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The regional impact of the single currency

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THE REGIONAL IMPACT OF THE SINGLE CURRENCY

ABSTRACT: While EMU will bring no change in policy regime as regards economic stabilisation at the regional (sub-national) level, the reduction of transaction costs as provided by the euro will give all regions of participating countries better access to the single market and may have an impact on regions' competitiveness. Estimates on the static integration effects of the euro do not show a clear centre-periphery pattern due to the overlapping effects of, on the one hand, national factors as reflected in foreign exchange costs in the past and openness to trade and, on the other hand, regional factors as reflected in the sectoral structure of the regions. Dynamic integration effects on the regions brought about by the euro will reinforce the importance of regional characteristics for location decisions on investment, production and employment. Theory and evidence only allow for the conclusion that income convergence through trade and investment can be expected if regional competitive advantages, in particular regarding price and quality of labour, go hand in hand with a significant reduction of transaction costs, such as those provided by the combination of the single currency, the single market, a stable economic policy and an adequate infrastructure.

* Views expressed in the paper are exclusively those of the author and do not necessarily correspond to those of the European Commission, for whose Directorate-General for Economic and Financial Affairs (DG II) the author is working. The author is grateful to several DG II colleagues for their helpful comments on an earlier version of the paper.

1. INTRODUCTION

At the beginning of May 1998, the Council decided that 11 member states of the European Union (EU) will participate in the single currency as of 1 January 1999. Among the participants are countries economically as different as Germany and Portugal, including – in terms of GDP per capita relative to the EU15 average – poorer regions such as Mecklenburg-Vorpommern and Açores as well as richer regions such as Hamburg and Lisbon. This gives rise to the question of whether the impact of the euro will vary between regions of different countries, i.e. between German and Portuguese regions, or rather between types of regions, i.e. between richer regions (e.g. Hamburg and Lisbon), on the one hand, and poorer regions (e.g. Mecklenburg-Vorpommern and Açores), on the other hand. This is not a purely academic question because, depending on the answer, it could have important policy implications for the design of regional policy at national and EU level.

When discussing the impact of EMU, two different aspects have to be distinguished: first, member states' preparations for EMU with respect to the convergence criteria, usually referred to as nominal convergence, and, second, the irrevocable fixing of nominal exchange rates of participating countries' currencies as well as a common monetary policy which are the essential features of a monetary union. For reasons of simplification, this paper will ignore the first aspect, assuming that member states would have carried out similar efforts on co-ordination and convergence of economic policies in the single market even without the single currency, and focus exclusively on the second aspect, i.e. the impact of the fixing of nominal exchange rates. Regions, as sub-units of member states, will not be directly affected by such a decision since they have - by definition - no access to exchange rate or monetary policy which in any case should never have been instruments for economic stabilisation at the regional level.¹ Indirectly, however, increased integration through the reduction of transaction costs and risks provided by the euro will give all regions of participating countries better access to the single market and will have an impact on regions' competitiveness.

In general, the single currency can have static integration effects as regards transactions within the existing production structures as well as dynamic effects changing the production structures through more competition, economies of scale, product differentiation, innovation and growth. However, it is not straightforward how these effects are spatially distributed within the euro area. Therefore, the paper proceeds by

estimating the static integration effect of the euro on the regions (section 2), analysing the dynamic integration effects of the euro on the regions (section 3) and drawing some conclusions regarding regional policy (section 4).

2. THE STATIC INTEGRATION EFFECTS OF THE EURO ON THE REGIONS

For transactions between different currency areas, costs occur for at least one of the transaction partners in comparing prices, exchanging foreign currency and managing exchange rate risks. Estimates on transaction cost savings brought about by the euro range between 0.3% to 0.4% of GDP (Commission of the EC 1990, p. 68) and 0.8% of GDP (IFO Institute 1998, p. 46). Without entering into the discussion of the reliability of these estimates, this section will present some evidence on transaction cost savings at the regional level which has not yet been subject to much investigation.²

In order to get an idea of the single currency's static integration effects on regions (at the sub-national level), exchange cost savings in the trade of goods and services can be studied. Given the poor data available at the regional level, the methodology necessarily has to rely on several assumptions and results will only be "best guess". The simple methodology applied does not take into account either the cost savings on capital and labour markets, or the savings in information costs and exchange risk management, or the possible structural change through increased market integration.³

Due to the non-existence of regional trade data, two steps - starting from the regions' sectoral structure of gross value added (GVA) - have been taken to calculate regional exchange cost savings (see annex for further details on the methodology):

1. *Regional trade with euro countries* has been calculated by multiplying the ratio of regional GVA to national GVA for each industry by a table of national trade on products and partner countries. This assumes regions' trade to be of an intra-industry type, i.e. exports and imports are proportional to regions' production, which might be less valid for agricultural products but not too unrealistic for manufacturing and services.
2. *Regional exchange cost savings* have been calculated by multiplying the bid-offer spread in foreign exchange of a currency against the DM by the table derived in step 1. By adding up - as exchange costs between two non-DM currencies - the spreads of the domestic currency to DM and of the foreign currency to DM, it is

assumed that all exchange transactions are effected via DM. Given the DM's role as anchor currency in the European Monetary System (EMS) and the high degree of arbitrage on foreign exchange markets due to relatively low transaction costs, this assumption should not be too far from reality. The exchange cost savings, which are the sum of those in imports and exports, are presented in relation to GVA.

Results as shown in Map 1 should be interpreted very cautiously, taking into account the main shortcomings in exactness of data and methodology as well as their sectoral background. As will become clear below when discussing the dynamic integration effects, a high or low static integration effect is not *a priori* good or bad for a region. In particular, trade data on services are generally of poor quality and might introduce some bias in favour of trade in manufacturing. Furthermore, the level of exchange cost savings should be of less interest than the relative position of regions within and between member states since every choice of bid-offer spreads is more or less arbitrary as regards the level of foreign exchange costs. It would be easy to change the level of exchange cost savings by taking other bid-offer spreads, e.g. lower ones in interbank trade or higher ones for tourists, but it would not affect the structure of results considerably.

The main findings are:

- The “country effect” is more important than the “regional effect” as can be seen in table 1. For example, the lowest regional value for Portugal is almost as high as the national average of France while the highest regional value for France is lower than the Portuguese national average. Germany is a case of very low exchange cost savings and low regional variation. These findings can be explained by the importance of two national factors. First, the exchange rate stability as reflected in the bid-offer spreads which tend to be high for south European currencies, Ireland and Finland, but low for central European currencies, in particular the DM. Second, the relative importance of trade with other euro countries tends to be high for Belgium, Ireland, Luxembourg, Netherlands and Portugal, and low for Germany, France and Finland.

Map 1: Exchange cost savings from the euro in NUTS 2 regions in % of GVA, 1994

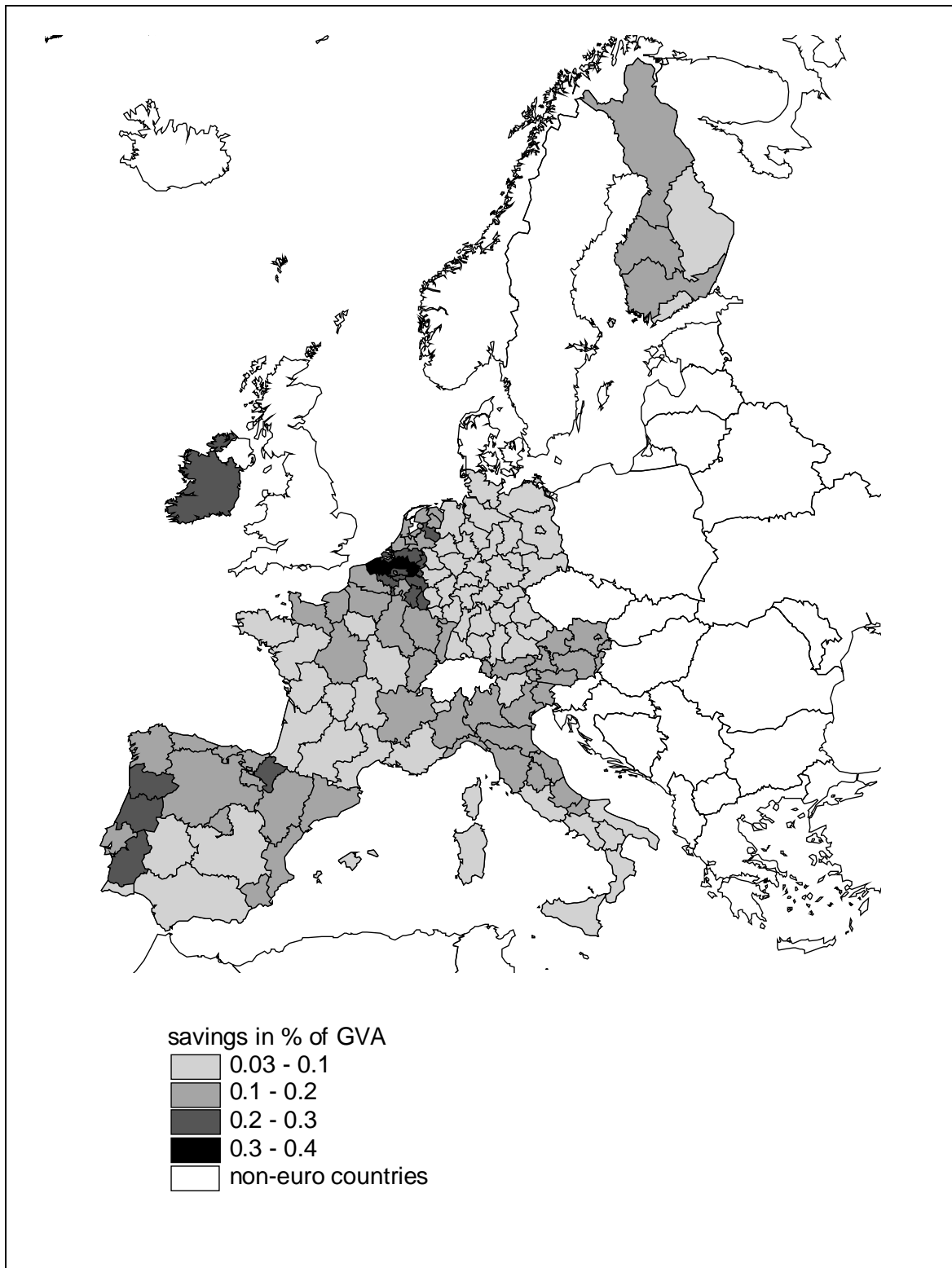


Table 1: National average, highest and lowest regional values for exchange cost savings in % of GVA, 1994

	average	highest	lowest
B	0.31	Limburg (0.40)	Namur (0.18)
D	0.05	Niederbayern (0.06)	Hamburg (0.03)
E	0.14	Navarra (0.23)	Ceuta y Melilla (0.04)
F	0.09	Franche-Comté (0.16)	Corse (0.03)
IRL	0.22	-	-
I	0.13	Piemonte (0.17)	Calabria (0.06)
L	0.26	-	-
NL	0.18	Noord-Brabant (0.24)	Utrecht (0.13)
A	0.14	-	-
P	0.22	Alentejo (0.28)	Madeira (0.08)
SF	0.12	Etelä-Suomi (0.14)	Ahvenmaa/Åland (0.09)
total	0.10	0.40	0.03

Source: Own calculations; see annex for methodology and data sources.

- Regions with a relatively high share of manufacturing, such as the north-east of Spain, the east of France, the north-east of Belgium, the north-east of Italy and the north of Portugal have a high integration effect compared to their national average. At the same time, there is a tendency for high score regions to have a location which favours closer trade links to one or more countries of the euro area.
- Regions dominated by services, such as major cities (Paris, Brussels, Frankfurt, Hamburg, Madrid, Lisbon, Helsinki) or peripheral regions (Corse, Ceuta y Melilla, Canarias, Sardegna, Açores, Madeira, Ahvenmaa/Åland) have a lower integration effect relative to their national average. However, this finding should be interpreted cautiously since trade data on services are of poor quality and structural change due to the single market and the single currency on the service sector, in particular financial services, are hardly taken into account in the 1994 data used for the calculations.

These results taken together indicate that a clear centre-periphery pattern regarding the integration effect does not emerge either at the country level or at the regional level. A correlation between GDP per capita and exchange cost savings at NUTS 2 level is almost non-existing (correlation coefficient = 0.018). This mixed pattern is due to the

overlapping effects of, on the one hand, national factors as reflected in foreign exchange and openness to trade and, on the other hand, regional factors as reflected in the sectoral structure of the regions' production.

3. THE DYNAMIC INTEGRATION EFFECTS OF THE EURO ON THE REGIONS

To the extent that transaction costs between previously different currency areas cease to exist within a single currency area, this integration effect might change the regional specialisation in goods, capital and labour markets or, in other words, the location of production, investment and employment.

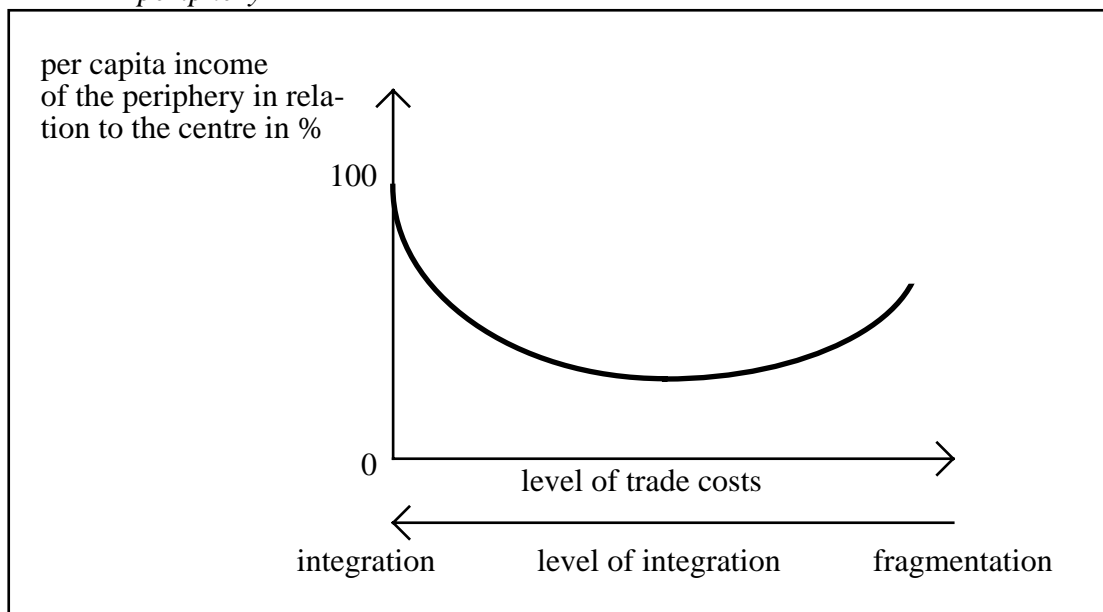
3.1 Effects on the location of production and investment

The static integration effect on regional trade in goods and services has been shown above to be important for some regions while almost negligible for others, although no clear centre-periphery pattern emerges. Lower transaction costs for capital movements in EMU will also have an integration effect on the price and availability of capital since interest rate differentials between participating member states will be squeezed due to the disappearance of exchange rate risk premia and due to an increased efficiency of previously rather fragmented financial markets. Within a single currency area, capital can more easily be transferred to investment in the most efficient locations given that an integrated financial market without exchange rate risk increases the certainty of the rate of return as the crucial determinant of investment behaviour. In other words, the elimination of country-specific risks gives more weight to the characteristics of regions in the competition for mobile capital.

For regions with a high static integration effect the question is whether this is good or bad news for them, in particular for peripheral regions which are striving to catch-up to the EU level of income. Economists usually analyse the regional effects of trade integration by addressing the question of whether convergence or divergence of per capita income prevails, i.e. whether income in central regions or in peripheral regions will grow at a relatively higher pace due to increased integration. Income convergence through trade is predicted by the traditional approaches of trade theory: trade and specialisation shift factor demand in favour of the relatively more abundant and cheaper factor until relative factor scarcities and prices have been equalised between countries.

Income divergence is maintained by approaches of regional and development economics based on models of location theory (Giersch 1949) or circular causation (Myrdal 1957), both referring to agglomeration economies as a crucial argument. The opposite propositions of convergence and divergence essentially result from different assumptions regarding the achieved reduction in transaction or trade costs, i.e. the achieved level of integration so that low trade costs result in convergence and medium trade costs result in divergence. Taking the trade cost level as an exogenous variable allows for the merging of these conflicting propositions into the so-called “U-thesis”. Increasing the integration of a peripheral region with a central region will initially cause a divergence of per capita income and then its convergence. The graphical illustration is a U-shaped curve of the periphery’s relative income when integration increases (see figure 1).

Figure 1: The U-thesis on the level of integration and the relative income of the periphery



Source: Hallet 1997, p. 29, based on Krugman/Venables 1990, p. 73.

Intra-industry trade models of the impact of integration on the competitiveness of peripheral industries resulting in the U-thesis have been developed by authors of the so-called New Economic Geography whose hypothesis is that “while complete elimination of obstacles to trade always raises the competitiveness of the peripheral regions, partial elimination may in principle have a perverse effect” (Krugman/Venables 1990, p. 58). With a partial reduction of trade costs, the peripheral industry can hardly compete with

the industry of the centre which has advantages by exploiting economies of scale. A further reduction in trade costs and a decline in relative wages allow the peripheral industry to regain competitiveness because of the use of economies of scale due to improved access to the large market of the centre. Consequently, wages in centre and periphery diverge in a range of high trade costs and converge in a range of low trade costs. Similar models also demonstrate that, contrary to widespread concerns, central regions usually gain from the catching-up of peripheral regions and will only lose in extreme cases of economic modelling (Krugman/Venables 1995).

While the U-thesis is certainly appealing, some caveats need to be taken into account. First, a geographical concentration of industries does not necessarily imply income divergence since different industries may concentrate in the centre and in the periphery, making it difficult to predict the outcome in terms of income. Since centres and peripheries may exist within EU member states and in the EU as whole, divergence within member states and convergence between member states may coincide as the evidence suggests for the EU between 1983 and 1993 (European Commission 1996a, pp. 17ff.). Second, the importance of economies of scale industries for regional development might be exaggerated since they mainly exist in the manufacturing sector which has become less important for economic growth than the more dynamic services sector. Nevertheless, many services are directly linked to manufacturing and economies of scale are relevant for some services as suggested by continuous mergers, for example, in the financial sector. Third, the New Economic Geography is empirically weak since its main variable of trade costs (or integration) is extremely difficult to measure, making it almost impossible to determine a region's position in the U-shaped curve.

Apart from the convergence/divergence issue, Krugman (1993) maintains that the single currency in combination with the single market would lead to a degree of market integration comparable to that of the US and would therefore cause a similar degree of regional specialisation as in US manufacturing. The result would be a higher vulnerability to regional asymmetric shocks following sectoral shocks. However, the empirical evidence on the impact of the single market on this aspect is much less conclusive (European Commission 1997, pp. 166f.). When looking at the empirical evidence, a distinction between national and regional specialisation in the EU is to be made. While groups of regions perform in an increasingly similar manner across national borders and decreasingly within countries (De Nardis et al. 1996, Fatás 1997),

there is no evidence of increasing inter-industry trade between member states which should be expected in the case of more national specialisation (European Commission 1996b, pp. 67 ff.). For those industries showing a trend towards localisation, there is no overall centre-periphery pattern across member states (Brülhart 1997). Bayoumi/Prasad (1995) present data for the whole economy showing that only the primary sector and manufacturing have a higher regional specialisation in the US, while the EU has a higher national specialisation in all remaining industries, i.e. in construction and all services. Taken together, this could point to a possible explanation for the inconclusive results which needs to distinguish between traded and non-traded goods: More national and regional specialisation may occur for traded goods whereas non-traded goods will basically follow settlement patterns except for when they are exclusively inputs to traded goods. Therefore, given the low mobility of people between EU member states, there is little reason to believe that the euro alone would increase national or regional specialisation in non-traded goods, although some more specialisation in traded goods industries might take place.

To sum up, the euro will reinforce regions' competition for mobile capital and might further increase national and regional specialisation in the production of traded goods. Income convergence through trade and investment can be expected if regional competitive advantages, in particular regarding price and quality of labour, go hand in hand with a significant reduction of transaction costs, such as those provided by the combination of the single currency, the single market, stable economic policy and adequate infrastructure. However, peripheral regions with high unit labour costs or a limited access to the single market might lose out from increased integration as estimated above in section 2. Although difficult to quantify, empirical evidence generally suggests that the single market has contributed to regional convergence within the EU (Cambridge Econometrics 1998).

3.2 Effects on the location of employment

Transaction cost savings brought about by the euro could also have an impact on labour markets. For an analysis of possible direct labour market effects it is important to distinguish the effects between countries participating in the euro from the effects within countries because the euro only changes labour market parameters between countries and not within countries. The low potential of geographical labour mobility between member states as opposed to a high potential within member states - the latter being however hardly visible due to mechanisms equalising disposable income⁴ - is a crucial point which must be taken into account since it makes the analysis of the euro's impact on the labour market very specific. However, the euro is unlikely to increase mobility between countries since different currencies are much less of a barrier to mobility than differences in language or culture.

The theory of optimum currency areas identified geographical labour mobility as the most important mechanism of adjustment in avoiding unemployment or inflation following a regional asymmetric shock (Mundell 1961). The argument is that in the case of inflexible wages and the missing instrument of nominal exchange rates, unemployment would occur in the region with reduced demand whereas inflationary pressure would occur in the region with excess demand, so that factor movements should find a new equilibrium. The flow of labour from declining into booming regions has however a major spatial impact because demand moves in the same direction. Models illustrating the centripetal effects of high labour mobility have been presented by various authors (Horn 1993, Puga 1997, Saint-Paul 1997). At the same time they show that a lack of geographical labour mobility can be substituted by regional wage differentiation which requires a low potential of labour mobility to avoid out-migration out of low-wage regions. Regional wage differences corresponding to differences in productivity – requiring a low potential of geographical labour mobility - may thus have centrifugal effects through capital flowing into low-wage regions.

From a positive point of view, migration causes high costs in terms of getting information, moving houses or adapting to a new environment, which are further increased by cultural and linguistic differences. Therefore, the low level of intra-EU-mobility compared to inter-state mobility in the US is of little surprise and can be in equilibrium in spite of high differences in income and unemployment. Empirical evidence confirms that geographical labour mobility is important as an adjustment

mechanism for regional shocks within the US, while this is hardly the case in Europe (Commission of the EC 1990, p. 151f., Blanchard/Katz 1992, Eichengreen 1993, Bayoumi/Prasad 1995, Obstfeld/Peri 1998).

From a normative point of view, the question is how worthwhile it is to have adjustment through migration which results in the desertion of regions in decline and in agglomeration problems in booming regions. The EU and its member states have decided to counteract such tendencies by cohesion policies in order to bring jobs to where people live rather than to bring people where the jobs are. A high potential for geographical labour mobility would undermine these efforts since it does not allow for regional wage differences according to regional differences in labour productivity. With a high potential for mobility and in the absence of inter-regional income transfers, only small inter-regional wage differentials can be sustained which prevent workers from moving into areas with higher wages. Unit labour costs in regions with low productivity, rising by wage equalisation across regions, would induce a loss of competitiveness and create a need for income transfers.

The experience of East Germany illustrates this conflict between a regional productivity gap requiring low wages to maintain competitiveness and a high potential for labour mobility requiring more or less equal wages between regions in order to prevent out-migration out of low-wage regions. The German and the European monetary union are therefore hardly comparable because of the fundamental difference regarding the potential for geographical labour mobility.

Both low labour mobility between member states because of cultural and linguistic barriers and high income differentials seem to suggest that wage differentiation is the more relevant mechanism in EMU. A low potential for labour mobility as it exists between EU member states can therefore be an important advantage for the euro area, allowing its regions to converge on the basis of maintained regional competitiveness by real wage differentials without causing the desertion of low wage areas. Accordingly, countries with low labour mobility between linguistic areas, as Belgium and Canada, have a lesson to tell regarding their institutional settings of wage bargaining. Wage bargaining at national level combined with regional differences in labour productivity and low geographical mobility have led to major differences in unemployment between their low productivity regions (Québec and Wallonie) and the rest of the country.

Similarly, problems of regional unemployment would be likely to occur in EMU if collective wage bargaining or social policy were centralised at EMU level.⁵

Indeed, it is a widespread concern regarding the impact of the single currency on labour markets that the higher transparency would make it easier to compare wages between participating countries. While hardly anybody expects an induced increase in migration towards high-wage countries, it is frequently argued that collective wage bargaining in low-wage countries would come under pressure to adjust wages to levels of high-wage countries (the so-called “imitation” or “demonstration effect”; Williamson 1975). The consequence would be - as far as an upward adjustment of wages is not in line with increases in productivity - a loss of competitiveness and jobs with a call for higher EU transfers to regions hit by high unemployment. However, it seems extremely unrealistic to suppose that catching-up member states, implicitly assumed to be at present subject to exchange rate illusion and until now unconscious of wage differentials, would put at risk one of their main competitive advantages in a single market with increased competition, i.e. low labour costs. Again, as outlined above, upward pressure to equalise wages between regions regardless of differences in productivity seems to depend less on information than on the potential for geographical labour mobility and the political will to avoid an emptying of low-productivity regions by financing the necessary transfers.

A similar, but opposite concern is that increased nominal wage transparency in a single currency would give rise to downward harmonisation of wages in EMU. Firms in high-wage regions would come under competitive pressure, forcing them either to reduce their wage bill or to relocate to low-wage regions (the so-called “wage dumping” argument). However, this argument neglects the fact that regional competitiveness depends not on labour costs alone, but - among several other factors such as market access - on their relation to labour productivity or, in other words, on unit labour costs. Given regional differences in productivity, downward adjustment of labour costs would give high productivity regions major competitive advantages regarding unit labour costs which would be reflected in higher wages once the labour market became more and more short of certain qualifications. In addition, even in a monetary union prices for non-traded goods vary between regions, so that the same real wages require regional variations in nominal wages to offset differences in purchasing power.

To sum up, a direct impact of the euro on the location of employment can hardly be expected, except for the case of centralisation of wage bargaining or social policy at

EMU level which might cause higher unemployment in low-productivity regions. Therefore, indirect effects on the location of employment following changes in the location of production and investment as discussed above will be the most important channel of impact, although extent and direction are empirically difficult to assess.

4. CONCLUSIONS

When drawing conclusions from the above analysis, the guiding question should be whether and how regional policy at national or EU level should intervene as a reaction to the regional impact of the euro.

First, it is to be recalled that there is no change in policy regime regarding economic stabilisation at the regional (sub-national) level since, already in the past, member states should not have made use of nominal exchange rates or monetary policy for purposes of regional stabilisation which is rather a task of the national system of fiscal policy. EU Structural Funds or the Cohesion Fund are neither in volume nor in design appropriate instruments for regional stabilisation, given their long-term objective of improving supply-side conditions for economic development.

Second, the above estimates on the static integration effects of the euro do not show a centre-periphery pattern. The mixed results are due to the overlapping effects of, on the one hand, national factors as reflected in foreign exchange costs in the past and openness to trade and, on the other hand, regional factors as reflected in the sectoral structure of the regions. It is therefore impossible to conclude that, due to the euro, less favoured regions would need more (or less) funding.

Third, the elimination of exchange rate risks brought about by the euro will reinforce the importance of regional characteristics for location decisions on investment, production and employment. Theory and evidence on these dynamic integration effects on the regions only allow for the conclusion that income convergence through trade and investment can be expected if regional competitive advantages, in particular regarding price and quality of labour, go hand in hand with a significant reduction of transaction costs, such as those provided by the combination of the single currency, the single market, a stable economic policy and an adequate infrastructure. In this context, a low potential of labour mobility as exists between EU member states can be an important advantage for the euro area, allowing its member states to converge on the basis of real

wage differentials without causing the desertion of low wage areas. Regional policy should therefore continue to help regions invest in human capital and infrastructure, but should be complemented by stable economic policies, in particular by labour costs corresponding to labour productivity. However, if the latter conditions are not fulfilled causing lower growth or higher unemployment, member states or regions should not be “rewarded” by additional regional funding.

ANNEX: METHODOLOGY APPLIED FOR THE CALCULATION OF REGIONAL EXCHANGE COST SAVINGS FROM THE SINGLE CURRENCY

A simple approach has been taken here to calculate regional exchange cost savings relative to gross value added (GVA) for the regions which will be part of the euro area as of 1 January 1999. Since regional trade data do not exist for the EU, several intermediate steps were taken through the sectoral composition of a region’s production and the sectoral and geographical orientation of national trade. The starting point of the exercise is regions’ gross value added by products as classified by NACE-CLIO. These data are available in Eurostat’s REGIO database for all the regions of the euro area for the year 1994 (1993 for the Netherlands) except for Ireland and Austria (see table A.1). Luxembourg has been analysed jointly with Belgium because of their economic and monetary union. The low sectoral breakdown of data for Germany and Ireland gives the results for these countries a limited reliability, but they have nevertheless been included in order to complete the picture.

On the way from this starting point to the final result, the following steps have been taken:

1. *Regional trade with euro countries* has been calculated by multiplying the relation of regional GVA to national GVA for each industry by a table of national trade on products and partner countries. Trade data for manufacturing for 1994 have been extracted from Eurostat’s COMEXT database; for Austria and Finland 1995 trade data have been taken due to different statistics before their EU membership. Trade data for services have been taken from balance of payments statistics which are only available for member states from/to EUR15 as a whole. Data on imports of services

by partner countries have therefore been estimated by assuming that they correspond to the other member states' shares in EUR15 exports (and vice versa for exports); for Ireland only incomplete data have been available.

Table A.1: Availability of regional data on gross value added (GVA) at market prices (mp) or factor costs (fc) by products as classified by NACE-CLIO in the Eurostat REGIO database for the year 1994

	NACE 3	NACE 17
B+L		NUTS 2 (B) + L (GVA _{mp})
D	NUTS 1 (GVA _{mp})	
E		NUTS 2 (GVA _{mp})
F		NUTS 2 (GVA _{mp})
IRL	National (GVA _{mp})	
I		NUTS 2 (GVA _{fc})
NL		NUTS 2 (GVA _{mp}) (1993)
A		National (GVA _{mp})
P		NUTS 2 (GVA _{mp})
SF		NUTS 2 (GVA _{fc})

In formal terms, the following has been calculated:

$$IM_j^r = \sum_i \left(\frac{GVA_i^r}{GVA_i^n} IM_{ij}^n \right)$$

$$EX_j^r = \sum_i \left(\frac{GVA_i^r}{GVA_i^n} EX_{ij}^n \right)$$

where IM = imports and EX = exports,
 GVA = gross value added,
 r = regional and n = national,
 i = industry and j = partner country.

2. *Regional exchange cost savings* have been calculated by multiplying the official bid-offer spread in foreign exchange of a currency against the DM at the Frankfurter Börse in 1994, as indicated by Bundesbank statistics on foreign exchange (see table

A.2), by the table derived in step 1. By adding up - as exchange costs between two non-DM currencies - the spreads of the domestic currency to DM and of the foreign currency to DM, it is assumed that all exchange transactions are effected via DM. The exchange cost savings, which are the sum of those in imports and exports, are presented in relation to GVA.

In formal terms, the following has been calculated:

$$C^r = \left(\sum_j IM_j^r S_j + \sum_j EX_j^r S_j \right) / GVA^r$$

where C = region r 's exchange costs in relation to GVA,

S_j = sum of bid-offer spreads of the domestic currency to DM and of country j 's currency to DM.

Table A.2: Official bid-offer spreads in foreign exchange of currencies against the DM at the Frankfurter Börse in 1994

FRF	BEF/ LUF	NLG	DEM	ITL	IEP	PTE	ESP	FIM	ATS
0.0021	0.0021	0.0012	0	0.0040	0.0029	0.0031	0.0033	0.0026	0.0014

Source: Deutsche Bundesbank (1998)

ENDNOTES

- 1) See Matthes/Hallet (1997) and European Commission (1997, pp. 162ff.) for an analysis of the regional impact of the single currency at the national level.
- 2) An exception is Gretschnann (1997) who has estimated the reduction of transaction costs for the German Land Nordrhein-Westfalen (“NRW”) on the basis of a transaction costs index $TKI = \sum_i g_i S_i$ with S being the relative bid-offer spread of country i 's currency against the DM on 31/7/1997 and g its relative share in NRW's exports (or imports). Setting $S=0$ for countries participating in EMU gives an approximate 50% reduction in transaction costs related to foreign exchange for NRW's foreign trade.
- 3) The results are, for example, relatively low for Paris and Frankfurt whose importance as financial centres in Europe is however expected to increase with the single currency (see IFO Institute 1997).
- 4) The result found by Abraham/Van Rompuy (1995) for regions in Germany (10), Spain (17), Italy (19), the Netherlands (9) and the UK (11) in the 1980s of “a relatively small response of regional labor income to changes in regional real labor productivity” is therefore of little surprise because the countries included in the study had little margin for inter-regional wage differences given a high potential of mobility within each of the countries.
- 5) The “hump-shaped” curve developed by Calmfors and Drifill maintains that very decentralised and very centralised levels of wage bargaining bring the most rationale outcome in terms of real wages and unemployment, while intermediate levels of wage bargaining have the worst outcome (see the overview in Peters 1995). The empirical evidence as regards the outcome of centralised wage bargaining is however controversial.

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