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The Determinants of Part-Time Work in EU Countries: Empirical Investigations with Macro-Panel Data

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ABSTRACT

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This paper aims to identify the contribution of the business cycle and structural factors to the development of part-time employment in the EU-15 countries, through the exploitation of both cross-sectional and time series variations over the past two decades.
Key results include that the business cycle is found to exert a negative effect on part-time employment developments. This is consistent with firms utilising part-time employment as a means of adjusting their labour force to economic conditions. Correspondingly, involuntary part-time employment is found to be countercyclical, being higher in troughs of economic activity. Splitting our sample reveals a very significant effect of the business cycle on the rate of part-time work for young and male prime-age workers. Conversely, the effect is very weak for women and insignificant for older workers.
Institutions and other structural factors are also found to be significant and important determinants of the rate of part-time employment. Changes in legislation to part-time employment are found to be effective, having a strong and positive impact on part-time employment developments. Moreover, employment protection legislation is positively correlated with the part-time employment rate, which is consistent with the use of part-time work as a tool for enhancing flexibility in the presence of rigid labour markets. Less robust evidence suggests the presence of unemployment traps for some potential part-time workers. Cross-country evidence also indicates that the lower labour costs borne by firms when employing part-time workers has a large and positive influence on the part-time employment rate.

JEL Classification: J21, J22, J68

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

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Table of contents

1. Introduction 5

2. Some theory: the factors influencing part-time employment 6

2.1 Business cycles 7

2.2 Labour market institutions 9

2.3 Other structural variables 11

3. The framework of the empirical analysis 12

3.1 Estimation strategy 12

3.2 Data 15

4. The effect of the business cycle on part-time employment in the short- to medium-run 16

5. The influence of institutions and other structural variables on the part-time employment rate in the longer run 18

5.1 Using a panel of OECD countries with general labour market institutions 18

5.2 Employing a panel of EU countries with additional institutional and structural variables 19

6. Conclusion 21

References 23

Annex 1: Trends in part-time work in EU-15 countries 26

Annex 2: Data 30

Annex 3: Econometric results 32

1. Introduction

A growing part-time employment share has been 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, the latter increased strongly in the EU-15, Japan and Canada in the same period (see annex 1 for the trends in part-time employment). From a macro-economic standpoint, the increase in the share of part-time work may have a dampening effect on aggregate wage growth[1] 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 2004).

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 draw people into the labour market that were previously unwilling or unable to work. Part-time employment may therefore increase potential output in the European Union (see the economic strategy and the targets for the EU employment rates set by the European Councils held in Lisbon in 2000 and Stockholm in 2001).

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 determinants of part-time work (Haskel 1997; Houseman 2001), to illustrate the role of part-time work as a flexible work arrangement (Haskel 1997, Faber 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 2004a). 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

[1] 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.

focus on international comparison (Lemaitre et al. 1997) and attempt to understand the reason why part-time 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. 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. 2002) which 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 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 two-fold. 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.

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.

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 rate[2] 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 Faber (1999) for the US, it seems unlikely that most of the full-timers moving to part-time work stay in their current firm. On the contrary, they are likely to go through a period of unemployment[3]. 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 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 employment[4].

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[2] The percentage of those working part-time relative to total employment

[3] Faber (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.

[4] 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.

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.

A fourth effect, also of labour supply, can be identified, known as the "discouraged worker effect". During a period of economic contraction or slowdown, labour supply from low-skilled or initially inactive females, which 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.

Table 3.1
Four effects of business cycle on part-time employment rate

Labour demand
(-) compositional effect (concentration in less cyclical sectors)
(-) flexibility effect (adjustment of hours worked along the cycle)
Labour supply
(-) involuntary part time effect (enhanced willingness to work part-time to avoid unemployment)
(+) discouraged worker effect (withdrawal from the labour market of part-time job seekers.)
===> Overall effect uncertain, but likely negative correlation between output gap and part-time increase

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 four effects (see Table 3.1). The finding of a significant counter-cyclical effect would 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. Conversely, 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 part-time work growth 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 staff[5]. 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

[5] 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.

and across countries. However, the small proportion of fixed-term part-time employment can be affected by *EPL for temporary contracts*[6]**.**

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 income[7]. 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 (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 out[8]. 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

[6] 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.

[7] 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.

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

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 lead 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 arrangements[9].

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. Part-time employment has been the main way of integrating women in the labour market in countries where the participation rate was low in the 1960s and 1970s. Sociological and cultural reasons, such as the separation 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 was mainly due to 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 allow[10]. 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

[9] 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.

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

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 labour[11]. 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 countries[12]. 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. 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 firm.

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 by running the Maddala and Wu test (1999). 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

[11] 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.

[12] See OECD employment outlook, June 1999.

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 dummies[13]:

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

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. In this model, we include lagged dependent 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 trend[14]. It easily resolves the problems arising from the use of non stationary variables.

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.

[13] 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.

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

It is expressed as follows:

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

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).

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 parameters[15]. We use the Maddala-Wu test (1999) to test for unit roots in the residual of the equations. The test clearly rejects the hypothesis of the residuals having a unit root and points to the existence of a cointegration relationship between the regressors[16].

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*., 2001 and Nunziata, 2001)[17]. The poolability of the country data was tested for models 1, 2 and 3 in Table 4.1[18].

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 and the growth rate of trade and services exports are used as instruments in specification *(a)*. In specification *(b)*, the issue of endogeneity, which is very likely to affect the relationship between the part-time employment rate and participation, is of a lesser concern as regards institutional and policy variables. While 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-

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

[16] Under the Maddala and Wu test and using Phillips-Perron tests for individual countries, the null of no cointegation (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.

[17] 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 ($\chi^2(1)=94.2$).

[18] We test the null of common slopes for cyclical parameters among three groups of countries chosen at random. The null cannot be rejected at 10% level by a Chow test (e.g. $\chi^2(2)=2.06$ for equation 3). We also found that a change in the group composition does not alter the results.

time employment rate to institutions seems to be fairly unlikely[19]. However, 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 2. 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.

Data on business cycle comes from OECD Economic Outlook[20]. 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 are available only until 1997-1998.

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 country[21]. 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 regulation[22]. 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"

[19] 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.

[20] 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 length.

[21] 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.

[22] 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)[23].

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 3. 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 potential[24].

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. 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 4.2 (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 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, as displayed by annex 1.

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

[23] 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.

[24] 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 cyclicality 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.

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 whole[25]. 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.

Table 4.3 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.

The second group we consider is prime-age males. Table 4.4 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 PTR[26]. 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 4.2).

[25] 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.

[26] 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.

For prime-age females, the effect of the cycle on the PTR is unclear and in any case very weak, as seen in Table 4.5. Although the effect of the contemporaneous output gap appears highly significant and relatively high in magnitude (column 1 and 3), it disappears once instrumented by fixed-capital investment and total exports (column 4). 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 PTR[27]. Thus, the upward trend in female PTR in the 1990s, as seen in annex 1, 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 cyclicality 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 4.6 reveals no clear effect of the cycle on the PTR for this group; neither real GDP growth nor the output gap is significant[28]. 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.

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 3 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 institutions[29].

[27] The relatively small impact of the output gap on involuntary female part-time work, compared to prime-age men (see Table 4.2) illustrates further the unclear effect of the business cycle on prime-age female part time employment.

[28] 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.

[29] Australia, Canada, Japan, New Zealand, Norway, Switzerland and the US.

The findings in columns 1 to 3 do not include instrumental variables. Correcting for possible reverse causality issues (columns 4 to 6), the instrumental variable technique (2-stage GLS) broadly confirms the significance of labour market institutions in influencing PTR[30].

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 equation 1, 2 and 3, in line with the predictions from theory (see section 2).

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 (column 2, 3, 5 and 6). 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.

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.

[30] The effect of EPL for regular work on the rate of part-time work is clearly positive and significant, while the coefficient for EPL on temporary jobs displays a smaller magnitude. The negative effect of unionisation and the labour tax rate are also confirmed. However, the total participation rate changes sign and the coefficient of unionisation, benefit replacement ratio, unemployment benefit duration and labour tax rate appear extremely strong compared to the results shown in column 2 and 3, likely reflecting statistical artefacts. The latter results are not intuitive and should be interpreted with caution, as the instruments used (lagged exogenous variables) are imperfect, albeit widespread in the literature.

Table 5.2 shows the results for this focus on European countries (EU15 plus Norway). Some findings emerge from equations 1 to 6, which are confirmed when using instrumental variable techniques (column 8)[31].

First, 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 2). This still holds true when excluding the Netherlands (column 1, 3, 6 and 7), 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 (column 5, 6 and 8), which suggests that the absence of substitution between part-time 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 is not robust across equations.

Second, 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 4), which may mirror the changing attitude of trade unions toward part-time work in the EU countries in the 1990s.

Third, 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. The fertility rate is 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

[31] Results for EU15 plus Norway 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 (column 7). Indeed, these dummies take out the component of the cycle common across countries.

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 9). Looking further, the cross-sectional relationship between PTR and the relative wage seems to be stronger for men than women (see Figures 5.1, 5.2 and 5.3).

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 5.4). The fitted value for European countries derived from Table 5.2 yields even better results, as shown by Figure 5.5[32].

6. Conclusion

Analysis of pooled data for EU-15 countries has considered to what extent the business cycle and structural variables have influenced the rate of part-time work in the EU over the past two decades. Indirectly, it allows us to see the extent to which part-time work may offer a means of increasing the flexibility of labour markets.

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, when using panel data techniques. This countercyclical effect is consistent with firms utilising part-time employment as a way to adjust their labour force (in terms of hours worked) to economic conditions. We hypothesise that during economic downturns, employers reduce the number of hours worked by current staff and/or hire new workers in part-time jobs. In an upswing, net employment creation consists of mostly full-time jobs in order to meet the increased demand for labour resources by firms. We find that, consistent with this hypothesis, involuntary part-time employment is 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.

The paper also considers the role of structural factors and institutions in explaining the rate of part-time employment. 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. Given the negative impact of

[32] Equation 2 in Table 5.1 and equation 3 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.

child benefits and, to a much lesser extent of unemployment benefits, the econometric results support an “unemployment trap” story affecting part-time employment.

Turning to other structural variables, societal and demographic, the fertility rate is found to be strongly and positively correlated with the part-time employment rate. This result 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 youth in tertiary education are also significant predictors of the part time employment rate.

Lastly, 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 relative hiring in part-time employment compared to full-time employment seems to be fairly sensitive to relative wages. This reflects also that part-time work is often used as a “precarious” form of employment, in line with the “insider/outsider” theory.

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Annex 1: Trends in part-time work in EU-15 countries

A thorough description of trends in part-time work in EU-15 countries can be found in Buddelmeyer, Mourre and Ward (2004b). A growing part-time employment share has been a main feature of a number of industrialised countries over the past two decades. Figure 2.1 shows a significant increase in the share of part-time employment in total employment in the EU-15, Japan and Canada during the late 1980s and 1990s, while the US experienced a slight fall in the part-time employment share. Figure 2.2 plots the proportion of part-time work across EU-15 countries in 2001, which varies considerably by country, ranging from 4.5% to 42%, with the EU-15 average at 18%. As shown by Figure 2.3, the Netherlands exhibits the highest rate of part-time work, with 42% of its workers working part-time. Relatively low rates of part-time work are found in Finland, Luxembourg and Portugal at around 11%, Italy and Spain at 8%, and in particular in Greece at 4.5%. The broad stylised facts for part-time employment in the EU-15 countries in 2001 by age group and gender can be summarised as follows:

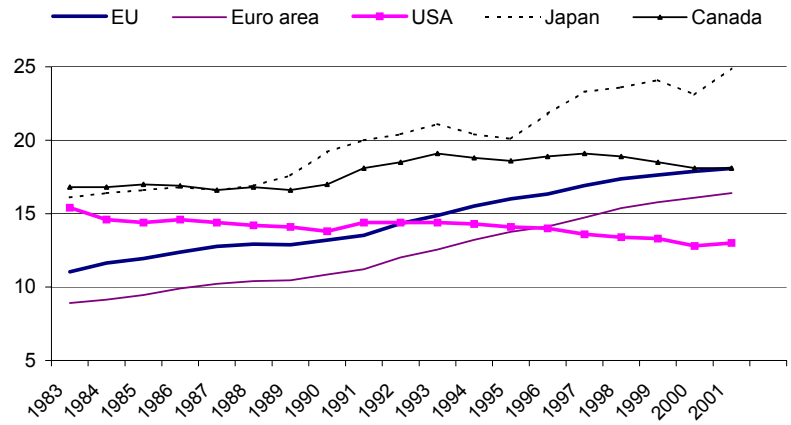
- The part-time employment share is currently highest for 15-24 year olds, at nearly 23% on average within the EU-15, and lowest for prime age workers (i.e. those aged 25-49), at just over 16%. Older workers have a part time employment share of 21%. Young workers experienced the fastest rate of growth in part-time work during the 1990s in the EU-15 as a whole, although the growth rate has flattened out more recently.

- 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 6.2% in 2001 in the EU-15. This pattern of a significantly higher rate of female part-time employment holds across time and for all EU-15 countries. Since the early 1990s, growth in part-time work has also generally been strongest among female workers.

- The majority of part-time work is voluntary. Nevertheless 14.2% of part-time workers were working part-time involuntarily in the EU-15 in 1992, this rate rising to 19.1% in 1997, before falling back to 14.4% in 2001 (Figures 2.4 and 2.5). The rate of involuntary part-time work within the EU-15 stood at 20% for men in 2001, but at a significantly lower 13% for women. Rates of involuntary part-time employment tend to be lower among young and older age groups.

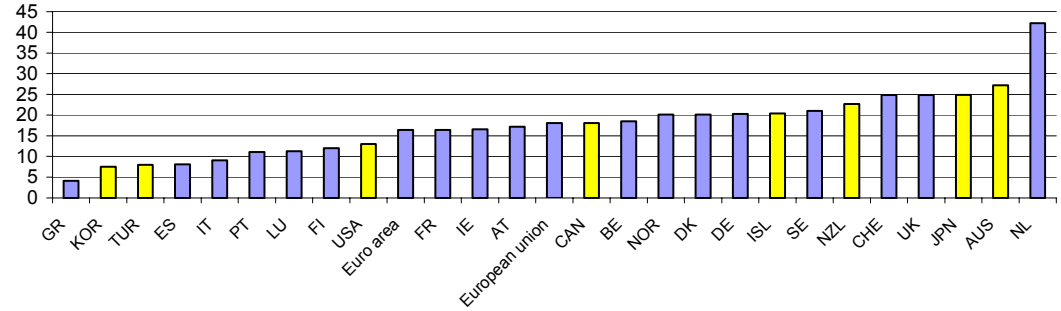
Tables and charts

Figure 2.1: Part-time employment rate (%)



Sources: OECD, Eurostat (Labour force surveys).

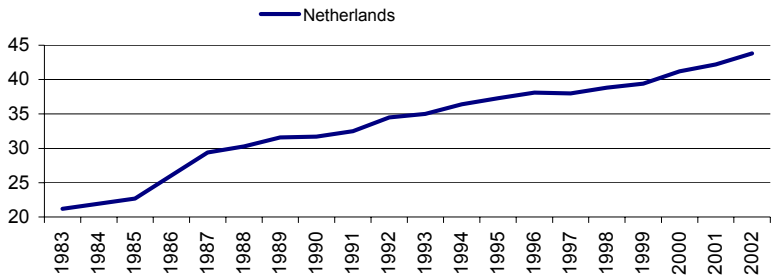
Figure 2.2: Part-time employment rate in 2001 (%)



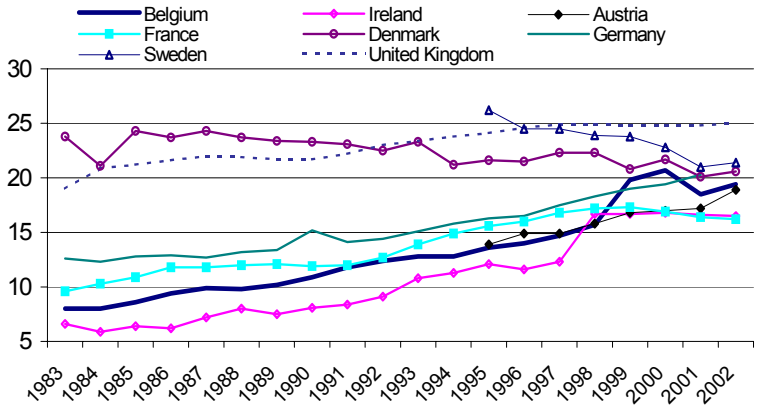
Sources: OECD, Eurostat (Labour force surveys).

Figure 2.3: Part-time employment rate (%)

High



Medium



Low

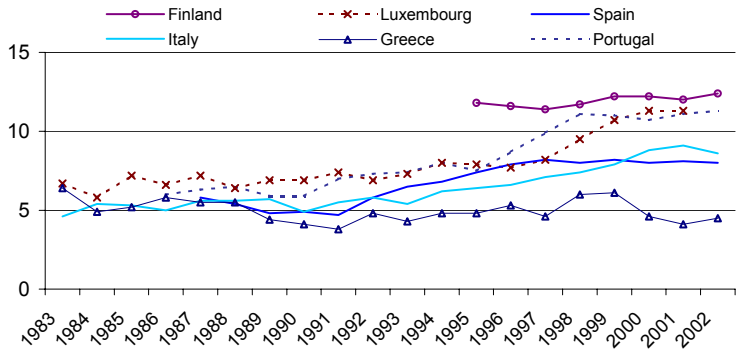
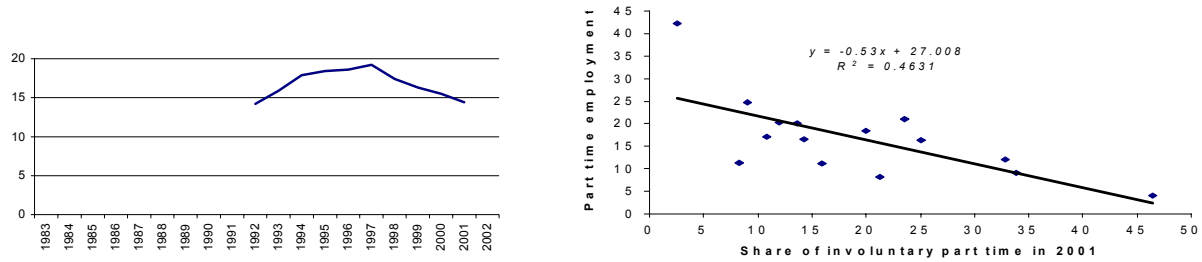


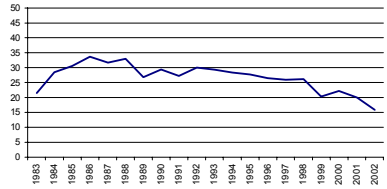
Figure 2.4: Share of involuntary part-time – EU 12 and relation with part-time employment rate



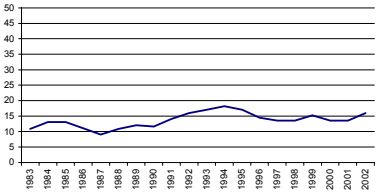
Source: Eurostat (Labour force surveys).

Figure 2.5: Share of involuntary part-time as percent of the total part-time employment (%)

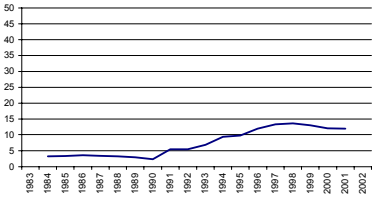
Belgium



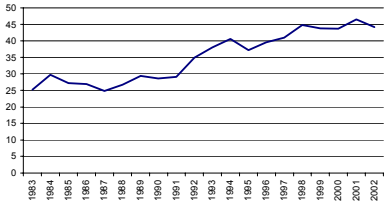
Denmark



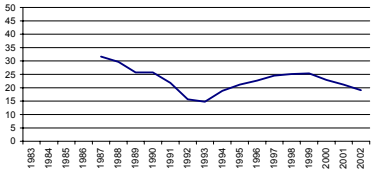
Germany



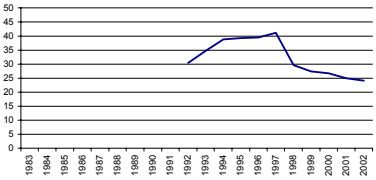
Greece



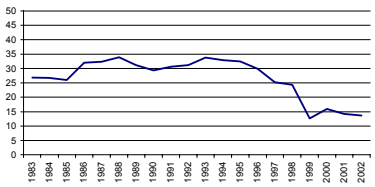
Spain



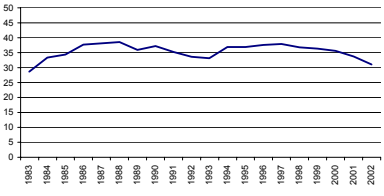
France



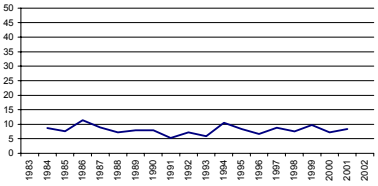
Ireland



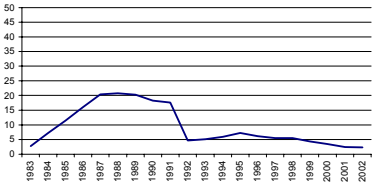
Italy



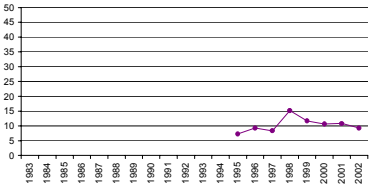
Luxembourg



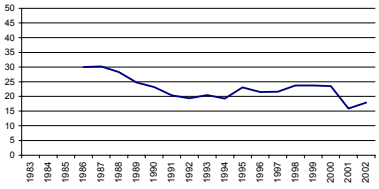
Netherlands



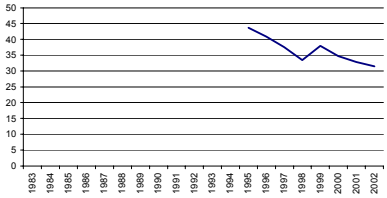
Austria



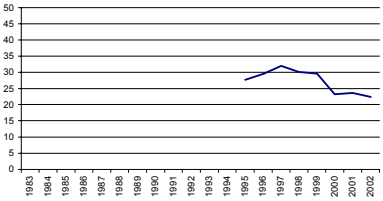
Portugal



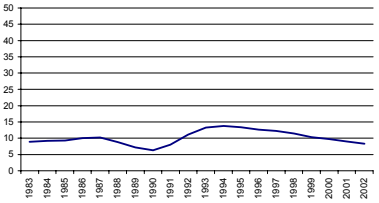
Finland



Sweden



United Kingdom



Source: Eurostat (Labour force surveys).

Annex 2: Data

Part-time employment

The *part-time employment rate (*PT) is defined as the percentage of workers working part-time relative to total employment. 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 Eurostat[33]. 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)[34]. 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 over[35].

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 results[36]. However, as output gaps are "non observable" variables, real GDP growth from the OECD Economic Outlook database is used to check the robustness of the results. Potential output for all countries, except Portugal, is calculated using the "production function method"[37]. 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 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

[33] 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.

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

[35] This split corresponds to the main age categories presented by Eurostat for the LFS.

[36] The correlation coefficient between the two measures of output gap is 0.96.

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

the OECD summary series (Nicoletti et al. 2000). Data on total taxes on labour, unionisation[38] 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 (2002)[39]. 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-invariant[40].

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

[39] For the most recent observations, see also Nickell, S, L. Nunziata and W. Ochel "Unemployment in the OECD since the 1960s. What do we know?" Bank of England, May 2002.

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

Annex 3: 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.)
(14 EU countries [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] All European Union member states except Luxembourg.
[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 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 for 1990-1991 to take 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 (lagged by 1 and 2 years) and the growth rate of trade and services exports (lagged by 1 and 2 years).

Table 4.2

Cyclical pattern of involuntary part-time employment

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

	Explanatory variables	
	(1)	(2)
Groups involved	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] Except Luxembourg.
*Value of t- statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.*
Note: The equations are estimated by 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 for 1990-1991 to take into account the German reunification.

Table 4.3

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.)
(14 EU countries[1] 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)
Output gap (GAP)	-0.206***		-0.177***	-0.281***		
	(-3.09)		(-4.92)	(-3.31)		
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] Except Luxembourg
[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 generalised least squares allowing for heteroskedastic errors and common-across-group first order serial correlation. Each equation contains country dummies, intercepts and specific dummy for 1990-1991 to take 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 4.4

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.)
(14 EU countries[1] 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Output gap (GAP)	-0.005						
	(-0.31)						
Output gap (-1) (GAP-1)	-0.066***		-0.026***	-0.061***			
	(-2.97)		(-3.05)	(-3.41)			
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*	-0.033*	
					(-1.88)	(-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 4.5
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.)
(14 EU countries[1] 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Output gap (GAP)	-0.127** (-2.04)		-0.094*** (-2.96)	-0.129 (-1.59)			
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 4.6
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.)
(14 EU countries[1] 1984-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Output gap (GAP)	-0.078 (-1.58)		-0.042* (-1.76)		-0.061 (-0.98)		
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)	(5)	(6)
Total participation rate	0.248	0.260	0.439	-0.398	-0.487	0.173
	(4.09)***	(4.30)***	(8.51)***	(-2.44)**	(-2.75)***	(1.81)*
Output gap	-0.122	-0.124	-0.113	-1.018	-1.291	-1.578
	(-3.74)***	(-3.83)***	(-3.91)***	(-3.84)***	(-4.31)***	(-3.29)***
EPL	0.227			2.076		
	(0.71)			(2.32)**		
EPL for temporary jobs		0.053	0.154		0.823	1.273
		(0.33)	(0.96)		(1.88)**	(2.48)**
EPL for regular jobs		0.731	0.824		4.961	3.873
		(1.84)*	(2.05)**		(4.08)***	(3.40)***
Unionisation	-4.764	-4.486		-9.836	-10.289	
	(-2.11)**	(-2.02)**		(-2.08)**	(-2.23)**	
Bargaining co-ordination	0.135	0.235		2.677	3.026	
	(0.36)	(0.63)		(3.38)***	(3.75)***	
Unemployment benefit replacement ratios	-4.970	-5.136		58.491	67.703	
	(-1.92)*	(-2.00)**		(3.16)***	(3.48)***	
Unemployment benefit duration	-0.946	-0.810		-36.259	-38.211	
	(-0.73)	(-0.63)		(-2.87)***	(-3.02)***	
Labour tax rate	-8.952	-9.211		-77.921	-92.142	
	(-2.66)***	(-2.75)***		(-4.61)***	(-4.89)***	
Constant	11.638	9.905	-12.247	89.041	94.336	6.815
	(2.12)**	(1.78)*	(-3.23)***	(4.38)***	(4.42)***	(0.97)
Observations	268	268	296	295	295	303
Number of countries	20	20	20	20	20	20
Instrumented	No	No	No	Yes	Yes	Yes

Sources: OECD; Nickell, Nunziata and Ochel (2002); 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 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 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 (%)

(14 European countries [1] 1983-1998)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Output gap	-0.071	-0.075	-0.075	-0.0628	-0.061	-0.025	-0.090	-0.350	-0.055
	(-1.53)	(-1.93)*	(1.73)*	(-1.50)	(-1.44)	(-0.65)	(-2.74)***	(-2.52)**	-(0.88)
Institutions									
Change in part-time regulation (more favourable)		0.349							
		(6.26)***							
Change in part-time regulation (more favourable) excluding the Netherlands	0.165		0.165	0.0506	0.115	0.125	0.375	0.029	
	(2.10)**		(2.32)**	(0.51)	(1.57)	(1.94)*	(6.74)***	(0.25)	
Children benefits	-1.437	-1.045	-1.679	-2.146	-1.478	-1.551	-0.881	-2.999	
	(-3.49)***	(-3.10)***	(-4.53)***	(-5.14)***	(-4.09)***	(-4.52)***	(-2.42)**	(-3.88)***	
EPL	0.622								
	(1.73)*								
EPL for regular jobs		2.207	2.512	2.38	2.276	2.004	1.961	4.600	
		(4.65)***	(5.44)***	(5.66)***	(4.74)***	(5.02)***	(3.51)**	(3.65)***	
EPL for temporary jobs		-0.126	0.072	0.0306	0.050	0.171	-0.337	-0.684	
		(-0.93)	(0.42)	(1.73)*	(0.30)	(1.12)	(-2.25)**	(-1.51)	
Unemployment benefit replacement ratios	-1.448	-1.029	-1.877	-3.77	-2.058	-1.636	-2.622	-3.631	
	(-1.39)	(-1.25)	(-2.09)**	(-2.89)**	(-2.36)**	(-2.13)**	(-2.62)***	(-1.63)	
Unemployment benefit duration	-1.090	0.099	-0.790	-1.61	-0.853	-1.431	-0.087	5.340	
	(-0.99)	(0.12)	(-0.80)	(-1.53)	(-0.89)	(-1.69)*	(-0.09)	(1.67)*	
Share of temporary jobs					6.514	7.285	4.168	15.593	
					(1.99)**	(2.52)**	(1.19)	(2.17)**	
Total labour tax rate				8.224					
				(1.61)					
Unionisation				-1.728					
				(-0.56)					
Other structural variables									
Female participation rate	0.381	0.354	0.401	0.3497	0.397	0.317	0.271	0.327	0.325
	(10.30)***	(12.25)***	(12.14)***	(10.22)***	(12.40)***	(9.43)***	(7.84)***	(5.18)***	(12.06)***
Fertility rate	4.886	2.313	4.424	4.704	4.885	8.230		6.489	
	(5.35)***	(3.29)***	(5.48)***	(5.39)***	(6.05)***	(6.96)***		(2.86)***	
Schooling rate of 15-25 population	0.033	0.082	0.079	0.0568	0.072	0.051	0.010	0.169	0.076
	(1.34)	(3.79)***	(3.41)***	(2.19)**	(3.22)***	(2.32)**	(0.45)	(3.11)***	(2.27)**
Share of employment in services						22.875	7.767	30.200	
						(2.85)***	(1.18)	(1.67)*	
Ratio part-time hourly wage / full-time hourly wage (time invariant)									-11.850
									(4.94)***
Constant	-13.637	-11.933	-14.382	-17.557	-15.275	-42.834	-2.079	-43.724	-4.409
	(2.45)**	(2.75)***	(3.24)**	(-2.48)**	(4.08)***	(7.31)***	(0.78)	(4.04)***	(1.43)
Observations	172	172	172	154	170	154	154	154	231
Number of countries	14	14	14	14	14	14	14	14	15[2]
Time dummies	yes	yes	yes	yes	yes	yes	no	yes	yes
Instrumented variables	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 (2002); Nickell and Nunziata database (2001).

[1] Countries included Norway and all the European Union member states except Luxembourg and Greece (Belgium, Denmark, Germany, 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 9 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 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).

Figure 5.1: Part-time employment rate and relative wages of part-time workers (%) – Both genders

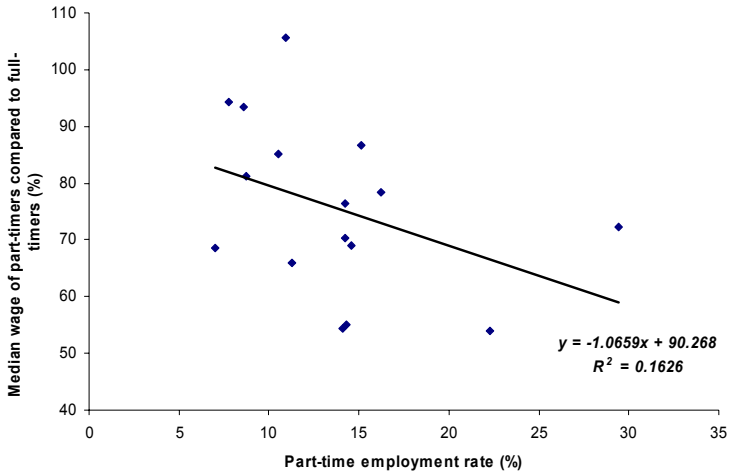


Figure 5.2: Part-time employment rate and relative wages of part-time workers (%) – Males

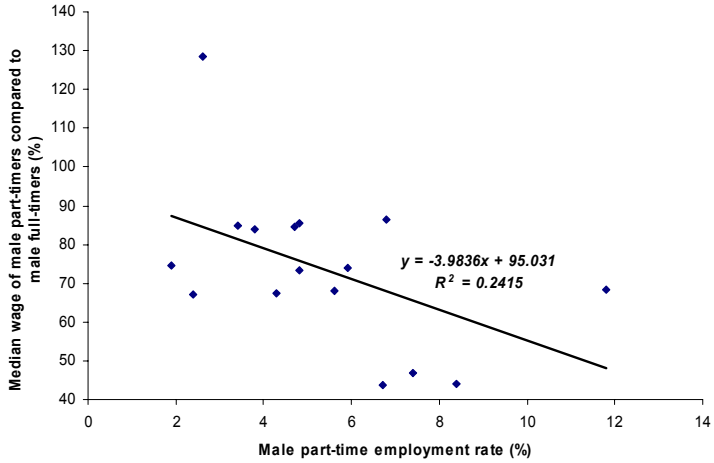


Figure 5.3: Part-time employment rate and relative wages of part-time workers (%) – Females

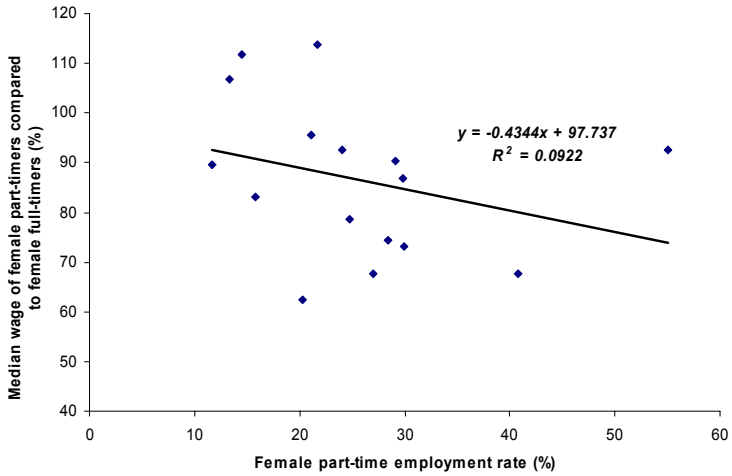


Figure 5.4: The fitted value of part-time employment rate for OECD countries
(model 2 of Table 5.1) (%)

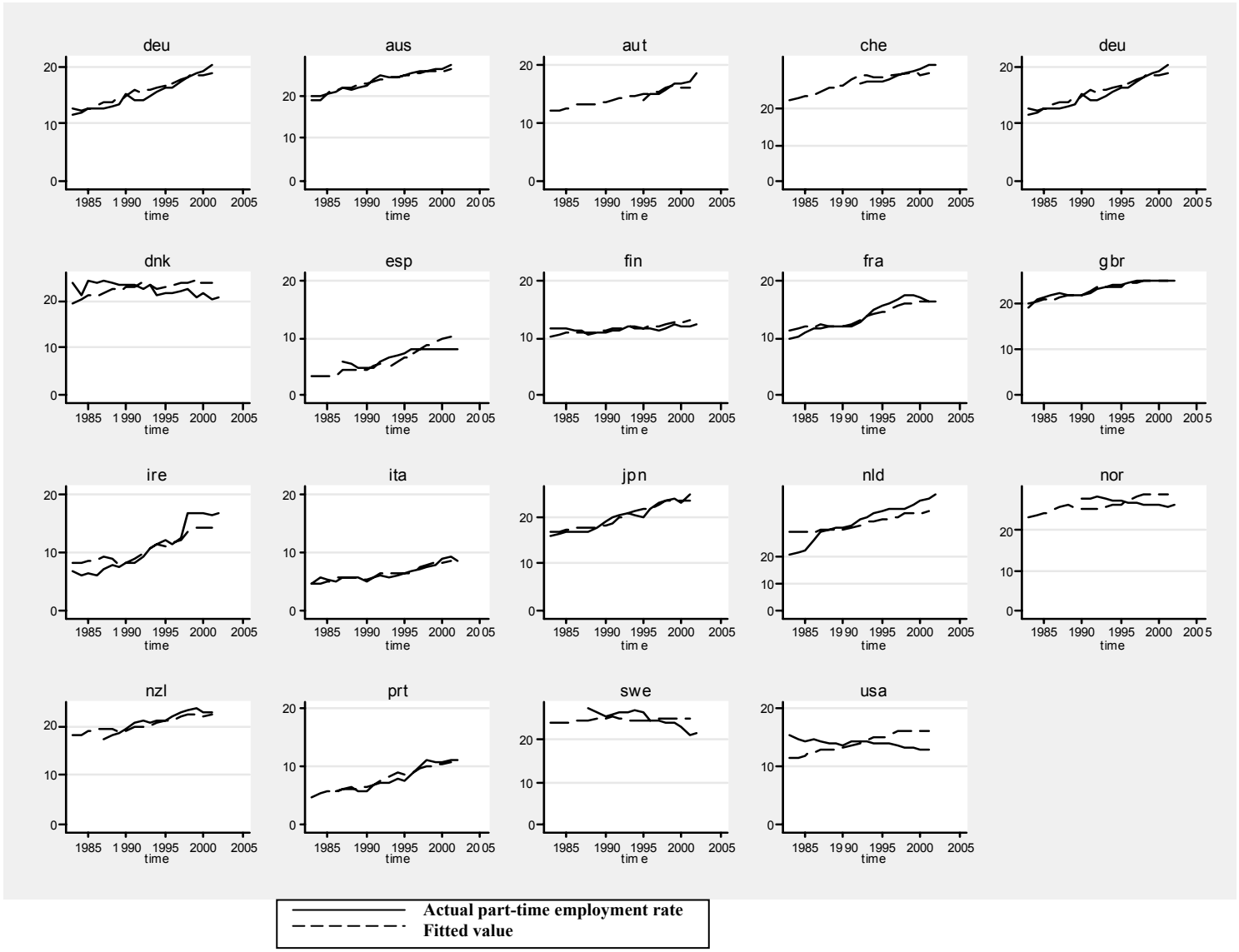


Figure 5.5: The fitted value of part-time employment rate for EU countries
(model 3 of Table 5.2) (%)