International Business Cycles and the Gold Standard:

An Econometric Approach,

1861-1913

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Abstract

This study compares the international transmission of business cycle shocks and the importance of exchange rates systems in Scandinavia and the Southern European countries of Italy, Portugal, and Spain, 1861-1913. Estimated VARs for real GDP and inflation reveal the presence of a real European business cycle. The findings show that countries on the gold standard (i.e., Scandinavia) do not absorb shocks and reflect the transmission of nominal business cycles disturbances. On the contrary, the Southern European countries do not experience a strong impact of international disturbances, and flexible exchange rates insulate them from both foreign nominal and real shocks.

Keywords: business cycles; exchange rates; shocks

I. Introduction

During the last years of the nineteenth century all the European countries adopted the gold standard, a regime that worked well with no major changes until World War I. The world economy suffered great shocks during the 1870s decade, and the gold standard was considered as the solution to mitigate those shocks. The gold standard was thought to be the "perfect" mechanism to avoid pressure over the balance of payments, to satisfy the various objectives of the national monetary authority, and to provide price and exchange rate stability. The system could work as long as the key international currency operating with gold, the pound sterling, was strong and backed by financial institutions assuring its convertibility in gold. Essentially the gold standard was a system of international balance of payments adjustment, capable of adjusting short-term deficits or surpluses in the external balance of individual countries using gold as the basis of the circulating medium.

The classical gold standard regime was a credible commitment mechanism characterized by stable economic growth, relative political stability, and the belief in free trade. Moreover, it provided access to the international capital markets of the core countries. It was a system of fixed exchange rates, and so international disturbances were transmitted easily from the main financial centers to the rest of the countries in the system. In contrast, countries that did not adhere strictly to the rule could suffer from no access to international capital markets and low growth, lacking then stability in the system. Nevertheless, the presence of flexible exchange rates allowed them to be insulated from external shocks. Indeed, countries not in the gold standard did not experience transmissions of international business cycles. Therefore, I expect that belonging to the international monetary regime reflect the degree of synchronization of national business cycles with the international one, economic development, or simply political will to foster a closer economic union. It is this

transmission of business cycles shocks what this study intends to investigate, following the line set up by Craig and Fisher (1992), and therefore by Friedman and Schwartz (1982).

Traditional studies of the business cycle in late 19th century Europe claim that financial crises in one country expand to others, inducing financial and real effects over a number of countries. Money is, therefore, not neutral in each country and money supplies are all linked through the international monetary rule (Friedman and Schwartz, 1982; Huffman and Lothian, 1984). However, empirical results on modern data as well as on some available historical data for few European countries (Bordo, 1986) show that financial crises in one country spread to others affecting them in real terms. Money is then neutral. In the spirit of Craig and Fisher (1992), this same real business cycle explanation holds and there is monetary neutrality. Moreover, there exists a close financial integration of the European economy on the late years of the nineteenth century. At the same time, discussions of the international transmission of business cycles also involve the exchange rate mechanism of the time. Theoretical work in macroeconomics argues that flexible exchange rates, as opposed to the fixed exchange rate system of the gold standard, do not prevent the transmission of international business cycle shocks (see Fleming, 1962; Mundell, 1968). Nevertheless, some more recent econometric results for historical data defend the idea that flexible exchange rates protect a country from foreign business cycle disturbances as opposed to what has been previously said (Choudhri and Kochin, 1980; Bordo, 1985).

This paper then proposes to study the international transmission of business cycle shocks during the classical gold standard period, 1861-1913, and its effects for two different groups of countries - Scandinavia and the southern European countries of Italy, Portugal, and Spain. The former strictly adhered to the gold standard and had a fixed exchange rate regime, whereas the Southern European countries did not. An international crisis might be a disturbance independent of economic domestic conditions. Therefore, by looking at these

two different groups of countries at the time of the gold standard, I pay especially close attention to exchange rate systems and their ability to absorb shocks, or on the contrary, to transmit business cycles disturbances from abroad. Basically, the two objectives of this paper are: to study the dynamics of the business cycles in these different countries; and, to see whether a flexible exchange rate system insulates an economy from international shocks.

This analysis is new in what it considers a set of countries that have not historically been analyzed and compared in this sense. The study is largely made possible by the development of national income accounting in Scandinavia as well as in Portugal and Spain. Moreover, transmissions of business cycles lead to possible interactions among these countries and Great Britain and the United States, which are the two references for international shocks. This allows to analyze whether there was a European business cycle among the countries that adopted the classical gold standard and that shared the same monetary policy (Backus and Kehoe, 1992). From this historical data, we can learn some lessons when compared to the current debate on European business cycles disturbances (see Artis and Zhang, 1997).

To investigate the transmission of international business cycle shocks, I analyze the behavior of GDP and change in prices over time using vector autoregressions (VARs). I conduct Granger causality tests and innovation accounting - impulse response analysis and variance decomposition - to study the interrelationship between GDP and changes in price level over time. A test of Granger causality looks for the causation direction of the variables considered, one way or bi-directional. The empirical results are then used to compare the extent to which not following the gold standard insulated small countries from international disturbances (Huffman and Lothian, 1984; Bordo, 1985). If flexible exchange rates insulate an economy, we would expect a given country's output and prices to be largely unaffected by international shocks. On the other hand, if flexible exchange rates fail to insulate an

economy, then we would expect international shocks to account for a large portion of movements in domestic output and prices.

We might expect then the Southern European countries to be insulated from both nominal and real shocks due to the flexible exchange rate regime. In contrast, I expect the Scandinavian countries not to be insulated from shocks, and reflect the international transmission of the business cycles through fixed exchange rates and its tight relationship with the gold standard regime. Therefore, this paper provides additional insight into the operation of the classical gold standard in the European periphery.[1] In addition, it allows us to show how insulated the countries that did not follow the gold standard were relative to countries that strictly adhered to the international monetary rule based on the importance of exchange rate regimes.

The paper is organized as follows. First, I present some historical background on the operation of the monetary regimes followed by the countries used in this study. Then I discuss the data used in this empirical analysis. This is followed by a description of the econometrics approach and the empirical results. The results are then placed within the framework of different exchange regimes to test the insulation issue. The paper concludes by summarizing the main results of this study.

II. The Gold Standard Experience of the European Periphery

To examine the transmission of international business cycles shocks, I compare a number of small European countries that operated under different monetary regimes during the last years of the nineteenth century and the beginning of the twentieth century. This sample has been chosen on the basis of adherence to the monetary rule in addition to data availability.

Recent research in monetary history confirmed that the gold standard worked successfully for the core countries on the classical gold standard: Britain, France, and the United States. A number of other countries also followed the rule. These included Australia, Canada, Japan, the Netherlands, the Scandinavian countries, and Switzerland. The last group is the countries of Latin America and the Southern European countries for which gold convertibility was the exception rather than the rule. This paper compares the effects of shocks on GDP and prices for two groups of European countries. The first group contains countries that followed the gold standard, the Scandinavian countries of Denmark, Norway, and Sweden. In contrast, the second group of countries, Italy, Portugal, and Spain, did not strictly adhere to the international regime but had an independent monetary policy.

The gold standard experience of the three Scandinavian countries can be analyzed as a whole just by looking at the development of the Scandinavian Currency Union which was established during the first years of the 1870s. Prior to the adoption of the gold standard, Denmark, Norway, and Sweden operated under a silver standard. In 1872, an agreement to form a monetary union was signed. Denmark and Sweden joined the Union that year while Norway did it three years later, in 1875. The Scandinavian Monetary Union was based on gold and adopted a common unit, the krona, which circulated equally in the three countries. However, there was not a gold coin in circulation due to the public preferences of using notes instead of gold. The Swedish constitution guaranteed the convertibility of central bank's notes into gold. The three central banks agreed to allow each other to draw drafts on each other at par. All notes, gold coins, and token coins were accepted at par in the other countries that allowed the Scandinavian Monetary Union to be very successful. In 1905, a political conflict between Norway and Sweden concerning the abolition of their political union led to a reduced monetary cooperation among the Scandinavian countries. The central banks were still accepting each other drafts but not necessarily at par. The three Scandinavian countries

showed a common pattern of adoption of the gold standard between 1872 and 1875 and adhered to the system until the outbreak of the World War I in 1914 (Bergman *et al*., 1993; Henriksen and Kærgard, 1995; Jonung, 1984).

Italy, Portugal, and Spain instead did not strictly adhered to the monetary rule. Italy adopted a bimetallic standard in 1862, although the monetary regime was a de facto gold standard. Three years later, Italy became a member of the Latin Monetary Union but war against Austria and fiscal profligacy forced Italy to abandon convertibility. Fiscal and monetary discipline was restored along with exchange rate parity in 1874. The central authorities resumed convertibility on April 12, 1884, but money was only convertible into silver. Italy adopted a fiduciary standard in 1894 and remained on this system until 1914 (Fratianni and Spinelli, 1984, 1997).

Portugal operated under a bimetallic standard since the 1680s, alternating between gold and silver. In 1854, Portugal joined the international monetary regime and was a member until 1891. The Baring international crisis in conjunction with poor government policies forced Portugal to abandon the gold standard in 1891. Portugal suffered from a deep political, economic, and financial crisis during the 1890s and remained inconvertible until after World War I (Reis, 1994, 1996, 1999).

Spain did really never adopt the gold standard for the entire period and operated under different monetary and fiscal regimes during the last half of the nineteenth and the beginning of the twentieth centuries. In 1848, Spain adopted a bimetallic standard that did not become fully operational until a monetary reform in 1868. During the 1870s, when many countries adopted the gold standard, Spain moved towards a fiduciary system with flexible exchange rates. Silver production increased and the price of silver in terms of gold fell during these years. Spain, which was then on a bimetallic system, operated under a de facto silver standard where the intrinsic value of the coin was smaller than the face value. Convertibility

of paper was finally suspended in 1883 and resumption never took place before or after World War I. However, Spain did enact fiscal and monetary reforms in the early part of the twentieth century to reverse the fiscal problems that emerged as a result of the Spanish-American War.

The objective of this paper is to investigate the incidence of cyclical fluctuations across countries in the gold standard - Scandinavia - and countries not in the gold standard - Italy, Portugal, and Spain. The Friedman-Schwartz work (1982) is the point of departure of almost all studies about the interrelationship between real and monetary issues. Any possible relationship between these two issues exists only in the short-run. In the long run, money is neutral with respect to output (Capie and Wood, 1994). However, and as noted by Craig and Fisher (1992), there is a connection between money and real events for business cycles. They also show the existence of strong financial linkages between European markets in the late years of the nineteenth century. I then propose to extent their study on business cycle transmissions to a new group of European countries where the main characteristic is their different experience with the international monetary rule, the classical gold standard.

III. Data

To test the transmission of international business cycle shocks, I undertake an empirical analysis of the latest gross domestic product (GDP) estimates and wholesale price indices for the eight countries of my sample. The quality of nineteenth century GDP figures is quite variable, especially for countries in the European periphery such as Italy, Portugal, and Spain (see Bardini *et al.*, 1995). GDP series for each country are normalized so that 1913=100. For Italy, I employ Fuà and Gallegati's (1996) new estimates of Italian GDP for the years 1861-1913.[2] For Portugal and Spain, I use Lains (1995)[3] and Prados (1995),

respectively. Recent estimates of GDP developed by Krantz (1997) are employed for Denmark and Sweden. For Norway, the absence of new series forced me to use Mitchell's (1978) which spans the period 1865-1913. For the two references, the U.K. and U.S., GDP series are drawn from Feinstein (1972, 1988) and Romer (1989), respectively. The U.S. data are for the years 1869-1913. Real GDP estimates for Scandinavia, and Italy, Portugal, and Spain with respect to the U.K. and the U.S. are plotted in Figures 1 and 2, respectively.

The so-called inflation rates (first differences in the logarithms of price levels) have been calculated from the wholesale price indices. The data of these series come from the following sources: Denmark, Norway, Sweden, and Spain (Mitchell, 1978). The Danish series covers the years 1876-1913 while the Norwegian spans the period 1891-1913. For the other countries, the references are: Italy (Fratianni and Spinelli, 1984), Portugal (Nunes *et al.*, 1989), the U.K. (Capie and Weber, 1985), and the U.S. (Balke and Gordon, 1989). Figures 3 and 4 present inflation rates for both groups of countries versus Great Britain and the United States.

Therefore and by looking at these four figures, it seems that the three Scandinavian countries display a higher degree of co-movement, being more synchronized with respect to Great Britain and the United States than the Southern European countries for the two variables considered. This confirms the differences between countries under the gold standard regime with fixed exchange rates - Scandinavia - and countries that were not in the gold standard system with flexible exchange rates - the Southern European countries of Italy, Portugal, and Spain.

IV. A General Econometric Approach

To test historical periods on the transmission of business cycles shocks, there are several approaches. The idea is to analyze if there is any co-movement among the variables. Let say, we want to study the relationship between every single country times series (i.e., real GDP and inflation) with respect to the two main leaders chosen as references, the U.K and the U.S. To answer this question, I conduct a correlation analysis to study the interrelationships among the variables over time to have a general overview of the case study. Table 1 gives us the first results of this test.

Table 1
Correlation Matrix
Real GDP

	Denmark	**Norway**	**Sweden**	**UK**	**US**
Denmark	1				
Norway	-0.0604	1			
Sweden	0.2904	0.3315	1		
UK	-0.0282	0.4046	0.0969	1	
US	0.1812	0.4632	0.0186	0.2729	1

Looking at the correlation that exists between the countries economic growth - real GDP differences - it is hardly difficult to state that there is a co-movement among the variables. The contemporaneous correlation matrix does not reveal any strong relationship among real GDP series being significant. Therefore, what we can expect is that real shocks are not transmitted from one economy to another just by looking at these findings.

Now the same correlation analysis has been done for the Southern European countries and the results drive us to same conclusions (Table 2).

Table 2
Correlation Matrix
Real GDP

	Italy	Portugal	Spain	UK	US
Italy	1				
Portugal	-0.1838	1			
Spain	0.0503	-0.1879	1		
UK	-0.2049	-0.0443	0.1181	1	
US	0.2288	-0.0735	0.1882	0.2729	1

Specially, our interests are based on the influence that any of the reference countries can have on the peripheral countries. Looking at both tables, there is not a high degree of correlation. By the contrary, there is a very small degree of correlation that implies that real GDP series do not co-move, and so shocks are not transmitted from country to country. The exception on our example is Norway. However, due to the short run data set available, the results are lacking power.

We repeat the same analysis with the so-called inflation rates (see tables 3 and 4).

Table 3
Correlation Matrix
Inflation Rates

	Denmark	Norway	Sweden	UK	US
Denmark	1				
Norway	0.5995	1			
Sweden	0.8661	0.6078	1		
UK	0.7748	0.7235	0.7853	1	
US	0.7125	0.4186	0.5089	0.5170	1

Table 4
Correlation Matrix
Inflation Rates

	Italy	Portugal	Spain	UK	US
Italy	1				
Portugal	0.2371	1			
Spain	0.1392	0.2991	1		
UK	0.4588	0.1785	0.3038	1	
US	0.0158	-0.0687	0.3189	0.5170	1

As it can be seen in these last two tables, there is a positive correlation with the two reference countries, mainly with the UK. It is important to highlight the results obtained for the Scandinavian countries. The correlation coefficients are very high and positive. Now we can expect that British inflation would mainly drive the inflation in Scandinavia. This basic approach has given us just a vague intuition of how business cycles shocks could be transmitted. Therefore, and in order to prove that results are consistent, I conduct a vector autoregression (VAR) analysis. This will confirm the previous results.

V. VAR Analysis and Innovation Accounting

We are interested in the dynamic relationship between real GDP and changes in price levels time series with respect to the U.K. and U.S. in order to analyze the transmission of business cycles shocks from 1861 to 1913. Therefore, I first conduct a VAR analysis that provides a Granger causality test, and second innovation accounting - impulse response analysis and variance decomposition to study the interrelationships among the variables over time.

VAR methodology allows us to examine the reactions of one variable to the other and vice versa. It postulates that all the variables in the system are endogenous and that each can be written as a linear function of its own lagged values and the lagged values of all other variables in the system. If all variables are joined in one single equation, or vector, this is called a vector autoregression. This vector represents a linear function of its own lagged values plus an error vector. However, it is inappropriate to estimate a VAR of cointegrated variables using only first differences.[4] Therefore, I include the error-correction portion of the model. With this new specification, I run a single OLS regression and F-tests to estimate the different models. In general, both variables in a cointegrated system respond to a deviation

from long-run equilibrium. But, it can be possible that one of them won't. In such a case, that variable does not respond to the discrepancy from long-run equilibrium and the other variable does all the adjustment.

Table 5 provides the results of the Granger causality test for real GDP.

Table 5
Granger Causality Test for Real GDP

	U. K.	U. S.
Denmark		
F-statistic [4]	0.4383	0.8739
Significance	(0.7798)	(0.4929)
Norway		
F-statistic [4]	1.5455	0.8901
Significance	(0.2185)	(0.4838)
Sweden		
F-statistic [2]	1.0604	6.4042
Significance	(0.3575)	(0.0436)
Italy		
F-statistic [3]	3.0256	0.6100
Significance	(0.0448)	(0.6138)
Portugal		
F-statistic [4]	0.4133	0.6245
Significance	(0.7974)	(0.6492)
Spain		
F-statistic [4]	0.5067	0.8572
Significance	(0.7312)	(0.5024)

Note: The number in brackets refers to the particular lags.

The F-statistic values reported refer just to one direction. I just look at the effects from Great Britain and the United States to the peripheral countries in order to analyze the influence they have over Scandinavia and the Southern European countries of Italy, Portugal, and Spain. The findings show that real GDP does not respond to deviations from long-run equilibrium and the UK and US real GDP do not Granger-cause real GDP in none of the six countries of the sample (i.e., error correction term: U.K. and U.S. do all the adjustment). The VAR results for inflation rates do not differ from what has been obtained for real GDP time series. Table 6 gives us the non-significant relation between inflation rates for the six countries and Great Britain and the United States inflation data.

Table 6
Granger Causality Test for Inflation

	U. K.	U. S.
Denmark		
F-statistic [1]	9.9842	0.000
Significance	(0.0036)	(0.9955)
Norway		
F-statistic [1]	0.3150	0.0083
Significance	(0.5929)	(0.9288)
Sweden		
F-statistic [2]	1.8244	0.8094
Significance	(0.1741)	(0.4521)
Italy		
F-statistic [2]	1.8169	0.0187
Significance	(0.1754)	(0.9815)
Portugal		
F-statistic [2]	0.8282	0.4706
Significance	(0.4440)	(0.6280)
Spain		
F-statistic [2]	0.0550	2.2027
Significance	(0.9465)	(0.1234)

Note: The number in brackets refers to the particular lags.

In essence and except for the cases of Sweden and Italy, and Denmark (GDP and inflation series, respectively), no relevant results have been found in any of the countries, which means that there is not a Granger causality relationship among the variables.

Once the VAR has been estimated, it is important to find its dynamic structure. Innovation accounting does this through the impulse response function and variance decomposition. Impulse response function analysis determines how each endogenous variable responds over time to a shock in that variable and in every other endogenous variable. Thus the impulse response function traces the response of the endogenous variable to such shocks. In the same way, the decomposition of variance tells us the proportion of the movements in a variable due to its own shocks versus shocks to the other variable.

The impulse response analyses as well as the decomposition of variance of real GDP leads us to the same conclusion for all countries (see Figures 5-10). There is not a strong correlation between the periphery and the reference countries. Therefore, the use of vector

autoregressions and innovation accounting assesses that there are no dynamic responses of the real GDP estimates. However, the innovation accounting results obtained for the inflation rates reveal a different pattern (see Figures 11-16). The British inflation essentially produces the main movements in the three Scandinavian countries inflation rates. The decomposition of variance for the Scandinavian inflation rates shows that the British inflation explains partially the forecast error variance of each one. This alternative way of finding out the dynamic structure of a VAR leads us to the conclusion that British inflation has a contemporaneous influence on Scandinavian inflation. I can then conclude that out of the six countries in the sample, Denmark, Norway, and Sweden show a clear short-run relationship between inflation and the British counterpart. Nevertheless, this is not so clear for Italy, Portugal, and Spain. Such a strong relationship between the Southern European and the British changes in price levels do not exist (i.e., faster speed of adjustment).

VI. Transmission of Cycles under Different Exchange Rates Regimes

Empirical evidence provided in the previous section indicates that shocks to real GDP and inflation had different effects in Scandinavia as compared with the Southern European countries of Italy, Portugal, and Spain. The F-statistics, reported on tables 5 and 6 for the Granger causality tests, reveal that there is not a relevant influence from the references' variables to the peripheral variables. Neither real GDP nor inflation series of Great Britain and the United States Granger cause any of the real GDP, or inflation, of the other countries (see tables 5 and 6).[5] However, there is one exception. Innovation accounting analysis leads to the conclusion that inflation rates for the Scandinavian countries are responsive to British inflation shocks over the short-run. Thus, British inflation has a short-run influence on Scandinavian inflation. Denmark, Norway, and Sweden inflation rates show a short-run

relationship with the British data, confirming the correlation coefficient results previously obtained. Therefore, there is a contemporaneous evidence of interaction but not Granger causality.

To explain the previous results based on the transmission of business cycles under different exchange rate regimes, we need to highlight the difference between flexible and fixed exchange rate systems. Advocates of flexible exchange rate regimes have often claimed that this regime better insulates the economy from foreign nominal business cycles disturbances, whereas real shocks are likely to be transmitted among countries under both regimes (Robertson and Wickens, 1997). A country that has a flexible exchange rate is able to independently determine its own monetary policy, and therefore it would not be affected by international disturbances. Flexible exchange rates will absorb international shocks and the country would only suffer from temporary disturbances. On the contrary, fixed exchange rates will allow a much easier transmission of disturbances both nominal and real from one country to another avoiding the insulation of the domestic economy.

From the point of view of small countries, any international financial crisis could have had an important effect on the economy. Thus, by focusing on these two groups of countries and its relationship with the classical gold standard, I emphasize the importance of exchange rates regimes in the transmission of international business cycles shocks. Theory predicts that nominal shocks are least transmitted among countries under a flexible than a fixed exchange rate regime. Therefore, I expect Southern European countries to be better insulated from foreign nominal shocks due to the flexible exchange rate system than Scandinavia.

Figures 1 to 4 present a striking contrast between the two exchange rate regimes. All three gold standard countries, Denmark, Norway, and Sweden experienced same movements in real GDP and inflation as the ones experienced by Great Britain and the United States during this period. Each gold country followed the British pattern closely as well as

smoothly. This could be easily explained through trade and industrial relationships they shared at the turn of the century. Flourishing demand for Scandinavian products led to a close relationship with mainly Great Britain, and hence to a deeper interrelationship among these economies. In contrast, the Southern European series experienced less synchronized movements, for the most part, during this period. The only country that shared an important political and economic relationship with Great Britain was Portugal. We could have then expected Portuguese real GDP and inflation rates to follow their British counterparts. However, the results show that it did not happen this way. Portugal's strong relationship with international markets reached an end with the international financial crisis of 1891. Trade relationships diminished considerably and Portugal abandoned the gold standard regime. Therefore, I can conclude that the post-gold period had a stronger impact on Portuguese real GDP and inflation, when compared with the gold standard period.

I have compared movements in real GDP and change in price levels in each of the six countries with the movements of their counterparts in Great Britain and the United States. The empirical findings were quite consistent with what it could be expected (Huffman and Lothian, 1984). Countries on the gold standard and with fixed exchange rates are not totally insulated from shocks. They reflect the transmission of real and nominal business cycles disturbances. On the contrary, countries out of the international monetary regime are able to absorb both real and nominal shocks due to the flexible exchange rate regime.

If fixed exchange rates did not insulate an economy from foreign disturbances, I would expect to observe the same movements in real GDP and inflation for the Scandinavian countries as well as for Great Britain and the United States. This is true when analyzing inflation rates but a slightly different picture emerges from the output data. There was not a real transmission of shocks from the U.K. and the U.S. to the Scandinavian countries when looking at real GDP series. The effect of Great Britain and the U.S. output is negligible for

the three Scandinavian countries. International real disturbances (i.e., the financial crisis of 1891 and its effects) did not account for any movements in domestic output. One possible explanation for this phenomenon would be the slightly independent monetary policy followed by Scandinavia when they were under the Scandinavian Currency Union.

To obtain further evidence on the effectiveness of exchange rate regimes, I also examine the experience of Italy, Portugal, and Spain. The first two countries started the period being part of the gold standard regime but switched to flexible exchange rates when they went out of the international system. Spain remained always at the margin of such a system. If the exchange rate system does not matter in the transmission process, we would expect the output and price behavior to be not much different from the gold countries. Looking at the results of output and inflation rates, it is clear that the Southern European countries did not experience a strong impact of international shocks. The effect of Great Britain and the United States on these three countries is not noticeable. Being out of the gold standard helped these three economies to be insulated from both real and nominal shocks and therefore, there was no effect on output and prices indices. International shocks then did not account for any movements in domestic output and inflation.

VII. Conclusion

My purpose in this paper has been to investigate the transmission of international business cycles shocks during the classical gold standard period, 1861-1913, and its effects for Scandinavia and the Southern European countries of Italy, Portugal, and Spain. I analyze the behavior of real GDP and changes in price level over time using vector autoregressions, VARs. Specifically, I emphasize the importance of exchange rate systems in the transmission of business cycles disturbances from abroad. The results are consistent, for the

most part, with the traditional view that flexible exchange rates insulate an economy from foreign cycle disturbances whereas fixed exchange rates do not.

I have shown that there is no Granger-causality between real outputs and inflation rates between the periphery of Europe, and Great Britain and the United States during the last years of the nineteenth and the beginning of the twentieth centuries. Nevertheless, when I study the dynamic behavior of inflation rates for the Scandinavian countries, I found that British inflation has a contemporaneous influence on the Scandinavian rates. The same result was found in the correlation matrix approach. I interpret this empirical finding as consistent with the idea of fixed exchange rates acting as an instrument for the transmission of international business cycles. I believe that the close trade relationship between Scandinavia and Great Britain can explain, in part, this short-run relation between output and inflation rates.

On the whole, these findings appear to explain some of the differences among these two groups of countries, Scandinavia and Southern Europe. Countries on the gold standard, and thus with a fixed exchange rate system are not totally insulated from shocks and reflect the transmission of both real and nominal business cycles disturbances. In the case of Scandinavia, nominal shocks are transmitted among all the countries while real shocks are not. On the contrary, Southern European countries are able to absorb both real and nominal shocks due to the flexible exchange rate regime. I do then conclude that flexible exchange rates do prevent the transmission of international business cycles against what it has been traditionally claimed by some work in macroeconomics.

Footnotes

[1] European periphery in this context means that these countries were not the main financial centers of the time.

[2] Recent estimates of Italian GDP developed by Rossi, Sorgato, and Toniolo (1993) are not examined because their series only begins in 1890. For a survey and critique of Italian GDP series for the years 1861-1913, see Ercolani (1993).

[3] I acknowledge the existence of Valério (1998). However, I rely on Lains's estimates based on Valério (1998) assessment that these estimates provide the most accurate characterization of Portuguese economic development for this period (also see Lains and Reis, 1991).

[4] All variables are cointegrated. Results are available from the author upon request.

[5] The F-tests indicate that, at conventional significance level, the U.K. and the U.S. Granger-cause themselves.

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