ECONOMICAL *VERSUS* POLITICAL CYCLES IN AN IBERIAN MANUFACTURING SECTOR
The Cat and the Mouse?

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ABSTRACT

The paper discusses several questions related to the economic cycles, from the scientific methodological approach to isolate the economic cycles, to an empirical application using data of the Portuguese industrial sector, passing by the identification of the real economic cycles that modulated the productive activity during almost the last 5 decades of the 20th century, and by its rationality. It ends trying to identify the explicative factors of the different phases of expansion, alert, depression, recession and recovering of the estimated economic cycles and puts them side-by-side with the political cycles dictated by the democratic elections.

Keywords: economic cycles, political cycles, manufactories industry, Portuguese economy, explicative cycle factors, industrial economics

JEL CLASSIFICATION: E32, L8

INTRODUCTION

The study of the economic cycles is a classical subject under the economic theory, reason why it is a preoccupation of the economic research long time ago. If there were any doubts about this it would be very easy to dissipate them reading the classical cyclical references referred in the bibliography, some of them coming from the late years of the nineteenth century or from the first years of twentieth cycle. Even being a classical theme this is an actual theme, too. The proof is that there are many modern studies or researches that we can integrate in this scientific area. The question that says that the economical evolution is cyclical is a pacific one; the only doubt is related with the identification of the economic cycles, with their characteristics, and above all, on what is behind the "*nature's caprice*" that show that the economies of the countries follow shorter or longer periods of expansion, of stationary, of contraction, during an irregular number of years, falling in crises passing successively from depression to recession and from this one to recovering and expansion

First, the study begins to present some cyclical terms namely the methods of forecasting economic cycles and by doing a brief reference to some general and classical theories of economic cycles and their authors. Second, it describes one of the methodologies used to estimate and identify the economic cycles. Third, it presents an empirical application of this thematic to the Portuguese economy and in particular to the production of the manufacturing industries; we refer to the data used and its origin, to the polynomial long way trend, to the cyclical movements that conduct to the cyclical cycles, and to the identification of the irregular or random movements. Fourth, we study in detail the economic cycles and their phases and present the explicative factors, or causes, of the successive phases. Fifth, we present, face to face, the economic cycles and the political cycles relating these one to the name of the contemporaneous prime minister of the country. The idea is to discuss which of these two cycles is the cat and the mouse, what is equivalent to discuss the interrelation between the economic cycles and the political ones.

1. SOME BRIEF CONSIDERATIONS ON THE ECONOMIC CYCLES

The expression economic cycle is used to identify an economical period of expansion followed by another of contraction. The cycles are, from the several movements of a chronological series, the more difficult to forecast deriving from the fact that they don't have a known period and besides this, because they are recurrent and are not periodical.

From all the methods that have been used to model the cyclical effects, and in some cases to forecast the turning-points we can refer: (1) the cyclical indices that use the percent decomposition related with the Moving-Average (MA) methods; (2) the seasonal differentiation to isolate the trend-cycle that appeals to the ARIMA models; (3) the Fourier analysis to study the simultaneous variations of seasonal, trend and cycles; (4) the econometric models; (5) the ARIMA and MARIMA models; (6) the utilization of double indicators that combine leading indicators and percent variations in the firm's performance (McLaughlin (1975), and Zarnovitch (1992)); (7) the firms' indexes composed from many others (McLaughlin, 1975); and (8) the pressure cycles (DeLurgio, 1998). Some of these methods can also be used to forecast the business cycle, reason why, sometimes they are used in the entrepreneurial world.

From the several theories concerning the economic cycles we have the long-wave cyclical theories whose recurrent causes continue to be studied by many researchers of different institutions. Without any preoccupation of being exhaustive we can cite the studies of Dewey (1979) that identified a climatic cycle of 33 months that affects other activities such as the prices of the cereals, of the cupper and the building construction. He identified a cycle of 30 to 40 months in the interest rates. Jevons (1835-1882) discovered that the sunspots affect the climate and the agriculture sector; upon him, the cycles motivated by the sunspots have durations of 22 years. Lord W. Beveridge (1922) identified a cycle of 50 to 60 years in the evolution of the wheat prices in Europe. N. Kondratieff (1892-1956), the father of the famous Kondratieff cycles, concluded that the capitalist economies or the market economies have growth cycles of approximately 50 years; these cycles continue to motivate researchers of the scientific community. Beveridge and Dewey studied the evolution of the wheat price during 500 years and concluded that it follows cycles with a medium duration of 54 years.

Besides these examples, we could speak of many other researchers of this kind of phenomena. Some of them, as Bernstein (1991), note that the importance of this kind of studies is not a great one because many times they can't be conclusive.

There are other studies that relate the economic cycles and the business cycles. That's the case of A Pigou, of J-B Say, of J. Schumpeter (1883-1950), of J. Hudson (1858-1940), of John M. Keynes (1883-1946), and of Milton Friedman. The contribution of these authors to the theory of the economic cycles can be seen in many books and papers. DeLurgio (1998, pp. 620-623) is one of the authors that does it.

Let's finish these brief considerations speaking of a two years old study (11/1999) of M. Baxter and R. G. King in which the authors refer that studying the business cycles begins obligatorily by the measure of these cycles. The initial study of Burns and Mitchell (1946) was an important one because it made disposable a set of empirical elements relative to the economic cycles of the developed countries, as the USA, and because it developed methods of measuring the economic cycles that could be used by other researchers for other countries and other sample periods. The today's researchers face the same basic problems; one of them is to know how to isolate the cyclical component of a time series. For instance, the macro-econometricians use a great variety of trend elimination or of smoothing techniques to separate the '*trend-cycle*'. But these techniques are frequently *ad hoc* ones in the sense that the only exigency is that they conduct as stationary cycles, without showing explicitly the statistical characteristics of the economic cycles. Some examples of the different techniques used this way are the utilization of the centred moving average, the first differences, the elimination of linear or of quadratic trends and the application of the Hodrick-Prescott (1980) filter. More recent studies use a battery of such methods to measure the economic cycles. Nevertheless, some of them have ignored – in the words of Burns and Mitchell (1946) and of Baxter and King (1999), too – a fundamental question, the definition of what is a business or an economic cycle. The two authors developed a methodology that began to specify, first, the cyclical component. The process used conducted to the separation of these components through the transforming of the macroeconomic data recurring to particular moving average techniques that respect those characteristics. In the words of these researchers "technically we developed an approach to a *band-pass filter* that forces the production of stationary time series when applied to increasing time series" (p. 575).

2. METHODOLOGICAL FRAMEWORK

The traditional method to study the cyclical effect passes by the classical decomposition of the series in all their different movements – trend, seasonal effects, cyclical effects and irregular or random effects. In fact, upon this methodology eliminating successively the seasonal effects (*deseasonalising*), the trend effects (*detrend* operation) and the random effects we arrive to the cyclical fluctuations.

It's worth to refer that this process is correct if the series has these four effects. If, for instance, the data is annual the series doesn't have seasonal effects, reason why, in this case it's not necessary to eliminate these effects.

The process of estimation of the economic cycles passes by the following steps: (1°) First of all it's necessary to verify if the data presents seasonality; in this case it's necessary to apply a test to verify if the seasonality is additive or multiplicative; suppose, that the seasonality is multiplicative and that the series can be written like this $Y_t = X_t.C_t.S_t.A_t$, where Y_t represents the original time series, X_t the trend, C_t the cyclical movements, S_t the seasonal movements, A_t the irregular or random movements and t a trend index. (2°) Second calculate the seasonal indexes, S_t, using one of the known methods. (3°) Eliminate the seasonal effects (ou *deseazonalysing*) the original series as is showed by the following equation $Y'_t = Y_t/S_t$. (4°) estimate the trend using an adequate technique – regression, moving-average, or exponential smoothing – and obtain the estimates values of the same trend if this is the case. (5°) Multiply the two last components, if they exist, in such a way to determinate a product component of the trend and seasonal effects $X_t S_t$. (6°) Isolate the cyclical-random *movements*, using the following formula $Y_t^* = Y_t/(X_t S_t)$. (7°) Calculate the cyclical movements, C_t, using the centred moving average methodology of k (in general 3 or 5) elements with this cyclical-random time series $C_t = (Y_{t-1}^* + Y_t^* + ... + Y_{t+1}^*)/k$. (8°) Confirm the theoretical and intuitive rationality of the cyclical values obtained this way. (9°) Calculate the adjusted values of the Y_t and A_t variables using the expressions $\hat{Y}_t = X_t.C_t.S_t$ and $A_t = Y_t/\hat{Y}_t$.

It's worth to say that if the empirical data are very erratic to the identification of the cyclical effects it may be necessary to calculate the moving average values of k greater than 3 (k>3) periods, and that there are cases in which not all the components of the time series – trend, seasonal and irregular or random movements – have to be eliminated before the identification of the cyclical component. There are other cases in which the trend and the cyclical movements are very interrelated reason why, in these cases, it's difficult to estimate the cyclical fluctuations. This is the real reason why they're some decomposition methods, like the Census II-XII, that identify a product component 'trend – cycle'.

3. EMPIRICAL APPLICATION

3.1 The Empirical Data and its Origin

The empirical application that we are going to see uses as database the Portuguese Long-Term Time Series estimated and published by the Portuguese Central Bank.

The data refers to a macroeconomic aggregate, the Portuguese Manufacturing Production; the individual values were obtained by summing all the manufacturing sectors (numbered from 31 to 39 of the CAE Revision 1).

The aggregate values were previously expressed in constant currency (escudos) using the deflator of the industrial production. Its base year is 1953. Later these constant or deflated values were converted in an index number whose base year was the same (1953).

In order that the results have a real meaning the study period must be as large as possible. In this sense we are going to use the long period of 43 years covered by the published Portuguese Long Term Time Series, the period 1953-1995.

3.1.2 The Global and Individual Evolutions

Let's begin by the analysis of the graph number 1 that relates the evolution of the Portuguese industrial production index.

Graph n. 1: Evolution of the industrial production time series index
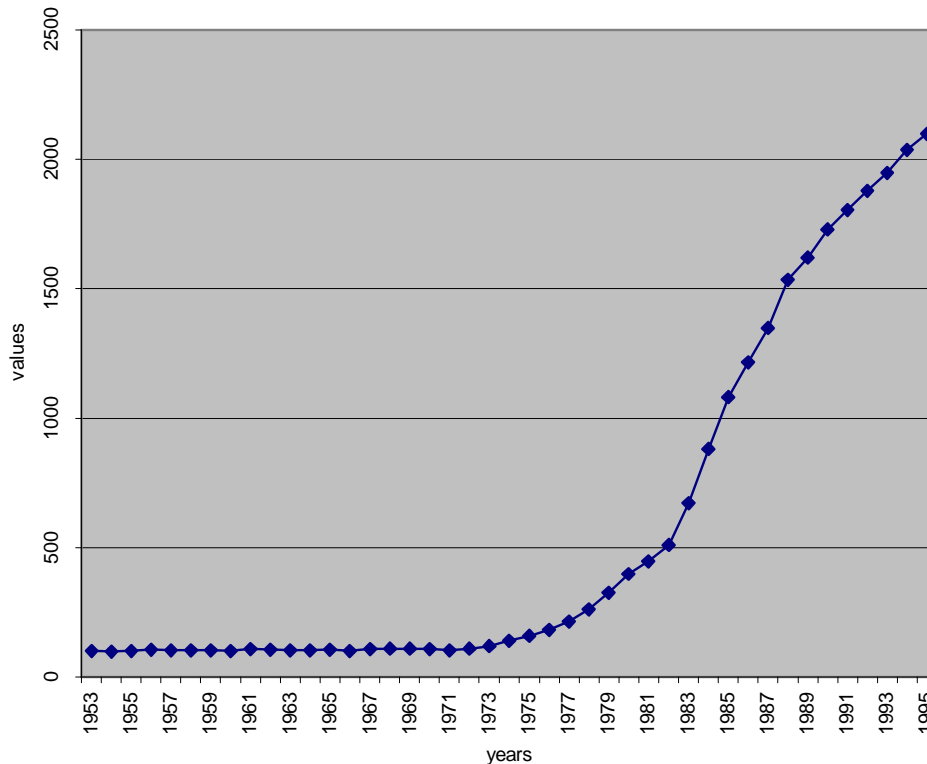
As we can see the Portuguese industrial production, in constant values, grew very slowly during the fifties and sixties (1950/60) and even during the first half of the decade 1970-80, and began to really grow after the oil crises of 1973 and especially after the Portuguese revolution of 1974. After these years the industrial production followed an exponential curve that relented only during the late eighties and beginning of the nineties of the 20th century.

3.2 The Methodology of Estimation of the Movements of the Series

In our analysis we are going to follow a process similar to the one referred in the section n. 2, reason why we assume that the movements are combined in a multiplicative scheme of the type ($Y_t = X_t . C_t . S_t . A_t$), i. e., a scheme in which every movement – the trend, (X_t), the cyclical, (C_t), the seasonal, (S_t), and irregular, (A_t), movements – are multiplied one another.

In order to estimate the long-term movement, or trend, we test several hypotheses of models to translate this process. The two curves that revealed good determination coefficients are the linear one and the polynomial.

As the data is annual there are no need to estimate the seasonal movements.

To estimate the cyclical movements we first estimate the trend values, second we eliminate them from the series, third we estimate the irregular movements by the technique of the moving average (MA), and finally we eliminate these movements. The solution thus obtained is the series of the cyclical movements.

Concerning the irregular movements, as we don't need them because our aim is to estimate the economic cycles – the cyclical movements – we ignore them estimating the moving averages of k=3 periods. In doing this operation we are estimating, by this way, the ambitioned cyclical effects.

If, besides this, we want to study the characteristics of the random movements and specially their size we can isolate them subtracting to the solution Y_t^* the cyclical effects (C_t), or by an alternative way approaching them by the following formula: $Y_t / X_t . C_t . S_t$.

More concretely we are going to follow the steps: 1st, estimate the trend of the national manufacturing production aggregate by adjusting an adequate regression model; 2nd, use this model and estimate the 41

adjusted values of the trend corresponding to the t values 1, 2, ..., 41; 3rd, assuming that the movements or effects of the national aggregate time series – the trend and the seasonal and cyclical movements – combine themselves in a multiplicative way, eliminate the trend values by dividing the values of the original time series (Y_t) by the trend ones (X_t); 4th, as we have annual data, and for this reason it has no seasonal effect, the obtained solution (Y_t') is a kind of cookie composed simultaneously of the cyclical effects (C_t) and of the random ones (A_t). Thus, to estimate the cyclical movements one has to calculate the centred moving averages of k=3 values previously isolated; this technique is equivalent to eliminate the random effects from the time series and to obtain, through these means, the values of the cyclical effects.
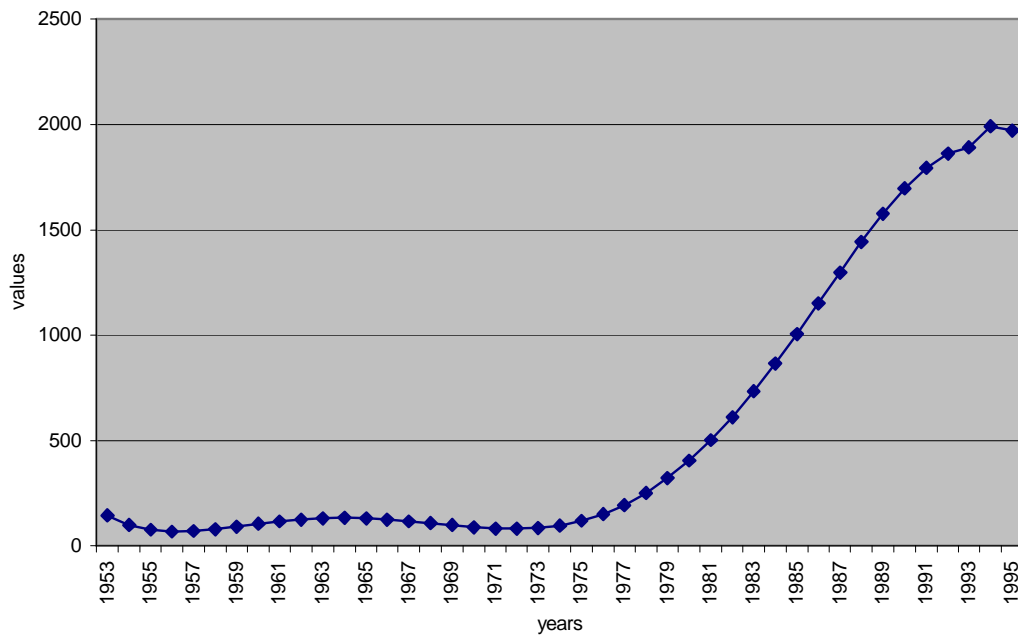
3.3 The Trend Estimation

As the data is annual then the series has no seasonal movements and, therefore, there's no need neither to verify its presence nor to estimate them. Instead of this it's necessary to estimate the trend or the long-term movement. From the several mathematical formulations tested – the linear, the exponential, the parabolic, and the polynomial... – the last one was the one that presented best results in terms of determination coefficient and in terms of their global and individual significance. The parameters' estimates of the polynomial curve (5th degree) chosen as trend and their individual statistical significances can be seen in the table n. 1.

Table n. 1: Estimated Parameters of the polynomial trend

Parameters	Coefficient	Standard deviation	t Statistic	Probability
β_1	181.6038	47.91599	3.790045	0.0005
β_2	-65.08758	21.10693	-3.083706	0.0039
β_3	13.50254	2.888748	4.674184	0.0000
β_4	-1.062074	0.164297	-6.464340	0.0000
β_5	0.033961	0.004097	8.288313	0.0000
β_6	-0.000354	0.0000371	-9.537246	0.0000
R^2	0.996620			
Adjusted R^2	0.996678			
Durbin-Watson d	0.544651			

The long-term evolution of the manufacturing sector production can be seen visually in the graph n. 2.

Graph n. 2: The long-term evolution of the manufactoring production industry
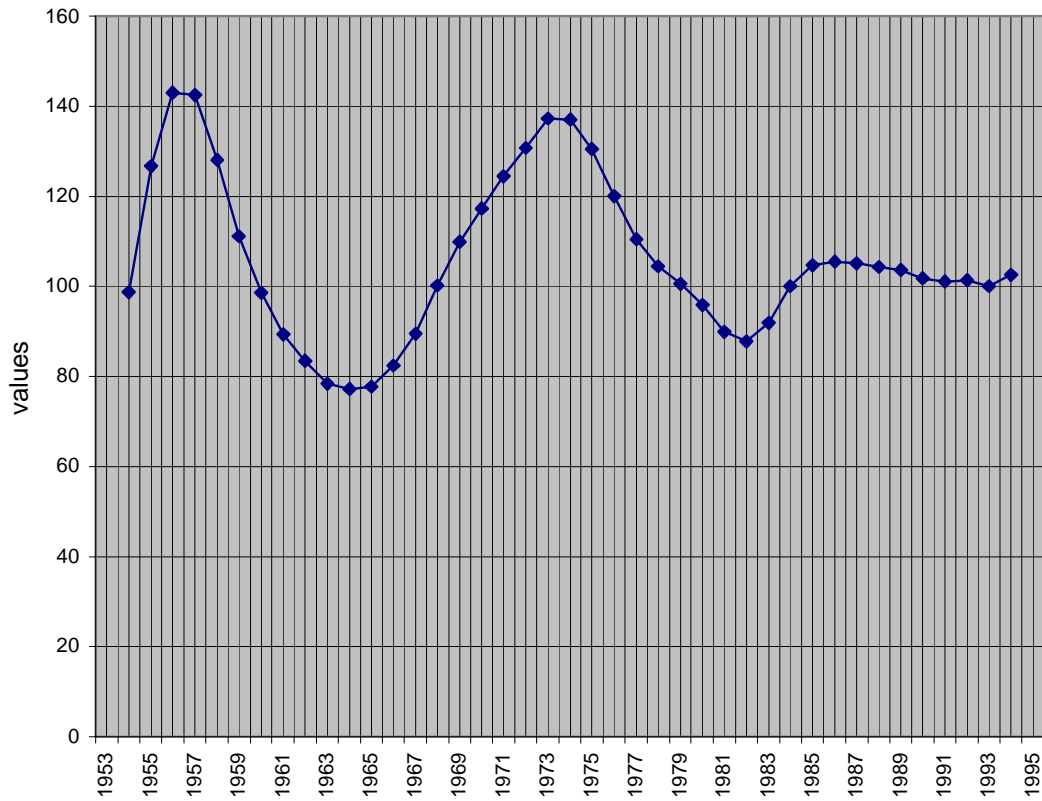

3.4 The Estimation of the Cyclical Movements of the Portuguese Manufacturing Sector

3.4.1 The Estimation of Economic Cycles

As was described earlier once the trend is known we continue by estimating the corresponding estimated values of the adjusted polynomial model and obtain, by division of one another (Y/X.100%), a solution that conglobates the cyclical movements and the random or irregular ones. Let us estimate, now, the cyclical effects recurring to the moving average method of the last solution (the Y'_t values).

Proceeding like this we obtained the cyclical movements that regulate the manufacturing activity during almost the second half of the twentieth century, whose trajectory can be seen in the figure n. 3:

Graph n. 3: Economic cycles in the Manufacturing sector


3.5 The Estimation of the Random or Irregular Movements

To finish these considerations related with the estimation process of the economic cycles that regulated the evolution of the manufacturing sector production during the second half of the twentieth century let us estimate the random movements. Assuming that these effects combine themselves with the others in a multiplicative way let us estimate the random effects. To achieve this aim we begin to constitute a cookie that integrates the trend and the cyclical movements (the economic cycles) and we divide the original time series by the values included in this cookie. The result must be presented in the percentage form.

The graph n. 4 shows the evolution and the dispersion of the values thus estimated in a system of Cartesian axes.

Graph n. 4: The evolution of the random movement of the manufacturing production
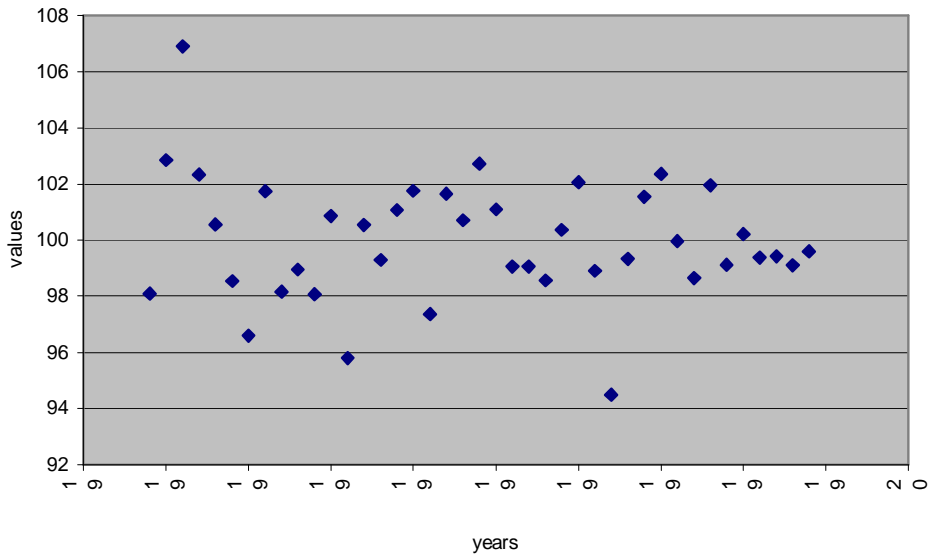
We don't finish these considerations without presenting one more graph, the n. 5, in which it can seen the evolutions of all the three movements we came to estimate and present and the evolution of the original time series.

Graph n. 5: The simultaneous evolution of the 3 movements estimated
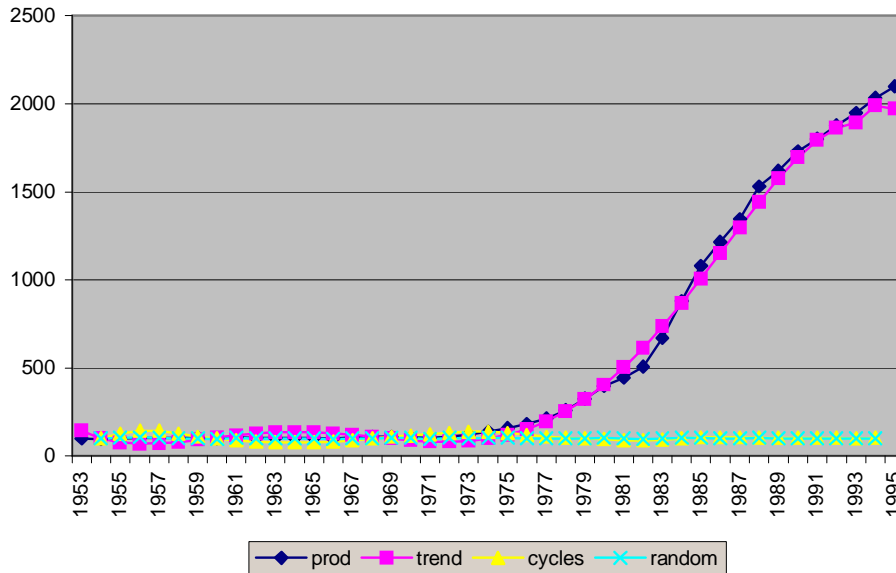
4. The Identification and the interpretation of the economic cycles
4.1 The Identification of these cycles and its successive phases

Looking attentively to the graph n. 3 it's now easy to identify some economic cycles – two of them complete ones and another that is not complete – in the Portuguese manufacturing sector during the period 1953-95. Thus:

- There is a first complete economic cycle that begins in 1954 and ends around the year 1968;
- There is another one, a complete one, too, that begins this year (1968), achieves its summit during the years 1973/74, and ends in 1984; and

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- There is a last and incomplete economic cycle that begins in this last year and ends, probably, as we only have data until 1995, in the late nineties of even in the first years of this century.

The first and the second economic and complete cycles are very perfect, in the sense that it's very easy to identify all the phases that integrate them. The first one – whose recovering phase began during the forties of the twentieth century – begins with a prosperity phase that goes from 1954 to 1956, followed by an alert phase that goes from this last year to the next one, followed by a crises period of the economic cycle with the recession phase between 1957 and 1960, the depression phase between 1960 and 1964, and finally the recovering phase from this last year till 1968.

The second complete economic cycle presents a prosperity phase from 1968 to 1973, followed by an alert phase between this last year and 1974, the year of the Portuguese political revolution. After this year one can easily see the crises of the economic cycle, phase that integrates the recession period (1974 till 1979), the depression period (from 1979 to 1982), and finally the recovering period (from this last year till 1984).

The third and last economic cycle presents a prosperity phase from 1984 to 1985, followed by an alert and long period (from this last year till 1988), followed by a moderate crises' phase of the economic cycle with the recession period beginning this last year. As our time series ends in the year 1995 we can't continue to follow the development of the cycle over the last 5 years of the last century and the first one of the new twenty-first century.

Comparing the profiles of the three economic cycles we came to identify we can see that the first one is very abrupt or slopped, with a very quick ascending phase and a quick descending one but not as quick as the ascending one. The second economic cycle is also a very vigorous, with a recovering/prosperity/expansion phase very sustained in the sixties till almost the year 1973, the year of the oil international crises; this year is followed by a period of crises almost as retarded as the expansion one. The last economic cycle is very weak either in terms of expansion period or in terms of the crises one.

Comparing the duration of the two complete economic cycles identified one can say that the first one is the shortest, with a duration of 14 years, while the second is the longest with a 16 years' duration. The last economic cycle, as it is not complete, one cannot say which is its duration.

4.2 The Explicative Factors of the Identified Economic Cycles

There are diverse causes or explicative factors that can be catalogued to explain either the expansion periods or the crises ones of the three economic cycles. Let us refer some of them.

Thus, concerning **the first economic cycle** (1954-1968) we may cite:

(1) As *expansion factors (1954-58)* we can refer the G annex of the Portuguese-EFTA agreement, the model of import's substitution, the beginning of the emigration process, the reduction of the unemployment, some productivity gains, the cheap price of the labour input, and the results of the 1st (indicative) Planning Project (1953-58);

(2) As *factors of the subsequent crises (1959-64)* one can refer the absence of labour force that followed the enormous emigration process of the 50/60 years, the emigration process itself, the pressure to rise the wages as a market reaction to the absence of specialized workers that had emigrated before, the beginning of the wars of Angola and other Portuguese colonies, the loss of the Portuguese colony of India occurred in the begin of the sixties, other political factors as the absence of democracy, …

(3) As *recovering factors (1964-68)* one can identify the foreign currency sent by the Portuguese emigrants, the arriving of hundreds of thousands of immigrants from Cape Vert and from other Portuguese colonies, the cheap price of fuel, the growing of the internal demand, the protected market of the Portuguese colonies, the politic of the import's substitution (internal production of motor-cars, etc.), the foreign direct investment...

The **political cycle** was directed by the *Prime-Minister* António de Oliveira Salazar, the leader of the unique party (the National Union Party), the party that governed the destinies of Portugal during almost 5 decades, from the beginning of the early thirties do the middle of the seventies.

Concerning the **second economic cycle,** which began in 1968 and ended in 1984, we can say:

(1) As *expansion factors*, during the period *1968-73*, we can refer the political changes occurred with the substitution of the dictator Salazar, the stimulation of the internal demand market motivated by the demand of clothes and other manufactured goods needed by the protected market of the colonies and ex-colonies, by the foreign currencies sent by the Portuguese emigrants to the European Market, by the agreement signed between Portugal and EFTA, the cheap energetic prices (especially that of the oil energy), the effect of several Planning Projects, ...

The Prime-Minister Marcello Caetano of the National Popular Action party, a new name for the ancient unique party, **conducted this political cycle**.

(2) As factors of the subsequent crises that occurred from 1973 to 1982 we can refer the great energetic crises of the year 1973 with the unexpected increase of the energy prices (especially of oil and

derivatives) and the sinking of all other economic sectors, the consequences of the political convulsions that occurred after the Portuguese democratic revolution (the 25th of April 1974) by the break down provoked in every sector of the Portuguese economy, the political instability, the unexpected increase of the wages of workers, the revolutionary exaggeration, the political discharge, the escape of the master-builders (entrepreneurs) and the forced desertion of the firms by their owners, the massive arrival of refugees from the ex colonies that reached the independence after the Portuguese revolution, the labour troubles (motivated above all by the strikes), the capital escape from Portugal to other 'safe' countries, the retention of some capital by the Portuguese emigrants (waiting for political stability and clarification), the second oil shock of 1979/80, the constant governmental instability with frequent changes of the government, the absence of gold and other foreign currencies (specially American dollars), the successive and abrupt devaluations of the Portuguese escudo to push the Portuguese economy by the external demand, the unjustified 5% revalorisation of the Portuguese decided by the Portuguese govern and by his Minister of Finance in 1979/80 decided by the prime-minister Sá Carneiro and by his finance minister Cavaco Silva used by them as a psychological weapon, the rise of the changes' tax of the US dollar, currency in which were and are paid most of the imports of the countries, namely the energy goods, the unemployment, the high interest rates that suffocated the firms and the people, the restrictive demand measures…

Several prime ministers directed the **corresponding political cycle**: Palma Carlos (1974, independent), Vasco Gonçalves (1975, independent and a military man), Mário Soares (1976-77, the leader of the Socialist Party (SP), Maria de Lourdes Pintassilgo (independent) and Nobre da Costa (independent), Sá Carneiro (1979/80 the leader of the Social Democrat Party (SDP)), F. Pinto Balsemão (1980/82 the leader of the SDP, too);

(3) *As recovering factors* (period of 1982-84) we may cite the successive devaluations of the Portuguese currency (escudo) that began in the second half of the seventies, fact that accelerated the employment and, through the acceleration of the exports, the changing of the sector's separation law, the changing of the labour law with the introduction of the term's or finite employment agreement, fact that has increased the employment, the impositions of World Bank.

The prime minister of this recovering economic part of the cycle was again the socialist party's leader Mário Soares; so, he directed the **political cycle** during this period.

Finally, concerning the **third and last economic cycle**, which began in 1984, we have:

(1) *As growth and expansion factors (1984-85)* we can refer the US dollar devaluation, the break down of the oil's price, the household's and firm's energetic conversion, the Common Market (EEC) help before the Portuguese integration in the EEC, the very brief political stability (with the central coalition government), the changing of the labour law with the introduction of the term's employment agreements, the stability programs imposed by the World Bank, the inflation rate with the real break down of the power's demand, that made the labour force cheaper and cheaper, ...

The leader (the Prime Minister) of **the corresponding political cycle** was again Mário Soares, the socialist that coordinated the Government of the two most important and central parties, the SP and the SDP…

(2) *As factors of the industrial crises* (from 1985 on) we have the growing and high increases of the rate of interest, the public investments in great civil works (specially roads) instead of helping the manufacturing firms, some unemployment motivated by the dismantling of the weaker industrial firms, the arrogance of the new ministers and above all the prime-minister, the social disturbances denounced by the catholic bishop of Setubal, other disturbances as the ones occurred in Lisbon' bridge (named 25 of April bridge), ...

The leader of this **political cycle** was the Prime Minister of Portugal was Cavaco Silva, the president of the Social Democratic Party.

Graphic n. 6: Economic Cycles *versus* Political Cycles
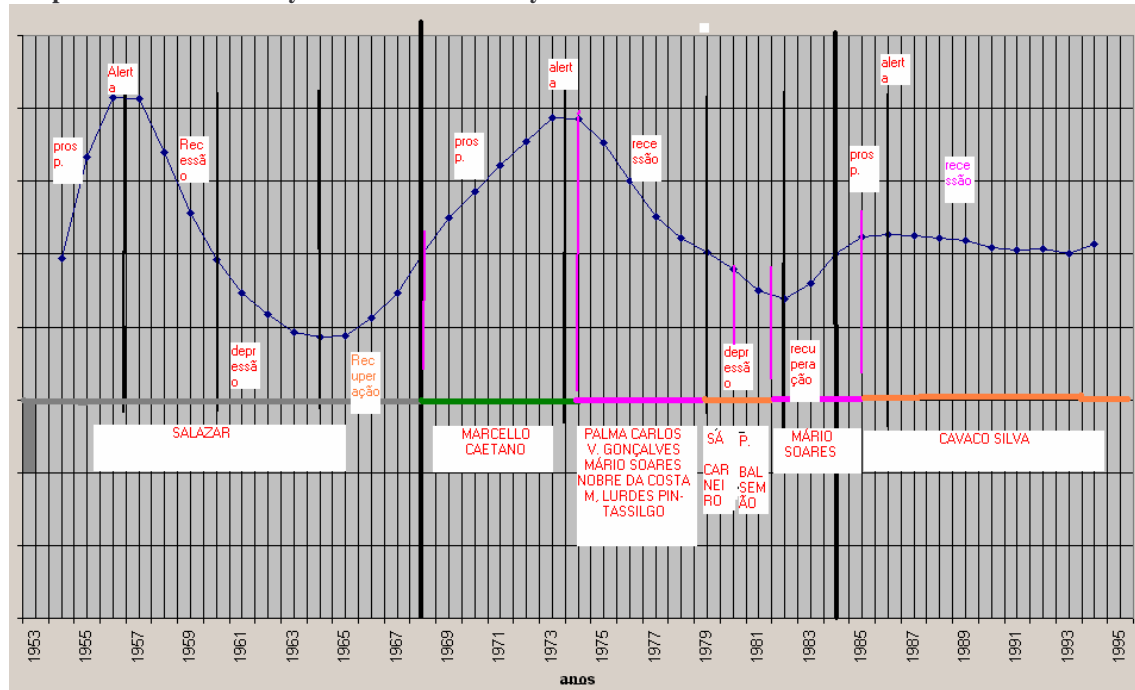
CONCLUSION

The text we came to present speaks of the economic cycles. One its aims is to identify the economic cycles that regulate the Portuguese industrial production during the 43 years that go from 1953 to 1995, almost all the second half of the twentieth century. Another aim is to study its characteristics, namely in terms of duration, of the rhythms of the expansions and crises, the explicative factors of one and another (the phases of the economic cycles). A third one is to put side by side the identified economic cycles and its phases and the political government cycles.

To achieve these goals we part from the production of the manufacturing sector obtained by summing the individual production of the sectors numbers 31 to 39 of the CAE revision 1. The value of this aggregate production was first converted in constant escudo. To obtain these values we first divided the current values by the corresponding industrial deflator values; the series thus obtained was later converted in an index of constant values (whose base year as 1953 = 100). After this we separate the index thus obtained in terms of the different movements that integrate it (namely the trend, the cyclical movements (as the series is annual there are no seasonal movements) and random or irregular movements) using an adequate methodology.

The analysis made permits to identify three economic cycles, two of them are complete (1954-1968, the first) and (1968-1984, the second), and the third is incomplete (from 1984 on), to describe them in detail – indicating, between others, the initial years, the final ones, the *turning-points,* its durations and inclinations (that shows its vigour) and the parts that compose each one of them –, and to refer a detailed reference to the crises or prosperity periods of each one of them. The study ends reefing several explicative factors for all the oscillations or economic cycles encountered (expansions and crises phases), from political and institutional causes, to labour, judicial and economic causes, ... putting side-by-side each one of the great phases that constitute the successive economic cycles and Portuguese government cycles from 1953 to the actuality.

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