect on the economy due to this monetary policy was puzzling in future. These issues were quickly tackled by the Rational Expectations theory.

The New Classical

The third branch to be considered is The New Classical, these economists taught economists how to use Rational Expectations concepts, first established by Muth (1961). Some of the most relevant economist who have worked on this field are John Muth, Robert Lucas, Thomas Sargent, Robert J. Barro and Neil Wallace. The principal point to highlight in Rational Expectations theory is that economics agents must use properly the information which is broadcast by the media and governments. New Classical dealt with information as a set which includes both past and future information. Examples of past information are mistakes which were made by economic agents, there are also in that set missed variables, monetary illusion and missed specification of economic environment. Agents deal with this information in order to maximise their utility. It is right to point out that in Rational Expectation scenario economic agents can make mistakes but they should however learn from them. Information that is related to the future is which they predict could happen. This information set should be dealt with as a dynamic element; agents have to learn from each situation in order to improve their forecasts. In addition, "**Rational**" term means that

¹³ In monetary, models inflation expectations were worked out under notion of adaptive expectations. These expectations show economic agents who repeat same mistakes frequently.

¹⁴ Relevant short periods are when economics agents do not have information on how monetary policy will be. In that context Central Banks could take advantage of this lack of information and then reach its achievements.

agents have to use properly the information that is in the set, implying that systematic mistakes are not to be repeated. Agents can also draw different economic models and make forecasts. Although economic agents have different information and models, the expected value of their forecast is the true value, which is the equilibrium.

One of the main points New Classicals worked on was monetary policy. They thought that although monetary policy does not have an effect in the long run, it has to be managed under targets; if authorities missed the monetary target, economics agents could face a lack of information about monetary policy and therefore the economy might suffer long cycles of recession.

In order to perform these models, New Classicals used econometrics concepts such as white noise stochastic variables. If a stochastic variable e_t is white noise then,

- i. $E[e_t] = 0$
- ii. $E[e_t e_{t-s}] = 0$ for all $s \neq 0$
- iii. $E[e_t e_t] = \sigma_e^2$

- i states that the expected value of e_t is zero.
- ii states that e_t does not have a correlation with its previous values.
- iii states that the variance of e_t is finite, σ_e^2 .

Econometrics knows this process to be wide since stationary.

When economists work on Rational Expectations, they pay attention to the last claims and also to the following¹⁵:

- iv. $E[x_{t-s} e_t] = 0$

¹⁵ White Noise variable is an particular case of variables which go with Rational Expectation theory.

The last term results because the information set contains x_{t-s} , rather than e_t . Although some features of e_t are known such as i - iv, its values are unknown before the model is run¹⁶. If $E[x_{t-s}e_t] \neq 0$ was a feature in the model, econometricians would be unable to find a proper econometric model. Under these circumstances, they did not use information properly. In this case econometrician can extract the relation between X_{t-s} and e_t through a model. If the model is not fixed, the result is a model which is biased¹⁷

New Classical economists developed these types of models under ideas of general equilibrium as Walras did. The New Classics thought about markets that they are in equilibrium. However, although markets can face disequilibrium, it would only be transitory. The agents have incomplete information at the beginning but when they take the new information, they fit their models, and thus the equilibrium is reached once again. Literature calls this scenario “Arbitrate strategy”.

In order to validate their ideas, New Classical Economists used an econometric model of aggregate demand, where monetary shocks have a short rather than long run effect. Lucas (1973) is one of the most relevant writing about this topic. This paper showed international evidence about monetary effects on the economy; the most relevant conclusion was that monetary shocks had an effect on the real sector in developed countries but not in underdeveloped countries. The reason is in developed countries inflation rates are stable whereas in underdeveloped ones the inflation rates are volatile. When the inflation rate is stable and monetary authorities increase the monetary supply, the inflation shows an increase, thus there were changes in prices level. Economics agents take the price increases as improvement in real sector or / and decrease in the real wage, which should have to result in a reduction in unemployment rate. However, as soon as agents realise that there was just a monetary shock, they correct their expectations and therefore the level of production and the real wage go back to their initial position, which is prior to the monetary shock. By contrast, in underdeveloped economies where the inflation rate is volatile, monetary shocks would not have a relevant

¹⁶ However, when State - Space model is used with Kalman Filter structure, there is a way to find in advance the values of e_t , but they are a forecast of the real values of e_t .

¹⁷ When this events occurs, econometrician use instrumental variables so that the biased disappear.

effect on it. Economics agents do not take this shock as new piece of information because inflation rates have been too volatile.

The formal model which Lucas took into account is like:

$$9. Y_t = \lambda + \theta_t + \varphi\alpha [p_t - E(p_t / \Omega_{t-1})] + \beta(Y_{t-1} - Y_{N,t-1}) + \varepsilon_t$$

Where:

- Y_t is the output in t .
- $\lambda + \theta_t$ are the permanent components.
- $\varphi\alpha [p_t - E(p_t / \Omega_{t-1})]$ is the effect due to difference between actual price and expected price. It is constrained to information available at period $t-1$.
- $-\beta(Y_{t-1} - Y_{N,t-1})$ is related to difference between output at $t-1$ and long run output at $t-1$. It can also be called deviations of the product from potential product at $t-1$
- ε_t is a random component.

Equation (9) shows how Rational Expectation works. For example, it can assume that all variables are constants through time except actual and expected price level. Then if $E(p_t / \Omega_{t-1})$ was higher than p_t , any change in the level of production would be negative. This case can be supported by “Offer Law”: when the price is close to zero, the level of production is close to none, but if the price is high, the level of production does so¹⁸. Therefore, when agents face an expected price higher than the price sight, they must reduce the quantity of production so they can maximise their profits. In this model it is right to point out that if the economy was in the long run, changes in price levels would solely have an effect on nominal variables. Thus, p_t would then be equal to $E(p_t / \Omega_{t-1})$ and Y_{t-1} equal to $Y_{N,t-1}$. Therefore shocks on monetary variables would not have any effect on Y_t . However, if firms made their forecast about their expected price and they already know that the economy is in the long run, they would adjust their capital

¹⁸ It is right to point out that the relationship between prices and quantities is not always one to one, it depends on technology, labour market and capital market

Inconsistency is another topic New Classicals worked on. It is about how authorities and economic agents use and behave when economic instruments are active and new information is broadcast. For example, when the Central Bank wants to keep a trade-off between inflation and unemployment, it needs to have an active monetary policy. However, if Central Bank broadcasts its information and economic agents make their decisions based on Rational Expectations concepts, the monetary instrument could be unsuccessful. On the other hand, if economic agents do not obtain either all the information or the Central Bank behaves randomly or both of these, then the trade-off could take place. The issue arises when this happens, economic agents might not be able to reach the results which they wanted whatever Central Bank did not broadcast the proper information to them. Therefore, economic agents use a range of strategies such as paying attention to Central Bank's last years decisions, forecasting on future production, etc so they can maximise their utility. These kinds of scenarios were developed by Calvo (1978). They used differential games to sort out lack of information from authorities.

Real Business

When economists realised that recessions had taken more time than the model had estimated, they started using other tools to explain it. They went back to review classic economists' ideas. Wicksell, in this case, developed the notion of the natural interest rate; he worked on real shocks more than monetary shocks. Even though monetary variables show a considerable impact on the economy, the nature of their movement comes from the real sector i.e. technology, capital and labour force. Wicksell's idea was used by Prescott in a dynamic general equilibrium model. Edward Prescott, Finn Kydland and other economist started working with real shock rather than monetary, these economists are known as Real Business economists, this is the last branch of economists who have worked under Macroeconomics with microeconomics backgrounds. These kinds of models have the following features:

- Representative agents maximise their expected utility throughout time.

- Representative agents face budget restriction, where their wage, bequest and shares are their wealth. On the other hand, consumption, taxes, investments are their spending.
- The utility function is time invariant.
- Formation of capital does not change throughout time.
- At the end these agents do not leave bequest.

The mathematical model for this is:

10.
$$\text{Max } E_t \left[\sum_{t=0}^{\infty} \beta^t U(C_t) \right]$$

s.a

$$K_{t+1} = (1-\delta)K_t + I_t$$

$$C_t + I_t \leq Y_t$$

The features of this model are:

- The utility function is time independent and additive separable.
- Economic agents face a stochastic economy and therefore pay attention to the expected value of their utility.
- The process of formation of capital is time invariant.
- The representative agent's target is to maximize their utility throughout time.

Where:

- $U(C_t)$ is the utility that he gets on t.
- β is the subjective factor of discount.
- E_t is the expected value operator.
- $\sum_{t=0}^{\infty}$ points the period of time for maximizing the utility.
- K_{t+1} is the capital in t+1.
- I_t is the investment in t.
- Y_t is the level of production.

By determining the maximization of utility, it results in the first order condition, which is called Euler's equation or the first order markov process. Equation (11) shows this equation. This condition is relevant because it gives information about how agents value consumption both at the present and in the future time¹⁹.

$$11. U'(C_t) = E_t[\beta U'(C_{t+1}) (1 + r_{t+1} + \delta)],$$

Where $U'(C_t)$ is the derivate of $U(C_t)$ on C_t

Equation (11) measures:

- The agent's cost of saving a monetary unit at moment t , which is $U'(C_t)$.
- Provides information about the benefit that this monetary unit, which is given in the future but evaluated in the present $E_t[\beta U'(C_{t+1}) (1 + r_{t+1} + \delta)]$.

The money supply in these models is endogenous. If the economy product rises, then the monetary variables will follow the same tendency. Therefore, this variable goes with the product, thus authorities have to follow the product path if they want to set a successful target on monetary supply. According to this, the Real Business economist started to work on quantitative equations in reverse, ie. $MV = YP$. In addition, Real Business Economists agreed with New Classicals about monetary rules and targets.

It is relevant to point out how economists have valued Real Business models. They used strategies which are called indeterminate coefficients²⁰ and calibration²¹. Researchers take the data from microeconomic resources and calculate the parameters which are going to be used in the general model. Although this way of estimation is a bit controversial, their results are accurate. For instance, if the economy faces a shock on the

¹⁹ In order to get equation 11, the following path have to be taken:

If there is considered a perfect market and the firms want to reach maximum profit, then they have to maximise $\Pi_{t+1} = P_{t+1} F(K_{t+1}, L_{t+1}) - wL_{t+1} - (r_{t+1} + \delta)K_{t+1}$, where δ is the rate of depreciation. The first order condition of firms is $r_{t+1} = F'_k(K_{t+1}, L_{t+1})$. So if the latter term is considered in optimization of model (10), equation (11) is straightforward.

²⁰ Enders (2004) shows how indeterminate coefficients method works in dynamic models.

²¹ Romer (2006) shows how calibration method works.

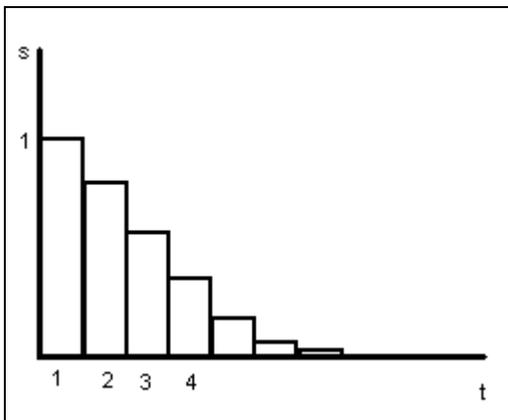
level of technology A_t , the model is going to show how the real and nominal variables move²².

The A_t path is important in the analysis because its impact on the economy depends on whether A_t is stationary process or unit root process. If A_t followed a stationary process and the economy faced a shock at t , its effect would disappear in the long run.

Chart 1 below, shows an example of stationary shock, which follows $A_{t+1} = a + bA_t + u_t$, where a is constant, $|b|$ is always less than one and u_t is a white noise process. On horizontal axes is time and on vertical axes is shock magnitude, in this case the magnitude was one.

Chart 1.

Shock's Path under Stationary Process

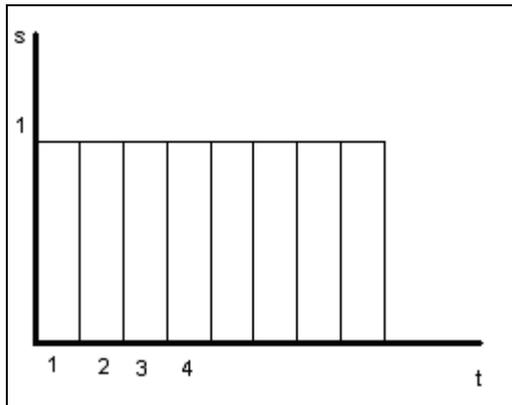


But if A_{t+1} followed a random walk, the effect of the stock would be permanent. In this case, the equation $A_{t+1} = \hat{a} + \hat{b}A_t + \hat{u}_t$ shows \hat{a} as constant, $|\hat{b}|$ equals one and \hat{u}_t is a white noise process. The Chart 2 below shows the shock throughout time.

²² In this case the model which is thought is $A_t F(K_t, L_t) = Y_t$.

Chart 2.

Shock's Path under Random Walk



This analysis could be one of the most important in Real Business theory. As mentioned, some branches put forward that the long run path is determined and shocks are just transitory, as Solow (1956) pointed out. Nevertheless, if the economy behaves such as Keynesians pointed out, the real effect of the shock is going to be permanent and active fiscal policy is relevant.

The Real Business theory is significant because it provided a new methodology for analysis of economic fluctuations. This branch has showed how economists can work on general equilibrium model which faces economic fluctuations and economic agents can reach elections which are Pareto optimum. The use of calibration method in this models let economist get accurate results to forecast and validate the previous data. These models are also flexible. For instance, when authorities' strategy is passive, this model works properly. In other words, the model shows off accurate results when government are not interested in taking monetary supply or government spending as a means of getting impact in economic variables. Another case what works properly with these models is when authorities take active decisions. Governments are interested in taking control on some economic variables, then they use monetary supply or / and government spending to achieve their targets. The first issue is closely related to Monetarists' and New Classicals' ideas. So, monetary and fiscal instruments do not change substantially because the government does not want to have an effect on the real variables path.

However, Keynesians and New Keynesians economists are closely related to the active view. In this case, agents seek to influence the economy through monetary and fiscal instruments in order to maximize their utility. According with these views, Blanchard and Quant (1989) developed a model which takes demand shocks as transitory and offer shocks as permanent.

However, some economists have pointed out some issues about the Real Business Model. These economists have compared the labour market and concluded that in economic depressions, voluntary unemployment is not the only unemployment that appears, also it appears involuntary unemployment. In addition, they checked the variation of production and technology in the USA and concluded that technology variations had a minor effect on the production, rather than the vast movements that it showed. Another factor was that inflation targeting both developed and underdeveloped economies had a huge impact on the real sector and thus the monetary policy was not neutral. Critiques against Real Business models are also related to agents' homogeneity and agents' behaviour. They point out that heterogenic agents make transactions instead of homogeneous agents, therefore the relationship between heterogeneous causes a co-ordination problem.

New Real Business economy models are developed in markets that are in equilibrium, involuntary unemployment and estimates in which microeconomic data is used. Even though this sort of model is performed to face real shocks and shows relative accuracy with the data set, Real Business economists do not determine such issues as market imperfections. The failure to deal with these issues allows Keynesians economists to start working on market imperfections under Rational Expectations. Keeping these failures in mind, a new school appeared and has showed how macroeconomic variables can be used in microeconomic models. The main branch which deals with this is called the New Keynesians and their thought about economics cycles was that their occurrence was due to microeconomic imperfections. Some of the most important economists who work on this branch are Joseph Stiglitz, Robert Gordon, Robert Schiller, Stanley Fischer, Olivier Blanchard, John Taylor and Stephen Turnovsky.

3. Macroeconomics as background of microeconomics

The New Keynesian

The New Keynesian economists work on issues such as coordination problems, welfare implications under economic cycles, relevance of monetary and fiscal policies in recovering from deep cycles and supply and demand shocks. One way they work on these issues is through the use of microeconomic theory.

The following are examples of topics that New Keynesians have worked on:

- Wage negotiations: they refer to agreements between an employer and employee. Contracts highlight the period of employment and rate of payment.
- Cost of searching: it is recognised when people want to buy goods or services. They spend time researching product quality and price. New Keynesians see this behaviour as a cost and then, as a result of this searching, markets tend to be divided into many segments.
- Cost of changing prices: this arises when factory owners have made a decision on fixing the output prices and they find it cheaper to hold the actual prices, rather than to change them.
- Asymmetric information: it appears in the process of making contracts when agents share different information, thus a lack of information might create rigidities in a few terms of the contract. For example in financial markets, this asymmetry is common because agents make contracts in advance.
- Implicit contracts and efficient wage: they are relevant when employers want to keep employees in the workplace. Employers and employees agree on contracts to

assure a reasonable period of employment and wages that reflect their skills. The employer thus reaches the maximum productivity of its employees and the employees maximise their utility. This type of contract also reduces the employee turnover.

- The selection adverse: it mentions how an employer is vulnerable to inefficient and / or short-term employees, in other words lemons. The focus of this issue is that employers have little information about employees' productivity.

In addition, New Keynesians have also developed models which are performed under general equilibrium and market imperfections. These economists have identified both frictions and imperfections as elements that amplify demand or / and supply shocks. For example, the co-ordination issues arise when the economy reaches a level of production that is lower than economy might produce. The reason for this level of production is that firms do not co-ordinate their decisions between each others. Instead, they set a price which is not the equilibrium price which let them to get the maximum profit, nevertheless this price let them to maximise their individual profits bounded to lack of coordination.

New Keynesians also suggest that wage and price rigidities are not the main problem of cycles. They have performed a model in which firms are assumed to be risk averse. When firms face periods of low production, their portfolios are reviewed and changed in accordance with the new environment. Owners of firms also make decisions which are not reversible (i.e. it is impossible going back to the initial state when a decision has been taken) and therefore this implies high risk to them.

To summarize, New Keynesians can be divided into two groups: those who work on microeconomics background under partial equilibrium and those who work on microeconomic background under general equilibrium. The latter models are developed by economists who have joined the New Neoclassical Synthesis School.

4. Conclusions

The main feature of Neoclassical economist is that they started using accurately aggregate definitions such as aggregate investment and aggregate production. They also used mathematical tools which support their ideas, for example Samuelson's principle.

Monetarist's work gave economists ideas to perform dynamic models with adaptive expectation. They also showed the important relation between unemployment rate and inflation rate. Although their analysis of long run was complained, economist were agree that in the short run monetary policy is relevant to stabilize macroeconomic variables such as unemployment rate.

The New Classical economists showed important issues to economists. For example, they showed the way working with Rational Expectations in environments with limited information. They also realised the importance to set up targets in monetary policy. However, they did not worked on economies under disequilibrium.

The Real Business economists have worked on the effect on the economy due to shock on real variables. The way that these economists have performed economic models is helpful. They use a representative agent and a firm who face the usual economic restrictions, then they use dynamic optimization in discrete and continuous time in order to come up with important results such as first order condition equations. They have estimated their model using a new method which takes into account microeconomic data. They also point out the importance to divided shocks into transitory and permanent.

Finally New Keynesians have paid attention to failures in the market. This means they bear in mind that economy shows disequilibrium and authorities have to use economic tools in order to hold up the economy. In addition, they agree with using Rational Expectations concepts as a main tool in their models.

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