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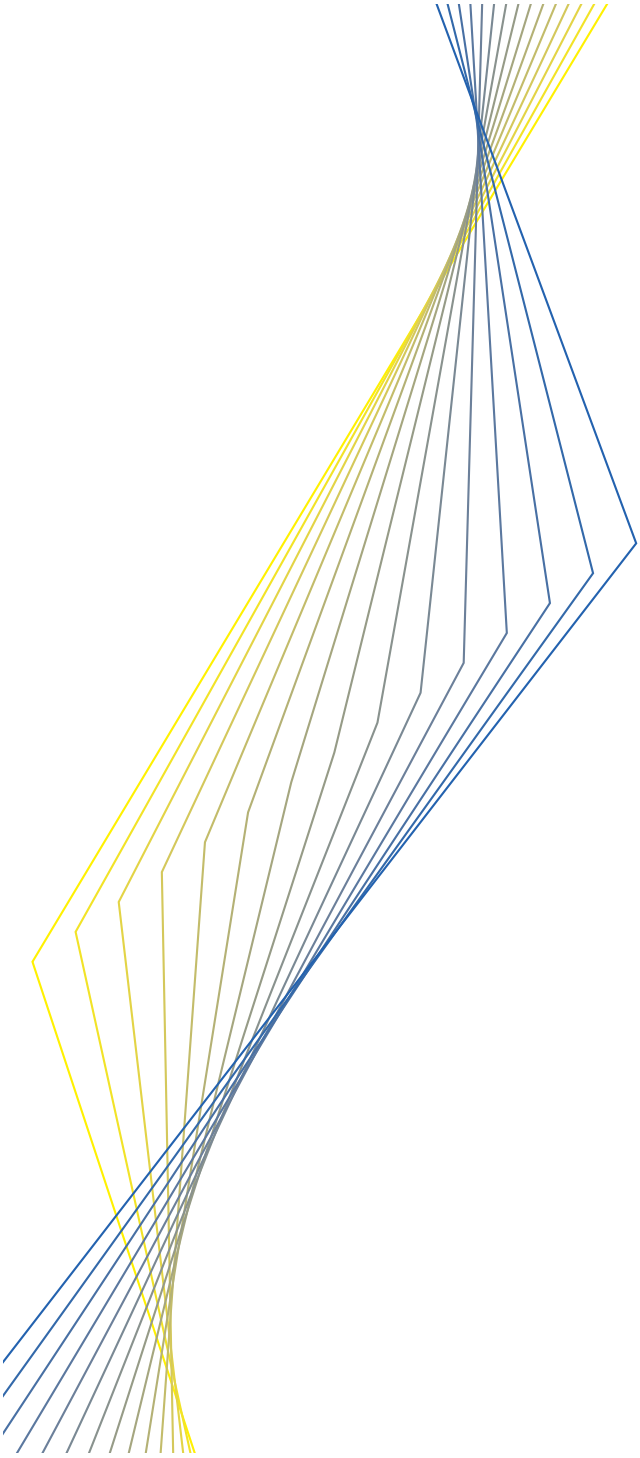

LABOUR MARKET MISMATCHES IN EURO AREA COUNTRIES

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ISBN 92-9181-262-5

Contents

Executive summary

An unemployment rate of 8.5% was recorded for the euro area in 2001, while at the same time firms in euro area countries reported difficulties in recruiting workers. This coexistence of unsatisfied labour supply and labour demand suggests an insufficient ability of the euro area to match labour supply and demand. Efficient labour market matching processes are of considerable importance for monetary policy for the following reasons:

- The functioning of the labour market affects the economic environment in which monetary policy is conducted. An inefficient allocation of labour adversely affects the level of potential output and, in the short run, limits the pace at which an economy can grow without creating inflationary pressures. If labour markets were to become more flexible in such a way that the job matching process becomes more efficient, this should transitorily increase the potential growth rate of the euro area economy until a higher employment rate is reached.

- Bottlenecks in the labour market resulting from matching inefficiencies might also lead to general wage increases in excess of labour productivity growth, thus triggering inflationary pressures. In general, one may conjecture that more efficient matching processes should also reduce the risk of cyclical upswings, reallocations in the economies' production structures and the expected demographic changes in the euro area resulting in labour shortages and upward pressure on wages and inflation.

- A greater matching efficiency of euro area labour markets accompanied by a higher degree of wage flexibility should speed up the adjustment of wages and prices to monetary policy actions and reduce the short-run effects of monetary policy on the real economy. This improved short-term inflation/growth trade-off would facilitate the conduct of the stability-oriented monetary policy of the European Central Bank (ECB).

- Efficiently functioning labour markets are of particular importance for countries participating in Economic and Monetary Union (EMU), because these countries are unable to use country-specific monetary and exchange rate policies to address asymmetric economic shocks.

Against this background, the aim of this report – prepared by the Monetary Policy Committee of the European System of Central Banks (ESCB)[1] – is to gather statistical evidence on the matching process in euro area labour markets and to discuss policy measures for its improvement.

The description of changes in matching processes is complicated by the fact that some of the data underlying the analysis are far from satisfactory, both in terms of quality and comparability. This holds particularly true for the vacancy data, which are only available for some euro area countries and then only cover a small proportion of actual vacancies. Furthermore, in some countries, the coverage of vacancy data has changed over the review period, which impedes the consistency of the results over time. Moreover, long-term unemployment data, also used in this report, are adversely affected by statistical problems in some countries. This calls for adequate caution when interpreting any empirical results and prevents the report from deriving straightforward interpretations.

Towards the end of the last decade, almost all euro area countries had experienced an improvement in their labour market situation in terms of employment growth and unemployment reduction, albeit to significantly differing degrees. Between 1997 and 2001, employment in the euro area grew

1 For the purposes of this report, the Monetary Policy Committee comprised experts from the central banks of the Eurosystem.

at least as rapidly as in the United States. The strong reduction in the level and share of long-term unemployment in most euro area countries and in the euro area as a whole during the cyclical upswing between 1997 and 2000 also seems to point to an improvement in the labour markets towards the end of the 1990s. The sheer magnitude of the reduction seems to indicate that it is more than a cyclical phenomenon. At the same time, the tightening of the labour market between 1997 and 2000 seems to have been associated with an increase in educational and regional mismatches, possibly indicating difficulties of the labour supply in adjusting its composition to changes in labour demand associated with the increasingly competitive global environment and rapid technological change. Although the existence of mismatches in conjunction with the cyclical tightening of the labour market in the period 1997-2000 may have translated into upward pressure on wages in some specific sectors or regions, this did not become a euro area-wide phenomenon, largely because the social partners generally adopted moderate wage policies.

Looking at the whole of the 1990s, the analysis identifies strong variations in the development of unemployment and vacancies across countries, indicating the substantial heterogeneity of euro area labour markets. Several euro area countries do not show any clear movement in the relationship between the unemployment rate and the vacancy rate, which is described by the so-called Beveridge curve. For some countries an outward shift of the Beveridge curve can be observed and, for one country, an inward shift occurs. For the euro area as a whole, these heterogeneous country developments seem to have translated into an outward shift of the Beveridge curve in the 1990s, which might partly be explained by an increase in the levels of educational and occupational mismatches over the decade.

The specific labour market reform measures taken in euro area countries during the 1990s contributed to the strong employment growth and the considerable decline in unemployment in many euro area countries during the cyclical upswing between 1997 and 2000. This happened notwithstanding an increasingly competitive global environment and skill-biased technological change, both of which tend to amplify the negative consequences of any remaining labour market deficiencies. It is difficult to assess the extent to which these reforms have improved the labour market situation by supporting the better functioning of labour markets in general or by enhancing the ability of the labour market to match non-employed persons and vacancies in particular. Nevertheless, the evidence gathered indicates that significant mismatches are still present in a number of areas, leaving ample scope for the continuation of the labour market reform process. Each country should identify the root causes of these mismatches and implement appropriate measures. Improved job mediation, more flexible wages and increased wage differentiation, improved education, training and life-long learning, reforms of tax and benefit systems, less restrictive employment protection regulation, working-time flexibility as well as measures to increase labour mobility all help towards making the matching process more efficient and labour markets more flexible. While euro area countries have certainly made some progress in improving the functioning of their labour markets in this direction, many of these reforms have been modest or have been introduced recently and are only gradually bearing fruit. The persistently high rate of unemployment, the low level of labour force participation and the uneven labour market performance across euro area countries indicate that much more remains to be done.

1 Introduction

An unemployment rate of 8.5%[1] was recorded for the euro area in 2001, while at the same time firms in euro area countries reported difficulties in recruiting workers. This coexistence of unsatisfied labour supply and labour demand suggests an insufficient ability of the euro area to match labour supply and demand. Efficient labour market matching processes are of considerable importance for monetary policy for the following reasons:

- The functioning of the labour market affects the economic environment in which monetary policy is conducted. An inefficient allocation of labour adversely affects the level of potential output and, in the short run, limits the pace at which an economy can grow without creating inflationary pressures. If labour markets were to become more flexible in such a way that the job matching process becomes more efficient, this should transitorily increase the potential growth rate of the euro area economy until a higher employment rate is reached.

- Bottlenecks in the labour market resulting from matching inefficiencies might also lead to general wage increases in excess of labour productivity growth, thus triggering inflationary pressures. In general, one may conjecture that more efficient matching processes should also reduce the risk of cyclical upswings, reallocations in the economies' production structures and the expected demographic changes in the euro area resulting in labour shortages and upward pressure on wages and inflation.

- A greater matching efficiency of euro area labour markets accompanied by a higher degree of wage flexibility should speed up the adjustment of wages and prices to monetary policy actions and reduce the short-run effects of monetary policy on the real economy. This improved short-term inflation/growth trade-off would facilitate the conduct of the stability-oriented monetary policy of the ECB.

- Efficiently functioning labour markets are of particular importance for countries participating in EMU, because these countries are unable to use country-specific monetary and exchange rate policies to address asymmetric economic shocks.

Against this background, experts from the Eurosystem have gathered statistical evidence on the matching process in euro area labour markets and discussed policy measures for its improvement.

The remainder of this report is structured as follows: Chapter 2 presents a framework for analysing the labour market matching process; Chapter 3 discusses some statistical evidence on changes in matching processes and mismatches in euro area labour markets; and Chapter 4 reviews recent trends in labour market reforms in euro area countries.

1 *This report was prepared prior to the revision of the Eurostat unemployment data, which was first published on 5 March 2002. The revised estimate of unemployment in the euro area is 8.3% in 2001. All data mentioned in this report are figures prior to the revision.*

2 Framework for analysis: the labour market matching process

This report focuses on the labour market matching process, i.e. the ability of the labour market to match labour supply and demand and thus to create employment both by bringing the non-employed into employment and by filling vacancies. Particular attention is given to labour market mismatches, i.e. labour market situations in which the characteristics

of the unemployed differ from those of available jobs in terms of education, occupation, sector and region.[2]

The levels of unemployment and vacancies are affected by different types of shocks in the economy:

- *Fluctuations in the business cycle* have a direct impact on labour market conditions. Decreasing aggregate demand tends to increase the number of lay-offs and unemployed and to reduce the number of vacancies throughout the economy, although some educational, occupational, sectoral or geographical differences are possible. Increasing aggregate demand would have the opposite effect.

- *Changes in the production structure of the economy* affect the characteristics of labour demand in terms of education, occupation, region and/or sector. For example, a change in the production structure of the economy owing to technological progress or changes in the structure of international trade in goods and services may lead to a decrease in labour demand in some sectors/regions of the economy and to an increase in others, thereby affecting the number of unemployed and vacancies in each sector/region (sectoral/regional mismatch). It might also lead to different qualitative profiles of workers and vacancies (educational/ occupational mismatch).

- *Changes in the composition of the labour force* can be due to changes in demographics, labour force participation and the characteristics of the workforce in terms of education, occupation or regional distribution. An increase in the participation of women or a larger inflow of foreign workers might affect the composition of the labour force, as would a decrease in the participation of elderly people, for example, as a result of an outflow into (early) retirement schemes and disability schemes.[3]

The size and persistence of the labour market imbalances resulting from these shocks will depend on the size and nature of the shocks and on the ability of the labour market to efficiently absorb them. Concerning the persistence of labour market imbalances, a distinction can be made between the following cases:

- Labour market imbalances partly relate to frictions in the labour market, which are due to the fact that it takes time to find jobs or to fill vacancies. Job-seekers have incomplete information on the available vacancies and firms with open positions have an incomplete view of the suitable candidates. Hence, well-functioning labour markets are also associated with certain levels of unemployment and vacancies which, at least in the very short run, are unavoidable. This part of labour market imbalances may be defined as frictional labour market mismatch. Its size is determined by the efficiency of the process of collecting, processing and assessing the necessary information for both the unemployed and employers.[4]

- Labour market imbalances resulting from variations in the business cycle should only be a temporary phenomenon. Nevertheless, changes in unemployment and vacancies stemming from temporary factors can become persistent. This becomes more probable, the lengthier the labour market adjustment processes are. In the presence of inflexible adjustment processes, unemployment may not be able

2 *Such labour market mismatches may result from an inefficient working of labour market institutions both inside and outside the labour market (e.g. education and qualification systems) as well as from individual preferences and social values (e.g. the social status of different professions). While the importance of the latter aspects should be kept in mind, this report focuses on causes related to the functioning of the labour market.*

3 *The impact of changes in the composition of the labour force on mismatches between vacancies and unemployment also depends on the cyclical position of the economy. For example, an increase in female participation should tend to have a smaller impact on unemployment and therefore mismatches, the more this increase represents a supply response to higher labour demand during a cyclical upswing.*

4 *In addition, the level of employment protection regulation tends to affect the hiring behaviour of firms (see Chapter 4). High hurdles to firing should tend to make vacancies harder to fill.*

to return to its initial level in an economic upswing, but may remain higher than before, for instance, because human capital has depreciated in the course of the adjustment period (the "hysteresis phenomenon"). Thus, the persistence of unemployment may change the composition of the labour force and give rise to mismatches between vacancies and unemployed persons.

- The impact of shifts in the production structure of the economy on labour market mismatches is generally a more persistent phenomenon, as it takes time for the existing structure of labour supply to adjust to a structure of labour demand, which has changed its educational, occupational, sectoral or regional composition. For example, the adaptation of the actual and future skills of the labour force to a changed labour demand through enhanced training and education is a time-consuming process. In the same vein, the impact of changes in the composition of the labour force on labour market mismatches also tends to be more persistent.

The adjustment process in the labour market is crucially dependent on a flexible wage mechanism, which should translate fluctuations in the business cycle, changes in the production structure of the economy as well as changes in the characteristics of the labour force into adequately differentiated wage adjustments. It is also dependent on labour market institutions, which determine the incentives and the capabilities of economic agents.[5] For example, generous unemployment benefits relative to wage incomes may reduce incentives to search for job opportunities and therefore increase labour market imbalances.

The empirical analysis in Chapter 3 focuses on changes in the size and persistence of labour market imbalances. A full assessment of the working of the matching process and its efficiency is, however, beyond the scope of the present report. Such an assessment is, indeed, complicated by the fact that it is difficult to disentangle the various shocks underlying those changes. For example, for an unchanged efficiency of the matching process, the level of unemployment and vacancies might be higher simply owing to the larger flow of workers resulting from an economic shock.[6] This relationship could be better analysed with the help of a matching function, i.e. a sort of production function, which determines the efficiency of the matching process in terms of "new hires" relative to the unemployment and vacancy levels.[7] This report does not estimate matching functions, however, since sufficient data on flows into and out of unemployment, vacancies and employment are not available for all euro area countries. The empirical analysis below will instead consider both labour market developments and various mismatch indicators, with the aim of providing a rich and differentiated picture of matching processes in euro area countries. This is supposed to mark a first step towards a deeper understanding of the working of euro area labour markets and the efficiency of matching processes.

5 *See also Blanchard and Wolfers (2000). They show that the interaction of some labour market institutions with cyclical and structural shocks contributes to explaining the increase in European unemployment over time as well as the heterogeneity in unemployment developments across European Union (EU) countries. Their results indicate that, whereas cyclical and structural shocks contribute to the general increase in unemployment, the interaction of these changes with different national labour market institutions seems to explain some of the heterogeneity of unemployment trends.*

6 *The number of "matches" between unemployed persons and vacancies might increase with the number of unemployed and vacancies in an economy, as the probability of finding suitable candidates for unfilled vacancies rises as the pool from which employers can choose grows.*

7 *See, for example, Blanchard and Diamond (1989). The matching function $H=a \cdot E(U,V)$ measures the efficiency of the matching process in terms of "new hires" (H) for each level of unemployed (U) and vacancies (V). H is increasing in both U and V, a is the efficiency parameter and the functional form of E(.) indicates whether the matching function exhibits constant, increasing or decreasing returns in matching.*

3 Developments in labour market mismatches in euro area countries

This chapter assesses the magnitude of and the developments in labour market mismatches in euro area countries since the last cyclical peak at the beginning of the 1990s.[8] This is done, firstly, by presenting data on overall labour market developments (labour force participation, employment, aggregate unemployment and vacancy rates) and by examining developments in unemployment and vacancies by duration. Secondly, this chapter analyses mismatch indicators such as Beveridge curves relating unemployment with vacancies, as well as specific mismatch indicators (educational, occupational and regional) which provide an indication of imbalances between the composition of labour demand and supply at a disaggregated level.

The description of changes in matching processes is complicated by the fact that some of the data underlying the analysis are far from satisfactory, both in terms of quality and comparability. This holds particularly true for the vacancy data, which are only available for some euro area countries and then only cover a small proportion of actual vacancies. Furthermore, in some countries, the coverage of vacancy data has changed over the review period, which impedes the consistency of the results over time. Moreover, long-term unemployment data, also used in this report, are adversely affected by statistical problems in some countries, such as Germany (see Annex 3). This calls for adequate caution when interpreting any empirical results and prevents the report from deriving straightforward interpretations.

3.1 Overall developments in euro area labour markets in the 1990s

Labour force participation

As Table 1 indicates, the labour force participation rate for the euro area as a whole decreased between 1991 and 1994, increased

8 *The year 1992 is often taken as it is the starting year of many series. The start of the last period of economic expansion differs across euro area countries. In France, for example, it had started already in 1990.*

Table 1

Participation rate

(labour force as a percentage of the population aged 15-64)

	Level		Percentage point difference			
Country	1990	2000	1990-2000	1990-1994	1994-1997	1997-2000
Belgium	58.7	65.2	6.5	3.0	0.9	2.6
Germany [a]	71.7	71.0	-0.7	-0.8	-0.3	0.4
Greece	59.1	63.0	3.9	0.4	1.3	2.2
Spain	58.7	63.7	5.0	0.9	1.2	2.9
France	67.1	68.8	1.7	0.3	0.6	0.8
Ireland	60.7	67.5	6.8	1.1	1.1	4.6
Italy	59.8	59.9	0.1	-2.3	0.2	2.2
Luxembourg	60.1	64.1	4.0	2.2	-0.8	2.6
Netherlands	66.2	74.9	8.7	2.5	2.8	3.4
Austria [b]	-	71.3	-	-	-0.6	0.4
Portugal	68.8	71.0	2.2	-1.2	0.6	2.8
Finland [b]	-	76.8	-	-	0.7	4.0
Euro area [a]	67.3	68.6	1.3	-0.6	0.4	1.5

Sources: Eurostat, ECB calculations.
Note: "-" means data are not available.
a) Data for Germany and the euro area start in 1991.
b) Austria and Finland became members of the European Union (EU) in 1995. Therefore, no Eurostat data are available for the years 1990-1994.

slightly between 1994 and 1997, and rose relatively strongly during the cyclical upswing between 1997 and 2000. In 2000, the euro area participation rate was 1.3 percentage points higher than in 1991. Between 1990 and 2000, the largest increases in participation rates took place in Belgium, Ireland and the Netherlands. Only Germany experienced a decline in its participation rate between 1991 and 2000, which was mainly the result of the adaptation of the East German labour force participation from the state-planned economy to the market economy. The labour force participation in West Germany developed

Table 2

Employment

Country	Average annual growth rate			
	1990-2000	1990-1994	1994-1997	1997-2000
Belgium	1.3	0.8	0.8	2.3
Germany [a]	-0.2	-1.1	-0.5	1.0
Greece	0.6	0.4	0.6	1.0
Spain	1.4	-1.7	2.8	4.4
France	0.7	-0.2	0.7	1.8
Ireland	4.1	1.7	4.5	6.9
Italy	-0.1	-1.4	0.0	1.5
Luxembourg	1.4	1.1	1.0	2.3
Netherlands	2.3	1.7	2.3	3.1
Austria [b]	-	-	-0.8	0.7
Portugal	0.4	-1.1	0.1	2.8
Finland [b]	-	-	2.7	3.8
Euro area [a]	0.5	-1.1	0.7	1.8

Sources: Eurostat (Labour Force Survey – LFS), ECB calculations.
a) Data for Germany and the euro area start in 1991.
b) Austria and Finland became members of the EU in 1995. Therefore, no Eurostat data are available for the years 1990-1994.

Table 3

Part-time employment

(persons in part-time employment as a percentage of total employment)

Country	Level		Percentage point difference			
	1990	2000	1990-2000	1990-1994	1994-1997	1997-2000
Belgium	10.9	17.4	6.5	1.9	1.9	2.7
Germany [a]	15.2	19.4	4.2	0.6	1.7	2.0
Greece	4.1	4.6	0.5	0.7	-0.2	0.0
Spain	4.9	8.2	3.2	2.0	1.3	0.0
France	11.9	16.9	5.0	2.9	1.9	0.1
Ireland	8.1	16.8	8.7	3.2	1.0	4.5
Italy	4.9	8.8	4.0	1.3	0.9	1.8
Luxembourg	7.0	11.3	4.3	0.9	0.4	3.0
Netherlands	31.6	41.2	9.6	4.8	1.5	3.3
Austria [b]	-	17.0	-	-	1.1	2.0
Portugal	5.9	10.7	4.8	2.1	1.9	0.8
Finland [b]	-	12.2	-	-	-0.3	0.8
Euro area [a]	11.2	16.5	5.3	2.4	1.5	1.4

Sources: Eurostat (LFS), ECB calculations.
a) Data for Germany and the euro area start in 1991.
b) Austria and Finland became members of the EU in 1995. Therefore, no Eurostat data are available for the years 1990-1994.

broadly in line with that of other west European countries.[9]

Employment

As Table 2 shows, employment in the euro area declined between 1991 and 1994, rose until 1997, and then increased strongly between 1997 and 2000. The IMF (2001) points to even more rapid employment growth in the euro area compared with the United States in the periods 1998-2000 and 1997-2001.[10] While employment growth in the euro area as a whole was thus relatively strong towards the end of the 1990s, performance differed significantly across euro area countries. For 1997-2000, the average annual employment growth rate ranged from 6.9% in Ireland to 1.0% in Germany and Greece and 0.7% in Austria. As Table 3 shows, in many euro area countries the rise in employment over the last decade was accompanied by a strong increase in part-time employment.

Aggregate unemployment

As Table 4 indicates, the euro area unemployment rate increased sharply from 8.1% in 1991 to 11.5% in 1994 and then remained broadly stable until 1997. Between 1997 and 2000, it declined substantially to 8.9% in 2000. However, at the end of 2000, it was still 0.8 percentage points higher than in 1991. Underlying this trend are rather heterogeneous developments across euro area countries:

- In 1990, the unemployment rate ranged from 1.7% in Luxembourg to 16.2% in Spain. From 1990 until 1994, it increased in all euro area countries, although to different extents. Finland, for example, experienced a 13.4 percentage point increase in its unemployment rate to 16.6%, whereas in Austria it rose by 0.8 percentage points to 3.8%.

- Between 1994 and 1997, Germany, Greece, Italy and Austria recorded further, though in some cases slight, increases in their unemployment rates, whereas they

9 Furthermore, according to the national accounts, which give a fuller coverage of short-hours work, and Bundesbank calculations, the German labour force participation increased from 74% to 74.7% in the period under review.

10 According to the IMF (2001), employment in the euro area grew by 5.3% between 1998 and 2000, compared with 4.3% in the United States. Between 1997 and 2001, employment growth stood at 7.2% in the euro area compared with 6.4% in the United States.

Table 4

Unemployment rate

(unemployed persons as a percentage of the labour force)

	Level		Percentage point difference			
Country	1990	2000	1990-2000	1990-1994	1994-1997	1997-2000
Belgium	6.7	7.0	0.3	3.3	-0.6	-2.4
Germany [a]	5.6	7.9	2.3	2.8	1.5	-2.0
Greece	6.4	11.1	4.7	2.5	0.9	1.3
Spain	16.2	14.1	-2.1	7.9	-3.3	-6.7
France	9.0	9.6	0.7	3.4	0.0	-2.7
Ireland	13.4	4.2	-9.2	0.9	-4.5	-5.6
Italy	9.0	10.5	1.5	2.2	0.6	-1.3
Luxembourg	1.7	2.4	0.8	1.5	-0.5	-0.3
Netherlands	6.2	2.8	-3.3	1.0	-1.9	-2.4
Austria	3.0	3.7	0.7	0.8	0.6	-0.7
Portugal	4.8	4.1	-0.7	2.1	-0.1	-2.7
Finland	3.2	9.7	6.5	13.4	-3.9	-3.0
Euro area [a]	8.1	8.9	0.8	3.4	0.0	-2.5

Sources: Eurostat, ECB calculations.

a) Data for Germany and the euro area start in 1991.

remained broadly stable in France and Portugal and declined in Belgium, Spain, Ireland, Luxembourg, the Netherlands and Finland.

- Between 1997 and 2000, unemployment decreased in all euro area countries apart from Greece, albeit to varying degrees. By 2000, the unemployment rate had fallen below its 1990 level in Spain, Ireland, the Netherlands and Portugal, but remained higher than this level in the other euro area countries.

Vacancies

As Table 5 shows, the vacancy rate (defined as the number of vacancies as a percentage of the labour force) is very low and, for the euro area as a whole, amounted to only slightly more than 1% in 2000. The euro area vacancy rate (excluding France, Ireland and Italy) decreased between 1991 and 1994, increased slightly between 1994 and 1997, and rose relatively strongly between 1997 and 2000. In 2000, it was higher than in 1991. For any interpretation of the data, it has to be kept in mind that these data from the public employment services only cover registered vacancies and tend to under-represent high-skill vacancies and over-represent low-skill job openings in relative terms. Despite the fact that the public employment services are frequently mentioned as a search vehicle by the unemployed, they are often found to have a relatively low success rate in unemployment placements. In addition, they tend to lead to low-paying jobs.[11] These facts tend to distort conclusions about the overall labour market matching process.

Unemployment and vacancy duration

In 2000, short-term unemployment (defined as unemployment with a duration of less than six months) represented around one-third of total unemployment in the euro area (see Table 6). Its level was particularly high in Luxembourg, the Netherlands, Austria, Finland and, to a lesser extent, in France and Ireland. This may reflect the fact that, in these

11 See Addison and Portugal (1998).

Table 5

Vacancy rate

(vacancies as a percentage of the labour force)

	Level		Percentage point difference			
Country	1990	2000	1990-2000	1990-1994	1994-1997	1997-2000
Belgium	0.5	1.3	0.8	0.0	0.1	0.7
Germany [a]	1.1	1.4	0.3	-0.3	0.2	0.5
Greece	0.5	0.2	-0.3	-0.2	-0.2	0.1
Spain	0.3	0.5	0.1	-0.2	0.2	0.1
Luxembourg	0.1	0.8	0.7	0.1	0.4	0.2
Netherlands	1.5	2.1	0.6	-0.9	0.5	1.0
Austria	1.4	0.9	-0.5	-0.6	-0.3	0.4
Portugal	0.2	0.2	0.0	-0.1	0.1	0.0
Finland [b]	1.0	0.6	-0.5	-0.7	0.3	0.0
Euro area [a], [c]	0.8	1.2	0.4	-0.3	0.2	0.5

Sources: NCBs, the Bank for International Settlements (BIS), ECB calculations.
Note: No vacancy data from public employment services exist in France, Ireland and Italy.
a) Data for Germany and the euro area start in 1991.
b) Data for Finland are available up to 1999.
c) Weighted average of available countries.

Table 6
Unemployment duration

Country	Share in %			% of labour force			Change in share (p.p.)		
	2000			1990	1997	2000	1990-2000	1990-1997	1997-2000
	Short-term (less than 6 months)	Between 6 months and 1 year	Long-term (more than 1 year)	Long-term (more than 1 year)			Long-term (more than 1 year)		
Belgium	28.2	15.5	56.3	4.8	5.5	3.7	-10.7	-6.4	-4.3
Germany [a]	32.4	16.1	51.5	1.6	4.9	4.0	20.7	19.3	1.3
Greece	26.5	17.1	56.4	3.6	5.5	6.4	6.9	6.2	0.7
Spain	37.8	19.7	42.4	8.4	10.9	6.0	-8.6	0.7	-9.3
France	43.6	16.8	39.6	3.6	5.0	4.1	-0.1	-0.2	0.1
Ireland [b]	43.1	20.0	36.6	9.0	5.7	1.5	-28.5	-8.8	-19.7
Italy	22.4	16.3	61.3	6.7	8.2	6.7	-7.7	-2.6	-5.0
Luxembourg [c]	56.0	18.8	25.3	-	-	0.7	-	-	5.7
Netherlands	53.5	13.8	32.7	3.5	2.5	0.8	-14.0	2.4	-16.4
Austria [d]	56.2	15.4	28.4	-	1.5	1.3	-	-	-0.1
Portugal	40.0	17.1	42.9	2.1	3.7	1.7	-1.5	11.3	-12.9
Finland [d]	58.9	16.5	24.6	-	4.4	2.7	-	-	-5.2
Euro area [a]	35.3	17.0	47.7	4.2	6.0	4.3	-1.1	2.1	-3.2

Sources: Eurostat (LFS), ECB calculations.

a) Data for Germany and the euro area are calculated using the 1991 figure for Germany as an approximation for the 1990 figure.

b) National data (Central Statistical Office).

c) National data (Administration de l'Emploi), only available from 1998. The figures refer to annual averages and are based on national unemployment data. The change in the share of the long-term unemployed refers only to the period 1998-2000.

d) Austria and Finland became members of the EU in 1995. Therefore, no Eurostat data are available for the years 1990-1994.

countries, a large part of unemployment is frictional and not persistent.

As Table 6 shows, the long-term unemployment rate for the euro area remained broadly unchanged over the last decade. Long-term unemployment as a share of total unemployment declined by 1.1 percentage points during the same period but was still very high in 2000, representing 47.7% of total unemployment. Between 1997 and 2000, the level and the share of long-term unemployment decreased significantly.

Underlying these changes in long-term unemployment in the euro area were again rather different country developments. Between 1990 and 1997, the share of long-term unemployment seems to have increased significantly in Germany and Portugal.[12] Between 1997 and 2000, the share of the long-term unemployed declined in all euro area countries apart from Germany, Greece, France and Luxembourg. This decline was particularly strong in Ireland (-19.7 percentage points), the Netherlands (-16.4 percentage points), Portugal (-12.9 percentage points) and Spain (-9.3 percentage points).

Turning to vacancy duration, changes in the share of hard-to-fill vacancies, i.e. vacancies with a duration of six months or more, might give an indication of developments in labour market mismatch. Between 1990 and 1997, the share of hard-to-fill vacancies declined or remained constant in all five countries for which data are available (see Table 7). This might indicate that in times of high and rising unemployment (although this was not the case in the Netherlands where unemployment

12 The level and growth of long-term unemployment is affected by statistical problems in some countries such as Germany where a significant share of the long-term unemployed above 55 years of age does not plan to return to work and should thus rather be classified as inactive rather than as unemployed.

Table 7

Vacancy duration

Country	Share in %	Change in share (p.p.)		
	2000	1990-2000	1990-1997	1997-2000
	Hard-to-fill (more than 6 months)		Hard-to-fill (more than 6 months)	
Belgium	10	-4	-9	6
Germany [a]	8	-5	-2	-3
Netherlands [b]	35	6	0	6
Austria	12	-12	-16	4
Portugal	15	-	-	7
Finland	47	1	0	0

Sources: NCBs, ECB calculations.
a) Data relate to West Germany only.
b) Data start in 1992.

declined over this period), difficulties for employers to fill vacancies diminished. Between 1997 and 2000, the share of hard-to-fill vacancies only decreased in Germany, whereas the other four countries experienced increases. This might indicate increasing difficulties for employers to fill vacancies in times of a tightening labour market. In all countries where the information is available, except the Netherlands, the proportion of hard-to-fill vacancies in 2000 was lower or remained broadly constant compared with 1990.

3.2 Developments in mismatch indicators

Beveridge curves

The Beveridge curve, which shows the relationship between the unemployment rate and the vacancy rate, can provide a first synthetic description of developments in the matching process.[13] Movements along the curve (i.e. where vacancies and unemployment move in different directions) reflect cyclical fluctuations in economic activity. An outward shift of the curve, where vacancies and unemployment increase simultaneously, might indicate a deterioration in the matching process owing to structural factors such as inadequately functioning labour market institutions. Conversely, an inward shift of the curve may indicate an improvement in the matching process.

National Beveridge curves show that developments in unemployment and vacancies differed substantially across euro area countries over the past decades (see Chart 1). Compared with the late 1980s, the Beveridge curve seems to have shifted outwards in Belgium, Germany, Greece and, albeit to a lesser degree, in Luxembourg,[14] Austria and Finland. By contrast, the Netherlands recorded an inward movement of the Beveridge curve. Spain and Portugal do not seem to have experienced any clear shift in their Beveridge curves. These results are broadly confirmed when using European Commission (EC) survey data (see Annex 2). For the countries where vacancy data are not available, the following picture emerges when

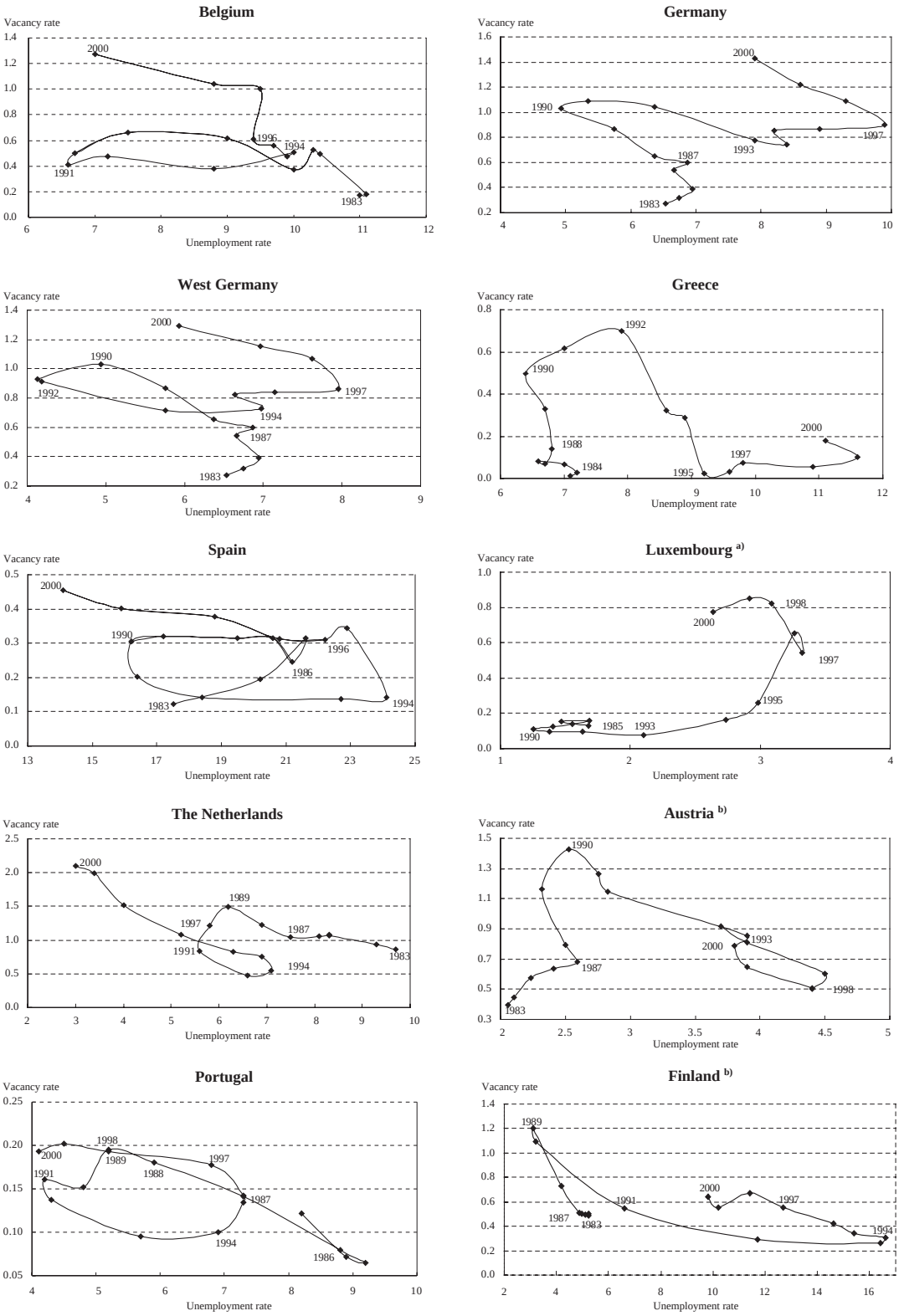
13 The Beveridge curve is formally defined as the path formed by all those vacancy and unemployment rate combinations, where unemployment is stable, i.e. where the inflow into unemployment is equal to the flow out of it. Given the matching process on the labour market, the higher the level of vacant jobs, the lower the level of unemployment, as the probability of finding a job increases. The analysis of Beveridge curves is made essentially over two comparable periods, the late 1980s and the late 1990s. See Annex 4 for methodological aspects.

14 The Beveridge curve for Luxembourg is constructed with national unemployment data from its public employment agency. It is therefore not directly comparable with the other national Beveridge curves based on unemployment data from the LFS. In addition, it has to be noted that, in contrast to the LFS data presented in Table 4 where the unemployment rate in Luxembourg declined between 1994 and 1997, the national data show an increase during the same period, tending to shift the Beveridge curve outwards.

Chart 1

Beveridge curves for the euro area countries

(vacancy rate/unemployment rate, %)



Sources: Eurostat (LFS), NCBs, BIS, ECB calculations.

a) The Beveridge curve is constructed with national unemployment data.

b) For the period 1983-1994, the unemployment rate is calculated using BIS data.

using EC survey data: in Italy and to a lesser extent in France, the Beveridge curve seems to have shifted outwards, whereas Ireland does not seem to have experienced any clear movement of its Beveridge curve. The developments in the national Beveridge curves were rather uneven across euro area countries between the end of the 1980s and the mid-1990s. Towards the end of the last decade, however, most national Beveridge curves (apart from Greece's) seem to display the cyclical pattern of a simultaneous decrease in unemployment and increase in vacancies.

The Beveridge curve for the euro area (see Chart 2), as proxied by the aggregate of the nine countries for which national Beveridge curves are available, indicates that during the period 1990-1993 a rising unemployment rate was accompanied by a decline in the vacancy rate, pointing to an influence of cyclical factors. Between 1994 and 1997, the unemployment rate was rather stable, whereas the vacancy rate was rising, possibly indicating an influence of structural factors. During the cyclical upswing between 1997 and 2000, the strongly declining unemployment rate was associated with a rather large increase in the vacancy rate. Both the euro area unemployment rate and vacancy rate were higher in 2000 than in 1990, as indicated by the outward shift of the Beveridge curve.[15, 16] Since three euro area countries (France, Ireland and Italy) are not covered, this outward shift is, however, rather closely linked to developments in unemployment and vacancies in Germany.[17]

Educational mismatch

In all euro area countries, the unemployment rate decreases significantly with the level of educational attainment: in 2000, the euro area unemployment rate was only 5% for those with tertiary education, compared with 7.5% for those with upper secondary education and 11.2% for those with lower secondary education and less (see Table 8). This appears to reflect the stronger demand for employees with a higher level of education. Indeed, annual employment growth averaged 3.3% for those with tertiary education in the period 1992-2000, compared with 1.1% for those with upper secondary education and 0.6% for those with lower secondary education and less.[18]

For the euro area as a whole, educational mismatch, as indicated by the variance of the ratio of education-specific unemployment rates to the total unemployment rate (see Annex 4), appears to have decreased slightly between 1992 and 1997 (see Table 8), but to have increased during the cyclical upswing between 1997 and 2000. By 2000, the level of educational mismatch in the euro area had increased relative to 1992.

Underlying these changes, however, are strongly diverging country-specific developments. Compared with 1992, educational mismatch seems to have increased significantly in Germany, France, Ireland and Austria and to a lesser extent in Belgium, Italy and Finland. In the Netherlands and Portugal, educational mismatch appears to have declined strongly between 1992 and 2000.

15 *The change in vacancy data coverage over time could have slightly influenced the results, but cannot in itself explain the outward shift in the Beveridge curve. Among other developments, the increasing use of the internet and of temporary workers through private employment agencies might have contributed to reducing the proportion of vacancies posted in public employment agencies, lowering the vacancy rate and pushing the curve inwards. However, at the same time, public employment agencies increasingly collect information via the internet, which should raise the number of vacancies they post.*

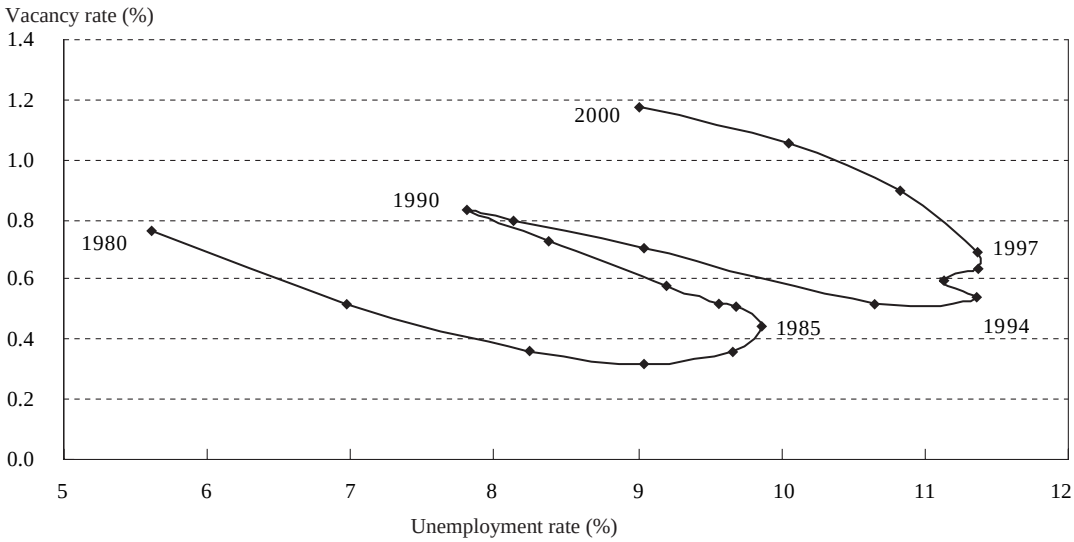
16 *It should also be considered that vacancies can be filled not only by unemployed and employed persons, but also by those who are inactive and willing to work if incentives are correctly set, as shown in some countries by the large flow from inactivity to employment. Ideally, non-registered vacancies and/or potential job openings should also be taken into account.*

17 *These developments are broadly confirmed when the Beveridge curve is approximated on the basis of information derived from survey data on the percentage of manufacturing firms reporting labour shortages as the main factor limiting production (see Annex 2). At the beginning of the 1990s, the increase in the unemployment rate was accompanied by a decrease in labour shortages reported by firms. During the mid-1990s, labour shortages reported by firms remained broadly unchanged, whereas they increased substantially between 1997 and 2000. In the late 1990s, the labour shortages reported by firms were larger than those recorded in the late 1980s, but at broadly the same level as in 1990, at any given rate of unemployment.*

18 *However, it is an empirical law that the unemployment rate for less qualified persons is nearly always and everywhere higher than the unemployment rate for highly qualified persons. As the opportunity costs of being idle are typically much lower for less qualified persons, this empirical finding is compatible with rational behaviour. See also Layard, Nickell and Jackman (1991).*

Chart 2

Beveridge curve for the euro area



Sources: Eurostat (LFS), NCBs, BIS, ECB calculations.
Notes: Vacancy data cover around 64% of the euro area. Calculation excludes France, Ireland and Italy.

Looking at vacancies, in some euro area countries 50% or more of vacancies require a low level of education. This is likely to be a consequence of over-representation of low-skilled occupations in vacancies registered by the public employment services.

In the presence of high unemployment for persons with a low level of educational attainment, it might nevertheless also indicate disincentives for workers with low educational attainment in certain countries.

Table 8

Educational mismatch in the euro area [a)]

Country	Unemployment rate 2000 (%)				Educational mismatch (var (ui/u), %)			
	Total	Lower secondary education and less	Upper secondary education	Tertiary education	2000	Change (p.p.)		
						1992-2000	1992-1997	1997-2000
Belgium	5.7	9.3	5.5	2.4	37	7	9	-2
Germany	7.9	14.0	8.0	4.2	39	19	11	8
Greece	9.2	8.5	11.0	7.2	5	0	0	-1
Spain	12.3	14.1	11.4	9.2	4	-1	-2	1
France	9.2	14.0	8.0	5.1	24	11	2	9
Ireland	4.3	7.5	2.6	1.9	50	16	8	7
Italy	8.4	10.0	7.4	6.1	6	2	0	2
Luxembourg	2.4	3.4	2.1	1.4	17	-	-	-
Netherlands	2.2	3.4	1.8	1.7	19	-29	-28	-1
Austria [b)]	4.5	8.2	4.0	2.4	47	25	4	21
Portugal	3.4	3.5	3.8	2.4	5	-12	-1	-11
Finland [b)]	8.1	12.2	8.9	4.8	20	4	5	0
Euro area [b)]	8.1	11.2	7.5	5.0	14	2	-1	3

Sources: Eurostat (LFS), ECB calculations.
Note: The unemployment breakdown by education is available only from 1992.
a) Unemployment data refer to the population aged 25 to 59. For the definition of the educational mismatch indicator, see Annex 4.
b) Data for Austria and Finland start in 1995.

Occupational mismatch

As Table 9 indicates, the unemployment rate declines sharply with the level of skill required by the occupation. Between 1992 and 1999, the unemployment rates for very highly skilled occupations (e.g. managers and professionals) remained broadly stable at a very low level. At the same time, employment growth was very strong for highly skilled occupations and for some medium-skilled occupations such as some categories of service workers. This reflects the fact that job creation was concentrated in the services sectors and in occupations requiring a high level of formal education or training. According to Table 9, occupational mismatch appears to have increased between 1992 and 1997 in the euro area (excluding France and the Netherlands). Between 1997 and 1999, however, it declined very slightly, still remaining higher than at the beginning of the decade. These developments over time seem to have been strongly affected by changes in the unemployment rate for elementary occupations, which significantly increased from 12.1% in 1992 to 17.5% in 1997 and then declined to 14.6% in 1999.

The comparison between the occupational composition of vacancies and unemployment provides additional information on the current structural imbalances between labour demand and supply by occupation (see Table 10). For example, occupations where labour demand seems to exceed labour supply are craft and related occupations (in Germany, Spain, Austria and Portugal), occupations in the agricultural sector (in Germany, Spain, France and Austria), technicians (in Belgium and Luxembourg), hotel and restaurant occupations (in Germany, France and Luxembourg) and occupations in information and communication technologies (in Ireland). Thus, although some of the occupations listed above require high or medium skills, recruitment difficulties also arise for some low-skilled occupations, such as in the hotel

Table 9

Occupational mismatch in the euro area

	Unemployment rate (%)				Average annual employment growth (%)		
		Change (p.p.)					
Occupation	1999	1992-1999	1992-1997	1997-1999	1992-1999	1992-1997	1997-1999
Legislators,[a] senior officials and managers	2.9	0.6	1.3	-0.7	4.7	4.4	5.5
Professionals	3.0	0.3	0.7	-0.4	1.9	1.4	3.2
Technicians and associate professionals	4.6	0.9	1.7	-0.8	2.5	2.5	2.3
Clerks	5.9	0.8	1.6	-0.8	-0.5	-0.7	-0.1
Service workers	8.8	1.0	1.8	-0.8	1.9	1.8	2.3
Skilled agricultural and fishery workers	4.4	0.8	0.7	0.0	0.5	1.8	-2.7
Craft and related trade workers	7.9	1.4	3.3	-1.9	-0.6	-1.3	1.0
Plant and machine operators and assemblers	7.5	1.0	2.6	-1.6	-0.2	-1.3	2.6
Elementary occupations	14.6	2.5	5.4	-2.9	-2.1	-3.1	0.3
Total	6.9	0.8	2.1	-1.3	0.7	0.3	1.7
Occupational mismatch var(ui/u)	27.9	2.7	4.2	-1.4			

Sources: Eurostat (LFS), ECB calculations.
Notes: Total unemployment rate refers to the population having already had a job. The unemployment breakdown by occupation is available only from 1992. 1999 instead of 2000 has been chosen as the end of the period in order to avoid a break in the series affecting "elementary occupations". Country coverage of data on unemployment and occupational mismatch: Belgium, Germany, Greece, Spain, Ireland, Italy, Luxembourg, Austria, Portugal and Finland (i.e. 75% of the euro area labour force). Data for Austria and Finland start in 1995. For Belgium, data for 1992 correspond to 1993. The occupational categories correspond to the International Standard Classification of Occupations (ISCO 88 (COM)).
a) Legislators include members of executive and legislative bodies (e.g. parliament, government).

Table 10

Mismatch between vacancies and job demand by occupation

	Occupation share in vacancies compared with that in unemployment (2000)	
	Over-represented	*Under-represented*
Belgium	Technicians, professionals	Plant and machine operators, agriculture and fishery workers, clerks, service and sales workers
Germany [a]	Agricultural and fishery workers, craft and related trade workers (locksmiths, electricians), service and sales workers, hotel and restaurant trade	Construction, commercial, organisational, administrative and office professions, warehouse and transport workers
Spain	Agricultural and fishery workers, craft and related trade workers	Unskilled workers, service and sales workers, clerks
France [b]	Agricultural and fishery workers, IT experts, hotel and restaurant trade, craft and related trade workers (construction, electricians), tourism and transport, nurses	Wood and paper workers, sales workers, personal care occupations, personal and protective services workers, teaching, management and administration
Ireland [c]	Traditional manufacturing, high-tech manufacturing, information and communication technologies	
Luxembourg	Liberal professions, technicians, office employees, hotel business, catering	Vendors, farmers, foresters, quarry workers, miners and similar categories
Austria	Hairdressing, leather, textiles, personal services, wood, mining, agriculture and forestry	Construction, office workers, supporting occupations, trade, tourism, metal and electrical occupations
Portugal	Elementary occupations, plant and machine operators and assemblers, craft and related trade workers	Legislators,[d] senior officials and managers, professionals

Sources: Eurostat (LFS), NCBs, anecdotal evidence, ECB elaboration.
Note: The list of occupations reported in the table is not exhaustive and the breakdown by occupation is not harmonised across countries.
a) The vacancy shares for Germany are distorted because in agriculture and the hotel and restaurant trade vacancies have to be registered at the employment offices, before employers may hire staff from non-EU countries. Furthermore, job offers not requiring high formal qualifications are more likely to be registered at the labour exchanges.
b) Vacancy flows (not stocks).
c) Assessment refers to sectors where a relatively high proportion of firms report unfilled vacancies.
d) Legislators include members of executive and legislative bodies (e.g. parliament, government).

and restaurant and agriculture sectors, which indicates that incentives for taking up work are important for these sectors. This is also supported by anecdotal evidence.

Table 11

Regional mismatch in the euro area

Country (number of regions)	Regional mismatch (var (ui/u), %)			
		Change (p.p.)		
	1999	1990-1999	1990-1997	1997-1999
Belgium (11)	22.8	6.2	-0.8	7.0
Germany (17) [a]	27.6	-1.3	-5.3	4.1
Greece (16)	6.0	-3.3	-1.0	-2.3
Spain (18)	13.4	-1.2	-7.4	6.2
France (22)	5.6	1.6	0.8	0.8
Ireland (2)	3.7	3.4	-0.2	3.6
Italy (20)	45.2	-1.7	-11.8	10.2
Netherlands (12)	12.3	6.3	-2.0	8.3
Austria (9) [b]	6.4	1.4	0.8	0.6
Portugal (7)	10.8	-31.5	-30.6	-0.9
Finland (5)	9.5	-	-	4.8
Euro area (137) [a], [c]	31.7	-9.6	-14.7	5.1

Sources: Eurostat (REGIO database), ECB calculations.
a) As the data for Germany start in 1991, the 1990 figures were approximated using the 1991 figures.
b) Data for Austria start in 1993.
c) The euro area figures reflect the dispersion of unemployment rates within and between the different euro area countries.

Regional mismatch

Regional mismatch appears to be an important source of labour market mismatch in some euro area countries. In particular, in Belgium, Germany and Italy, regional mismatches[19] are relatively large (see Table 11). Regional mismatch in the euro area, as indicated by the variance of relative regional unemployment rates, appears to have decreased between 1990 and 1997, with the large falls in Portugal and Italy making a significant contribution. Between 1997 and 1999, it increased for the euro area as a whole, with a rise being observed in all euro area countries except Greece and Portugal where it declined. This increase in regional mismatches in many euro area countries might indicate an insufficient geographical mobility of labour in times of changes in the regional composition of labour demand during the cyclical upswing between 1997 and 2000. The data suggest that compared with 1990, regional mismatches in 1999 were smaller for the euro area as a whole, although this was mainly due to the strong decline in Portugal.[20]

Conclusions

Summing up, towards the end of the last decade, almost all euro area countries had experienced an improvement in their labour market situation in terms of employment growth and unemployment reduction, albeit to significantly differing degrees. Between 1997 and 2001, employment in the euro area grew at least as rapidly as in the United States. The strong reduction in the level and share of long-term unemployment in most euro area countries and in the euro area as a whole during the cyclical upswing between 1997 and 2000 also seems to point to an improvement in the labour markets towards the end of the 1990s. The sheer magnitude of the reduction seems to indicate that it is more than a cyclical phenomenon. At the same time, the tightening of the labour market between 1997 and 2000 seems to have been associated with an increase in educational and regional mismatches, possibly indicating difficulties of the labour supply in adjusting its composition to changes in labour demand associated with the increasingly competitive global environment and rapid technological change. Although the existence of mismatches in conjunction with the cyclical tightening of the labour market in the period 1997-2000 may have translated into upward pressure on wages in some specific sectors or regions, this did not become a euro area-wide phenomenon, largely because the social partners generally adopted moderate wage policies.

Looking at the whole of the 1990s, the analysis identifies strong variations in the development of unemployment and vacancies across countries, indicating the substantial heterogeneity of euro area labour markets. Several euro area countries do not show any clear movement in the relationship between the unemployment rate and the vacancy rate, which is described by the so-called Beveridge curve. For some countries an outward shift of the Beveridge curve can be observed and, for one country, an inward shift occurs. For the euro area as a whole, these heterogeneous country developments seem to have translated into an outward shift of the Beveridge curve in the 1990s, which might partly be explained by an increase in the levels of educational and occupational mismatches over the decade.[21]

The high level of unemployment and labour market mismatches as well as the large number of people not participating in the labour market clearly indicate that the euro area's economic potential is not fully exploited. This in turn points to inefficient matching processes, inadequate labour market institutions, insufficient wage dispersion and a lack of labour mobility.

19 The regional mismatch might reflect insufficient labour mobility and/or insufficent capital mobility and very uneven regional developments (e.g. Mezzogiorno/North of Italy; western Germany/eastern Germany, Flanders/Wallonia, South and Centre of Spain/north-eastern regions).

20 The implementation of some labour market reforms, demographic developments as well as indications of increased labour mobility might explain this decline in Portugal.

21 Although evidence is missing, the compression of wage scales and inadequate wage flexibility in some euro area countries might have contributed to the worsening of occupational mismatch.

4 Improving the functioning of the labour market

As countries participating in EMU are unable to use country-specific monetary and exchange rate policies to address asymmetric economic shocks, improving the ability of their labour markets to adjust to such shocks is in their interest. An increase in the efficiency with which the labour market matches non-employed persons and vacancies would certainly help to achieve this. Over the past years, euro area countries have conducted some reforms of labour market institutions with the aim of improving the functioning of their labour markets, mainly starting in the mid-1990s. The type and scope of the reforms differed significantly across countries and, as the evidence discussed in Chapter 3 shows, labour market outcomes have evolved differently.

The following analysis will briefly review those areas where improvements are possible and desirable. It will consider, on the one hand, those labour market reforms which can be expected to directly increase the efficiency of matching processes, i.e. the number of hires for each given level of unemployment and vacancies. This analysis builds on the fact that the efficiency of matching processes depends on "technological features", such as information dissemination, as well as on the nature of labour market mismatches, i.e. differences in the profiles of non-employed and vacancies. The analysis will, on the other hand, indicate those labour market reforms which could achieve a more general improvement in the working of the labour market by, for example, increasing aggregate labour supply and demand.

Job mediation

An increased effectiveness of employment services could enhance the efficiency of labour market matching processes through better channelling of information about job vacancies to the unemployed and better mediation between unemployed persons and vacancies as well as through stronger incentives to collect information on vacancies. As the OECD (2001) points out, more intensive job search assistance is found to be particularly cost-effective. Belgium, Germany, Greece and Luxembourg have recently improved their public employment services, providing personalised services to the unemployed. In France, a reform was implemented in 2001, which included a stricter control of the effectiveness of job search by the unemployed and more intensive support for each unemployed person to find a job, intended to offset the fact that unemployment benefits no longer decrease over time. Germany, Greece and Italy have authorised the operation of private employment agencies. Such agencies have also gained importance in Portugal. Furthermore, in Germany, as a consequence of a report by the Bundesrechnungshof (the Supreme Audit Institution of Germany), a complete overhaul of labour market policies and public employment offices is envisaged. Austria intends to privatise its public employment offices by 2003/4. In Spain, however, profit-oriented employment agencies are still prohibited, meaning that job search assistance remains almost the exclusive responsibility of public employment offices, although their labour market coverage does not exceed 15%. Nevertheless, the role of the implemented temporary employment agencies in improving job mediation has been notable. Generally, the increased use of the internet can be expected to positively affect the short-term efficiency of labour market matching processes and to accelerate the adjustment process. *As most of the reforms in this field in euro area countries have only been undertaken recently or are planned for the future, they cannot be expected to have had a significant effect on the evolution of labour market matching processes over the 1990s.*

Wage-setting systems

Wage-setting systems and the associated degree of centralisation of wage bargaining

affect matching processes through their impact on the structure and the level of wages.[22] Institutions which prevent wage levels from reflecting differences in personal qualifications (such as educational attainment levels) or in labour market conditions across occupations, regions and sectors hinder the market-clearing role of wages and contribute to labour market mismatches. The occupational mismatches in some euro area countries indicate that, at present, insufficiently differentiated occupational or sectoral wage structures impede mobility between occupations and sectors. Furthermore, the educational mismatches indicate that an inadequate dispersion of the educational wage structure reduces incentives to invest in human capital. Along similar lines, an insufficient dispersion of regional wage structures limits the incentives of firms in some euro area countries to relocate their production to regions with high unemployment, thereby contributing to the persistence of regional labour market mismatches as well as insufficient regional labour mobility. Flexible and sufficiently differentiated wages are therefore of crucial importance for reducing labour market mismatches. *So far, evidence is rather scarce that wage bargaining systems are being reformed in a way that might be conducive to more flexible and differentiated wages. Generally, there remains much scope for increasing the flexibility and differentiation of wages in euro area countries.*

Education, training and life-long learning

Educational and occupational mismatches are to a considerable extent due to education and training systems, which insufficiently prepare the workforce for changing demands. In particular, they do not effectively provide for knowledge needed in times of rapid technological progress, specifically in the field of new information and communication technologies. Some labour shortages of highly educated personnel can be traced back to a distinct lack of people with appropriate education. Improved education, training and life-long learning are therefore crucial for reducing educational and occupational mismatches.[23]

In many euro area countries, improvements in education and training systems are high on the political agenda.[24] In Italy, the Government has recently designed a temporary tax relief scheme to stimulate firms' accumulation of capital, including human capital, extending the tax relief to expenditure on employee training. The Austrian Government introduced an education allowance in 2000, creating tax incentives for education and training. In Luxembourg, expenditures incurred by individuals for professional training are partly tax-deductible; alternatively, the state offers firms a direct contribution to their professional training costs. Portugal implemented new training programmes, targeting special professional groups and specific groups of the labour market such as young people and the long-term unemployed. In Greece, training programmes for 2001-2003 have been planned after using as inputs, *inter alia,* the results of a large survey of enterprises concerning skills shortages. In addition, according to the new law on the restructuring of the public employment services, a new flexible subsidisary, operating as a *société anonyme,* will deal with basic and continuing training and life-long learning programmes. Finland has made occupational training of the unemployed mandatory for being eligible for unemployment benefits. The effectiveness of these active labour market programmes is increasingly coming under

22 *The impact of labour market matching processes on labour costs and inflation depends largely on the wage bargaining process. Localised labour shortages may for example result in (excessively) high wage settlements throughout the economy, if the bargaining process in leading sectors or regions also affects wage agreements in sectors or regions where supply and demand for labour are more balanced. Conversely, a high level of unemployment only results in lower nominal wage increases if the outsiders on the labour market have some power to influence the wage negotiations. See, for example, Lindbeck and Snower (1986), and Blanchard and Summers (1988).*

23 *It has to be taken into account that the uncertainty surrounding the marginal return from investment in education in times of transition owing, for example, to technological change might negatively affect individual investments in education.*

24 *For a general discussion of this issue for EU countries, see European Commission (2001a).*

review with respect to the targeting of these measures, which is essential in order for their costs and benefits to be assessed.[25] *Many of the reforms that are supposed to enhance education and training have only been implemented recently. It cannot therefore be expected that they have contributed to a reduction in educational and occupational mismatches over the last decade. The significant educational and occupational mismatches in many euro area countries highlight the necessity for substantial further improvements in education and training systems.*

Tax and benefit systems

Tax and benefit systems affect the efficiency of matching processes from the supply side of the labour market to the extent that they influence both search intensity and incentives to invest in human capital.[26] In particular, in the absence of strict job search requirements, generous unemployment benefits may lead to an insufficient job search intensity.[27] Long benefit durations additionally tend to increase the possibility of long-term unemployment. Generally, generous unemployment benefits

25 See, for example, OECD (2001).

26 More generally, the incentives are determined by the size of the "tax wedge", i.e. the amount of social security contributions, payroll taxes, personal income tax and consumer taxes, which create a wedge between real labour costs for employers and the real take-home pay of employees. For a discussion of the literature, see Carone and Salomäki (2001).

27 Generally, the unemployment benefit system is supposed to provide an insurance against job losses and to allow the unemployed to search for adequate employment opportunities suiting their abilities, thereby enhancing overall labour productivity (see also OECD (1994)). Very low unemployment benefits might imply that unemployed people have a strong incentive to quickly accept job offers not suiting their abilities, possibly leading to a mismatch in employment.

Table 12

Benefit systems in the euro area

	Unemployment benefit systems				(Early) retirement systems	
Country	Unemployment insurance (unemployment assistance) in months	Gross replacement rates (UI) [a]	Tighter work availability [b]	Tighter benefit eligibility [c]	Increase in retirement age [d]	Stronger disincentives [e]
Belgium	No limit (none)	=	+	=	+	+
Germany	6 – 32 (unlimited)	40% → 38%	+	=	=	+
Greece	5 – 15 (none)	=	=	=	=	+
Spain	4 – 24 (6)	80% → 70%	+	+	=	-
France	4 – 60 (unlimited)	57% → 53%	=	+	=	+
Ireland	15 (unlimited)	41% → 32%	=	=	=	=
Italy	6 – 9 (none)	15% → 33%	+	=	-	+/-
Luxembourg	12 [f] (none)	=	=	=	+	=
Netherlands	6 – 60 (24)	=	+	+	=	+
Austria	5 – 12 (unlimited)	43% → 36%	=	+	+	+
Portugal	12 – 30 (6 – 15)	=	=	-	+	=
Finland	23 (unlimited)	54% → 61%	+	+	+	+

Sources: CESifo database for institutional comparisons in Europe, Boeri (2000), European Commission (2000).
Notes: Some figures have been updated by NCBs. The indicators of change summarise changes since 1990. + (-) indicates an increase (decrease) in the respective indicator and = means that no changes have been enacted.

a) UI refers to unemployment insurance benefits. Figures refer to gross replacement rates in the first months of joblessness for unemployed persons with a dependent spouse. In countries with no UI, the figures refer to guaranteed income schemes. Changes refer to the 1990s.

b) "Tighter work availability" includes tighter requirements for being available for work when offered a job.

c) "Tighter benefit eligibility" includes, for example, tighter eligibility requirements for certain groups of people and/or an increased contribution duration.

d) This includes increases in retirement and early retirement ages.

e) Disincentives include, for example, less favourable taxation of pension benefits, a reduction in pension benefit eligibility for certain groups of workers, and a lengthening of the contribution period before receiving pension benefit entitlements.

f) This can be prolonged for a maximum of 12 additional months under certain conditions. There is an upper limit to the unemployment insurance benefit of 2.5 times the legal (gross) minimum wage.

can adversely affect matching processes in the event of cyclical downswings, as workers who become unemployed have weaker incentives to take up work when real wages decrease. Furthermore, a high level of unemployment insurance negatively affects matching processes in the case of changes in the structure of the economy. This is due to the fact that incentives to take up work for people who have become unemployed in the goods producing sector are only small when the corresponding wages are lower in the growing services sector. As the empirical investigation suggests, this seems to have contributed to high unemployment as well as a high number of unfilled vacancies for low-educated workers, particularly in the services sector. In addition, a more than proportional rise in taxes and/or a reduction in benefit eligibility affects the efficiency of matching processes in response to structural changes in that it reduces the incentives to invest in education. Finally, other benefit schemes such as disability schemes and early retirement schemes encourage non-participation and reduce the availability of experienced workers.

As Table 12 indicates, unemployment benefit systems differ widely across euro area countries. For example, in Finland the unemployment benefit duration is potentially unlimited and gross replacement rates are rather high, whereas in Italy the duration is rather short and gross replacement rates are rather low. Reforms of unemployment benefit systems in euro area countries have focused on reducing the level of unemployment benefits and on tightening the eligibility criteria for several groups of unemployed people or disabled workers. *However, while these reforms of benefit systems in euro area countries go in the right direction, they have often been implemented only cautiously and in most cases have not been far-reaching.*

Apart from directly affecting the labour market matching process between non-employed persons and vacancies, tax and benefit systems can influence the general functioning of the labour market by hampering the creation of additional labour demand and supply. Tax and benefit systems negatively affect aggregate labour demand to the extent that they lead to high tax and social security contribution rates for firms, thereby increasing the tax burden and labour costs. They can also adversely affect labour supply through the following channels:

- Unemployment benefit systems reduce work incentives for the unemployed and some employed persons might even withdraw from the labour market, if the level of unemployment benefits is high relative to potential net incomes after taxes ("unemployment trap").[28]

- Tax and benefit systems also negatively affect work effort, in particular for low-paid labour. This is due to the fact that higher work effort in terms of hours worked does not lead to a sufficient increase in net labour income, because of a more than proportional rise in taxes and/or a reduction in the eligibility for benefits ("poverty trap").

- Some benefit systems (such as early retirement and disability schemes) encourage non-participation instead of job search. For example, generous early retirement schemes increase incentives to withdraw from the labour force. Their negative impact on work incentives has contributed to low participation rates of workers aged 55-64 across all educational levels and occupations in many euro area countries.

Looking at tax rates, the effect of a change in the marginal tax on labour supply is ambiguous as income and substitution effects usually have opposite signs. On the one hand, a reduction in the tax on labour implies that a worker may increase labour supply owing to the attractiveness of a higher real wage

28 However, high unemployment benefits might also increase participation rates as participation is a condition for benefit eligibility. The generosity of unemployment benefits also affects incentives in wage bargaining in that high unemployment benefits should result in higher bargained wages.

relative to the increased cost of leisure (substitution effect). On the other hand, the increase in net income might lead to a reduction in labour supply (income effect). The empirical literature has mainly come to the conclusion that a reduction in the *total tax burden* should reduce unemployment and raise labour supply, although the impacts are found to be rather small.[29]

Over the past years, many euro area countries have implemented reforms to reduce high tax burdens.[30] According to EC calculations, marginal tax rates were reduced in several euro area countries between 1997 and 2000.[31] Active labour market policies subsidising low-paid employment have also been introduced to increase the effective labour supply of low-skilled workers, for example in experiments in Germany where these measures are now being extended. In general, however, such measures are second-best to necessary reforms of tax and benefit systems. Furthermore, in order to increase labour force participation, some countries have started to reform pension systems and limit the scope of (early) retirement systems, often by raising retirement ages. *In sum, euro area countries should continue to put reforms of tax and benefit systems with a view to increasing labour supply and demand high on their policy agenda, while safeguarding sound budgetary positions.*

Employment protection regulation

Employment protection regulation differs widely across euro area countries, both in terms of its overall strictness and the emphasis placed on the various types of regulations.[32] In the presence of strict employment protection regulation, employers tend to fill vacancies only with well-matching employees, as dismissals tend to be costly. This might reduce occupational mobility substantially. High firing costs for firms tend to reduce the number of hires during upswings, because employers will be more reluctant to hire if dismissal costs are high. At the same time, they tend to reduce firings during downturns. Consequently, as a result of reduced inflows into unemployment, employment protection regulation tends to reduce short-term unemployment. Owing to a smaller outflow, however, it tends to increase long-term unemployment. Strict employment protection regulation may reduce labour market flexibility in that it sets insufficient incentives for employment to adjust to cyclical and structural changes, thereby negatively affecting productivity.

The OECD (1999) found negative employment effects of employment protection regulation to be concentrated on prime-age women, young and older workers, pointing to an insufficient ability of the labour market to match certain groups of labour supply with labour demand.[33] This seems to be related to the consideration that, for firms, the cost of an unsatisfactory hiring is probably higher in the presence of high employment protection, with the result that they might avoid hiring workers whose capabilities are not immediately obvious to the firm (e.g. young workers). These structural effects are also found by Heckman and Pagés (2000). In contrast to the OECD (1999), which found a negative but not statistically significant effect

29 See, for example, Nickell (1997).

30 There have been across-the-board tax-cutting measures (in, for example, Germany, Spain, France, Italy, Luxembourg and the Netherlands). Some attention has been given to reducing fiscal pressure at the lower end and in the middle of the income distribution (e.g. in Belgium, France, Germany, Greece, Austria and Ireland). For an overview of the recent tax reforms in the EU, see Carone and Salomäki (2001, pp. 29-32). On 1 January 2001, a two-stage tax reform was initiated in Luxembourg, benefiting both employees and firms. Ireland sought to increase the participation rate of women (e.g. through the "individualisation" of the standard rate tax band, which increases work incentives for married women). Other measures (e.g. in Germany and Greece) were aimed at reducing or stabilising social security contribution rates.

31 See European Commission (2001b), pp. 85-95.

32 Regulations regarding hiring cover e.g. rules favouring disadvantaged groups, conditions for using temporary or fixed-term contracts and training requirements. Regulations concerning firing cover redundancy procedures, mandatory notice periods, severance payments and special requirements for collective dismissals and short-time work schemes. Employment protection can be provided by the private market, labour legislation, collective bargaining agreements and court interpretations of legislative and contractual provisions.

33 The study also finds that employment protection regulation has little effect on overall unemployment. Instead, it might have an impact on the demographic composition of unemployment, where unemployment is found to be lower for prime-age men, but higher particularly for young workers.

of employment protection regulation on total employment rates, they present evidence of a strong adverse impact on overall employment as well as on unemployment in OECD countries.[34] According to the OECD 1999 study, the overall strictness of employment protection concerning regular and temporary employment was reduced in many euro area countries in the 1990s. For example, in Spain, several reforms of the employment protection regulation have been undertaken since the last decade, including the creation of a new permanent contract with lower severance payments and rebates of social security contributions. In France employment protection legislation seems to have increased over the 1990s according to the OECD 1999 study and to have remained unchanged in Greece, Ireland and Austria. More recently, Greece reduced the level of employment protection regulation, whereas in Germany and France opposite movements or intentions can be observed.[35] *In order to enhance productivity and the allocation of labour, it would appear conducive to reduce the strictness of employment protection regulation in many euro area countries.*

Working time

Increased working time flexibility might contribute to a better adaptation of labour supply to changing demand, thereby improving the functioning of the labour market in general. Working time accounts as well as the possibility of shifting between full-time and part-time jobs allow firms to adjust the level of employment more flexibly in response to changes in production and employees to adjust working time in line with their private needs. The share of part-time employment in the euro area increased from 11.2% to 16.5% between 1991 and 2000 (see Table 3), although shares differ significantly between countries, ranging from 4.6% in Greece to 41.2% in the Netherlands in 2000.

The trend in working time reforms is not clear-cut. Whereas some government initiatives have been aimed at general working time reductions in recent years (e.g. in Belgium, France and Italy), other initiatives, either at the legislative or at the collective bargaining level, have sought to introduce greater flexibility in working time. In France, Portugal and in some sectors in Italy and Greece, for example, a moderate reduction in average hours worked per year has recently been exchanged for greater working time flexibility. The Austrian labour market has experienced various forms of increased working time flexibility, including for example bandwidth models, where normal working hours can be extended substantially. In Germany, working time accounts have effectively reduced the need to pay overtime compensation in the last economic upswing and have thus contributed to an easing of wage pressures. *In order to allow firms to better adjust production to cyclical fluctuations, a further increase in working time flexibility would appear desirable.*

Labour mobility

Closely linked to the existence of labour market institutions, the extent of labour mobility also affects the efficiency of matching processes. As the empirical evidence indicates, regional labour market mismatches appear to be of particular importance in some euro area countries, pointing to insufficient regional labour mobility and a low mobility between European Union (EU) countries despite the fact that the free movement of labour is one of the principles of the Treaty establishing the European Community.[36] An increased level of geographical mobility and stronger mobility incentives are therefore a prerequisite for reducing regional labour market mismatches. Mobility incentives depend on whether the additional utility from migrating outweighs the economic and social

34 See Heckman and Pagés (2000).

35 In Germany, recent legislation largely undid the earlier relaxation of employment protection rules.

36 For an overview of employment of foreigners and labour mobility in the euro area and the EU, see for example OECD (2001).

costs of moving.[37] In this regard, the extent of labour mobility is also affected by labour market institutions such as the tax and benefit systems or the degree of wage-setting centralisation. For example, centralised wage-setting systems can prevent the emergence of adequate regional wage differentials. If, in addition, unemployment benefit systems do not provide sufficient work incentives in the presence of high migration costs, regional labour market imbalances will remain.[38] Against this background, mobility grants for young persons are playing an increasing role, e.g. in Germany. However, the effect of institutional reforms, such as the strengthening of work incentives through tax and benefit system reforms, will not immediately raise work and migration incentives and, therefore, they will not immediately improve the working of the labour market matching process. *It is therefore important that sufficient regional wage differentiation contributes to redressing regional labour market imbalances.*

Given difficulties in recruiting highly educated workers such as software engineers or workers with a low level of education, for example seasonal employees in the agricultural and services sectors, immigration from non-EU countries is playing or will play an important role in satisfying labour demand and in reducing sectoral and occupational labour shortages. This holds true for a number of countries. With a special view to dealing with shortages of highly educated workers, Germany has implemented immigration programmes for IT specialists ("green card") and France has facilitated the recruitment conditions or criteria for issuing employment visas for highly educated workers.[39]

Two further aspects to be considered are:

- Immigration can, in the short run, cushion the impact of labour market mismatches as it might help to reduce severe labour shortages. Immigration might therefore ease wage pressures and constraints on output growth.

- Immigration could, however, in the longer term hinder stronger incentives to reduce existing unemployment if it were to reduce incentives for labour market reforms abolishing the true underlying causes of the insufficient labour market adaptability.[40]

37 The costs of migration depend on a wide range of factors from the actual costs of transport to transaction costs on the housing market. Apart from this, the linguistic differences within the EU are frequently quoted as an additional major obstacle for mobility between euro area countries. Additionally, a number of administrative obstacles such as the non-recognition of professional diplomas and limited possibilities to transfer pension rights to another Member State still exist.

38 For a discussion of the role of centralised bargaining on regional unemployment, see Boeri, Layard and Nickell (2000).

39 The management of immigration flows to the EU is still primarily the responsibility of the Member States, but the European Commission is putting increasing emphasis on their proposal to establish "an open procedure for co-ordination" of immigration policy at the Community level. This is based on the Tampere Council conclusions from 1999, which include the agreement to consider a more efficient management of immigration flows and is supported by the proposal for "European Guidelines on immigration". See European Commission (2001c).

40 In Greece, immigration is mainly complementary to domestic labour, in areas such as housecare, care for the aged, agriculture, construction, tourism and in small manufacturing enterprises. Labour shortages do persist, however, in medium and large manufacturing enterprises, as well as for medium to highly specialised jobs in services. Thus, incentives for labour market reforms have not been reduced because of immigration.

5 Concluding remarks

The specific labour market reform measures taken in euro area countries during the 1990s contributed to the strong employment growth and the considerable decline in unemployment in many euro area countries during the cyclical upswing between 1997 and 2000. This happened notwithstanding an increasingly competitive global environment and skill-biased technological change, both of which tend to amplify the negative consequences of any remaining labour market deficiencies. It is difficult to assess the extent to which these reforms have improved the labour market situation by supporting the better functioning of labour markets in general or by enhancing the ability of the labour market to match non-employed persons and vacancies in particular. As argued in Chapter 2, assessing the impact of labour market reforms on the efficiency of labour market matching processes is hampered, on the one hand, by the difficulty to disentangle cyclical and structural changes and, on the other hand, by considerable statistical hurdles, particularly the insufficient quality of vacancy data.

Against this background, this report refrains from drawing firm conclusions on changes in the efficiency of matching processes in euro area countries. Nevertheless, the evidence gathered indicates that significant mismatches are still present in a number of areas, leaving ample scope for the continuation of the labour market reform process. Each country should identify the root causes of these mismatches and implement appropriate measures. Improved job mediation, more flexible wages and increased wage differentiation, improved education, training and life-long learning, reforms of tax and benefit systems, less restrictive employment protection regulation, working-time flexibility as well as measures to increase labour mobility all help towards making the matching process more efficient and labour markets more flexible. While euro area countries have certainly made some progress in improving the functioning of their labour markets in this direction, many of these reforms have been modest or have been introduced recently and are only gradually bearing fruit. The persistently high rate of unemployment, the low level of labour force participation and the uneven labour market performance across euro area countries indicate that much more remains to be done.

Annex 1

Data availability and data issues

To assess the usefulness of unemployment rates and vacancy data and the difference between both measures as mismatch indicators, the definitions and data availability of unemployment and, in particular, vacancy measures have to be considered. While there are widely used statistical definitions of unemployment, for example those based on standard International Labour Organization criteria, data on vacancies are subject to various limitations since they are often not representative, as they include only those vacancies posted in public employment agencies. Therefore, the data only represent a small part of the real number of vacant job offers. Complementing the official data with survey data taking into account job offers in newspapers, on the internet and by private agencies can provide a more complete picture of the *size* of labour shortages. Business surveys can help to assess whether labour shortages have recently acted as an impediment to production.

Furthermore, unfilled vacancy data are only available for Belgium, Germany, Greece, Spain, Luxembourg, the Netherlands, Austria, Portugal and Finland, representing around 60% of the euro area labour force. For France, the data available are vacancy flows (new vacancies) and not vacancy stocks (unfilled vacancies) which are unavailable.

Table 13

Main sources used for assessing labour market mismatches in the euro area

Indicators and sources	Coverage	Data availability and reliability
Unemployment rate Sources: Eurostat's Labour Force Survey (LFS): breakdown by educational attainment, occupation and duration. National sources.	All countries except Ireland and Luxembourg for the breakdown by educational attainment and all countries except France and the Netherlands for the breakdown by occupation. All countries except Ireland for unemployment by duration. Data for Ireland on unemployment by duration have been provided by the Central Statistical Office, and for Luxembourg by the Administration de l'Emploi.	Breakdown by educational attainment available annually from 2000 back to 1992. Breakdown by occupation available back to 1992 for Germany, Spain, Portugal, Luxembourg and Italy, back to 1993 for Belgium, and back to 1995 for Austria and Finland. Breakdown by region (from the REGIO database) available back to the early 1980s except for Germany (1991), Austria (1993) and Finland (1996). Data (available from the LFS) correspond to harmonised definitions and are broken down according to identical classifications.
Vacancies [1] Sources: BIS and NCBs.	Available for whole economy. Only Belgium, Germany, Spain, Luxembourg, the Netherlands, Austria, Portugal and Finland publish such data, i.e. 60% of the euro area. Data for Greece and Luxembourg were provided by the respective NCBs.	The breakdowns by educational attainment, occupation and region are not available for the late 1990s or for the early 1990s for many countries. Breakdowns by educational attainment, occupation or region are not made according to harmonised classifications. *Vacancy data only represent a small proportion [2] of the real number of vacant job offers*, because they correspond to vacancies posted at public employment agencies and do not take into account other sources of offers such as newspapers, the internet and private agencies. Data are not harmonised across countries. Moreover, the *proportion of total vacancies that are registered could fluctuate over time*, in particular with changing economic conditions. It could also be affected by some of the labour market reforms implemented in European countries. Most notably, the more flexible use of temporary workers through private employment agencies would imply a reduction in the proportion of vacancies posted in public employment agencies. Lastly, some vacancies that have been filled could still be registered as unfilled in public files if firms were to forget to inform the employment agency on time. Hence, data are more relevant in terms of changes than levels.

Table 13 (cont'd)

Indicators and sources	Coverage	Data availability and reliability
Vacancies (cont'd) [1]		*Vacancy breakdowns* are not fully reliable because of registration biases, tending for instance to overestimate the share of low-skilled people in vacancies registered by the public employment agencies.
Surveys Source: European Commission (EC) business surveys	*Manufacturing sectors only for EC surveys.* Data are not yet published by the EC, but are now available in its database. No breakdown by skill, occupation or sector is available for the euro area.	Timely and quarterly data, published in the second week of the month following the survey. (The questionnaire is sent to firms in January, April, July and October.) More direct indicators of labour shortage. Data harmonised across countries. *Biased estimator* owing to the limited sectoral coverage. Firms report labour shortages as the main factor limiting production. Indeed, firms are requested to mention only one factor limiting production (labour shortage, insufficient demand, lack of equipment, others). Therefore, the survey data could underrate the magnitude of labour shortages, as they do not take into account firms encountering hiring difficulties but suffering more from another production constraint. Nevertheless, subjective information based on employers' opinion. Reporting major hiring difficulties could be due to a *memory effect*, i.e. the implicit benchmark of firms is often the early or mid-1990s, when qualified (and often overqualified relative to the jobs offered) labour was available immediately.

1) This report refers to vacancies remaining unfilled (stocks), which are likely to be a better indicator of labour shortages than data for the flow of new vacancies. However, the latter data also exist and could be useful for analysing frictional shortages in future studies.

2) According to available studies, registered vacancies may represent only one-third of total vacancies in Germany, and only 10-20% in Spain and Portugal.

Annex 2

Beveridge curves (calculated with EC business survey data)

The vacancy data are replaced here by the percentage of firms reporting labour shortages as the main limit to production in the *manufacturing* sector (taken from EC business surveys). All euro area countries are represented, including those for which vacancy data are missing. For Finland, the data come from a national survey and focus on the shortage of skilled labour as an output constraint. Although the vacancy and survey data correspond to different concepts and scopes, the shape of this Beveridge curve is fully consistent with the traditional Beveridge curve (which plots the vacancy rate against the unemployment rate) and allows similar conclusions to be drawn.

Chart 3

Beveridge curves for the euro area countries calculated with EC business survey data

(labour shortages/unemployment rate, %)

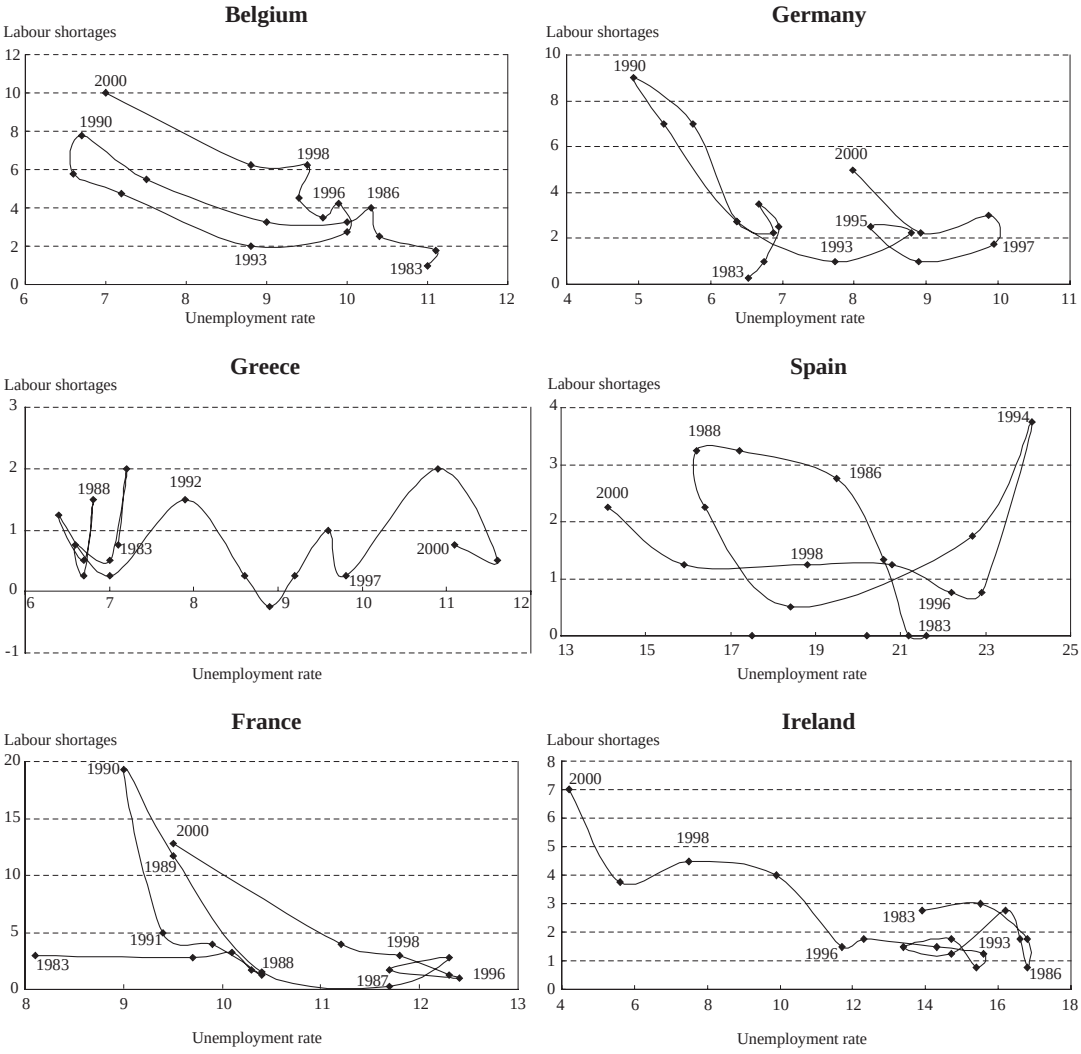
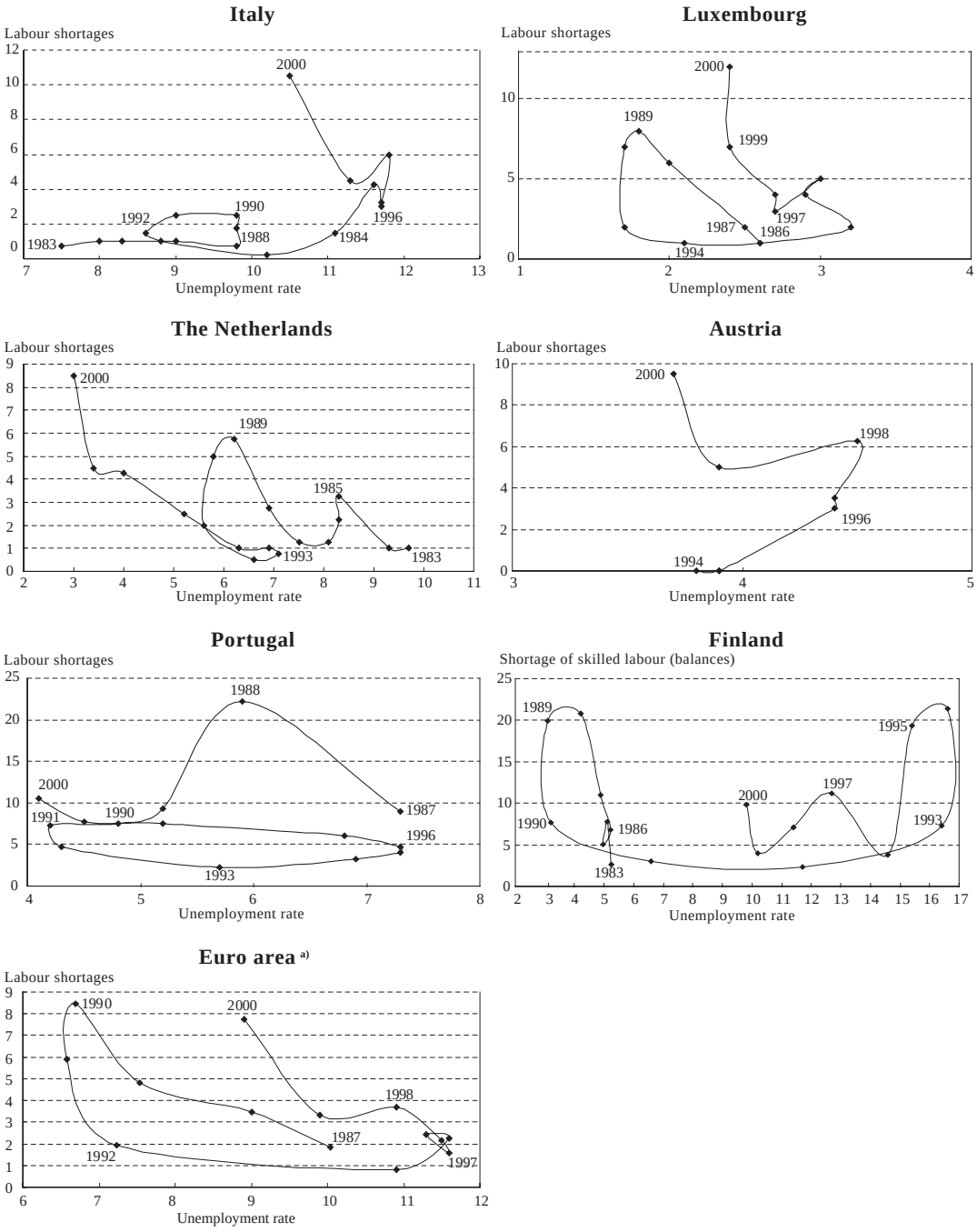


Chart 3 (cont'd)



Sources: EC business surveys, NCBs, BIS, Eurostat (LFS), ECB calculations.
a) Survey data cover 95% of the euro area.

Annex 3

Country-specific information on the development of labour market mismatches

In addition to the Beveridge curves and the specific mismatch indicators calculated in this report, some further information can be useful in assessing the developments in labour market mismatches at an individual country level. In the six countries discussed below, further information qualifies the general assessment made in the main text.

Germany

As employers are not obliged to register vacancies at the Federal Statistical Office, registered vacancies do not cover all vacancies. The ratio of registered vacancies to total vacancies, estimated by the Institute for Employment Research (IAB) on the basis of a survey, is only around 35% and varies over time, tending to be low (high) when unemployment is low (high). However, the Beveridge curve built from survey-based estimates of vacancies and from standardised unemployment rates shows the same broad pattern as the one constructed from registered vacancies and registered unemployment. Therefore, registration problems do not call into question the interpretation of the Beveridge curve. However, the mismatch indicators based on the vacancy structures are strongly affected by registration biases. The standardised unemployment rate, and in particular the long-term unemployment rate, are affected by overreporting in Germany, especially among the elderly. Only a very small proportion of unemployed people aged 55-64 are willing to take up a job, as many of the older unemployed do not plan to start working again and are not actively looking for work. They should therefore be classified as inactive and not as unemployed in the LFS. This phenomenon partly explains the sharp 21 percentage point increase in the long-term unemployment rate between 1990 and 2000.

Spain

The absence of movement in the Beveridge curve at the aggregate level hides diverging patterns across regions. The regions with above-average unemployment rates (Andalusia, Extramadura, Asturias, Cantabria, the two Castiles and Galicia) saw a clear outward shift of their Beveridge curve during the 1990s, whereas the regions with a unemployment rate well below the average, at around 5% (Aragon, Balearic Islands, Navarre, Catalonia and la Rioja), experienced an inward shift over the decade. In addition, vacancy data coverage remains very low, representing between 10% and 20% of total vacancies.

France

For France, the Beveridge curve shows a fairly clear outward movement, suggesting a deterioration in matching efficiency over the 1990s. This conclusion, drawn also by Pisani-Ferry (2000), should be carefully considered. First, the survey data used to build the Beveridge curve only cover the manufacturing sector. Second, the outward shift is somewhat less obvious when one considers the recent period, in particular the year 2000. Indeed, in 2000, recruitment difficulties reported by firms increased much less in reaction to the strong decline in unemployment than in 1990, which could signal a recent improvement in the matching process. This might be partly due to recent labour market reforms and, in particular, the recent measures taken in the area of public placement policy, as encouraged by the Employment Guidelines. Third, although this deterioration in matching efficiency over the 1990s seems to be confirmed by educational and regional mismatch indicators built using data from the LFS and the REGIO database, other indicators based on more disaggregated national data (Enquête emploi, INSEE) provide a more favourable picture of the

developments in educational, occupational and regional mismatch over the decade. This may be partly due to the choice of the time frame. The respective time series provided by Eurostat (LFS) start only in 1992, while mismatches seem to have declined between 1990 and 1992, according to national sources.

Italy

The Beveridge curve based on EC survey data shows an outward shift, pointing to a decrease in matching efficiency compared with the late 1980s. This pattern is confirmed when the survey data are replaced by a "help-wanted" indicator (based on the number of job openings advertised in major Italian newspapers) and when the working-age population (those aged 15-64) is used instead of the unemployed. However, an estimated job matching function gives opposite results, suggesting an increase in matching efficiency (see Brandolini and Cipollone, 2001). Moreover, the other mismatch indicators (educational, regional and occupational) do not show any clear decline in the matching efficiency during the 1990s. Furthermore, the long-term unemployment share decreased markedly by 8 percentage points from 1990 to 2000. The study by Brandolini and Cipollone (2001) confirms that the evidence is rather mixed and does not lend itself to an easy interpretation. In addition, the authors find that, unlike the Beveridge curve, most indicators point to an improvement in matching efficiency over the 1990s in connection with the labour market reforms carried out during the same period. This was accompanied by a lasting and significant regional mismatch.

Luxembourg

According to the LFS and as reported in Table 2 in the main text of this report, the average employment growth rate for Luxembourg stood at 2.3% between 1997 and 2000. However, this rate strongly understates the magnitude of job creation in Luxembourg, because it does not include cross-border workers.

Portugal

The Beveridge curve should be interpreted carefully, because of measurement problems affecting the comparability of vacancy data between the late 1980s and the late 1990s. In the late 1980s, the public employment service had not yet been completely set up. As a result, the unemployment and vacancy statistics were of very poor quality. In addition, vacancy data coverage remains very low, at only 10% of total vacancies.

Annex 4

Indicators of labour market mismatches

Various indicators of labour market mismatches may be considered based on different theoretical concepts. However, there is no preferred indicator for measuring mismatches. The choice of indicators used in this report largely depends on data availability and comparability across different countries and at a disaggregated level for educational attainment, occupations and regions. Problems of data availability, especially for vacancy data, are discussed in more detail in Annex 1.

Beveridge curves

The Beveridge curve is the main tool used to assess changes in the efficiency of matching processes. It is formally defined as the path formed by all those vacancy and unemployment rate combinations, where unemployment is stable, i.e. where the inflow into unemployment is equal to the flow out of it. Given the matching process on the labour market, the higher the level of vacant jobs, the lower the level of unemployment, as the probability of finding a job increases. Movements along the curve (i.e. where vacancies and unemployment move in different directions) reflect cyclical fluctuations in economic activity. An outward shift of the curve, where vacancies and unemployment increase simultaneously, would indicate a decrease in matching efficiency owing to structural factors, such as a more rigid labour market. This means that, at a given unemployment rate, vacancies are more numerous than in the past. Conversely, an inward shift of the curve may indicate an increasing efficiency in matching processes. As, in practice, it might not be straightforward to distinguish between cyclical movements along the Beveridge curve and possible shifts of the curve, this report attempts to identify developments in matching processes by comparing the last two periods of strong economic expansion, i.e. the late 1980s and the late 1990s.

One has to be aware that, by comparing unemployment and vacancy rates, looking at the Beveridge curve will only give a very indirect measure of changes in the efficiency of labour market matching processes as, for example, an outward shift of the curve does not directly imply a deterioration in matching processes.[41] More generally, the curve maps changes in labour market outcomes in terms of unemployment and vacancies, reflecting the interplay of shocks and variations in the degree of labour market adaptability. Moreover, empirical measures of Beveridge curves should be interpreted with some care since vacancy data, when available, are often not representative of total vacancies in the economy, which might bias the analysis. For France, Ireland and Italy, vacancy data are not available. Instead, EC business survey data on labour shortages in the manufacturing sector (i.e. the proportion of firms experiencing labour shortages as the main limit to production) are used. When comparing the traditional Beveridge curve based on vacancy data, when available, and the Beveridge curve plotted with survey data, the patterns lead to a similar assessment of changes in matching processes.

In order to confirm the general assessment arrived at using the Beveridge curve and to determine the nature of the mismatch (educational, occupational or regional), some more specific indicators are applied. They supply information on the *level* of mismatch across countries and the *changes* in matching processes. In order to highlight possible structural changes, the indicators are computed back to 1990. However, the comparison with the previous period of

41 *Nonetheless, the Beveridge curve can be regarded as summarising the outcomes of flows into and out of unemployment and vacancies given the efficiency of the labour market matching process. An increase in unemployment can arise as a result of inflows of job losers and workers leaving their positions of employment. An increase in vacancies can arise from the creation of new employment positions and from workers quitting their jobs. Vacancies can be filled with unemployed persons, formerly employed persons or with persons from outside the labour force. For a discussion, see Bleakley and Fuhrer (1997) and Petrolongo and Pissarides (2001).*

economic expansion in the late 1980s/early 1990s is not always possible since unemployment and employment breakdowns by occupation and educational attainment are available back to 1992 at most.

Unemployment and vacancy duration

An assessment of the *persistence* of the mismatch is provided by the analysis of unemployment duration and vacancy duration.[42] First, a high proportion of short-term unemployment and short-term vacancies (less than six months) could indicate that there is substantial frictional and temporary mismatch between job-seekers and open vacancies. Second, a reduction (increase) in the share of long-term unemployment (short-term unemployment) could suggest a fall in the average unemployment duration and, thereby, an improved matching process (to be viewed in relation to vacancy duration changes). Third, a high level of long-term unemployment in a period of economic expansion might indicate that many job-seekers are durably excluded from the labour market owing to a loss of human capital, lower job search effort and stigma effects (e.g. a hysteresis effect), and are therefore less able to fill open vacancies.

The ***variance of the relative unemployment rate,*** as defined by Lipsey (1960), is:

$$m_U = Var\left(\frac{u_i}{u}\right)$$

where u_i is the unemployment rate for the group *i* and *u* the total unemployment rate. A higher value indicates more dispersed group-specific unemployment rates and therefore greater mismatch. Under certain constraining theoretical assumptions relating to the curvature of the price and wage functions and to the fact that wage behaviour in a sector is caused primarily by unemployment in that sector rather than by unemployment in some leading sector, ½ m_u gives an estimate of the share of total unemployment (expressed in logarithm form) explained by the mismatch across one given dimension.[43] However, in order to avoid discussions on the empirical relevance of these assumptions, the indicator m_u is only used in this report to measure the degree of heterogeneity in the labour market across a limited number of dimensions, usually restricted to educational attainment, occupation and region. Educational and occupational indicators are especially informative since they are calculated according to an identical breakdown across countries, e.g. for the educational breakdown, lower secondary education or less, upper secondary education and tertiary education. Furthermore, unemployment data provided by the LFS or the REGIO database (Eurostat) are standardised.

42 *Vacancy duration is available only for Belgium, Germany, the Netherlands, Austria, Portugal and Finland, i.e. over 45% of the euro area labour force.*

43 *For a discussion, see Layard, Nickell and Jackman (1991), pp. 307-317.*

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