A "Two-Tier" Labour Market for Fixed-Term Jobs?
Evaluating Evidence from West Germany
Using Quantile Regression

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Abstract

Recent discussion of fixed-term contracts tends to ignore the considerable variation in the quality of these jobs and the wages associated with them (e.g. Booth et al. 2002). In this paper the authors develop the concept of a "two-tier" labour market for fixed-term contracts in Germany and test this concept using quantile regression. Using data from the German Socio-Economic Panel (SOEP) they find that those with high-wage fixed-term contracts earn only slightly less than permanent counterparts, those with low-wage temporary jobs earn much less, indicating that Ordinary Least Squares (OLS) regression misses important aspects of the wage structure of fixed-term workers.

JEL Classification: J31

1. Introduction

Fixed-term contracts in Europe have recently become the subject of both policy and research interest. Policy makers often see these contracts as an instrument of labour market flexibility, particularly relevant in countries with relatively high levels of employment protection such as Germany. Fixed-term workers can be laid off at the end of their contract without incurring statutory redundancy payments or restrictions imposed by employment protection legislation. Critics argue that fixed-term contracts are very disadvantageous for the individual, as they offer little job security and are associated with low wages and bad conditions of employment. Recent research from Britain and a number of other European countries has examined the wages and conditions attached to fixed-term employment (Booth et al. 2002, Hagen 2002, Jimeno/ Toharia 1993). In general, the finding is that fixed-term workers earn somewhat less than comparable permanent employees. However, these papers have tended to compare all fixed-term contracts with all permanent contracts, and

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this paper argues that it is important to bear in mind the considerable heterogeneity of fixed-term contracts.

We begin by developing the concept of a "two-tier" labour market for fixed-term contracts in Germany in Section 2. There is an "upper tier" of privileged fixed-term contracts. These are high-skilled jobs with high wages. There is also a "lower tier" with low-skilled fixed-term contracts with low wages. In order to test whether a clear distinction between "good" fixed-term jobs and "bad" fixed-term jobs can be found, we use quantile regression techniques, which have been applied to a wide range of economic issues (see contributions in issue 26/2001 of Empirical Economics; Buchinsky, 1998). Quantile regression allows us to analyse whether the wage differentials between permanent and fixed-term workers previously found are true for all workers on this type of contract, or limited to workers in different parts of the wage distribution. Section 3 presents the estimation methods and introduces the data used from the SOEP. Section 4 then presents the empirical analysis, beginning with some descriptive statistics before going on to model quantile regressions for wages. Section 5 summarises our results.

2. The Use of Fixed-Term Contracts
and Theoretical Consequences for Wages

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 (e.g. OECD 1993). In Germany, as in other European countries, both legal regulations and labour court decisions make it expensive and time-consuming to lay off permanent employees. For individual dismissals, dismissal protection regulations stipulate notice periods based on measures such as tenure, age and type of job; the employer needs a specific reason (i.e. misconduct) and the works council *(Betriebsrat)* needs to be present. If the employee challenges the dismissal, legal proceedings may be protracted, often resulting in high severance payments (Schömann et al. 1998). Since the Employment Promotion Act of 1985, employers can hire employees on a fixed-term contract without a reason for up to two years duration, thus avoiding potential redundancy payments and employment legislation restrictions.[1]

Apart from the obviously higher job insecurity, fixed-term contracts may also be associated with different wage conditions, and different approaches to the use of fixed-term contracts generate different predictions about the wages associated with them. One view implicit in neo-classical labour market theory is that fixed-term workers should receive higher wages to compensate for the job insecurity associated with fixed-term employment and the loss of potential

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[1] Further details of the legislation may be found in Mertens / McGinnity, 2004.

redundancy pay. So, if we assume *compensating wage differentials,* wages for temporary contracts will be higher than for similar permanent jobs.

A number of approaches view fixed-term employment as having substantially worse conditions of employment than permanent employment. According to the *labour market segmentation theory,* the labour market is divided into primary and secondary segments (e.g. Doeringer / Piore 1971). Primary segment jobs offer long-term, stable employment with structured career ladders. Jobs in the unskilled secondary segment – where fixed-term jobs will be found – offer lower wages, no training, few career prospects and unstable careers. A second approach, from the employer's perspective, is that fixed-term contracts are used to *regulate short-term fluctuations in demand,* if employers are unsure about long-run sales opportunities and if it is expensive to fire permanent employees, as in Germany. If this is the case, we would expect fixed-term contracts to be offered in low-skill / low-wage sectors and to pay less than comparable permanent jobs.

A different reason sometimes proposed for the use of fixed-term contracts is the screening hypothesis. According to the screening approach, employers may use fixed-term contracts in order to extend the legally limited probation period. If the individual employee is good, they are retained in the firm, if not, the employer is spared expensive dismissal costs. Probationary contracts are more likely for highly skilled workers, where productivity may be particularly difficult to assess. Wages attached to fixed-term contracts may not necessarily be lower, and these jobs are certainly not found in the low-wage sector of the labour market.[2] In keeping with the idea that fixed-term contracts may actually be advantageous to the individual is the suggestion that in some occupations fixed-term contracts are part of a *career path.* For a number of professional careers, such as teachers, researchers and doctors, a series of temporary contracts is an important part of acquiring further experience before finally taking a permanent job. As jobs where this is the case are often highly skilled and associated with high ability, wages will not be lower than in comparable permanent jobs.

Finally, combining a number of these perspectives, a third possibility is that wage differentials between fixed-term and permanent workers may depend on the wages the job pays. Fixed-term contracts used to regulate fluctuations in demand will tend to be associated with easy measurement of productivity and low firm-specific human capital. These jobs will be found at the lower end of the wage distribution, the "lower tier". If these workers are sorted into the lowest job categories, they will earn less than workers with similar qualifications in permanent jobs. Alternatively there are some temporary jobs that are "good jobs" and found in the "upper tier" – at the higher end of the wage

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[2] Though some authors argue that wages may be lower initially (Wang / Weiss, 1998).

distribution. For example, fixed-term contracts that are part of a career path are often professional jobs, situated at the higher end of the wage distribution. These workers will not have low wages relative to permanent workers in similar jobs. The concept of compensating wage differentials may be more relevant at the higher end of the wage distribution, where workers are highly skilled and have a high potential wage.

3. Estimation Methods and Data

In the standard OLS (or mean) approach regression, coefficients are assumed to be constant across the whole conditional wage distribution. Our two-tier theory suggests, however, that this need not be the case. Indeed, fixed-term workers at different ends of the wage distribution may not face the same risk of receiving lower wages than their permanent counterparts. Therefore, we estimate quantile regression models, as introduced by Koenker / Basset (1978), that fit quantiles to a linear function of covariates. Supplementing the usual estimation of conditional mean functions with conditional median and other conditional quantile functions allows us to look at the complete conditional wage distribution (see Buchinsky 1998, Fitzenberger et al. 2001). In fact, "potentially different solutions to distinct quantiles may be interpreted as differences in the response of the dependent variable to changes in the regressors at various points in the conditional distribution of the dependent variable" (Buchinsky, 1998: 89). In addition, one can test to what extent OLS estimates are driven by outliers as median regression, the most commonly known form of quantile regression, is much less affected by outliers than standard OLS regression.

The quantile regression model according to Koenker / Basset (1978) is defined as follows (see Buchinsky 1998):

$$(1) \qquad y_i = x_i'\beta_\theta + u_{\theta_i} \text{ and } \text{Quant}_\theta(y \,|\, x_i) = x_i'\beta_\theta$$

where (y_i, x_i), $i = 1, \ldots, n$ is a sample from some population where x_i is a $K \times 1$ vector of regressors, $\text{Quant}_\theta(y_i \,|\, x_i)$ denotes the conditional quantile of y_i, conditional on x_i. In our following empirical analysis, we follow the literature in estimating the 90th, 75th, 50th, 25th and 10th percentage quantiles. These will give us a good overview of how the influence of contract type on wages evolves over the conditional distribution of y.

We use the data waves from 1995 to 2000 of the SOEP for the analyses reported in this paper (SOEP Group 2001). While in the early years the information on the contract type is only selectively available, we have full information since 1995.[3] For the analysis we select a sample of West German men.

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[3] We cannot identify agency workers at any point in this survey.

This is because wage determination in East and West Germany still differs (Franz / Steiner 2000), and labour market participation and wage determination also differs between men and women: analyzing them separately is beyond the scope of this paper.[4] The self-employed, civil servants and apprentices were excluded from the analysis, as is conventional in German analyses of fixed-term employment. The sample was limited to those of working age, that is between 18 and 60 years of age, and excludes extreme hourly wage observations below 5 DM and above 100 DM, and observations with missing values on important variables. A detailed list of independent variables used in the models, including their means and frequencies, is provided in Table A1 (see Appendix). With these selections applied to this data, we find 8.5 % of male employees aged 18 – 60 in temporary contracts.

4. Empirical Analysis

4.1 Comparing the Wages of Fixed-Term and Permanent Workers

It has generally been found that fixed-term workers earn less, on average, than permanent workers. For Britain, Booth et al. (2002) report that male fixed-term workers' hourly wages were, at £ 7.38 per hour, approximately 16 % lower than of workers with a permanent contract, who earned £ 8.55 on average over the period 1991 – 1997. In our data set, we find that an even more pronounced difference in hourly wages for West German men, with fixed-term workers earning 32 % less on average than permanent workers.

In order to examine wage differentials between fixed-term and permanent employees in more detail, we split the sample into four different quartiles.

Figure 1 shows that fixed-term workers are indeed more likely to be found in the lower quartiles of the wage distribution. Of all 428 male workers with fixed-term contracts, over 50 % are to be found in the lowest quartile while only 10 % are found in the highest quartile.[5] This lends support to our two-tier labour market hypothesis, that is, that not all fixed-term jobs can be rated equally good or bad. In particular workers with low qualifications, who are already in the lowest quartile of the wage distribution, suffer further disadvantage when hired on a fixed-term contract, as fixed-term contracts offer little job security. On the other hand, over 25 % of all fixed-term jobs are found in the upper half of the wage distribution, which is, by itself, a positive sign.

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[4] In other work, we have investigated how the wages associated with fixed-term contracts differ between men and women and between East and West Germans (Mertens / McGinnity 2004).

[5] This refers to our pooled sample of 7593 male workers between 1995 and 2000. Selections were described above in the data Section 3.
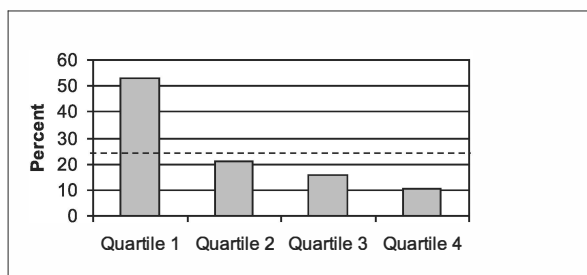
Note: Quartile 1 refers to the lowest quartile and quartile 4 to the highest quartile of the wage level distribution. The dotted line at 25% represents the proportion of fixed-term workers we would expect in each quartile.

Source: Own calculations based on pooled waves 1995 – 2000 of the SOEP sample A.

Figure 1: Percentages of Fixed-Term Workers Found in the Different Quartiles
of the Wage Distribution

What is most relevant now for our two-tier labour market hypothesis is the question of whether wage differentials behave equally over the whole distribution. Table 1 compares the mean log wages for fixed-term and permanent workers in the overall sample, but is also disaggregated for the different quartiles of the wage distribution. It becomes immediately clear that negative wage differentials are by no means a general phenomenon. In the highest quartile, fixed-term workers tend to earn even more on average – at least before controlling for any individual or job characteristics.

4.2 A Multivariate Analysis of Wages
Using Quantile Regression

Controlling for individual and job characteristics in traditional OLS analyses, the estimated difference between the mean hourly wage of fixed-term and permanent workers falls from 32 % to around 16 % for West German men (Mertens / McGinnity 2004). In general, these findings are similar to earlier OLS estimates for Germany (Schömann / Kruppe 1994) and more recent estimates by Hagen (2002). Booth et al. (2002) report negative wage differentials for Britain. Jimeno / Toharia (1993) also estimated wage regressions to show that fixed-term workers in Spain earn approximately 10 % less, controlling for observable individual and job characteristics.

Turning now to the quantile regressions, we consider whether the wage pattern observed in the purely descriptive analysis in Table 1 holds in the multivariate context of Mincer wage regressions. We estimate the following model:

(2) $$\ln w_{i,t} = \alpha + \gamma_\theta \, fixed_{i,t} + \beta'_\theta x_{i,t} + u_{\theta i,t}$$

*Table 1*

Mean Log Wages of Male Employees by Quartiles

	Mean log wages
Overall	
Permanent	3.317
Fixed-term	3.035
Quartile 1 (lowest)	
Permanent	2.869
Fixed-term	2.717
Quartile 2	
Permanent	3.181
Fixed-term	3.177
Quartile 3	
Permanent	3.400
Fixed-term	3.396
Quartile 4 (highest)	
Permanent	3.770
Fixed-term	3.825

Note: Quartile 1 is the lowest and quartile 4 is the highest quartile in the wage distribution.
Source: Own calculations based on pooled waves 1995 – 2000 of the SOEP sample A.

with x a vector of covariates, *fixed* being a vector of dummy variables inter-acting contract type (fixed term or permanent) with tenure and θ indicating the quantile. The control variables used in x can be found together with means and frequencies in Appendix Table A1. Apart from relatively standard controls for personal and job characteristics, we additionally include unem-ployment experience during the past 5 years, generated from the so-called employment calendar of the SOEP, which includes information on labour force status on a monthly basis. As previous research has shown, this variable controls for at least part of the unobserved individual heterogeneity and tends to reduce the estimates on the fixed-term dummy variable *fixed* (Mertens / McGinnity 2004). As most fixed-term contracts generally do not last longer than two years, due to the legal restrictions discussed above, we control for tenure in our specification. It could be that fixed-term workers earn less than workers with long tenure, but not necessarily less than permanent contract workers with tenure of up to two years. We, therefore, divide workers into six groups – fixed-term contracts less than 2 years; fixed-term contracts more than 2 years; permanent contracts less than 2 years, 2 to 5 years, 5 to 10 years and greater than 10 years. With permanent workers with a tenure of

less than 2 years as the reference group this gives five dummy variables for the other groups as shown in Table 2.[6]
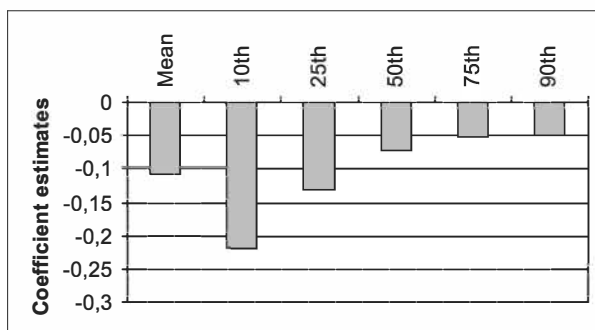
Note: Coefficients on the dummy for fixed-term contract workers with tenure of less than 2 years in OLS (mean) and quantile wage regressions. Control group: workers with permanent contract and tenure of less than 2 years.

Source: Own calculations based on pooled waves 1995–2000 of the SOEP sample A.

Figure 2: Wage Differences between Fixed-term and
Permanent Workers wit Tenure of Less than Two Years:
Comparing OLS Results (Mean) and Quantiles

Figure 2 presents results of the comparison between fixed-term and permanent workers with tenure of less than 2 years, comparing the quantile estimates to standard OLS (or mean) differentials. In contrast to the descriptive analysis of different quartiles in Table 1, in the quantile estimates we always observe negative differentials for fixed-term workers with tenure of less than 2 years. Most of these differentials are significant as can be seen from Table 2. However, these differentials clearly decrease with higher quantiles. Workers in the upper quantiles (90th and 75th) earn only slightly less than their permanent counterparts, whereas workers in the lowest (10th) quantile earn considerably less. We find no evidence of compensating wage differentials in any of these quantiles, but our findings provide some support for the concept of a two-tier labour market for fixed-term contracts, where how much less fixed-term employees earn depends on their position on the wage distribution.

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[6] Although most fixed-term jobs last less than two years, the data includes enough observations with fixed-term contracts of longer duration to justify a separate dummy.

Table 2

Quantile Wage Regressions

	Mean (OLS)	Quantiles				
		90th	75th	50th	25th	10th
Fixed < 2	–0.109*** (0.019)	–0.049 (0.035)	–0.052** (0.022)	–0.073*** (0.018)	–0.130*** (0.023)	–0.219*** (0.028)
Fixed ≥ 2	–0.086*** (0.023)	–0.022 (0.042)	–0.051* (0.028)	–0.040* (0.023)	–0.112*** (0.028)	–0.146*** (0.035)
2 ≤ Perm < 5	0.035*** (0.011)	0.044** (0.020)	0.026** (0.013)	0.041*** (0.011)	0.037*** (0.013)	0.034** (0.017)
5 ≤ Perm < 10	0.069*** (0.011)	0.059*** (0.020)	0.041*** (0.013)	0.071*** (0.010)	0.081*** (0.013)	0.081*** (0.016)
Perm ≥ 10	0.106*** (0.010)	0.043** (0.020)	0.071*** (0.013)	0.123*** (0.010)	0.145*** (0.013)	0.120*** (0.016)

Note: Significance levels: *** = 1%, ** = 5%, * = 10%.

Source: Own calculations based on pooled waves 1995–2000 of the SOEP sample A. Selection: without civil servants, without self-employment, without ABM (Employment Creation Schemes), without apprentices, only employees who are 18–60 years old. Hourly wage observations below 5 DM and above 100 DM were dropped. Further controls: age dummies, education dummies, part-time worker status, spouse present, skill level, firm size, industry, region, the year of observation, and the proportion of time unemployed during the past five years.

5. Conclusions

The main message of this paper is that the impact of fixed-term contracts on wages depends very much on where these jobs are found in the wage distribution. Workers with relatively high-paying fixed-term contracts earn only slightly less than their permanent counterparts, workers with low-paying temporary jobs earn much less than those with a comparable permanent job. These findings support the concept of a two-tier labour market for fixed-term contracts. There is a "higher tier" of jobs where fixed-term contracts are not such a disadvantage compared to permanent jobs and a "lower tier" where having a fixed-term contract puts the individual at considerable disadvantage, at least in terms of wages. A more thorough examination of the two-tier hypothesis would require an analysis of subsequent job prospects and wage growth. However, we can conclude from these findings that previous work using Ordinary Least Squares (OLS) regression misses important aspects of the wage structure of fixed-term workers.

Regarding the policy implications of these findings, it would be wrong for policymakers to assume that fixed-term employees always earn considerably less than comparable permanent employees. However, workers who earn

much less are those whose earnings are already low, being about half of all male fixed-term workers. The workers in this group are doubly disadvantaged: they have short-term employment contracts and very low wages. For them a fixed-term contract is certainly not a better alternative than a comparable permanent job. However, fixed-term contracts are not "equally bad" for all individuals concerned, and there are a group of individuals with high earnings for whom fixed-term contracts carry a minimal wage penalty.

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Appendix

Table A1

Means and Frequencies in the Wage Regressions

West German men	*N* of cases	Means / frequencies
ln (hourly wage)	7281	3.31
Fixed-term	367	5.04
Part-time	227	3.12
Age < 30	1287	17.68
Age 30 – 44	3772	51.81
Age 45	2222	30.52
Spouse	5568	76.47
No training	689	9.46
Vocational training	5301	72.81
University	1291	17.73
Unskilled blue-collar	917	12.59
Skilled blue-collar	2257	31.00
Unskilled white-collar	127	1.74
Skilled white-collar	2016	27.69
Highly skilled white-collar	1937	26.60
Small firm (< 20)	1324	18.18
Medium (20 – 199)	1993	27.37
Large firm (> = 200)	3964	54.44

Source: Own calculations based on pooled waves 1995 – 2000 of the SOEP sample A. 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.