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Fixed-term contracts in East and West Germany: low wages, poor prospects?

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Abstract

Amid lively debate on the consequences of temporary employment, the paper examines the wages and transitions of temporary employees in Germany using socio-economic panel data from the late 1990s. Compared to simple OLS estimates, using a fixed effects model decreases wage differentials between permanent and temporary workers. A two-step instrumental variables estimator leads to insignificant estimates, suggesting that the contract type is an endogenous variable. Moreover, about 1/5 of male temporary employees experience significantly higher 2 and 10 year wage growth than workers on permanent contracts. Using multinomial logistic regression models we find that many temporary workers move into permanent jobs, often with the same employer. For some temporary employment leads to unemployment, particularly those with low human capital. Positioning ourselves between arguments on the positive and negative consequences of temporary employment, we develop the idea of a two-tier labour market for temporary employment in Germany.

Keywords: Fixed-term contracts, dynamic wages, unemployment, mobility

JEL Numbers: J31, J60, J64

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1. Introduction

Making Germany's labour market more flexible has been on the agenda for some years now. That Germany is far from having already reached a satisfying state in the labour market is well known. However, as it seems that the current recession has hit Germany more than its European neighbours, the topic has become of primary interest once again. Politicians outstrip each other with suggestions to increase employment and liberalize the labour market. Against that background it is surprising that empirical research on existing flexible instruments in the labour market is relatively scarce. One such instrument – fixed-term contracts – is looked at in more depth in this paper. These contracts are often also called temporary contracts, although temporary work can additionally include agency or casual and seasonal work. We focus on those contracts that are by definition not open-ended but fixed to a maximum duration from the start.

The German example is especially interesting, as it seems to be an intermediate case between countries with high employment protection and high percentages of fixed-term jobs like Spain, France and Italy and countries with low employment protection and low fixed-term employment like the UK or the US. In fact we know that Germany has relatively high employment protection but fixed-term contracts did not increase significantly in the 1990s although their use has been made easier by legislation introduced in the 1980s (Rudolph 2000, Bielenski 1997).

Yet some of the most animated discussion of temporary employment is about the consequences of temporary employment for individual employees, and this is the focus of this paper. Different approaches to the labour market offer different perspectives on temporary employment. Buechtemann and Quack (1989) were some of the first to use the question “a bridge or a trap?” to juxtapose these different perspectives. For some approaches, temporary employment is seen as a very disadvantageous labour market situation, with low wages, bad conditions of employment and poor prospects, a “trap”. In favour of this hypothesis is evidence from a number of European countries showing that workers on a fixed-term contract tend to earn less than comparable co-workers (Schömann and Hilbert 1998). For others, temporary employment is seen as a stepping stone to permanent employment, often facilitating the transition into working life from outside the labour market, a “bridge”.

Indeed many researchers and policy-makers argue that what happens after a temporary contract is more salient than the current conditions associated with the job (e.g. wages, fringe benefits etc). Remember that this situation is, by its very nature, a temporary one. The fact that many temporary contracts in Germany are legally limited to 2 years makes a compelling case for examining what happens after such a contract. To answer these questions we need to know something about workers longer run wage paths in Germany as well as transitions between fixed-term contracts and other labour market states – more than is already known in the literature.

We address the following key questions in our paper: Recasting the question of wage differences we ask to what extent are wage differences a result of unobserved differences between temporary and permanent workers? Is the contract type an endogenous variable? Are workers really stuck in those jobs over a longer time horizon? What happens to the wages of those workers who stay in the labour market over a five or ten year period? Which temporary workers are more likely to stay employed and get a permanent job? Are there any differences between East and West Germany in this regard?

This paper gives some intriguing new insights into wage differentials and wage dynamics, transition behaviour of fixed-term contract workers using the German Socio-economic Panel for East and West Germans (Soep Group 2001). We begin in section 2 by giving a review of the literature, discussing the possible reasons why firms might use fixed-term contracts and how this type of contract will influence wages and transitions. This is followed by a short description of our data and an overview of who can be found in a fixed-term contract (section 3). Section 4 then challenges the view that fixed-term contract workers always earn less by comparing pooled OLS wage regression estimates with the outcome from fixed-effects (or random effects) regressions. We also present a two-step Instrumental Variables (IV) estimator, because including a fixed-term dummy may cause endogeneity problems and bias our estimates. In section five we deal with dynamic issues. Wage growth regressions are reported in section 5.1 for year to year, five year or ten year intervals. Section 5.2 goes on to look at the transitions between fixed-term employment, permanent employment unemployment and non-participation.

This paper is innovative in a number of ways. Firstly, while other authors have compared wages of fixed-term and permanent employees in Germany (e.g. Schömann and Kruppe,

1993, 1994; Hagen, 2001), we present the first wage regressions focusing on temporary employment in Germany which use the panel element of the data to control for unobserved differences between individuals. Secondly, while Booth et al. (2002) analyse some wage trajectories in 1990s Britain, this is the first paper which compares wage growth among temporary and permanent employees in the short and longer term in Germany. Thirdly, while previous work has considered the role of fixed-term contracts in labour market transitions (see especially Giesecke and Gross, 2002; Dekker, 2001), this is the first analysis which follows a group of employees on fixed-term contracts and considers their labour market status 1 and 4 years later.

2. The use of fixed-term contracts and theoretical consequences for wages and transitions

2.1. Why firms use fixed-term contracts

Dismissal regulations in Europe and high firing costs of permanent workers are generally believed to be the primary reason for the use of fixed-term contracts (see OECD 1993). In Germany, like in other European countries, there are legal rules and decisions of labour courts which make it expensive and time-consuming to lay off workers. Since the "Employment Promotion Act" of 1985 employment protection has been reduced by allowing the creation of fixed-term jobs without a reason (see Appendix A for details). The central idea of this act was to reduce unemployment by facilitating the use of temporary contracts. However, Blanchard and Landier (2002) argue that the introduction of fixed-term contracts may have perverse effects: the main effect could simply be high turnover in fixed-term jobs, leading to higher and not lower unemployment.

Obviously the relative costs of hiring and firing as well as expectations about long-run sales opportunities influence firms decisions. Quite a large body of literature discusses the theoretical links between labour demand and adjustment costs (see e.g. Nickell 1978 and for an overview Hamermesh and Pfann 1996). Empirically Bentolila and Saint-Paul (1992) analyse the macroeconomic implications of fixed-term contracts and estimate that this type of employment significantly increased overall employment in Spain (see Dolado et al. 2002 for an overview of the Spanish experience). In a model with asymmetric adjustment costs Goux et al. (2001) show for France that indeed it is much more costly to lay off permanent workers than to hire them and much less costly to adjust the number of fixed-term contracts. The

asymmetry seems to be more important for non-production workers. However, we see large international differences, that are in need of some explanation: though legislation on the use of fixed-term contracts in Germany has been relaxed since the mid 1980s, Germany has significantly lower rates of fixed-term contracts (6.3%) than France (11.8%) or Spain (31.6%) (Rudolph 2000). This difference is sometimes underestimated in comparative studies as apprenticeship trainees are often included in German figures. When apprentices are included, the percentages are 12.2% for Germany, 13.9% in France and 32.9% in Spain. Perhaps the lower rate of temporary jobs indicates that asymmetries between contract types tend to be lower in Germany. Or alternatively, apprenticeships are used as a low-wage substitute for other fixed-term contracts.

Moreover, German firms tend to react to changes in labour demand by adjusting average hours rather than employment levels (Houseman and Abraham 1993). This is facilitated by subsidized short-time work and relatively moderate overtime premiums of roughly 20%. Confirming this view Hunt (2000) shows that facilitating the use of fixed-term contracts in 1985 did not affect employment adjustment in Germany. However, when unions in certain industries allowed hours per worker to fluctuate without associated overtime payment there was a small reduction in the speed of adjustment of workers. Hunt concludes: "The results imply either that firing costs are less important than commonly thought, or that the short-term contracts did not reduce them sufficiently" (p. 178).

On the other hand, Boockmann and Hagen (2001) show that fixed-term contracts also serve as a means of employment adjustment: positive changes in expected or actual turnover are associated with higher probability of fixed-term contracts in Germany (see Holmlund and Storrie 2002 for the Swedish experience). Moreover, they show that reducing dismissal protection in 1996 significantly reduced the use of fixed-term contracts in those firms that were exempted from dismissal regulations (the threshold level was raised from 6 to 11 employees). Moreover, they report that the existence of works councils significantly increases the use of fixed-term contracts as works councils tend to increase the costs of laying off permanent workers. So far we can sum up that fixed-term contracts in Germany, though used as a measure of adjustment, are not the most important means.

This seems surprising as similar reforms in Spain in the mid 1980s led to sharply different outcomes. As already mentioned above fixed-term contracts in Spain now make up around

30% of all contracts. The OECD *Employment Outlook* (1993) mentions three possible reasons for this phenomenon: (i) strong sense of social partnership in Germany with firms regarding long-term relationships as an asset (Büchtemann 1993), (ii) wide availability of fixed-term apprenticeship contracts that pay well below entry-level wages (Rogowski and Schömann 1996) or (iii) firing cost differentials between different contract types remained higher in Spain than in Germany at least in the 1980s.

Another hypothesis sometimes proposed for the use of fixed-term contracts is the screening hypothesis. For example, employers have problems predicting the productivity of potential employees, so they use temporary employment as a screening contract. This is particularly relevant for younger workers with less work experience, but also perhaps for workers who have been out of the labour market (e.g. for childrearing) or unemployed. If the employer is not satisfied with the employee's performance, the contract will simply not be renewed. If the employer is pleased with the productivity of the employee, they will be hired on a permanent basis. By using such contracts it is today possible to increase the probation period from the normal 6 months up to two years.

2.2. Consequences for fixed-term employees – wages and transitions

In the previous section we discussed firms' reasons for using fixed-term contracts. In this section we consider the implications of fixed-term contracts for employees, introducing some theoretical perspectives on temporary employment to generate predictions for wage differentials and subsequent labour market transitions. According to one view temporary workers should receive higher wages to compensate for the loss of the expected value of redundancy pay and higher unemployment risk.

While these compensating wage differentials will only be offered in competitive labour markets, a number of approaches see temporary employment as having substantially worse conditions of employment and poorer prospects than permanent employment (see e.g. Booth et al. 2002). What these approaches have in common is that they stress labour market boundaries, and the difference between temporary work and permanent work. Probably the most important of them is labour market segmentation theory (e.g. Doeringer and Piore, 1971). According to the basis tenets of this theory, the labour market is divided into primary

and secondary segments. Primary segment jobs offer long-term, stable employment with structured career ladders. Jobs in the secondary segment offer lower wages, no training, few career prospects and unstable careers. The secondary segment is where temporary jobs will be found. Segments relying on unskilled labour will offer fixed-term contracts, not large engineering, professional and bureaucratic employers. Associated with these jobs will also be low wages and even possibly, due to recurring unemployment spells or less training opportunities and job prospects, lower wage growth.

Two further reasons are usually reported why fixed-term employment may affect wages negatively: collective bargaining and wage discrimination (see e.g. Jimeno and Toharia 1993, Booth et al. 2002). As fixed-term workers will be made redundant first the probability of being employed increases for permanent workers with rising proportions of fixed-term employment. This will in turn increase their bargaining power, allowing them to negotiate higher wages. The second effect, wage discrimination arises when fixed-term workers are offered lower wages than comparable permanent workers. As collective agreements usually do not allow different wage rates for certain contract types, the discrimination will in effect be realized by sorting fixed-term employment into lower categories of employment.

By contrast if employers use temporary contracts as a screening device in order to extend the probation period, other outcomes for wages will be observed than discussed so far. From the screening approach we would expect wages to grow at least as fast as those on permanent contracts, as they move to a permanent job. Wang and Weiss (1998) even suggest that steep wage profiles might result as firms offer high wage increases to those workers they want to retain.

From a reading of the literature two different central hypothesis evolve regarding transitions following temporary employment. From the segmentation literature is the idea that temporary jobs are found in segments of the labour market where unskilled work dominates and large amounts of these jobs are traps in so far as they will not lead to permanent employment. In fact in many cases temporary employment will be interspersed (by definition) with periods of unemployment, which has the well-known negative consequences for subsequent labour market performance. From the screening theory comes the idea that fixed-term jobs can be part of the matching process in the labour market. Thus many, though not all, temporary jobs

will lead to a permanent appointment. This perspective also implies that many of these permanent jobs will be in the same company.

Finally, combining these two perspectives, a third possibility is that some temporary jobs are low-skilled and others are used for screening purposes. Screening periods more likely for positions crucial to the organisation: jobs with no qualification requirements attached are likely to be of little importance to the functioning of the firm. These latter jobs are simply used to regulate fluctuations in demand. Thus a temporary job is more likely to lead to permanent job if qualifications required are higher. The following empirical analysis will show whether there is any evidence for one of these first two hypotheses or whether there is indeed a two-tier labour market for fixed-term contracts with some workers being trapped while others use temporary employment as a bridge.

3. Data

We use the German Socio-economic Panel for our analyses (see SOEP Group 2001). The German Socio-economic Panel is a nationally representative panel survey which has collected data since 1984 for West Germany and since 1990 for East Germany. The question on whether the contract is temporary is not available for all waves of the panel study. In the early years we have complete information for all respondents in 1985 and 1988 only. Apart from those two years, only those who report job changes were asked about the type of contract. From 1995 onwards we have full information for both East and West Germany. This allows us to compare short run outcomes in the second half of the 1990s with longer run outcomes of up to 15 years¹.

Only samples A and C are included in our study, that means the original West German sample and the original East German sample; foreigners and migrants are excluded.² For the results presented we have followed these sample distinctions in the survey. An alternative distinction is using the current region of residence. We also tested some of the models, distinguishing

1 We cannot identify agency workers at any point in this survey. Agency workers may or may not classify themselves as on a temporary contract. While agency work has risen steadily in Germany in the last decade, and was 1.2% of dependent employment in June 2000, we do not expect it to affect our results (Bundesanstalt für Arbeit, 2000).

2 The foreigners and immigrants samples are not included as we believe that both the remuneration of employment and labour market transitions are sufficiently different in these two groups that they would need to be analysed separately. For the sake of clarity we focus on the West German and East German sample, where roughly 99% of respondents have German citizenship.

whether the individuals lived in East or West Germany at the time of the survey. Differences in findings are negligible. Apart from that the following selections were made. First of all, as is conventional in German analyses of temporary employment, we excluded the self-employed and young workers in apprenticeship training schemes. Moreover, we decided not to include civil servants, as their career patterns tend to be distinct from other workers. We limited the sample to those of working age, between 18 and 60 years of age. Finally, for the models, we exclude observations with missing values on important variables: education, wages, type of contract, skill level, industry, firm size and region. Exact sample sizes are reported under the corresponding table. A detailed list of independent variables used in the models, including their means and frequencies, is provided in appendix table B1.

Using this data for 1999, for example, excluding apprentices, civil servants and those on ABM contracts, we find 8.2% of all employees aged 18-60 in temporary contracts: 8.5% of men, 7.9% of women³. Women are thus not substantially over-represented in temporary contracts, as in some other countries, for example the UK (OECD, 1993). In table 1 we compare temporary and permanent workers in Germany in 1999 - their age profile, working time and educational qualifications.

Table 1 about here.

Temporary workers tend to be younger than their permanent counterparts, as we might have expected. For men, a significantly greater proportion of temporary workers are found in part-time employment than permanent workers. For women a large proportion of temporary workers work part-time, but this also holds for female permanent workers. There are some striking differences between temporary and permanent workers in terms of educational qualifications. For men we detect a slight “polarization” of qualifications among temporary workers, a greater proportion of them having either low qualifications (no vocational training) or third level education, compared to their permanent counterparts. For women, we find very many highly qualified temporary workers: over one third of female temporary workers have a third level qualification, compared to around 10% of permanent workers. For industrial sector, we find a much greater proportion of temporary workers in services, particularly the category “other services”, than is the case for permanent workers. These findings, i.e. that temporary workers are younger and less likely to have an apprenticeship training, are largely consistent

³ Weighted analysis of native East and West Germans. These proportions are somewhat higher than in the micro census as the samples are somewhat different.

with the findings of other more detailed analyses of the characteristics of temporary workers in Germany (Schömann and Kruppe, 1993, 1994; Giesecke and Gross, 2002). Having briefly sketched a profile of temporary workers, we now turn to the first part of our substantive analysis, comparing the wages of temporary and permanent employees.

4. The cross sectional view: Do workers on fixed-term contracts earn less?

We start by first looking at the typical cross sectional wage pattern, on which there is little evidence to date. Our analysis is most comparable to analysis from Booth et al. (2002) for the UK as well as Schömann and Kruppe (1993, 1994) and Schömann and Hilbert (1998) for Germany (also see Gross and Vogel 2001). All these papers look at the question of whether workers in fixed-term contracts earn less than comparable co-workers within standard wage regressions. Hagen (2001) also looks at the effect of fixed term contracts using different estimation procedures within a cross section of the GSOEP. His results are somewhat mixed as one estimator leads to relatively large wage differentials while the other shows hardly any differences. Schömann and Kruppe (1993, 1994) report that wages in West Germany tend to be significantly smaller, but not in East Germany. Our results will show that this could be due to the mixture of female and male workers within the same regression. Moreover, estimations for Germany so far have neglected the importance of unobserved heterogeneity in panel data. We control for this by comparing the outcome within conventional OLS models and fixed effects regressions. The OLS model is defined as follows:

$$(1) \quad \ln w_{i,t} = \alpha + \gamma_1 \text{fixed}_{i,t} + \beta x_{i,t} + \varepsilon_{i,t}$$

where $w_{i,t}$ is the hourly wage rate in period t of individual i (estimated from gross monthly wages and actual hours worked), $\text{fixed}_{i,t}$ indicates temporary contracts, $x_{i,t}$ includes the usual set of control variables (age, education, part-time worker status, spouse, skill levels, firm size, industry, region and the year of observation) and finally $\varepsilon_{i,t}$ is the error term. In the case of fixed effects models we include individual constants α_i that represent those effects peculiar to the i th individual which are more or less constant over time. Therefore, we excluded all individuals with less than 2 observations. In accordance with common practice we also excluded extreme hourly wage observations below 5 DM and above 100 DM.

Table 2a about here.

As wage determination can still be assumed to be different between east and west we estimate separate models for both parts of Germany. Men and women are also treated separately as it is well known that coefficients on important covariates might vary by gender.⁴ Since we are primarily interested in the effects of contract type on wages we only report this coefficient in table 2. Full results for men can be found in appendix table B2. The estimated OLS coefficient (in specification I) of -0.163 for West German men and -0.106 for East German men are among what we could expect from previous research. This difference might be explained by the fact that wages on average as well as wage dispersion are lower in East Germany than in the West Germany. The same reasoning applies for women where we find negative differentials for workers on fixed-term contracts of -0.085 and -0.062 , all of which are highly significant. The slight differences between East and West Germany could, however, be also due to a different structure of temporary jobs. As figure 1 shows nearly half of all temporary contracts in East Germany are within employment programmes (*Arbeitsbeschaffungsmaßnahmen* ABM) while the number in West Germany is negligible.⁵ When we estimated models distinguishing between both types of temporary contracts in East Germany we found that workers in employment programmes tend to have even lower wages than other East Germans on fixed-term contracts. However, apart from that, results do not differ and the results for those on employment programmes are therefore not reported separately in the tables.

Figure 1 about here.

These results from specification I so far also correspond to findings from other countries like the UK and Spain. Booth et al. (2002) reports wage differentials very similar to ours for the UK. Jimeno and Toharia (1993) also estimate wage regressions to show that fixed-term workers earn roughly 10% less controlling for observable individual and job characteristics. Bentolila and Dolado (1994) show that wages of permanent workers have increased with the introduction of temporary contracts. Other researchers in Spain have used the Oaxaca-Blinder decomposition to estimate wage discrepancies and have also found that fixed-term earn less,

4 As we are only interested in comparing temporary and permanent contracts for women who are actually in the labour market, we decided not to correct the female wage equation for selectivity.

5 We thank Helmut Rudolph for kindly providing us with this graph.

though differentials are smaller for women and most of the differential can be explained by different characteristics (de la Rica and Felgueroso 1999, Davia and Hernanz 2001 and for an overview see Dolado et al. 2002).

However, it is possible that these initial estimates are affected by unobserved differences between individuals. So, now we introduce individual fixed effects which are detected by the Hausman test to be superior to estimating random effects models. Looking at specification I, we first of all see that East and West German differentials converge roughly towards 0.06 for men and 0.03 for women. Obviously differentials between east and west but also between contracts types decrease. In the case of East German women contract type differences even disappear. Similar patterns have been reported by Booth et al. (2002) estimating fixed effects for the United Kingdom. This indicates that workers on fixed-term contracts are on average different from those on open-ended contracts. Such differences might, for example, be caused by diverse labour market experiences or ability: those workers who start off in worse jobs or more importantly have less unmeasured ability are found to experience a less successful career.

Another way of controlling for unobserved heterogeneity is to include measures of previous labour market experience. We do this by generating a variable "proportion of time unemployed in the previous 5 years" from the employment calendar of the GSOEP, which reports monthly labour force status. Results are presented in Table 2a, specification II. As can be seen from the table, previous unemployment experience reduces earnings significantly. Including our measure of heterogeneity also reduces OLS estimates while the FE results remain virtually unchanged. However, there is still a considerable decline in the estimates when moving from OLS to FE.

So far we have compared fixed-term workers, who are supposed to have relatively short tenure within a firm, with all other workers with median tenure of roughly 9 years. If older workers are paid more, the fixed-term dummy might simply measure some kind of seniority effect. To test whether our fixed-term dummy measures real contract type effects or seniority effects we control for tenure in specification III by a set of dummy variables.⁶ Although fixed-

⁶ The GSOEP supplies tenure information for West Germany for all waves and for East Germany starting in 1997. We therefore had to calculate tenure for East Germany in 1995 and 1996 from the original variables. To check for the plausibility of our estimations we compared the original GSOEP tenure distribution in West Germany with the distribution from our estimations, and found them to be very similar.

term contracts are legally restricted to last only two years (except in academia), a non-negligible proportion of our sample holds fixed-term contracts with the same firm for more than 2 years. Therefore we include two dummies for fixed term workers – one for those with tenure of less than two years and one for those with higher tenure. Workers with permanent contracts are sorted into four groups with tenure < 2 years, 2-5 years, 5-10 years and ≥ 10 years. The reference category is chosen to be permanent workers with tenure ≥ 10 years. The results are also reported in table 2a. As can easily be seen by comparing the outcomes for workers with tenure less than 2 years, fixed-term contracts pay less than permanent contracts, with the exception of East German women, where OLS estimates show similar wage reductions. Again, the effects of contract type are reduced once we control for unobserved individual heterogeneity.

Before turning to our dynamic analysis we need to consider another problem that has also been mentioned previously in the literature on this topic (see e.g. Hagen 2001). The fixed-term dummy could be a choice variable, i.e. endogenous and therefore correlated with the unobservables that influence wages. Not controlling for this might bias our results. One possible way to test whether this is indeed a problem is to estimate a two-step instrumental variables model. In a first step we estimate a simple probit model where the dependent variable is one for workers with a fixed-term contract (see appendix table B3). The estimated probability is then included in a second step as an instrument in the wage regression. Table 2b reports the results for the simple specification I, where neither tenure nor unemployment experience is controlled for, and our most preferred specification III. Not controlling for unobserved individual heterogeneity in the instrumental variables estimator leads to estimated wage reductions well above the simple OLS estimates. This highly implausible result is also what Hagen (2001) reports in a cross sectional analysis estimating treatment models. However, we show that controlling for fixed-effects substantially affects this result and parameter estimates on the fixed-term contract dummy variable become insignificant. The same applies even if we control for tenure. This implies that the fixed-term contract dummy seems indeed to be correlated with the error term in the wage regression. Contract type and wages are determined simultaneously and the contract type can not without doubt be assumed to be an exogenous influence on wage rates.

Table 2b about here.

Summarizing our results so far, we conclude that wage losses of fixed-term contract workers can be explained largely by individual heterogeneity and therefore the fact that different kind of workers are sorted into different jobs. The cross sectional evidence alone, however, can not be interpreted without doubt as conclusive evidence for the segmentation hypothesis. Therefore we would like to know whether workers earn significantly less over a longer time period or are caught in a long run trap of repeated low-wage contracts and unemployment experiences. As this has not been properly explored before, we go on in the following section to investigate the dynamic consequences of fixed-term employment on wages and transitions.

5. The dynamic view

To examine the competing hypotheses developed in section 2 we need to consider a group of temporary employees at one point in time, and then look at their wages and labour market status at some point in the future. Are the individuals subsequently found in permanent employment, still in a temporary job, unemployed or out of the labour market? What happens to their wages in comparison with other workers' wage growth?

5.1. Wage growth and fixed term contracts

We start off by estimating a simple 2-year wage growth regression that is specified similar to our wage level analysis using the same covariates:

$$(2) \quad \ln w_{i,t+1} - \ln w_{i,t} = \alpha + \gamma_1 \text{fixed}_{i,t} + \beta x_{i,t} + \varepsilon_{i,t}$$

Results are presented in table 3. There are two important findings that can be reported from those growth regressions. First, looking at specification I we see that wages in West Germany tend to grow more quickly for workers who have been on fixed-term contracts, while there are no differences in East Germany. Second, introducing fixed effects in this case actually increases the differences between contract types.⁷ The latter finding seems to indicate exactly the opposite of the level analysis. There is something different about those individuals on fixed-term contracts which makes their wages grow more quickly. However, this pattern does

⁷ The Hausman test is only significant for West Germany. However, random effect models yield the same results as OLS and are therefore not reported.

not hold for the whole sample of fixed-term contract workers: excluding the top 20% of wage growth observations, i.e. the highest quintile, leads to insignificant parameter estimates on the contract type which are thus not reported. Therefore, it seems that fixed-term workers are over-represented in the highest quintile, as 7.6% of all workers in that quintile are fixed-term, while only 5.4% are fixed-term in the whole sample. On the other hand this means that the rest of the fixed-term workers do not catch up, at least in the short-run. We also estimated some instrumental variables models and found once again, that the parameter estimates become insignificant once individual fixed effects are controlled for (not reported).

Table 3 about here.

To see whether there are some effects in the long-run we also estimated wage growth over the period 1995-1999 and 1985-1995. We included those workers observed in paid employment in those pairs of years, and do not yet control for the intervening time period. Obviously, there are severe selection problems here, however, we believe that it is still worthwhile looking at these estimates to find out something about longer-run wage growth. As the number of observations is already small, we only present OLS estimates in table 4. Here we find very strong growth effects indicating some sort of process whereby temporary workers catch up. Again, these results tend to become insignificant once the upper quintile is omitted. Only for male workers from western Germany do we find a marginally significant effect of 0.1 remaining (not reported in the table).

Table 4 about here.

Our results so far show that a high percentage of fixed-term jobs seem to belong to a lower segment of the labour market. On the other hand there also seems to be a group of workers who do extremely well, even though they have been in a temporary contract at some point in their career. The consequences of fixed-term employment for wages are not unambiguously negative.

5.2. Transitions between fixed-term contracts, permanent jobs, unemployment, and non-participation

Up until now the dynamic analysis has focused on the wages of temporary employees, but by definition this is only for those who are subsequently in employment. In this section we focus on the subsequent labour market transitions of temporary workers, arguing that one cannot consider wage growth among temporary workers without doing so. What proportion of temporary workers remain in employment? Of these, how many get a permanent job, and how many remain in temporary employment? Which temporary workers make which transitions? The analysis thus allows us to look at empirical evidence for the debate on temporary employment as a “bridge” and a “trap”. We also compare the hypotheses derived from the segmentation and screening approaches described in section 2 above.

Before assessing these transitions, we briefly consider previous evidence on labour market transitions. We turn first to German work on the topic, all of which uses the socio-economic panel. In an early paper Büchtemann and Quack (1989) find that fixed-term employment is associated with greater employment instability in West Germany, though they also stress that permanent employees with a job tenure of less than 2 years also have unstable employment careers. In a more recent paper Dekker (2001) looks at transitions between non-regular employment, regular employment and non-participation in the Netherlands, West Germany and Britain. For West Germany, Dekker (2001) concludes that "atypical" employment is “a phase workers are going through”. However, as he does not distinguish fixed-term work from other non-regular employment, we cannot be sure what role fixed-term contracts play here.

Giesecke and Groß (2002) look at, amongst other things, the risk of, changing into a fixed-term job in West Germany. They also examine the effect of fixed-term employment on the probability of becoming unemployed. While their results are interesting for this paper, their research design is somewhat different, so their results are not directly comparable to those presented below. They find that, compared to permanent employees, fixed-term employees are more likely to enter a second fixed-term job and also more likely to become unemployed. From this they conclude that those on fixed-term contracts are part of the secondary labour market, with relatively poor prospects. However, being in a fixed-term contract does compare favourably to being unemployed.

Focusing on whether temporary employment acts as a bridge from unemployment in the US, Farber (1999) shows that though job losers are more likely to be found in temporary jobs these will frequently lead back to regular full-time employment. For Sweden, using a sample of initially unemployed workers, Korpi and Levin (2001) show that permanent and temporary jobs differ relatively little in the employment security they offer the unemployed.

For Britain Booth et al. (2002) consider transitions from temporary employment in Britain using a proportional hazard model. As they limit their focus to a group of workers on temporary contracts and follow their transitions, this analysis is closest to this paper, therefore we discuss their more detailed findings with the results below. Overall, they find some evidence to suggest that fixed-term contracts are a stepping stone to permanent work. By contrast Amuedo-Dorantes (2000), in her analysis of transitions of temporary workers in Spain, finds that temporary workers have little opportunity for advancement, and often remain trapped in a repeating cycle of temporary jobs.

We begin our analysis of transitions from temporary employment in Germany by simply looking at what percentage of temporary workers move to different labour market states. In table 5 we show the labour market destinations of fixed-term workers one year later, for the years 1995-2000 for West and East Germany. Results are also presented for East Germany without those in employment programmes (ABM contracts).

Table 5 about here.

In table 5, panel A we see that for West Germany, on average two fifths of temporary employees have a permanent contract the following year. Of these, about 70% are with the same firm (see panel B). This supports the notion of temporary contracts as screening contracts or “bridges”, at least for a substantial proportion of employees. About a further 35% of temporary employees have a temporary contract the following year, but note that once again, about 70% of these are with the same employer. Thus, it is more a case of longer temporary contracts, than moving from one temporary job to another. Splitting up the sample by age groups we see that older workers are more likely to get a permanent contract. If we compare destinations of temporary employees with those of permanent workers, we find temporary employees to be more at risk of both unemployment and leaving the labour market (see also Giesecke and Groß, 2002). Particularly the higher risk of unemployment fits the segmentation theory argument, though the finding is hardly surprising, given that these

contracts are by definition time limited. For East Germany the findings differ depending on whether we include those on an ABM contract or not. With the full sample we observe considerably more transitions to unemployment than in West Germany, around one third of all temporary employees, and less transitions to permanent employment. However, when we exclude those on an ABM contract, the transition pattern of temporary employees in East Germany looks rather similar to the West.

In general the findings are in stark contrast to those reported by Amuedo-Dorantes (2000) for Spain, where only 11.6% of temporary employees in 1995 have a permanent job the next year, 62% a temporary job. With 40% of temporary employees each year in West Germany moving to permanent employment, we would argue these jobs cannot simply be labelled “traps”.

We now go on to ask which temporary workers are making which transitions? Are the highly educated getting permanent jobs, those without qualifications becoming unemployed, as predicted by the third hypothesis in section 2.2? To analyse these transitions in more detail, we model these subsequent labour market states using a multinomial logistic regression. This model is an extension of the binary logistic regression model when multiple outcomes are mutually exclusive and independent of each other. The model estimates the log-odds of being in one labour market status versus another. Thus:

$$(3) \quad \text{Log} [\text{Prob} (y=j)/\text{Prob} (y=J)] = \alpha + \beta_j X_i + u_j$$

where ‘ J ’ is the reference labour market state (in this case remaining in temporary employment) and ‘ j ’ any one of the others (i.e. permanent employment, unemployment and out of the labour market); α the constant, X_i a vector of independent variables and β_i the coefficient estimate for that independent variable for the contrast between labour market state ‘ j ’ and the reference labour market state. We include a range of covariates measuring individual characteristics (age, education, disabled category, presence of small children) and job characteristics (such as firm size, working time, industrial sector) and finally two measures of employment growth.

Focusing firstly on the labour market status one year later, the results of this model, using pooled data for 1995 to 2000, are presented in tables 6a and 6b for West and East Germany respectively. The coefficient estimates compare the log-odds of being in a state in year $t+1$,

compared to being in the reference category, conditional on having been in temporary employment in year t . Given that we use pooled data, the standard errors reported are using the Huber/White/Sandwich estimator of variance⁸.

Table 6 about here.

As the results for East and West Germany are very similar, they are discussed together. For the transition to permanent employment compared to staying in temporary employment, we find no significant gender difference. We do find that older employees are significantly more likely to move to permanent employment than the youngest age group, those under 30. The disabled are less likely to move to permanent employment. However, somewhat surprisingly, those with third level education are less likely to move to permanent employment than those with secondary education and no apprenticeship. This finding is similar to Dekker (2001) for all non-regular employment. Those in larger firms are also less likely to move to permanent employment. What is a likely explanation for this? One possibility is that these workers may simply have longer temporary contracts, so they are more likely to stay in temporary employment. In this case, we need to follow them over a longer time period, which is what we do in the long-run model presented later.

What about the transition to unemployment and out of the labour market? For the transition to unemployment we find no significant gender differences, but East Germans on ABM are much more likely to become unemployed. Older workers are also more likely to become unemployed than younger workers. Those with third level education are somewhat less likely to become unemployed, though the effect is not significant. Finally, those in a medium or large firm are more protected from unemployment than those in a small firm. For the transition out of the labour market we find, as expected, women are more likely to make this transition. The highly educated and those working in large firms are less likely to move out of the labour market. So too are older workers. Note that leaving the labour market in this case can be for a number of reasons - to look after children, but also to enter training and education.

But what happens to these temporary workers after this year? Are their medium term transitions different from the short-term transitions? To check how sensitive our results are to

⁸ This estimation method is used for repeated observations, such as we have, allowing these observations not to be independent within clusters (Stata Manual, 2001).

the choice of yearly transitions, we estimated a long-run model looking at destinations 4 years later. However, because of the relatively small number of cases we found hardly any significant parameter estimates and the full results are not reported. The most important result is that the puzzling finding on higher education from the previous model has partly been resolved. For the medium term transition to permanent employment, having higher educational qualifications provides a distinct advantage. This is consistent with the hypothesis that those with higher skills will be more likely to move to permanent employment, and also consistent with our interpretation of table 6, that those with higher education may have longer temporary contracts.

6. Conclusions

In the context of much discussion about the advantages and disadvantages of temporary work in Germany, our focus in this paper was on the implications of temporary employment for individual employees. Our overall conclusion is that temporary employment in Germany is not as disadvantageous as many people make out, but that temporary employees are a heterogeneous group, and we think it makes sense to speak of a “two-tier” market for temporary employment.

Building on previous research on wages of temporary workers which has found negative wage differentials for workers on fixed term contracts compared to permanent employees (Germany, Spain, France, UK), we show that ignoring unobserved differences between individuals somewhat overestimated the wage differentials between permanent and temporary workers. However, wages of temporary workers are still lower on average, which seems to indicate some discrimination or segmentation of the labour market. Controlling for endogeneity of the contract type variable on the other hand, makes the wage differential become insignificant. This indicates that workers on fixed-term contracts tend to be those who earn lower wages. Looking at wage growth for 2-year, 5-year and 10-year intervals we further show clearly that on average West German male workers with fixed term contracts in the base year have higher wage growth. West German women experience higher wage growth at least in the short run and East German men in the long run. However, splitting up the sample by quintiles we found that fixed-term contract workers are only over represented in the top quintile and higher wage growth is not at all an overall phenomenon of fixed-term contracts. This indicates that the screening hypothesis may just be relevant for some (better educated)

temporary workers. Results for East and West Germany are rather similar, though if anything overall differences between temporary workers and permanent workers are not as marked in East Germany, at least in terms of wages.

The screening hypothesis is further supported by our transitions analysis: we find that about 40% of all temporary workers are in a permanent job in the next year. Most of these permanent jobs are with the same employer. However, as 12-18% of temporary employees are unemployed the following year, temporary employment could also be seen as a risky labour market situation. Multivariate modelling reveals to whom these rather different scenarios apply: At least in the medium term, workers with more education tend to find permanent employment.

Our findings indicate considerable heterogeneity of outcomes for temporary employees which supports the idea of a two-tier market for temporary employment in Germany. For highly skilled jobs temporary employment functions more as a screening contract, a probation period, after which the employee is offered a permanent job and experiences rapid wage growth. For other jobs, i.e. low-skilled jobs with low qualification requirements, employers use temporary workers to regulate fluctuations in demand. For the individual employee in this kind of temporary job, a permanent job is not guaranteed afterwards, and temporary employment is an insecure labour market position. Workers falling into what is arguably the "middle tier" in Germany – those with apprenticeship training – are less likely to hold a fixed-term contract. One could argue that the period of apprenticeship training already allows employers to screen workers reducing the need for fixed-term contracts. Indeed in further research it would be interesting to investigate in more depth how the consequences of fixed-term employment are influenced by the existence of a widespread and highly developed system of apprenticeship training, such as it exists in Germany.

The question of what proportion of temporary employees fall into each of the categories is more difficult to quantify. The wage growth estimates indicate rapid growth for a smaller group of temporary employees. However, the transitions analysis suggests that, at least in terms of the move to permanent employment, a significant proportion of temporary employees achieve permanence, even in the very short term (if we exclude ABM contracts, i.e. East German workers in employment programmes). On balance we conclude that our findings lend more credence to the screening/probation perspective, with temporary

employment providing a “bridge” for many into permanent employment. Certainly outcomes for temporary employees seem much more favourable in Germany than in Spain, where conclusions on temporary employment are much more pessimistic.

Literature

- Amuedo-Dorantes, Catalina (2000)**, "Work Transitions into and out of Involuntary Temporary Employment in a Segmented Market: Evidence from Spain", *Industrial and Labor Relations Review* 53, 309-325.
- Bentolila, Samuel and Juan J. Dolado (1994)**, "Spanish Labour Markets", *Economic Policy*, 9 (18), April 1994.
- Bentolila, Samuel and Gilles Saint-Paul (1992)**, "The Macroeconomic Impact of Flexible Labor Contracts, with an Application to Spain", *European Economic Review*. 36 (5), 1013-47.
- Bielenski, Harald (1997)**, "Deregulierung des Rechts befristeter Arbeitsverträge. Enttäuschte Hoffnungen, unbegründete Befürchtungen", *WSI Mitteilungen* 8, 532-537.
- Blanchard, Olivier and Augustin Landier (Forthcoming 2002)**, "The Perverse Effects of Partial Labor Market Reform: Fixed-Term Contracts in France", *The Economic Journal*.
- Boockmann, Bernhard and Tobias Hagen (2001)**, "The Use of Flexible Working Contracts in West Germany: Evidence from an Establishment Panel", Zentrum für Europäische Wirtschaftsforschung (ZEW), Discussion Paper No. 01-33.
- Boeri, Tito (1999)**, "Enforcement of Employment Security Regulations, on-the-Job Search and Unemployment Duration", *European Economic Review* 43, 65-89.
- Booth, Alison L., Marco Francesconi and Jeff Frank (Forthcoming 2002)**, "Temporary Jobs: Stepping Stones or Dead Ends?", *The Economic Journal*.
- Büchtemann, Christoph F. (ed.) (1993)**, *Employment Security and Labor Market Behavior: Interdisciplinary Approaches and International Evidence*, ILR Press, Ithaca, New York.
- Büchtemann, Christoph F. and Sigrid Quack (1989)**, "'Bridges' or 'Traps'?: Non-Standard Employment in the Federal Republic of Germany", in: G. Rodgers and I. Rodgers (eds.): *Precarious Jobs in Labour Market Regulation: The Growth of Atypical Employment in Western Europe*, pp. 109-148. Geneva, International Institute for Labour Studies.
- Bundesanstalt für Arbeit "Arbeitsmarkt 2000"**, Amtliche Nachrichten der Bundesanstalt für Arbeit (ANBA), 49. Jahrgang, Sondernummer, Nürnberg, 28. Juni 2001.

- Davia, Maria A. and Virginia Hernanz (2001)**, "Temporary Employment and Segmentation in the Spanish Labour Market: an Empirical Analysis through the Study of wage Differentials", Universidad de Alcalá, mimeo.
- Dekker, Ronald (2001)**, "'A Phase they're Going through': Transitions from Nonregular to Regular Jobs in Germany, The Netherlands and Great Britain", Paper for the LOWER Conference on Combining Work, Home, and Education. University of Minho, Braga, Portugal, October 26-27, 2001, mimeo.
- De la Rica and Felgueroso (1999)**, "Wage Differentials between Permanent and Temporal Workers: Further Evidence", Universidad del País Vasco and Universidad de Oviedo, mimeo.
- Doeringer, P. and Piore, M. (1971)**, *International labor markets and manpower analysis*. Lexington, Mass. : Heath Lexington Books.
- Dolado, Juan J., Carlos García-Serrano and Juan F. Jimeno (Forthcoming 2002)**, "Drawing Lessons from the Boom of Temporary Jobs in Spain", *The Economic Journal*.
- Farber, Henry S. (1999)**, "Alternative and Part-Time Employment Arrangements as a Response to Job Loss", *Journal of Labor Economics* 17, No 4 Part 2, S142-S169.
- Giesecke, Johannes and Martin Groß (2002)**, "Befristete Beschäftigung: Chance oder Risiko?", *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 54, 85-108.
- Goux, Dominique, Eric Maurin and Marianne Pauchet (2001)**, "Fixed-Term Contracts and the Dynamics of Labour Demand", *European Economic Review* 45, 533-552.
- Gross, Martin and Claudia Vogel (2001)**, "Flexible Employment and Income Inequality in Great Britain and West Germany", Working Paper, Humboldt University Berlin.
- Hagen, Tobias, (2001)**, "Do Temporary Workers Receive Risk-Premiums? Assessing the Wage Effects of Fixed-Term Contracts in West-Germany by Matching Estimators Compared with Parametric Approaches, Zentrum für Europäische Wirtschaftsforschung (ZEW) Discussion Paper No. 01-71.
- Hamermesh, Daniel S. and Gerard A. Pfann (1996)**, "Adjustment Costs in Factor Demand", *Journal of Economic Literature* XXXI (September), 1264-1292.
- Holmlund, Bertil and Donald Storrie (Forthcoming 2002)**, "Temporary Work in Turbulent Times: The Swedish Experience", *The Economic Journal*.
- Houseman, Susan N. and Katharine G. Abraham (1993)**, "Labor Adjustment under Different Institutional Structures: A Case Study of Germany and the United States", NBER Working paper No. 4548.
- Hunt, Jennifer (2000)**, "Firing Costs, Employment Fluctuations and Average Employment: An Examination of Germany", *Economica* 67, 177-202.

- Jimeno, Juan F. and Luis Toharia (1993)**, "The Effects of Fixed-Term Employment on Wages: Theory and Evidence From Spain". *Investigaciones Economicas*, Madrid XVII (3), 475-494.
- Korpi, Thomas and Henrik Levin (2001)**, "Precarious Footing: Temporary Employment as a Stepping Stone out of Unemployment in Sweden", *Work, Employment & Society* 15 (1), 127-148.
- Nickel, Stephen (1978)**, "Fixed Costs, Employment and Labour Demand over the Cycle", *Economica* 45, 705-724.
- OECD**, 1993, *Employment Outlook*. Paris: OECD.
- OECD**, 1999, *Employment Outlook*. Paris: OECD.
- Rudolph, Helmut (2000)**, "Arbeitsmarktpolitik. Befristete Arbeitsverträge sind bald neu zu regeln", IAB Kurzbericht Nr. 12, Nürnberg.
- Rogowski, Ralf and Klaus Schömann (1996)**, "Legal Regulation and Flexibility of Employment Contracts", in: Schmid, G., O'Reilly, J. and Schömann, K. (eds.) *International Handbook of Labour Market Policy and Evaluation*, pp. 623-651. Cheltenham: Edward Elgar.
- Schömann, Klaus and Thomas Kruppe (1993)**, "Fixed-Term Employment and Labour Market Flexibility – Theory and Longitudinal Evidence for East and West Germany", Discussion Paper prepared for the SOEP User Conference at the Berlin-Brandenburgische Academy of Sciences in Berlin 7-8.6.1993.
- Schömann, Klaus and Thomas Kruppe (1994)**, "Who Enters Fixed-Term Contracts: Evidence from East and West Germany", *DIW Vierteljahrshefte zur Wirtschaftsforschung* 64, 69-74.
- Schömann, Klaus and Christoph Hilbert (1998)**, "The Youth Labour Market in Germany. A New Target Group for German Labour Market Policies?", *DIW Vierteljahrshefte zur Wirtschaftsforschung* 67, 272-285.
- Soep Group (2001)**, "The German Socio-Economic Panel (GSOEP) after more than 15 Years – Overview, in: Elke Holst, Dean R. Lillard and Thomas A. DiPrete (eds.): Proceedings of the 2000 Fourth International Conference of German Socio-Economic Panel Study Users (GSOEP 2000), *DIW Vierteljahrshefte zur Wirtschaftsforschung*, 70 (1), 7-14.
- Wang, Ruqu and Andrew Weiss (1998)**, "Probation, Layoffs, and Wage-Tenure Profiles: A Sorting Explanation", *Labour Economics* 5 (3), 359-383.

Tables

Table 1 - Who has a fixed term contract in Germany? 1999

Groups	Fixed-term in group i	Permanent		Fixed-term	
	(%) weighted	(%) weighted	N of cases	(%) weighted	N of cases
AGE					
<i>Men</i>					
under 30	18.3%	14.9%	(344)	33.0%	(77)
30-44	5.8%	51.8%	(1099)	50.8%	(68)
45 +	5.0%	33.3%	(649)	16.2%	(34)
<i>Women</i>					
under 30	18.0%	17.7%	(361)	35.5%	(79)
30-44	6.5%	47.2%	(883)	47.7%	(61)
45 +	4.6%	35.1%	(608)	16.8%	(29)
WORKING HOURS					
<i>Men</i>					
Full-time	6.7%	94.0%	(2025)	80.2%	(146)
Part-time	72.8%	6.0%	(67)	19.8%	(179)
<i>Women</i>					
Full-time	40.1%	62.6	(1109)	54.8	(743)
Part-time	35.5%	37.4	(109)	45.2	(60)
EDUCATION					
<i>Men</i>					
No train.	17.8%	10.0%	(152)	22.6%	(33)
Voc. train.	6.1%	73.6%	(1586)	55.2%	(103)
Third level	10.9%	15.1%	(327)	21.4%	(40)
Missing	10.0%	1.4%	(27)	0.8%	(3)
<i>Women</i>					
No train.	12.0%	14.2%	(220)	13.6%	(30)
Voc. train.	6.2%	74.7%	(1444)	49.5%	(96)
Third level	19.7%	9.8%	(163)	34.8%	(40)
Missing	10.7%	1.3%	(25)	2.1%	(3)

Table 2a – Pooled Wage Level Regressions - Coefficient on Fixed-term-contracts

	Men				Women			
	West		East		West		East	
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Specification I								
Fixed-term	-0.163*** (0.014)	-0.062*** (0.012)	-0.106*** (0.018)	-0.057*** (0.017)	-0.085*** (0.017)	-0.043*** (0.016)	-0.062*** (0.016)	-0.018 (0.017)
Specification II								
Fixed-term	-0.148*** (0.014)	-0.061*** (0.012)	-0.058*** (0.018)	-0.048*** (0.017)	-0.076*** (0.017)	-0.042*** (0.016)	-0.017 (0.017)	0.023 (0.017)
Proportion of time unemp. last 5 years	-0.291*** (0.043)	-0.113 (0.070)	-0.520*** (0.047)	-0.299*** (0.076)	-0.279*** (0.067)	-0.235*** (0.104)	-0.315*** (0.039)	-0.152*** (0.055)
Specification III								
Fixed < 2	-0.215*** (0.018)	-0.047*** (0.017)	-0.138*** (0.024)	-0.124*** (0.026)	-0.160*** (0.023)	-0.056** (0.023)	-0.132*** (0.023)	-0.022 (0.025)
Fixed ≥ 2	-0.196*** (0.023)	-0.069*** (0.019)	-0.092*** (0.031)	-0.006 (0.030)	-0.097*** (0.027)	-0.035 (0.025)	-0.078*** (0.028)	0.020 (0.029)
Perm < 2	-0.109*** (0.010)	0.002 (0.011)	-0.107*** (0.015)	-0.060*** (0.019)	-0.103*** (0.013)	-0.011 (0.015)	-0.137*** (0.017)	-0.036* (0.019)
2 ≤ Perm < 5	-0.073*** (0.010)	0.012 (0.010)	-0.077*** (0.013)	-0.037** (0.019)	-0.100*** (0.012)	-0.005 (0.014)	-0.118*** (0.013)	-0.035** (0.017)
5 ≤ Perm < 10	-0.040*** (0.008)	0.000 (0.008)	-0.019 (0.013)	-0.007 (0.018)	-0.027** (0.011)	0.002 (0.012)	-0.070*** (0.013)	-0.028* (0.015)
Proportion of time unemp. last 5 years	-0.156*** (0.045)	-0.124* (0.071)	-0.387*** (0.050)	-0.201*** (0.078)	-0.101 (0.070)	-0.210** (0.106)	-0.183*** (0.044)	-0.136** (0.059)
Hausman test ^a	663.72***		220.98***		316.52***		384.65***	
No of cases	7294		4629		5801		4325	

Note: OLS=Ordinary Least Squares regression, FE=Fixed effects regression.

a: Random effects versus fixed effects regression. A significant result can be interpreted as evidence that the random effects $v[i]$ and the regressors $x[i,t]$ are correlated (H_0 =difference in coefficients not systematic). Results reported for specification III. Significance levels: *** = 1%, ** = 5%, * = 10%.

Source: Own calculations based on pooled waves 1995-2000 of the German Socio-Economic Panel samples A and C. Selection: without civil servants, without self-employment, without apprentices, only employees who are 18-60 years old. Hourly wage observations below 5 DM and above 100 DM were dropped.

Table 2b – Pooled Wage Level Regressions - Instrumental variables estimator

Specification I	Men				Women			
	West		East		West		East	
	IV without FE	IV with FE	IV without FE	IV with FE	IV without FE	IV with FE	IV without FE	IV with FE
Fixed-term	-0.198*** (0.036)	-0.052 (0.037)	-0.193*** (0.044)	-0.024 (0.044)	-0.343*** (0.088)	-0.103 (0.084)	-0.193*** (0.044)	-0.024 (0.044)
Specification III								
Fixed < 2	-0.184*** (0.036)	-0.042 (0.038)	-0.078* (0.045)	0.003 (0.045)	-0.354*** (0.086)	-0.083 (0.083)	-0.078* (0.045)	0.003 (0.045)
Fixed ≥ 2	-0.150*** (0.023)	-0.047** (0.023)	-0.067** (0.031)	0.044 (0.029)	-0.070*** (0.027)	-0.011 (0.026)	-0.067** (0.031)	0.044 (0.029)
Perm < 2	-0.072*** (0.010)	0.050*** (0.012)	-0.069*** (0.013)	0.008 (0.016)	-0.078*** (0.013)	0.033** (0.014)	-0.069*** (0.013)	0.008 (0.016)
2 ≤ Perm < 5	-0.048*** (0.009)	0.066*** (0.012)	-0.049*** (0.012)	0.019 (0.015)	-0.080*** (0.012)	0.039*** (0.013)	-0.049*** (0.012)	0.019 (0.015)
5 ≤ Perm < 10	-0.023*** (0.008)	0.036*** (0.010)	0.002 (0.012)	0.044*** (0.016)	-0.013 (0.010)	0.039*** (0.012)	0.002 (0.012)	0.044*** (0.016)
Proportion of time unemp. last 5 years	-0.267*** (0.043)	0.049 (0.090)	-0.453*** (0.049)	-0.215*** (0.079)	-0.161** (0.070)	-0.347*** (0.118)	-0.453*** (0.049)	-0.215*** (0.079)

Note: IV=Instrumental variables estimator, FE=Fixed effects regression. Significance levels: *** = 1%, ** = 5%, * = 10%.

Source: Own calculations based on pooled waves 1995-2000 of the German Socio-Economic Panel samples A and C. Selection: without civil servants, without self-employment, without apprentices, only employees who are 18-60 years old. Hourly wage observations below 5 DM and above 100 DM were dropped.

Table 3 – Pooled 2-Year Wage Growth Regressions - Coefficient on Fixed-term-contracts

	<i>Men</i>				<i>Women</i>			
	<i>West</i>		<i>East</i>		<i>West</i>		<i>East</i>	
	<i>OLS</i>	<i>FE</i>	<i>OLS</i>	<i>FE</i>	<i>OLS</i>	<i>FE</i>	<i>OLS</i>	<i>FE</i>
Specification I								
Fixed-term	0.036** (0.014)	0.048** (0.023)	-0.009 (0.023)	-0.028 (0.035)	0.055*** (0.020)	0.067*** (0.032)	0.006 (0.019)	-0.027 (0.033)
Specification II								
Fixed-term	0.036** (0.014)	0.047** (0.023)	0.011 (0.023)	-0.029 (0.035)	0.056*** (0.020)	0.068** (0.032)	0.007 (0.020)	-0.027 (0.033)
Proportion of time unemp. last 5 years	-0.003 (0.048)	0.019 (0.196)	0.086 (0.060)	0.095 (0.193)	0.013 (0.078)	-0.081 (0.232)	-0.019 (0.044)	0.003 (0.127)
Specification II								
Fixed < 2	0.039** (0.019)	0.003 (0.032)	0.040 (0.031)	0.059 (0.054)	0.106*** (0.028)	0.123*** (0.047)	0.032 (0.027)	0.042 (0.049)
Fixed ≥ 2	0.034 (0.022)	0.042 (0.034)	-0.054 (0.036)	-0.052 (0.056)	0.033 (0.030)	0.076* (0.046)	-0.003 (0.030)	0.000 (0.052)
Perm < 2	0.002 (0.010)	-0.037* (0.019)	0.025* (0.015)	0.051 (0.036)	0.036*** (0.014)	0.045** (0.028)	0.016 (0.016)	0.058 (0.035)
2 ≤ Perm < 5	0.001 (0.009)	-0.038** (0.018)	0.015 (0.014)	0.053 (0.034)	0.008 (0.013)	0.028** (0.026)	0.010 (0.013)	0.061* (0.031)
5 ≤ Perm < 10	-0.001 (0.008)	-0.012 (0.015)	0.005 (0.014)	0.036 (0.033)	0.028** (0.011)	0.050* (0.022)	0.011 (0.013)	0.058** (0.028)
Hausman test ^a	53.71**		34.32		69.02***		41.41	
No of cases	5176		3149		3895		2966	

Notes: see Table 2

Table 4 - Long Run OLS Wage Growth - Coefficient on Fixed-term-contracts

	<i>Men</i>			<i>Women</i>		
	<i>West</i>		<i>East</i>	<i>West</i>		<i>East</i>
	1985-95	1995-99	1995-99	1985-95	1995-99	1995-99
Specification I						
Fixed-term	0.265** (0.186)	0.327*** (0.049)	0.144*** (0.056)	-0.111 (0.099)	0.072 (0.054)	-0.041 (0.066)
No. of cases	609	897	567	374	642	531

Note: Weighted Ordinary Least Squares regressions. Significance levels: *** = 1%, ** = 5%, * = 10%.

Source: Own calculations based on waves 1985, 1995 and 1999 of the German Socio-Economic Panel samples A and C. Selection: without civil servants, without self-employment, without apprentices, only employees who are 18-60 years old. Hourly wage observations below 5 DM and above 100 DM were dropped.

Table 5 - Destinations of Temporary Workers one year later

Panel A: Destinations

	Perm	Temp	Unemp	Out	N of cases
	%	%	%	%	(unweighted)
WEST	41.0	36.3	11.8	10.9	810
< 30	35.1	37.8	9.8	17.3	353
≥ 30	44.4	35.4	13.0	7.2	457
EAST (with ABM[#])	29.2	34.6	30.5	5.8	850
< 30	29.9	39.6	18.7	11.8	239
≥ 30	28.9	32.7	34.8	3.5	611
EAST (no ABM)	40.0	36.0	18.4	5.7	580
< 30	32.6	41.6	13.3	12.5	205
≥ 30	44.1	32.9	21.2	1.8	375

Panel B: Firm switches

	Destination: permanent contract		Destination: temporary contract	
	without firm change	with firm change	without firm change	with firm change
	%	%	%	%
WEST	70.8	29.2	68.4	31.6
EAST (with ABM)	65.8	34.2	66.8	33.2
EAST (without ABM)	64.6	35.4	74.5	25.5

Notes: Weighted with longitudinal weight. [#] ABM status imputed for 1996 as it is not reported in the survey.
Source: Own calculations from the GSOEP 1995-2000.

Table 6a Transitions from Temporary Employment. Log odds of being in a state in the next year, 1995-2000. West Germany

	Permanent Employment	Unemployment	Out of Labour Market.
Women	0.005 (<i>p.</i> =0.981)	-0.068 (0.849)	0.777*** (0.007)
<i>Ref: Age: 18-30</i>			
Age: 30-44	0.369* (0.084)	-0.089 (0.817)	-0.777*** (0.007)
Age: 45-60	0.875*** (0.007)	0.032 (0.954)	-0.990** (0.043)
<i>Ref: no vocational</i>			
Secondary with vocational	-0.101 (0.710)	-0.263 (0.538)	-1.389*** (0.000)
Third Level	-0.650** (0.034)	-0.888 (0.126)	-1.175*** (0.003)
Previous Unemp. Experience	0.012 (0.989)	2.941** (0.011)	0.811 (0.524)
Tenure (years)	0.042* (0.053)	-0.032 (0.590)	0.026 (0.427)
Part-time/marginal	-0.250 (0.216)	-0.192 (0.617)	0.569** (0.040)
Disabled	-0.963* (0.053)	-0.275 (0.681)	-0.393 (0.626)
<i>Ref: Small firm</i>			
Medium firm	-0.598** (0.028)	-1.199*** (0.007)	-0.385 (0.306)
Large Firm	-0.638** (0.011)	-1.126*** (0.005)	-0.782** (0.018)
Emp. Change (year t)	0.209 (0.246)	-0.337 (0.320)	-0.314 (0.237)
Emp. Change (year t+1)	0.097 (0.588)	0.072 (0.800)	0.136 (0.622)

Notes: Results from a multinomial logistic regression with pooled data (unweighted). Reference category is temporary employment. No. of observations, 778; Log Likelihood -792.36 *P<=0.10; **P<=0.05; ***P<=0.01; Dummy variables for industrial sector, having young children and year of transitions are included but not reported. Selection: without civil servants, without self-employment, without apprentices, only employees who are 18-60 years old.

Source: Own calculations from the GSOEP, 1995-2000.

Table 6b Transitions from Temporary Employment. Log odds of being in a state in the next year, 1995-2000. East Germany

	Permanent Employment	Unemployment	Out of Labour Market.
Women	-0.389* (p. =0.088)	-0.123 (0.597)	-0.045 (0.908)
<i>Ref: Age: 18-30</i>			
Age: 30-44	0.170 (0.482)	0.424 (0.134)	-1.151*** (0.001)
Age: 45-60	-0.335 (0.251)	0.381 (0.211)	-1.833*** (0.000)
<i>Ref: no vocational</i>			
Secondary with vocational	0.332 (0.386)	-0.142 (0.692)	-1.056** (0.024)
Third Level	0.045 (0.916)	-0.788 (0.061)	-1.667*** (0.001)
Previous Unemp. Experience	0.365 (0.617)	2.488*** (0.000)	0.562 (0.626)
Tenure (years)	0.079*** (0.000)	0.044 (0.122)	0.087** (0.023)
ABM[#]	-1.279*** (0.000)	0.672*** (0.004)	0.896** (0.036)
Part-time/marginal	-0.321 (0.216)	-0.137 (0.613)	0.755** (0.034)
Disabled	-1.245 (0.154)	-0.134 (0.852)	-0.502 (0.715)
<i>Ref: Small firm</i>			
Medium firm	-0.567** (0.039)	-0.521** (0.003)	-0.419 (0.302)
Large Firm	-0.594** (0.026)	-1.009*** (0.000)	-1.306*** (0.003)
Emp. Change (year t)	-0.062 (0.623)	-0.083 (0.560)	0.366 (0.102)
Emp. Change (year t+1)	0.080 (0.501)	-0.025 (0.853)	-0.054 (0.821)

Notes: See table 6. No. of observations, 840; [#]ABM imputed for 1996. Significance levels: *P<=0.10; **P<=0.05; ***P<=0.01.

Source: Own calculations from the GSOEP, 1995-2000.

Appendix A

The Employment Promotion Act (1985): Introduction, Extensions and Amendments.

- Employment protection which was introduced mainly in the early 1970s is relatively high in Germany. For individual redundancies from permanent jobs works councils (if existant) have to be consulted and notice periods have to be given based on measures like tenure, age and type of job. Severance payments for individual redundancies are relatively frequent.
- Pre-1985 – fixed term contracts only permitted for special reasons. Fixed-term contracts were limited to 6 months, and the employer had to demonstrate that the work was temporary by nature.
- The “Employment Promotion Act” (*Beschäftigungsförderungsgesetz*) of 1985, removes the need for a reason under certain conditions. New employment contracts, or employment contracts immediately following vocational training are now permitted for a duration of up to 18 months. In small, new firms, the contract can be for 24 months. Valid until December 1989.
- 1990, 1994 Extensions of the Employment Promotion Act, finally until December 2000.
- 1996 – Extension of the maximum duration of fixed term contract to 24 months for new contracts; 3 continuous extensions within the maximum period allowed; unlimited temporary contracts for employees over 60.
- 2001 – The new law on part-time employment and fixed-term contracts, extends the previous legislation on fixed-term contracts for an unlimited period.

Source: Schömann and Hillbert (1998), Rudolph (2000), Bundesarbeitsblatt Februar (2001)

Appendix B

Table B1 – Means and Frequencies in the Wage Level Analysis

	Men		Women	
	N of cases	Means/Frequencies	N of cases	Means/Frequencies
West Germany				
ln (hourly wage)	7296	3.31	5801	3.02
Fixed-term	378	5.18	349	6.02
Part-time	230	3.15	2549	43.96
Age < 30	1292	17.71	1253	21.60
Age 30-44	3775	51.74	2732	47.10
Age ge 45	2229	30.55	1816	31.30
Spouse	5577	76.44	4341	74.83
Hauptschule/no training	459	6.29	593	10.22
Realschule/Abi/no training	235	3.22	325	5.6
Hauptschule/training	3304	45.29	1954	33.68
Realschule/Abi/train	2004	24.47	2240	42.06
University	1294	17.74	489	8.43
Unskilled blue collar	921	12.62	825	14.22
Skilled blue collar	2258	30.95	238	4.10
Unskilled white collar	130	1.78	453	7.81
Skilled white collar	2021	27.70	3727	64.25
Highly skilled white collar	1938	26.56	540	9.31
Small firm (< 20)	1328	18.20	1680	28.96
Medium (20-199)	2000	27.41	1598	27.55
Large firm (>=200)	3968	54.39	2523	43.49

Table B1- continued	Men		Women	
	N of cases	Means/Frequencies	N of cases	Means/Frequencies
East Germany				
ln (hourly wage)	4629	2.88	4325	2.83
Fixed-term	306	6.61	381	8.81
Part-time	64	1.38	1021	23.61
Age < 30	782	16.89	779	18.01
Age 30-44	2260	48.82	2077	48.02
Age ge 45	1587	34.28	1469	33.97
Spouse	3838	82.91	3599	83.21
Hauptschule/no training	35	0.76	71	1.64
Realschule/Abi/no training	95	2.05	56	1.29
Hauptschule/training	855	18.47	574	13.27
Realschule/Abi/train	2582	55.78	1970	45.55
University	1062	22.94	1654	38.24
Unskilled blue collar	632	13.65	419	9.69
Skilled blue collar	2293	49.54	504	11.65
Unskilled white collar	85	1.84	254	5.87
Skilled white collar	778	16.81	2520	58.27
Highly skilled white collar	837	18.08	618	14.29
Small firm (< 20)	1286	27.78	1217	28.14
Medium firm (20-199)	1841	39.77	1331	30.77
Large firm (>=200)	1502	32.45	1777	41.09

Table B2 - Pooled Wage Level Regression Results for Men

	West		East	
	OLS	FE	OLS	FE
Constant	2.902*** (0.020)	3.167*** (0.050)	2.774*** (0.052)	2.839*** (0.186)
Fixed < 2	-0.215*** (0.018)	-0.047*** (0.017)	-0.138*** (0.024)	-0.124*** (0.026)
Fixed ≥ 2	-0.196*** (0.023)	-0.069*** (0.019)	-0.092*** (0.031)	-0.006 (0.030)
Perm < 2	-0.109*** (0.010)	0.002 (0.011)	-0.107*** (0.015)	-0.060*** (0.019)
2 ≤ Perm < 5	-0.073*** (0.010)	0.012 (0.010)	-0.077*** (0.013)	-0.037** (0.019)
5 ≤ Perm < 10	-0.040*** (0.008)	0.000 (0.008)	-0.019 (0.013)	-0.007 (0.018)
Proportion of time unemployed last 5 years	-0.156*** (0.045)	-0.124* (0.071)	-0.387*** (0.050)	-0.201*** (0.078)
Part-time	-0.137*** (0.018)	-0.102*** (0.021)	-0.076** (0.037)	0.094** (0.045)
Age 30-44	0.135*** (0.009)	0.054*** (0.011)	0.055*** (0.013)	0.042** (0.019)
Age ge 45	0.180*** (0.011)	0.029* (0.017)	0.042*** (0.015)	0.049* (0.027)
Spouse	0.070*** (0.008)	0.018* (0.011)	0.017 (0.012)	-0.028 (0.020)
Realschule/Abi/no training	0.019* (0.021)	-0.052 (0.046)	-0.090 (0.056)	-0.055 (0.201)
Hauptschule/training	0.037*** (0.013)	-0.020 (0.033)	-0.131*** (0.049)	0.068 (0.163)
Realschule/Abi/train	0.088*** (0.014)	0.111** (0.045)	-0.087* (0.049)	0.028 (0.190)
University	0.242*** (0.017)	0.128*** (0.049)	0.010 (0.051)	0.034 (0.195)
Skilled blue collar	0.101*** (0.010)	0.027** (0.012)	0.060*** (0.013)	-0.002 (0.015)
Unskilled white collar	0.040* (0.024)	0.010 (0.022)	0.007 (0.033)	-0.050 (0.033)
Skilled white collar	0.184*** (0.011)	0.061*** (0.014)	0.125*** (0.016)	0.049** (0.023)
Highly skilled white collar	0.364*** (0.013)	0.122*** (0.017)	0.296*** (0.020)	0.043 (0.029)
Small firm (< 20)	-0.088*** (0.009)	-0.040*** (0.011)	-0.129 (0.010)	-0.077*** (0.014)
Large firm (≥200)	0.083*** (0.007)	0.024*** (0.009)	0.101*** (0.011)	0.058*** (0.014)

Appendix table B2 continued	West		East	
	OLS	FE	OLS	FE
Linear yearly trend	0.014*** (0.002)	0.027*** (0.001)	0.021*** (0.003)	0.027*** (0.002)
Agriculture, forestry, fisheries	-0.114*** (0.031)	-0.040 (0.037)	-0.221*** (0.024)	-0.071* (0.037)
Energy, water, mining	0.023* (0.017)	-0.012 (0.025)	0.065*** (0.024)	-0.094** (0.040)
Construction	0.003* (0.011)	-0.010 (0.015)	0.041*** (0.012)	-0.030* (0.017)
Trade	-0.162*** (0.011)	-0.014 (0.013)	-0.095*** (0.016)	-0.028 (0.022)
Transport, communication	-0.123*** (0.013)	-0.021 (0.018)	-0.044*** (0.016)	-0.039 (0.027)
Credit and insurance	-0.057*** (0.014)	0.005 (0.027)	0.027 (0.035)	-0.138* (0.075)
Other services	-0.142*** (0.011)	-0.044*** (0.015)	-0.042*** (0.015)	-0.034 (0.022)
State and social security	-0.070*** (0.013)	-0.013 (0.020)	-0.004 (0.018)	-0.053* (0.030)
Private households	-0.085*** (0.023)	-0.036 (0.030)	-0.031 (0.038)	-0.098** (0.040)
F-test industries	46.22***	1.25	19.67***	1.73*
F-test regions	3.88***	2.56***	74.29***	5.38***
R ² (FE: overall)	0.53	0.23	0.42	0.18
N of cases	7294		4629	
N of groups	1637		1061	

Note: OLS=Ordinary Least Squares regression, FE=Fixed effects regression. Control group: unskilled blue collar worker in manufacturing, under 30, without school or training, working full-time in permanent contract, in medium sized firm. Significance levels: *** = 1%, ** = 5%, * = 10%.

Source: Own calculations based on pooled waves 1995-2000 of the German Socio-Economic Panel samples A and C. Selection: without civil servants, without self-employment, without apprentices, only employees who are 18-60 years old. Hourly wage observations below 5 DM and above 100 DM were dropped.

Table B3 – Probit of being in a fixed-term contract (Used in IV-estimations)

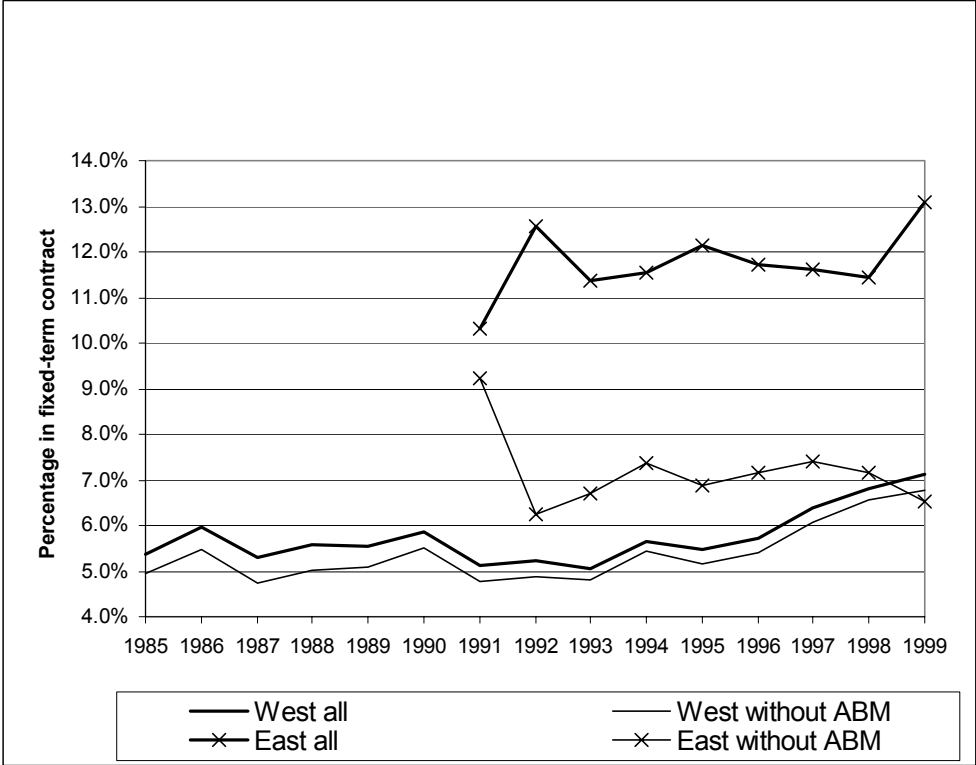
Covariates	Coefficient	Covariates	Coefficient
Constant	-0.242 (0.295)	Skilled white collar	-0.736*** (0.161)
Training last year	0.838*** (0.268)	Highly skilled white collar	-0.853*** (0.199)
Out of labour force last year	0.218 (0.213)	Small firm (< 20)	-0.228 (0.143)
Unemployed last year	0.687*** (0.200)	Large firm (>=200)	0.235** (0.116)
Proportion of time employed in the last 5 years	-2,565*** (0.321)	Agriculture, forestry, fisheries	-0.629 (0.588)
Children	-0.460*** (0.147)	Energy, water, mining	-0.612 (0.502)
Part-time	0.838*** (0.200)	Construction	-0.082 (0.210)
Age 30-44	0.068 (0.154)	Trade	0.265 (0.170)
Age ge 45	-0.087 (0.187)	Transport, communication	0.284 (0.224)
Spouse	0.082 (0.134)	Credit and insurance	-0.406 (0.312)
Practical training	-0.109 (0.180)	Other services	0.644*** (0.183)
University	0.548** (0.227)	State and social security	0.567** (0.243)
Skilled blue collar	-0.664*** (0.151)	Private households	0.512 (0.359)
Unskilled white collar	-0.430* (0.246)		

Note: Dependent variable = 1 if respondent has a fixed-term contract. Only those in employment are included. Control group: unskilled blue collar worker in manufacturing, under 30, without school or training, working full-time in permanent contract, in medium sized firm. Significance levels: *** = 1%, ** = 5%, * = 10%.

Source: Own calculations based on pooled waves 1995-2000 of the German Socio-Economic Panel samples A and C. Selection: without civil servants, without self-employment, without apprentices, only employees who are 18-60 years old.

Figures

Figure 1 – Temporary employment and employment programmes (ABM)



Source: Rudolph (2000)