UNIVERSITÀ DEGLI STUDI DI ANCONA
DIPARTIMENTO DI ECONOMIA

EUROPEAN BUSINESS CYCLES:

1960-1998

MARCO GALLEGATI & MAURO GALLEGATI

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Dipartimento di Economia
INV. N.
4057
ANCONA

Maggio 2001

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BUSINESS CYCLES FLUCTUATIONS IN EUROPE, 1960-1998

di Marco Gallegati[1] e Mauro Gallegati[2]

Abstract

The goal of the paper consists in investigating if comovements in some selected time series are common to various countries and periods of time. To do so, we use 18 economic time series between 1960: I – 1998: IV for 17 European countries. We found "regularity" in terms of comovements and periodicity with respect to the GDP, in slightly most of the series. In particular, consumption and investment among the aggregate demand components, employment and productivity, and, to a lesser degree, the consumers' and GDP price indexes, their inflation rates and the stock market index, are stable across countries, while the "exogenous" component of the national income series, the monetary variables, the interest rates and the nominal wage level are not. Cyclical movements of some series certainly are policy and institutional specific, as previous studies argued. Moreover, we investigated if GDP-comovements are robust within each single country, by comparing the various cyclical phases. As regards the cycle-specific approach, we found that only the real series are stable: prices, interest rates and wages are very irregular. Our results puzzle the "one-sided" impulse-propagation approach to fluctuations: The main message which emerges from this paper is that business cycle are not all alike, but some characteristics are very robust.

JEL classification numbers: E32, E31.

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Index

1. Introduction

According to Lucas (1977: 217), business cycle is characterized by "*comovements* among different aggregative time series" which are common to all decentralised market economies with no restriction "to particular countries or time period", and therefore they are *all alike* (from a theoretical perspective, one may say that there should be some *general* laws governing market economies; moreover, these laws can be represented by a stochastically disturbed different equation of very low order). This notion replaces the NBER view (Burns and Mitchell, 1946) which claimed the business cycle to "consist of expansion occurring at about the same time in many economic activities, followed by similairly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle" (from a theoretical perspective, one may say that there should be an endogeneous mechanism determining self sustained fluctuations; moreover, these laws can be represented by a deterministic, difference or differential, equation).

Following Lucas' insight, Kydland and Prescott, 1990, apply the Hodrick-Prescott (1981) filter to analyze the US cyclical growth between 1954 and 1989. Their pathbreaking work shows that:

- all the series are highly correlated;
- the "real" series and M2 are procyclical, while prices are countercyclical;
- investment volatility is much higher than output;
- while inventories, employment, exports and investment lag the cycle, productivity, net exports and money lead it.

Correia *et al.*, 1992, apply the same methodology to annual long term series of UK and US, while Backus and Kehoe, 1992, use annual data for ten OECD countries. They show that relations among real quantities have been stable, prices are procyclical before WWII and countercyclical afterward, while fluctuations in money are less correlated with output after 1945. In subsequent work, Backus *et al.*, 1995, show that international business cycles do not replicate the theoretical prescription of the standard model (in particular, output

correlation is higher than the cross-country correlation of productivity, and the fluctuations in terms of trade are larger than those prescribed by the standard model; see also Ambler et al., 1999). Bergman *et al.*, 1998, analyse an international set of annual data by the Baxter and King, 1995, band-pass filter. Their finding corroborates previous studies results, with two exceptions: amplitude and simmetry of cycles have changed through time, and prices are almost always countercyclical. They also note that there is not "any clear pattern over time supporting any single *structural* interpretation" (p.92). In the same vein, Basu and Taylor, 1999, after having investigated business cycles characteristics of several countries in the long run, conclude that much more work is needed on the sources of propagation of small shocks and on the historical and institutional context in order to an adequate understanding of fluctuations (see also Temin, 1998).

Danthine and Girardin, 1989, Danthine and Donaldson, 1993, Correia *et al.*, 1992, Blackburn and Ravn, 1992, Fiorito and Kollintzas, 1992, Englund *et al.*, 1992, Brandner and Neusser, 1990, Dimelis *et al.*,1992, and Christodoulakis *et al.*, 1995, apply the Hodrick-Prescott filter to quarterly data of several OECD countries, basically finding that the behaviour of GDP, prices, consumption, investment and net exports are similar, while government expenditure and money vary accross countries. All of them apply the Hodrick-Prescott filter, which has been criticized (see e.g. Chadha and Prasad, 1992) because it is not "neutral": it makes artificial behaviour to emerge because of its detrending assumption. Moreover, it passes much of the high-frequency noise outside the business cycle frequency band: in particular, Canova, 1991, shows that it removes all frequencies corresponding to 12 quarters, or longer.

Our study is based upon the bandpass filter by Baxter and King, 1994, (see section 2 below) which mitigates such a problem. Recently, Stock and Watson, 1998, use this bandpass filter to analyze 71 US economic time series between 1947:I - 1996:IV. They show that real series (private consumption, investment, change in inventories, exports, imports, employment, and labour productivity), money and short-term interest rate are procyclical, while the price level is countercyclical, and the rate of inflation acyclical.

While the empirical literature still largely investigates (once again, after Bronfenbrenner, 1969) if business cycles are all alike (or if they still exist: see e.g. Weber, 1997; Zarnovitz, 1999), some scholar begin questioning if shocks and linearity are an adequate tool for investigating fluctuations (Cochrane, 1994; Zarnovitz, 1998; Fuhrer and Schuh, 1998) or if we should change our attitude toward fluctuations in favour of a cycle specific approach (Temin, 1998, e.g. claims that it is impossible to identify a single type of perturbation as the source of the American business cycle). After all, they argue, if fluctuations were depending on shocks, we could never predict recessions. Moreover, some scholars emphasize that attention should be placed on the propagation mechanism, rather than the nature or the magnitude of the impulse. Zimmerman, 1998, e.g., argues that an impulse triggers recession only if the propagation mechanism is such that the economy is "vulnerable".

Our approach in this paper is atheoretical:[3] we aim to investigate if comovements in aggregative time series are roboust, i.e. if they are common to various countries and periods of time. To do so, we use 18 economic time series (GDP and demand components, employment and wages, money and prices, interest rates and stock price) between 1960: 1 - 1998: IV for 17 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Island, Italy, Nederland, Norway, Portugal, Spain, Sweden, Switzerland, and UK) to test whether regular and stable comovements of the series can be found.

Anticipating some results we found "regularity" in terms of comovements and periodicity with respect to the GDP, in slightly most of the series. In particular, consumption and investment among the aggregate demand components, employment and productivity, and, to a lesser degree, the consumers' and GDP price indexes, their inflation rates and the stock market index, are stable accross countries, while the "exogenous" component of the national income series, the

[3] Atheoretical in the sense that we do not use a theoretical framework, such as the RBC e.g., as a guideline for our research, or evaluate which model "fits better" the data; using a band-pass filter implies to assume a certain set of characteristics about the cause of growth and the business cycle and their decomposition. Moreover, as Canova, 1991, points out the band-pass filter methodology may alter measures of relative variability, persistence and comovements of the series. Previous studies (Fiorito and Kollintzas, 1994, and Christodoulakis et al., 1995) show that alternative detrending procedure do not affect basic results.

monetary variables, the interest rates and the nominal wage level are not. Moreover, the US statistics, with the possible exception of the nominal wages and the M1 plus quasi money series, conform to the European evidence.

Cyclical movements of some series certainly are policy and institutional specific, as previous studies argued ("only variables under the direct control of the government behave differently", see e.g. Christodoulakis *et al.*, 1995: 3), but this is not all. In fact, we investigated if GDP-comovements are roboust within each single country, by comparing the various cyclical phases (after all, the correlation coefficients are "mean" values, and we should be not very interested in laws claiming that "most of the times" apples fall to the ground even if, from time to time, they fluctuate in the space). As regards the cycle-specific approach, we found that only the real series are stable: prices, interest rates and wages are very irregular (even if some homogeneity can be detected by referring to specific cycles: e.g. the cycles following the oil-shocks).

Since our finding shows that prices, interest rates and the costs of the factors behave not unifourmly, a most cautious approach to the analysis of the business cycle should be taken. Our results puzzle the "one-sided" impulse-propagation approach to fluctuations:[4] the correlation among prices, interest rates, output, and money do not corroborate the money shock approach, as well as the weak correlations among GDP and real wages and inflation does not confort the "equilibrium" real business cycle and the "demand-side innovations" views. If an agnostic approach to business cycle has to be taken seriously, we have to contemplate the chance of the business cycle to be not alike, because different innovations may affect the economy at different times, different distributions of agents change the propagation mechanism, or the chance of having self-sustained fluctuations (Zarnovitz, 1998, 1999).

The main message which emerges from this paper is that business cycle are *not all alike*, but some characteristics appear to be very roboust.

[4] Bergman et al., 1998: 85, claim that "the cross-country evidence over a century of data does not suggest a single cause of recession" (see also Cochrane, 1994).

2. Methodology, data set and results

A traditional decomposition of economic time series distinguishes among a 'trend component', a 'cyclical component' and a 'noise component'. Given an *a priori* definition of business cycle as cyclical comovements among macroeconomic variables at business cycle periodicities, business cycle analysis needs filtering out the cyclical component of the series. It means to find a filter which eliminate both low frequency fluctuations (associated to long-run trend) and the high frequency fluctuations (associated to temporary factors). The optimal filter for an infinite series will completely shut out the fluctuations at all other frequencies than those in business cycles frequencies, but for a finite series complete elimination of fluctuations at frequencies outside business cycle frquencies in not feasible. In other words, the power transfer function of a feasible filter will not be unity for business cycle frequencies and zero elsewhere, due to the finite nature of the series. As band-pass filtering permits a decomposition of a sries into trend, cycle and noise components, corresponding, respectively, to the low, business cycle and high frequency of the spectrum, we apply the Baxter and King's (1995) approximate band-pass filter which isolate business cycle fluctuations in macroeconomic time series between specified frequency bands. The filter, designed in order to make the filtered series stationary if the raw series is integrated of order one or two, uses a centered moving average method using up to 12 weighted leads and lags. Moreover, as suggested by Baxter and King, we pass frequencies corresponding to between 6 and 32 periods, a typical business cycle frequency range with quarterly data (see Stock and Watson, 1998).

We examine the business cycle properties of real GDP, demand components, labor market, prices, money and interest rate variables for 17 european countries using seasonally adjusted quarterly data over the period 1960-1998. The statistical source are OECD Main Economic Indicators, for money, money plus quasi-money and share prices index, and OECD Business Sector Data Base (May 1999) for the rest of variables. All variables are expressed in natural logarithms, except net exports (which is taken as ratio to GDP), unemployment rate and interest rates. The "quality" of data is rather disomogeneous.

Some quartely series (e.g. employment for Greece, Spain and Portugal) are obtained from annual data adjusted on the basis of the industrial production index. This last is far more variable than GDP: being the Switzerland's quarterly GDP based upon the industrial production index, it comes as a no surprise and helps explaining why the statistical facts of this country are very different from other European economies. German unification affects the main statistics, also, and as a general *memento* we should recall that Italy revaluated its GDP by 20% in 1986 and the share of the black market on European economies have been estimated by ranging from 10 to 35% of total income (and this quota is likely to fluctuate considerably during the business cycle).

The results of cross-correlations of real GDP with itself and with all the other under consideration are presented in the Appendix (tables A1 to A18). In order to facilitate interpretation of this large amount of information the results contained in tables A1 to A18 are presented in figures 2 to 19 in a parsimonious way which may give us contemporaneous informations both on the procyclity, acyclity or countercyclicity of the series and if it is leading or lagging the cycle. Figures 2 to 19 are constructed as a scatter diagram where the coordinates of the series of each country are the values of its contemporaneous correlation with GDP and the values of its maximum correlation with GDP. In particular, if the series is positively correlated with GDP we report it at the right of the y-axis, while if the series is negatively correlated with GDP we report it at the left of the y-axis. Moreover, if a series is positively correlated with GDP and is leading GDP the value of contemporaneous correlation will be on the x-axis and that of the maximum correlation on the y-axis, while if it is lagging GDP the value of contemporaneous correlation will be on the y-axis and that of the maximum correlation on the x-axis. At the opposite, if a series is negatively correlated and lagging GDP the value of contemporaneous correlation will be on the x-axis and that of the maximum correlation on the y-axis, while if it is leading GDP the value of contemporaneous correlation will be on the y-axis and that of the maximum correlation on the x-axis. In this way we may immediately see both if a country's series is leading or lagging GDP, according to the position of the country with respect to

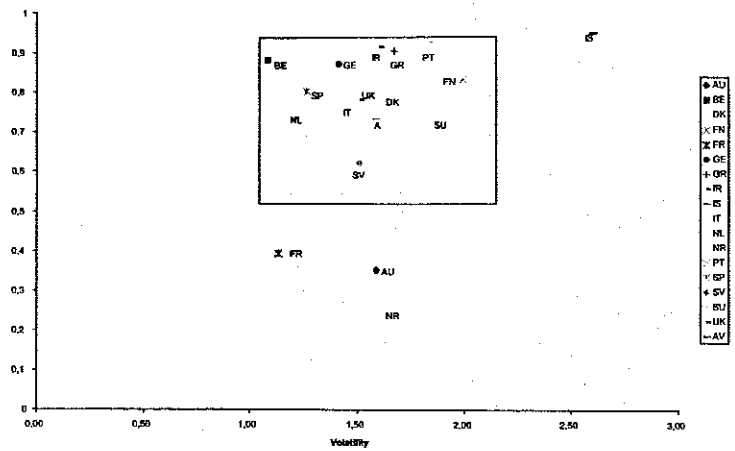
the 45° degree line, and if it is countercyclical, procyclical or acyclical when it is in the upper left corner, upper right corner, or middle and lower part of the figure, respectively. In particular, we define a series procyclical when contemporaneous correlation with GDP is greater than .20 (strongly procyclical if greater than .60), acyclical when it is between .20 and -.20, and countercyclical for values lower than -.20.

3. Cyclical behaviour of some selected time series

This section is devoted to the presentation of the behaviour of the 18 time series of our sample during the cycle. The data set we analyse is the largest in the literature: it has advantages and caveats. Quarterly data of 17 countries constitutes an important reference because of its time extention and country-specific aspect. These data fits better than annual data the business cycle frequency; moreover, whenever annual data refer to the long period, they are often built upon some operation of "archeological statistic" which make them not very relaiable (even if economic structural transformation can be taken into account) while reduction to a costant price base underestimates the more recent rates of growth (affecting the business cycle frquency estimated by the band pass filter). Furthermore, European countries ranges from 7 to 70 million people, some of them have been the "birthplace" of the Industrial Revolution, while others have experienced their *take off* at the end of the XIXth century, or even only after the Second World War, their labor markets are institutionally different while international trade openess (as measured by the export plus import over GDP ranges from 40 to 80%) and cross-country GDP correlation varies a lot.

Roughly speaking we find, not surplising indeed, similarities among the statistics of 3 groups of countries: the Scandinavian region, the European "core" (Germany, France and the smaller economy of Belgium), and the Late Developed Countries of Greece, Italy and Portugal (and to a lesser degree Ireland and Spain).

Figure 1 - Persistence and volatility of real GDP for the 17 countries



3.1. GDP demand components

GDP volatility and serial correlation uniformity is a quite standard result, since Maddison, 1982. In our sample all the countries, but Iceland, have standard deviations between 1.08 and 1.99, while GDP correlation range from .23 to .94 (see figure 1). Point *A* in figure 1 correspond to the unweighted average of our sample, while the rectangle identifies the standard deviation range.

Previous studies (see e.g. Christoulakis et al., 1995) have shown that the endogenous component of the GDP (Consumption and Investment) are remarkably uniform among different countries and periods of time, while its exogenous components (Government expenditure and Net Export) follow different patterns. European data corroborate this finding.

Private consumption is strongly procyclical (except for Norway, Portougal[5] and Sweden,[6] where it is only procyclical, and Switzerland, where it is acyclical) and coincidental with GDP in all cases but, again, Portugal and Switzerland, where it is lagging and leading respectively.

[5] See also Christodoulakis et al., 1995.

[6] According to Bergman et al., 1998, it was .49 post 1973,

Figure 2 -Private Consumption

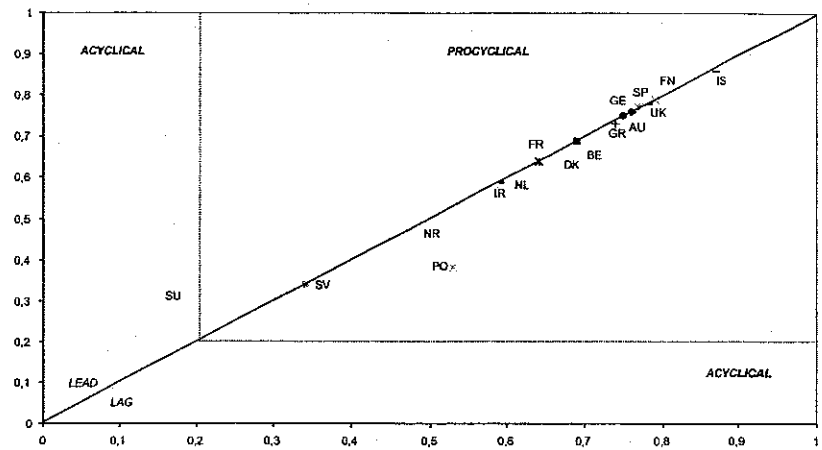
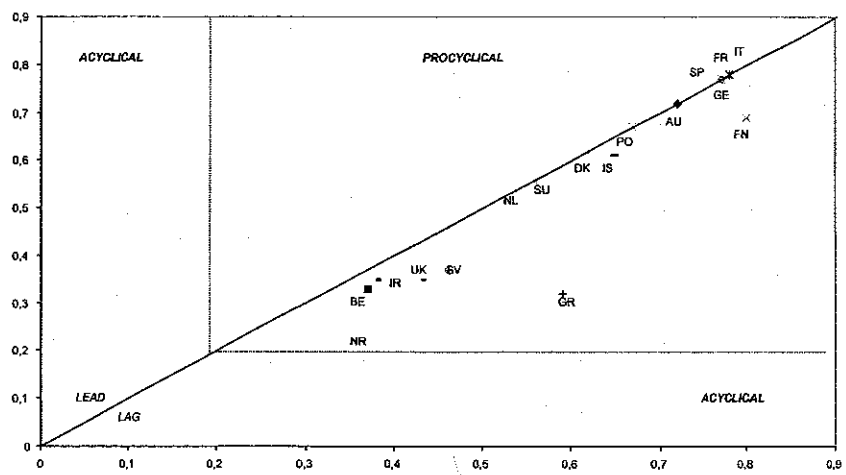


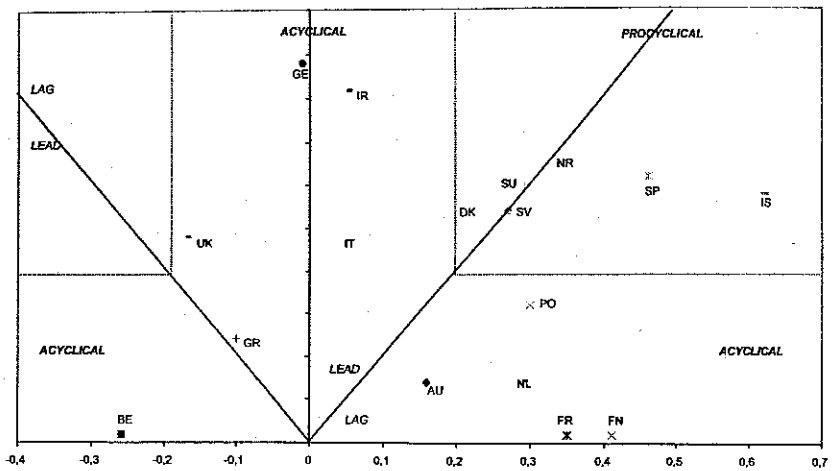
Figure 3 - Investments



Its standard deviation is smaller or moderately larger than that of the GDP with a few exceptions (Austria, Iceland, Ireland and Portugal).

Private total investment is also procyclical (with no exceptions)[7] and coincident or lagging the cycle. Its volatility is 3-5 times higher than

Figure 4 - Government consumption



GDP (exceptions are Ireland, Iceland and Netherlands with a volatility more than 5 times higher).

Far less homogeneity characterizes Net Exports and Government expenditures. As regards as Government expenditures, figure 4 shows it is acyclical in 2/3 of the countries of our sample, procyclical in Denmark, Island, Norway, Spain, Swedwen, and Switzerland, with most of the countries lagging the cycle. A even less uniform path emerges for the Balance of Trade: 10 countries of our sample are countercyclical (two of which only moderately countercyclical), the others acyclical (see de la Torre, 1997), with 12 (6) countries out of 18 lagging (leading) the cycle. Net exports variability exceeds that of GDP in all countries but Iceland, Norway and Portugal.

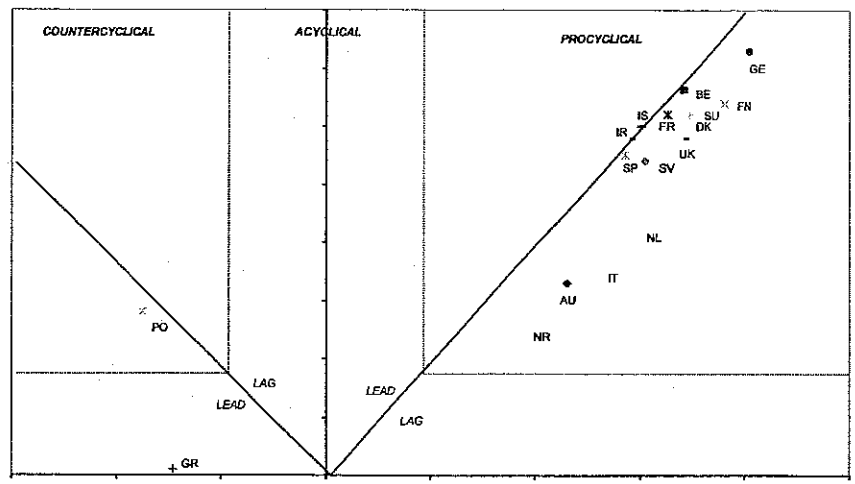
3.2. Employment and wages

Employment measures should be interpreted with extreme cautioness. On the one hand, the "black labour market" is a widespread phenomena particurlarly in the European Late Developed Countries

[7] UK prociclicity (0.4) is due to its low value during the Bretton Woods period; according to Bergman et al. 1998, in fact, between 1960 and 1973, the correlation between investment and GDP was .28.

(Italy, Ireland, Greece, Portougal and Spain: Fuà, 1981). On the other hand, international comparisons often do not rely on common statistical set. Moreover, as a measure of productivity, we prefear the standard total output-total input ratio with respect to the Solow residual, since this last refers, by construction, to long-run periods, which are outside the sort-term horizon of business cycle fluctuations (Basu, 1998).

Figure 6 - Employment



Average labour productivity and total employment (this last with the exception of Greece[8] and Portougal[9]) are both procyclical and less variable than ouput (with the exception of Greece and Portugal as regards labour productivity). Moreover, labor productivity is always coincidental, while employment lags the cycle (exceptions are, a part from Greece and Portugal, Iceland and Ireland where it is coincidental), as well as the rate of unemployment, which is everywhere strongly countercyclical (see figures 6-9). This evidence suggest that labor hoarding, rather than technology shocks, drives labor dynamics as suggested by Fiorito and Kollintzas, 1994.

[8] It is acyclical, while Christodoulakis *et al.*, 1995, find a correlation value of .4.

[9] The anticyclicity of this value is also reported by Christodoulakis *et al.*, 1995.

Figure 7 - Labor productivity

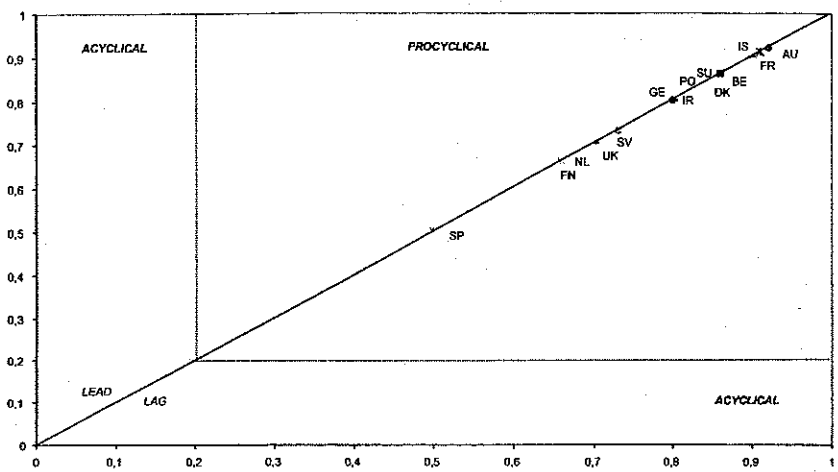


Figure 8 -Unemployment

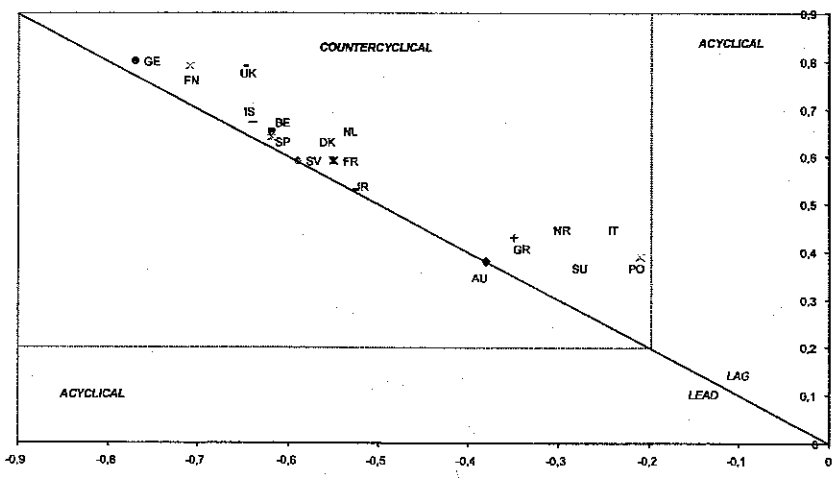


Figure 9 -Nominal wages

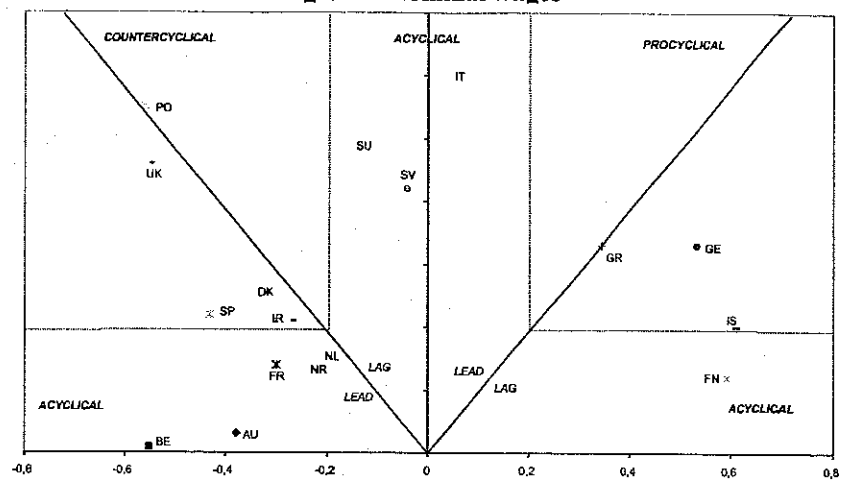
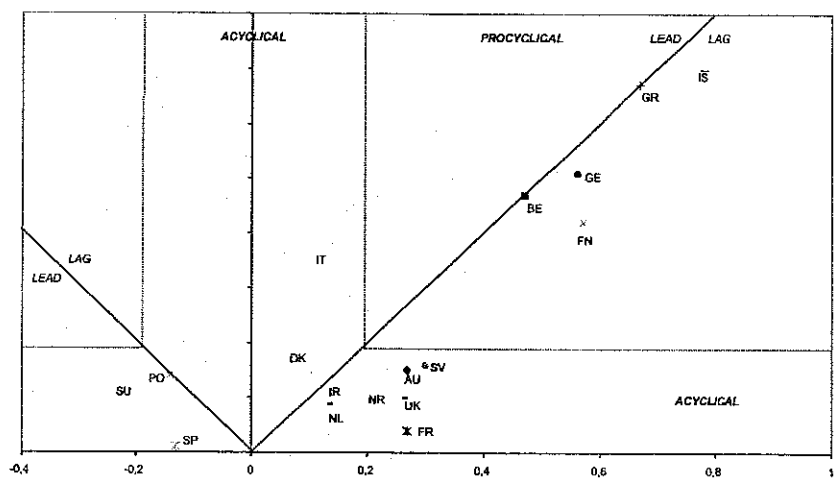


Figure 10 - Real wages



As the real wage rate is concerned (the series is obtained by dividing the nominal wage rate by the level of consumers' price index), data show that it is mostly acyclical (procyclical in Belgium, Finland,

Germany,[10] Greece,[11] and Island) and lags the cycle (exceptions are Belgium, Greece and Portugal where it is coincidental, and Denmark, Italy, Spain and Switzerland, where it leads the cycle).

The nominal wage rate behaviour is less uniform. It is acyclical in 9 countries, countercyclical in Denmark, Ireland, Portugal, Spain and UK, and procyclical in Germany, Greece[12] and Iceland, mostly leading the cycle, with a standard deviation ratio generally larger than one. These findings support the labour-hoarding view of the labour market. Moreover, European countries adopt different unempolyment compensations, hiring and firing procedures, and jobs search policies, and cross-countries differences in labour market easily emerge. The nominal wage rate also shows a behaviour close to that of the consumer price index: this can be due to the contractual indexing of the nominal wage to the CPI (a quite standard practise after the oil shock). Moreover, the countries with strongly procyclical behavior of the real wage rates are the same with procyclical behavior of the nominal wage.

3.3. Money and prices

According to the Keynesian view, nominal money changes have real effects, since prices are sticky. The classical view, on the contrary, argues for a dichotomy between the real and the monetary sector, and no real effects can emerge from a nominal monetary change. Besides the difficulty of defining a measuring the monetary aggregate (we consider two measure of money: one "exogenous", *M1*, which is under the control of the Monetary Authorities, the other "endogenous", *M1 plus quasi-money*), our study, even if does not directly try to give an aswer to the debate about the pro-counter-cyclicity behaviour of prices, inquires the, possibly, different properties of the consumer price index and the GDP deflator.

M1 supply measure is very volatile, and its cyclical behavior is shared between countries with weak procyclicity and acyclicity

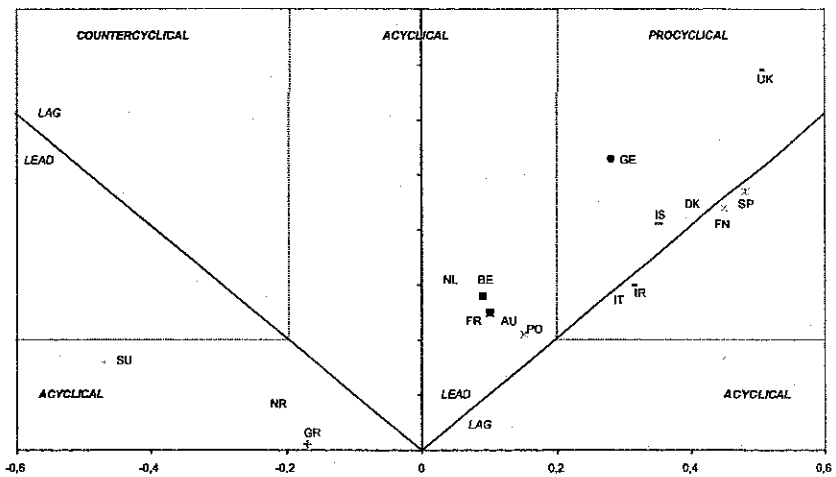
[10] According to Abraham and Haltinwanger, 1995, real wage is mostly procyclical. Other studies, such as Braundner and Nesser, 1990, and Christodoulakis *et al.*, 1995, show that the real wage rate in Germany is also procyclical, while Bergman *et al.*, 1998, find it acyclical.

[11] Christodoulakis *et al.*, 1995, report a strongly procyclical value, also.

[12] See also Christodoulakis *et al.*, 1995.

(Austria, Belgium, France, Greece, Netherland, Norway, Portugal and Switzerland). The variability is higher in those countries, such as the European Late Developed Countries historically prone to inflation. The *M1+quasi money* aggregate shows a more uniform behaviour: it is mostly acyclical since Ireland, Island and UK monetary aggregate is not more procyclical (see figures 10-15).

Figure 11 - Money M1



The level of the consumer price index (and of the GDP deflator) is countercyclical and leads the cycle (exceptions are France,[13] Italy[14] and Switzerland[15]), corroborating previous inquires. The debate on the cyclical behaviour of prices is very intertwined and we do not ask to our data to provide a definitive answer (see Cooley and Ohanian, 1991; Chadha and Prasad, 1993; den Haan, 1996). To discriminate between alternative theories, one needs more support from the data, and if an indication may be drawn from them it is that none of the theories explain business cycle fluctuations.

[13] Bergman et al., 1998, finds acyclical behavior before 1973 and countercyclical afterward.

[14] Bergman et al., 1998, finds procyclical behavior before 1973 and acyclical afterward.

[15] Danthine and Donaldson, 1990, also find a similar value.

Figure 12 - Money plus quasi-money

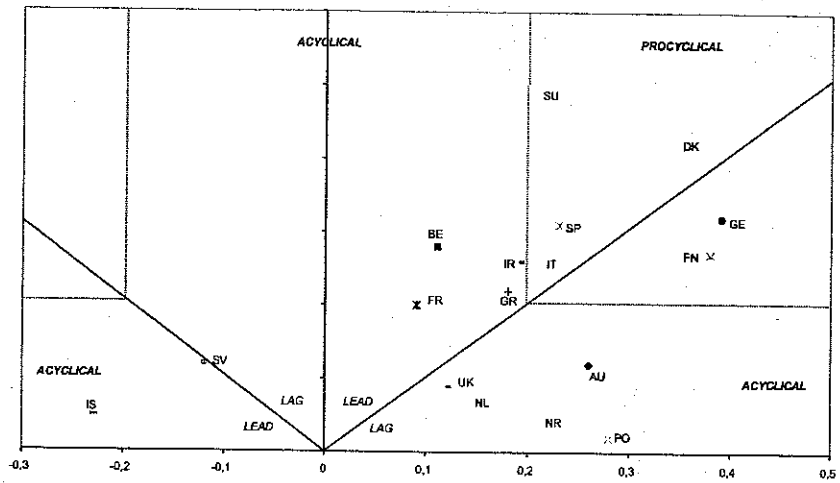


Figure 13 - Consumer prices

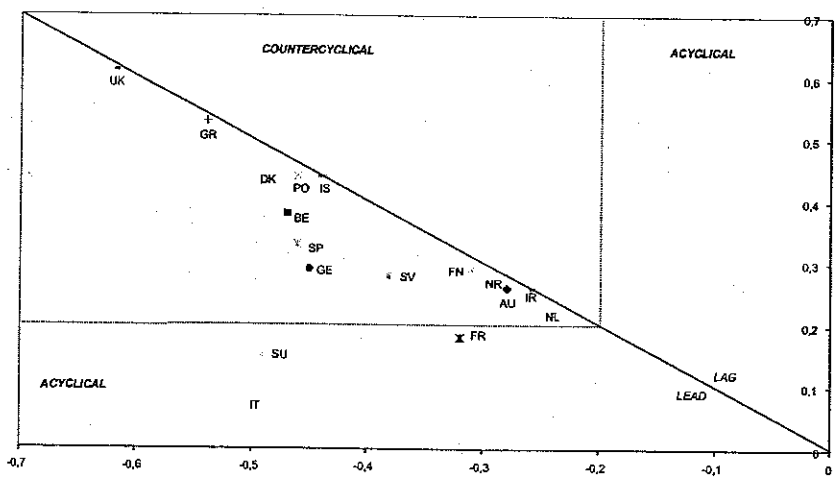
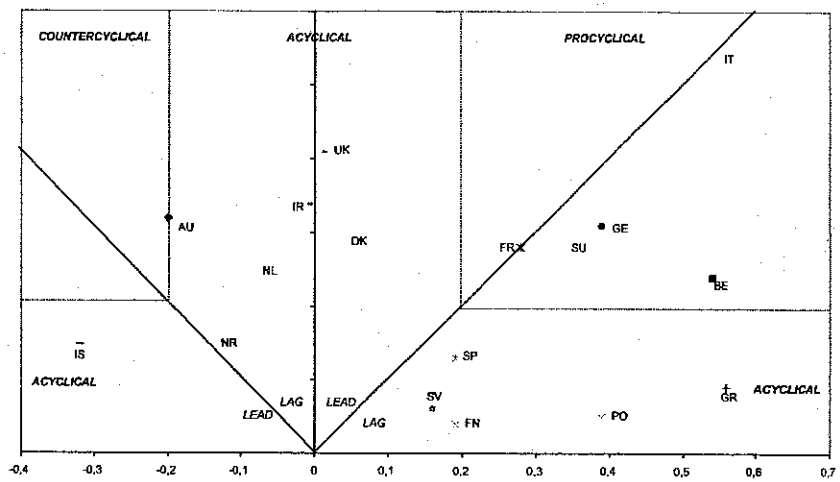


Figure 14 - Inflation rate



The cyclical components of the inflation rate of the consumer price index and the GDP deflator are acyclical or weakly procyclical (Belgium, France, Germany and Switzerland, while in Italy it is strongly procyclical). The same is true for the volatility ratio which falls within the interval 0.18 and 0.71. This is puzzling for those model, like the RBCs, where correlations in levels and first differences are not contemplate (see Ball and Mankiw, 1994).

All in all: the cyclical behaviour of the level prices is countercyclical for the CPI and the GDP indexes, while there is a striking divergence between the behavior of the levels and the rate of inflation.

Figure 15 - Short term interest rate

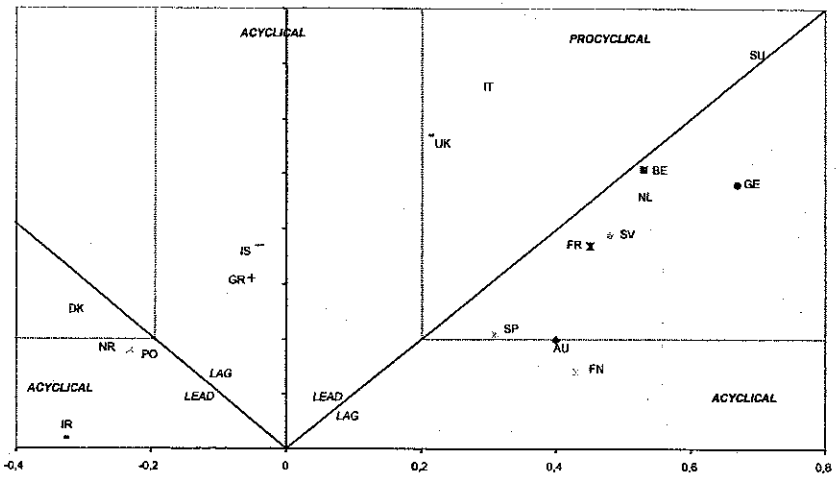
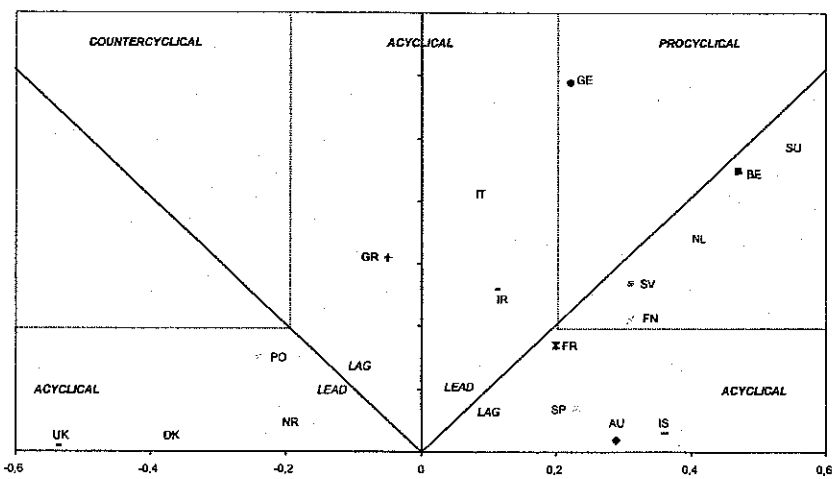


Figure 16 - Long term interest rate



3.4. Interest rates and stock prices

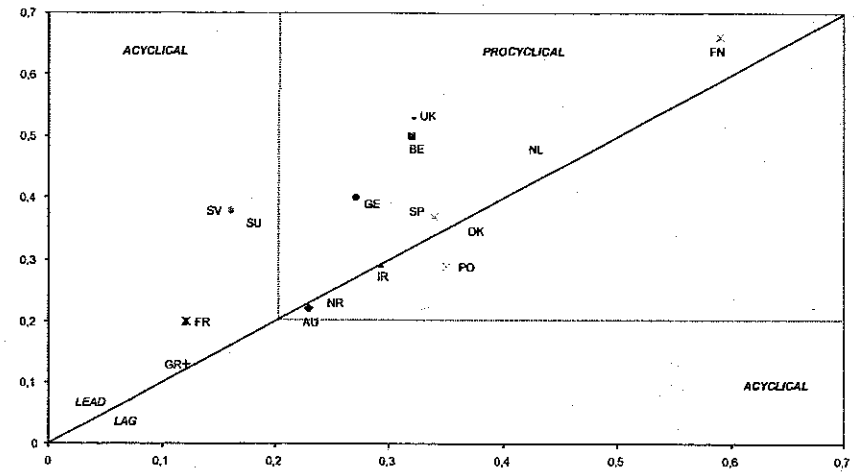
The behaviour of the interest rates and stock prices has not been the focus of previous studies. Our data (see figures 16-19) show that the

short term interest rate is procyclical (in the largest countries and the European core), or acyclical (the only exception being the Denmark), mostly lagging the cycle. The long term rate of interest is mostly acyclical (procyclical in Belgium, Finland, Germany, Nederland, Sweden, and Switzerland) and lags the cycle. As regards th evolatilities of short and long term interest rates we find that, as expected, while the short term interest rates are more variable than GDP (exceptions are Austria, Finland, Greece, Norway, Portugal and Switzerland), the long term interest rate is anywhere less variable than GDP (the only exception is Iceland).

As the real rate of interest, or the "price of capital", we measured it as the difference between the long run nominal rate of interest and the GDP deflator's rate of change (this construction tecnique deeply affects the results: the countries with procyclical behavior of the long term rate of interest are those also procyclical as the real rate is concerned). Data show a clear acyclical path (exceptions are the same countries above emphasized as the long term interest rate is concerned) mostly leading or lagging. Real rate are less cyclical than nominal rates, thus corroborating US experience. Let also note that the cost of capital does not seem to affect capital accumulation which is mostly sensitive to the GDP changes, according to the aceleration principle of the imperfect competition approach.

Finally, ambigous evidence from the stock market was expected because of the different "tickness" of the various stock markets. Its behaviour is mostly proyclical (acyclical in France, Greece, Sweden and Switzerland) and leading the cycle (exceptions are Austria and Portugal), corroborating the view of profits-expectation mechanism. Furthermore, the share prices index is 7.40 to 15.19 times more volatile than GDP and this volatility is far more higher in the smallest countries.

Figure 17 - Share prices



4. Individual business cycles: some empirical evidence

The previous section has shown that real series (aggregate demand components, employment and productivity) behave quite similairly among different countries in the time period under investigation. The correlation statistics basically tell us the "average" behaviour of a series with respect to a series we have choosen as a reference (in our case the GDP). As usual, there exist statistical tests to ascertain the confidence level of a parameter; here the issue is in a way different, since differences in a series behaviour make the business cycle to be different (as the traditional wisdom would put it, prices are pro(counter)-cyclical if a demand (supply) shock affects the system). In other words, this section is dedicated to the question: is there *a* business cycle, i.e. a definible entity with establishabled characteristics, or there exist *many* business cycles?[16]

A graphical analysis of the US price variables show that of the 9 cycles after 1949, 6 are different each other, i.e. they have substantial differences among the series. Fluctuations of variables with the same behavior concern the cycles between 1958 and 1970, and between

[16] Before the post-Lucas 1977 mainstream dominance, scholars of the business cycles were used to adopt a very flexible view: see e.g. Harberler, 1958.

1970 and 1982. It is a robust signal against the hypothesis of the one-side explanation of the business cycle and the underlying idea of "all alike business cycle". To test whether this hypothesis is rejected from European data, we analyse the behavior of the time series within different cycles by isolating each episode and calculating the correlation with output for those countries belonging to the G7 group.[17] Results of the "price series" (nominal consumer price and wage rate, GDP and consumers' rate of inflation and the price of capital) are shown in table 6. While real series are very coherent during time and countries prices behavior looks quite erratic. It is quite evident that series vary considerably and no uniform behavior can be detected (price level is not an exception but after the first oil shock).

In order to analyze such a issue, we did the following:

- Selected the 4 largest economies of our data set (France, Germany, Italy, and UK);
- Dated the business cycles through the FT method;
- Within each single cycle, we performed the statistical analysis of the previous section.[18]

Business cycles cronology shows that between 1960 and 1997, European countries experienced six major fluctuation episodes (*through* years are "around" 1963, 1967, 1971, 1975, 1982, 1987 and 1993), although not all the four countries are affected by the common cyclical movement at the same time and some country specificity may be detected. In particular, except for the UK, there exists asymmetry between expansion and contraction, as the number of quarters are involved.

Table 5a-d report the statistical outcome of the individual cycle analysis: since the "real" and employment series are very uniform within cycles, i.e. they reply (and corroborate) the empirical evidence of section 3, we do not report them (see table 5).

Results are quite troublesome. Look at the UK statistics: Besides some minor "irregularities", the behavior of the price level (always

[17] A longer term analysis of the hypothesis of a representative cycle in the G7 economies has been performed by Gallegati and Stanca, 1998.

[18] Statistical analysis of individual cycles have to be interpreted with some cautioness because of the paucity of the data of our sample.

anticyclical), the nominal wages (anticyclical, but between 1963:1-64:2) and the real rate (acyclical, but between 75:3-79:2), is pretty uniform. The inflation rate is, on the contrary, very unstable (apparently it does not care who lives in Downing St.) being procyclical (75:3-79:2, 92:2-97:4), acyclical (67:4-68:1, 84:3-88:4), as well countercyclical (72:1-73:1, 81:2-84:1). Among the other countries, only the behavior of the real wage in Germany shows a remarkable stability, being procyclical but in the period 1971:4-73:1.

As the behaviour of the series within each individual cycle, we may emphasize that the nominal wages and price level, the rate of GDP inflation and the real wage move togheter with the cycle always in UK (but between 1967:4-68:1) and France, and between 1964:4-70:1 in Italy. In other words, according to individual cycle analysis there appear to exist a relationship between the price level and the GDP inflation and the nominal wage rates: if the first moves in a direction, the others follow (exception is Germany, always but between 1971:4-1973:1; and Italy between 1972:3-74:1 and 1993:3-96:1). The real wage of interest replicated the behavior of the nominal wage but for Italy after 1974:1 and UK.

Table 5a - France

	61:1 68:1	68:2 75:2	75:3 80:4	81:1 86:4	87:1 93:2	93:3 96:4	97:1 98:2	
Nominal Wages	.04	.01	-.69	.46	-.15	-.39	-	-.14
Real wages	-.14	.13	-.42	.41	-.16	-.32	-	.04
Consumer prices	.03	-.06	-.68	.21	.01	-.21	-.81	-.18
GDP deflator	.15	-.01	-.64	.31	-.49	-.44	-.70	-.14
Inflation rate	-.02	.41	.43	.16	.04	-.20	-.64	.28
Real int. rate	-.11	.23	-.23	.33	.30	.94	.14	.18

Table 5b - Germany

	61:1 63:1	63:2 67:2	67:3 71:3	71:4 74:4	75:1 82:4	83:1 86:4	87:1 90:3	
Nominal Wages	.76	.70	.47	-.11	.01	.23	-.23	.33
Real wages	.75	.87	.61	.01	.77	.32	-.35	.51
Consumer prices	-.29	.01	-.97	-.19	-.69	-.25	.20	-.29
GDP deflator	.87	.52	.07	-.69	-.80	-.58	-.08	-.12
Inflation rate	-.87	.83	.39	.18	.16	.02	.27	.31
Real int. rate	-.27	.25	.40	.01	.03	.27	.68	.23

Table 5c - Italy

	.61:1 64:3	64:4 72:1	72:2 75:1	75:2 77:3	77:4 82:3	82:4 93:2	93:3 96:4	
Nominal Wages	.41	-.40	.35	.59	.16	-.23	-.01	.03
Real wages	.51	-.19	.54	.16	.47	.38	-.52	.14
Consumer prices	.35	-.29	.09	.74	-.15	-.49	.08	-.07
GDP deflator	.22	-.62	.26	.63	-.19	-.38	.07	-.08
Inflation rate	.39	.35	.63	.68	.78	.17	.68	.55
Real int. rate	-.04	.19	-.20	.77	-.36	.02	.87	.06

Table 5d - UK

	63:1 67:3	67:4 71:4	72:1 75:2	75:3 81:1	81:2 84:2	84:3 92:1	92:2 98:4	
Nominal Wages	-	-.18	-.42	-.64	-.76	-.42	-.43	-.46
Real wages	-	.08	.15	-.20	-.05	.16	.02	.10
Consumer prices	-.06	-.50	-.75	-.69	-.92	-.76	-.82	-.61
GDP deflator	-.09	-.59	-.62	-.78	-.90	-.55	-.81	-.58
Inflation rate	.47	-.08	-.50	.21	-.30	.09	.29	.01
Real int. rate	.37	.63	.01	-.10	-.73	.05	.51	.04

The behavior of the rate of inflation is very erratic in France and Italy, less in Germany (after 1971:4 the GDP inflation is anti-cyclical, while the consumers' price inflation is acyclical) and, as the consumer's rate is concerned, UK. France's data are quite volatite accross different cycles, but homogeneous if we look at the individual episodes: price level, nominal and real wages are *all* acyclical (anticyclical) (procyclical) in the periods 68:2-74:1 and 87:1-90:1 (75:3-90:3, 93:3-95:1) (81:2-82:4). Statistics of Germany and Italy are very erratic and each cycle differs from the other as the correlation among series are involved (the only exception being the Italian cycles 77:4-82:4 and 82:4-93:3.)[19]

Although a definitive answer is not likely to be drawn from a single study, it is quite clear the the data puzzles the one sided approach to business cycle since no uniform behavior emerges if we look at the individal cycle. As Schumpeter, 1951, suggested business cycle scholars should analyse "how industries and individual firms rise and fall and how their rise and fall affect the aggregates and what we call

[19] This last cycle marked the first decline in the level of private Consumption in Italy after the WWII (see Weber and, . 1999) and this represents, by itself, an exception..

loosely general business conditions". Panel data analysis (Stokey, 1993) and historiografic tools (Temin, 1998) may of help in describing business cycle, but more work is needed to evaluate the approach. It has been suggested (Zimmerman, 1998) that economies respond differently to the same shock because of their "vulnerability": a flu can kill a very sick patient, but simply forces to bed a healthy individual. Moreover, vulnerability may change during the cycle affecting the propagation mechanism.

Nevertheless this business cycle heterogeneity, some uniformiy among fluctuations may be found. The business cycle following the first oil shock experienced countercyclical behaviour of the price level in all of the 4 economies.

4. Conclusive remarks

In this paper, we leave open the question concerning the "cause" of fluctuations: it can well be that different causes produce business cycle (Temin, 1998; it is appropriate to recall that Marshall, 1960, ridiculized the avocates of the one-sided theorists of value by emphasizing that there is not a hedge of a scissor cutting the paper) or some endogenous mechanism generates fluctuations (Zarnovitz, 1998). Rather, we empirically investigated if at least some business cycle facts are common according to European and US evidence. Our main conclusion is that business cycle fluctuations *are not* "all alike" either through time or between countries.

Much more work is needed to a real understanding of the nature of the business cycle. In the meanwhile we should bear in mind that, talking about fluctuations, no-one is esempted from saying non-senses: it is therefore important to avoid to tell them without any presumption.

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