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**A CROSS-COUNTRY
PANEL ANALYSIS**

by Hielke Buddelmeyer, Gilles Mourre
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Hielke Buddelmeyer²,
Gilles Mourre³,
and Melanie Ward⁴



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Abstract

This empirical paper seeks to determine the relative contribution of the business cycle and structural factors to the development of part-time employment in the EU-15 countries over the 1980s and 1990s, exploiting a panel of EU countries. In the short-run, the business cycle is found to exert a short-term negative effect on part-time employment developments, which is consistent with firms utilising part-time work to adjust their labour force to changing economic conditions. Institutions and other structural factors such as changes in legislation affecting part-time employment are found to be key drivers of the rate of part-time employment, significant in the longer run. Overall, although the role of individual factors differs in the 1980s and 1990s, a contribution analysis considering the most significant factors shows that the main structural and institutional variables generally well explain the development in the part-time employment rate in the EU countries, which is not the case in the United States.

JEL Classification: J21, J22, J28, J68

Keywords: part-time employment, working time organisation, the business cycle, labour supply, labour market policies, institutions, regulations.

Non technical summary

A number of industrialised countries recorded a fast increase in part-time employment over the past two decades. Whereas the US experienced a slight fall in the share of part-time employment in total employment during the late 1980s and 1990s, the latter increased strongly in the EU-15, Japan and Canada. Recent papers have suggested that total employment growth (in terms of persons employed) in the 1990s benefited from the development of part-time employment in the European countries.

The promotion of part-time work may be an important measure through which the flexibility of labour markets can be increased, despite some possible drawbacks of this type of job in terms of substitution effects with full-time jobs and reduced career and wage prospects. On the labour demand side, it may allow employers to adjust hours worked to cyclical conditions more easily, facilitating adjustment of production and labour costs. On the labour supply side, part-time work may increase the labour market choices open to individuals and may thus improve social welfare.

Against this backdrop, this paper has three purposes. First, it reviews the determinants of part-time employment, as identified by the economic literature. Second, it aims to determine the role of the business cycle and structural factors in the development of part-time employment, using a panel of EU-15 countries. This could incidentally cast some light on whether part-time jobs have been used as a flexible work arrangement by firms in the EU-15, as has been shown for some specific countries and sectors. Third, the main objective of the paper is to measure the *relative importance* of each determinant of part-time employment over time. This justifies the macro perspective of the paper and its comprehensive approach (encompassing a large set of determinants), since the relative contribution of the relevant macroeconomic, policy and institutional factors could not have been obtained with a micro analysis or with a study focusing on one specific factor of part-time employment.

The business cycle, as measured by both the output gap and real GDP growth, is found to exert a negative effect on part-time employment developments. This countercyclical effect is consistent with firms utilising part-time employment as a way to adjust total hours worked to changing economic conditions. The "flexibility" hypothesis suggests that employers reduce the number of hours worked by current staff and/or hire new workers in part-time jobs during economic downturns, while net employment creation in upswings mostly consists of full-time jobs in order to meet the increased demand for labour resources by firms. Consistent with this, involuntary part-time employment turns out to be cyclical, being higher in troughs of economic activity. Splitting our sample by age and gender groups reveals a very significant effect of the cycle on young and male prime-age workers. Conversely, the effect is unclear for women and clearly insignificant for older workers.

Looking at institutions, changes in legislation favourable to part-time employment are found to be effective, having a strong impact on actual part-time employment developments. Moreover, while overall employment protection legislation has no clear-cut effect, employment protection legislation for *permanent contracts* is found to be positively related to the part-time employment rate, which is consistent with the use of part-time work as a tool for enhancing flexibility in the case of rigid labour markets.

As for other structural variables, the fertility rate is found to be strongly and positively correlated with the part-time employment rate. This suggests that part-time work creates an opportunity for women to combine taking care of their children with market work. In line with conventional stylised facts, the share of the services sector in the economy and the proportion of young people in tertiary education are also significant predictors of the part time employment rate. In addition, cross-sectional analysis underscores the positive impact of the differential in hourly wages between part-timers and full-timers on the part-time employment rate. This suggests that hiring through part-time relative to full-time positions would be fairly sensitive to relative wages. This could also reflect part-time work being used by firms as a cheap and “precarious” form of employment, in line with the “insider/outsider” theory.

Finally, a contribution analysis, comparing the relative importance of each factor, finds that the main institutional and structural variables generally explain the development in the part-time employment rate in the EU countries fairly well over the full period 1983-1998, while this is not the case in the United States. Moreover, in some EU countries such as United Kingdom, Ireland, the Netherlands and Portugal, other factors, not captured by the analysis, have also contributed to increasing the part-time employment rate. While rising female participation appears to be the main driving force behind the development in part-time employment, declining fertility rates exert a dampening effect in some countries. Looking at labour market institutions, the relaxation of the legislation on part-time jobs in Belgium, Spain and France played the major role. Other institutions may also have played some part in Spain and Portugal (easing of EPL for permanent jobs) and in the Netherlands (the cut in child benefits).

The role of the various determinants of part-time work differs across countries in the 1980s and 1990s. The effect of the fertility rate was stronger in the 1980s. Child benefits had an unambiguously positive contribution in 1980s, while their contribution was weaker or negative in the 1990s. Conversely, the change in part-time employment laws and in EPL for regular contracts only played a strong role in the 1990s. Lastly, the effect of the business cycle contributes, albeit to a limited extent, to the generally stronger developments in part-time employment seen in the 1990s, compared with the 1980s. However, its role was quite negligible over the full period, as cyclical peaks and troughs offset each other.

1. Introduction

A growing part-time employment share was a main feature of a number of industrialised countries over the past two decades. While the US experienced a slight fall in the share of part-time employment in total employment during the late 1980s and 1990s, this share increased strongly in the EU-15¹, Japan and Canada in the same period. From a macro-economic standpoint, the increase in the share of part-time work may have a dampening effect on aggregate wage growth² and some recent papers have shown that total employment growth (in terms of persons employed) in the 1990s benefited from the development of part-time employment in the European countries (Garibaldi and Mauro 2002, Mourre 2006).

Furthermore, from an economic policy perspective, the promotion of part-time work may be an important measure through which the flexibility of labour markets can be increased. On the labour demand side, it may allow employers to adjust hours worked to cyclical conditions more easily, facilitating adjustment of production and labour costs. On the labour supply side, part-time work may increase the labour market choices open to individuals and may then raise their welfare.

At the same time, part-time work may have its drawbacks. Part-time workers may be subject to lower wages, be less likely to receive fringe benefits and face reduced chances for promotion (for a discussion, see e.g. OECD 1999). For employers, part-time work may be connected with higher fixed costs, such as recruitment and training costs. Furthermore, part-time jobs may crowd out full-time positions.

Broadly speaking, the literature on part-time job developments to date can be divided into two main vintages. A first branch relies on micro-econometric analysis based on firm surveys. The purpose of this work is to identify the microeconomic and individual determinants of part-time work (Haskel 1997; Houseman 2001), to illustrate the role of part-time work as a flexible work arrangement (Haskel 1997, Farber 1999, Barrett and Doiron 2001), or to explain the transition between part-time jobs and other labour market states (Blank 1994, O'Reilly and Bothfeld 2002; Buddelmeyer, Mourre and Ward 2005a). The second vintage deals with the comprehensive description of part-time employment developments based on macro-data and includes sociological and institutional qualitative evidence (Smith et al. 1998; Delsen 1998; OECD 1999, Walwei 1998). In this vein, some papers focus on international comparison (Lemaitre et al. 1997; Buddelmeyer, Mourre and Ward 2005b) and attempt to understand the reason why part-time

¹ i.e. the European Union before its enlargement in May 2004, comprising 15 member states.

² This is because, first, the increase in the part-time employment rate mechanically decreases the average hours worked per individual, reducing total average compensation per employee, *ceteris paribus*. This is a pure measurement effect. Second, some studies have shown that the hourly wage rate received by part-time workers is lower than that of full-time workers (OECD 1999). Both of these two dampening effects on aggregate wage growth may increase with a rise in part-time employment.

work is so low in some countries such as Spain and Portugal (Ruivo et al. 1998) or so different across countries (Pfau-Effinger 1998).

The present paper belongs to the second vintage of the literature, whilst extending it through the use of a country panel of time-varying institutions and structural variables covering most EU-15 Member States. This latter methodological approach can be associated with another branch of the labour market literature (initiated by Scarpetta 1996 and extended by Belot and van Ours 2000, Blanchard and Wolfers 2000 and Nickell et al. 2003) who uses cross-sectional or pooled time-series data on indicators of labour market performance and labour market institutions to account for unemployment differentials across countries. This paper therefore fills a gap in the literature by analysing the cause of part-time job developments systematically *in a Europe-wide perspective*, including the *ex post* impact of changes in legislation regarding part-time employment³. This paper also considers the effect of the business cycle on part-time employment. Although the counter-cyclicality of the relative growth of part-time employment compared to full-time employment has often been mentioned in the literature (Delsen 1998, Lester 1999) and tackled indirectly through the cyclicality of hours worked (Millard 1999), no systematic econometric investigation has been carried out using macroeconomic data.

Thus the purpose of this paper is threefold. First, it reviews the determinants of part-time employment as identified by the economic literature. Second, it aims to identify the role of the business cycle and structural factors in the development of part-time employment in the EU-15 countries by exploiting both cross-sectional and time series variation. This may enable us to comment upon whether part-time jobs have been used as a flexible work arrangement by firms in the EU-15, as has been shown for some specific countries and sectors within the micro-econometric literature. Third, the main goal of the paper is to measure the *relative weight* of each determinant of part-time employment over time. This justifies the macro perspective of the paper and its comprehensive approach (encompassing a large set of determinants), since the relative contribution of the relevant macroeconomic, policy and institutional factors could not have been obtained with a micro analysis or with a study focusing on one specific factor of part-time employment.

The paper is organised as follows. Section 2 surveys the determinants of part-time work offered by theory. Section 3 introduces the simple econometric setting to be utilised in the remainder of the paper and describes our data sources. Section 4 analyses the impact of the business cycle on part-time employment developments and on involuntary part-time work. Section 5 considers the role of part-time legislation, labour market institutions and other structural features (of demographic, sociological or economic nature) on the rate of part-time work within EU-15 countries. Section 6 concludes.

³ It should be noted that the vast economic literature on European employment laws tends to focus primarily upon the distinction between permanent vs. short-time contracts, rather than full-time and part-time contracts.

2. Some theory: the factors influencing part-time employment

This sub-section reviews the various determinants of part-time work offered by theory which will be consequently important for our econometric analysis in the following sections. The determinants can be grouped under the headings of (i) The business cycle, (ii) Labour market institutions and policies and (iii) Other structural factors. While the economic literature generally suggests that the business cycle plays some role in the short to medium run, it also stresses the importance of various institutions and policies as well as other structural factors of sociological, demographic or economic nature in the longer run.

2.1 Business cycles

Business cycles affect movements in the part-time employment rate⁴ in the short to medium term. This implies that the rate of part-time work may respond differently to business cycle effects relative to full-time employment. The literature has identified a number of ways in which the business cycle affects the share of part-time employment (see OECD, 1995, Delsen, 1998).

On the demand side, two effects may be at play. First, there is a compositional effect. As noted by Lester (1999), shifts *between* sectors arise because sectors with a higher share of full-time employees, such as manufacturing and construction, are generally affected earlier and more strongly by the cycle than other sectors. Therefore, part-time employment may be less responsive to business cycle effects than total employment, and may show a counter-cyclical pattern.

Second, shifts *within* sectors may boost part-time employment during downturns as employers offer part-time employment as a way to adjust hours worked over the cycle, while continuing to hoard labour (Delsen 1998). This enables employees in place to avoid dismissal and job seekers to avoid long-term unemployment. Thus, during a downturn, employers may reduce the number of hours worked by their current workforce or hire new workers in part-time jobs. However, as suggested by Lester (1999) for Australia, and Farber (1999) for the US, it seems that a non-negligible proportion of full-timers moving to part-time work do not stay in their current firm, going through a period of unemployment⁵. Moreover, as some employers use part-time jobs to screen workers for full-time positions (Houseman 2001) and firms may be more demanding and more risk-averse before hiring new staff in bad times, they may prefer to systematically recruit part-timers rather than full-timers in periods of economic slowdown. In an upswing, employers may offer full-time contracts to their part-time workers (so called “tap effects”) in order to increase their total stock of labour resources, as this was the case in Sweden in the 1980s (Sundström 1991). We will label the use of part-time work by employers as a means to regulate

⁴ The percentage of those working part-time relative to total employment

⁵ Farber (1999) for the US found that job losers are significantly more likely than non losers to get an involuntary part-time job, which may suggest that workers, formally in full-time jobs, go through a (short) unemployment spell before occupying a part-time job.

the size of their workforce in response to the economic cycle as the “flexibility effect”. We would therefore expect the flexibility effect to exert a countercyclical impact on the rate of part-time employment⁶.

On the supply side, in an environment of falling economic activity and/or rising unemployment, workers may be more willing to consider part-time work as an alternative to their preferred labour supply choice of full-time employment. This third effect can also be viewed as a consequence of the “flexibility effect”, as it also reflects the mismatch between job seekers, preferably looking for a full-time job, and firms mainly offering a part-time job. Conversely, in a period of expanding output and/or falling unemployment, workers with a preference for full-time work may be less willing to work part-time. This “involuntary part-time work effect” is expected to be negatively related to the part-time rate.

An additional labour supply effect is the “added worker effect”. Here, the unemployment of a household member leads to an increase in the labour supply of other household members (Mincer 1962, Layard *et al.* 1980 and Maloney 1991). Typically, a recession causes job losses in single breadwinner household, urging the other partner (often female) to work part-time so as to limit the income loss. The empirical evidence to date however suggests that this effect is small.

A fifth effect, also of labour supply, can be identified, known as the “discouraged worker effect” (Long, 1953). A lasting period of unemployment reduces the probability of finding a job and may induce groups of disadvantaged groups not to enter in the labour market, awaiting better opportunities, given that searching for a job is a costly activity. A large set of empirical studies reports evidence supporting the discouraged worker hypothesis (Clark and Summers, 1982; Blundell, Ham and Meghir, 1998; Darby, Hart and Vecchi, 2001). During a period of economic contraction or slowdown, labour supply from low-skilled or initially inactive females, who are more likely to look for part-time jobs, may be reduced, given the lesser prospect of finding a job. Thus, the discouraged worker effect is likely to be negatively related to the part time rate.

⁶ In other words, the flexibility effect reduces the negative cyclical responsiveness of the number of those working part-time compared to those working full-time, thereby causing a countercyclical effect on the share of part-time employment in total employment.

Table 2.1
Five effects of business cycle on part-time employment rate

<p><i>Labour demand</i></p> <ul style="list-style-type: none"> (-) compositional effect (concentration in less cyclical sectors) (-) flexibility effect (adjustment of hours worked along the cycle) <p><i>Labour supply</i></p> <ul style="list-style-type: none"> (-) involuntary part time effect (enhanced willingness to work part-time to avoid unemployment) (-) added worker effect (unemployment of a household member causing an increase in labour supply of another household member) (+) discouraged worker effect (withdrawal from the labour market of part-time job seekers.) <p>====> Overall effect uncertain, but likely negative correlation between output gap and part-time increase</p>
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Reading: (-) means countercyclical effects.
(+) means procyclical effects.

Thus, the effect of the cycle on the rate of part-time work will be positive or negative depending on the relative importance of these five effects (see Table 2.1). The finding of a significant counter-cyclical effect could suggest that (i) labour demand is one of the main driving forces behind developments in part-time employment and that (ii) employers use these types of jobs to adjust to the general economic situation. Indeed, the labour supply effects going in the same direction are supposed to be weak (“added worker effect”) or the mirror of cyclical labour demand conditions (“involuntary part-time effect”). In contrast, the finding of no or weak cyclical patterns of part-time work relative to total employment may indicate that developments in part-time jobs rather reflect structural factors, such as the design of labour market institutions.

2.2 Labour market institutions

While the business cycle affects the short-to-medium term, developments in part-time employment, institutional and sociological factors are likely to influence the longer-term level of the part-time rate. Smith et al. (1998) survey the factors affecting the growth of part-time work in Europe. Some of these factors are not mutually exclusive and might reinforce each other.

Specific regulations on part-time work (statutory or collectively bargained) can affect part-time employment developments through three mechanisms, as described by Smith et al. (1998). First, some regulations directly affect the working-time system by restricting the use of part-time work. Second, some regulations indirectly influence part-time employment through wage regulation, the social protection system or the tax and benefit system. For example, in some countries (e.g. Portugal), hourly wages for part-time and full-time work are restricted by law to be equal (pro rata clause). Such legislation may change the structure of non-wage costs for employers, such as hours or earnings thresholds for social insurance contributions or special



subsidies or tax rebates for firms hiring part-time staff⁷. Lower pension entitlements can also restrict the labour supply of part-time jobs (Ginn and Arber 1998). A third type of regulations facilitates the conversion of full-time jobs into voluntary part-time employment in order to reconcile personal and professional lives (Genre et al. 2003).

Employment protection legislation (EPL) has become a more and more important reason for hiring part-time employees. In the late 1990s, in a context of increasing competition and uncertainty, firms realised the advantages of “atypical jobs”, which were considered to be more flexible and less expensive. Part-time employment was quickly acknowledged as offering such a job type, together with temporary jobs, help agency employment, shift work, on-call jobs and atypical working hours (nights and weekends). Bentolila and Dolado (1994) call this new search for flexible staffing arrangements the “new reasons” for hiring part-time workers. The stringency of job protection legislation may have two conflicting effects. First, it can encourage the use of part-time work so as to *circumvent* highly rigid employment legislation affecting full-time jobs. Second, employment protection legislation in some countries can affect directly and adversely part-time employment by strictly limiting its use. In any case, as part-time employment in the EU-15 mostly corresponds to permanent contracts (above 80% in the late 1990s), *EPL for regular contracts* seems more relevant for understanding the level of part-time work over time and across countries. However, the small proportion of fixed-term part-time employment can be affected by *EPL for temporary contracts*⁸.

The effect of *child benefits* on part-time work is ambiguous. In general, the provision of child benefits can create an “unemployment trap”, if benefits are only granted below a certain level of income⁹. Moreover, some child benefits grant additional income to parents who renounce to work in order to take care of their young children. These can have a strong adverse effect on female participation (Laroque and Salanié 2003). On the other hand, the lack of childcare benefits or a subsidised *childcare system* is a major disincentive to taking up employment. Therefore, the overall effect may depend on the shape and the composition of child benefit systems.

Unemployment benefit systems (together with other benefits) may create an “unemployment trap” through high net replacement rates and long benefit duration. As stated by Doudeijns

⁷ For instance, in 1993-2000, a specific social security contribution rebate was granted to firms in France for each recruitment in part-time, in addition to some additional social security contribution cut for the recruitment of low-paid part-timers. This coincided with a boom in part-time employment over the same period. As reported by Ruivo et al. (1998), the legislation on part-time work underwent important changes in Spain in 1994 (relaxation of the maximum daily and weekly working hours, reduction in social security contribution). This resulted in a strong increase in the part-time employment rate between 1994-1995.

⁸ A low level of EPL for temporary contacts may also make the use of part-time contracts less necessary as temporary employment can meet the need for more flexible staffing arrangements.

⁹ If child benefits are means-tested, this increases the marginal rate of taxation around the income threshold above which the incumbents are not eligible to these benefits. This might deter one member of the couple to take up a job because this may mean the loss of child benefits. However, if the eligibility threshold is high, this could encourage taking a part-time job rather than a full-time job.

(1998), this financial disincentive to take up a job has a significant impact on the decision to work part-time, since part-time jobs are not likely to yield high earnings. Conversely, “in-work benefits”, the tightening of eligibility criteria and enhanced controls of their implementation may help to alleviate such a disincentive.

The tax system and in particular *high income tax* rates may deter part-time work. Where the income tax is computed on the basis of a couple’s earnings rather than on an individual basis, the second earner in the couple may be taxed at a relatively high marginal rate, creating an “unemployment trap”. Moreover, the existence of a dependent partner’s allowance may create disincentives for the second earner to take up a job, especially low-paid part-time jobs (Jaumotte, 2003).

Trade unions have generally fought against part-time work – seen as a threat to full-time standards. Houseman (2001) found some econometric evidence of a negative relationship between trade union density and part-time employment for the US, although reverse causation cannot be ruled out¹⁰. This can also explain the low part-time rate in highly unionised sectors such as manufacturing, while the services sector, less unionised, is more part-time intensive. However, high unemployment has started to change trade unions’ attitudes. In this context, a high level of co-ordination between unions may facilitate the conclusion of tripartite agreements involving the government, which aim at reducing unemployment via some “work sharing” or improving working conditions by encouraging voluntary part-time employment (Genre et al. 2003).

The share of temporary jobs (short-term contracts, help agency employment) could exert a crowding-out effect on part-time employment. In Portugal and Spain (until 1994), the favourable legislation on fixed-term contracts and the sharp development in this type of job have led to a weak development in part-time employment. Nonetheless, in many cases, the development in part-time jobs goes hand in hand with that of fixed-term contracts as complementary flexible staffing arrangements¹¹.

2.3 Other structural variables

The rise in *female participation* has occurred hand in hand with an increase in the part-time rate in many countries. While the causality is not clear between the decision to participate into the labour market and the choice of working part-time, the rising proportion of women willing to join the labour markets, mostly explained by rising levels of education, contributed to the development of part-time employment. Sociological and cultural reasons, such as the separation

¹⁰ Firms or sectors with a high proportion of part-timers are generally considered to be harder to unionise.

¹¹ In France, part-time jobs increased strongly in the service sector in the 1980s and 1990s, while temporary jobs and particularly agency employment flourished in manufacturing.

of tasks within the household and the family model, combined with institutional reasons (e.g. the lack of childcare facilities) explain in part why women are more inclined to work part-time than men. For instance, a “male breadwinner” model of family encourages women to work part-time rather than full-time (Fagan and O’Reilly 1998). Likewise, an increase in the *fertility rate* and the number of children per family may increase the need for working part-time instead of working full-time so as to reconcile professional and family life, especially when the child care system is insufficient. However, in some countries, such as Finland, the male breadwinner model was never dominant and the rise in female participation mainly induces the increase in full-time employment (Pfau-Effinger 1998). However, these variables may suffer from endogeneity problems.

The share of *employment in services* is also an important determinant of part time work in the literature to date. Traditionally, employers hire part-time workers in order to deal with regular and predictable peaks of demand (“rush hours”) or to extend opening hours on evenings or weekends, beyond what the hours worked by a full-timer in a single shift would allow¹². This situation particularly concerns some service sectors, where part-time work is concentrated (retail trade, hotels and restaurant, personal services). Conversely, mass-production and capital intensive industries rely far more on full-time workers. Part-time work may also be used to substitute for absent employees (on maternity or sick leave) or to meet unexpected orders. Part-time staff therefore acts as a back-up for full-time employees (Delsen 1995). In addition, as mentioned by Delsen (1998), the issue of “gender flexibility” plays a role. Many services rely on predominantly female employees, who are more prone to accept working part-time, while male-dominated sectors (industry, construction) have been more reluctant.

The schooling rate of the 15-24 aged population is likely to positively influence the part-time employment rate, as the latter is currently highest for those aged 15-24 within the EU. From the labour demand side, students offer relatively cheap and flexible labour¹³. From the labour-supply side, students are mainly looking for part-time jobs to finance their studies. Moreover, some newly graduated students may be ready to accept working part-time in bad times in order to build up professional experience and avoid unemployment spells, which might be stigmatising.

The *differential in wages and non-wage costs* between part-time and full-time employment may make part-time work advantageous to firms. OECD (1999) showed that both the hourly wage rate and the benefits received by part-time workers were lower than that of full-time workers in most OECD countries¹⁴. This remains true even after controlling for occupational characteristics of part- and full time jobs. The gap between part-time and full-time earnings is 10% on average.

¹² Therefore, employers avoid underemployment of staff in off-peak times and overtime payment in busy periods.

¹³ Young workers may be considered as “outsiders”, allowing firms to make them bear a higher proportion of adjustment costs in terms of wages and working conditions. Youth labour may often consider their part-time job as temporary, limiting the risk to the firm of recruiting an inefficient worker.

¹⁴ See OECD employment outlook, June 1999.

One reason for this may be that part-time workers tend to receive less job-related training than full-timers. As suggested by Houseman (2001), a second reason might be that part-timers belong to a “secondary” labour market, and might not have as strong a bargaining position as full-time workers. Likewise, part-timers are less likely to benefit from an “efficient wage” policy, given their lower contribution in terms of number of hours to the firm¹⁵.

3. The framework of the empirical analysis

This section explains the estimation strategy and the data used to show empirically how important the factors mentioned in the previous section are in the determination of the rate of part-time work in EU-15 countries.

3.1 Estimation strategy

The part time employment rate follows a clear positive trend over time in Europe and the presence of a unit root is confirmed in most countries by running the Augmented Dickey-Fuller test and Phillips-Perron test. We first use the annual change in the part-time employment rate (ΔPT) as the dependent variable in order to address the issue of non-stationarity. As this variable offers a limited time series dimension by country (i.e. 18 time observations at most), we pool annual data across EU-15 countries. Therefore, for our analysis of the effect of the business cycle on the part-time employment rate we first use the following simple fixed-effect specification (a) where OG denotes a measure of the cyclical position of the economy and α_i are i country dummies¹⁶:

$$(a) \quad \Delta PT_{it} = \alpha_i + \beta OG_{it} + \varepsilon_{it}$$

Under this model (a), the business cycle OG is proxied by (i) estimates of the output gap and (ii) real GDP growth. The former is preferred since it offers a better measure of the cyclical fluctuation of economic activity, whilst real GDP growth also encases variation in potential output growth across countries. The output gap is defined as the difference between actual GDP and potential GDP as a percentage of potential GDP. The latter, also called potential output and calculated using the production function method, corresponds to the productive capacity of the economy, that is, the level of sustainable output, compatible with a stable inflation rate. However, since output gaps are derived from model-based estimates of potential output and are

¹⁵ More tentatively, another reason for an increase in part-time employment might be the demographic ageing, as the elderly may need more care, often provided by part-timers, and young generations may find part-time jobs more appealing. However, given the slow nature of demographic changes, these effects, playing in different directions, are likely to be of second order. Likewise, the substantial immigration observed in some EU countries might influence part-time employment, although the theoretical bond is unclear.

¹⁶ In specification (a), we do not use time dummies because they would bias the estimation of the effect of the economic cycle. Indeed, they would capture the component of the business cycles that is common across countries and the coefficient of the output gap would only take into account the country-specific component instead of the full cyclical effect.

consequently “non observable” variables, real GDP growth is used to check the robustness of the results.

In this model, we include lagged independent variables. According to a Wald test, two periods lags are found to be sufficient for our model, as the removal of further lags (3 and 4) does not affect the results significantly. Since the effect of the business cycle on the part-time rate may be asymmetric, a specification (iii) regresses the output gap (with lags) interacted with a dummy variable, which indicates whether the output gap is positive or negative. Finally, one may conjecture that the “flexibility effect” mentioned earlier would be more acute for countries experiencing strong structural rigidities. In these countries, which are likely characterised by a high unemployment rate, firms would use part-time work as a means of circumventing structural rigidities and adapting resources according to fluctuations in economic activity. Moreover, in the case of very high unemployment, workers may be more willing to accept a part-time job, enhancing the involuntary part-time work effect. Therefore, specification (iv) uses the output gap interacted with a dummy reflecting a high unemployment country to investigate whether the countries hit by high unemployment witness a more pronounced cyclical pattern.

Model (a) is straightforward, breaking down the PT rate into a cyclical component and a linear country-specific trend¹⁷. It easily resolves the problems arising from the use of non stationary variables. However, the results are constrained by the absence of quarterly data for part-time employment, which would have been more suitable to investigate its cyclical behaviour. Annual data are by definition less frequent, tends to smooth out quarterly pattern and loose information about the start of upturns and downturns.

For sake of robustness, we also complement this model in first differences with a more comprehensive model in levels. The structural changes brought out by reforms in the regulatory or legal framework of part-time employment may cause acceleration in part-time developments, which is not captured by the linear trend of model (a). This may disturb somewhat the empirical estimation of the cyclical component of part-time employment. Thus, our model (b) considers the *level* of the part-time employment rate across countries and over time as well as the impact of structural factors and institutions. It also allows us to check the robustness of the cyclical effect and control for possible omitted variable bias by taking into account additional explanatory variables. It is expressed as follows:

$$(b) \quad PT_{it} = \alpha_i + \alpha_t + \beta OG_{it} + \sum_{k=1}^K a_k X_{k\ it} + \sum_{j=1}^J b_j X_{j\ it} + \varepsilon_{it}$$

where α_i are *i* country dummies and α_t are *t* time dummies. X_k are *k* variables representing institutions and X_j are *j* variables capturing structural factors (of societal, demographic or economic nature).

¹⁷ The linear country-specific trends correspond to country fixed effects (i.e. country-specific intercept), as the model (a) is written in first differences.

This specification is close to that used by Nickell et al. (2001) to explain OECD unemployment, but the variables for short-term macroeconomic shocks (labour demand shock, real import price shock, real interest rate, etc.) are replaced by the output gap. Moreover, the lagged dependent variable is dropped as its presence introduces correlation between the errors and the regressors, which can bias the GLS estimate of parameters¹⁸.

As most variables are not stationary, it is crucial to check that they are linked together in the long run through a cointegrating relationship and thus that the residuals of the equation are stationary. In order to test for unit roots in the residuals we use the Fisher-Maddala-Wu test, which is suggested by Maddala and Wu (1999) on the basis of previous work by Fisher (1932). This non parametric test is used here since it does not require a balanced panel. It is also easy to run as it and combines the observed significance levels of any type of unit-root test performed individually on N countries. If P_i denotes the p -value from the unit test on the i^{th} country time series, then $-2\sum \ln P_i$ follows a χ^2 distribution with $2N$ degrees of freedom. However, this test assumes the absence of cross-sectional correlation, i.e. that the observations are generated independently across countries. When this assumption is violated, which is often the case in practice, the standard test may suffer from large size distortion, as evidenced by Maddala and Wu (1999) who have computed the exact distribution of the test and corrected the critical value by bootstrapping. Here, following Nunziata (2005), we control for cross-country correlation using time dummies (which capture cross-sectional dependency caused by common time-specific components) and then we utilise the standard distribution of the test. Under the Fisher-Maddala-Wu test and using Phillips-Perron tests for individual countries, the null of no cointegration (non-stationarity of the residual) is strongly rejected for all equations in Table 5.1¹⁹. For instance, using the equation 1 of Table 5.1, the test statistic is $\chi^2(40) = 79.2$ with a p -value of 0.02%. The test clearly rejects the hypothesis of the residuals having a unit root and points to the existence of a cointegrating relationship between the regressors²⁰.

As some heteroskedasticity and first order autocorrelation is detected in both models a and b , all equations are estimated by feasible generalised least squares (see also Nickell *et al.*, 2003 and Nunziata, 2005)²¹.

To tackle possible endogeneity problems, we also use an instrumental variable method, namely the two-stage feasible generalised least squares. Although the causality may mainly run from GDP/output gaps to part-time employment, the growth rate of fixed capital investments (along

¹⁸ Given the fairly short time series dimension of the data, this bias may be not negligible.

¹⁹ The results are confirmed when using Dickey Fuller test as country-by-country unit-root test.

²⁰ Under the Maddala and Wu test and using Phillips-Perron tests for individual countries, the null of no cointegration (non-stationarity of the residual) is strongly rejected for all equations in Table 5.1. For instance, using the equation 1 of Table 5.1, the test statistic is $\chi^2(40) = 79.2$ with a p -value of 0.02%. This test relies on no cross-country correlation. The introduction of time dummies in specification (b) is likely to capture much of the cross-correlation in the data.

²¹ For instance, on the basis of regression 1 in Table 4.1, the hypothesis of homoskedastic residuals is strongly rejected by a LR test ($\chi^2(13)=72.8$), while the hypothesis of non-serially correlated residuals is clearly rejected by a LM test ($\chi^2(1)=94.2$).

with its lagged values) and the growth rate of trade and services exports are used as instruments in specification (a). Indeed, whereas employment developments directly influence output growth through household disposable income and household consumption, trade and services exports and fixed capital investments are not driven by national employment, at least in the short run. Instead they are strongly correlated with output and table 4.2 shows that the two variables are important explanatory factors of the output gap²². This suggests that the two-stage least squares estimate should not suffer from the weak instrument problem.

In order to further gauge the robustness of the results to the possible endogeneity of regressors, we also run granger-causality type of equations (a'), where the business cycle variable is lagged by one year. The estimate (a') confirms the significance and the sign of the output gap coefficient, although its magnitude is lower than in estimates (a) (see Table 4.3).

$$(a') \quad \Delta PT_{it} = \alpha_i + \beta OG_{it-1} + \varepsilon_{it}$$

In specification (b), the issue of endogeneity is very likely to particularly affect the relationship between the part-time employment rate and participation. Moreover, a growing share of part-time jobs might make policy makers more responsive to part-time worker preferences. In this respect, the European Union directive on part-time work could be seen as a European Union wide response to the growing importance of part-time workings.²³ Therefore, we instrument the structural and institutional variables by their values lagged by two years. One year lag does not suffice because of the presence of first order autocorrelation in the residuals.

3.2 Data

The data used in this paper are presented more in detail in Annex 1. The part-time employment rate (PTR) is defined as the percentage of workers working part-time relative to total employment. The part-time employment rate, as well as the share of involuntary part-time employment, is derived for each country from the annual European Community Labour Force Survey, which has been conducted every year in the spring since 1983 and compiled by Eurostat. The definition of “part-time” is based on individuals’ declarations of working status (part-timer versus full-timer), rather than on a precise measure of hours worked.

²² The instruments are selected from equation 1, which contains the largest number of highly significant variables.

²³ Possible endogeneity with other policy variables is less obvious. Indeed it is reasonable to assume that the developments in labour market institutions and policies in EU countries have been influenced by the general situation of the labour market in each country (as reflected by the unemployment rate), the causation from part-time employment rate to institutions seems to be fairly unlikely. Moreover, as pointed out by Nunziata (2001), the reasons behind institutional and policy changes are far from evident. The pattern of political decision making in each country would tend to indicate that other important factors such as the timing of election, the policy makers’ agenda and the average voters’ preference may have played a crucial role in shaping the institutional and policy changes.

Data on business cycle (output gap, GDP growth) comes from OECD Economic Outlook. The output gap is measured as the percentage difference between actual GDP in constant prices and potential GDP estimated by the OECD²⁴.

Data on labour market institutions and structural variables are taken from various sources, in particular the recent macro-economic literature on labour markets. Most of these data on national labour market institutions were available only until 1997-1998 when the study was carried out. It should be noted that the empirical models are estimated with annual data, which may underestimate the full effect of the business cycle by not taking into account intra-annual cyclical variations. Indeed, the annual indicator of output tends to smooth out the real cyclical fluctuations. The choice of annual data relates to statistical limitations. While cyclical indicators can be available on a quarterly basis, part-time employment series are only available on an annual basis as well as data on labour market institutions and structural variables. The use of panel data approach however increases the number of observations and circumvents this lack of time length²⁵.

The series capturing the effect of part-time regulation on the part-time rate deserve particular attention. This is a vector of country-specific trends which start from the year in which regulations of part-time employment were relaxed in each country²⁶. The motivation for the creation of this variable is that we wish to capture the additional annual increase in the part-time employment rate that follows the change in part-time regulation²⁷. The latter is identified using the information provided by EIRO and OECD (1999). The starting date of each trend therefore varies by country. For the countries where part-time regulation has not changed (Ireland, Portugal, Sweden and the United Kingdom), the value of the variable is set at zero for the complete period 1983 to 2001. To avoid an “outlier” bias, we have also constructed the “policy”

²⁴ For further details, see Giorno *et al.*, “Potential output gaps and structural budget balances”, *OECD Economic Studies*, N.24, 1995/I.

²⁵ A panel data analysis appears adequate. A cross-section study only exploiting the time average of each variable would face the problem of the relatively limited cross-sectional dimension (21 OECD countries and 14 EU countries) and will lose some time-series information. Table 3.1 shows that the time variation (“within”) is relatively important for some structural variables (female participation, fertility rate, schooling rate) and is not negligible for some labour market institutions such as total tax rate, EPL and bargaining coordination. The section on contribution analysis (section 5.3) will more intuitively confirm that, since the importance of institutions in each country varies between the 1980s (Figure 5.4) and the 1990s (Figure 5.5).

²⁶ Technically, this vector corresponds to “pooled after-reform country trends”. We have stacked the observations country by country to compose the vector. Within each block we have a trend which is 0 before any policy change and 1 after the first year following the easing of part-time regulations, 2 the second year, n the nth year, etc. In principle, we could have estimated each country block separately. However, given the relatively limited time series dimension, we stacked them and restricted the coefficients to be the same across countries in order to increase the efficiency of the estimate and to capture the *overall* effect of reforms.

²⁷ The rise in PTR induced by the regulatory change is likely to disappear in the long run, as it corresponds to the dynamics toward the new steady state implied by the reform of part-time regulation.

variable excluding the trend for the Netherlands, which experienced a much sharper increase in part-time employment than the other EU countries (Euwals and Hogerbrugge 2004)²⁸.

4. The effect of the business cycle on part-time employment in the short to medium run

Results derived from model (a) are presented in Table 4.1 in Annex 2. Noteworthy results include, first, that the output gap is found to significantly and negatively affect the increase in the part-time employment rate (PTR) – see column 1. When the economy operates above its potential, PTR tends to decline, or in other words, part-time employment grows to a lesser extent than full-time employment. Conversely, PTR tends to increase when the economy operates below its potential²⁹.

The negative effect of the economic cycle on PTR is also shown when running country-by-country OLS equations, as seen in Table 4.4. The coefficient of the output gap (either contemporaneous or one-year-lagged) is negative for all countries except for Denmark, although of different magnitude across countries, and is significant at 5% for France, United Kingdom and Spain. Given the very small size of the sample for each country, the statistical inference is problematic and the value of the *t*-test might not be reliable. Therefore, we formally test the poolability of the country results: a standard Chow test does not reject the hypothesis of common output gap coefficient across countries. Panel data analysis, also called pooled-time-series estimation, increases the number of observations and degrees of freedom, allowing for better inference and providing more efficient estimators.

The negative effect of the economic cycle on PTR is consistent with the *flexibility effect* outlined in section 2.1. The counter-cyclical pattern of PTR is less marked in periods of strong economic activity than in periods of weak activity, as shown by column 7 in Table 4.1. Indeed, this would indicate that part-time employment enables employers to react flexibly in the presence of increasing economic uncertainty, e.g. in the event of recession or the very start of economic recovery. Moreover, as most part-time jobs are created in the services sector, it is not surprising that the counter-cyclical relationship is highly significant when the cycle is measured by the value-added growth in the service sector (column 6). This result is fully consistent with the aforementioned *compositional effect*.

Table 4.5 (first row) shows a highly significant and negative impact of the business cycle on the share of involuntary part-time employment. This would confirm the existence of a *flexibility*

²⁸ More technically, as the change in the regulatory framework for part-time jobs in the Netherlands occurred before the start of the sample (i.e. 1982), the “policy” variable for the Netherlands cannot really measure the effect of the *change* in regulation. It would instead simply capture the trend increase in PTR.

²⁹ Other ancillary results suggest the robustness of the findings mentioned above (see Table 4.1). The countercyclical pattern still holds when taking real GDP growth as our measure of the cycle in column 2. The cyclical pattern appears even stronger when using instrumental variables for the output gap to treat possible problems of endogeneity between the output gap and PTR (column 5). Column 8 suggests that the cyclical effect on part-time work is not very different between countries with high unemployment and other countries.

effect and *involuntary part-time effect*. The bulk of the effect of the cycle on involuntary PTR seems to occur within the same year. This contemporaneous effect of the business cycle holds for both the total and involuntary share of part-time work. Therefore, the expansion of economic activity recorded in the late 1990s likely reduced involuntary part-time employment, which continuously declined from 21.8% of total part-time employment in 1997 to 16.4% in 2001.

Our results generally indicate that, although strongly *significant*, the effect of the economic cycle on the part-time share appears *limited in magnitude*. The use of an annual model, for statistical reasons, may slightly underestimate the impact of the business cycle, as the intra-annual cyclical variations are not taken into account, although this measurement effect should not be overstated given that the output gap is smoothed out over a relatively short period of four quarters. A negative output gap of 1% is associated with an increase in the total PTR of around 0.06 percentage point at most. Regarding the period 1992-1999 which was characterised by continuously negative output gaps, the cycle explained less than one fifth (17%) of the total increase in PTR recorded in the European Union as a whole³⁰. This result is likely to be related to the fact that involuntary part-time work represented less than 20% of total part-time jobs in the EU in the 1990s. This also gives some support to the idea that other factors, of structural nature, which are considered in section 5, have been far more important in the explanation for the upward trend in part-time employment developments.

The remainder of this section considers the importance of the business cycle on the development of part-time work for four different groups of workers: young workers, prime age males, prime age females and older workers separately. As displayed in Table 4.3, the findings for each group are broadly confirmed by the Granger-causality approach, which is used to check the robustness of the estimates to possible endogeneity issues.

Table 4.6 presents results for model (a) for the part-time employment rate of young workers. The effect of the economic cycle, captured either by the output gap or real GDP movements, is found to be highly significant. The coefficient of the output gap lies between -0.15 and -0.21 across regressions. Taking a median elasticity of 0.18, the cycle would have accounted for around 25% of the total increase in youth PTR recorded in the European Union in the period 1992-1999, which is clearly stronger than the impact of the cycle on total PTR. The more acute cyclical pattern in countries displaying high unemployment might suggest that the need for higher flexibility for youth is larger in presence of strong structural rigidities. Moreover, the effect of the cycle on the share of involuntary youth part-time employment is statistically significant, but smaller compared to other groups. This would suggest that firms' labour demand generally matches the desire of young people, who are mainly looking for part-time jobs to finance their studies.

³⁰ In this period, the cycle explained 0.09 p.p. only out of the 0.51 p.p. increase in PTR recorded on average each year in the EU-15 as a whole. In the period 1992-1997, the cyclical effect reached its maximum, i.e. 23% of the total increase in PTR.

The second group we consider is prime-age males. Table 4.7 suggests that the effect of the economic cycle on the PTR for this group is again highly significant, with an elasticity of around 0.26 on the output gap (see column 3). Thus the cycle would have explained around 20% of the total increase in PTR recorded in the European Union in the period 1992-1999, which is slightly stronger than the impact of the cycle on the total PTR³¹. This is consistent with the fact that the share of prime-age male involuntary part-timers appears highly cyclical with a negative output gap of 1% increasing the proportion of involuntary part-timers by 0.34 percentage points (see Table 4.5).

For prime-age females, the effect of the cycle on the PTR is unclear and in any case very weak, as seen in Table 4.8. Although the effect of the contemporaneous output gap appears highly significant and relatively high in magnitude (column 1 and 3), it does not turn out to be significant anymore once instrumented by fixed-capital investment and total exports (column 4). When regressing the female PTR on the output gap lagged by one year so as to examine the Granger causality, the coefficient is only significant at 10% and its magnitude is almost halved (see Table 4.3). Moreover, an alternative indicator of the business cycle, such as real GDP growth, is not significant (column 2). The cycle could only explain between 8% and 15% of the total increase in female PTR recorded in the European Union in the period 1992-1999. This impact is very small and lower than the impact of the cycle on total PTR³². Thus, the upward trend in female PTR in the 1990s is likely to have mainly been the result of structural factors considered in the next section. An alternative explanation could be related to the fact that most female part-timers are working in the services sector, which is much less cyclical than industry. However, when considering specifically an indicator of cyclicity in the services sector (value-added growth), the effect on female part-time work remains insignificant.

Finally, we consider workers aged 50 and over. Table 4.9 reveals no clear effect of the cycle on the PTR for this group; neither real GDP growth nor the output gap is significant³³. This result suggests that either part-time work is particularly unattractive for this group or that employers do not typically use older workers in their attempts to increase the flexibility of their workforce through part-time work.

³¹ The effect of negative output gaps on the PTR of prime age males is found to be stronger when lagged by one year, while that of positive output gaps is strongest when contemporaneous. The negative output gap effect outweighs the positive output gap effect. One interpretation of these results again follows our flexibility effect argument: firms prefer to hire staff on flexible contracts when the economic outlook is uncertain (recession or very start of economic recovery). When the economy recovers, firms' need for part-time contracts decreases, as the uncertainty concerning future economic activity fades away gradually.

³² The relatively small impact of the output gap on involuntary female part-time work, compared to prime-age men (see Table 4.5) illustrates further the unclear effect of the business cycle on prime-age female part time employment.

³³ The only exception to this result is for relatively high unemployment countries (Spain, France, Italy and Finland) where the cycle is found to have a modest negative impact on changes in PTR.

5. The influence of institutions and other structural variables on the part-time employment rate in the longer run.

In addition to the impact of the business cycle, macro panel data analysis (model *b*) allows us to shed some light on the effect of the institutional and structural factors described in section 2.2 and 2.3 on part-time employment.

5.1 Using a panel of OECD countries with general labour market institutions

Covering the main OECD countries, Table 5.1 in Annex 2 shows the impact of general labour market institutions on the rate of part-time employment. As most of institutional data are only available until 1998 and display low time-series variation, we first include non-EU OECD countries into the sample in order to exploit better the cross-sectional dimension of institutions³⁴.

The findings in columns 1 to 3 do not include instrumental variables. Correcting for possible reverse causality issues (columns 4), the instrumental variable technique (2-stage GLS) broadly confirms the significance of labour market institutions in influencing PTR.

The output gap is found to be negatively correlated to PTR and appears highly significant in all equations, confirming the results displayed in section 4. The labour market participation rate is found to be positively related to PTR in equations 1, 2, 3 and 4, in line with the predictions from theory (see section 2)³⁵.

While the measure of EPL for temporary contracts is not found to be statistically significant in the explanation for the PTR, EPL for regular jobs is found to be significantly and positively related to PTR (columns 2, 3, and 4). This is consistent with very stringent EPL for regular jobs making it necessary for firms to develop flexible staffing arrangements. This is also in line with the fact that most part-time jobs are permanent.

Unionisation is found to be negatively related to PTR, possibly reflecting the reluctance of some trade unions towards the introduction of flexible work arrangements. Likewise, the unemployment benefit replacement ratio is negatively linked to PTR, signalling the possible existence of “unemployment traps”, which may particularly affect part-timers given their relatively low level of earnings compared to full-timers. The labour tax rate is also negatively and highly significantly correlated with PTR. A plausible interpretation of this finding could refer to the high marginal rate of taxation borne by the second earner of a couple.

³⁴ Australia, Canada, Japan, New Zealand, Norway, Switzerland and the US.

³⁵ The surprising results found in equation 4 and 5 could be explained by the high degree of colinearity between the participation rate and some institutional variables in the context of instrumental variable estimations. This can be seen through the very high value of some coefficient.

5.2 Employing a panel of EU countries with additional institutional and structural variables

The recent literature on the effect of labour market institutions on unemployment has argued that the institutions in Europe may be different from those in other OECD countries, significantly more rigid and affect labour market output variables, such as unemployment, in significantly different ways than in the US (see Nickell et al. 2001 for the impact on overall employment and unemployment). This final subsection therefore restricts our analysis to a consideration of European countries. Furthermore, we deepen our analysis of the determinants of part-time work through the collection of other structural and institutional variables, which are expected to specifically influence part-time employment. Indeed, a further critique of the analysis in the previous specification could be, for example, that the general labour market institutions affect the labour market as a whole rather than the market for part-time work.

Table 5.2 shows the results for this focus on EU15 countries. Some findings emerge from equations 1 to 9, which are broadly confirmed when using instrumental variable techniques (column 10)³⁶.

First, the negative influence of output gap is confirmed. Its significance is very strong in equations 1 and 9, where there are no time dummies. Indeed, time dummies, used in the other equations, tend to capture the common component of the output gap across the EU15, which is fairly important given the degree of synchronisation of European business cycles. Thus, the output gap coefficient in equations with time dummies mostly points to the country-specific component of the business cycle. As regards the magnitude of the business cycle influence, the output gap coefficient ranges from -0.07 to -0.11, which is in line with the results of section 4, albeit slightly higher.

Second, some institutions and policies appear to have a clear influence on the part-time employment rate as expected by the economic theory. The change in part-time regulation turns out to have a very significant impact on the part-time employment developments (column 4). This still holds true when excluding the Netherlands (columns 1, 2, 3, 5, 8 and 9), although the magnitude of the effect decreases somewhat. Another noteworthy result is the strong, negative and highly significant effect of child benefits on PTR, which acts as a disincentive to working part-time and makes it less attractive for individuals to (re-) enter the labour market. The reasoning behind this phenomenon may be that the benefit alters the trade-off between work and leisure towards a more family-oriented life. Broadly confirming the results of section 5.1, EPL on regular jobs is found to be highly significant, while overall EPL is only significant at a 10% level. The temporary employment rate is found to be positively correlated with the PTR (columns 7, 8 and 10), which suggests that the absence of substitution between part-time

³⁶ Results for EU15 displayed in Table 5.2 show that the impact of the output gap is negative, supporting our previous findings. It is clearly significant when the equation is estimated without time dummies (columns 1 and 9). Indeed, these dummies take out the component of the cycle common across countries.

employment and temporary employment and that these two flexibility schemes are complementary in circumventing the rigidity of European labour markets. Lastly and as in section 5.1, unemployment benefit replacement ratios are found to be negatively correlated with PTR, but the statistical significance of this variable and the magnitude of its effect are not robust across equations.

Third, some institutions do not seem to drive PTR. Unemployment benefit duration is not significant. Reflecting the theoretical uncertainty concerning its overall impact (e.g. income versus substitution effects), total labour taxes do not seem to be significant. The total labour tax rate probably remains too aggregated to identify the relative tax burden borne by part-timers compared to full-timers. In particular, it does not take into account the difference between the tax rate borne by the second earner in a household and that undergone by a single wage-earner household. Likewise, union density is not found to be significant (see column 6), which may mirror the changing attitude of trade unions toward part-time work in the EU countries in the 1990s.

Fourth, some structural factors of sociological, demographic or economic nature are also found to be an important determinant of PTR. The female participation rate is positively related to PTR. This is consistent with the fact that women seem to prefer to work part-time much more than men, in order for instance to better reconcile family and professional lives especially after their child's birth. While part-time workers are much more likely to be women, with the female part-time employment rate standing at 34% and the male rate at only 6.2% in 2001 in the EU-15, the vast majority of female part-time work is voluntary. The rate of involuntary part-time work within the EU-15 stood at 20% for men in 2001, but at a significantly lower rate of 13% for women³⁷. However, the issue of reverse causality should not be overlooked, as part-time jobs can be seen in many cases as a condition for women to enter the labour market. In order to ascertain that endogeneity problems do not lead to misspecifications and as commonly done in the literature, we first ran a two-stage least square estimation (column 10 in Table 5.2), where all the explanatory variables lagged by 2 years are used as instruments (including the female participation rate). The coefficient on the female participation rate is found to be very close to those obtained in the other equations reported in Table 5.2. Second, we followed the Granger-causality approach, where PTR is regressed by the female participation rate lagged by one year and two years. As shown in Table 5.3, the results also confirm the robustness of the previous estimates: the female participation rate lagged by one or two years remains highly significant and its coefficient is only slightly smaller than that of the contemporaneous estimate. A rise of 1 percentage point in the female participation rate would lead to an increase of around 0.3 percentage point in PTR. This is in line with the fact that female employment accounts for less than 45% of total employment in the EU15 and that almost half of the net increase in female

³⁷ This pattern of a significantly higher rate of female part-time employment and lower female rate of involuntary part-time work holds across time and for most EU-15 countries.

employment in EU15 in the late 80s and the 1990s was attributed to full-time jobs (which goes against the idea that the causality might exclusively run from female participation to part-time rate).³⁸ Finally, an alternative regression (column 5 in Table 5.2) using country trends instead of female participation also displays broadly similar results, although the multi-colinearity that country trends introduce might artificially remove the explanatory power of some institutions.

The fertility rate is also found to be strongly and positively correlated with the part-time employment rate, which suggests that part-time work creates an opportunity for women to combine taking care of their children with market work. Similarly, the schooling rate of the 15-25 aged population and the share of employment in the service sector are also found to positively affect the PTR. The relative hourly wage of part-time workers vis-à-vis full-time workers exerts a strong and highly significant effect on PTR: therefore the use of part-time work may be partly accounted for by a reduction of hourly labour costs borne by firms (see equation 11)³⁹.

Lastly, the two types of models reviewed in section 5.1 and 5.2 seem to well explain part-time developments over time and across countries. The fitted value for OECD countries is broadly close to the actual series with the exception of Denmark and the US (see Figure 5.1). The fitted value for European countries derived from Table 5.2 yields even better results, as shown by Figure 5.2⁴⁰.

5.3 The relative importance of the business cycle and of institutional and structural variables: a contribution analysis

The contribution analysis is one important value-added of the paper, as it measures the *relative weight* of each relevant factor over time. This justifies the macro-economic perspective and the comprehensive approach of the paper (encompassing a large set of determinants), since the contribution of relevant factors could not have been obtained with a micro analysis or with a study focusing on one specific factor of part-time employment.

The contribution analysis is carried out using the baseline version of the model (model 1 in Table 5.2). As the model is static, the contribution of each variable to the development in the part-time employment rate is the product of the regression coefficient and the change in the variable at stake over the period considered.

³⁸ Table 5.3 also suggests that the reverse causality, i.e. the impact of female participation on PTR, is higher in magnitude: in order to raise the female participation rate by 1 percentage point, a rise of 0.7 percentage point in PTR would be needed.

³⁹ The estimate of the coefficient of relative wages derived from pooled-time-series analysis might be slightly biased, as relative wage data are only available as cross-section for 1995. However, a sheer cross-sectional regression for 1995 broadly confirms the negative relationship between PTR and the relative hourly wage of part-time workers vis-à-vis full-time workers.

⁴⁰ Equation 2 in Table 5.1 and equation 2 in Table 5.2 have been chosen to make simulations because they are comparable to each other and they both use EPL indicators broken down by types of contracts (regular and temporary), which provide better results than using simply the overall EPL indicator.

Looking at Figure 5.3, the contribution of the main structural and institutional variables generally explains the development in the part-time rate in the EU countries rather well over the full period 1983-1998. This is especially true for Belgium, Germany, Spain, France and Italy, while other (unobserved) factors have also contributed to increasing part-time employment rate in the United Kingdom, Ireland, the Netherlands and Portugal. By contrast, the main structural and institutional factors do not explain the decline in the US part-time employment rate⁴¹.

As we might expect, female participation appears to be the main driving force behind the development in part-time employment. The countries experiencing the strongest increase in their part-time employment rate were those recording a surging female participation rate. However, part-time job dynamism was slightly dragged down by declining fertility, especially in Ireland, Spain and to a lower extent Italy. On the institutional side, the relaxation of the legislation on part-time jobs in Belgium, Spain and France played a major role in the rising rate of part-time work, explaining some 2 percentage points of the rise. The other institutions played a more marginal role, except in Spain and Portugal, where the reduction in EPL stringency significantly weighed upon part-time job developments, and for the Netherlands, where the cut in child benefits boosted part-time employment further.

It should be noted that the (negative) effect of the business cycle was quite negligible over the full period 1983-1998, not even reaching half a percentage point, which stresses the principally structural nature of the upward trend in part-time employment. Indeed, cyclical movements in different directions offset each other over the full period, as EU economies experienced broadly similar positions in the business cycle at the start and the end of the time sample.

In order to better identify the cyclical factors, we split the period in two sub-periods - 1983-1990 (Figure 5.4) and 1990-1998 (Figure 5.5). While the contribution of output gap was negative (between half and one percentage point) in most countries in the 1980s, it was slightly positive (of around $\frac{1}{4}$ percentage point) in the 1990s, when EU economies were running slightly below their potential. Therefore, the business cycle has contributed to explaining the generally stronger developments in part-time employment in the 1990s compared with the 1980s, albeit to a modest extent.

As regards structural and institutional indicators, their individual role in the 1980s and 1990s differs across countries. However, some general features emerge. The (either positive or negative) effect of the fertility rate was stronger in the 1980s. Child benefits had an unambiguously positive contribution in 1980s, while their impact was weaker or negative in the 1990s. Conversely, the change in part-time employment laws and in EPL for regular contracts only played a real role in the 1990s.

⁴¹ This is possibly due to the flexibility of permanent contracts in the US, which makes the use of part-time jobs less necessary for firms. Even more importantly, the already high rate of female participation and the culture of much longer working hours compared with Europe could explain the stalling part-time employment rate in the US.

6. Conclusion

The negative impact of the business cycle helps to explain developments in the part-time employment rate in the short run. This paper finds that the business cycle contributed, albeit to a limited extent, to explaining the generally stronger developments in part-time employment seen in the 1990s compared with the 1980s. The countercyclical relationship between the part-time employment rate and the business cycle also suggests that part-time work may offer a means of increasing the flexibility of labour markets by allowing firms to adjust hours worked to economic conditions. Over and above this cyclical effect, the role of part-time work as a flexible form of employment is evidenced by the estimated complementarity between part-time and temporary employment, and the sensitivity of hiring part-time to the lower relative wages of these jobs.

In the longer run, the main structural variables and institutions reviewed in this paper generally explain the rise in the part-time employment rate in most EU countries over the 1983-1998 period fairly well. These factors are much less powerful in explaining part-time work developments in the United States. In absence of further evidence, it can only be hypothesized that the flexibility of permanent contracts in the US makes the use of part-time jobs less necessary for firms, while the already high rate of female participation and the culture of much longer working hours compared with Europe could explain the stalling part-time employment rate in the US.

In Europe, while female participation is found to be the main driver of the development in the part-time employment, declining fertility rates exert a dampening effect in some countries. Looking at labour market institutions, changes in legislation favourable to part-time employment are effective, having a strong impact on actual part-time employment developments. In particular, the relaxation of the legislation on part-time jobs played a key role in Belgium, Spain and France. Other institutions are found to have played some part in Spain and Portugal (easing of EPL for permanent jobs) and in the Netherlands (the cut in child benefits).

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Annex 1: Data

Part-time employment

The *part-time employment rate* (PT) is defined as the percentage of part-time employment relative to total employment⁴². The annual part-time employment rate, as well as the share of involuntary part-time employment, is derived for each country from the annual European Community Labour Force Survey, which has been conducted every year in the spring since 1983 and compiled by Eurostat⁴³. Although data on part-time employment are generally available from 1983, no information is available for countries before they joined the European Union (i.e. for Spain and Portugal prior to 1986, for Austria, Sweden and Finland prior to 1995)⁴⁴. Thus, for some countries, such as Finland or Sweden, data has been back-cast using OECD Annual Labour Force Statistics, when available. These data are considered the most harmonised existing data source on part-time work. Moreover, data are available by age groups and by gender. For this study, four age/gender categories have been considered: those aged 15-24, men aged 25-49, women aged 25-49, those aged 50 and over⁴⁵.

Business cycle indicators

We mainly focus on annual output gaps stemming from the OECD Economic Outlook database. The use of the output gaps computed by the European Commission (DG-ECFIN-AMECO database) leads to very similar results⁴⁶. The output gap is measured as the percentage difference between actual GDP in constant prices, and estimated potential GDP. Its construction is precisely documented in Giorno et al. (1995) and Turner et al. (1996). The estimated potential GDP is estimated by the OECD using a production function approach for all countries but Portugal. This approach takes into account the capital stock, total factor productivity, changes in labour supply and the non-accelerating wage rate of unemployment (NAWRU) for each OECD country. By contrast, potential output for Portugal is calculated using a Hodrick-Prescott filter of actual output. It should be stressed that the estimated levels of potential output are subject to significant margins of error.

Unemployment data were also obtained from this database. Matching the frequency of part-time employment data, the business cycle is measured using annual data to match the long time series

⁴² The concept *stricto sensu* refers to employment, i.e. number of jobs rather than number of people employed. As a result, two part-time jobs held by the same individual are not counted as a full-time job but as two different jobs. Moreover, full-time and part-time employment can either correspond to self-employment or wage-earning jobs and, alternately, to fixed-term contracts or permanent positions.

⁴³ A detailed description of the sampling methods and adjustment procedures used to compile this data can be found in the latest *Labour Force Survey – Methods and definitions*, 1998. Part-time employment series are only available on an annual basis. Some quarterly series of part-time employment rate exist for some countries but remain rather short and display a very strong seasonal pattern, which is risky to correct given the poor time series dimension of the data.

⁴⁴ Data have been made available for 2002. The estimations in this paper used data until 2001.

⁴⁵ This split corresponds to the main age categories presented by Eurostat for the LFS.

⁴⁶ The correlation coefficient between the two measures of output gap is 0.96.

of the part-time employment rate. Although the annual frequency does not allow for a precise measurement of the dynamic adjustment to the cycle, the number of available observations appears satisfactory by pooling annual time series.

General labour market institutions

Data are taken from the recent macro-economic literature on labour markets. Data on employment protection legislation in particular for regular contracts and temporary contracts are the OECD summary series (Nicoletti et al. 2000). Data on total taxes on labour, unionisation⁴⁷ and wage bargaining co-ordination, benefit replacement rates and benefit duration are those collected by Nickell and Nunziata (2001) with an update provided by Nickell, Nunziata and Ochel (2005)⁴⁸. Most of these data on national labour market institutions are available only until 1997-1998. An indicator for the provision of child benefits (drawn from Eurostat) is also used.

Other structural variables

In addition to labour market institutions, we collected various structural data which on the basis of section 3 were likely to influence part-time employment developments. Most of these data are available for the EU countries and they are relatively harmonised across countries. Demographic variables, including fertility rates and the schooling rates of 15-24 year olds, are provided by the World Bank's World Development Indicators database. Series for total and female participation rates come from the OECD's Annual Labour Force Survey database. Data on structural aspects of national labour markets include social protection data for European countries (such as child/family benefits) which are drawn from Eurostat European Social Statistics, Expenditure and receipts dataset for 1980-1999, which gather levels of benefits in ECU/Euros for all European Countries. These variables are expressed as a percentage of GDP. Data on temporary employment as well as the share of employment in the services sector stem from Community Labour Force Surveys (Eurostat).

The wage differential between part-time and full-time employment

The wage differential (i.e. the ratio of the median hourly wage excluding overtime of part-time workers to that of full-time employees) is computed from the Eurostat Survey of the Structure of Earnings, implemented in 1995. This variable is time-invariant⁴⁹.

⁴⁷ Also called union density. This is the percentage of reported union members among wage and salaried employees.

⁴⁸ For the most recent observations, see also Nickell, Nunziata and W. Ochel (2005).

⁴⁹ The wage differential for the US used in section 6 comes from the OECD (1999).

Table 3.1 Summary statistics on the variables of interest 1983-1998

Variables		Mean	Std. Dev.	Min	Max	Observations
Part-time variables						
Total part-time employment rates (%)	overall	13.86	8.31	3.8	38.8	N 216
	between		8.15	5.0	31.6	n 15
	within		2.19	3.4	21.3	T 14.4
Part-time employment rates 15-24 (%)	overall	16.87	13.77	3.6	61.6	N 191
	between		14.10	5.6	41.0	n 15
	within		5.48	-7.7	37.4	T 12.7
Part-time employment rates prime-age men (%)	overall	2.88	2.04	0.7	9.9	N 181
	between		1.87	1.6	8.4	n 14
	within		0.78	-0.2	5.0	T 12.9
Part-time employment rates prime-age women (%)	overall	26.49	16.14	5.6	68.2	N 197
	between		15.77	7.7	64.0	n 15
	within		2.83	19.9	37.8	T 13.1
Part-time employment rates prime-age 50-64 (%)	overall	15.55	9.27	1.4	39.6	N 196
	between		8.69	6.5	33.0	n 15
	within		3.27	-10.8	25.4	T 13.1
Share of involuntary PT (%)	overall	21.38	11.53	2.3	44.8	N 184
	between		11.56	6.5	38.9	n 15
	within		3.91	13.1	33.4	T 12.3
Share of involuntary PT 15-24 (%)	overall	5.37	3.21	0.2	12.6	N 169
	between		2.81	0.7	9.6	n 14
	within		1.51	0.4	10.0	T 12.1
Share of involuntary PT prime-age men (%)	overall	16.51	9.99	2.9	35.8	N 164
	between		9.38	5.2	31.1	n 14
	within		3.23	4.7	24.0	T 11.7
Share of involuntary PT prime-age women (%)	overall	12.67	7.03	1.4	29.9	N 173
	between		7.32	4.2	27.2	n 15
	within		3.04	4.7	23.4	T 11.5
Share of involuntary PT prime-age 50-64 (%)	overall	3.51	1.91	0.2	8.1	N 167
	between		1.88	1.3	6.4	n 14
	within		0.84	1.5	6.0	T 11.9
Economic activity						
Output gap (%)	overall	-1.12	2.62	-10.5	5.5	N 224
	between		0.82	-2.4	0.2	n 14
	within		2.50	-9.1	6.4	T 16
GDP growth (%)	overall	2.60	2.25	-6.3	13.2	N 224
	between		0.85	1.6	5.1	n 14
	within		2.09	-6.1	12.9	T 16
Institutions						
Change in part-time regulation (more favourable)	overall	0.94	2.80	0.0	17.0	N 240
	between		2.43	0.0	9.5	n 15
	within		1.52	-6.6	8.4	T 16
Change in part-time regulation (more favourable) excluding the Netherlands	overall	0.31	1.09	0.0	7.0	N 240
	between		0.55	0.0	1.8	n 15
	within		0.95	-1.4	5.6	T 16
Children benefits (%)	overall	2.18	0.96	0.3	4.6	N 223
	between		0.98	0.4	4.0	n 15
	within		0.30	1.3	3.3	T 14.9

Table 3.1 Summary statistics on the variables of interest 1983-1998 (continued)

	Variable	Mean	Std. Dev.	Min	Max	Observations	
EPL	overall	2.71	1.03	0.5	4.2	N	224
	between		1.02	0.5	4.0	n	14
	within		0.29	2.0	3.2	T	16
EPL for regular jobs	overall	2.60	0.94	0.7	5.0	N	224
	between		0.96	0.7	4.7	n	14
	within		0.17	2.0	3.0	T	16
EPL for temporary jobs	overall	2.82	1.44	0.3	5.3	N	224
	between		1.38	0.3	5.0	n	14
	within		0.55	1.4	3.7	T	16
Unemployment benefit replacement ratios	overall	0.32	0.14	0.00	0.71	N	224
	between		0.13	0.08	0.59	n	14
	within		0.05	0.08	0.44	T	16
Unemployment benefit duration	overall	0.50	0.26	0.00	1.02	N	210
	between		0.27	0.05	0.80	n	14
	within		0.08	0.23	0.71	T	15
Share of temporary jobs	overall	0.10	0.07	0.02	0.35	N	195
	between		0.06	0.03	0.30	n	15
	within		0.02	-0.04	0.17	T	13
Total labour tax rate	overall	0.38	0.08	0.23	0.53	N	218
	between		0.07	0.25	0.46	n	14
	within		0.02	0.31	0.47	T	15.6
Unionisation	overall	0.45	0.22	0.10	0.91	N	206
	between		0.23	0.12	0.85	n	13
	within		0.05	0.36	0.66	T	15.8
Bargaining co-ordination	overall	2.14	0.50	1.0	3.0	N	208
	between		0.46	1.0	2.9	n	13
	within		0.23	1.5	2.8	T	16
Other structural variables							
Female participation rate (%)	overall	62.18	13.70	33.0	87.7	N	201
	between		13.90	46.5	86.1	n	15
	within		5.69	47.7	76.2	T	13.4
Total participation rate (%)	overall	68.19	7.80	55.1	82.9	N	240
	between		7.89	57.7	80.6	n	15
	within		1.56	63.8	73.5	T	16
Fertility rate	overall	1.61	0.25	1.15	2.74	N	240
	between		0.21	1.31	2.14	n	15
	within		0.14	1.29	2.21	T	16
Schooling rate of 15-25 population (%)	overall	55.87	8.45	34.3	72.0	N	191
	between		8.03	43.5	71.1	n	15
	within		5.01	42.8	67.1	T	12.7
Share of employment in services	overall	0.64	0.08	0.44	0.77	N	192
	between		0.07	0.51	0.73	n	13
	within		0.03	0.56	0.71	T	14.8
Ratio part-time hourly wage / full-time hourly wage (time invariant)	overall	0.77	0.14	0.54	1.06	N	240
	between		0.14	0.54	1.06	n	15
	within		0.00	0.77	0.77	T	16

Note: unless indicated, the variables are not expressed as percentages.

Annex 2: Econometric results

Table 4.1

Cyclical pattern of total part-time employment rates
 Dependent variable: annual change in the part-time employment rate (p.p.)
 (EU-15 countries except Luxembourg⁽¹⁾ 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output gap ⁽²⁾ (GAP)	-0.059** (-2.10)		-0.060*** (-4.51)					
Output gap (-1) (GAP-1)	-0.022 (-0.54)			-0.032** (-2.31)	-0.121*** (-3.81)			
Output gap (-2)	0.04* (1.66)							
GDP growth		-0.033 (-1.62)						
GDP growth (-1)		-0.045* (-1.90)						
GDP growth (-2)		-0.012 (-0.57)						
Value-added growth in services sector						-0.052*** (-2.95)		
Negative Output gap							-0.064*** (-3.12)	
Positive Output gap							-0.055 (-1.63)	
Output gap in high unemployment countries ⁽³⁾								-0.053 (-3.22)***
Output gap in low and medium unemployment countries								-0.077 (-3.27)***
Instrumented variables	No	No	No	No	Yes	No	No	No
Number of observations	228	228	228	228	223	228	228	228

Sources: Eurostat, labour force surveys; OECD, Annual Labour Force Statistics and Economic Outlook (2001).

⁽¹⁾ Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Netherlands, Portugal and Spain, Sweden and United Kingdom.

⁽²⁾ OECD

⁽³⁾ Spain, France, Italy and Finland.

Value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies to account for cross-country heterogeneity as well as a specific dummy taking into account the German reunification. When indicated, the two-stage generalised least squares (fixed-effects regression estimator with instrumental variables) have also been used to tackle possible problems of endogeneity. The instruments are the growth rate of fixed capital investments (and its value lagged by 1 and 2 years) and the growth rate of trade and services exports. The first-stage equation of the instrumental variable estimation is displayed in the Table 4.2 (equation 1).

Table 4.2

First-stage equation of the instrumental variable estimation
 (EU-15 countries except Luxembourg 1984-2001)

Instruments	(1)	(2)	(3)	(4)
Dependent variable: Output gap (%)				
Growth rate of trade and services exports	0.048 (3.34)***	0.055 (3.53)***	0.081 (4.63)***	
Growth rate of trade and services exports lagged by 1 year		0.016 -0.93	0.063 (3.32)**	
Growth rate of trade and services exports lagged by 2 years		0.018 -1.09	0.071 (3.88)**	
Growth rate of fixed capital investments	0.078 (6.96)***	0.075 (6.53)***		0.083 (7.44)***
Growth rate of fixed capital investments lagged by 1 year	0.087 (8.23)***	0.084 (7.65)***		0.082 (7.68)***
Growth rate of fixed capital investments lagged by 2 years	0.071 (7.19)***	0.071 (7.19)***		0.071 (7.03)***
Constant	-1.648 (1.80)*	-1.835 (1.98)*	-2.407 (4.13)***	-1.369 -1.47
Observations	257	257	266	257
Number of countries	14	14	14	14

Sources: Eurostat, labour force surveys; OECD, Annual Labour Force Statistics and Economic Outlook (2001).[†]

Value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies.

Table 4.3
Granger-causality from the output gap to part-time employment rates
 (EU-15 countries except Luxembourg 1984-2001)

	Explanatory variable	
	Output gap	Output gap lagged by one year
Dependent variable: Part-time employment rate		
Overall	-0.032 (2.32)**	-0.060 (4.51)***
Youth	-0.078 (2.21)**	-0.168 (4.76)***
Men aged 25-49	-0.028 (3.28)***	-0.037 (4.42)***
Women aged 25-49	-0.058 (1.95)*	-0.099 (3.12)***
Older workers	-0.002 (0.08)	-0.043 (1.87)*
Dependent variable: Share of involuntary part-time employment		
Overall	-0.252 (3.98)***	-0.380 (6.58)***
Youth	-0.050 (2.85)***	-0.103 (6.50)***
Men aged 25-49	-0.268 (4.69)***	-0.316 (5.21)***
Women aged 25-49	-0.090 (2.43)**	-0.154 (4.33)***
Older workers	-0.022 (1.60)	-0.048 (3.56)***

Sources: Eurostat, labour force surveys; OECD, Annual Labour Force Statistics and Economic Outlook (2001).

Value of t-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. While some heteroskedasticity has been detected, there is no evidence of serial correlation.

Table 4.4
Cyclical pattern of total part-time employment rates by country
 Dependent variable: annual change in the part-time employment rate (p.p.)
 (OLS country-by-country equation 1984-2001)

Explanatory variable	(1)		(2)		Number of Obs.
	Output gap		Output gap lagged by one year		
Austria	0.062	(0.29)	-0.156	(1.17)	6
Belgium	0.008	(0.22)	-0.041	(0.56)	18
Germany	-0.002	(0.02)	-0.038	(0.35)	18
Denmark	0.103	(0.67)	0.160	(1.16)	18
Spain	-0.084	(3.02)**	-0.012	(0.24)	14
Finland	-0.027	(1.28)	-0.008	(0.41)	18
France	-0.170	(3.96)***	-0.101	(1.53)	18
United kingdom	-0.124	(3.02)***	-0.100	(2.43)**	18
Greece	-0.084	(0.80)	0.050	(0.53)	18
Ireland	-0.041	(0.94)	-0.014	(0.20)	18
Italy	-0.075	(0.79)	-0.103	(1.13)	18
Netherlands	-0.169	(0.86)	-0.034	(0.34)	18
Portugal	-0.022	(0.40)	-0.011	(0.29)	15
Sweden	-0.096	(1.77)	-0.056	(1.02)	13
Chow's poolability test	$\chi^2(13)=17.7$ (0.169)		$\chi^2(13)=11.47$ (0.572)		

Sources: Eurostat, labour force surveys; OECD, Annual Labour Force Statistics and Economic Outlook (2001).

Value of t-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

For Chow's poolability test, the p-value is shown in parentheses:

Note: The equations are estimated by OLS with Newey-West standard errors allowing for heteroskedastic errors and serial correlation.

Table 4.5
Cyclical pattern of involuntary part-time employment

Dependent variable: annual change in the share of involuntary part-time employment in total employment (p.p.)
(EU-15 countries except Luxembourg⁽¹⁾ 1984-2001)

Groups involved	Explanatory variables	
	(1)	(2)
	Output gap	Output gap (-1)
Total part-timers	-0.415*** (-7.10)	-0.265*** (-4.15)
Youth	-0.1172*** (-7.19)	-0.0542*** (-2.99)
Men aged 25-49	-0.337 *** (-5.43)	-0.275*** (-4.77)
Women aged 25-49	-0.171*** (-4.70)	-0.097** (-2.58)
Older workers	-0.0575*** (-4.12)	-0.025* (-1.82)

Sources: Eurostat, labour force surveys.

⁽¹⁾ Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Netherlands, Portugal and Spain, Sweden and United Kingdom
Value of t- statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies to account for cross-country heterogeneity as well as a specific dummy taking into account the German reunification.

Table 4.6

Cyclical pattern of part-time employment rates for youth

Dependent variable: annual change in the part-time employment rate for those aged 15-24 (p.p.)
(EU-15 countries except Luxembourg⁽¹⁾ 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)
Output gap (GAP)	-0.206*** (-3.09)		-0.177*** (-4.92)	-0.251*** (-3.58)		
Output gap (-1) (GAP-1)	-0.003 (-0.03)					
Output gap (-2)	0.075 (1.22)					
GDP growth		-0.104** (-2.14)				
GDP growth (-1)		-0.057 (-1.19)				
GDP growth (-2)		-0.047 (-1.09)				
Negative Output gap					-0.227*** (-3.45)	
Positive Output gap					-0.114 (-1.53)	
Output gap in high unemployment countries ⁽²⁾						-0.255*** (-3.57)
Output gap in low and medium unemployment countries						-0.144*** (-3.48)
Instrumented variables	No	No	No	Yes	No	No
Number of observations	209	209	209	204	209	209

Sources: Eurostat, labour force surveys; OECD economic outlook (2001).

⁽¹⁾ Austria, Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Netherlands, Portugal and Spain, Sweden and United Kingdom

⁽²⁾ The high unemployment countries are Spain, France, Italy and Finland.

Value of t- statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies to account for cross-country heterogeneity as well as a specific dummy taking into account the German reunification. When indicated, the two-stage least squares within estimator (fixed-effects regression estimator with instrumental variables) has also been used to tackle possible problem of endogeneity. The panel is unbalanced as part-time employment series start later for some countries (Austria, Finland and Sweden).

Table 4.7
Cyclical pattern of part-time employment rates for prime-age males
 Dependent variable: annual change in the part-time employment rate for those aged 25-49 (p.p.)
 (EU-15 countries except Luxembourg⁽¹⁾ 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Output gap (GAP)	-0.005 (-0.31)						
Output gap (-1) (GAP-1)	-0.066*** (-2.97)		-0.026*** (-3.05)	-0.072*** (-4.92)			
Output gap (-2)	0.054*** (3.67)						
GDP growth		-0.094 (-0.79)					
GDP growth (-1)		-0.029*** (-2.64)					
GDP growth (-2)		-0.016 (-1.62)*					
Negative Output gap						-0.038*** (-2.68)	
Negative Output gap (-1)					-0.020 (-1.37)		
Positive Output gap (-1)					-0.039* (-1.88)	-0.033* (-1.75)	
Output gap in high unemployment countries (-1)							-0.023 (-1.64)
Output gap in low and medium unemployment countries (-1)							-0.029*** (-2.60)
Instrumented variables	No	No	No	Yes	No	No	No
Number of observations	209	209	209	204	209	209	209

Note: For further details, see Table 4.3.

Table 4.8
Cyclical pattern of part-time employment rates for prime-age females
 Dependent variable: annual change in the part-time employment rate for women aged 25-49 (p.p.)
 (EU-15 countries except Luxembourg⁽¹⁾ 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Output gap (GAP)	-0.127** (-2.04)		-0.094*** (-2.96)	-0.056 (-0.86)			
Output gap (-1) (GAP-1)	0.047 (-0.52)						
Output gap (-2)	-0.0162 (-0.28)						
GDP growth		-0.049 (-1.02)					
GDP growth (-1)		-0.0199 (-0.37)					
GDP growth (-2)		-0.047 (-0.97)					
Value-added growth in services sector							-0.0473 (-1.19)
Negative Output gap					-0.049 (-0.88)		
Positive Output gap					-0.156** (-2.25)		
Output gap in high unemployment countries ⁽³⁾						-0.132*** (-2.72)	
Output gap in low and medium unemployment countries						-0.068 (-1.64)	
Instrumented variables	No	No	No	Yes	No	No	No
Number of observations	209	209	209	204	209	209	209

Note: For further details, see Table 4.3.

Table 4.9**Cyclical pattern of part-time employment rates for older workers**

Dependent variable: annual change in the part-time employment rate for those aged 50-64 (p.p.)
(EU-15 countries except Luxembourg⁽¹⁾ 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Output gap (GAP)	-0.078 (-1.58)		-0.042* (-1.76)		-0.073 (-1.54)		
Output gap (-1) (GAP-1)	0.008 (0.11)			0.0009 (0.04)			
Output gap (-2)	0.06 (1.26)						
GDP growth		-0.055 (-1.52)					
GDP growth (-1)		-0.059 (-1.56)					
GDP growth (-2)		-0.024 (0.73)					
Negative Output gap						-0.001 (-0.02)	
Positive Output gap						-0.118 (-1.59)	
Output gap in high unemployment countries							-0.053** (-2.02)
Output gap in low and medium unemployment countries							0.008 (0.15)
Instrumented variables	No	No	No	No	Yes	No	No
Number of observations	209	209	209	209	204	209	209

Note: For further details, see Table 4.3.

Table 5.1**Effects of institutions on part-time employment rates**

Dependent variable: the part-time employment rate (%)

OECD panel⁽¹⁾ 1983-1998)

	(1)	(2)	(3)	(4)
Total participation rate	0.248 (4.09)***	0.260 (4.30)***	0.439 (8.51)***	0.173 (1.81)*
Output gap	-0.122 (-3.74)***	-0.124 (-3.83)***	-0.113 (-3.91)***	-1.578 (-3.29)***
EPL	0.227 (0.71)			
EPL for temporary jobs		0.053 (0.33)	0.154 (0.96)	1.273 (2.48)**
EPL for regular jobs		0.731 (1.84)*	0.824 (2.05)**	3.873 (3.40)***
Unionisation	-4.764 (-2.11)**	-4.486 (-2.02)**		
Bargaining co-ordination	0.135 (0.36)	0.235 (0.63)		
Unemployment benefit replacement ratios	-4.970 (-1.92)*	-5.136 (-2.00)**		
Unemployment benefit duration	-0.946 (-0.73)	-0.810 (-0.63)		
Labour tax rate	-8.952 (-2.66)***	-9.211 (-2.75)***		
Constant	11.638 (2.12)**	9.905 (1.78)*	-12.247 (-3.23)***	6.815 (0.97)
Observations	268	268	296	303
Number of countries	20	20	20	20
Instrumented	No	No	No	Yes

Sources: OECD; Nickell, Nunziata and Ochel (2005); Nickell and Nunziata database (2001).

⁽¹⁾ OECD Countries included Australia, Austria, Belgium, Canada, Denmark, Germany, Finland, France, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the US.

Value of t- statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies to account for cross-country heterogeneity as well as a specific dummy taking into account the German reunification. When indicated, the two-stage least squares within estimator (fixed-effects regression estimator with instrumental variables) has also been used as an alternative method to correct for possible endogeneity. The instruments used are the variables lagged by 2 years. The panel is unbalanced as part-time employment series are starting later for some countries (Austria, Finland, Norway, Sweden and Switzerland).

Table 5.2
Determinants of part-time employment rates
 Dependent variable: the part-time employment rate (%)
 (European countries ⁽¹⁾ 1983-1998)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Output gap	-0.116 (-3.47)***	-0.075 (-1.73)*	-0.071 (-1.53)	-0.075 (-1.93)*	-0.075 (-1.46)*	-0.0628 (-1.50)	-0.061 (-1.44)	-0.025 (-0.65)	-0.090 (-2.74)***	-0.350 (-2.52)**	-0.055 (-0.88)
Institutions											
Change in part-time regulation (more favourable)				0.349 (6.26)***							
Change in part-time regulation (more favourable) excluding the Netherlands	0.334 (5.68)***	0.165 (2.32)**	0.165 (2.10)**		0.384 (5.24)***	0.0506 (0.51)	0.115 (1.57)	0.125 (1.94)*	0.375 (6.74)***	0.029 (0.25)	
Child benefits	-1.383 (-3.56)***	-1.679 (-4.53)***	-1.437 (-3.49)***	-1.045 (-3.10)***	-1.324 (-2.49)**	-2.146 (-5.14)***	-1.478 (-4.09)***	-1.551 (-4.52)***	-0.881 (-2.42)**	-2.999 (-3.88)***	
EPL			0.622 (1.73)*								
EPL for regular jobs	1.938 (3.50)***	2.512 (5.44)***		2.207 (4.65)***	0.430 (1.05)	2.38 (5.66)***	2.276 (4.74)***	2.004 (5.02)***	1.961 (3.51)**	4.600 (3.65)***	
EPL for temporary jobs	-0.059 (-0.35)	0.072 (0.42)		-0.126 (-0.93)	-0.390 (-1.81)*	0.0306 (1.73)*	0.050 (0.30)	0.171 (1.12)	-0.337 (-2.25)**	-0.684 (-1.51)	
Unemployment benefit replacement ratios	-0.789 (-0.37)	-1.877 (-2.09)**	-1.448 (-1.39)	-1.029 (-1.25)	-15.17 (-3.29)***	-3.77 (-2.89)**	-2.058 (-2.36)**	-1.636 (-2.13)**	-2.622 (-2.62)***	-3.631 (-1.63)	
Unemployment benefit duration	-0.253 (-0.23)	-0.790 (-0.80)	-1.090 (-0.99)	0.099 (0.12)	1.736 (1.18)	-1.61 (-1.53)	-0.853 (-0.89)	-1.431 (-1.69)*	-0.087 (-0.09)	5.340 (1.67)*	
Share of temporary jobs							6.514 (1.99)**	7.285 (2.52)**	4.168 (1.19)	15.593 (2.17)**	
Total labour tax rate						8.224 (1.61)					
Unionisation						-1.728 (-0.56)					
Other structural variables											
Female participation rate	0.374 (16.5)***	0.401 (12.14)***	0.381 (10.30)***	0.354 (12.25)***		0.3497 (10.22)***	0.397 (12.40)***	0.317 (9.43)***	0.271 (7.84)***	0.327 (5.18)***	0.325 (12.06)***
Fertility rate	3.425 (4.05)***	4.424 (5.48)***	4.886 (5.35)***	2.313 (3.29)***	4.296 (3.88)***	4.704 (5.39)***	4.885 (6.05)***	8.230 (6.96)***		6.489 (2.86)***	
Schooling rate of 15-25 population	0.029 (2.63)***	0.079 (3.41)***	0.033 (1.34)	0.082 (3.79)***	0.028 (1.04)	0.0568 (2.19)**	0.072 (3.22)***	0.051 (2.32)**	0.010 (0.45)	0.169 (3.11)***	0.076 (2.27)**
Share of employment in services								22.875 (2.85)***	7.767 (1.18)	30.200 (1.67)*	
Ratio part-time hourly wage / full-time hourly wage (time invariant)											-11.850 (4.94)***
Constant	-9.77 (-3.31)	-14.382 (3.24)**	-13.637 (2.45)**	-11.933 (2.75)***	18.16 (2.79)***	-17.557 (-2.48)**	-15.275 (4.08)***	-42.834 (7.31)***	-2.079 (0.78)	-43.724 (4.04)***	-4.409 (1.43)
Observations	172	172	172	172	172	154	170	154	154	154	231
Number of countries	14	14	14	14	14	14	14	14	14	14	15 ⁽²⁾
Time dummies	no	yes	yes	yes	no	yes	yes	yes	no	yes	yes
Country trends	no	no	no	no	yes	no	no	no	no	no	no
Instrumented variables	no	no	no	no	no	no	no	no	no	yes	no

Sources: Eurostat Labour force surveys; Eurostat European Social Statistics; OECD economic outlook (2001); OECD labour market database; World Bank's World Development Indicators database; Nickell, Nunziata and Ochel (2005); Nickell and Nunziata database (2001).

⁽¹⁾ Countries included all the European Union member states except Luxembourg (Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Netherlands, Austria, Portugal, Finland, Sweden and the UK).

⁽²⁾ The US is also included to increase the cross-sectional dimension, as the ratio of part-time hourly wage to full-time hourly wage is time invariant, corresponding to its 1995 value (Eurostat survey of structure of earnings). For the same reason, equation 11 was estimated without country dummies (GLS with time dummies).

Value of t-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally estimated by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies, intercepts and a specific dummy taking into account the German reunification. When indicated, the two-stage least squares within estimator (fixed-effects regression estimator with instrumental variables) has also been used as an alternative method to correct for possible endogeneity. The instruments used are the variables lagged by 2 years. The panel is unbalanced as data are starting later for some countries (Austria, Finland, Norway and Sweden).

Table 5.3
Granger-causality from the female participation rate to part-time employment rate
 (EU-15 countries except Luxembourg 1984-2001)

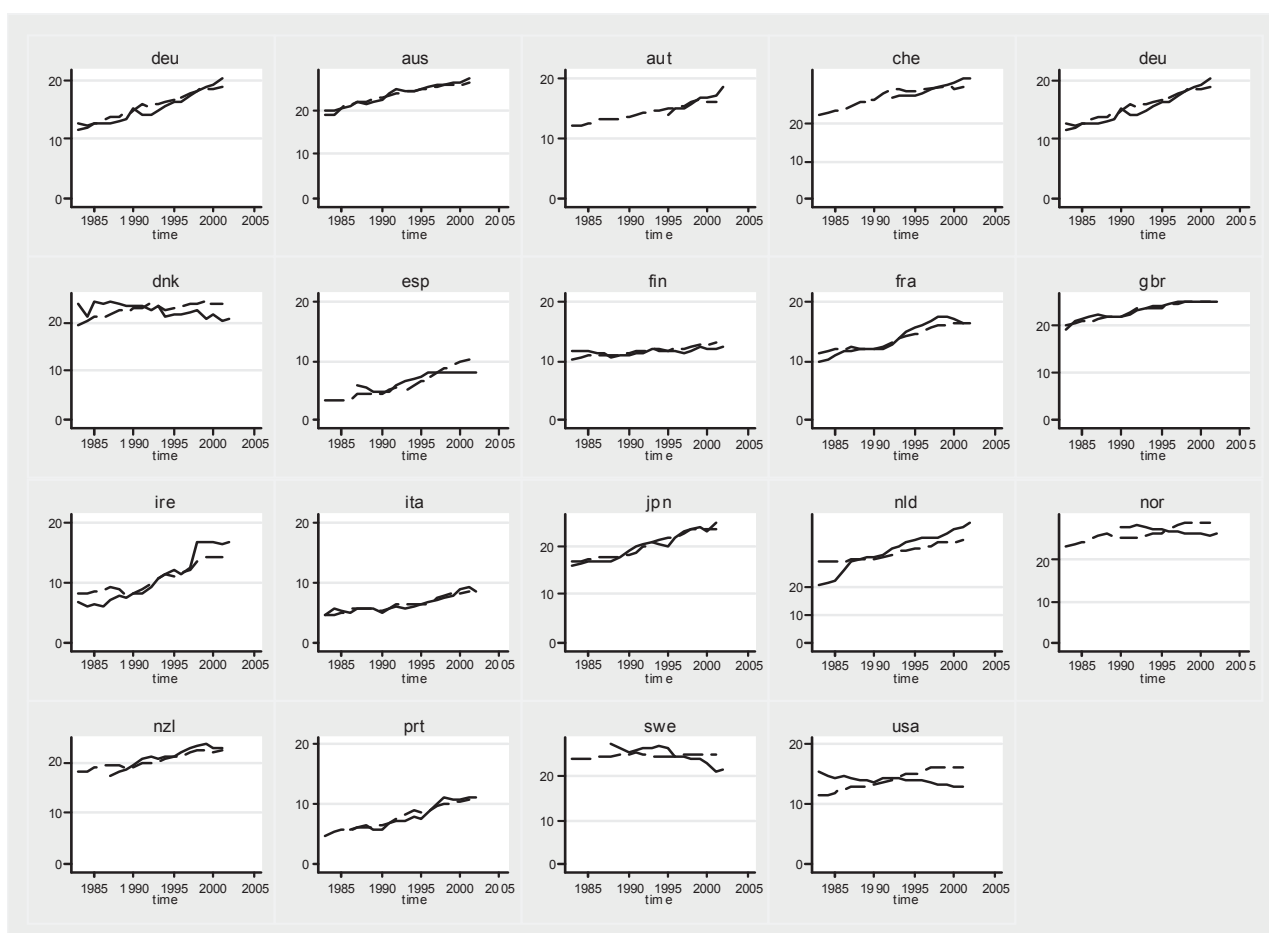
	Explanatory variable		
	contemporaneous	lagged by 1 year	lagged by 2 years
Dependent variable: Total part-time employment rate			
Female participation	0.358 (17.22)***	0.318 (15.71)***	0.314 (15.43)***
Observations	223	210	197
Number of countries	14	14	14
Dependent variable: Female participation rate			
Total part-time rate	1.388 (20.73)***	1.382 (20.30)***	1.269 (15.74)***
Observations	223	211	199
Number of countries	14	14	14

Sources: Eurostat, labour force surveys; OECD, Annual Labour Force Statistics (2001).

Value of t-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Note: The equations are generally by feasible generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation.

Figure 5.1: The fitted value of part-time employment rate for OECD countries
 (model 2 of Table 5.1) (%)



— Actual part-time employment rate
 - - - Fitted value

Figure 5.2: The fitted value of part-time employment rate for EU countries
(model 2 of Table 5.2) (%)

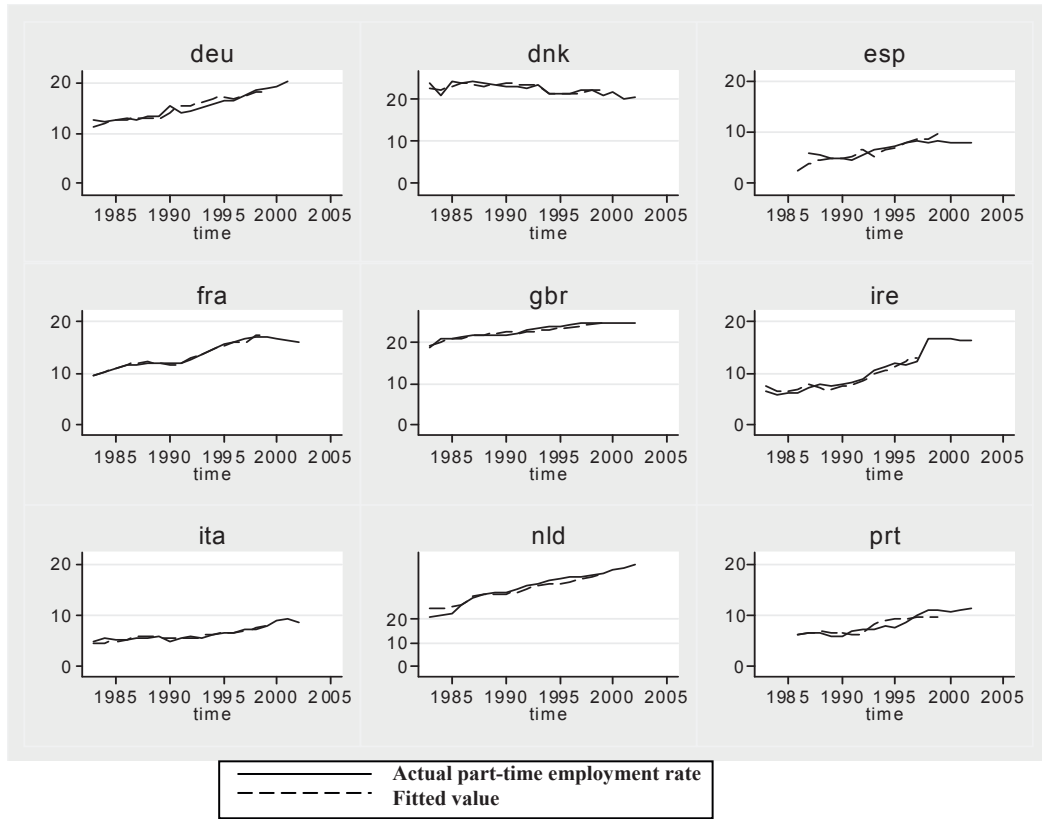


Figure 5.3: Change in part-time employment rate (in black) and contribution of each determinant over the full-period (1983-1998) (model 1 of Table 5.2) (percentage points)

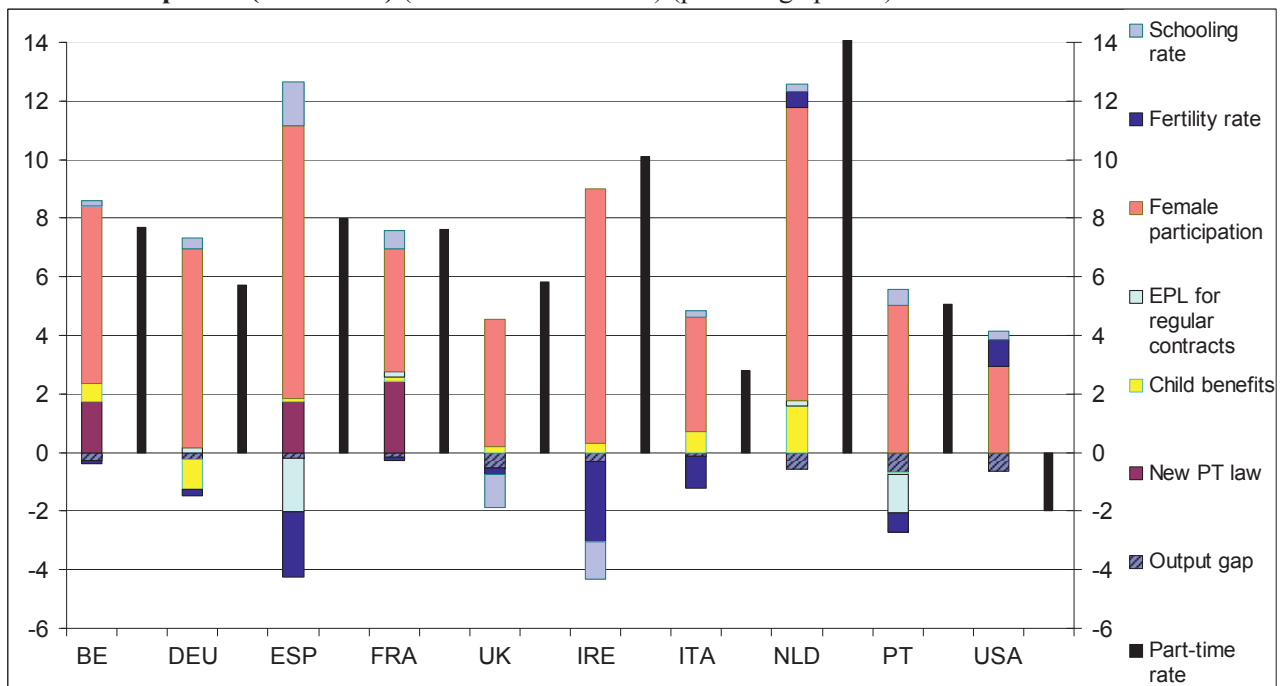


Figure 5.4: Change in part-time employment rate and contribution of each determinant in the 1980s- (1983-1990) (model 1 of Table 5.2) (percentage points)

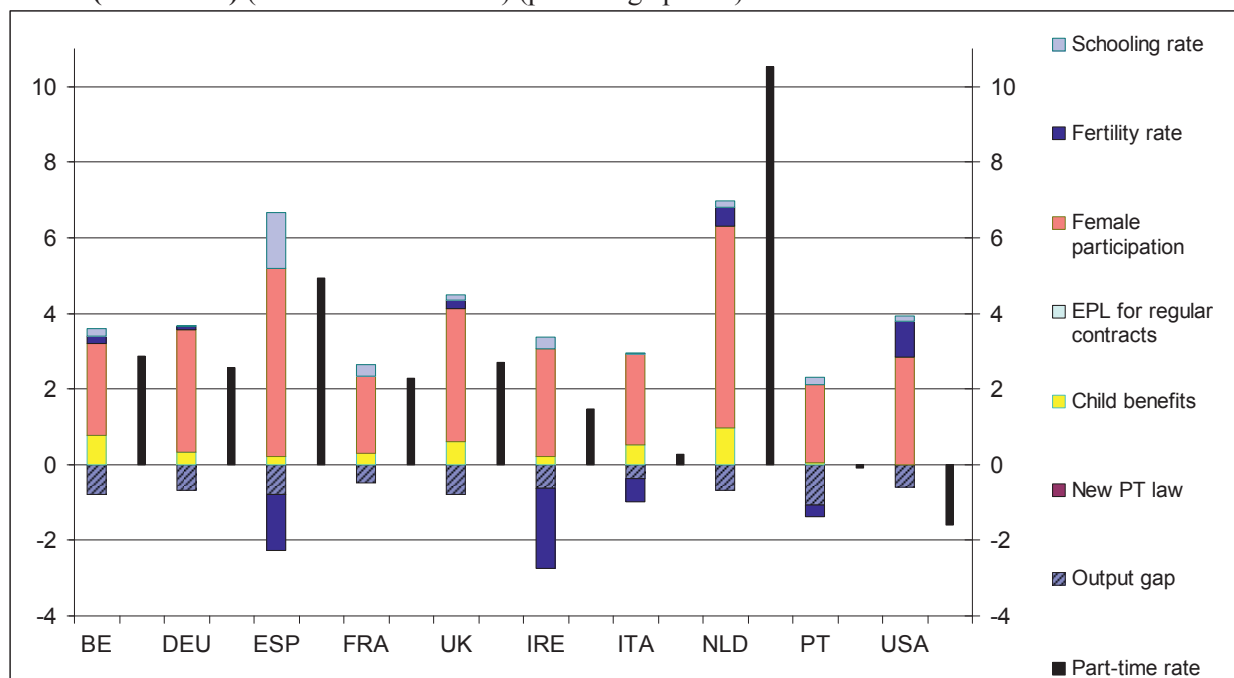
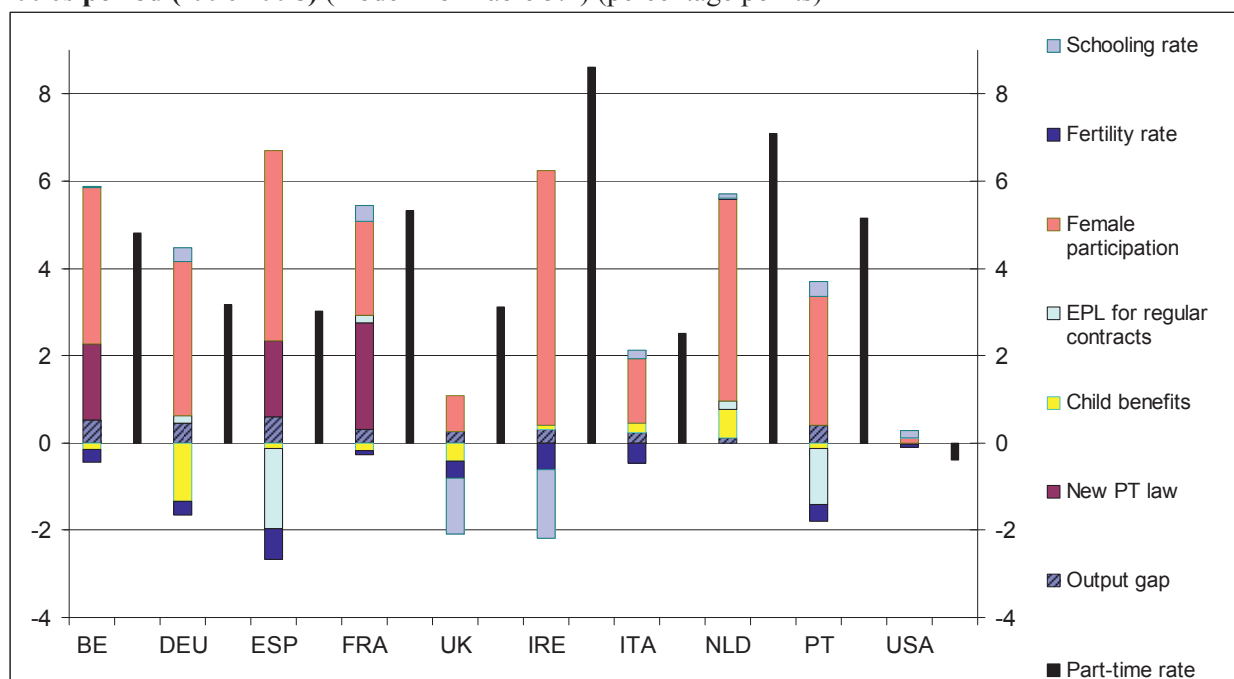


Figure 5.5: Change in part-time employment rate and contribution of each determinant in the 1990s period (1990-1998) (model 1 of Table 5.2) (percentage points)



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