Business Cycle Synchronization since 1880

Michael Artis[ac], George Chouliarakis[bc] and P.K.G. Harischandra[d1]

a. Centre for Economic Policy Research, London

b. Department of Economics, School of Social Sciences, University of Manchester

c. Centre for Growth and Business Cycle Research, University of Manchester

d. Central Bank of Sri Lanka

Abstract: This paper studies the behaviour of the international business cycle across 25 advanced and emerging market economies for which 125 years of annual GDP data are available. The picture that emerges is more fragmented than the one drawn by studies that focused on a narrower set of advanced market economies. The paper offers evidence in favour of a secular increase in international business cycle synchronization within a group of European and a group of English-speaking economies that started off during 1950-1973 and accelerated since 1973. Yet, in other regions of the world, country-specific shocks are still the dominant forces of business cycle dynamics.

Keywords: Business Cycles; Dynamic Factor Models; Globalization; Integration

JEL Classification: C32, E32, F41, N10

[1] Earlier versions of this paper were presented at the International Symposium on Business Cycle Behaviour in Historical Perspective, University of Manchester, June 2009 and the 8th European Historical Economics Society Conference, Geneva, September 2009. We would like to thank the participants for their comments and suggestions. George Chouliarakis gratefully acknowledges financial support from the School of Social Sciences of the University of Manchester.

1. INTRODUCTION

During the past three decades, the world economy has moved towards closer integration. International trade flows have increased substantially, financial markets in developed and emerging economies have become increasingly integrated, significant parts of the world economy that were hitherto relatively insulated opened up to free trade and capital flows, and continental European countries adopted a single currency. These developments raise the possibility of changes not only in the properties of national business cycles but also in their synchronization.

The large body of research that explored the effects of these structural changes on business cycle behaviour has produced mixed results. One branch of the literature has concluded that evidence from a wide range of industrial and developing economies does not lend strong support to the hypothesis that increasing international trade and financial market integration has led to an increase in the degree of business cycle synchronization (Kose et al, 2003, 2008). Another branch of the literature, focusing specifically on the experience of advanced industrial economies, has detected the emergence of a 'European business cycle' since the early 1980s (Artis and Zhang, 1997, 1999, and Artis, 2004) while more recent evidence suggests that, as the process of international trade and financial market integration deepens, such regional business cycle affiliations are superseded by wider business cycle clubs (Artis, 2008). Yet other studies have found that output correlations among the major industrial countries have even decreased in the recent decades, largely on account of a remarkable cycle of de-synchronization in the late 1980s and early 1990s (Helbling and Bayoumi, 2003, Doyle and Faust, 2002, 2005). Overall, and despite a number of significant contributions, it would be fair to say that the state of our knowledge about the effects of integration on cross-national business cycle linkages remains imperfect and largely limited to the very recent period.

The goal of this paper is to contribute towards a better understanding of the effects of globalization on business cycle co-movements by adding to the debate a historical dimension. To this end, the paper studies the behaviour of business cycles in 25 countries for which at least 125 years of annual data are available. In so doing, the paper aims to

document some of the salient features of national business cycle behaviour and examine changes in the pattern of cross-national business cycle synchronization over time. We know that in many respects the countries of our sample and the historical periods that we cover have been markedly different. They differ in terms of their institutions, their monetary and fiscal policies, their economic structures, their natural endowments and their growth record. The question is whether, despite these differences, the forces of economic integration that swept the world economy during 1880-1913 and, again, since the collapse of the Bretton Woods system of fixed exchange rates have led to greater economic interdependence and more synchronization. Seeking an answer to this question is important for several reasons, not least, because greater business cycle synchronization would require tighter macroeconomic policy co-ordination during economic downturns if the experience of beggar-thy-neighbour policies of the 1930s were to be avoided.

A variety of data and empirical methodologies suggest that the historical process of trade and capital market integration has followed a distinctive 'U-shape' pattern, with momentum peaking at the beginning and at the end of the twentieth century, but coming to a halt during the years of the two World Wars and the Great Depression (Obstfeld and Taylor, 2003, 2004). These ebbs and flows of integration cover a period of more than a century and cut across a wide range of international monetary regimes. The main question we address is whether the degree of business cycle synchronization across a large number of advanced and emerging market economies follows the same stylized 'U-shape' pattern. In so doing, we also examine whether the effect of financial market integration on the international business cycle, if any, varies with the constraints imposed on domestic macroeconomic policy by the international monetary regime. We do so by splitting the sample in four different sub-periods, each of which corresponds to a distinct international monetary regime (Eichengreen 1996). The period from 1880 to 1913 corresponds to the classical Gold Standard, a period of credible commitment to pegged exchange rates and free trade and capital markets, often referred to as the first era of globalization of the world economy. The period from 1920 to 1939 is characterized by the failed attempt to restore the prewar liberal economic order in the context of a new institutional environment, the Great Depression, and the reversal of economic integration through the introduction of trade and capital controls. The period from 1950 to 1973 corresponds to the Bretton Woods era of fixed but

adjustable exchange rates and limited capital mobility as a means to prevent currency crises and confer some degree of autonomy to domestic monetary policy. Finally, the period from 1973 onwards, an era characterized by an unprecedented rise in trade and capital market integration, the formation of the European Monetary Union, and floating exchange rates among the main world currencies.

In addressing the above question, our study is closely related to earlier work by Backus and Kehoe (1992), Bergman, Bordo, and Jonung (1998), Basu and Taylor (1999), and Bordo and Helbling (2003). These pioneering studies also examine the behaviour of business cycles over the long run and across different exchange rate regimes. Yet, our study departs from theirs in some fundamental ways. First, our study covers a much wider sample of countries. Unlike earlier international comparative studies that limit themselves to a rather narrow sample of advanced market economies, we use Barro and Ursua's (2008) dataset and cast our net across 25 advanced and emerging market economies. The benefit from doing so is large as no other study has looked at the effects of financial globalization on the historical properties of the international business cycle of emerging market economies. Second, we use an unobserved component model to estimate the business cycles of the countries of our sample. This method has not been used before by other international and historical studies and has the potential to significantly improve the measurement, and our understanding, of the historical properties of the international business cycle. Third, unlike earlier work, our study explores the channels through which financial market integration may affect the synchronization of national business cycles. In principle, financial market integration may increase business cycle synchronization, either by increasing the relative importance of international shocks, or by strengthening the spillover effects across countries, e.g., through contagion. We use a Factor Structural VAR model (Clark and Shin, 20000, Stock and Watson, 2005) to identify the relative importance of the channels through which trade and financial integration may have historically affected the international business cycle.

The remainder of the paper is organized as follows. Section 2 offers a discussion of the dataset and presents the business cycle definition and measurement method that we use. Section 3 summarizes the changes in business cycle correlations across the four sub-periods of the sample. Section 4 uses a Factor Structural VAR model to identify the changing

importance of international shocks, spillovers, and country-specific shocks in driving the international business cycle dynamics during the past 125 years. Section 5 concludes.

2. DATA AND FILTERING

The data are annual values of the logarithm of real GDP per capita and cover 25 advanced and emerging market economies from 1880 to 2006. These economies are Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom, Greece, Portugal, Spain, Australia, Canada, United States, Argentina, Brazil, Chile, Uruguay, India, Japan and Sri Lanka. The data source is Barro and Ursua (2008) who updated Maddison's (2003) monumental and widely used dataset by incorporating new information from a series of recent major historical national accounts projects and, in some occasions, provided superior estimates.

Before proceeding, a caveat is in order. We know that the quality of national accounts data prior to World War II varies considerably across countries primarily because of differences in the availability of raw data sources. In countries with established annual income tax systems or statistical bureaus, the measurement of national account aggregates tends to be more accurate than is the case elsewhere. As a result, in some cases, the ex post reconstruction of historical national accounts is often based on extrapolations from fragmentary raw data that cover only a narrow subset of economic activity raising, thus, the likelihood of measurement error. Christina Romer's (1986, 1989) criticism of prewar US national accounts data illustrates this point very well. Although recent progress in creating historical national accounts has significantly increased the accuracy of the data, we need to bear this caveat in mind when interpreting results.

Our focus is on economic fluctuations over business cycle horizons. It is common to distinguish two types of business cycles – the so-called 'classical' cycle and the 'deviation' cycle. The former is in the spirit of Burns and Mitchell's (1946) NBER business cycle project, where peaks are identified by being followed by absolute declines in output while troughs by absolute increases. Such cycles are, of course, comparatively rare in growth economies and to focus our attention only on these would lead to a paucity of observations,

at least, as far as the post-WWII period is concerned. The deviation cycle, by contrast, deals with deviations in output growth from trend growth and it is this concept of the cycle that we will use here. Thus, measuring deviation cycles requires the filtering out of the economy's trend growth rate. One way to do this is to use band-pass-filtered log GDP with a pass band that only admits business cycle frequencies (periods of 1½ to 8 years). The main drawback of this method is that a good deal of data has to be 'thrown away' at the two ends of the sample. An alternative method would be to consider simple annual growth rates which use differencing to eliminate the linear growth rate in the series. Despite the merit of simplicity, the drawback of this method is that the trend growth rate of GDP over the past 125 years cannot be assumed to be constant. Because a low frequency drift can introduce bias into certain statistics used later on, such as cross-country correlations computed over sub-samples, in our analysis, we use a flexible detrending method based on a model with a stochastic drift (Clark 1987, Harvey and Jaeger 1993, Stock and Watson 2005). Define $y_t = 100\Delta \ln(GDP_t)$ as the annual growth rate of GDP. We adopt an unobserved components specification that represents y_t as the sum of two terms, a slowly evolving mean growth rate (trend) and a stationary component (cycle):

$$y_t = \mu_t + u_t \tag{1}$$

where

$$\mu_t = \mu_{t-1} + \eta_t \tag{2}$$

and

$$\varphi(L)u_t = \varepsilon_t \tag{3}$$

Where $\varphi(L)$ is a finite polynomial in the lag operator L and ε_t and η_t are serially and mutually uncorrelated mean zero disturbances. The Kalman smoother can be used to estimate the trend growth rate (μ_t) and the residual (u_t). Obviously, the Kalman smoother estimate of u_t is our estimate of the deviation of GDP growth from its trend. Implementing this detrending procedure requires a value of the ratio $\sigma_\eta^2 / S_{uu}(0)$, where $S_{uu}(0)$ is the spectral density of u_t at frequency zero. This ratio determines the smoothness of trend

growth and, in principle, it could be estimated by the maximum likelihood procedure. However, when the true variance of a nonstationary state variable is nonzero but small, as it plausibly is here, its maximum likelihood estimate is downward biased towards zero. To avoid this so-called 'pileup' problem, we estimate $\sigma_\eta^2 / S_{uu}(0)$ on a country-by-country basis using the median unbiased estimator of Stock and Watson (1998) and use this country-specific estimate to detrend GDP growth.

Figure 1 plots the business cycle estimates of the 25 countries of the sample. Naturally, positive values of the estimates correspond to expansions and negative values to recessions. The vertical lines in the United States business cycle graph indicate the business cycle troughs as calculated by the National Bureau of Economic Research. Despite a significantly different definition and measurement of business cycles, our below-trend-growth estimates correspond closely to conventional chronologies of the cyclical behaviour of the US economy. Figure 2 plots 'raw' estimates of the volatility of business cycles across the countries of the sample. The segmented line in Figure 2 plots the absolute value of the deviation of each series from its mean while the solid, smoother line is its filtered counterpart (Hodrick-Prescott filter, smoothing parameter=100). The results present a varied picture across countries but a recurrent theme is the considerable decline in volatility following the end of WWII. Table 1 summarizes the changes in the standard deviation of detrended GDP growth across countries and sub-periods and confirms that business cycle volatility declined since 1950 in all the countries of the sample. The last column of Table 1 reports the ratio of the standard deviation of post-WWII business cycles to the standard deviation of the pre-WWI business cycles. The data imply that business cycle volatility since 1950 has been lower than during the classical Gold Standard for 19 out of the 25 economies of the sample.

3. CHANGES IN BUSINESS CYCLE SYNCHRONIZATION

This section reports results on the evolution of international business cycle comovements. Tables 2-5 tabulate the correlation of detrended annual GDP growth rates across countries for each of the four subperiods of the sample. Coefficients that are statistically significant at

the 10 percent level are highlighted in bold. A cursory inspection of the four Tables suggests that the number, size and distribution of the statistically significant bilateral correlation coefficients differs considerably across subperiods. The number of positive and statistically significant correlation coefficients tripled between 1880-1913 and 1919-1939, fell by one-third during the Bretton Woods era and increased by two-and-a-half times during 1973-2006. Figure 3 plots the frequency distributions of the bilateral correlation coefficients for the four subperiods of the sample and illustrates the shifts of the sample means. The average change of these 'raw' correlations between the classical Gold Standard and the interwar period is 0.18 (from 0.02 to 0.20), the average change between the interwar years and the Bretton Woods period is -0.06 (from 0.20 to 0.14) while the average change between Bretton Woods and the post-1973 period is 0.10 (from 0.14 to 0.24). Are these changes over time statistically significant? This question is very relevant since, given the relatively few observations per era, the confidence intervals of the correlation coefficients can be relatively wide. Tables 6 and 8 report standard mean equality and non-parametric Wilcoxon Rank Sum tests suggesting that these changes are statistically significant at the 1 percent level. The overall picture that emerges from Tables 2-5 and Figure 3 does not lend support to the view that periods of high trade and capital market integration are associated with increased international business cycle comovements. During the classical Gold Standard, a period of free trade and capital mobility, the degree of business cycle synchronization across countries is close to zero whereas during the post-1973 period of trade and capital market integration, the mean correlation coefficient of detrended output growth is positive but moderate. We think that this result merits closer examination. Without precluding the likelihood of measurement error in the prewar data, this result may point to an interpretation of the classical Gold Standard as a period where country-specific shocks were dominant, hence, as a system that conferred some degree of domestic policy independence. We will return to this in section 4 when we discuss the changing significance of international and country-specific shocks in driving business cycle dynamics.

To the extent that the distribution of bilateral correlation coefficients within subperiods is not uniform, as it is not, the size and direction of changes in average correlation coefficients across subperiods for the country sample *as a whole* may hide information about patterns of international business cycle comovements within and between country subsamples. Tables 6

and 8 report the evolution of mean correlation coefficients for a number of country groups while Tables 7 and 9 report mean correlation coefficients across these groups. Two aspects bear emphasis. First, There is compelling evidence in favour of the historical emergence of two cyclically coherent groups. A European group that includes Austria, Belgium, France, Germany, Italy, Netherlands and Switzerland exhibits a secular rise in its mean correlation coefficients from a statistically insignificant value during the classical Gold Standard, to 0.24 during the interwar period, to 0.35 during the Bretton Woods years, and to 0.63 since 1973 (as the equality tests of Tables 6 and 8 suggest, under the entry 'Core and Western European Countries', the mean correlation coefficient changes from the Classical Gold Standard to the interwar period and from Bretton Woods to the post-1973 period are statistically significant at the 1 percent level). Similarly, an Anglo-Saxon group that includes Australia, Canada, the UK and the USA, exhibits a secular rise in its mean correlation coefficients from a statistically insignificant 0.17 during the Classical Gold Standard and interwar years, to 0.25 during Bretton Woods and to 0.61 since 1973 (see the entry 'Anglo-Saxon Countries' in Tables 6 and 8). While the mean correlation coefficients within each group have risen sharply, the average cross-group correlation (i.e. the average correlation of each member of the two groups with the members of the other) has fallen from 0.23 to 0.17 between the interwar years and Bretton Woods period (although the change is not statistically significant) and has risen only mildly to 0.32 since 1973. The secular increase in within-group average correlation of the order of 0.40 for both groups since 1950, coupled with a rise in cross-group correlation of just 0.09 during the same period, points towards the emergence of two distinct groups. The origins of the two groups lie in the mid-twentieth century but their formation process accelerated after 1973. Second, Tables 6-9 document well that no other country group exhibits a similar secular increase in within-group or cross-group cyclical coherence indicating that business cycle synchronization has not increased over time universally and is not a natural consequence of closer trade and capital market integration. Our findings lend support to earlier results by Doyle and Faust (2002), Heathcote and Perri (2004) Kose, Prasad, and Terrones (2003) and Stock and Watson (2005) which found little evidence in favour of increased overall synchronization during the past forty years. We now turn to examine the proximate causes of changes in business cycle synchronization by analyzing changes in the structure of shocks in the context of a Factor Structural VAR model.

4. CHANGES IN THE IMPORTANCE OF INTERNATIONAL VS IDIOSYNCRATIC SHOCKS

A convenient dichotomy that helps us to analyze changes in business cycle dynamics is the dichotomy between shocks and propagation (Frisch, 1933). According to it, changes in the dynamics of the international business cycle can be the result of changes in the nature of shocks, changes in the transmission mechanism of shocks across countries, or a combination of the two. Increased business cycle synchronization will then be reflected in the rising importance of international vis-à-vis country-specific shocks or the strengthening of the propagation mechanisms of country-specific shocks across countries (e.g. through trade and capital flows). Identifying, thus, changes in the nature of shocks and transmission mechanisms will cast new light in the behaviour of the international business cycle and contribute to a better understanding of its proximate causes. The aim of this section is to do exactly this. In particular, this section aims to measure the changes in the fractions of a country's cyclical variance that is due to international shocks, cross-country transmission of country-specific shocks and idiosyncratic shocks. The basic question to be resolved is the best way to identify an international shock and the approach taken here is to develop a dynamic factor model in a structural VAR context (Clark and Shin 2000, Stock and Watson 2005). The model is based on the presumption that there exists a small number of common factors that produce business cycle comovements among the economies, possibly through trade and financial market interdependence. The common factors refer to international shocks, therefore, it is important to distinguish between an international shock and a country-specific shock which has some spillover effects. In FSVAR models, shocks are identified by imposing a factor structure on the reduced form VAR innovations, such that, an international shock is identified as a shock that affects all countries simultaneously, while transmission of country-specific shocks affects the rest of the world with one period lag. Because the definition of shocks depends on the frequency of data, Stock and Watson (2005) highlight that FSVAR models may tend to misclassify shocks in studies using high frequency data, e.g., with quarterly data, a world shock that hits one country and passes over to others with a lag of one or more periods may be identified as a country-specific shock that has spillover effects. However, this study is less likely to be affected by this, because we use

annual data, in that an international shock is most likely to have an impact within a year, while an idiosyncratic shock may transmit to the trading partners with some lag. On the other hand, we are aware that idiosyncratic shocks that spread to other parts of the world within a year will be misclassified as international shocks and we bear this caveat in mind.

The basic framework of the model is described below, in that, y_t represents annual growth rate of per capita real GDP for country $i\ (=1,2,...,n)$:

$$\begin{pmatrix} y_{1t} \\ \vdots \\ y_{nt} \end{pmatrix} = \begin{pmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{pmatrix} \begin{pmatrix} y_{1t-1} \\ \vdots \\ y_{nt-1} \end{pmatrix} + \begin{pmatrix} \nu_{1t} \\ \vdots \\ \nu_{nt} \end{pmatrix},$$

where the error vector is assumed to be determined by the following factor structure:

$$\begin{pmatrix} \nu_{1t} \\ \vdots \\ \nu_{nt} \end{pmatrix} = G\varsigma_t + \begin{pmatrix} \eta_{1t} \\ \vdots \\ \eta_{nt} \end{pmatrix},$$

where ς_t are common international factors that affects output in all countries simultaneously, *G* is a (*n* x *k*) vector of factor loadings, and η_i is a country-specific shock. $E\left(\varsigma_t \varsigma_t^{'}\right)$ and $E\left(\eta_t \eta_t^{'}\right)$ are both assumed to be diagonal. The model is estimated by using Gaussian maximum likelihood.[2] To proceed, we need to specify the lag structure for VAR dynamics and a value for *k* (the number of common factors). In specifying a lag structure in a multi-country factor model, one needs to be concerned about the *dimensionality* problem, because a higher lag structure leads to a larger number of coefficients to be estimated. Two solutions exist in the literature: first, to impose restrictions on VAR coefficients, e.g., specifying a different number of lags on domestic and foreign GDP growth rates, such as VAR(4,1) as in Stock and Watson (2005) i.e., four own lags and one foreign lag. While this option may seem to be more relevant to high frequency data, information criteria tests suggest a VAR(1,1) specification for the present study, which seems to be consistent with

[2] Results are produced in GAUSS 6.0, using an appropriately amended version of Mark Watson's code.

annual data. The second option is to specify VARs for subsets of countries. This seems reasonable given the width and length of our dataset. However, grouping countries comes with a cost, because it tends to restrict the explanatory power of the model by limiting the international shocks and spillover effects. Therefore, we adopt a cautious approach, in that, we group the countries in such a way that a particular set of countries, conventionally classified as 'core countries' in modern economic history, stays together all the time with each subset of countries based on region. The core country group consists of the Anglo-Saxon countries (Canada, UK and US) and the 'core' European countries (Belgium, France, Germany, and the Netherlands). We then specify another six groups of countries: the Nordic group (Denmark, Finland, Norway, and Sweden), the Western European group (Austria, Italy, and Switzerland), the Southern European group (Greece, Portugal and Spain), the Latin American group (Argentina, Brazil, Chile, Uruguay), the Asian group (India, Japan, and Sri Lanka), and Australia. Each wave of Factor Structural VAR results consists of pooling the core country group together with one regional group.

The other key issue in estimating FSVAR models relates to the specification of the number of common factors (k). The literature points towards two approaches: first, formal tests can be performed to determine k, for example, Stock and Watson (2005) propose likelihood ratio tests, given that the FSVAR model is overidentified, in that, null hypothesis of k-factor structure is tested against the alternative of an unrestricted VAR. The number of common factors is determined at the level of k, which fails to reject the null. Also, Bai and Ng (2002) suggest information criteria preferably for a larger data set. The other approach is more of case-specific, in that, authors specify a number of k based on the empirical context of the research study. For example, Bergman and Jonung (2010) who examine business cycle synchronization of three Scandinavian economies impose two factors in order to allow for estimation of the relative importance of European wide shocks and Scandinavian shocks. Further, Bordo and Helbling (2003) who examine business cycle synchronization over sixteen industrialized countries and across exchange rate regimes highlight opt for a one common factor (in the static factor model).

In this study, we first experiment with alternative k structures, to examine how sensitive the results are to the number of k specified. In doing so, we examine degrees of freedom issues, pertaining to subsample estimates, as highlighted in Bordo and Helbling (2003). It turns out that one factor model seems to produce robust results (with more degrees of freedom), yet, without changing the results qualitatively. The degrees of freedom issue is a major concern here because we estimate the model across subsamples, in that, we consider four sub-samples based on historical monetary regime classifications, namely, Classical Gold Standard (1880-1913), Interwar Gold Standard (1920-1939), Bretton Woods (1950-1972), and Post-Bretton Woods (1973-2006). Given the definition of factor structure k=1, we estimate the FSVAR model with 4-year ahead forecast horizon of detrended GDP growth rate over the country groups specified above, in that, forecast errors are decomposed into: international shocks, domestic shocks, and spillover effects, which are defined as one minus the sum of the international and domestic shocks. By construction of the model, international and country-specific shocks are uncorrelated, thus, the Stock and Watson (2005) procedure produces a threefold variance decomposition of 4-year ahead forecast errors for GDP growth in each country. Depending upon the share of error variance explained by each component, we identify the relative importance of international shocks, country-specific shocks and spillover effects in explaining international business cycle comovements.

Tables 10-15 summarize these variance decompositions for detrended GDP growth for the six groups of results. At the one-year horizon, international spillovers account for none of the business cycle forecast error variance: this is the assumption used to identify the international shock. At longer horizons, spillovers typically account for between 10 and 40 percent of business cycle variance, depending on the country group and the sub-period. The relative importance of international sources of fluctuations, either common shocks or spillovers, can be measured as one minus the share of the forecast error variance attributed to domestic shocks. A small domestic share corresponds to a relatively larger role for international rather than domestic disturbances. Consequently, in the context of our model, examining the hypothesis that closer trade and capital market integration increases the degree of business cycle co-movement is tantamount to examining whether the fraction of the forecast error variance of detrended GDP growth attributed to county-specific shocks falls

when integration rises. The results reported in Tables 10-15 do not offer support to this hypothesis as, for most of the country groups of our sample, country-specific shocks do not follow the 'U-shaped' pattern that is characteristic of the evolution of the trade and capital market integration of the world economy. In particular, the relative contribution of idiosyncratic shocks in explaining the forecast error variance of our business cycle measure during the classical Gold Standard period is invariably high across country groups and confirms our result in section 3 of this paper that the average correlation coefficient across the whole country sample during this period is not statistically significantly different from zero. This result should be interpreted with caution as the likelihood of measurement error in the national accounts data of this period is not trivial and, to our view, this could constitute a potential problem that needs addressing in future research. Yet, to the extent that the data problem does not contaminate our result, this result points towards an interpretation of the classical Gold Standard as an international monetary regime that conferred some degree of autonomy to domestic monetary policy, e.g., a target zone.

Four salient features emerge from the historical record of business cycle synchronization as summarized in Tables 10-15. First, the fraction of the forecast error variance of detrended GDP growth that is due to country-specific shocks in the European Core (Belgium, France, Germany and Netherlands) declines steadily over time. At the two-year horizon, the average Core European fraction of cyclical variance attributed to domestic shocks declines from a typical value of 70 percent during the Classical Gold Standard to 40 percent during the interwar years to 35 percent during the Bretton Woods years and finally to below 30 percent since 1973. This result holds across sub-samples and reflects mostly the increasing importance of international shocks, and to a much lesser extent stronger transmission, in shaping the business cycle behaviour of the European core. Second, the declining significance of country-specific shocks is also evident in the average Western European fraction of cyclical variance explained by domestic shocks. Indeed, the experience of Western Europe (Italy, Austria, Switzerland) is very similar to this of the European core suggesting that the business cycle behaviour of these seven economies is shaped to a good extent by common international shocks. Third, the Anglo-Saxon group (Canada, UK, USA) allows a far larger role to idiosyncratic shocks and exhibits no secular change over time. The same is true for all four other groups, the Latin American, the Asian, the Nordic group and

Australia. Fourth, Table 12 shows that although the Anglo-Saxon group historically shared a common factor with Europe, this hasn't been the case since 1973 pointing towards a weakening of comovements between the two country groups during the past forty years. Indeed, this is one of the main findings of section 3 too. On the basis of the above evidence, one can safely argue that there is no secular change in the degree of synchronization since 1880 as many parts of the world economy do not share a common factor and their business cycles are driven by idiosyncratic shocks. The exception to this is a group of European countries where international shocks have played an increasingly significant importance in shaping the behaviour of the business cycle. This result is very much in line with the results of section 3 but qualify the conclusion of Bordo and Helbling (2011) whose study is based on a smaller sample of countries.

5. CONCLUSIONS

This paper studies the behaviour of the international business cycle across 25 advanced and emerging market economies for which 125 years of annual GDP data are available. The picture that emerges is far more fragmented than the one drawn by studies that focused on a narrower set of advanced market economies. The main results, and some directions for future research, can be summarized as follows. First, there is compelling evidence in favour of a secular increase in international business cycle synchronization within a group of European and a group of English-speaking economies that started off during 1950-1973 and accelerated since 1973. Based on the results of the Factor Structural VAR model, it is hard to avoid the conclusion that gradual trade integration since the 1960s diminished the relative significance of idiosyncratic shocks within a group of European countries and offered the springboard for the formation of the European Monetary Union. Second, the secular increase in the cyclical coherence within these two groups far outweighs the small rise in the cyclical coherence between the two groups, thus, it would be fair to describe these two cyclical groups as distinct. Future research should explicitly take into account the possibility of regional common factors to allow for the emergence of distinct cyclical groups. Third, the observed secular rise in business cycle synchronization does not extend outside this subset of advanced market economies. In other regions of the world, country-specific shocks are still the dominant forces of business cycle dynamics. Fourth, the lack of international business

cycle comovements during the Classical Gold Standard, i.e. a period of fixed exchange rates and free trade and capital mobility, merits our attention and should act as a trigger for future research, not least, in the direction of double-checking and improving the quality of historical national accounts data. In this respect, very recent work in extracting information on business cycle behaviour from less noisy economic aggregates than national accounts data is in the right trail. Fifth, the sharp increase in business cycle synchronization during the interwar years, as reflected in the almost universal increase in the fraction of the cyclical variance explained by the international shock and transmission, is consistent with the view that the Great Depression was a global monetary shock that was spread across world through the workings of the interwar Gold Standard.

REFERENCES

Artis, M. (2004). 'Is There a European Business Cycle?', in H. Siebert (ed.) *Macroeconomic Policies in the World Economy*, Berlin, Springer.

Artis, M. (2008). 'Europeanization or Globalization? What do Business Cycle Affiliations Say?'', in R.Shlomowitz (ed.), *Flinders Essays in Economics and Economic History*, Adelaide, Wakefield Press.

Artis, M., and Zhang, W. (1997). 'International Business Cycles and the ERM: Is There a European Business Cycle?', *International Journal of Finance and Economics*, Vol. 2, pp. 1-16.

Artis, M., and Zhang, W. (1999). 'Further Evidence of the International Business Cycle and the ERM: Is There a European Business Cycle?', *Oxford Economic Papers*, Vol. 51, pp. 120-132.

Backus, D. and Kehoe, P. (1992). 'International Evidence on the Historical Properties of Business Cycles', *American Economic Review*, Vol. 82, pp. 864-888.

Bai, J. and Ng, S. (2002). 'Determining the Number of Factors in Approximate Factor Models', *Econometrica*, Vol. 70, pp. 191-221.

Barro, R. and Ursúa, J. (2008). 'Macroeconomic Crises since 1870', *Brookings Papers on Economic Activity*, Vol. I, pp. 255-335.

Basu, S. and Taylor, A. M. (1999). 'Business Cycles in International Historical Perspective', *Journal of Economic Perspectives*, Vol. 13, pp. 45-68.

Bayoumi, T., and Helbling, T. (2008). 'Are They All in the Same Boat? The 2000-2001 Growth Slowdown and the G-7 Business Cycle Linkages', *IMF Staff Papers*.

Bergman, M., Bordo M. and Jonung, L. (1998). 'Historical Evidence on Business Cycles: The International Experience', in J.C. Fuhrer and S. Schuh (eds.), *Beyond Shocks: What Causes Business Cycles?* , Boston, Massachusetts, Federal Reserve Bank of Boston.

Bergman, M. and Jonung, L. (2011). 'Business Cycle Synchronization in Europe: Evidence from the Scandinavian Currency Union', *The Manchester School*, Vol. 79, pp.

Bordo, M., and Helbling, T. (2004) 'Have National Business Cycles Become More Synchronized?', in H. Siebert (ed.), *Macroeconomic Policies in the World Economy*, Berlin, Springer.

Bordo, M. and Helbling, T. (2011). 'International Business Cycle Synchronization in Historical Perspective', *The Manchester School*, Vol. 79, pp.

Kose, A., Prasad, E. and Terrones, M. (2003a). 'How Does Globalization Affect the Synchronization of Business Cycles?', *American Economic Review*, Vol. 93, pp. 57-62.

Kose, A., Otrok, C. and Whiteman, C. (2003b). 'International Business Cycles: World, Region, and Country-Specific Factors', *American Economic Review*, Vol. 93, pp. 1216-1239.

Kose, A., Otrok, C. and Whiteman, C. (2008). 'Understanding the Evolution of World Business Cycles', *Journal of International Economics*, Vol. 75, pp. 110-130.

Kose, A., Otrok, C. and Prasad, E. (2008). 'Global Business Cycles: Convergence or Decoupling?', *NBER Working Paper 14292*.

Maddison, A. (2003). '*The World Economy: Historical Statistics*', Paris, Organization of Economic Cooperation and Development.

Obstfeld, M. and Taylor, A. M. (2003). 'Globalization and Capital Markets', in M. Bordo, A. M. Taylor and J. Williamson (eds.), *Globalization in Historical Perspective*, NBER, Chicago, IL, University of Chicago Press.

Obstfeld, M. and Taylor, A. M. (2004). *Global Capital Markets: Integration, Crisis, and Growth*, Cambridge, Cambridge University Press.

Ritschl, A., Sarferaz, S. and Uebele, M. (2008). 'Output and Consumption in the Global Business Cycle 1870-2006: A Dynamic Factor Approach', mimeo.

Romer, C. (1986). 'New Estimates of Prewar Gross National Product and Unemployment', *Journal of Economic History*, Vol. 46, pp. 341-352.

Romer, C. (1989). 'The Prewar Business Cycle Reconsidered: New Estimates of Gross National Product, 1869-1908', *Journal of Political Economy*, Vol. 97, pp. 1-37.

Stock, J. and Watson, M. (1998). 'Median Unbiased Estimation of Coefficient Variance in a Time-Varying Parameter Model', *Journal of the American Statistical Association*, Vol. 93, pp. 349-358.

Stock, J. and Watson, M. (2005). 'Understanding Changes in International Business Cycle Dynamics', *Journal of the European Economic Association*, Vol. 3, pp. 968-1006.

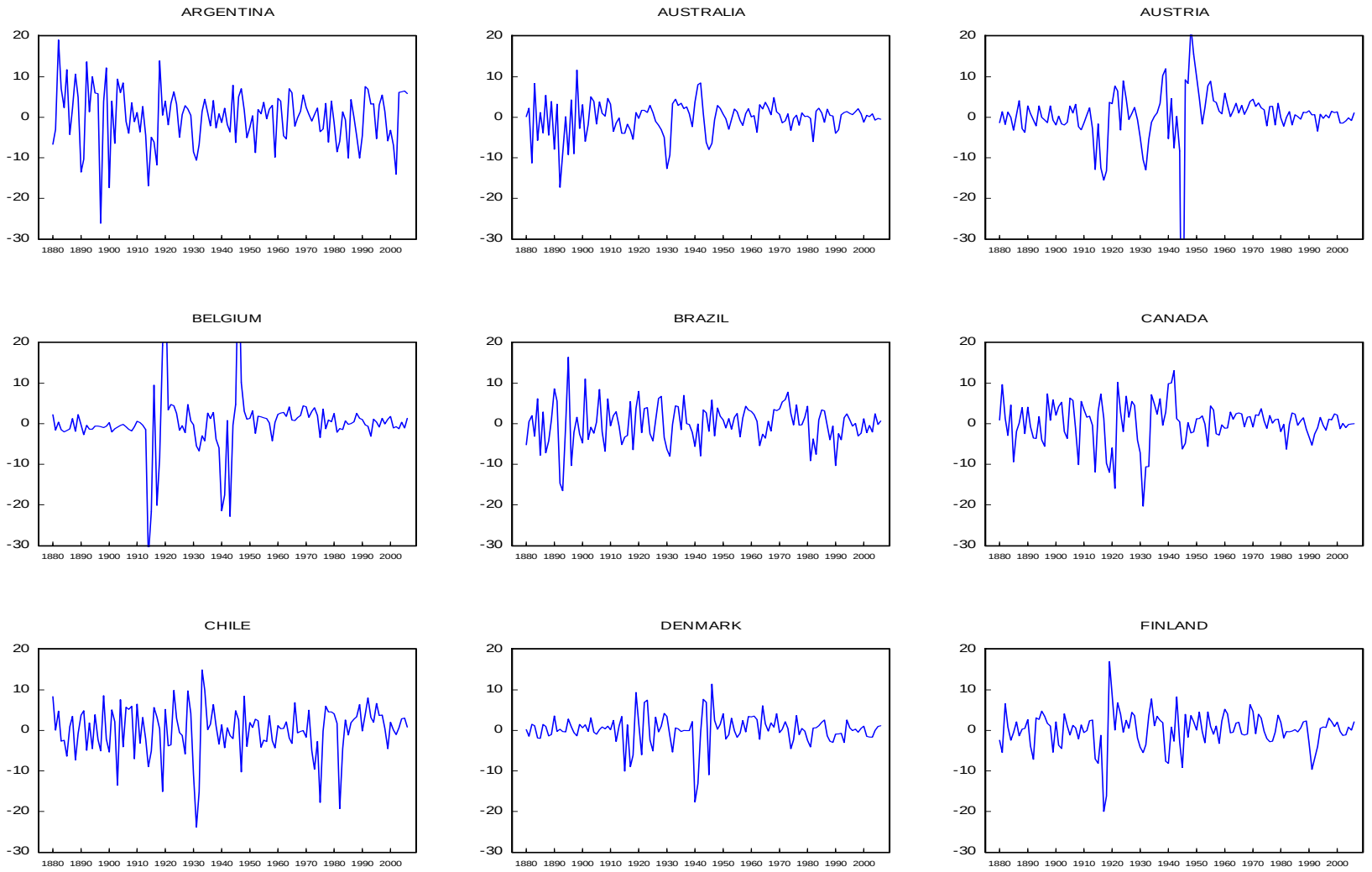

FIG. 1 DETRENDED GDP GROWTH (UNOBSERVED COMPONENTS METHOD)

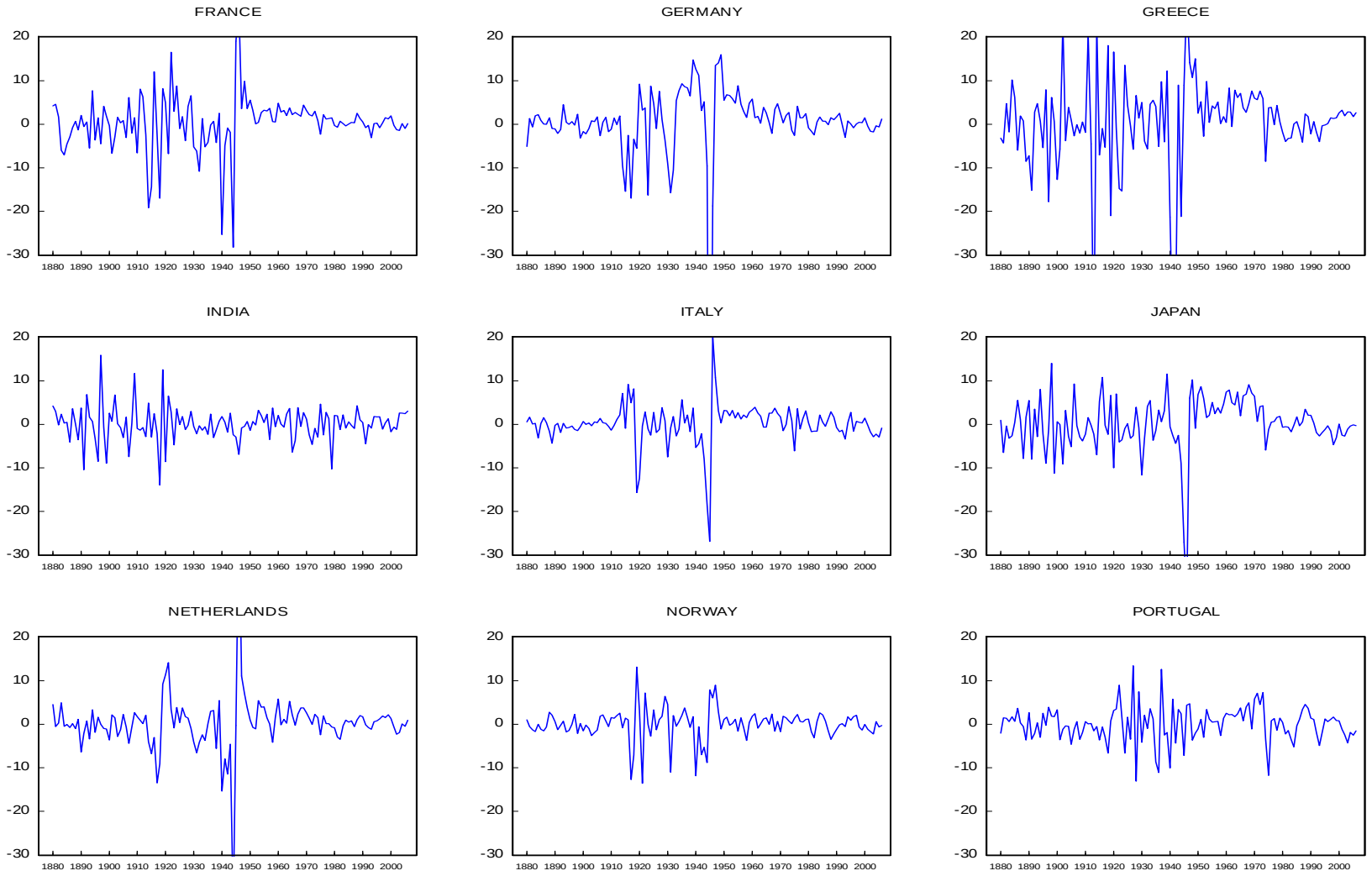

FIG. 1 DETRENDED GDP GROWTH (UNOBSERVED COMPONENTS METHOD)

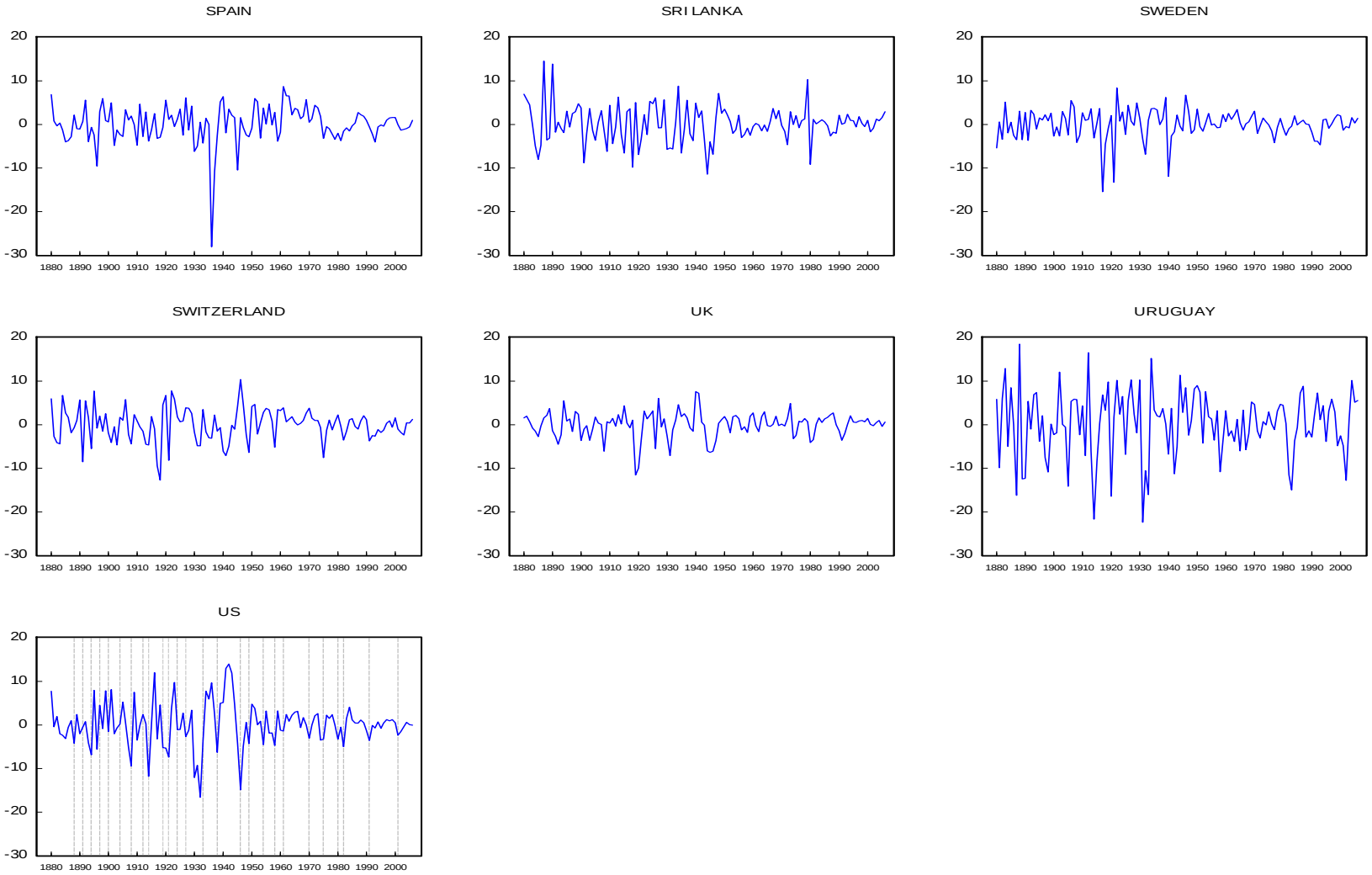

FIG. 1 DETRENDED GDP GROWTH (UNOBSERVED COMPONENTS METHOD)

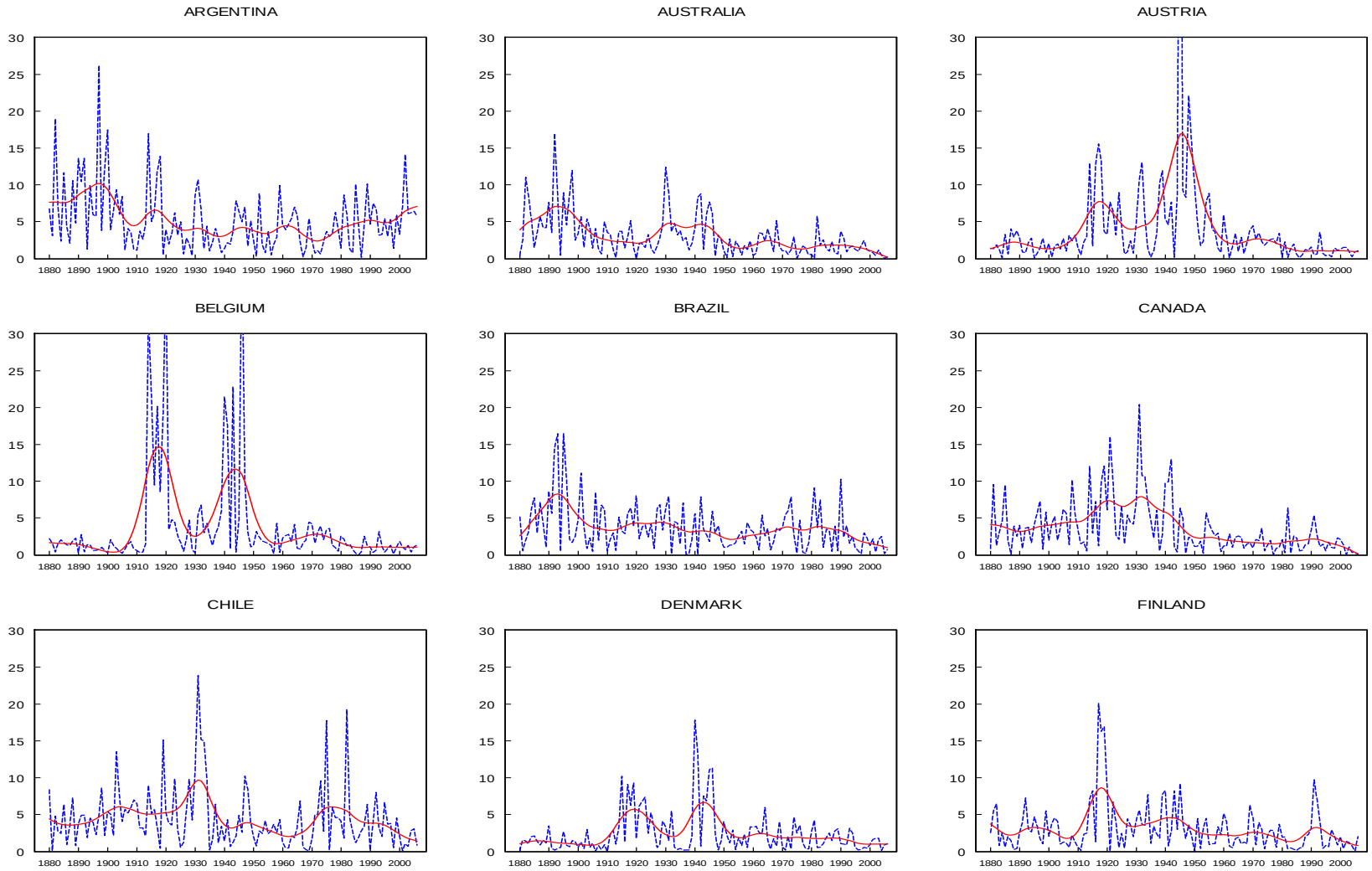

FIG. 2 BUSINESS CYCLE VOLATILITY (ABSOLUTE VALUE OF DEVIATION FROM MEAN)

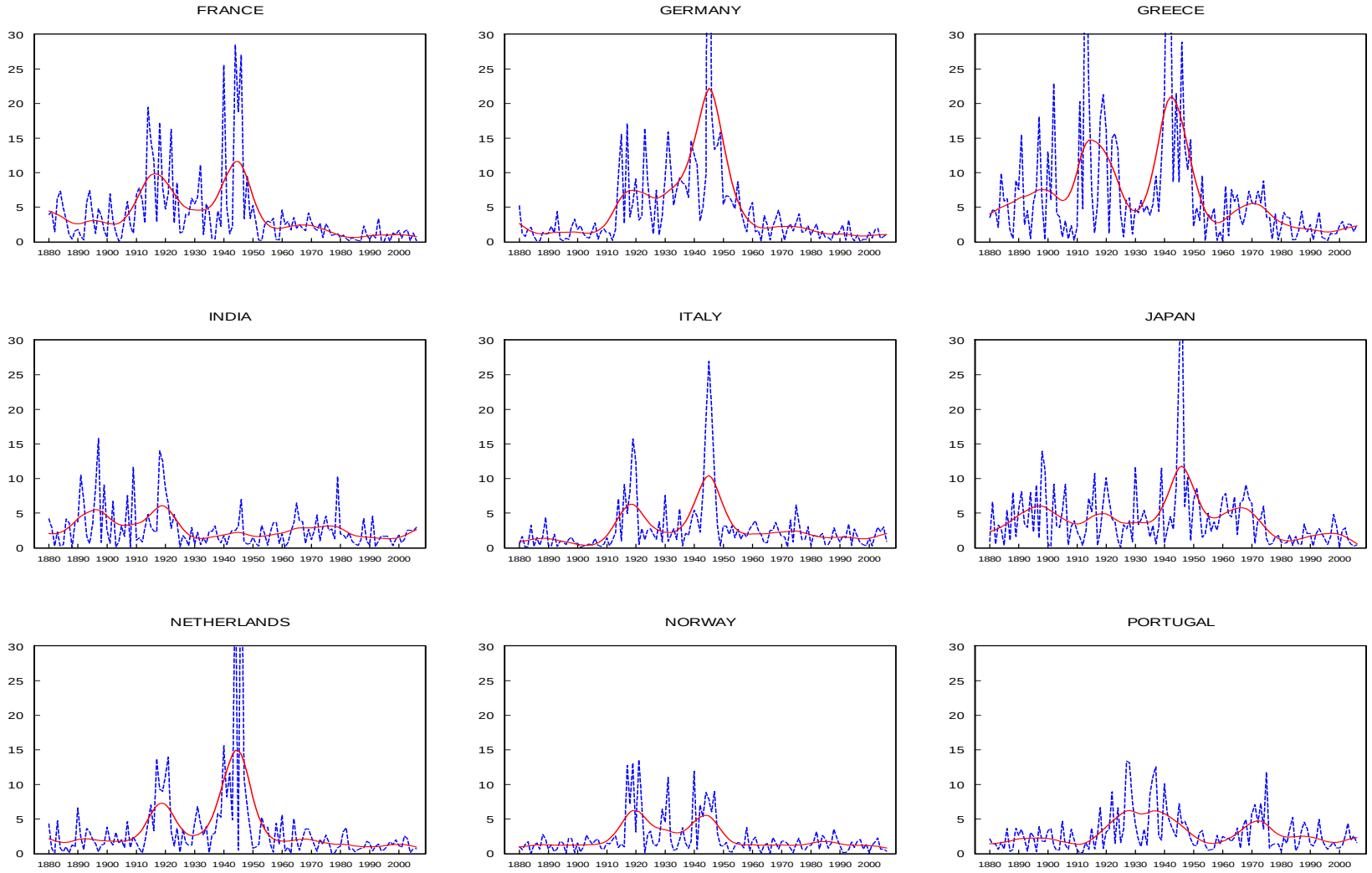

FIG. 2 BUSINESS CYCLE VOLATILITY (ABSOLUTE VALUE OF DEVIATION FROM MEAN)

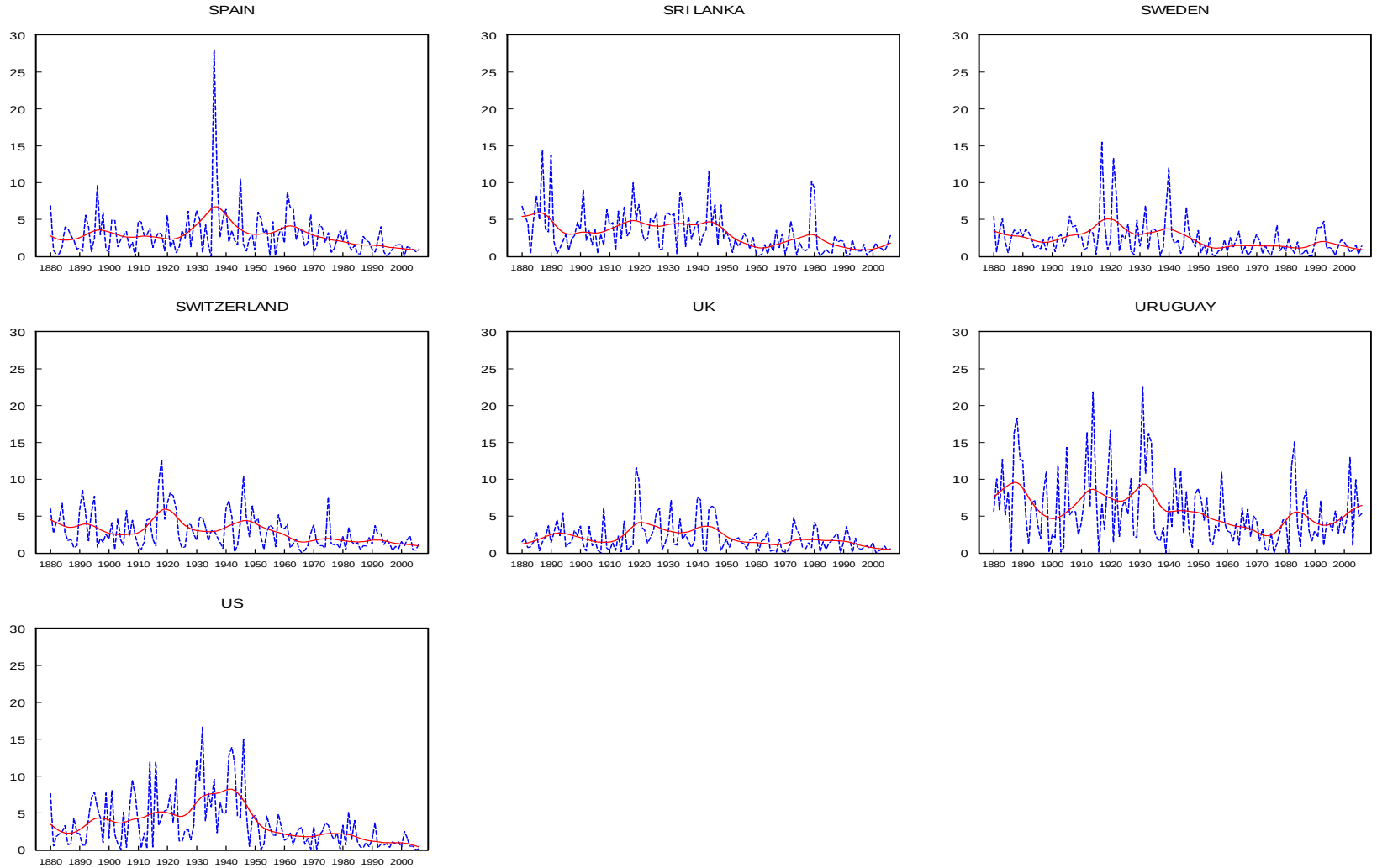

FIG. 2 BUSINESS CYCLE VOLATILITY (ABSOLUTE VALUE OF DEVIATION FROM MEAN)

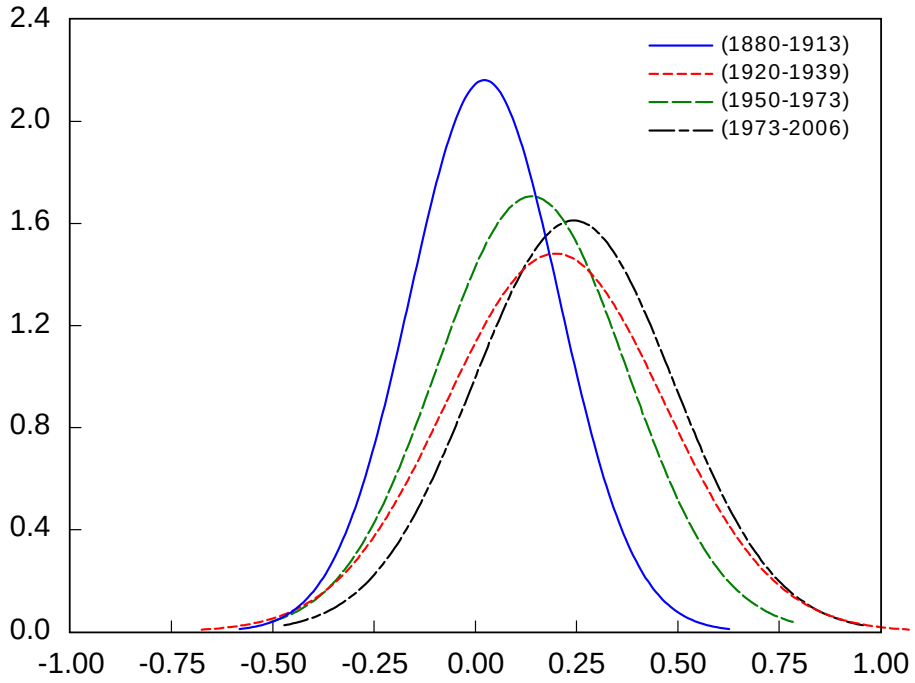

FIG. 3 FREQUENCY DISTRIBUTION OF BILATERAL CORRELATION COEFFICIENTS ACROSS FOUR SUB-PERIODS

TABLE 1

STANDARD DEVIATION OF DETRENDED GDP GROWTH

Country Groups		1880-1913	1920-1939	1950-1973	1973-2006	$\frac{sd_{1920-1939}}{sd_{1880-1913}}$	$\frac{sd_{1950-1973}}{sd_{1920-1939}}$	$\frac{sd_{1973-2006}}{sd_{1950-1973}}$	$\frac{sd_{1950-2006}}{sd_{1880-1913}}$
Core European	Belgium	1.13	9.62	1.95	1.68	8.54	0.20	0.86	1.58
	France	4.16	6.32	1.39	1.30	1.52	0.22	0.93	0.32
	Germany	1.87	8.82	2.59	1.63	4.71	0.29	0.63	1.08
	Netherlands	2.42	5.26	2.41	1.51	2.17	0.46	0.63	0.78
Southern European	Greece	12.29	8.59	3.25	3.00	0.70	0.38	0.92	0.25
	Portugal	2.24	7.14	2.52	3.36	3.19	0.35	1.34	1.35
	Spain	3.58	7.57	3.26	1.88	2.12	0.43	0.58	0.68
Western European	Austria	2.12	6.51	2.77	1.59	3.07	0.43	0.57	0.98
	Italy	1.30	4.07	1.45	2.20	3.13	0.36	1.52	1.46
	Switzerland	3.94	4.18	2.25	1.98	1.06	0.54	0.88	0.53
Anglo-Saxon	Australia	6.09	4.42	2.06	1.81	0.72	0.47	0.88	0.31
	Canada	4.59	8.31	2.32	2.12	1.81	0.28	0.91	0.48
	UK	2.45	3.99	1.46	1.90	1.63	0.37	1.31	0.70
	US	4.41	7.22	2.63	1.97	1.64	0.36	0.75	0.51
Nordic	Denmark	1.47	3.60	2.28	1.89	2.45	0.63	0.83	1.39
	Finland	3.15	4.35	2.75	2.76	1.38	0.63	1.01	0.87
	Norway	1.54	5.01	1.53	1.56	3.25	0.31	1.02	1.01
	Sweden	2.95	4.77	1.63	1.84	1.62	0.34	1.12	0.59
Asian	India	5.32	3.25	2.85	2.75	0.61	0.87	0.97	0.52
	Japan	5.42	5.50	2.44	2.11	1.01	0.44	0.86	0.41
	Sri Lanka	5.32	4.89	2.17	2.74	0.92	0.44	1.26	0.47
Latin American	Argentina	9.28	4.59	4.39	5.75	0.49	0.96	1.31	0.56
	Brazil	6.81	4.62	3.00	3.75	0.68	0.65	1.25	0.51
	Chile	5.35	9.19	3.07	5.97	1.72	0.33	1.95	0.89
	Uruguay	8.70	9.88	5.00	5.77	1.14	0.51	1.15	0.63

TABLE 2

CROSS-COUNTRY CORRELATIONS OF DETRENDED GDP GROWTH
1880-1913

	BEL	FRA	GER	NETH	AUST	ITA	SWITZ	GRE	POR	SPA	DEN	FIN	NOR	SWE	IND	JAP	SLK	ARG	BRA	CHL	URU	AUSL	CAN	UK	US
BEL	1.00																								
FRA	0.23	1.00																							
GER	**-0.40**	-0.09	1.00																						
NETH	0.19	-0.06	-0.14	1.00																					
AUST	-0.06	**0.37**	0.07	-0.12	1.00																				
ITA	-0.21	0.14	-0.02	-0.04	0.21	1.00																			
SWITZ	**0.32**	-0.20	-0.21	-0.11	-0.09	-0.27	1.00																		
GRE	0.06	0.16	0.09	0.04	0.15	-0.27	0.22	1.00																	
POR	0.00	-0.09	0.13	**-0.46**	0.10	0.07	**0.29**	0.02	1.00																
SPA	0.02	0.22	-0.26	0.10	0.04	-0.03	-0.01	-0.23	-0.15	1.00															
DEN	0.14	0.03	-0.22	-0.22	0.05	0.16	0.01	-0.10	0.18	0.05	1.00														
FIN	0.14	0.07	**0.28**	-0.19	-0.06	0.09	-0.06	-0.18	**0.33**	**-0.31**	**0.29**	1.00													
NOR	0.16	0.00	-0.07	-0.01	-0.18	-0.10	0.18	**-0.28**	-0.07	0.22	-0.17	-0.05	1.00												
SWE	**-0.28**	-0.07	0.26	-0.22	0.10	0.08	0.13	-0.14	**0.28**	0.06	0.15	0.16	0.27	1.00											
IND	0.13	-0.15	-0.07	0.19	-0.17	-0.06	0.26	0.05	0.14	0.25	-0.07	-0.05	0.05	-0.03	1.00										
JAP	0.21	0.19	0.00	-0.11	**0.33**	-0.06	0.13	-0.04	0.12	**0.36**	0.09	**0.31**	-0.12	0.09	0.19	1.00									
SLK	**0.42**	0.21	-0.17	**-0.30**	**0.32**	0.20	0.05	**-0.29**	**0.36**	0.06	**0.37**	0.12	0.07	0.12	0.07	0.13	1.00								
ARG	-0.02	0.06	0.20	0.26	-0.07	-0.22	-0.05	**0.34**	**-0.31**	-0.15	-0.08	0.01	-0.28	0.08	**-0.33**	-0.03	-0.24	1.00							
BRA	-0.11	-0.02	-0.26	-0.08	0.26	-0.01	0.11	-0.17	0.07	0.14	0.25	0.19	-0.06	-0.03	-0.11	0.19	-0.07	-0.14	1.00						
CHL	0.15	-0.02	-0.22	-0.08	**0.32**	0.20	0.06	0.05	-0.02	0.11	-0.04	-0.07	0.10	-0.17	-0.21	0.16	0.26	-0.12	0.22	1.00					
URU	**-0.33**	-0.04	-0.04	0.14	-0.24	0.17	-0.20	0.19	-0.10	-0.12	-0.23	0.06	0.11	0.17	-0.09	-0.24	**-0.33**	0.24	-0.22	0.01	1.00				
AUSL	0.06	0.13	0.03	0.18	0.13	0.14	**-0.38**	-0.03	-0.14	-0.11	-0.16	0.06	-0.21	-0.06	-0.21	0.09	0.04	-0.05	0.02	0.08	-0.03	1.00			
CAN	0.04	0.14	-0.28	0.07	0.25	0.02	0.10	-0.02	0.13	0.22	-0.09	-0.22	0.18	0.04	**0.32**	-0.09	0.15	**-0.33**	**0.39**	-0.06	-0.23	-0.07	1.00		
UK	**0.30**	**0.39**	-0.04	**0.38**	0.25	-0.11	-0.02	-0.01	-0.08	0.00	-0.11	0.14	0.14	-0.02	-0.20	0.07	0.11	0.17	0.24	0.07	-0.19	0.24	**0.39**	1.00	
US	**0.34**	-0.03	**-0.53**	0.24	-0.03	0.00	**0.34**	-0.17	-0.02	**0.30**	0.17	-0.12	-0.03	-0.14	0.17	-0.08	0.03	-0.04	**0.43**	0.04	**-0.33**	-0.19	**0.40**	0.22	1.00

Note: Figures in bold indicate statistical significance at the 10 percent level.

TABLE 3

CROSS-COUNTRY CORRELATIONS OF DETRENDED GDP GROWTH
1920-1939

	BEL	FRA	GER	NETH	AUST	ITA	SWITZ	GRE	POR	SPA	DEN	FIN	NOR	SWE	IND	JAP	SLK	ARG	BRA	CHL	URU	AUSL	CAN	UK	US
BEL	1.00																								
FRA	**0.38**	1.00																							
GER	0.19	0.24	1.00																						
NETH	**0.59**	0.32	**0.47**	1.00																					
AUST	0.20	**0.45**	**0.72**	**0.57**	1.00																				
ITA	**-0.60**	0.01	0.11	-0.15	0.12	1.00																			
SWITZ	**0.47**	**0.78**	0.12	0.12	0.19	-0.20	1.00																		
GRE	0.34	0.04	**0.53**	0.30	0.29	-0.26	0.00	1.00																	
POR	0.05	0.11	-0.02	0.10	-0.02	-0.10	0.32	-0.19	1.00																
SPA	0.15	0.14	0.03	0.15	0.18	-0.04	0.28	0.15	0.35	1.00															
DEN	0.21	**0.61**	-0.17	-0.10	0.03	-0.15	**0.66**	-0.26	0.11	0.01	1.00														
FIN	**0.52**	0.33	0.32	0.23	0.16	-0.22	**0.56**	-0.09	0.19	0.01	0.21	1.00													
NOR	0.16	**0.43**	0.21	-0.17	0.04	0.06	**0.56**	0.03	0.01	-0.01	**0.49**	0.27	1.00												
SWE	0.09	**0.64**	0.33	-0.15	0.25	0.02	**0.58**	0.08	-0.06	-0.01	**0.73**	0.20	**0.68**	1.00											
IND	**-0.49**	0.10	0.10	0.19	0.28	**0.40**	**-0.39**	-0.17	-0.13	-0.09	-0.24	-0.31	-0.20	-0.13	1.00										
JAP	**-0.46**	-0.13	0.32	0.14	0.30	**0.60**	-0.35	0.03	-0.16	-0.08	**-0.40**	-0.32	-0.25	-0.26	**0.43**	1.00									
SLK	-0.24	**0.37**	0.23	-0.04	0.22	0.20	0.27	0.09	0.24	0.02	0.09	0.29	0.18	0.31	0.35	0.01	1.00								
ARG	**0.38**	**0.57**	**0.46**	**0.41**	**0.42**	0.02	**0.66**	0.12	0.21	0.23	**0.44**	**0.64**	0.27	**0.44**	-0.17	-0.01	**0.40**	1.00							
BRA	**0.44**	0.29	0.34	0.28	0.10	-0.15	**0.53**	-0.10	0.00	-0.11	0.27	**0.78**	0.33	0.24	-0.29	0.00	0.06	**0.66**	1.00						
CHL	0.29	**0.42**	**0.43**	0.20	0.33	-0.03	**0.52**	0.26	-0.05	-0.01	0.30	**0.62**	0.30	0.32	-0.15	0.11	**0.45**	**0.78**	**0.59**	1.00					
URU	-0.22	0.16	0.27	0.06	**0.41**	0.19	0.09	-0.15	-0.07	0.00	0.29	0.21	0.28	0.35	**0.38**	-0.13	**0.40**	**0.39**	0.15	0.22	1.00				
AUSL	0.06	0.12	**0.48**	0.26	0.25	0.28	0.09	-0.03	0.03	-0.02	-0.25	**0.50**	0.03	-0.03	0.04	**0.40**	0.28	**0.54**	**0.47**	**0.52**	0.07	1.00			
CAN	0.00	**0.43**	**0.47**	0.04	**0.45**	**0.39**	**0.50**	-0.04	0.01	0.03	0.37	**0.48**	**0.64**	**0.62**	-0.05	-0.06	**0.47**	**0.60**	**0.42**	**0.46**	**0.65**	0.33	1.00		
UK	**-0.47**	0.12	0.28	-0.25	0.15	**0.52**	0.17	-0.26	0.15	-0.05	0.02	0.27	**0.39**	0.26	0.28	0.19	**0.49**	0.35	0.20	0.34	**0.57**	**0.40**	**0.63**	1.00	
US	0.02	**0.47**	0.35	0.16	0.35	0.36	0.34	-0.08	-0.07	-0.18	**0.49**	**0.37**	0.32	**0.61**	0.04	0.07	**0.46**	**0.66**	0.36	**0.57**	**0.43**	0.34	**0.70**	**0.46**	1.00

Note: Figures in bold indicate statistical significance at the 10 percent level.

TABLE 4

CROSS-COUNTRY CORRELATIONS OF DETRENDED GDP GROWTH
1950-1973

	BEL	FRA	GER	NETH	AUST	ITA	SWITZ	GRE	POR	SPA	DEN	FIN	NOR	SWE	IND	JAP	SLK	ARG	BRA	CHL	URU	AUSL	CAN	UK	US
BEL	1.00																								
FRA	**0.55**	1.00																							
GER	0.02	0.14	1.00																						
NETH	**0.60**	0.33	0.33	1.00																					
AUST	0.32	**0.69**	**0.47**	0.34	1.00																				
ITA	0.00	0.11	0.28	0.04	0.16	1.00																			
SWITZ	**0.71**	**0.60**	**0.37**	**0.46**	**0.62**	0.23	1.00																		
GRE	**0.54**	0.07	-0.16	0.23	0.08	-0.15	0.29	1.00																	
POR	**0.53**	-0.02	**-0.41**	**0.39**	-0.08	-0.32	0.25	**0.47**	1.00																
SPA	0.13	0.03	-0.27	**-0.43**	-0.25	-0.09	-0.09	0.08	-0.17	1.00															
DEN	0.33	0.34	-0.03	**0.40**	0.03	0.02	0.14	0.16	0.07	-0.27	1.00														
FIN	**0.59**	**0.47**	0.27	0.27	**0.37**	0.04	**0.62**	0.16	0.08	0.17	0.21	1.00													
NOR	**0.44**	0.29	-0.09	0.27	0.11	-0.16	**0.49**	0.25	0.28	0.14	0.33	**0.38**	1.00												
SWE	**0.49**	**0.39**	0.08	**0.37**	0.34	0.18	**0.50**	0.16	0.01	-0.03	**0.46**	**0.40**	0.12	1.00											
IND	0.06	-0.02	0.12	0.27	0.05	0.28	0.00	-0.11	-0.22	-0.05	0.01	-0.07	-0.10	0.32	1.00										
JAP	**0.37**	**0.39**	0.10	0.10	0.10	**0.56**	0.31	-0.05	-0.10	0.16	0.19	**0.36**	0.07	0.31	0.17	1.00									
SLK	0.14	**0.40**	0.12	0.10	0.25	**0.47**	0.17	-0.16	-0.27	0.08	0.02	0.06	0.00	0.16	0.28	**0.66**	1.00								
ARG	**0.35**	**0.43**	0.04	**0.42**	**0.36**	-0.18	0.12	**0.45**	0.23	0.00	0.26	0.29	0.07	0.11	0.13	0.05	0.13	1.00							
BRA	-0.08	-0.04	0.07	-0.11	0.15	0.04	-0.04	-0.18	0.10	-0.21	0.10	0.25	-0.27	-0.18	-0.20	0.04	-0.06	0.02	1.00						
CHL	-0.09	0.12	-0.18	-0.13	-0.11	0.19	-0.14	0.04	-0.04	0.00	-0.08	-0.32	0.03	**-0.37**	-0.15	0.13	0.26	-0.14	-0.08	1.00					
URU	**0.54**	**0.57**	**0.46**	**0.43**	**0.61**	0.33	**0.58**	0.25	0.01	-0.27	0.20	**0.34**	0.16	0.26	0.03	0.29	0.32	0.19	0.01	**0.37**	1.00				
AUSL	0.11	0.01	-0.08	0.27	0.16	0.03	0.11	0.30	0.14	-0.10	-0.02	0.09	-0.05	**0.37**	0.03	0.19	0.16	0.27	-0.18	-0.26	-0.09	1.00			
CAN	0.23	0.10	0.14	0.07	-0.10	-0.20	0.12	0.19	0.08	0.18	-0.06	-0.18	0.07	-0.22	-0.28	0.13	0.13	-0.07	-0.21	0.13	0.01	-0.04	1.00		
UK	**0.45**	0.25	0.30	**0.64**	**0.49**	0.10	**0.49**	0.27	0.28	**-0.45**	0.30	0.30	0.27	**0.50**	0.17	0.22	0.00	0.16	-0.06	-0.21	**0.40**	**0.50**	-0.11	1.00	
US	0.25	0.14	0.22	0.09	0.06	0.07	0.28	0.17	0.05	-0.09	0.17	-0.05	0.20	0.02	**-0.43**	0.30	0.25	-0.24	-0.20	0.15	0.28	0.14	**0.70**	0.30	1.00

Note: Figures in bold indicate statistical significance at the 10 percent level.

TABLE 5

CROSS-COUNTRY CORRELATIONS OF DETRENDED GDP GROWTH
1973-2006

	BEL	FRA	GER	NETH	AUST	ITA	SWITZ	GRE	POR	SPA	DEN	FIN	NOR	SWE	IND	JAP	SLK	ARG	BRA	CHL	URU	AUSL	CAN	UK	US
BEL	1.00																								
FRA	**0.77**	1.00																							
GER	**0.67**	**0.72**	1.00																						
NETH	**0.70**	**0.61**	**0.66**	1.00																					
AUST	**0.57**	**0.74**	**0.66**	**0.56**	1.00																				
ITA	**0.82**	**0.81**	**0.70**	**0.62**	**0.52**	1.00																			
SWITZ	**0.59**	**0.54**	**0.46**	**0.56**	**0.42**	**0.58**	1.00																		
GRE	0.24	0.25	**0.40**	0.22	0.06	0.15	0.06	1.00																	
POR	**0.65**	**0.74**	**0.59**	**0.56**	**0.59**	**0.71**	**0.60**	0.16	1.00																
SPA	**0.63**	**0.62**	**0.39**	**0.70**	**0.48**	**0.50**	**0.43**	0.15	**0.66**	1.00															
DEN	0.28	**0.29**	**0.52**	**0.34**	**0.28**	**0.28**	0.12	**0.38**	0.16	0.13	1.00														
FIN	**0.42**	**0.45**	0.07	**0.32**	0.23	**0.46**	**0.55**	0.23	0.33	**0.40**	0.13	1.00													
NOR	0.16	-0.04	**0.31**	**0.33**	0.12	0.16	0.05	0.12	-0.16	-0.19	**0.50**	0.04	1.00												
SWE	**0.46**	**0.40**	0.18	**0.39**	0.20	**0.42**	**0.34**	0.27	0.15	**0.49**	**0.34**	**0.78**	0.13	1.00											
IND	-0.19	-0.20	**-0.32**	-0.06	**-0.31**	**-0.39**	-0.04	0.17	-0.23	0.06	-0.09	0.06	-0.15	0.00	1.00										
JAP	**0.34**	**0.41**	**0.55**	0.16	0.25	**0.38**	**0.32**	**0.42**	**0.50**	0.16	0.20	0.14	-0.01	0.01	0.00	1.00									
SLK	-0.19	0.04	0.19	0.00	0.19	0.00	-0.11	0.14	-0.12	-0.21	0.20	0.06	0.16	0.10	**-0.41**	0.15	1.00								
ARG	-0.04	-0.14	0.08	0.12	0.19	-0.19	-0.05	-0.09	-0.06	-0.03	0.16	-0.16	**0.30**	-0.08	-0.10	-0.13	0.26	1.00							
BRA	**0.44**	0.16	0.20	**0.30**	0.13	**0.35**	0.17	**0.30**	0.14	0.15	**0.33**	**0.32**	**0.53**	**0.33**	-0.20	0.10	-0.03	0.17	1.00						
CHL	0.17	0.03	**0.30**	**0.31**	0.06	0.28	**0.48**	-0.04	**0.32**	-0.02	-0.03	-0.06	0.14	-0.16	-0.09	0.08	-0.08	0.25	0.03	1.00					
URU	0.13	-0.07	0.09	0.17	0.00	-0.03	0.11	0.09	0.09	-0.01	0.05	0.02	**0.31**	0.05	-0.01	0.11	0.08	**0.60**	**0.36**	**0.40**	1.00				
AUSL	0.06	-0.05	0.10	0.21	-0.20	0.25	0.16	**0.30**	0.02	0.01	0.15	**0.31**	**0.32**	0.28	0.16	-0.04	-0.04	0.00	0.23	**0.36**	0.19	1.00			
CAN	**0.45**	**0.42**	**0.38**	**0.50**	0.20	**0.53**	**0.44**	**0.32**	0.19	**0.33**	**0.29**	**0.53**	**0.36**	**0.56**	0.00	0.11	0.19	-0.09	0.45	0.14	0.09	**0.63**	1.00		
UK	**0.32**	**0.50**	**0.38**	**0.39**	0.25	**0.46**	0.28	**0.43**	**0.45**	**0.47**	**0.53**	**0.51**	0.05	**0.46**	0.04	**0.38**	0.25	0.00	0.32	-0.03	-0.04	**0.40**	**0.58**	1.00	
US	**0.33**	**0.40**	**0.56**	**0.55**	0.19	**0.47**	**0.47**	**0.38**	**0.29**	0.23	**0.47**	**0.30**	**0.35**	**0.30**	0.11	**0.34**	0.21	0.07	0.20	**0.36**	0.13	**0.65**	**0.76**	**0.67**	1.00

Note: Figures in bold indicate statistical significance at the 10 percent level.

TABLE 6

EQUALITY TESTS OF AVERAGE WITHIN-GROUP CORRELATION COEFFICIENTS ACROSS SUB-PERIODS

	1880-1913[a] & 1920-1939[b]			1920-1939 & 1950-1973[c]		1950-1973 & 1973-2006[d]	
	t-test [*p*-value]	Mean[a]	Mean[b]	t-test [*p*-value]	Mean[c]	t-test [*p*-value]	Mean[d]
All Countries	-9.29	0.02	0.20	2.84	0.14	-5.28	0.24
	[0.00]	(0.01)	(0.02)	[0.00]	(0.01)	[0.00]	(0.01)
Core European	-3.66	-0.04	0.37	0.32	0.33	-3.77	0.69
	[0.00]	(0.09)	(0.06)	[0.75]	(0.09)	[0.00]	(0.02)
Core & Western European	-3.20	-0.02	0.24	-1.27	0.35	-5.17	0.63
	[0.00]	(0.04)	(0.07)	[0.21]	(0.05)	[0.00]	(0.02)
Core & Southern European	-4.05	-0.03	0.21	0.85	0.14	-4.68	0.53
	[0.00]	(0.04)	(0.04)	[0.40]	(0.07)	[0.00]	(0.05)
Core & Southern European	-3.79	-0.05	0.22	1.01	0.12	-5.83	0.64
(excld. Greece)	[0.00]	(0.05)	(0.04)	[0.32]	(0.09)	[0.00]	(0.02)
Core, Western & Southern European	-3.81	-0.01	0.18	-0.02	0.18	-6.49	0.53
	[0.00]	(0.03)	(0.04)	[0.99]	(0.05)	[0.00]	(0.03)
Core, Western & Southern European	-3.69	-0.02	0.19	0.08	0.18	-7.74	0.61
(excld. Greece)	[0.00]	(0.03)	(0.04)	[0.94]	(0.05)	[0.00]	(0.02)
Nordic	-2.62	0.11	0.43	1.05	0.31	-0.05	0.32
	[0.03]	(0.07)	(0.10)	[0.32]	(0.05)	[0.96]	(0.12)
Anglo-Saxon	0.00	0.17	0.17	-0.50	0.25	-2.67	0.61
	[1.00]	(0.10)	(0.10)	[0.63]	(0.13)	[0.02]	(0.05)
Latin American	-3.63	0.00	0.47	3.17	0.06	-2.15	0.30
	[0.00]	(0.08)	(0.10)	[0.01]	(0.08)	[0.06]	(0.08)
Asian	-0.98	0.13	0.26	-0.53	0.37	2.01	-0.09
	[0.38]	(0.03)	(0.13)	[0.62]	(0.15)	[0.11]	(0.17)

Note: Standard errors in parentheses. The European Core includes Belgium, France, Germany and the Netherlands; the Western European group includes Austria, Italy, and Switzerland; the South European group includes Greece, Portugal and Spain; the South European group (excl. Greece) includes Portugal and Spain only; the Nordic group includes Denmark, Finland, Norway and Sweden; the Latin American group includes Argentina, Brazil, Chile and Uruguay; the Asian group includes India, Japan and Sri Lanka; the Anglo-Saxon group includes Australia, Canada, the UK and the USA.

TABLE 7

EQUALITY TESTS OF AVERAGE CROSS-GROUP CORRELATION COEFFICIENTS ACROSS SUB-PERIODS

	1880-1913[a] & 1920-1939[b]			1920-1939& 1950-1973[c]		1950-1973 & 1973-2006[d]	
	t-test [*p*-value]	Mean[a]	Mean[b]	t-test [*p*-value]	Mean[c]	t-test [*p*-value]	Mean[d]
Core, Western & Southern European	-2.09	0.07	0.17	0.77	0.14	-3.71	0.31
(excld. Greece) with Anglo-Saxon	[0.04]	(0.03)	(0.04)	[0.44]	(0.04)	[0.00]	(0.03)
Nordic with Anglo-Saxon	-4.73	-0.07	0.32	2.53	0.11	-4.04	0.36
	[0.00]	(0.03)	(0.06)	[0.02]	(0.05)	[0.00]	(0.04)
Latin American with Anglo-Saxon	-6.39	0.01	0.45	6.91	-0.01	-2.34	0.15
	[0.00]	(0.06)	(0.04)	[0.00]	(0.05)	[0.03]	(0.04)
Asian with Anglo-Saxon	-2.45	0.03	0.22	1.67	0.07	-0.96	0.14
	[0.02]	(0.04)	(0.06)	[0.11]	(0.06)	[0.35]	(0.04)
Core, Western & Southern European	-2.88	0.03	0.17	-0.85	0.22	-0.83	0.26
(excld. Greece) with Nordic	[0.00]	(0.03)	(0.04)	[0.40]	(0.04)	[0.41]	(0.03)
Core, Western & Southern European	-5.05	-0.01	0.22	1.70	0.13	0.14	0.12
(excld. Greece) with Latin American	[0.00]	(0.03)	(0.04)	[0.09]	(0.04)	[0.89]	(0.03)
Core, Western & Southern European	0.79	0.10	0.05	-1.43	0.15	1.64	0.04
(excld. Greece) with Asian	[0.43]	(0.04)	(0.05)	[0.16]	(0.04)	[0.11]	(0.05)

Note: Standard errors in parentheses. See Table 6 for country group definitions.

TABLE 8

NON-PARAMETRIC EQUALITY TESTS OF AVERAGE WITHIN-GROUP CORRELATION COEFFICIENTS ACROSS SUB-PERIODS

	1880-1913[a] & 1920-1939[b]			1920-1939& 1950-1973[c]		1950-1973 & 1973-2006[d]	
	Test value [*p*-value]	Median[a]	Median [b]	Test value [*p*-value]	Median[c]	Test value [*p*-value]	Median[d]
All Countries	8.56	0.02	0.21	2.93	0.13	4.95	0.23
	[0.00]			[0.00]		[0.00]	
Core European	8.56	-0.08	0.35	0.08	0.33	2.80	0.69
	[0.00]			[0.94]		[0.01]	
Core & Western European	2.96	-0.06	0.20	1.03	0.33	3.85	0.62
	[0.00]			[0.30]		[0.00]	
Core & Southern European	3.07	-0.06	0.15	0.87	0.13	3.40	0.66
(excld. Greece)	[0.00]			[0.38]		[0.00]	
Core, Western & Southern European	3.60	-0.02	0.15	0.04	0.19	5.82	0.61
(excld. Greece)	[0.00]			[0.97]		[0.00]	
Nordic	1.84	0.15	0.38	0.72	0.35	0.08	0.24
	[0.07]			[0.47]		[0.94]	
Anglo-Saxon	-0.08	0.23	0.23	0.40	0.22	1.84	0.64
	[0.94]			[0.69]		[0.07]	
Latin American	2.32	-0.05	0.49	2.32	0.02	1.84	0.30
	[0.02]			[0.02]		[0.07]	
Asian	0.44	0.13	0.35	0.00	0.28	1.75	0.00
	[0.66]			[1.00]		[0.08]	

Note: Results are based on the Wilcoxon Rank Sum Test. See Table 6 for country group definitions.

TABLE 9

NON-PARAMETRIC EQUALITY TESTS OF AVERAGE CROSS-GROUP CORRELATION COEFFICIENTS ACROSS SUB-PERIODS

	1880-1913[a] & 1920-1939[b]			1920-1939 & 1950-1973[c]		1950-1973 & 1973-2006[d]	
	Test value [*p*-value]	Median[a]	Median [b]	Test value [*p*-value]	Median[c]	Test value [*p*-value]	Median[d]
Core, Western & Southern European (excld. Greece) with Anglo-Saxon	2.13 [0.03]	0.06	0.15	0.82 [0.41]	0.11	3.59 [0.00]	0.33
Nordic with Anglo-Saxon	3.45 [0.00]	-0.04	0.37	2.36 [0.02]	0.08	3.33 [0.00]	0.34
Latin American with Anglo-Saxon	4.16 [0.00]	-0.01	0.47	4.35 [0.00]	-0.07	2.05 [0.04]	0.13
Asian with Anglo-Saxon	1.88 [0.06]	0.06	0.23	1.24 [0.21]	0.14	0.32 [0.75]	0.13
Core, Western & Southern European (excld. Greece) with Nordic	2.18 [0.03]	0.05	0.13	1.11 [0.27]	0.27	0.91 [0.36]	0.28
Core, Western & Southern European (excld. Greece) with Latin American	4.27 [0.00]	-0.02	0.25	1.60 [0.11]	0.06	0.43 [0.66]	0.12
Core, Western & Southern European (excld. Greece) with Asian	0.47 [0.64]	0.13	0.10	0.99 [0.32]	0.12	1.54 [0.12]	0.00

Note: Results are based on the Wilcoxon Rank Sum Test. See Table 6 for country group definitions.

TABLE 10

VARIANCE DECOMPOSITIONS BASED ON THE ONE-FACTOR FSVAR:
INTERNATIONAL SHOCKS, SPILLOVERS, AND IDIOSYNCRATIC SHOCKS

Country Groups	Horizon	1880-1913			1920-1939			1950-1973			1973-2006		
		Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:		
		Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks
Nordic	1	0.03	0.00	0.97	0.03	0.00	0.97	0.39	0.00	0.61	0.17	0.00	0.83
	2	0.03	0.17	0.80	0.05	0.40	0.56	0.33	0.38	0.29	0.07	0.13	0.80
	3	0.03	0.23	0.74	0.09	0.42	0.49	0.32	0.44	0.23	0.04	0.27	0.69
	4	0.02	0.26	0.71	0.10	0.44	0.45	0.36	0.43	0.22	0.03	0.36	0.61
Core European	1	0.16	0.00	0.84	0.41	0.00	0.59	0.56	0.00	0.44	0.71	0.00	0.30
	2	0.16	0.14	0.71	0.33	0.36	0.32	0.59	0.13	0.29	0.65	0.10	0.26
	3	0.14	0.19	0.68	0.31	0.44	0.26	0.59	0.18	0.24	0.57	0.16	0.26
	4	0.14	0.21	0.65	0.28	0.50	0.22	0.59	0.19	0.22	0.50	0.23	0.26
Anglo-Saxon	1	0.49	0.00	0.51	0.51	0.00	0.49	0.24	0.00	0.76	0.29	0.00	0.71
	2	0.43	0.12	0.45	0.41	0.30	0.29	0.26	0.13	0.62	0.18	0.15	0.66
	3	0.42	0.17	0.40	0.40	0.34	0.25	0.28	0.18	0.54	0.11	0.29	0.61
	4	0.41	0.22	0.37	0.39	0.38	0.23	0.30	0.21	0.50	0.09	0.37	0.55

Notes: The Nordic country group includes Denmark, Norway and Sweden. The European Core includes Belgium, France, Germany and the Netherlands. The Anglo-Saxon group includes Canada, the UK and the US. Results refer to simple averages over country groups.

TABLE 11

VARIANCE DECOMPOSITIONS BASED ON THE ONE-FACTOR FSVAR:
INTERNATIONAL SHOCKS, SPILLOVERS, AND IDIOSYNCRATIC SHOCKS

Country Groups	Horizon	1880-1913			1920-1939			1950-1973			1973-2006		
		Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:		
		Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks
Latin American	1	0.19	0.00	0.81	0.26	0.00	0.74	0.16	0.00	0.84	0.01	0.00	0.99
	2	0.18	0.15	0.68	0.34	0.28	0.38	0.14	0.24	0.62	0.02	0.16	0.82
	3	0.17	0.21	0.62	0.33	0.39	0.28	0.14	0.30	0.55	0.01	0.26	0.72
	4	0.17	0.24	0.59	0.30	0.47	0.23	0.13	0.32	0.55	0.01	0.34	0.65
Core European	1	0.16	0.00	0.84	0.44	0.00	0.56	0.43	0.00	0.57	0.70	0.00	0.31
	2	0.15	0.16	0.70	0.42	0.18	0.40	0.37	0.21	0.42	0.63	0.10	0.27
	3	0.13	0.23	0.64	0.43	0.24	0.33	0.30	0.38	0.32	0.57	0.18	0.25
	4	0.12	0.26	0.62	0.43	0.27	0.30	0.25	0.49	0.27	0.53	0.24	0.24
Anglo-Saxon	1	0.49	0.00	0.51	0.44	0.00	0.56	0.16	0.00	0.84	0.34	0.00	0.66
	2	0.42	0.17	0.40	0.37	0.34	0.30	0.12	0.21	0.68	0.19	0.20	0.61
	3	0.41	0.23	0.36	0.32	0.51	0.17	0.10	0.33	0.58	0.11	0.35	0.54
	4	0.41	0.27	0.32	0.26	0.63	0.11	0.09	0.38	0.53	0.08	0.42	0.50

Notes: The Latin American group includes Argentina, Brazil and Uruguay. See Table 10 for definitions of the European Core and Anglo-Saxon groups. Results refer to simple averages over country groups.

TABLE 12

VARIANCE DECOMPOSITIONS BASED ON THE ONE-FACTOR FSVAR: INTERNATIONAL SHOCKS, SPILLOVERS, AND IDIOSYNCRATIC SHOCKS

Country Groups	Horizon	1880-1913			1920-1939			1950-1973			1973-2006		
		Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:		
		Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks
Western European	1	0.06	0.00	0.94	0.26	0.00	0.74	0.47	0.00	0.53	0.51	0.00	0.49
	2	0.04	0.25	0.71	0.13	0.24	0.63	0.45	0.18	0.37	0.53	0.13	0.33
	3	0.05	0.29	0.66	0.13	0.34	0.53	0.43	0.27	0.30	0.47	0.25	0.28
	4	0.04	0.33	0.63	0.12	0.42	0.45	0.39	0.37	0.24	0.44	0.30	0.26
Western European (excl. Switzerland)	1	0.02	0.00	0.99	0.05	0.00	0.96	0.48	0.00	0.52	0.60	0.00	0.40
	2	0.04	0.14	0.82	0.07	0.09	0.84	0.41	0.19	0.41	0.63	0.14	0.23
	3	0.05	0.18	0.78	0.10	0.21	0.70	0.37	0.31	0.33	0.57	0.24	0.20
	4	0.05	0.22	0.74	0.09	0.33	0.58	0.32	0.42	0.27	0.54	0.28	0.18
Core European	1	0.11	0.00	0.90	0.52	0.00	0.48	0.55	0.00	0.45	0.71	0.00	0.29
	2	0.10	0.21	0.69	0.39	0.29	0.32	0.58	0.16	0.27	0.56	0.15	0.29
	3	0.10	0.27	0.63	0.40	0.33	0.28	0.56	0.21	0.23	0.45	0.28	0.28
	4	0.10	0.30	0.60	0.38	0.37	0.25	0.53	0.26	0.21	0.39	0.34	0.27
Anglo-Saxon	1	0.45	0.00	0.55	0.39	0.00	0.61	0.44	0.00	0.56	0.12	0.00	0.88
	2	0.40	0.13	0.48	0.39	0.33	0.28	0.44	0.09	0.47	0.05	0.13	0.82
	3	0.37	0.21	0.42	0.33	0.43	0.24	0.44	0.13	0.43	0.04	0.24	0.73
	4	0.35	0.26	0.38	0.28	0.54	0.18	0.44	0.16	0.40	0.04	0.28	0.68

Notes: The Western European group includes Austria, Italy and Switzerland. See Table 10 for definitions of the European Core and Anglo-Saxon groups. Results refer to simple averages over country groups.

TABLE 13

VARIANCE DECOMPOSITIONS BASED ON THE ONE-FACTOR FSVAR:
INTERNATIONAL SHOCKS, SPILLOVERS, AND IDIOSYNCRATIC SHOCKS

Country Groups	Horizon	1880-1913			1920-1939			1950-1973			1973-2006		
		Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:		
		Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks
Southern European	1	0.01	0.00	0.99	0.18	0.00	0.82	0.54	0.00	0.46	0.31	0.00	0.69
	2	0.01	0.31	0.68	0.15	0.33	0.52	0.45	0.23	0.31	0.23	0.11	0.67
	3	0.02	0.39	0.59	0.14	0.37	0.49	0.53	0.23	0.24	0.19	0.20	0.61
	4	0.02	0.40	0.58	0.12	0.38	0.50	0.56	0.25	0.20	0.17	0.26	0.57
Southern European (excl. Greece)	1	0.01	0.00	0.99	0.24	0.00	0.77	0.53	0.00	0.47	0.44	0.00	0.57
	2	0.01	0.32	0.68	0.20	0.37	0.44	0.45	0.16	0.39	0.33	0.10	0.58
	3	0.03	0.39	0.59	0.19	0.40	0.41	0.49	0.20	0.32	0.27	0.18	0.55
	4	0.03	0.41	0.57	0.17	0.42	0.42	0.53	0.21	0.27	0.24	0.24	0.53
Core European	1	0.17	0.00	0.83	0.27	0.00	0.74	0.52	0.00	0.49	0.67	0.00	0.33
	2	0.15	0.15	0.70	0.18	0.39	0.44	0.55	0.14	0.31	0.54	0.19	0.27
	3	0.13	0.25	0.63	0.19	0.47	0.35	0.54	0.26	0.20	0.41	0.37	0.22
	4	0.12	0.28	0.61	0.18	0.53	0.30	0.52	0.33	0.15	0.33	0.48	0.19
Anglo-Saxon	1	0.43	0.00	0.57	0.51	0.00	0.49	0.22	0.00	0.78	0.13	0.00	0.87
	2	0.36	0.17	0.48	0.51	0.23	0.26	0.21	0.15	0.64	0.05	0.18	0.77
	3	0.33	0.29	0.38	0.51	0.27	0.23	0.23	0.21	0.57	0.03	0.30	0.66
	4	0.32	0.33	0.35	0.48	0.33	0.19	0.24	0.24	0.51	0.03	0.35	0.62

Notes: The South European group includes Greece, Portugal and Spain. See Table 10 for definitions of the European Core and Anglo-Saxon groups. Results refer to simple averages over country groups.

TABLE 14

VARIANCE DECOMPOSITIONS BASED ON THE ONE-FACTOR FSVAR:
INTERNATIONAL SHOCKS, SPILLOVERS, AND IDIOSYNCRATIC SHOCKS

Country Groups	Horizon	1880-1913			1920-1939			1950-1973			1973-2006		
		Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:		
		Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks
Asian	1	0.02	0.00	0.98	0.06	0.00	0.94	0.21	0.00	0.79	0.07	0.00	0.93
	2	0.04	0.33	0.63	0.13	0.20	0.67	0.23	0.14	0.64	0.07	0.17	0.76
	3	0.04	0.42	0.54	0.15	0.29	0.57	0.23	0.22	0.55	0.07	0.25	0.69
	4	0.03	0.44	0.52	0.14	0.32	0.54	0.21	0.29	0.50	0.07	0.30	0.64
Core European	1	0.16	0.00	0.84	0.46	0.00	0.54	0.59	0.00	0.41	0.64	0.00	0.36
	2	0.15	0.12	0.74	0.42	0.23	0.35	0.59	0.16	0.25	0.55	0.17	0.29
	3	0.14	0.15	0.70	0.41	0.29	0.31	0.55	0.27	0.18	0.47	0.27	0.26
	4	0.14	0.17	0.69	0.40	0.33	0.28	0.51	0.35	0.14	0.42	0.34	0.24
Anglo-Saxon	1	0.48	0.00	0.52	0.51	0.00	0.49	0.40	0.00	0.60	0.37	0.00	0.63
	2	0.41	0.11	0.47	0.52	0.24	0.24	0.41	0.22	0.37	0.19	0.25	0.55
	3	0.39	0.16	0.44	0.50	0.34	0.17	0.39	0.30	0.31	0.12	0.44	0.45
	4	0.39	0.19	0.42	0.43	0.43	0.13	0.36	0.38	0.26	0.09	0.50	0.40

Notes: The Asian group includes India, Japan and Sri Lanka. See Table 10 for definitions of the European Core and Anglo-Saxon groups. Results refer to simple averages over country groups.

TABLE 15

VARIANCE DECOMPOSITIONS BASED ON THE ONE-FACTOR FSVAR:
INTERNATIONAL SHOCKS, SPILLOVERS, AND IDIOSYNCRATIC SHOCKS

Country Groups	Horizon	1880-1913			1920-1939			1950-1973			1973-2006		
		Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:			Fraction of Forecast Error variance due to:		
		Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks	Int'l shocks	Spillo-vers	Own shocks
Australia	1	0.00	0.00	1.00	0.05	0.00	0.95	0.22	0.00	0.78	0.02	0.00	0.98
	2	0.01	0.10	0.89	0.10	0.02	0.88	0.18	0.26	0.56	0.01	0.06	0.93
	3	0.02	0.09	0.89	0.13	0.05	0.83	0.16	0.31	0.53	0.01	0.08	0.91
	4	0.02	0.10	0.88	0.14	0.06	0.80	0.14	0.37	0.49	0.01	0.09	0.90
Core European	1	0.15	0.00	0.85	0.39	0.00	0.61	0.56	0.00	0.44	0.69	0.00	0.31
	2	0.14	0.11	0.75	0.27	0.30	0.45	0.64	0.06	0.30	0.63	0.09	0.27
	3	0.14	0.15	0.72	0.25	0.41	0.34	0.65	0.10	0.26	0.56	0.19	0.25
	4	0.14	0.16	0.70	0.24	0.48	0.29	0.64	0.13	0.23	0.50	0.26	0.25
Anglo-Saxon	1	0.44	0.00	0.56	0.23	0.00	0.77	0.32	0.00	0.68	0.27	0.00	0.73
	2	0.39	0.14	0.47	0.16	0.34	0.49	0.34	0.08	0.58	0.18	0.10	0.72
	3	0.38	0.19	0.43	0.11	0.48	0.42	0.35	0.10	0.54	0.13	0.18	0.69
	4	0.37	0.23	0.40	0.08	0.59	0.33	0.37	0.13	0.51	0.10	0.23	0.67

Notes: See Table 10 for definitions of the European Core and Anglo-Saxon groups. Results refer to simple averages over country groups.