

**-FIRST DRAFT-**

## **Structural convergence and monetary integration**

September 2002

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### **1 Introduction**

The introduction of euro coins and banknotes on 1 January 2002 was a milestone in the process of modern European monetary unification. Twelve of the fifteen current EU Member States have relinquished their monetary autonomy to form the euro area. In the run-up to Economic and Monetary Union (EMU) there was a lively academic debate on the pros and cons of a common currency for Europe. The formal criteria for entry into the euro area, the so-called Maastricht-criteria, played a subordinate role in this debate. In fact, some argued that the ‘nominal’ convergence criteria were neither necessary nor sufficient to form a successful monetary union<sup>23</sup>. Instead, the academic discussions focussed on the structural economic features of the potential participants in order to assess the optimality of monetary integration<sup>4</sup>. A general framework for such an assessment is provided by the theory of optimum currency areas (OCA), as first developed by Mundell (1961)<sup>5</sup>. The OCA framework proposes criteria that help judge the costs and benefits of a monetary union. The criteria focus on the probability that countries face asymmetric economic shocks and on the ability of countries to adjust swiftly to economic shocks. If prospective members of a monetary union generally face similar economic shocks and have flexible adjustment mechanisms in place to deal with economic shocks, they could consider giving up monetary autonomy. In these circumstances they no longer need the exchange rate as an adjustment mechanism. Authors that tried to operationalise the OCA framework and applied it to Europe have generally concluded that the EU is not an optimum currency area, but monetary integration might be beneficial for some subset of countries. Notwithstanding these views, EMU went ahead in 1998 with eleven Member States<sup>6</sup>. Recently, however, the balance seems to have shifted somewhat in favour of a relatively large euro area. Studies

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<sup>2</sup> See for example De Grauwe, 1996, pp.4-5 and Bayoumi and Eichengreen, 1997, p.767)

<sup>3</sup> Nevertheless, the nominal convergence criteria of Maastricht served a useful purpose as they fostered monetary and fiscal discipline in the run-up to EMU.

<sup>4</sup> In this paper the terms monetary integration and monetary unification (or union) are used interchangeably. In the literature, these terms sometimes have slightly different meanings; see Tavlas (1993, 665-666) for a categorisation of monetary integration.

<sup>5</sup> Other important early contributions were made by McKinnon (1963) and Kenen (1969).

<sup>6</sup> Greece joined two years later.

on the endogeneity of OCA-criteria seem to suggest that countries that are not suitable for a monetary union *ex ante* might be so *ex post*.

In the coming years, the EU faces an unprecedented enlargement of up to 12 countries, mostly Central and Eastern European countries (CEECs)<sup>7</sup>. A number of these accession countries have already indicated they want to join the euro area soon after entry into the EU. The formal economic requirements for EU entry, as laid down in the so-called Copenhagen-criteria, reflect a need for convergence in terms of structural development<sup>8</sup>. The criteria include, *inter alia*, the need for a functioning market economy and the ability to adhere to the aims of political, economic and monetary union. These criteria offer considerable room for interpretation and therefore lack transparency. After accession, the question remains whether it is beneficial for the new entrants to adopt the euro quickly. Given that these countries still face a considerable catch-up compared to the current EU members, they might need the exchange rate instrument for some time in order to stabilise growth of output and prices. The public debate on early euro adoption often refers to the need for further structural convergence before entry will be beneficial. However, it is not always clear what structural convergence means, especially in the context of monetary integration. The purpose of this article is to fill this gap by reviewing the literature, in particular on the theory of optimum currency areas, in order to investigate the main structural determinants for a successful monetary union. Furthermore, we take a first look at some of the available data about the level of structural convergence between the CEECs and the current euro area. The evidence indicates that a number of CEECs have converged substantially over the past few years, at least up to the level of some current euro area countries.

The paper is structured as follows. In the second section, we define structural convergence in the context of monetary integration. Section 3 lists the different structural indicators that have been proposed in the theoretical and empirical literature. We also present some data on the current EU-countries and, where available, the accession countries of Central and Eastern Europe. Section 4 concludes. All indicators are of an economic nature. Even though we admit that the political framework is at least as important as the economic framework, it is outside the scope of this paper<sup>9</sup>.

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<sup>7</sup> The first wave of EU-enlargement in 2004 or 2005 will most likely consist of Malta, Cyprus and 8 CEECs. These are Estonia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia. Two other CEECs, Bulgaria and Romania, are expected to join a few years later.

<sup>8</sup> Adopted by the European Council in December 1993.

<sup>9</sup> In fact, some go as far as to consider the political will to integrate the single most important condition for adopting a common currency. See for example Mintz (1970).

## 2 Structural convergence

### 2.1 *A definition*

The Penguin dictionary of economics defines convergence as: ‘a narrowing in the variation between productivity in a group of countries or the catching up of countries with the leader or leaders’. As productivity is an indicator of real economic performance, convergence is normally synonymous to real convergence. In the context of European monetary integration the term nominal convergence was used, as the indicators of convergence (the so-called Maastricht-criteria) were nominal ones, e.g. inflation and interest rates. The Maastricht-criteria implicitly assumed that the economies of the prospective members of EMU had already reached sufficient convergence in terms of productivity and underlying economic structures, so that nominal convergence was key to successful entry. This assumption was not necessarily accepted in the academic literature, as can be seen from a number of articles that dealt with the issue of optimality of monetary integration in Europe without using the Maastricht-criteria<sup>10</sup>. Indeed, authors looked at structural indicators such as similarity of production structures or the flexibility of the labour market. De Grauwe (1996), among others, argues that nominal convergence is neither necessary nor sufficient to form a successful monetary union. It is not necessary, because countries with different inflation rates may have similar economic structures. Nominal convergence is not sufficient, because two countries with similar inflation rates can have very different underlying structures. Therefore, in this paper we look at indicators of structural convergence to complement the Maastricht-criteria. Structural convergence is defined as an increasing similarity between countries’ economic and institutional frameworks that determine the frequency of and vulnerability to asymmetric shocks.

### 2.2 *What does the theory on optimum currency areas tell us?*

For two or more countries it can be beneficial to give up their national currencies and form a monetary union. Mundell (1961) suggested that two countries or regions will wish to adopt a common currency when the saving in transaction costs dominates the rise in adjustment costs (Bayoumi and Eichengreen, 1996, p.2). Enlarging a currency area leads to lower transaction costs<sup>11</sup>. These benefits are positively related to the size of the prospective union and the degree of openness of the participating countries (McKinnon, 1963; Collignon, 1999). By reducing uncertainty, monetary integration also improves allocative efficiency. For an overall assessment of the usefulness of monetary integration one has to weigh the benefits against the cost of losing the monetary policy

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<sup>10</sup> See for example Bayoumi and Eichengreen (1993, 1997); Demertzis, Hughes Hallet and Rummel (2000); Eichengreen (1990), Belke and Gros (1999).

<sup>11</sup> These should be interpreted in a wide sense, not only including currency exchange costs, but also exchange rate risk and search costs (transparency).

instrument<sup>12</sup>. The costs of monetary union are inversely related to the symmetry of economic disturbances and the ability to deal with such disturbances<sup>13</sup>. When shocks are completely symmetric across countries or countries have flexible responses to these shocks, there is no need for autonomous monetary policy<sup>14</sup>. In other words, if two or more countries have shown a sufficient level of structural convergence, it can be beneficial to adopt a common currency.

### 2.3 *Operationalising OCA*

OCA theory has suggested a number of criteria to operationalise the concepts of symmetry in shocks and the vulnerability of countries in the event of an asymmetric shock. The symmetry of economic shocks is determined by the extent to which countries have similar economic structures. In one of the early contributions to the literature, Kenen (1969), put forward that countries with diversified economies are natural candidates for a currency union. In practice, countries do not need to be fully diversified as long as their production structures are similar enough. The importance of production structure as a determinant of business cycle symmetry is confirmed in recent studies by Imbs (1999) and Kalemli-Ozcan et al. (2001). Directly linked to the production structure is the level of trade integration between countries. In one of the early contributions to the literature, McKinnon (1963) already stressed the importance of openness to trade in the context of optimum currency areas. The core of his argument is that if we move across the spectrum from closed to open economies, flexible exchange rates become both less effective as a control device for external balance and more damaging to internal price-level stability. Moreover, the degree of trade interdependence and in particular of intra-industry trade are key forces that promote economic integration and a closer synchronisation of business cycles (OECD, 1999, p.98). Using thirty years of data on twenty OECD countries, Frankel and Rose (1997, 1998) have found evidence that countries with closer trade links tend to have more tightly correlated business cycles. In addition, Fidrmuc (2002a) shows that intra-industry trade induces the convergence of business cycles in OECD countries.

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<sup>12</sup> See Emerson et al. (1990) for an extensive overview of the costs and benefits of monetary integration. A review can be found in Artis (1991).

<sup>13</sup> The terms ‘disturbances’ and ‘shocks’ are used interchangeably.

<sup>14</sup> The focus in this paper is on the probability of asymmetric shocks and the flexible adjustment mechanisms as an alternative for monetary policy in case of such asymmetric shocks. In practice, it can be the case that countries face completely symmetric shocks, but still exhibit diverging business cycles due to different transmission of these shocks. Monetary policy in the euro area is a good example of a symmetric shock with potentially asymmetric transmission. The degree of asymmetry is to a considerable extent determined by factors that are discussed in this paper. In addition, financial structure plays a significant role. For an overview of the issues and some empirical studies on Europe, see for example Borio (1996), Clausen and Hayo (2002), Hughes Hallet and Piscitelli (1999), OECD (1999, p.82; 2000, p.63), Sala (2001) and Suardi (2001). Another issue that is not dealt with any further is the possibility that countries react to symmetric shocks with a similar, but low degree of flexibility. In theory, these countries could form a monetary union, albeit not a very successful one. For the remainder of the paper it is assumed that countries need a sufficient level of symmetry in shocks as well as flexible adjustment mechanisms to deal with any type of shock.

Given that countries face asymmetric shocks, different adjustment mechanisms can cushion the effects of these shocks. The ability to adjust to economic shocks is the result of the interplay of a country's economic institutions and non-economic, perhaps cultural, preferences<sup>15</sup>. In his seminal article on optimum currency areas Mundell (1961) proposed high factor mobility, in particular labour mobility, as a main criterion for a currency area<sup>16</sup>. In his view, an optimum currency area is a region -not necessarily following national boundaries- in which there is a sufficient degree of labour mobility, so that there is no need for exchange rates to stabilise unemployment and prices after a shock. However, such mobility is likely to be modest in the short run and could display its effect in the course of time. OECD (1999, p.131) cites a number of studies that have investigated the role that labour markets can play in adjusting to economic shocks<sup>17</sup>. Eichengreen (1990) finds that labour mobility is three times higher in the United States (US) than in Europe. A well-known study by Blanchard and Katz (1992) provides evidence that labour migration plays a major role in reducing interstate unemployment differentials in the US. Decressin and Fatas (1995) adapt the framework of this study to compare US States and European regional labour markets and conclude that labour mobility plays a relatively small role in the adjustment of European labour markets.

International comparisons show that especially in the case of cyclical shocks, wage flexibility may play a major role (DNB, 2001, p.49). Lower real wages that translate in lower prices might mitigate the loss of business. Nominal wage flexibility has traditionally been very low as workers, supported by unions, find it hard to accept a downward adjustment of their wages. Real wages have been somewhat more flexible. The OECD (2000a) reports that real wages in the euro area react more slowly to changes in unemployment than in the US. Pauli (2002), on the other hand, finds that wages in the US are not more sensitive to unemployment changes than in Germany, France and the Netherlands. Looking at regional rather than national data, Baddely et al (2000) find that real wage (in)flexibility varies across regions both in the EU and the US, but on average, regional wages are no less flexible in EU core regions than in the US states. However, wage flexibility should not be seen in isolation, but in

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<sup>15</sup> One can argue that non-economic preferences are at least partially reflected in economic institutions.

<sup>16</sup> Labour and capital mobility are each other's direct complement. Workers can go to where employment opportunities exist or companies can move to where there is sufficient labour supply. Capital mobility as an adjustment channel is not examined in this paper. In general, capital market integration not only serves as a direct adjustment channel, mainly through FDI, but can also serve as a shock absorber by functioning as a diversification mechanism. In other words, if a country is hit by an adverse country-specific shock, its holdings of foreign (fixed or portfolio) capital can provide for insurance and smooth the income effect of the adverse shock. Currently, this mechanism does not yet seem to play an important role. See for example OECD (1999, pp.98-102) and Mélitz and Zumer (1999). In addition, fiscal transfers can provide another (temporary) adjustment mechanism. There has been considerable discussion on the need for Europe to have a transnational transfer mechanism. See for example Krugman (1993) and Casella (1993). The main outcome is that even though fiscal transfers could play an important role in the short term, there is considerable danger that transfers get a more permanent character, thereby slowing the necessary adjustment. Moreover, in contrast to US states, euro area countries still have substantial power to smooth expenditures over time. Although, within the constraints of the Stability and Growth Pact.

relation with labour supply and therefore labour mobility. In other words, it is likely that US regional labour markets require smaller changes in real wages than European labour markets to induce the same level of labour mobility. Acknowledging the important relationship between wage flexibility and labour mobility, we will focus on the latter when operationalising the labour market criterion. In practice, similar labour market institutions and regulations play a role in determining wage flexibility and labour mobility.

Various factors play a role in the determination of labour mobility. An important factor is the generosity of social expenditures. This is expressed, among other things, in replacement rates for unemployed and employment protection legislation. On top of these mobility disincentives, there are also mobility barriers. Regarding explicit migration costs, housing policies are important, in particular transaction costs for buying and selling a house. Apart from this, non-economic factors such as language, family dislocation and different lifestyles are also relevant determinants of the decision to relocate. These factors are especially important when it comes to international mobility. In addition, there are a number of other factors that limit international mobility, such as educational certificate recognition and different social systems, including pension systems (OECD, 2000a; Blanchard and Wolfers, 2000).

#### 2.4 *The 'new' OCA theory*

In the decades that followed Mundell's contribution, the theory has been modified a number of times, but the basic ideas survived. The Maastricht Treaty, which defined the criteria for EMU entry, revived interest in the theory of optimum currency areas (OCA). In the 1990's, there were many attempts to operationalise the theory and give it empirical backing<sup>18</sup>. Unfortunately this has not led to a unified framework in which countries can be compared directly in order to determine unambiguously whether they should form a currency area. Nonetheless, it is safe to say that in recent years the so-called 'new' optimum currency area theory has put more emphasis on the advantages that monetary integration offers (Tavlas, 1993). These include reputation effects for countries with a history of high inflation. Also, the benefits of an autonomous exchange rate policy are not considered as highly as before: the instrument becomes blunt when it is used too often, as expectations start to play a role<sup>19</sup>. Moreover, changes in nominal exchange rates do not always foster adjustments of external disequilibria, as was

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<sup>17</sup> In the context of this paper, we focus on geographical mobility as an adjustment mechanism. For a full study of the labour market dynamics one should also include non-spatial mobility.

<sup>18</sup> See for example Eichengreen (1990) and Bayoumi and Eichengreen (1996).

<sup>19</sup> This point is derived from both the literature on the vertical Phillips curve and that on time-consistency of monetary policy. As Artis (1991) puts it: 'the displacement of the Phillips curve by the "natural rate of unemployment"' as the place to start analysis is going to mean that the only benefit of floating exchange rates is the ability to choose a different rate of inflation from other countries. Regarding the time-consistency literature, Tavlas (1993) writes: 'Barro and Gordon (1983) have shown that, to gain a reputation of credibility, authorities must pursue a policy rule that is time consistent.' A rule is not time consistent if it is expected to become sub-optimal in a future period, so that governments will face high incentives to change it.

assumed by the 'old' optimum currency area theory. The insights from the 'new' OCA and recent empirical studies have shifted the balance somewhat in favour of European monetary unification, although there seems to be broad consensus among economists that the EU-15 is still not an optimum currency area (De Grauwe, 1997, p.74). Notwithstanding these views, EMU went ahead in 1998 with eleven Member States.

### 2.5 *What happens after monetary integration?*

A debate that has been going on for a while centres on the question whether monetary integration leads to greater symmetry in shocks through integration or to increased asymmetry as integration leads to specialisation. Krugman (1993) puts forward the latter argument. He argues that specialisation in Europe is limited by barriers to trade and high transportation costs. As these progressively disappear through technological innovation, the single market programme and monetary integration, the incentive to reap scale economies and agglomeration benefits may rise and production becomes more concentrated in particular regions. This in turn leads to higher asymmetry of shocks throughout the monetary union. Krugman presents some evidence that suggests a higher degree of specialisation in the US, a long-standing monetary union, than in Europe<sup>20</sup>. The opposing view is that some of the OCA criteria are endogenous and that monetary union leads to greater symmetry of business cycles because of common demand shocks or intra-industry trade. The argument, as presented by Frankel and Rose (1997, 1998), is as follows. As mentioned above, countries with close international trade links are more likely to be members of an OCA: they can expect higher benefits, as well as lower costs since an open economy has limited room for independent monetary policy. However, for a more closed economy, foregoing the possibility of dampening business cycle fluctuations through independent counter-cyclic monetary policy is potentially costly. Therefore, countries with symmetric cycles are more likely to be members of an OCA. Entry into a monetary union may raise international trade linkages, which in turn can lead to greater symmetry in business cycles when the increased trade reflects intra-industry trade and demand shocks (or other common shocks) predominate. The authors state that the question which effect dominates is essentially empirical. Their subsequent calculations, using a panel of bilateral trade and business cycle data for twenty industrialised countries over a time-span of thirty years, indicate that closer trade links result in more closely correlated business cycles across countries. Their conclusion, therefore, is that a country is more likely to satisfy the criteria for entry *ex post* than *ex ante*. Other authors have tried to detect a trade-effect from monetary unification, using cross-section and historical analyses<sup>21</sup>. A number of these studies have found support for the hypothesis that currency unions have positive trade effects, but the results differ widely and are not unambiguous. In short, the empirical question has not received a definitive answer. What will happen

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<sup>20</sup> Bayoumi and Eichengreen (1996) present evidence that suggest an increasing specialisation in Europe versus a decreasing trend in the US in eight industries over the 1970s and 1980s.

in the particular case of the euro area now and after future entry remains, therefore, an open question. It is possible that both integration and specialisation effects are going on at the same time. In any case, Europe is far away from a monetary union with strongly specialised regions, so the debate has limited relevance for Europe today. If, however, the specialisation hypothesis turns out to be right in the long run, this puts even more emphasis on the need for alternative adjustment mechanisms in case of adverse shocks.

### **3 An overview of structural convergence indicators**

We now discuss the criteria of the previous section in more detail. In particular we try to operationalise the criteria by formulating indicators. Where available, we look at the data for the EU and the accession countries from Central and Eastern Europe. This gives an indication of the progress the latter has made in converging with the former.

#### *3.2 Economic structure*

Symmetry in shocks is determined by symmetry in economic structures. These in turn can be defined by a number of structural indicators: similarity in production structures and the level of trade integration, in particular intra-industry trade.

##### 3.2.1 Production

A high diversification in production, and correspondingly of exports and imports, ensures that the possible impact of any sector-specific shock remains limited. From the start, it should be noted that measuring the convergence in production structures has important limitations and one should be careful with interpreting any particular indicator. It is *a priori* not clear what the relevant level of aggregation is. High levels of industry disaggregation tend to reveal greater specialisation between countries, almost by definition. The implications for monetary policy, however, become limited as the impact of a particular industry on overall output falls with a rising level of disaggregation.

There are different ways in which the production structure of an economy can be measured. The most straightforward one is by comparing the size of the different sectors. The most common division is between agriculture, industry, and services. However, such a rough division still leaves considerable room for specialisation within sectors. Krugman (1993) developed an output divergence index to measure the degree of specialisation in any given country compared to another country or group of countries. The index is the sum of the absolute differences in share between the given country and the benchmark in a number of economic sectors.

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<sup>21</sup> See for example Flandreau and Maurel (2001), Frankel and Rose (2000), Glick and Rose (2002), Rose (2000), Thom and Walsh (2002). For an overview, see Alesina et al. (2002).



OECD (1999, pp.108-9) calculations show ambiguous results about the convergence production structures in Europe over the last decades. The output divergence index, comparing the share of GDP produced in eight sectors in each euro area country (except Ireland) with the average of the euro area, shows a slight overall divergence over the period 1980 to 1995. However, an euro area regional specialisation index, comparing the share of employment in 3 sectors (agriculture, industry and services) and summing up the differences, shows a slightly declining level of regional specialisation over the period 1986 to 1996. Bayoumi and Eichengreen (1996) report an increasing degree of specialisation in eight EU countries in the 1970s and 1980s.

Using Krugman's methodology, table 1 presents the output divergence index of the euro area, the 'outs' and the four OECD accession countries, Hungary, the Czech and Slovak Republics and Poland. All countries are compared to the euro area average<sup>22</sup>. The results indicate considerable divergence between the production structure of the countries considered. All CEECs have a considerably higher index than the euro area average<sup>23</sup>. Only Hungary has a lower number than at least one of the current participants. The main differences between the euro area and the CEECs are explained by the larger agriculture and industry sectors, and an underdeveloped financial sector. Within the euro area one can roughly distinguish three groups. The largest grouping has a divergence index of around 10%. Finland and Spain form a middle group. The only two 'outliers' are Luxembourg and Greece. Luxembourg has an atypically small industrial sector and by far the largest financial sector. Greece is on the other end of the spectrum, having relatively large agricultural and domestic trade sectors, but relatively small industrial and financial sectors. The 'outs' would all fall within the first group of the euro area, with the UK being closest to the euro area average of all current EU Member States. As mentioned above, these results have to be interpreted with care as the level of aggregation can substantially influence the results<sup>24</sup>. To get some idea of the sensitivity of the results, we made the same calculations after subdividing industry and financial intermediation, the two largest sectors. As expected, the 9 sector index on average showed higher numbers, albeit only by a few percentage points. However, introducing more sectors did change the ranking of individual countries. Most notable was the change for Portugal; in table 1 it is within the first group of most similar countries, while in the 9-sector index Portugal is

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<sup>22</sup> We use the euro area, because this is the relevant benchmark for any individual country wishing to adopt the euro at this moment. An alternative would be to include all potential member (EU and accession countries) and assess the individual countries against this benchmark. However, it is not clear when the 'outs' might join. Moreover, it can be expected that the current accession countries join the euro area at different points in time. Therefore, it is uncertain when such a broad benchmark might become the relevant one.

<sup>23</sup> This and subsequent euro area averages are simple arithmetic averages.

<sup>24</sup> One further remark seems in place here. In general, larger countries can be expected to have more diversified production structures than smaller ones. For the euro area countries, this is tentatively confirmed by a simple ranking correlation of 0.6. As the accession countries are relatively small in terms of GDP, they can be expected to be less diversified than most euro area countries (Poland being the exception!).

ranked 9th, with only Greece and Luxembourg still more divergent. The relative position of the CEECs does not change significantly.

**Table 1 Output divergence index<sub>1</sub>**

Country	Index (2000) <sup>1</sup>
France	8
Belgium	8
Netherlands	9
Italy	9
Germany	10
Portugal	12
Austria	13
Finland	19
Spain	20
Luxembourg	28
Greece	32
euro area <sup>2</sup>	15
UK	4
Sweden	12
Denmark	13
Hungary	22
Slovak republic	33
Czech republic	35
Poland	48

Source: OECD National Accounts 2002

1.) output divergence index is based on 6 main OECD sectors:  
 agriculture, industry, construction, wholesale and retail trade,  
 financial intermediation and other services

2.) no data for Ireland available

### 3.2.2 Trade

A standard way to measure openness to trade is the ratio of exports plus imports over GDP. The level of intra-industry trade is commonly measured by the so-called Grubel-Lloyd index, which measures the share of intra-industry trade in total trade. Since 1970, the share of intra-euro area trade in GDP has almost doubled and intra-industry trade has soared. In manufacturing, EU domestic producers have been steadily losing home market shares since the early 1980s to the benefit of other EU and non-EU competitors (OECD, 2001, p.43). Openness towards the rest of the euro area -defined as half the ratio of exports plus imports over GDP- is currently at about 18% on average; of this trade about 60% consists of intra-industry trade<sup>25</sup>. Tables 2 and 3 present these data in more detail and again compare the individual euro area countries with the 'outs' and the CEECs. The results in table 2 reveal that all CEECs have reached a considerable degree of openness with the euro area in recent years. Five of the CEECs (Hungary, Estonia, Slovenia, Czech republic and Slovak republic) trade more with the euro area (relative to their GDP) than any of the current euro area members, with the exception of Belgium/Luxembourg<sup>26</sup>. Only Poland, Romania and Latvia show a lower degree of openness than the

<sup>25</sup> Own calculations based on IMF and OECD data.

<sup>26</sup> IMF trade data are only available for the two countries together.

average of euro area countries. All have stronger trade relations with the euro area than six of the current members<sup>27</sup>.

To measure intra-industry trade we calculate the commonly used Grubel Lloyd index. If the index is 0, all export and import is in different types of goods. In other words, countries specialise and trade is between industries. A value of 100 means that imports and exports are of the same size in all types of goods so that all trade is within industries. Different types of trade are captured in measurements of intra-industry trade: horizontal trade in similar products with differentiated varieties (e.g. cars of similar class and price range); trade in vertically differentiated products distinguished by quality and

**Table 2 Openness to euro area<sup>1</sup>**  
In percentage of GDP, average 1997 - 2001

Country	Openness
Belgium+Luxembourg	41
Netherlands	28
Portugal	21
Ireland	21
Austria	19
Spain	13
France	12
Germany	12
Finland	11
Italy	9
Greece	9
euro area	18
Sweden	14
Denmark	12
UK	11
Hungary	37
Estonia	35
Slovenia	33
Czech republic	32
Slovak republic	29
Bulgaria	22
Latvia	18
Romania	17
Lithunia	15
Poland	14

Sources: IMF, OECD.

1.) Openness =  $0.5 * (\text{import,goods} + \text{export,goods}) / \text{GDP}$   
price (e.g. Italy exports high-quality clothing and imports lower-quality clothing); and vertical

<sup>27</sup> As with the output divergence index: size matters. Smaller economies are expected to be more open and, in this particular case, more open towards the euro area. Using a gravity equation in which size and distance play a role could detect whether countries trade exceptionally much or little with the euro area. A simple ranking correlation for the euro area (-0.3) reveals that the size-openness relation is not that strong within the euro area, even though one should keep in mind that the table only measures openness towards the euro area and not total openness.

specialisation of production that results in trade in similar goods at different stages of production. (OECD, 2002). These examples show that even intra-industry trade can still cover relatively heterogeneous goods. This makes an unambiguous interpretation in the context of monetary integration more difficult. To illustrate this point, research in the mid-1990s by Aturupane et al. (1997) indicates that 80 to 90% of the intra-industry trade between the CEECs and the EU concerns trade in goods of varying quality (i.e. vertically differentiated products).

Table 3 presents the development of intra-industry trade with the EU<sup>28</sup> as a percentage of total trade throughout the last decade. Both the euro area and the CEECs show considerable heterogeneity when it comes to the level of intra-industry trade in total trade. In the euro area, the more mature industrial economies show the highest levels. For some euro area countries, especially Portugal, intra-industry trade has increased significantly over the last decade. Others, like, Finland, Ireland and especially Greece seem to have stabilised at relatively low levels. In the 1990s, the CEECs as a whole have shown a substantial improvement in their level of intra-industry trade. However, a second look reveals important differences. Four of the more advanced CEECs, have surpassed the euro area average. There seems to be a strong relation between the rising share of intra-industry trade and the high and increasing inflows of foreign direct investment over the 1990s, especially from Germany. It is consistent with the increasing extent to which multinational firms have located parts of their production operations in these countries. Some of the CEECs show more moderate levels of intra-industry trade and Bulgaria and Latvia even fail to show a rising trend. Nonetheless, only Latvia has an index that is lower than Greece, the 'worst' performer in the euro area.

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<sup>28</sup> Data for the euro area were not available.

**Table 3 Intra-industry trade with EU-15**Grubel-Lloyd index<sup>1</sup>

Country	1993	1996	2000
France	86	88	88
Belgium	81	82	85
Austria	n.a.	77	82
Germany	77	81	77
Spain	69	72	76
Italy	65	70	73
Netherlands	74	74	72
Luxembourg	n.a.	n.a.	67
Portugal	47	58	61
Finland	n.a.	56	57
Ireland	60	55	56
Greece	27	29	26
euro area	65	67	68
UK	82	80	79
Sweden	n.a.	77	77
Denmark	66	66	69
Hungary	57	70	75
Czech republic	58	64	74
Slovenia	61	71	71
Slovak republic	42	57	68
Poland	45	47	58
Estonia	17	45	57
Romania	30	36	41
Bulgaria	46	42	39
Lithunia	15	28	37
Latvia	13	25	20

Source: Eurostat.

1.) Grubel-Lloyd index =

$$100 * ( 1 - (\text{sum,all sectors } |(\text{export,per sector} - \text{import,per sector})| / \text{sum,all sectors}(\text{export,per sector} + \text{import,per sector})) )$$

### 3.3 *Labour market*

In section 2 we identified the labour market, and mobility in particular, as potentially providing the most important adjustment mechanism in case of permanent asymmetric shocks. Also, different studies indicated that labour mobility is much more important as an adjustment mechanism in the US than in Europe. The minor importance of external labour mobility (i.e. between countries of the EU) is reflected in the number of EU citizens who migrate. The number of EU nationals resident in another member State is only 5.5 million out of 370 million, equivalent to 1½% of the population (OECD, 1999, p.121). Because most migrants are of working age, the share of workers from other EU countries in the labour force is slightly higher. Generally, this share stays below 3%, with some countries (Finland, Italy) having a negligible percentage of foreign EU workers. Exceptions are

Belgium, with a share over 5% and especially Luxembourg where around 40% of the workforce comes from other EU countries. Whereas one might expect limited external mobility in a monetary union with many languages, different cultures and government-induced barriers to mobility such as incompatibility of social security systems, this does not hold for domestic or internal mobility. However, as table 4 shows, domestic mobility is lower in all euro area countries than in the US, commonly used as the relevant benchmark for Europe<sup>29</sup>. Only the UK, one of the 'outs' has gross migration levels comparable to the US. The level of internal migration is especially low in southern European countries.

As suggested in the literature, differences in social policies (including income policy) and housing policy might play an important role in explaining some of the differences. Regarding social policies, De Nederlandsche Bank (2001), reports that net replacement rate (defined as the ratio between the net social security benefit and a low net wage level) is 63% in the US, against an average of 80 to 85% in the euro area. More important than the height of social benefits seems to be the longer duration which explains why migration within Europe, unlike that in the United States appears to be insensitive to unemployment developments. Regarding other costs of mobility, it turns out that transaction costs associated with buying and selling a property are sizeable in all OECD countries, but they are considerably higher in some EU countries compared with the US, largely because of stamp duty and VAT. In Belgium and France, for example, stamp duties are close to 10% of the average property value, whereas in the US they are close to zero (OECD, 1999, pp.138-139).

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<sup>29</sup> Because migration is not exclusively motivated by work, these figures must be regarded as an upper boundary of labour mobility.

**Table 4 Domestic mobility**

Annual gross migration between regions,  
as a percentage of total population

<u>Country</u>	<u>1995</u>
Netherlands	1.61
France	1.58 *
Belgium	1.27
Germany	1.24
Finland	0.92
Spain	0.60
Italy	0.53 *
UK	2.30 *
Sweden	1.61
Hungary	1.50 *
Czech republic	0.56 *
Japan	2.45
US	2.40 *

Source: OECD 2000 Employment Outlook

\*) data year 1998

Data on gross migration need to be interpreted with care. The results of Fidrmuc (2002b) suggest that migration in a number of CEECs indeed responds to inter-regional wage differentials, its responsiveness to unemployment is weaker. Moreover, the effect of wage differentials on migration is only partially consistent with regional adjustment occurring via migration. Although wages have a positive effect on net migration, they are positively correlated with overall mobility – both immigration and emigration. Hence, depressed regions experience low overall migration (inbound and outbound) rather than a net outflow of migrants. These results suggest that the data in table 4 provide little guidance for assessing the well functioning of the labour market in these countries. To see how the results of table 4 relate to net migration, which seems to be the relevant benchmark if one looks at labour market interactions, table 5 shows these numbers for a few countries concerned. Generally, the results are comparable with those in table 4: migration is much higher in the US than in Europe. However, the data indicate that Italy has higher net migration than Germany and the UK, whereas the latter had the highest gross mobility and Italy the lowest.

**Table 5 Net Migration Rate**  
as percentage of regional population

<u>Country</u>	<u>1980-9</u>	<u>1990-5</u>
Italy	0.33	0.40
Germany	0.34	0.31
UK	0.26	0.20
US	0.84	0.87

Source: Obstfeld and Peri (1998)

#### **4 Conclusion**

The theory on optimum currency areas provides a helpful framework to analyse the structural convergence that countries need to go through before giving up their monetary autonomy becomes beneficial. It is also clear, however, that in case of forming a monetary union, political will is essential for succeeding in the medium to long term. This is exemplified when one looks at the current euro area. The criteria discussed show considerable heterogeneity between different participants. However, one thing binds the euro area countries, although this is not a favourable one: their lack of substantial labour mobility, both internal and external. The available data also suggest that the Central and Eastern European accession countries show substantial convergence with the current euro area. Nevertheless, considerable differences remain, especially regarding the production structure. Also, labour mobility in these countries is comparable, or even lower than in the current euro area. For the future functioning of the euro area, it is important that all countries make significant efforts to improve on this.



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