

Andreas Rees*

One Fits All in the EMU? One Monetary Policy for Eleven Countries

Euro-skeptics continue to argue that the discrepancies between national business cycles are too wide, and that a common European monetary policy cannot work in the long run.

The laboriously accomplished monetary stability will therefore not be able to last, high rates of inflation and a "soft" euro will, in the long run, be the inevitable consequences. The empirical evidence given in the following article supports a different view: not only has there been a strong correlation of business cycles in Euroland over the past decade, but there are also a multitude of forces that are working towards further convergence.

The start of the EMU has not dispelled the fears of the euro-skeptics. One of their main arguments was that the discrepancies between the business cycles in the individual countries were too wide for a common European monetary policy ("one fits all") to work in the long run. On the one hand there were EMU-countries with low levels of economic activity and little pressure on prices; on the other hand there were EMU countries with above-average growth rates which were unable to keep their prices stable. Whereas in one area of Euroland key interest rates would therefore have to be raised in order to avoid the risk of inflation, in other EMU countries tighter monetary policies would be inappropriate because of the low level of business activity and slow price dynamics.

The present situation would seem to confirm the viewpoint of such skeptics. The differences in growth rates in Euroland are still considerable (cf. Table 1). Whereas countries like Spain and the Netherlands are likely to grow by about 4% this year, and Ireland by even more than 7%, GDP in Germany and Italy, both at the lower end of the growth tables, is expected to increase by less than 3%.

However, looking at growth rates does not actually answer our question as to whether the economies are growing apart, as growth rates are a pale reflection of economic activity. If, for example, GDP increases considerably, but at the same time the production potential of the economy as a whole grows to the same extent, there will be no pressure on prices. Shortages in the labor market and significant wage increases will be avoided due to a growing supply of manpower, and capacity utilization will remain the same as a result of the increase in capital stock. For

this reason, to record business cycles accurately, the relative deviation of GDP from the production potential, the so-called output gap, is needed as a benchmark. With this data it is possible to empirically clarify whether business cycles in Euroland really are diverging, as current growth rates seem to imply.

Strong Correlation of Business Cycles in Euroland

In order to look into the question of how close the correlation of business cycles is, the first step was to determine the production potential of the individual EMU countries. Basically there are two possible ways of doing this. One way is to use macroeconomic structural models in order to calculate trends in growth. However, since reliable data relating to capital stock are not available in some EMU countries, this method was inevitably out of the question. The other way is to use time-series models, so-called "structure-less" models. This method enables national GDP figures to be broken down into a trend component (production potential) and a cyclical component (the output gap). Amongst academics the so-called Hodrick-Prescott filter has established itself as the generally accepted and most used method of calculation. The ECB used a similar method for a study on the economic union in Euroland.¹ Instead of using a structural model to calculate the production potential for the EMU countries, an auxiliary factor – a so-called "potential euro-GDP" – was generated using time-series models.

Having determined the output gaps for the EMU countries, the second step was to establish the correlation between these figures. This needs to be

¹ I. Angeloni, L. Dedola: From the ERM to the euro: new evidence on economic and policy convergence among EU countries, ECB working paper No. 4, May 1999.

* Economics Department, HypoVereinsbank, Munich, Germany.

illustrated with a brief example. First of all a correlation coefficient was calculated representing the relationship between the output gap of the individual country (e.g. Germany) and the output gap of the remaining EMU countries (without Germany). The same procedure was then repeated for all the other EMU countries. Using the statistics thus obtained for all EMU countries, both unweighted correlation coefficients and correlation coefficients weighted by national GDP shares were then determined in order to present a picture of the correlation of business cycles in Euroland as a whole.

The respective quarterly figures for the 1980s and 1990s, taken separately, served as the time period for the selection of the data points. However, the most interesting question is whether or not fundamental shifts have occurred in the correlation of business cycles among EMU countries over the past few years as a result of their having fulfilled the Maastricht criteria.

Comparison with Germany and the USA

Initially, however, the two correlation coefficients for the 1980s and 1990s alone do not say a lot. Even if the correlation of business cycles in the EMU has grown stronger as time has passed, this may, in view of the euro interest-rate policy, still not be enough; what is necessary is some kind of yardstick. The degree of economic interdependence within Germany and the USA was therefore also calculated. This is an appropriate comparison because in both countries quite successful monetary policies have been pursued for many years. The GDP of the West German Federal States (excluding the city states of Hamburg, Bremen and Berlin) and of the US Federal States was used as data. The figures for the US Federal States were aggregated to the twelve Federal Reserve Districts, giving an insight into the economic union among the different regions of the USA (see box). The situation is similar to Euroland in that each Federal Reserve District is presided over by a chairman who represents his region on the Federal Open Market Committee (FOMC) – the central decision making body of the Federal Reserve System.²

The time period from which the German and American GDP figures were selected started, unlike that for Euroland, at the beginning of the 1960s. A historical period that was longer than the one used for Euroland was selected for two reasons. The first is

that growth rates on a regional level are, in both Germany and the USA, available only on a yearly basis. However, in order to be able to determine the degree of economic interdependence reliably, a sufficiently large number of data points are required (at least 25 to 30). The second is that resorting to a longer time period is actually consistent in that the two counterparts to the ECB – the Bundesbank and the Federal Reserve System – have, for many years now, been supplying their Federal States and Districts with a common monetary policy. It is, in fact, the comparison of two different periods of time that enables an interesting insight to be gained into areas associated with monetary policy: on the one hand, the correlation of business cycles which the Bundesbank and the Federal Reserve System saw themselves faced with over the past 35 to 40 years; on the other hand, the more immediate comparison of business cycles in Euroland using figures from the 1980s and, above all, the 1990s, which must certainly play an important role in the current estimates of the ECB. Even so, comparing annual figures with quarterly figures is somewhat problematic. Data based on annual figures normally appear “smoother” than those based on quarterly figures. It is possible that the

Demarcation of the Federal Reserve Districts

Before the output gaps of the individual Federal Reserve Districts were calculated with the help of the Hodrick-Prescott filter, the GDP figures available for the US Federal States had to be aggregated. As the Federal Reserve Districts have grown historically and, as far as their demarcation is concerned, are not totally consistent with the Federal States, allocation problems inevitably arise. So, for example, Fairfield County, as a part of the Federal State of Connecticut, belongs to the District of the Federal Reserve Bank of Boston. The other Counties, however, belong to the Federal Reserve Bank of New York. The Gross State Product (GSP), however, is only listed on a State level and not on the lower level of the individual Counties. In order to be able to solve this problem, for all overlapping Federal States, employment shares on a County level were calculated and allocated to the GDP of the respective Federal Reserve District. This approach must be justifiable since the economic strength of a county is greater, the more people work in the region.¹ To return to our concrete example: since Fairfield County has an employment share of slightly more than 25% in Connecticut, about 1/4 of the GSP of Connecticut was allocated to the District of the Federal Reserve Bank of Boston and about 3/4 to the Federal Reserve Bank of New York.

¹ M. A. Wynne, Jahyeong Koo: Business cycles under monetary union: a comparison of EU and US business cycles, Revised Working Paper, Federal Reserve Bank of Dallas, April 1999.

² Unlike the ECB-Committee, they have a rotating system.

economic unions within Germany and the USA appear to be stronger simply because time series with different frequencies were used. In order to deal with this problem, the output gaps of Euroland were "smoothed out" using a four-quarter moving average.

Unexpected Results

If such technical differences are disregarded, the expectations drawn from economic theory with regard to such a correlation calculation are obvious. The correlation between growth rates inside Germany and inside the USA ought to be significantly closer than within Euroland, one reason being the identical overall monetary conditions that have prevailed in all Federal States and Federal Reserve Districts for many years now. However, uniform economic and fiscal policies on a national level must also have had a strong influence on economic harmonization. In Euroland, on the other hand, the interdependence of the national output gaps should turn out to be significantly weaker.

This is what makes the results all the more unexpected. The correlation coefficient of 0.86 among the Federal States of Germany and of 0.85 among the Federal Reserve Districts did, in fact, indicate that the correlation of business cycles was closest there. The differences between Germany (USA) and Euroland are, from a statistical point of view, almost impossible to measure. After all, in the 1990s, the EMU countries were only just behind with a correlation of 0.84.³ What is also really impressive is the speed at which Euroland has been converging: in comparison to the 1980s when its correlation value amounted to only 0.29, the correlation has almost trebled since then (cf. Figure 1).

The correlation coefficients were calculated with the help of the GDP weights of the States and Districts. They therefore provide us with information about how closely woven the business cycles are within the currency area as a whole. From an economic point of view such an approach certainly makes sense: each region is only taken into account in proportion to its economic strength, and political boundaries have been abstracted from. Unweighted correlation coefficients are, on the other hand, more informative when analyzing the voting behavior of monetary decision-makers. Each national central bank governor has one vote in the ECB commission, independent of whether he comes from an econom-

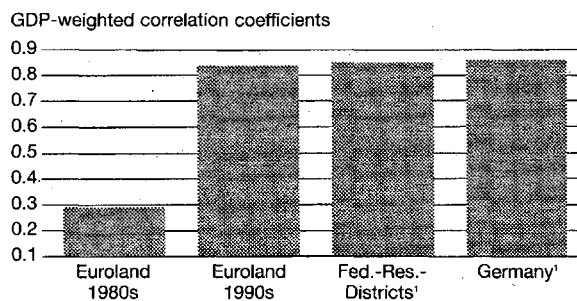
ically small country like, for example, Ireland (GDP share in the EMU 0.9%) or from Germany (GDP weight of 29%).⁴ If unweighted correlation coefficients are used, the economic union in Euroland at 0.83 is even higher than that of Germany at 0.78 (cf. Table 2). Decisive is, above all, the comparatively weak correlation between the Saarland and Schleswig-Holstein and the remaining Federal States. Structural problems in region-specific industrial sectors – mining in the Saarland and agriculture and shipbuilding in Schleswig-Holstein – have resulted, relatively speak-

Table 1
EMU Member Countries' GDP Growth Rates, 2000*

| | |
|-----------------|--------------|
| Ireland | +7.5% |
| Luxembourg | +5.5% |
| Finland | +4.5% |
| Netherlands | +4.0% |
| Spain | +4.0% |
| Belgium | +3.5% |
| France | +3.5% |
| Portugal | +3.5% |
| Austria | +3.0% |
| Germany | +2.9% |
| Italy | +2.7% |
| Euroland | +3.2% |

* HypoVereinsbank forecasts.

Figure 1
Correlation of Business Cycles in Euroland, Germany and the USA



¹ since 1963.

Table 2
Correlation of Business Cycles with Weighted and Unweighted Correlation Coefficients

| | Unweighted | Weighted |
|----------------|------------|----------|
| Euroland 1980s | 0.23 | 0.29 |
| Germany | 0.78 | 0.86 |
| Euroland 1990s | 0.83 | 0.84 |
| USA | 0.85 | 0.85 |

³ Without the effects of German reunification (92q2-98q4).

⁴ Source for the GDP shares: OECD.

ing, in these areas becoming detached from the dynamic growth in the other Federal States.

Impressive as the figures for the EMU countries may be – weighted or unweighted – we are only talking about figures which are valid for the *entire* euro area, in other words, averages. Inevitably they can only provide a first impression of economic harmonization. But how has the correlation of *individual* countries' business cycles with the rest of Euroland developed? Here we were in for another surprise. The interdependence of the business cycles of all EMU countries has become stronger since the beginning of the 1990s and this has happened independently of their economic size. Above all, it is the so-called "small countries" which have particularly caught up since the beginning of the 1990s (cf. Table 3). For example, a decade ago the degree of interdependence between Ireland and the Euro economy was a slightly negative one(!), but now its correlation coefficient is 0.75. The convergence process in Portugal has been even more impressive. Here the coefficient has risen from -0.34 to +0.85. The strongest business cycle correlation with the rest of Europe can be seen in Spain, where the coefficient is 0.96, followed by France and Belgium (both 0.91).

Italy is the only country that has been slightly "disappointing" in that it was only able to record moderate growth compared with its achievements in the 1980s. The main reason for this performance is likely to be the fact that in trying to fulfill the Maastricht criteria Italy was rather late in introducing its budget consolidation program. By reducing its deficit from 6.7% to 2.7% within a year, Italy was thrown into a recession in 1996/97 while the rest of Euroland was growing at a rate of 2.2%. Nonetheless the degree of correlation between Italy and the remaining EMU countries has, at a level of 0.73, been comparatively high throughout the 1990s.

What Lies Behind the Figures?

What factors have played a decisive role in making the economies in Euroland (almost) as "in step" with one another as the economies in Germany and in the USA? Fiscal compensatory mechanisms cannot have been one of these factors, since these are of minimal importance in Europe. The EU central budget only

accounts for 1.2% of the nominal GNP of the EU countries. It is also not due to the fact that the division into Federal States or Federal Reserve Districts results in more heterogeneous divisions in terms of economic strength, which would tend to lead to a lower correlation (the problem with outliers). Quite the contrary, in terms of economic strength the range is far greater in Euroland. The smallest District, Minneapolis, has a 3.0% share of GDP in the USA. San Francisco, the largest District has a share of somewhat more than 18%. In the EMU, the economic giant, Germany, with a 29% share of GDP, is confronted with Ireland with 0.9%, Finland with 1.7% and Portugal with 2.3%. Further calculations also show that the

Table 3
Increase in Correlation of Individual Countries' Business Cycles with the Rest of Euroland

| Country | 1980s | 1990s ¹ | Increase |
|-------------|-------|--------------------|----------|
| Italy | 0.69 | 0.73 | +0.04 |
| Austria | 0.46 | 0.81 | +0.35 |
| Netherlands | 0.50 | 0.86 | +0.36 |
| Finland | 0.18 | 0.66 | +0.48 |
| Belgium | 0.41 | 0.91 | +0.50 |
| Germany | 0.14 | 0.84 | +0.70 |
| France | 0.20 | 0.91 | +0.71 |
| Ireland | -0.02 | 0.75 | +0.77 |
| Spain | 0.06 | 0.96 | +0.90 |
| Portugal | -0.34 | 0.85 | +1.19 |

¹ Without the effects of German reunification (92q2-98q4).

Table 4
Business Cycle Correlation of the Smaller and Larger Federal Reserve Districts

| Federal Reserve Districts | Weight | Correlation |
|------------------------------|---------------|--------------|
| Small | | |
| Minneapolis | 3.0% | 0.85 |
| St. Louis | 4.6% | 0.95 |
| Philadelphia | 4.8% | 0.95 |
| Kansas City | 5.2% | 0.69 |
| Boston | 5.3% | 0.89 |
| Cleveland | 6.6% | 0.97 |
| Dallas | 7.3% | 0.45 |
| All "small" Districts | 36.8% | 0.82* |
| large | | |
| Richmond | 8.8% | 0.96 |
| Atlanta | 10.3% | 0.92 |
| New York | 12.2% | 0.85 |
| Chicago | 13.8% | 0.93 |
| San Francisco | 18.1% | 0.81 |
| All "large" Districts | 63.2% | 0.89* |
| Total | 100.0% | 0.85* |

* Unweighted average.

⁵ Due to the fact that only yearly GDP figures are published in Luxembourg, it was not possible to include it in this analysis. A simple comparison of the growth rates of GDP indicates that the correlation between Luxembourg and the other euro-countries turned out to be negative in the 1990s. Special factors, such as Luxembourg's importance as an international banking center, are likely to have played an important role here.

size of the Federal Reserve Districts only minimally influenced the results obtained (cf. Table 4). Although Districts of above-average economic strength within the USA (over 8.3%) have an unweighted correlation coefficient of 0.89 (weighted: 0.88), the smaller regions do not lie far behind with a correlation of 0.82 (weighted: 0.80).

Rather than the different magnitudes of economic strength in the USA and in Euroland, there are essentially two reasons that are likely to have been decisive for the parallel course the economies in the EMU have taken.

Intra-Euroland Trade

Intra-trade in Euroland has, over the past few years, increased appreciably more than the exchange of goods with non-EMU countries (cf. Figure 2). The movement of goods and services within Euroland has risen by a factor of 3.4 since 1985. Trade with countries outside Euroland, on the other hand, has "only" increased by a factor of 2.9. One consequence of this increasingly intensive trade within the EMU area has been a greater transfer of business cycles within Europe. If, for example, consumer spending rose in France or Italy in the course of an economic upswing, this gave German export industry new impetus. In return, if the economy in Germany boomed, this stimulated economic growth in the rest of Euroland.

One reason for the disproportionately fast growth in intra-Euroland trade was the creation of a single European market in 1993. But also the stability and calculability of currency developments in the European Monetary System (EMS) will have played an important role. Since the beginning of the 1990s the real exchange-rate fluctuations in the EMS have been less dramatic in real terms for some hard-currency countries than the changes in consumer prices between different regions of the USA (cf. Figure 3). Whereas, for example, the Dutch guilder "hovered" on average within a margin of $\pm 1.1\%$ of the D-Mark, inflation rates in the USA deviated from one another by $\pm 2.4\%$, i.e. by more than double that amount. Other European currencies remained similarly stable against the D-Mark, for example the Belgian or French franc. The stability of the Austrian schilling was the most impressive. Although Austria only joined the EMS in 1995, the schilling fluctuated less than any other currency, remaining at $\pm 0.8\%$. For some years now, the countries that comprise present-day Euroland have, de facto, been a more unified currency bloc than the USA – at least as far as hard-currency countries are concerned.

Fulfillment of the Maastricht Criteria

The fact that the Maastricht criteria have successively been fulfilled is another important factor for explaining the closeness of business cycle correlation. Nominal convergence in terms of prices, interest rates and budget deficits has turned into convergence in real economic terms. A stability-oriented monetary and fiscal policy has ensured low inflation and interest rates and meant that the economies in Euroland have become increasingly in step with one another. In order to have some idea of the dynamic strength of this convergence process, the standard deviation of the national business cycles was determined. The standard deviation is defined as the average variance of the national output gap as compared with the average in Euroland. The smaller this is, the greater the business cycle correlation among EMU countries. As this measure – unlike a correlation coefficient which is an average reflection – can be calculated for each quarter, the course of the convergence process can be depicted. In the 1980s the standard deviation hovered between about 1.25 and 1.75 percentage points. When, for example, in 1983 the output gap in Europe was -0.4% , on

Figure 2
Development of Intra-Euroland Trade and Trade with Non-EMU Countries

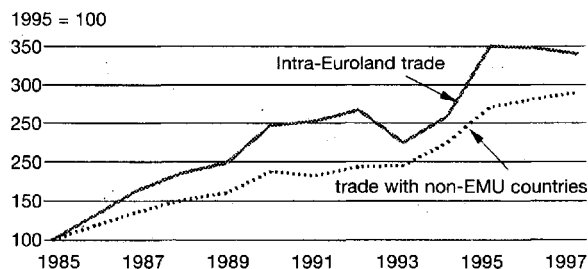
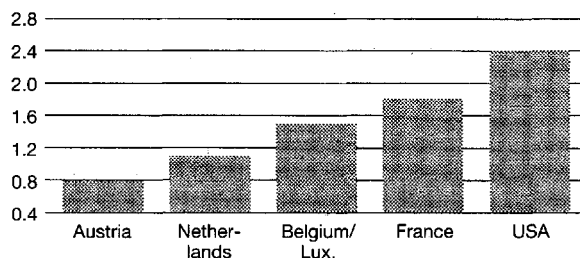


Figure 3
Real "Exchange Rate" Fluctuations between different US Regions and between Germany and some other EMU Countries

(Standard deviation in %; currencies of the EMU countries against German Mark; for USA consumer prices)



average the output gap of the individual countries deviated by 1.8 percentage points above and below this figure. For a short period of time, the reunification of Germany caused the business cycles in Euroland to deviate even further. Since 1992 a rapid movement towards a level below the convergence level of the 1980s has taken place. The standard deviation fell to a level lower than one percentage point and since 1995/96 has stabilized at this low level – i.e. since the time when fiscal policies gradually started to bring about the fulfillment of the Maastricht criteria (cf. Figure 4).

Prospects for Synchronous Business Cycles

A look at the past cannot provide us with an answer to the question as to how strong the economic union among the EMU countries is going to be in the future. The biggest unknown quantity is the euro itself: what effects is it likely to have on economic policy and practices in industry? Some factors seem to speak in favor of a further increase in economic integration; other factors would seem to imply the opposite.

The following arguments might speak out against the further convergence of business cycles.

□ *The impossibility of using exchange rates as a valve for economic policies.* In the past, the effects of abortive wage or tax policies on growth and employment could be compensated for by devaluing the currency. In this manner it was possible to maintain a high correlation of business cycles between countries like Italy or Spain and the rest of the European countries. In the age of the euro, however, it is no longer possible to use exchange rates as a buffer for the economy. Economic policy-makers can no longer use the remedy of depreciation to conceal their mistakes. If, despite the resultant pressure to reform, sustainable measures affecting labor markets and fiscal policy are not implemented in some countries, it is conceivable that such countries might, in terms of

both business cycles and trends, become “out of step” with growth in the EMU countries that are more willing to reform.

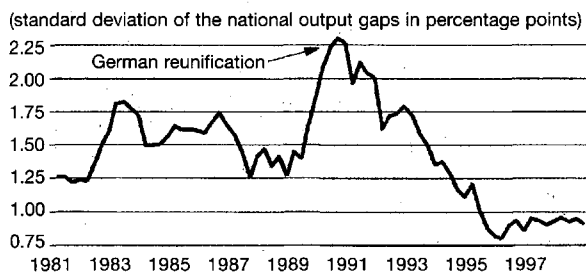
□ *Cluster formation in Euroland.* It is conceivable that different Euroland regions specialize in specific branches of the economy and industrial sectors. So, some areas – like Silicon Valley in California – could develop into high-tech locations within the EMU. Other regions might then specialize in providing services like financial and insurance businesses. Because certain types of businesses would be focused in one area, suppliers would also set up their business in these areas and clusters would begin to form in Euroland, divided up according to the branch of industry and the technology level (“technology gap”). National business cycles would henceforth be replaced by region-specific and industry-specific economic activities. The emergence of exogenous shocks like, for example, the appearance of new technologies which particularly affect certain branches of industry, would also be likely to weaken the correlation of business cycles.

However, does a single economic and currency area inevitably cause regional specialization? And if it does, how quickly and to what extent might this formation of clusters in Euroland occur? Historical developments in the USA provide us with a standard of comparison. After all, despite all its differences, in terms of size and divergences in its regional economic structure, the USA must come closest to the countries of the EMU. In addition, the US regions have been competing with each other for many years for jobs and investments – a development with which Euroland is still likely to be confronted. In contrast, the fiscal equalization scheme among the Federal States in Germany prevented truly competitive structures among the Federal States.

At the beginning of the 1990s, the American economist Paul Krugman proposed an index with which to record regional specialization. According to this, a region is the more specialized the larger the employment share of a branch of industry located in the area in relation to the employment share of the same industry in another region.⁶ The Krugman index can produce figures between zero (no specialization of labor) and two (total specialization). Two calculations were carried out using this measure. Firstly, the regional specialization in Euroland and in the USA

⁶ A mathematically exact explanation of the Krugman index can be found together with a concrete example in the box.

Figure 4
Structural Break in the 1990s: Declining Differences in Euro Business Cycles



The Krugman Index

The index proposed by Krugman (KI) is able to reflect the specialization of regions in terms of branches of the economy and industries. Formally, it corresponds to the sum of the absolute values of the difference in employment shares (E), classified according to industrial sectors, of the different regions.

$$KI_{jk} = \sum_{i=1}^n \left| \frac{E_{ij}}{E_j} - \frac{E_{ik}}{E_k} \right|$$

According to this, region j differs in its economic structure all the more from region k, the bigger the difference between the employment shares in the industrial sectors is. Two extreme cases are (theoretically) conceivable: if identical structures in the form of the same employment shares can be seen in both districts, the difference between both quantities – and therefore the Krugman index – is zero; no specialization of labor exists between regions j and k. If, in contrast, total regional specialization exists, both employment shares take on the value one, consequently the resultant index value is two.

The Krugman index was determined for the time-period since the beginning of the 1950s, so as to be able to trace the development of regional specialization in a historical context. Since on a county level no data exists for these periods arranged according to industrial sectors, it was not possible to split up the USA along the borders of the Federal Reserve Districts. For this reason, as is often the case with other empirical studies concerned with regional questions, we fell back on the definition of the US Census, a department of the US Department of Commerce.¹ According to this, the USA is divided into nine districts, starting with New England on the East Coast and finishing with the Pacific Region in the West.

¹ T. E. Clark: Employment fluctuations in U.S. regions and industries: the roles of national, region-specific, and industry-specific shocks, in: Journal of Labor Economics, Vol. 16 (1998), pp. 202-229.

² For the same approach see S. Kim: Expansion and the geographic distribution of economic activities: the trends in U.S. regional manufacturing structure, 1860-1987, in: Quarterly Journal of Economics, November 1995, pp. 882-908.

Using nine regions means that for the calculation of the Krugman index a total of 36 sub-indicators (specialization of each region with the remaining eight) need to be determined. From these sub-indicators an unweighted average was then calculated in order to obtain the regional specialization in the USA.²

Division of the USA according to Census Regions

| Census Region | US Federal State |
|--------------------------|---|
| New England (NE) | Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont |
| Middle Atlantic (MA) | New York, New Jersey, Pennsylvania |
| South Atlantic (SA) | Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia |
| East South Central (ESC) | Alabama, Kentucky, Mississippi, Tennessee |
| West South Central (WSC) | Arkansas, Louisiana, Oklahoma, Texas |
| East North Central (ENC) | Illinois, Indiana, Michigan, Ohio, Wisconsin |
| West North Central (WNC) | Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota |
| Mountain (MT) | Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming |
| Pacific (PC) | California, Oregon, Washington, Alaska, Hawaii |

For some individual industrial sectors no figures exist for the time-period since the 1950s. So, for example, the employment data for mining and services in Michigan only start in 1970. In order to guarantee comparability, time series such as these have been excluded from the study. Hawaii and Alaska have also not been taken into consideration because employment figures are only available as from the middle, or even only the end, of the 1950s. In addition, at times, the figures for the building and construction sector and the service sector in the region of New England include the figures for mining. In terms of quantity this should, however, only have a very minimal effect on the Krugman index, so that we dispensed with an – inevitably indiscriminate – adjustment of the figures by means extrapolation.

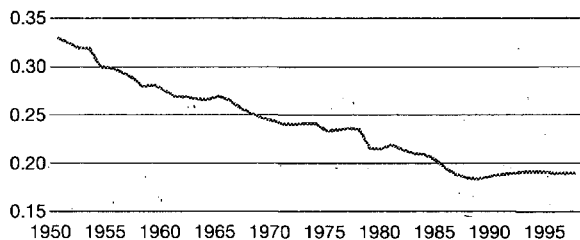
were compared. Secondly, the specialization of the US regions since the beginning of the 1950s was determined. It was thus possible to establish to what extent clusters have formed in the USA. The following branches of industry were used for the purpose of these calculations: the building and construction industry, manufacturing industry, financial services and insurance, retail and wholesale trade.

With respect to the comparison between Euroland and the USA, it initially transpired that the US regions

are more specialized than the EMU countries. In this respect the results lived up to our theoretical expectations. However, the gap between the two economic areas turned out to be surprisingly narrow. Whereas the Krugman index was 0.17 for Euroland in 1997 (the latest available data), for the USA it turned out to be only slightly higher, namely 0.19. We were also surprised when we determined the extent to which the US regions had specialized from a historical point of view. No cluster formation had taken place, quite the opposite. Since the beginning of the 1950s,

Figure 5
Downward Trend of Regional Specialization
in the USA

Krugman index



regional specialization dropped from 0.33 to 0.18. In the last few years this downward trend has bottomed out and the amount of specialization has since remained at this low level (cf. Figure 5).

One critical objection to these results might well be that by classifying the branches of industry into manufacturing industry, the financial services and the insurance industry, retail and wholesale trade etc. we were covering areas that were too vast. It is possible that an increase in regional specialization has taken place within these groups. Empirical research has, however, shown that the opposite is true. There is a downward trend, even in the case of subaggregates, i.e. within manufacturing industry.⁷ One possible explanation for this regional de-specialization could be better methods of transportation and the emergence of new information technologies. The development of infrastructures and the continually growing motorization in the 1950s and 1960s made it less necessary for particular branches of industry to locate themselves in specific regions. Geographical distances and production locations played an increasingly minor role. The emergence of new media, e.g. the internet, will have had a similar effect.

These historical developments in the USA and the fact that specialization in Europe is not significantly different from specialization in the US regions do not indicate that the correlation of business cycles in Euroland is likely to weaken significantly. Furthermore, there are other reasons that lead us to expect that the current high level of integration is likely to increase or at least stabilize.

□ *Increase in arbitrage transactions involving goods.* The absence of exchange-rate risks following the introduction of the euro is likely to give cross-border

arbitrage transactions involving goods new impetus. Different prices for the equivalent product will lead to adjustments in the flow of goods between the EMU countries causing intra-EU trade to continue to grow disproportionately.

□ *Common monetary policy.* Since the beginning of 1999 the ECB has been providing a common monetary policy in Euroland. Of course, especially during the initial stages of the currency union, differences in the transmission mechanisms of the individual countries are still possible. For example, a decrease in key interest rates will have a more expansionary effect on the Italian economy than on the German economy. The reason for this is the higher proportion of short-term credits in Italy. However, due to the introduction of a common European monetary and capital market an alignment of these transmission mechanisms can be reckoned with,

□ *Stability-oriented fiscal policies.* Provided that the Maastricht criteria are kept to, there remains very little leeway for single nations to "go it alone" in their fiscal policy. Since the public-sector deficit is not allowed to exceed the limit of 3 percent of nominal GDP, the short-term expansionary effects of higher public spending on the economy remain limited. A cyclical split from the other EMU countries triggered off by the fiscal policies of one country is therefore, at the most, expected on only a very small dimension.

Conclusion

The euro-skeptics are in agreement: the discrepancies between the national business cycles are too wide, and a common European monetary policy cannot work in the long run. In such an environment, the laboriously accomplished monetary stability will not be able to last, high rates of inflation and a "soft" euro will, in the long run, be the inevitable consequences.

However, the empirical facts tell a different story: since the beginning of the 1990s, the correlation of business cycles in Euroland has been just as strong as the correlations within Germany and within the USA have been for the past 35 years. Economic developments in Euroland are likely to continue to run parallel at this level since a multitude of forces are working towards convergence. Alongside complete institutional independence, the prerequisites, in real economic terms, also exist for a common European monetary policy. The future prospects of the ECB are therefore just as favorable as those of the Bundesbank and the Federal Reserve System.

⁷ S. Kim: Changing structure of U.S. regions: a historical perspective, Working Paper, Federal Reserve Bank of Chicago, February 1996.