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VÉRONIQUE GENRE
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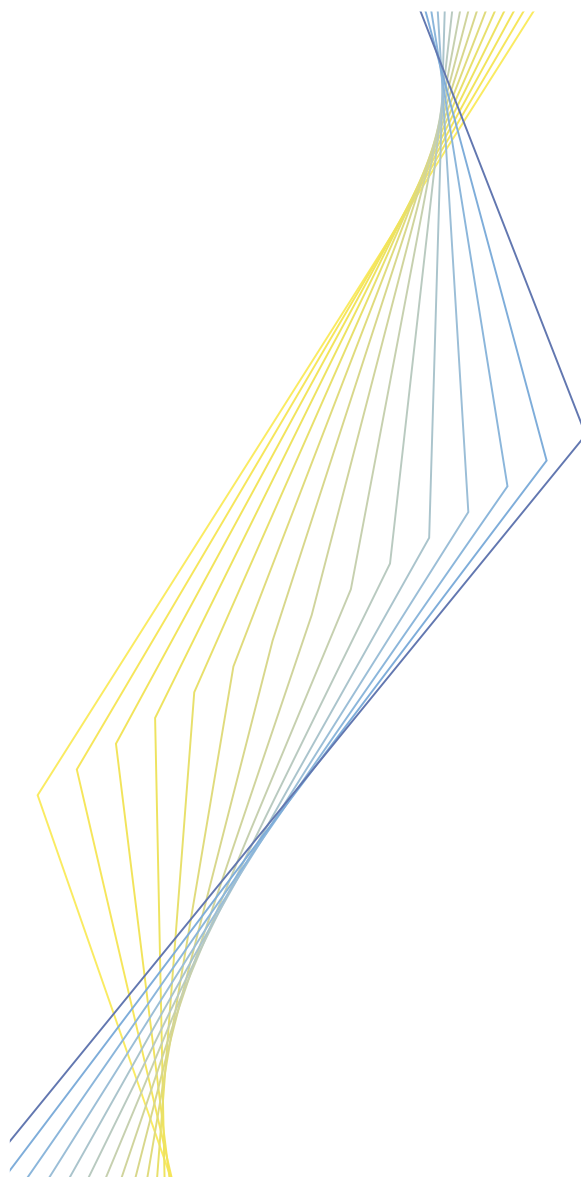
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Introduction[1]

In the context of the second pillar of its monetary policy strategy, the Eurosystem pursues a broadly based assessment of the general outlook for price developments and risks to price stability in the euro area as a whole. This calls for the close monitoring and the careful analysis of a wide range of economic indicators whose developments, directly or indirectly, have some bearing on the overall price climate. Among these indicators, an important variable to monitor is the labour force.

The labour force, which comprises all individuals actively participating in the labour market, i.e. employed (including self-employment) and unemployed, is an important guide to labour supply. Its size, which is influenced by the demographic composition of the euro area population and by incentives to participate in the labour force, can influence labour shortages in the short to medium term. Such shortages could affect the balance of risks to the overall price climate in the euro area. In addition, the analysis of the driving forces behind labour force growth throughout the euro area also facilitates the understanding of long-term trends in a key supply factor of the economy and one of the determinants of potential output.

The aim of this paper is to describe recent developments in the euro area labour force and the main factors behind them, drawing the reader's attention, whenever appropriate, to policy implications. By doing so, the paper fills a gap in the analysis of this variable across the euro area. It also puts labour force developments spanning the last two decades in a historical perspective and draws comparisons with the United States. Finally, the results serve as a basis for the discussion of future developments and, thereby, provide an additional input to euro area economic projections on the assessment of the current and future outlook of the overall price climate.

Executive summary and main conclusions

In the context of the second pillar of its monetary policy strategy, the Eurosystem monitors and analyses a wide range of economic indicators in order to identify the forces which determine the overall price climate. Although, in the long term, the price level is determined by monetary factors, other factors could influence inflation in the short and medium terms; among these factors, developments in the labour market are an important element. By monitoring the labour force, together with employment, it is possible to identify potential medium-term shortages in the labour market and factors which could help to alleviate them. It therefore follows that labour force developments may affect wage developments within the economy.

Over a longer perspective, labour force developments are also linked with potential output growth which provides an overall measure of the aggregate supply capacity of the economy. Indeed, in a production function approach, the rate of growth of potential output depends on growth in the capital stock (higher investment growth and/or lower depreciation), growth in total factor productivity and growth in labour supply (hours worked and/or labour force).

According to initial demographic estimates for 2001, published by Eurostat, the population of the euro area is estimated to be slightly over 300 million. Of this total, around 136 million people make up the labour force, either in employment or actively searching for a job. In the period 1996-2001, the euro area labour force increased by an average of 0.8% per year, compared with average growth rates of 0.3% over the first half of the 1990s. However, the recent growth rate remains below that recorded in the second half of the 1980s, when yearly growth rates averaged 1.2%. Moreover, over the last two decades, the gender imbalance in the labour force relative to the composition of the population has narrowed significantly. Between 1983 and 2001, the percentage of males in the total labour force fell from 62.3% to 57.0%, reflecting a modest decline in male participation and a sharp (more than 10 percentage points) increase in female participation. The age composition of the labour force has also changed quite substantially over the last two decades; for example, the weight of young people (those aged 15 to 24 years old) in the total labour force fell quite sharply, from 19.0% in 1983 to 12.0% in 2001. The percentage of people aged 50 to 64 years old decreased steadily from 20.1% in 1983 to 18.7% in 1996, but rose to 20.4% in 2001.

This Occasional Paper aims to assess the relative importance of the factors behind these developments. It analyses labour force developments in the euro area over the last two decades and seeks to identify the respective influences of working age population growth and changes in participation rates, focusing on age and gender. It also considers the effect of the business cycle on participation rates and includes a comparison of such rates in the euro area and the United States. Finally, it establishes a range for the rate of growth of the labour force in the euro area up to the year 2010, based on population projections compiled by Eurostat.

Driving forces behind labour force growth

Chapter 1 describes the two main forces driving labour force growth, i.e. changes affecting the population (including changes in the rate of growth and shifts in the age composition of the population) and changes in participation rates, and points to a gradually shifting balance between these two influences. In the past, working age population change was the main factor behind labour force growth but in line with the gradual slowdown of total population growth, its contribution has continuously decreased since the early 1980s. By contrast, increase in participation became the main reason for labour force growth during the expansion period 1996-2001. The gradually shifting roles of participation rates and working age population growth call for further explanation. While changes in the

population of working age are essentially driven by long-term demographic trends, participation in the labour force is affected by various factors. Participation rates vary according to gender and age. The participation of women, though still much lower than that of men, has been steadily increasing, partly as the behaviour of the young population cohorts spreads to older groups. The participation of men, by contrast, has steadily declined, though the trend has undergone a slight reversal in the last few years. This reversal is mainly due to higher participation rates in the youngest and oldest age groups, probably reflecting policy measures favouring the incorporation of young people in the labour market and less encouragement for early retirement. Participation is also closely linked to developments in the economic cycle. The estimates presented in this paper confirm the positive effect of economic activity, though a breakdown by gender suggests that the female participation rate is driven by factors of a more structural nature. Finally, the overall participation rate is also affected by the ageing population, leading to an increase in the weight of mid-age groups which tend to have higher participation rates. However, this factor is found to be less important than changes in participation behaviour.

Participation rates in the euro area compared with the United States

Chapter 2 puts the euro area figures in perspective by comparing them with those of the United States. Participation rates are shown to have been higher in the United States than in the euro area, by around 10 percentage points in 2001, though the difference has decreased slightly in the last few years. The main differences between the euro area and the United States concern the participation rates of the younger (15 to 24 years old) and the older (above 55 years old) age groups and, in general, of female age groups. Prime-age men in the euro area, however, tend to show higher participation rates than their counterparts on the other side of the Atlantic. It is also shown that differences in the composition of the population between the two economic areas only offer an explanation for a minor part of the difference in the overall participation rate.

Population and labour force projections in the euro area

Drawing on the observations made in the previous chapters, Chapter 3 presents tentative and illustrative scenarios for labour force growth in the euro area for the next decade. Based on population projections compiled by Eurostat and different assumptions for changes in participation rates, five scenarios for labour force growth are presented. The contribution of population growth to labour force developments is expected to continue to play a shrinking role, assuming there are no significant changes in net immigration compared to recent years. Inflows into the labour force are therefore expected to be mostly linked to further changes in participation behaviour. The growth in the labour force varies from 0.04% per year, on average, for the period 2002-2010, when participation rates are maintained at the level of 2001, to 1.4% when a convergence of the euro area to the current participation rate levels recorded in the US is assumed in 2010. Intermediate assumptions would imply, on average, an increase in the labour force of 0.5-1.0% per year. This range would imply a participation rate of 70.6-73.4% for the economy as a whole (between 77.2% and 78.3% for men and between 63.8% and 69.5% for women).

On the basis of recent developments in the labour force, it can be concluded that labour supply should neither prevent sustained economic growth nor be a risk to price stability in future years. However, given the small contribution expected from population growth, a continuation of labour market policies

to encourage participation will be needed if the targets agreed in the Conclusions of the Lisbon European Council in March 2000 and in the Employment Guidelines for 2001 – to raise the overall employment rate across the European Union to around 70% by 2010, and to more than 60% in the case of women – are to be met.

1 Driving forces behind labour force growth

In order to place labour force growth and its determinants in the relevant analytical context, Table 1 shows developments in the labour force within the euro area between 1980 and 2001, as determined by two driving forces: working age population[2] growth and the change in the participation rate. In addition, it breaks down developments in the labour force into developments in employment (including self-employment) and unemployment. Four periods are distinguished: 1980-85, 1986-90, 1991-95 and 1996-2001. While the second and fourth periods cover economic expansions, the first and the third were characterised by weak economic growth. These four periods allow the analysis of two consecutive economic cycles and therefore the identification of cyclical and trend factors explaining labour force developments.

This Occasional Paper focuses on the euro area as a whole. However, for reference and comparison purposes and to draw attention, even if only briefly, to the high degree of diversity of national situations within the euro area, Annex II reports individual Member States' positions with regard to current participation rates and labour force developments since the early 1980s.

Table 1

Working age population, labour force and participation rate in the euro area[1]

(annual percentage changes, unless otherwise indicated)

	1980-1985	1986-1990	1991-1995	1996-2001	1980-2001
Working age population growth	1.0	0.6	0.4	0.2	0.5
Participation rate[2]	63.6	65.6	65.1	67.5	65.4
Change in participation rate[3]	-0.03	0.4	-0.1	0.4	0.2
Unemployment rate[4]	10.7	8.8	11.4	8.4	9.8
Change in unemployment rate[3]	0.9	-0.4	0.5	-0.5	0.1
Labour force growth	0.9	1.2	0.3	0.8	0.8
Population growth effect[5]	1.0	0.6	0.3	0.1	0.5
Participation rate effect[5]	-0.1	0.6	0.0	0.7	0.3
Employment growth	-0.1	1.6	-0.3	1.3	0.6
Labour force growth effect[5]	1.0	1.3	0.3	0.9	0.9
Unemployment growth effect[5]	-1.1	0.3	-0.6	0.4	-0.3

Sources: Eurostat and ECB calculations.
1) Average over the period. In the four sub-periods, GDP growth was 1.5%, 3.4%, 1.3% and 2.4% respectively.
2) Labour force as percentage of working age population at the end of the period, except in the last column, which reports an average of the four periods. Euro area participation rate in 1980 was 63.9%.
3) Expressed as percentage points.
4) Percentage of the labour force at the end of the period, except in the last column, which reports an average of the four periods. The euro area unemployment rate in 1980 was 5.7%.
5) Expressed as percentage points contributions.

Focusing first on the driving forces of the euro area labour force, it appears that working age population growth, which can be considered to be exogenous, has been on a downward trend throughout the entire period. On average, the annual rate of growth has slowed from 1.0% in 1980-85 to 0.2% in 1996-2001, pointing to a future stabilisation of or even a decrease in the working age population. At the same time, the participation rate has shown a clear cyclical pattern. Both in the early 1980s and 1990s, it fell slightly in response to the slowdown in economic activity, increasing in the second half of both decades when activity resumed.

2 The working age population refers to the population aged between 15 and 64 years. See Glossary in Annex I for a detailed description of the main concepts mentioned.

Overall, the participation rate showed an upward trend for the period as a whole. Given the combined effect of these two forces (changes in population growth and in participation rates), it appears that labour force growth slowed during periods of weak economic growth and gathered pace during expansions. This can be seen in the different annual rates recorded in the first and second half of both decades (from 0.9% to 1.2% in the 1980s and from 0.3% to 0.8% in the 1990s) and illustrates the cyclical behaviour of participation rates. In addition, the magnitude of labour force growth during expansion periods diminished between the two decades, mainly due to the declining role played by population growth (see Section 1.1).

The results of the study of specific labour force components (i.e. employment and unemployment) reveal that over the four periods their developments were inverse. In response to economic growth, employment increased during expansionary periods by 1.6% per year in the 1980s and 1.3% per year in the 1990s, absorbing the increasing labour force. This led to unemployment rate reductions of around 0.5 percentage point, on average, per year for both periods. By contrast, during periods of weak economic growth, the fall in

employment (-0.1% in 1980-85 and -0.3% in 1991-95), together with a slight increase in the labour force, implied a significant increase in the unemployment rate (on average 0.9 and 0.5 percentage point per year respectively). Alternatively, the same developments can also be seen when breaking up employment developments into labour force and unemployment contributions (see lower portion of Table 1).

Several studies confirm that labour force growth responds to the cyclical position of the economy through the participation rate (see for instance Darby et al., 1998, and Cutler and Turnbull, 2001). The argument supporting this assertion is that strong economic growth leads to increased employment and to a fall in the unemployment rate, which sends a positive signal to those not participating in the labour market, i.e. those neither working nor seeking a job. Conversely, an economic slowdown tends to discourage potential workers from participating at all. However, changes in the population also play a role, both in terms of growth and composition. Furthermore, it is also important to look at developments by gender because participation rates differ between men and women.

1.1 The combined effect of population growth and participation behaviour

Changes in the labour force can be classified according to two effects: those of population growth, which take into consideration changes in working age population for given participation rates for each gender and age group, and those of changes in labour force participation, through changes in the participation rate for a given working age population.

As expected, considering the long-term slowdown of population growth, the results (see Table 1) show the increasing importance of the participation rate during economic expansions. Indeed, in the most recent period (1996-2001), the effect of changes in the participation rate has exceeded those of

population growth, contributing 0.7 and 0.1 percentage point per year respectively, to the change in the labour force. This situation contrasts with the late 1980s, when the two effects were similar (i.e. a contribution of 0.6 percentage point in both cases). Finally, during both periods of weak economic growth, i.e. the first half of the 1980s and 1990s, the increase in the labour force was fully explained by population growth (which was much faster in the 1980-85 period than in 1991-95).

In addition to the effect of working age population growth, labour force developments are also influenced by the indirect impact of shifts in the age composition of the population

on participation rates. Comparing the two expansionary periods, i.e. 1986-90 and 1996-2001, both changes in the age composition of the population and changes in the participation behaviour of different age groups seem to have contributed to an increase in participation rates (see Chart 1). Mid-age categories (30-49 years old), which tend to have the highest rates of participation, increased their relative weight in the population in 1996-2001 compared with 1986-90. At the same time, all age categories experienced an increase in labour force participation, with the exception of the youngest and the oldest age groups. In order to examine the importance of changing population composition in relation to changes in participation behaviour, the participation rate by gender can be calculated from observed 1996-2001 participation rates using 1986-90 population weights. The results are shown in the table in the box below. Compositional changes had an impact in the case of both genders. However, whereas for men this impact was outweighed by a reduction of participation for all age groups, for women, the increase in participation – in all groups but the youngest and the oldest – contributed much more to the sharp increase in the overall participation rate between the two periods.

In sum, by contrast with the end of the 1980s, changes in participation have turned out to be a more important factor behind the increase in the labour force in recent years than working age population growth, due to the slowdown in the latter. The next section examines the labour force in terms of breakdown by gender and age.

Chart 1

Age distributions and participation rates in the euro area

(as a percentage of working age population)
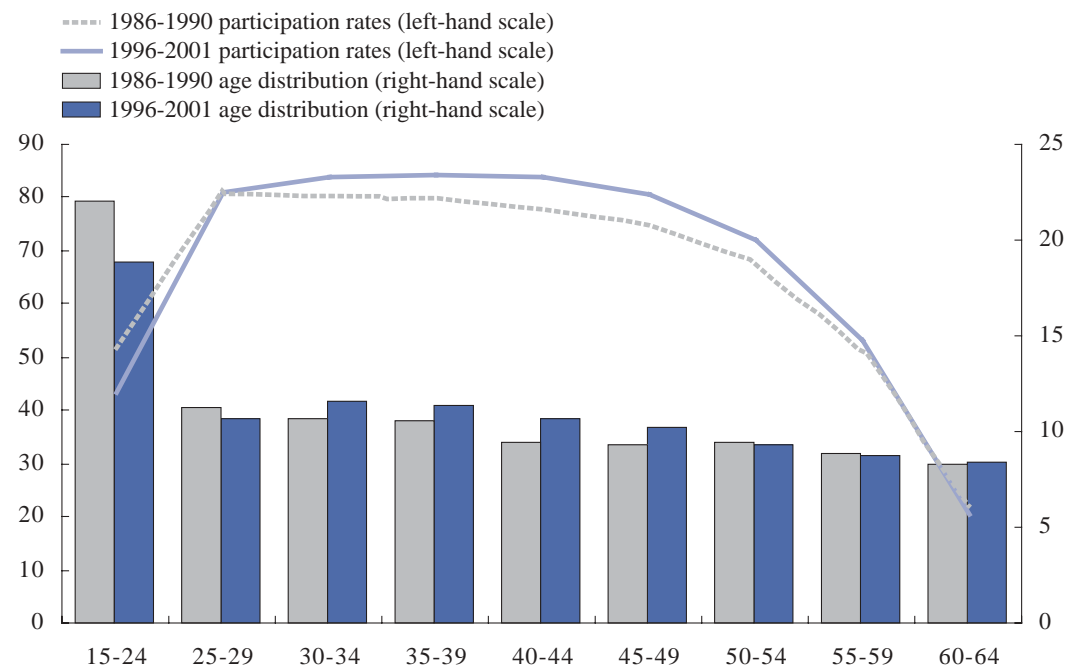
Sources: Eurostat and ECB calculations.

Box 1

The effects of compositional changes in population and of changes in participation behaviour on the participation rate

The increase in the overall participation rate may be the result of changes in participation rates across population age groups and also compositional changes in the population itself. For instance, the overall participation rate may increase even if participation rates for all age and gender groups remain constant, solely due to the effect of an ageing population increasing the weight of mid-age groups which tend to have higher participation rates. This box quantifies the effect of the two components in explaining the increase in the overall participation rate between the two expansions considered, i.e. 1986-90 and 1996-2001.

The breakdown of the participation rate indicated (see Table) is based on the following identity:

$$pr^{1996\text{-}2001} - pr^{1986\text{-}90} = \sum_i \alpha_i^{1996\text{-}2001} pr_i^{1996\text{-}2001} - \sum_i \alpha_i^{1986\text{-}90} pr_i^{1986\text{-}90} \tag{1}$$

where $pr^{1986\text{-}90}$ and $pr^{1996\text{-}2001}$ are the overall participation rates for the two expansions, on average, and α_i and pr_i are respectively the weight in total population and the participation rate of the gender and age group i, in each period. This equation can also be written as follows:

$$pr^{1996\text{-}2001} - pr^{1986\text{-}90} = \sum_i pr_i^{1996\text{-}2001}(\alpha_i^{1996\text{-}2001} - \alpha_i^{1986\text{-}90}) + \sum_i \alpha_i^{1986\text{-}90}(pr_i^{1996\text{-}2001} - pr_i^{1986\text{-}90}) \tag{2}$$

where the first part of the formula computes the population composition effect and the second part the participation rate effect. Considering the different behaviour of male and female participation, the analysis is carried out for each gender group separately. The table shows the change in participation rates from the first period (1986-90) to the second period (1996-2001) for both gender groups, and the contribution to that change of each effect broken down by age group.

Change in male and female participation rates during the periods 1986-90 and 1996-2001: compositional changes in population versus changes in participation rates by age group

Change in total participation rate *of which*	Women 5.6 percentage points		Men -2.6 percentage points	
	Population effect (in percentage points)	Participation effect (in percentage points)	Population effect (in percentage points)	Participation effect (in percentage points)
15-24 years	-1.3	-2.1	-1.5	-2.1
25-29 years	-0.4	0.6	-0.4	-0.4
30-34 years	0.7	0.9	0.9	-0.2
35-39 years	0.6	1.0	0.7	-0.1
40-44 years	0.9	1.3	0.9	-0.1
45-49 years	0.7	1.2	0.8	-0.1
50-54 years	-0.1	1.0	-0.2	-0.2
55-59 years	-0.1	0.8	-0.1	-0.3
60-64 years	0.0	0.0	0.1	-0.4
Total contribution:	1.1	4.5	1.3	-3.9

Sources: Eurostat and ECB calculations.

During the periods 1986-90 and 1996-2001, the participation rate of women increased by 5.6 percentage points, while in the case of men, for the same periods a fall of 2.6 percentage points was recorded. A positive value for either the population effect or the participation effect for each age group indicates that this element has contributed to the overall increase in participation rate. A negative value indicates the opposite is true. For example, the population effect in the case of women aged 25-29 years old reduced the increase in total participation by 0.4 percentage point over the two reference periods. Meanwhile, the participation

effect for the same female age group contributed 0.6 percentage point to the increase in the total participation rate.

The results show that the increase in overall female participation during the second half of the 1980s and the second half of the 1990s is mainly the result of changes in participation rates. This is true for all age groups except the youngest, which had a negative contribution due to a decrease in the participation rate, and the oldest, the participation rate of which remained unchanged for both periods. Especially significant is the increase in participation of women aged between 40 and 49 years. The effect of the change in population composition was also positive for women, given the increase in the weight of age groups between 30 and 49 years of age which have high participation rates.

Turning to the data concerning the male labour force, the decrease in the overall participation rate was the result of the decline in participation rates for all ages, although this is more marked among the youngest and the oldest age groupings. These negative effects are only partially offset by the positive effect of the compositional changes in population. As in the case of women, the weight of mid-age male groups increased in the population, contributing positively to the overall participation rate.

1.2 Changes in participation rates: breakdown by gender and age group

The breakdown of labour force growth showing the effect of working age population growth and participation rate changes by gender reveals two contrasting developments (see Table 2). On the one hand, the female labour force grew during all four periods, mainly as a result of rising participation rates, which contributed between 0.8 and 1.9 percentage points per year to female labour force growth. By contrast, population growth effects have been much less significant, except in 1980-85. Male labour force growth, on the other hand, clearly below that of women, generally experienced negative contributions from changes in the participation rate but positive contributions, although decreasing in size, from population growth. This led to an increase in the male labour force during the 1980s, driven by the growth in population, while, in the 1990s, male labour force growth was more cyclical, linked to changes in participation. Indeed, in the first half of the 1990s, the decrease in male labour force was due to a fall in participation rates, while in the second half of the decade an increase in male participation can be observed.

Table 2

Labour force growth and participation rates in the euro area: breakdown by gender[1]

(annual percentage changes, unless otherwise indicated)

| | 1980-1985 | | 1986-1990 | | 1991-1995 | | 1996-2001 | |
	Men	Women	Men	Women	Men	Women	Men	Women
Labour force growth	0.4	1.8	0.5	2.3	-0.2	0.9	0.4	1.3
Population growth effect[2]	1.4	0.9	0.7	0.4	0.4	0.1	0.2	0.1
Participation rate effect[2]	-1.0	0.9	-0.2	1.9	-1.2	0.8	0.2	1.2
Participation rate[3]	79.8	47.8	78.9	52.4	76.1	54.1	77.0	58.0
Change in participation[4]	-0.5	0.4	-0.2	0.9	-0.6	0.3	0.2	0.7

Sources: Eurostat and ECB calculations.
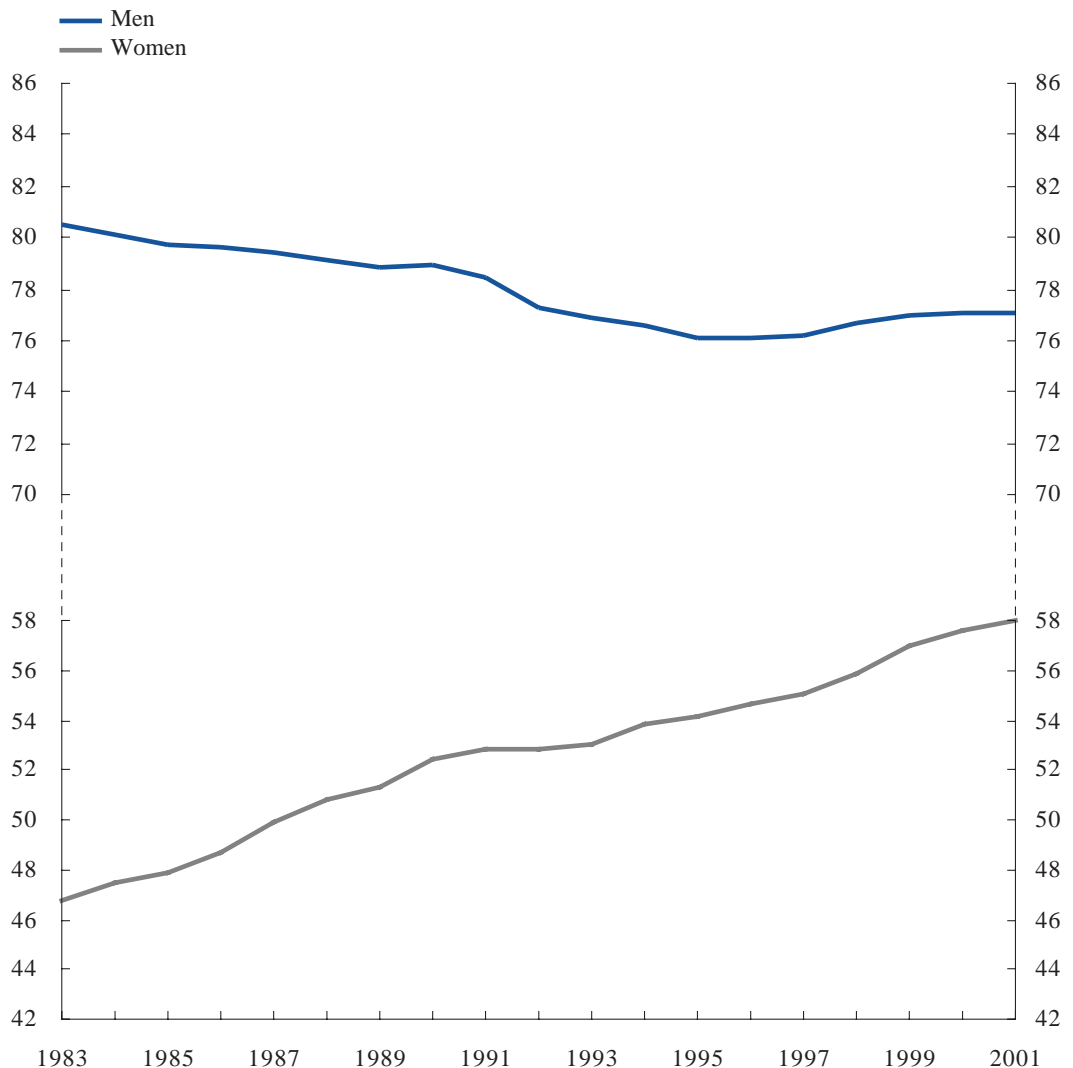*1) Average for the period.*
2) Percentage point contribution to the labour force growth.
3) Percentage of working age population at the end of the period.
4) Percentage points.

Chart 2

Participation rates by gender

(as a percentage of working age population)

Sources: Eurostat and ECB calculations.

Chart 2 confirms that between the early 1980s and mid-1990s, male participation decreased continuously, falling more strongly during periods of weak economic growth, whereas in recent years it has started to increase. In the period 1996-2001, it rose by an average of 0.2 percentage point per year. By contrast, female participation has increased throughout the entire period.

The breakdown by age indicates that changes in male participation rates when comparing the two expansionary periods are mainly the result of changes in the younger and older population groups. Between 1986 and 1990 the participation rate of all male age groups decreased (Chart 3), but between 1996 and 2001 male participation rates in most age groups increased, especially among those aged under 24 and above 50 years old. This contrasts with the increase in female participation rates which was spread over most age groups in both periods, although the rates increased to a lesser extent in the second period for those aged between 25 and 44 years old (see Chart 4).

Chart 3
Male participation rate
(as a percentage of working age population)
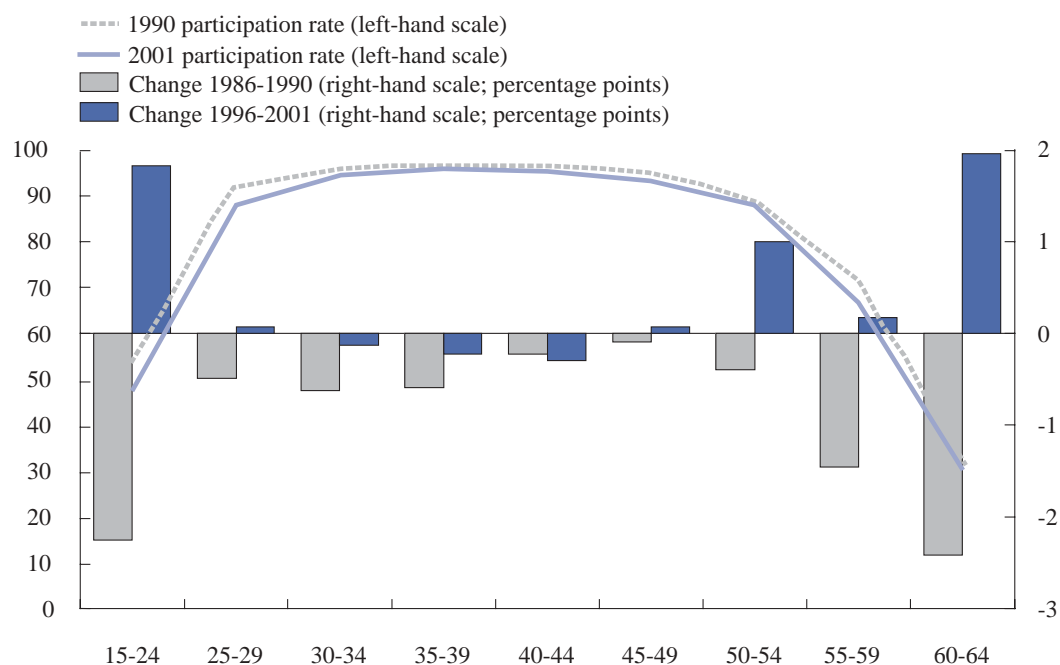
Sources: Eurostat and ECB calculations.

Chart 4
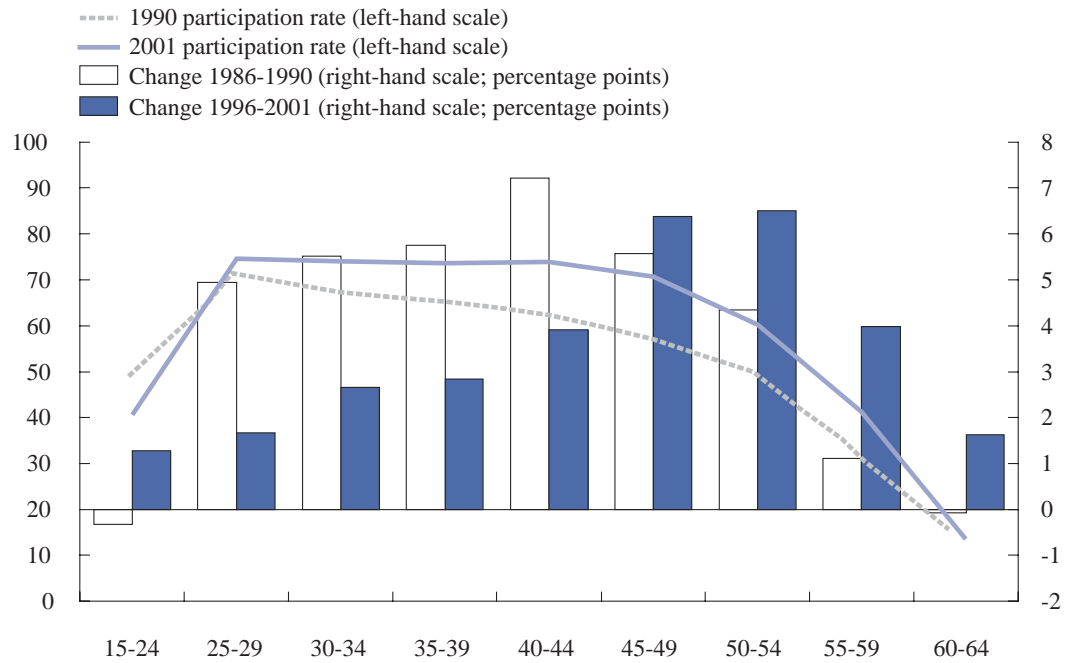
Female participation rate

(as a percentage of working age population)

- ····· 1990 participation rate (left-hand scale)
- —— 2001 participation rate (left-hand scale)
- ☐ Change 1986-1990 (right-hand scale; percentage points)
- ■ Change 1996-2001 (right-hand scale; percentage points)

Sources: Eurostat and ECB calculations.

The change in the participation behaviour of younger male age groups over the last few years may be related to labour market policies encouraging young people to enter the labour market (training programmes, temporary and part-time contract schemes, etc). At the same time, the increase in the participation rate of men above 60 years old may be related to a reduction in early retirement schemes (see

Chart 5). While some of these policies have also had a similar effect on women, the upward trend in female participation is also due to other factors, such as changes in cultural habits. In 1996-2001 these factors continued to have a significant positive impact on participation of women above 45 years old, while, compared with 1986-90, they seem less important for those aged below 45 years.

1.3 Changes in participation rates: the influence of economic conditions

Increases in participation rates tend to be attributed to improvements in economic conditions and to underlying trends. Under-lying trends are generally associated with changes in the population composition and with long-term behavioural changes, such as changes in participation habits. In order to assess to what extent these factors can explain recent developments in the euro area, the following model is estimated for a panel of euro area countries:

$$\ln(l/p)_{it} = \alpha_0 + \alpha_1\ln(l/p)_{it-1} + \alpha_2\ln u_{it} + \alpha_3 t + \upsilon_i + \varepsilon_{it} \qquad (1)$$

where l/p is the participation rate, the lag of which is included among the explanatory variables to capture persistence; u is the unemployment rate, which captures the discouragement effect – i.e. the higher the unemployment rate the lower the incentive to participate; t is the trend component, included to capture behavioural and compositional

Chart 5

Public expenditure on labour market programmes in the euro area[1]

(as a percentage of GDP)

Early retirement programmes
Youth measures
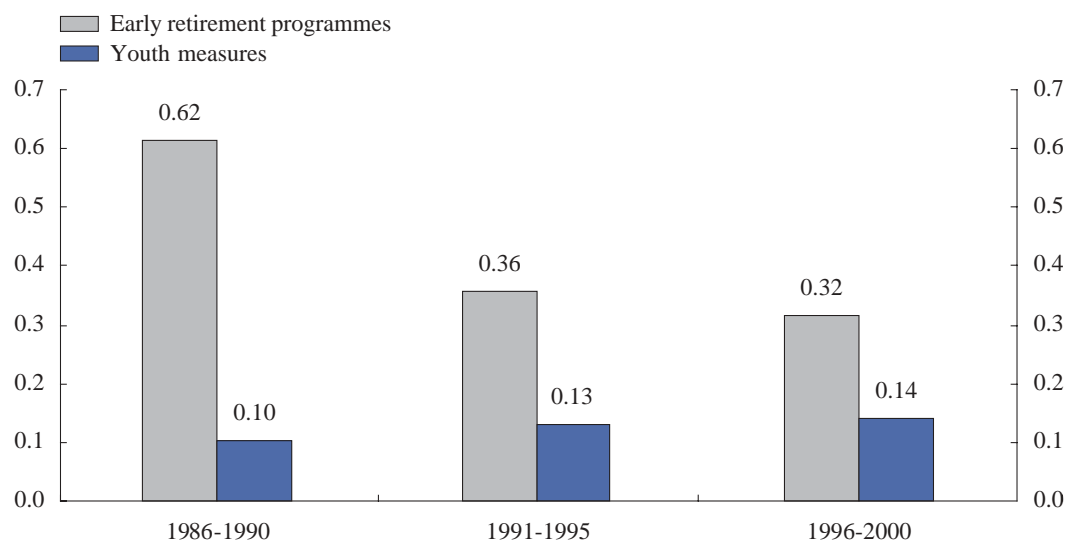
Sources: OECD and ECB calculations.
1) *Data on early retirement programmes cover all euro area countries except Italy. Youth measures data refer only to Austria,*
  Belgium, Finland, France, Ireland, Luxembourg and Portugal.

changes; and finally, υ is an unobserved country component, which captures the specific institutional framework in each country and is expected to correlate with the participation rate. In order to separate cyclical from structural factors, both captured by the unemployment rate, a second equation including an estimate of the structural and cyclical components of the unemployment rate has been estimated. The trend of the unemployment rate, obtained using the Hodrick-Prescott filter, is a proxy of the structural component (*sur*), while the difference between the structural component and the observed unemployment rate is a proxy of the cyclical component (*cur*).

Table 3 summarises the results of the panel data estimates including all euro area countries. Panel data techniques provide more robust results by introducing more variability, given the relatively low number of observations (annual data sets from 1983 to 2001 for each country). The estimates of equation (1) for the euro area aggregate show that the unemployment rate has, as expected, a significant and negative effect on participation (see Table 3, column 1), i.e. a declining unemploy-

ment rate increases the rate of participation and vice versa. This is reflected in the negative sign of the contemporaneous unemployment rate. Moreover, the participation rate shows a high level of persistence (the first lag is positive and significant) and follows a positive trend. This positive trend, as shown by the gender estimates, is related to behavioural changes in female participation. Indeed, estimation by gender reveals different patterns for men and women. First, economic conditions affect female participation slightly more than male participation. This result is consistent with those of other studies, e.g. Elmeskov and Pichelman (1993), and may indicate a less stable relationship of women with the labour market. Second, as already noted, female participation follows a positive trend, while the trend for men has been negative. When a quadratic trend variable is included in the equations to capture changes in the slope of the trend, it is found to be significant only for men. This indicates that a continuation of the falling trend in male participation is not to be expected. By contrast, the quadratic trend is not significant for women, suggesting that female participation will continue to rise.

The separation between the structural and the cyclical factors gives the expected results (see Table 3, column 2). On the one hand, structural unemployment is found to be negative and significant, i.e. the higher the structural unemployment rate the lower the motivation to participate. On the other, although it has a relatively low significance, the cyclical component appears to be positive, i.e. if the unemployment rate observed is below the structural component there is an incentive to participate. A similar result is obtained when the cyclical unemployment rate is replaced with an estimate of the output gap, although the latter variable is found to be less significant. Looking at the results by gender, it appears that the structural unemployment rate affects the participation rate of women more than that of men, while the cycle, although positive in both cases, is found to be more significant for men. It is possible, however, that structural unemployment captures other structural variables not included in the equation which have a more significant impact on female participation than on male participation.

Table 3

Panel data estimates of euro area participation rates

(all variables in first differences)

	Total		Women		Men	
Ln l/p$_{-1}$	0.749	0.738	0.799	0.753	0.728	0.730
	(18.17)	*(17.01)*	*(15.20)*	*(12.01)*	*(14.44)*	*(14.97)*
Ln ur	-0.014		-0.015		-0.012	
	(4.29)		*(2.61)*		*(3.48)*	
Ln sur		-0.024		-0.030		-0.017
		(5.30)		*(4.62)*		*(3.74)*
Ln cur		0.006		0.004		0.006
		(1.26)		*(0.54)*		*(1.27)*
Trend	0.001	0.001	0.003	0.003	-0.002	-0.002
	(4.54)	*(4.56)*	*(3.32)*	*(3.39)*	*(2.74)*	*(2.62)*
Trend squared					0.0001	0.0001
					(2.66)	*(2.42)*
Number of observations	177	177	177	177	177	177
Sargan test (Probability > χ^2)	0.95	0.99	0.97	0.99	0.99	0.99
Second order autocorrelation (m$_2$)	0.17	0.00	0.36	0.28	0.33	0.20

The equations are estimated by instrumental variables using the dynamic panel estimator package (DPD) developed by Arellano and Bond (1991), which derives a Generalised Method of Moments estimator. Ln ur, Ln sur and Ln cur are treated as predetermined variables instrumented by the level lagged two periods. The Sargan test of over-identifying restrictions follows a chi-squared (χ^2) distribution; the probability shows the level of acceptability of the null hypothesis that the instruments selected are valid. Robust t-values are indicated in brackets. m$_2$ measures second-order autocorrelation in the first-difference errors and follows an N(0, 1) distribution; according to the assumptions of the Arellano and Bond methodology, this autocorrelation should not be significant.

In conclusion, the estimates show the relevance of both cyclical and structural aspects in determining participation behaviour. Moreover, the estimates confirm the important differences between gender. Female participation tends to be more determined by structural factors, while the cycle is relatively more important in influencing male participation.

The growing influence of changes in partici-pation behaviour to explain labour force growth in the euro area raises the question of whether this is a common development among industrial countries and, if so, whether it is likely to continue in the coming years. The following section draws a comparison of participation rates by gender and age between the euro area and the United States[3].

---

3   *The labour force in the United States (some 140 million people) is similar in size to that of the euro area.*

2 Participation rates: a comparison between euro area and the United States[4]

In 2001 the overall participation rate in the United States was close to 77% of the working age population, i.e. around 10 percentage points above the rate in the euro area (see Table 4). The gap between the euro area and the United States is wider in the case of women (12.5 percentage points) than in men (6.4 percentage points).

The breakdown by age shows that both in the United States and the euro area, those aged between 25 and 54 years old show the highest levels of participation. This is above 90% on average for men and over 70% for women, except for those in the euro area who fall in the 45-54 age group, in which case it is slightly above 65%. Participation rates are quite similar for mid-age groups on both sides of the Atlantic, being even slightly higher for men aged between 35 and 54 in the euro area. This higher participation rate for male mid-age groups in the euro area is, however, an exception. In general, participation rates in the euro area are lower, especially for women.

Important differences between US and euro area participation rates also exist for the youngest and oldest age groups. As a rule, younger people participate much less in the labour force in the euro area than their US counterparts. In the euro area, young men aged under 24 have a participation rate of 47.7% while the corresponding US rate is 67.1%. This gap of around 20 percentage points also appears when comparing participation rates for young women, whose participation is, on average, slightly below that of men. A large gap is also found for older age groups. Men between 55 and 59 years old in the euro area have a participation rate below 70%, while the participation rate of their US counterparts is 10 percentage points higher. This gap is even greater in the case of women – around 20 percentage points. Moreover, whereas more than half of men above 60 years of age still participate in the US labour force, less than a third of men in the euro area do so. Once again, the difference is even more striking among women. Women's participation rates drop sharply in the euro area to 13.6% for the 60-64 age group, while more than 40% of American women in the same age group still participate in the labour force.

4 A comparison between US and euro area labour market developments in a more long-term perspective is given in the article "Developments in and structural features of the euro area labour markets", published in the May 2000 issue of the ECB's Monthly Bulletin.

2.1 Developments in participation rates since the early 1980s

The results described above correspond to 2001. In 1983, however, the overall picture of labour force participation on both sides of the Atlantic was different. Since then, both the United States and the euro area have witnessed a rapid increase in female participation rates and a slow decrease in male participation (see Table 5). Nevertheless, the magnitude of these changes has been greater in the euro area, where the participation rate of women increased from 46.9% in 1983 to 58.0% in

2001, a rise of 11.1 percentage points, compared with a rise of 8.6 percentage points in the United States. The female's participation rate in the United States was already 61.9% in 1983, above the corresponding rate in the euro area for 2001. By contrast, the participation rate of men fell from 80.5% to 77.0% of the working age population over this period in the euro area, while the American participation rate for men fell by only 1.7 percentage points to 83.4%.

Table 5

Participation rates by gender and age groups in the euro area and the United States and the change from 1983 to 2001

(as a percentage of working age population)

	Euro area				United States			
	1983		Percentage point difference in 2001		1983		Percentage point difference in 2001	
Participation rate	63.4		*4.1*		73.2		*3.6*	
– By gender:	**Men** 80.5	**Women** 46.9	**Men** *-3.5*	**Women** *11.1*	**Men** 85.1	**Women** 61.9	**Men** *-1.7*	**Women** *8.6*
– By age group and gender:								
15-24[1]	56.4	47.3	*-8.7*	*-6.7*	72.5	61.9	*-5.4*	*0.3*
25-34	95.3	60.7	*-3.6*	*13.6*	94.2	69.0	*-1.5*	*6.8*
35-44	97.5	53.8	*-2.0*	*20.0*	95.3	68.7	*-2.8*	*8.4*
45-54	93.2	46.3	*-2.4*	*19.2*	91.2	61.9	*-2.7*	*14.5*
55-59	74.3	30.7	*-7.2*	*10.6*	80.7	48.8	*-3.4*	*12.8*
60-64	40.2	13.5	*-9.7*	*0.1*	57.0	33.8	*-0.5*	*8.6*

Sources: Eurostat and OECD.
1) US data refer to the 16-24 age group.

The increase in female's labour force participation which characterised the second half of the twentieth century can be explained by several factors. These include the general rise in labour demand, more widely available education for women, which raised their earnings potential (see Bover and Arellano, 1994), and changes in family structures, mainly due to falling birth rates and increasing divorce rates. It is also linked to technological progress. An increasing number of goods and services which used to be produced at home have become available for purchase in the market, in greater variety, and households have

acquired appliances which reduce the amount of time spent on housework. These were often expensive and gave women further incentive to enter the labour market (see Jacobsen, 1999). Turning to male participation, the falling trend may be due to the increased replacement of male labour by female labour, and to the declining demand for labour in predominantly male sectors – manufacturing in particular. Other factors include greater household earnings due to an increase in female employment, which enables men to retire earlier.

In terms of age groups, two additional and quite pronounced differences are evident in the development of US and euro area participation rates since 1983. Firstly, the participation of the youngest age group in the euro area is much lower in 2001 than in 1983. The participation rates of young men and women have decreased by more than 5 percentage points – to 47.7% and 40.6% respectively – in the euro area over the last eighteen years. The participation rates of young Americans did not fall so substantially; the participation rate of young men decreased by around 5 percentage points to 67.1%, while the participation rate of young American women remained broadly unchanged at around 62.0%. There is clear evidence that the young have tended to postpone their entry into the labour force in the euro area. One reason for this may be the high rates of unemployment among this age group, and also higher subsidies for education (i.e. government contribution to education costs), which reduce the incentives for students to combine school and work (see Blau and Kahn, 1997). Secondly, the oldest age group in the euro area displays a clear declining pattern of participation, while those above 60 years of age in the United States tend to participate more in the labour force than they did in 1983. The participation rate of men aged above 60 years fell from 40.2% to 30.4% in the euro area, while it remained stable for women (at around 13%). In the United States, the participation rate for this age group remained broadly stable for men (slightly above 55%) and increased for women (from 33.8% to 42.4%). Several studies have indicated that social security systems, occupational pension schemes and early retirement policies provided strong incentives in Europe to retire early (see Börsch-Supan, 2000 and Johnson, 2000).

2.2 Accounting for differences in the population composition and in participation rates

To explain the difference in participation rates between the United States and the euro area, it is important to distinguish between the role of population composition effects and that of participation rates. Table 6 shows a breakdown of the difference in participation rates using the following identity:

$$pr^{US} - pr^{EA} = \sum_i \alpha_i^{US} pr_i^{US} - \sum_i \alpha_i^{EA} pr_i^{EA} \qquad (2)$$

where pr^{US} and pr^{EA} are the aggregate participation rates for the United States and the euro area respectively for the year 2001, and α_i and pr_i are the weight in total population and the participation rate of the gender and age group i respectively. This equation can also be written as follows:

$$pr^{US} - pr^{EA} = \sum_i pr_i^{EA}(\alpha_i^{US} - \alpha_i^{EA}) + \sum_i \alpha_i^{US}(pr_i^{US} - pr_i^{EA}) \qquad (3)$$

where the first part of the formula computes the population composition effect for a given euro area participation rate and the second part the participation rate effect for a given US population composition.

Analysis of the difference in participation rates between the United States and the euro area

(percentage point contributions; 2001)

	Contribution of differences			
	in population weights		in participation rates	
	Men	**Women**	**Men**	**Women**
– By age group:				
15-24[1]	3.1	3.0	20.5	22.7
25-34	-6.0	-0.1	1.1	1.8
35-44	8.2	9.2	-3.9	4.5
45-54	3.1	4.7	-2.7	12.8
55-59	-4.0	-1.7	4.0	8.5
60-64	-4.5	-1.9	7.9	9.8
TOTAL	-0.1	13.2	26.9	60.0

Sources: Eurostat, Bureau of Labor Statistics and ECB calculations.
1) US data refer to the 16-24 age group.

Table 6 confirms that the difference between the US and the euro area participation rates, which was close to 10 percentage points in 2001, is explained more by the differences in participation rates than by those in the population composition. In fact, population weights only play a more important role in the case of the 35-44 age groups (both male and female) since this category has a higher weight in the US. Looking at the differences in participation rates, it is worth noting that in male participation the difference is concentrated in the youngest age group, which contributes 20.5% to the difference. By contrast, in female participation, all age groups positively contribute to the difference between the US and the euro area (a total of 60.0%), although the youngest age group and those between 45 and 54 years old appear to be the most important contributors.

3 Population and labour force projections in the euro area

In 1999, Eurostat compiled long-term demographic forecasts from data obtained from National Statistical Institutes (see Annex 1 – Data sources and presentation). These forecasts are used to review the implications of projected changes in the age composition of population on the labour force. Demographic forecasts are based on assumptions on fertility, mortality and migration. As far as the working-age population is concerned, population projections are fairly reliable up to the year 2010, barring unforeseen migration movements[5].
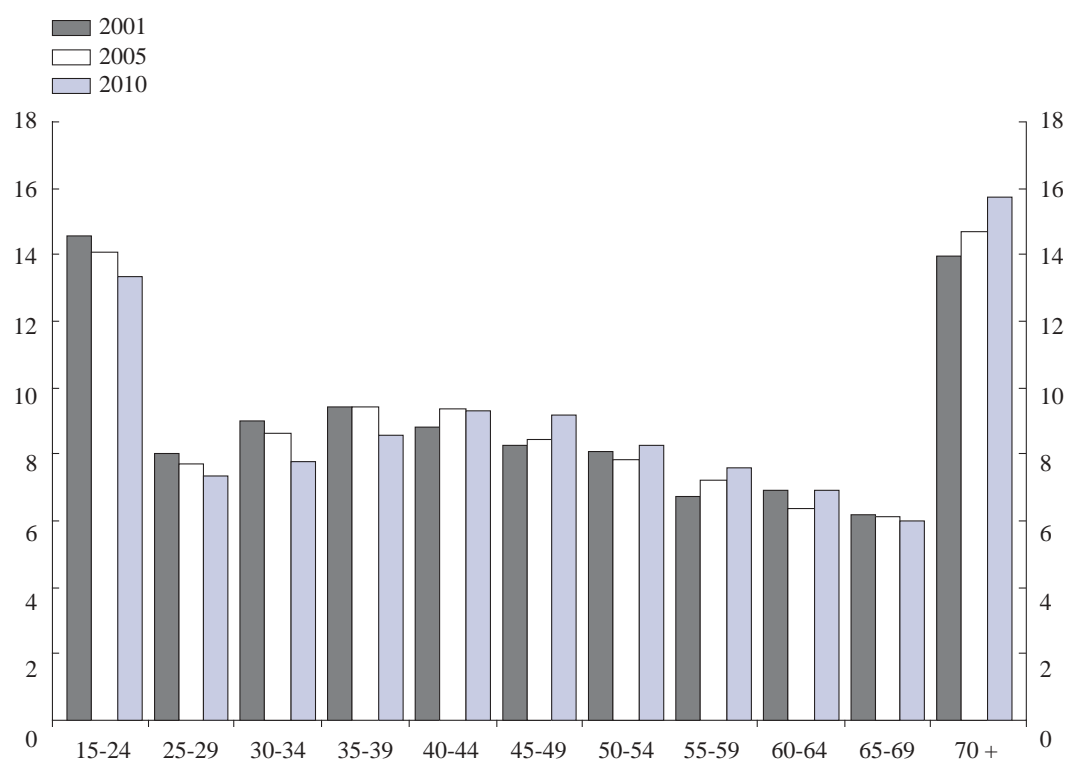
3.1 Population projections

Population projections suggest that the growth rate of the euro area working-age population will decelerate further in the next ten years, resulting in a stabilisation or even a fall in its level. Chart 6 shows the expected age breakdown of the euro area population in 2005 and 2010. By 2010 the weight of younger age groups (from 15 to 39 years old) in the total population is expected to decline, from 42% to 37%. By contrast, the weight of age groups above 45 years old rises steadily, with the exception of the group between 60 and 69 years old whose weight will remain broadly stable.

5 See Chagny et al. (2001) for a different migration scenario in the EU to that assumed by Eurostat, on the basis of the prospective enlargement to eastern European countries.

Chart 6

Weights of age groups in the euro area population

(as a percentage of population 15 years old and above)

Sources: Eurostat and ECB calculations.

3.2 Labour force projections

Combining labour force participation rate projections with these population projections provides an outlook for labour force growth and composition in the next ten years. Two scenarios are assumed for participation rate developments to provide an upper and lower limit for the range of growth projections. Scenario 1 assumes that current participation rates will not change in the coming years, while Scenario 2 assumes that, by 2010, participation rates in the euro area will have converged on the equivalent US level for 2001[6].

Given the population projections and assuming unchanged rates of participation in each gender/age group in the euro area (i.e. Scenario 1), it is estimated that labour force growth will slow down to an average annual rate of 0.04% between 2002 and 2010 (see Table 7). According to this scenario, changes in the growth rate and composition of the euro area labour force would mainly reflect the ageing of the population. The labour force would grow only as a result of the increase of older age groups (35 years old and older), while those aged under 35 would contribute negatively to labour force growth (see Table 8). The composition of the labour force would also change accordingly, with younger age groups, especially female ones, becoming a lower percentage of the labour force.

Table 7

Working age population, labour force and participation rates in the euro area[1]

(annual percentage change, unless otherwise indicated)

	1980-1985	1986-1990	1992-1995	1996-2001	2002-2010 Scenario 1	Scenario 2
Working age population growth	1.0	0.6	0.3	0.2	0.03	0.03
Labour force growth	0.9	1.2	0.1	0.9	0.04	1.4
Participation rate[2]	63.6	65.6	65.1	67.5	67.6	76.2

Sources: Eurostat and ECB calculations.
1) Average over the period.
2) Percentage of the working age population at the end of the period.

In the first scenario, however, the average annual growth of the female labour force remains more or less unchanged over the whole period, which seems unlikely given the trend in female participation rate in the past. As suggested by the results of the panel estimate of the participation equation, there seems to be no reason to expect the trend in female participation in the labour force to alter in the near future.

The second scenario assumes that participation rates in the euro area will converge with US 2001 levels. Labour force growth in the euro area would then accelerate to an average of 1.4% per year over the 2002-2010 period. The female labour force would tend to grow faster than the male labour force (1.7% average yearly growth compared to 0.8%).

This implies that increased participation, which, until 2001, was a trend concerning mostly younger women, would extend to older female age groups. The ageing population effect would be reinforced by increasing participation of older groups, so that labour force age groups of between 60 and 64 years old would experience the highest growth rates – on average 7.3% per year for men and 13.7% for women. However, the labour force aged 24 years old and under would also rise significantly, by an average of 3.3% and 3.9% per year for men and women respectively. The weight of older age groups would increase, owing to the influence of the overall ageing of the population, although the

6 *A year-on-year constant rate of convergence is assumed between 2002-2010.*

Labour force growth and participation rates in the euro area in 2002-2010

(average annual percentage change)

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Men	**0.2**	**0.8**	**0.2**	**0.3**	**0.2**
15-24 years old	-0.5	3.3	-0.5	0.4	-0.5
25-34 years old	-0.9	-0.8	-0.9	-1.0	-0.9
35-44 years old	0.2	-0.1	0.2	0.1	0.2
45-54 years old	1.1	0.8	1.1	1.2	1.1
55-59 years old	1.5	3.1	1.5	1.5	1.5
60-64 years old	0.2	7.3	0.2	1.6	0.2
Women	**-0.1**	**1.7**	**1.7**	**0.9**	**0.9**
15-24 years old	-0.9	3.9	3.9	0.1	-0.3
25-34 years old	-1.3	-1.0	-1.0	-0.6	-1.2
35-44 years old	-0.1	0.4	0.4	0.8	0.8
45-54 years old	0.9	2.6	2.6	2.7	3.0
55-59 years old	1.5	6.1	6.1	2.9	4.0
60-64 years old	0.2	13.7	13.7	2.5	2.3
Total	**0.04**	**1.4**	**1.0**	**0.6**	**0.5**
Participation rates[1]					
Total	67.6	76.2	73.4	71.3	70.6
Men	77.2	82.8	77.2	78.3	77.2
Women	57.8	69.5	69.5	64.1	63.8

Scenario 1: based on 2001 euro area participation rates. Scenario 2: uses US 2001 participation rates as a benchmark. Scenario 3: based on 2001 euro area participation rates for males and uses US 2001 participation rates for females. Scenario 4: based on the recent annual changes in euro area participation rates for males and females. Scenario 5: based on 2001 euro area participation rates for males and assumes a convergence in gender gap using US 2001 participation rates as a benchmark.
Sources: Eurostat and ECB calculations.
1) Percentage of the working age population in 2010.

share of those aged under 25 in the total labour force would also rise.

Neither of the first two scenarios seems very likely. A number of others can be envisaged, combining an increase in female participation with broadly stable male participation rates: Scenario 3 assumes convergence only with US female participation rates (the male participation rate remains constant); Scenario 4 forecasts future participation rates, for both genders, using the changes observed over the last three years, i.e. prolonging the positive effects of recent labour market developments and the positive trend in female participation, in line with the results of the participation rate estimates; and finally, Scenario 5 allows for convergence with the US gender gap instead of the levels, maintaining the male participation rate constant. These intermediate scenarios show a range of variations in labour force growth for the period 2002-2010, averaging

between 0.5% and 1.0% (see Table 8). These scenarios lead to rates more in line with the recent past, i.e. an average of 0.8% in 1996-2001. According to these scenarios, male labour force growth is between 0.2% and 0.3% per year whereas female labour force growth lies between 0.9% and 1.7% per year.

Scenarios 1 and 2 imply an increase in the male participation rate to 77.2% and 82.8% respectively, due to the compositional effects of the population in the first scenario. The female participation rate would show a slight decrease to 57.8% in Scenario 1 (because of age composition effects) but an increase to 69.5% in Scenario 2. For the economy as a whole, the participation rate in Scenarios 1 and 2 would increase to 67.6% and 76.2% respectively. Scenarios 3 to 5 are characterised by male participation rates between 77.2% and 78.3% and female rates between 63.8% and 69.5%, leading to total population results of 70.6% to 73.4%.

Conclusions

The study of labour force developments in the euro area points to the shifting roles of changes in participation rates and of working age population growth as an explanation of recent developments. It has been shown that over the last few years (1996-2001), owing to the slowdown in population growth, the effects of changes in the participation rate have exceeded those of the increase in working age population. Moreover, it has been found that the increase in participation from one expansionary period to the next – i.e. from 1986-90 to 1996-2001 – is mainly driven by changes in the willingness of members of most age groups, irrespective of gender, to participate, while compositional changes in population are of less importance. The most significant change affects male participation, which, since 1996, has started to grow by around 0.2 percentage point per year, reversing a downward trend. This change in pattern is mainly concentrated in those groups aged under 24 and over 60 years of age, possibly as a result of labour market policies encouraging the participation of the youngest age group and a reduction in early retirement schemes in the case of the oldest. The participation rate among women has maintained its upward trend, thereby contributing to labour force growth.

Since the beginning of the 1980s, the overall participation rate has followed a positive trend, mainly capturing sociological changes in female participation. It has also been shown that the participation rate responds to more or less favourable conditions which either attract or discourage people from joining the labour force. This so-called "discouragement effect" measures the disincentive effect to participate when the unemployment rate is high. The breakdown by gender confirms the negative impact of the unemployment rate on participation and reveals a lower response of female participation to cyclical factors.

In the coming years, apart from any significant changes in net immigration, it is expected that population growth will contribute less to overall labour force growth. Only changes in the participation rate, together with compositional changes in the population, will add to the labour force. The comparison of the euro area with the United States shows a continuing, substantial difference in the female participation rate and among the youngest and oldest male age groups, giving room for future positive contributions coming from participation. Depending on assumptions on participation rates, labour force growth in the euro area in the period 2002-2010 is likely to average between 0.5% and 1.0% per year.

On the basis of recent developments in the labour force, it can be concluded that labour supply should neither prevent sustained economic growth nor be a risk to price stability in coming years. However, given the small contribution which is expected from population growth, a continuation of labour market policies encouraging participation, particularly of those groups whose participation rates are still low, is desirable. In particular, policies should be directed at achieving greater integration in the labour market of the young and of women, groups with participation rates much lower than in the United States, and at reducing the negative impact which early retirement programmes have on the participation rates of older workers. The European Commission drew similar conclusions in a recent report entitled "Increasing labour force participation and promoting active ageing". It calls for policy actions to encourage labour force participation, especially of women and older workers. In particular, the report suggests reforms of tax, benefit and pension systems, increased provision of childcare facilities, and the promotion of labour mobility and flexible working time arrangements which could help to eliminate structural impediments and disincentives to work. These policies would help to achieve the objective agreed in the Conclusions of the Lisbon European Council in March 2000 and in the Employment Guidelines for 2001, namely to raise the overall employment rate to around 70% by 2010, and to more than 60% for women, across the European Union.

Annex I - Glossary and data sources

Glossary

Working age population:	Population aged between 15 and 64 years old.
Labour force:	The total labour force or currently active population comprises all those persons aged between 15 and 64 years old who fulfil the requirements for inclusion among the employed or the unemployed, as defined below.
Participation rate:	Defined as the number of people in the labour force, expressed as a percentage of the total working age population.
Unemployment:	Unemployed persons are those who, during the reference week, had no employment, were available to start work within the next two weeks, and had actively sought employment at some time during the previous four weeks. Also included are those who had no current employment but had already found a job due to start at a later date.
Unemployment rate:	Defined as the number of people unemployed, expressed as a percentage of the total labour force.
Employment:	Persons in employment are those who, during the reference week, worked for pay or profit for at least one hour, or were not working but had jobs from which they were temporarily absent. It includes both employees and the self-employed.
Employment rate:	Defined as the number of people employed, expressed as a percentage of the total working age population.

Data sources

The euro area data used in this paper are drawn from the annual European Community Labour Force Survey, which has been conducted every year in the spring since 1983. These data are compiled by Eurostat and a detailed description of the sampling methods and adjustment procedures can be found in the latest *Labour Force Survey – Methods and definitions,* 1998. There is no information available for euro area countries before they joined the European Union (i.e. prior to 1986 in the case of Spain and Portugal, and prior to 1995 in the case of Austria and Finland). The series were extended using national data from OECD Labour Force Statistics. Greek data have been included in the estimation of euro area series (Greece joined EMU in January 2001). In the case of Germany, data prior to 1991 have been obtained on the basis of the developments in West Germany. The output gap series was obtained from the European Commission's AMECO database.

Population and labour force projections over the period 1995-2010 are based on Eurostat's demographic scenarios which were compiled in 1995 and updated in 1999 with the assistance of National Statistical Offices. Although three different scenarios were envisaged, this paper has only selected the baseline scenario which assumes that most current demographic trends continue and that national projections compiled by Eurostat in 1997 remain valid.

US data come from the US Census Bureau and the Bureau of Labor Statistics.

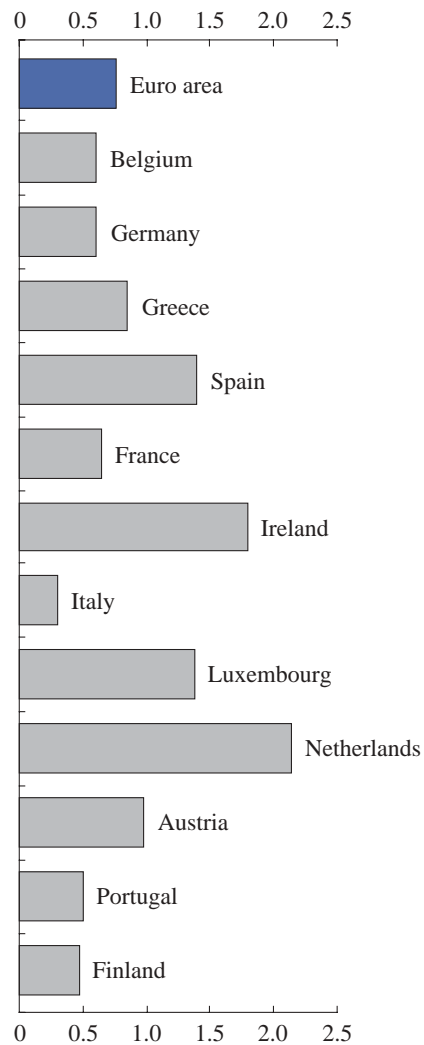# Annex II - Euro area countries' participation rates and labour force growth

Participation rates in euro area countries in 2001

(as a percentage of working age population)
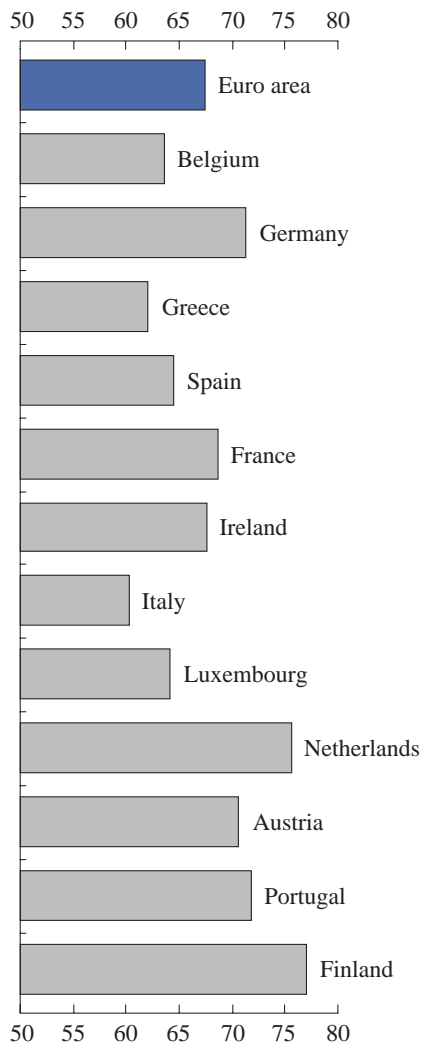
Labour force growth in euro area countries between 1983 and 2001

(average annual percentage change)

Sources: Eurostat and ECB calculations.

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