6 HOW FAST DO NEWLY FOUNDED FIRMS MATURE?

Empirical Analyses on Job Quality in Start-Ups*

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1. Introduction

Economic policy in Germany strongly stimulates the founding of new firms, not least because politicians hope that new firms may create the additional employment that is so desperately needed in Germany. In order to find out whether this is really the case and how successful new firms are, a growing empirical literature has studied the performance of new firms at various levels of aggregation. At the micro level, i.e. using data of individual firms or establishments, quite a few studies have been published in the last decade that analyze the success of newly founded firms over the years in terms of survival rates, employment growth, and other indicators of firm performance (see, e.g., Wagner, 1994; Brüderl et al., 1996; Brixy and Kohaut, 1999; Almus, 2002). From a macro perspective, using the concepts of job creation, job destruction and job turnover, a number of studies have tried to identify the extent to which new firms contribute to aggregate employment growth (see, e.g., Boeri and Cramer, 1991; Bellmann et al., 1996; Gerlach and Wagner, 1997; Turk 2002; Brixy and Grotz, 2004).[1]

Most of this research has concentrated on the number of new jobs created, although the persistence of these jobs has also been taken in consideration. This reflects the insight that not only the *quantity* but also the *quality* of (new) jobs is important. The quality of employment has also been stressed recently by the European Commission (2001: ch. 4) and is part of its employment strategy. While it may be difficult to define and measure the characteristics

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1 International studies at the micro level include Dunne et al. (1989) for the US and Storey (1994) for the UK; macro analyses are provided, inter alia, by Davis et al. (1996) for the US and Barnes and Haskel (2002) for the UK.

which best reflect job quality, wages and working conditions as well as labor fluctuation in the plant are surely among potential indicators. Whether these indicators differ between newly founded and incumbent firms has received surprisingly little attention in empirical research so far. It would also be interesting to know whether such differences – if they exist – vanish over time once the new business matures and how fast such a convergence takes place. In other words, we do not know how long it takes until a new firm becomes an incumbent firm.

This paper seeks to overcome this research deficit by analyzing differences in wages, bargaining coverage and labor fluctuation between newly founded and other firms in Germany in the period from 1997 to 2001. It makes use of a representative sample of establishments that were founded in 1995/96 and that form part of a large-scale set of establishment data in Germany. This unique data set is described in section 2. Section 3 analyzes the determinants of labor fluctuation and traces the observed differences in labor turnover of the cohort of newly founded establishments over time. In a similar way, the wage differential of newly founded establishments is investigated in Section 4, and their bargaining coverage is compared to that of other plants. Section 5 provides some concluding remarks and suggestions for future research.

2. The Data

The data used in this study is derived from two sources that are closely interrelated and together form an employer-employee data set. The employee side of the data set is the "German Employment Statistics", which is sometimes also called the "German Social Insurance Statistics" (see Fritsch and Brixy 2004 for details). It requires all public and private employers to report certain information about every employee who is subject to obligatory social insurance, i.e. health and unemployment insurance along with pension funds. Misreporting is legally sanctioned. The information collected is transformed into an establishment file that provides longitudinal information about the establishments and their employees and which is called "IAB Establishment Register".[2] A great advantage of this database is that it covers all establishments that employ at least one employee who is liable to social insurance. The attributes of each firm covered in this database are the number of employees, their sex, age, and qualification (four levels) as well as the wages and salaries paid and the exact duration of the engagement in days. Although these data refer to individuals, only aggregate data at the establishment level were available to us.

The employer side of our data set is given by the "IAB Establishment Panel", a random sample of establishments from the comprehensive IAB Es-

2 IAB is an acronym for "Institut für Arbeitsmarkt- und Berufsforschung", which is the research institute of the German Federal Employment Agency.

tablishment Register drawn according to the principle of optimal stratification. The stratification cells are defined by ten classes for the size of the establishment and by 16 economic sectors. This selection process means that the selection probability of an establishment increases with its size. Every year since 1993 the IAB Establishment Panel has surveyed the same establishments from all branches and different size categories in western Germany (and since 1996 in eastern Germany). In order to correct for panel mortality, exits and newly founded establishments, the panel is augmented regularly. The questionnaire covers a wide variety of questions which can be used for our analysis, such as information on the legal form, the profit situation and the location of the establishment, the state of production technology and on bargaining coverage. Data are collected in personal interviews with the owners or senior managers of the establishments by professional interviewers.[3]

In 1997, a representative sample of establishments that reported under a new firm-identification-number in the employment statistics was drawn and integrated into the IAB Establishment Panel. From this sample, 826 newly founded establishments can be used in our analysis, 368 of which can be traced every year until 2001 (although not all of these establishments provide information on all variables in every year). Each of these newly founded establishments hired its first employee between July 1, 1995 and June 30, 1996. Our sample was restricted to establishments that had less than 200 employees in 1997[4] and that were in private ownership of one or more founders but were not owned by other firms, so there are no derivative foundations. The development of these newly founded establishments is contrasted with 4,525 incumbent establishments from the private sector that had already existed in 1996 and had employed at least one and less than 200 employees in 1997. Of these establishments, 3,083 could be traced in every year until 2001, the last year in which information from both the employees' and the employers' side is available.

In our empirical analysis we predominantly make use of the data from the IAB Establishment Panel. In addition, exact data on the composition of the workforce, the number of employees, labor fluctuation, and the amount of wages and salaries paid in the establishment are supplied from the quasi-official German Employment Statistics via the IAB Establishment Register. The data are linked through a plant identifier that is available in both data sets.

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3 Details regarding the IAB Establishment Panel (including information on the questionnaires and how to access the data) are given in Kölling (2000).

4 We do not use the full sample because we want to compare groups of plants that are roughly similar with respect to establishment size. While in the unrestricted sample there would be many incumbent firms with more than 200 employees, there is only one newly founded establishment that is larger, and this seems to be an outlier; on average the start-ups had five employees.

Table 6.1: Newly founded and incumbent establishments in Germany 1997 (sample restricted to establishments with less than 200 employees)

	Western Germany			Eastern Germany		
Establishment characteristics	Newly founded	Incumbent	Difference (t-test)	Newly founded	Incumbent	Difference (t-test)
Establishment size (no. of employees)	2.4	8.3	-5.9** (-278.1)	4.2	9.6	-5.3** (-73.5)
Female employees (%)	40.5	47.0	-6.5** (-40.3)	47.8	48.2	-0.4 (-1.6)
Part-time employees (%)	17.5	15.5	2.0** (15.4)	9.4	9.4	-0.0 (-0.1)
Fixed-term employees (%)	1.4	1.6	-0.2** (-8.2)	2.1	1.9	0.2** (3.3)
High-skilled employees (%)	7.3	2.1	5.2** (58.8)	5.0	5.5	-0.4** (-4.3)
Low-skilled employees (%)	25.9	24.9	1.0** (6.7)	21.9	16.3	5.7** (27.4)
Export share (%, in 1996)	3.3	2.5	0.9** (15.9)	1.2	0.8	0.4** (8.8)
State-of-the-art production technology (%)	67.0	65.0	2.1** (12.4)	70.0	66.0	3.9** (15.6)
Labor turnover rate	0.7	0.5	0.2** (70.0)	0.7	0.4	0.3** (61.6)
Hiring rate	0.6	0.4	0.2** (57.6)	0.6	0.3	0.3** (63.0)
Departure rate	0.8	0.5	0.2** (63.5)	0.8	0.5	0.4** (47.6)
Covered by a collective agreement (%)	39.0	59.0	-20.0** (-116.3)	31.0	41.0	-10.0** (-40.5)
Daily wage (€)	58.4	60.1	-1.7** (-15.9)	42.8	47.1	-4.3** (-50.2)

Note: Weighted data based on information about 255 new and 2153 incumbent establishments in western Germany and 571 new and 2372 incumbent establishments in eastern Germany; two-sample t-test with unequal variances; ** denotes statistical significance at the 0.01 level.

Source: IAB Establishment Panel, German Employment Statistics.

Some descriptive evidence based on weighted data from our representative set of data is presented in table 6.1. Since labor markets and economic conditions still differ considerably between western and eastern Germany, we provide disaggregated information for both regions. The comparison of newly founded and incumbent establishments shows that there were substantial (and statistically significant) differences between both groups in 1997. On average, newly founded establishments were much smaller and had a slightly higher export share than incumbents. More of them said that their production technology was state of the art, but their share of low-skilled employees was also higher than in incumbent establishments. Concerning our indicators of job

quality, new establishments were characterized by a higher labor fluctuation (measured by the labor turnover rate, the hiring rate and the departure rate explained below), by a lower bargaining coverage and by lower wages than incumbents. It will be interesting to see whether these differences still show up in multivariate analyses.

3. Labor Fluctuation

Since newly founded firms, by definition, have no current employees and cannot fill vacancies through vocational training or promotion in internal labor markets, they need to attract employees from the external labor market. Potential employees will compare the quality of the job offered with the quality of their current job or with what they are offered by other firms. When assessing quality, employees can be expected to not only look at compensation and working conditions but also at the (expected) employment stability and the labor fluctuation rates in new firms.

It is well known that new firms are more likely to fail than incumbent ones what has been termed "the liability of newness" by Stinchcombe (1965). The risk of failure tends to increase within the first year(s) and to decrease non-monotonically afterwards.[5] Interestingly, at the aggregate level employment is usually rather stable in the sense that the number of employees working in a cohort of firms tends to stabilize over time at a level roughly comparable to the size in the year of entry since the "decline of employment in a cohort due to exiting firms ... is more or less compensated by the growth of survivors of the same cohort." (Wagner, 1994, 144).[6] This observation makes clear that there is a lot of heterogeneity behind the aggregate stability: While the majority of new firms do not change employment size in their first years, some shrink, others dissolve, and a few show a rapid expansion and account for the lion's share of employment growth and of total employment after ten years (see Brüderl et al., 1996; Almus, 2002; Fritsch and Weyh, 2004).

These insights are interesting, but they do not fully reflect the labor fluctuation at the plant level and an individual employee's chance of employment stability. For reasons of data availability, most studies are only able to investigate *net* employment flows, that is whether the total number of employees in a plant has changed between two points in time. It could well be, however,

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5 Depending on the data sets and the periods of observation used, German studies differ at the exact shape and length of this process; see, e.g., Brüderl et al. (1996, 94ff.), Gerlach and Wagner (1997), Turk (2002) and Fritsch and Weyh (2004).

6 While this is a stylised fact for western Germany (see also Boeri and Cramer, 1991; Brixy and Grotz, 2004), in eastern Germany for a short period after unification an exceptionally positive "start-up window" for new firms seemed to exist which resulted in substantial employment gains of several cohorts (see Brixy and Kohaut, 1999).

that several hires and departures have taken place in this period whereas the total level of employment has remained the same. Since our linked employer-employee data set contains information on the beginning and the end of each employment relationship, we are able to analyze *gross* employment flows and labor fluctuation in each plant. To the best of our knowledge, no empirical studies exist that have explicitly addressed these issues with German or international data on newly founded firms.

For various reasons we would expect newly founded firms to record a higher labor fluctuation than similar incumbent firms. Since the likelihood of termination of an employment contract (by either party) declines with tenure (Franz, 2003, 197), incumbent firms with a certain history of job matches tend to have higher employment stability than newly founded firms hiring their first employees. These new firms will have to go through the usual matching process characterized by trial and error when attempting to hire suitable employees. In addition, new firms face the problem that due to their higher risk of failure (and their lower wages analyzed below) they may not be able to poach employees from other firms but may have to rely more on attracting workers who are currently unemployed. If unemployed people are less able (or willing) to fulfil the requirements of the job, there is a higher risk of layoffs or quits in new firms (followed by a new process of hiring). Since newly founded firms also tend to face higher uncertainty and fluctuation in demand for their products or services while at the same time having less financial resources to hoard labor in weaker periods, they may have to adjust employment more often than incumbent firms.[7] Over time, these differences should become smaller and even vanish once the critical initial period of new employment relationships is over and the economic situation of the new firms stabilizes.

To analyze these issues, an appropriate dependent variable and a well-known indicator of labor fluctuation is the labor turnover rate, which is defined as the ratio of the sum of hires and departures in a plant over its average employment level in a given year. Of course, hires and departures may also be analyzed separately, relative to average employment levels.[8] This means that we can make use of three dependent variables that reflect various aspects of labor fluctuation, with the labor turnover rate being the most encompassing

7 The higher chance of failure of newly founded firms could also imply higher departures if firms or employees react accordingly when they see the shadow of death sneaking around the corner in the months or years before the exit. There is, however, conflicting empirical evidence as to whether this is the case in Germany; see Wagner (1999) and Almus (2002).

8 More precisely, following standard practice and in order to achieve some consistency with the rates of hires / employment and of departures / employment, the labor turnover rate was calculated as 0.5 (hires + departures) / employment (see Franz, 2003, 194). We dropped a few establishments with labor turnover rates of 3 and above since these may reflect some errors in the data base (the mean of this rate is about 0.4 in our sample). Note that departures are a composite measure that includes dismissals, quits, and retirement, *inter alia*.

one. We estimate OLS regressions for the period from 1997 to 2001, making use of stacked cross section models for each year as well as pooling the data, and we provide disaggregated estimates for the different labor markets of western and eastern Germany.

The main interest of our analysis is the labor fluctuation in newly founded establishments, which are represented by a dummy variable indicating whether an establishment hired its first employee between July 1, 1995, and June 30, 1996. The other independent variables used are standard in labor turnover regressions of this sort.[9] They include establishment size because for purely mechanical reasons the labor turnover rate is usually higher in small establishments where the entry or exit of one single employee has a higher percentage effect. In order to take account of potential non-linearities in this relationship, we also include the square of establishment size. Potential spill-over effects in personnel policies from the mother firm are accounted for by a dummy variable indicating whether the establishment is a branch plant or subsidiary. We control for the structure of the workforce using the employment shares of female, part-time, and low/high-skilled employees and we take into account that establishments with a high proportion of fixed-term employees should have a higher labor turnover. Since collective bargaining agreements are often said to inhibit labor force adjustments we include dummy variables on the existence of sectoral or firm-level collective agreements. Employees can be expected not to leave establishments that pay well and are in good economic shape. Therefore the average level of wages in the establishment, a dummy variable reflecting its subjective assessment of the ("very good or good") profit situation and a dummy variable for its state of production technology are included in the analysis. The situation on the regional labor market is reflected by the regional rate of unemployment; however, since high unemployment might be associated with less quits and hires but more layoffs, its total effect on labor turnover is open.[10] As further controls we also include ten industry dummies and three dummies for the degree of urbanization at the location of the establishment (highly agglomerated, densely populated or rural regions).

9 See, for instance, Addison et al. (2001). Note that although we have a relatively rich data set, selection of control variables was limited by the fact that information on some potential explanatory variables was either never asked (this is the case for the capital stock and for fringe benefits) or was not available in all years of our observation period (e.g. existence of a works council and profit sharing).

10 In the estimations with Stata/SE 8.2, we made use of the *cluster* option to take into account that the unemployment data at district level are at a different level of aggregation than the establishment data and that the unobserved influences on the dependent variables may be not independent in establishments from the same district.

Table 6.2: Determinants of labor turnover and wages in Germany, 1997-2001 (OLS estimations; pooled data; establishments < 200 employees)

Dependent variables	Labor turnover rate		ln wage	
Explanatory variables	Western Germany	Eastern Germany	Western Germany	Eastern Germany
Constant	1.0356**	1.2700**	4.1973**	3.9990**
	(8.44)	(13.24)	(123.97)	(89.30)
Newly founded establishment	0.0979**	0.1468**	-0.0901**	-0.0570**
(dummy: 1 = yes)	(2.85)	(8.87)	(-2.91)	(-3.87)
Establishment size	-0.0008**	-0.0010**	0.0016**	0.0006**
(number of employees)	(-5.17)	(-5.60)	(10.91)	(4.53)
Establishment size squared	4.42e-07**	6.26e-07**	-7.30e-07**	-2.23e-07*
	(3.92)	(4.98)	(-6.14)	(-2.53)
Branch plant/subsidiary	0.0442**	0.0265	0.0521**	0.0954**
(dummy: 1 = yes)	(2.68)	(1.75)	(3.45)	(5.59)
Female employees	-0.0017**	-0.0020**	-0.0028**	-0.0037**
(percentage)	(-5.56)	(-7.75)	(-12.31)	(-8.28)
Part-time employees	0.0006	0.0007*	0.0019**	0.0037**
(percentage)	(1.50)	(2.00)	(4.38)	(8.28)
Fixed-term employees	0.0108**	0.0065**	0.0003	-0.0004
(percentage)	(7.38)	(10.90)	(0.57)	(-1.47)
High-skilled employees	0.0002	0.0001	0.0062**	0.0059**
(percentage)	(0.32)	(0.23)	(11.82)	(17.22)
Low-skilled employees	0.0017**	0.0009**	-0.0019**	0.00004
(percentage)	(5.39)	(4.09)	(-7.38)	(0.27)
Covered by sectoral collective	-0.0228	-0.0331**	0.0619**	0.0921**
agreement (dummy: 1 = yes)	(-1.71)	(-2.80)	(4.33)	(9.52)
Covered by firm-level collective	-0.1545**	-0.0100	0.0478**	0.0484**
agreement (dummy: 1 = yes)	(-5.90)	(-0.71)	(2.83)	(4.78)
Wage level	---	-0.1988**	---	---
(ln daily wage per employee, in €)		(-8.43)		
Firm receives wage subsidies	-0.0119	---	-0.0114	-0.0534**
(dummy: 1 = yes)	(-1.02)		(-1.02)	(-6.89)
Profit situation		-0.0350**	0.0395**	0.0558**
(dummy: 1 = very good/good)		(-3.56)	(3.73)	(7.33)
Export share	---	---	0.0021**	0.0009*
(percentage)			(6.84)	(2.19)
Production technology	-0.0232	-0.0592**	0.0577**	0.0420**
(dummy: 1 = state of the art)	(-1.86)	(-3.95)	(5.90)	(5.42)
Legal form of the firm	---	---	-0.1750**	-0.1668**
(dummy: 1 = family-owned firm)			(-11.86)	(-16.32)
Regional unemployment rate	0.0001	-0.0005	-0.0007	-0.0051*
(at district level, in percent)	(0.06)	(-0.23)	(-0.36)	(-2.41)
Year dummies	yes*	yes	yes**	yes**
Industry dummies	yes**	yes**	yes**	yes**
Urbanization dummies	yes**	yes	yes**	yes**
N	7389	9436	7037	9203
R^2	0.1413	0.1380	0.4606	0.4819

Note: Heteroscedastic-consistent t-values in parentheses; **/* denote statistical significance at the 0.01 and 0.05 levels, respectively; see text for exact definitions of dependent variables.

Source: IAB Establishment Panel, German Employment Statistics.

The results of the pooled estimations of the labor turnover rate for the period 1997 to 2001 (which also include dummies for each year) are presented in columns 2 and 3 of table 6.2. It can be seen that most of the coefficients estimated are of the expected sign, but not all of them are statistically significant at conventional levels, and the overall explanatory power of the regressions is modest. While the impact of control variables does not need to be discussed in detail, it is important to note that newly founded establishments have higher labor turnover rates than incumbent ones. This difference shows up in western as in eastern Germany and is statistically significant at the 1 percent level, thus confirming our theoretical hypothesis above.

The estimated coefficients of the dummy variables for newly founded establishments can be interpreted as follows: The average labor turnover rate in our sample is 0.39 in western and 0.42 in eastern Germany, which means that labor fluctuations (i.e. hires and departures) amount to 39 and 42 percent of the average stock of employment, respectively. In newly founded establishments, this rate is 9.8 percentage points higher in western Germany and even 14.7 percentage points higher in eastern Germany. In other words, over the first five years labor turnover rates in newly founded establishments are one quarter to one-third higher than in incumbent establishments.

Table 6.3: Labor fluctuation in newly founded establishments over time (coefficients of OLS estimations similar to table 6.2, columns 2 and 3)

Indicator, region	1997	1998	1999	2000	2001
Labor turnover rate					
Western Germany	0.1583**	0.1341**	0.0123	0.0432	0.0232
	(3.26)	(2.64)	(0.23)	(0.68)	(0.32)
	[N=2042]	[N=1686]	[N=1376]	[N=1058]	[N=901]
Eastern Germany	0.1725**	0.1749**	0.1339**	0.0566	0.0699
	(6.93)	(5.93)	(4.33)	(1.41)	(1.43)
	[N=2621]	[N=2134]	[N=1776]	[N=1354]	[N=1189]
Hiring rate					
Western Germany	0.1659**	0.1675**	0.0304	0.0357	0.1010
	(3.22)	(2.99)	(0.57)	(0.55)	(1.17)
Eastern Germany	0.1766**	0.1763**	0.1274**	0.0801	0.0613
	(5.19)	(6.37)	(3.32)	(1.82)	(1.08)
Departure rate					
Western Germany	0.1507*	0.1008	-0.0058	0.0507	-0.0546
	(2.33)	(1.48)	(-0.09)	(0.64)	(-0.81)
Eastern Germany	0.1685**	0.1736**	0.1405**	0.0330	0.0786
	(4.97)	(3.74)	(3.47)	(0.53)	(1.21)

Note: Heteroscedastic-consistent t-values in parentheses; **/* denote statistical significance at the 0.01 and 0.05 levels, respectively; see text for exact definitions of dependent variables.

Source: IAB Establishment Panel, German Employment Statistics.

In addition to the average effects over the whole period shown in table 6.2, table 6.3 presents the results of cross section estimations for each single year. The models estimated are almost identical to those shown in table 6.2, the only differences being that the year dummies are not included, of course, and that for all years except 1999 (where information is lacking) a dummy variable on the existence of overtime work is included. In order to economize on space, table 6.3 just presents the estimated coefficients of the dummy variable for newly founded establishments (full results are available from the authors on request). It can be seen that the labor turnover rate in newly founded establishments is higher than in incumbent establishments only for a relatively short period of time and that start-ups assimilate fast: After three years in western Germany and four years in eastern Germany, the difference in labor turnover rates between both types of plants is not statistically significant any more.[11]

Table 6.3 also provides estimates of hires and departures that largely mirror the labor turnover results. As expected, hiring in newly founded establishments is stronger than in similar incumbent establishments, but only in the first two to three years. The same is true for departures: Already in the second year in western Germany and in the fourth year in eastern Germany, jobs in newly founded establishments seem to be as stable as those in incumbent establishments. These results probably reflect an initial period of new employment relationships, uncertainty and likely failure of newly founded firms that is characterized by difficult matching processes and a higher frequency of labor adjustment in both directions. They show that, concerning labor fluctuation, it takes a new plant only a few years to become an incumbent plant.

4. Bargaining Coverage and Wage Setting

In Germany, wages and working conditions are predominantly determined by collective bargaining between trade unions and employers associations or single employers at sectoral or firm level, respectively. Since the powerful German trade unions have been able to push through wages that are relatively generous in international comparison and since negotiated working conditions (such as working hours, annual leave or fringe benefits) are usually much better than stipulated by law, establishments and employees covered by collective bargaining can be assumed to have high-quality jobs. Bargaining coverage may thus be interpreted as a crude catch-all indicator of job quality.

11 Since these results might be affected by the failure (or non-reporting) of newly founded and other establishments in the panel, we tested this by including a dummy variable for establishments which survived until 2001 and an interaction term of surviving and newly founded establishments in the regressions on which the upper part of table 6.3 is based. While labor turnover was found to be significantly lower in surviving establishments, among newly founded establishments we did not find an (additional) systematic difference between survivors and non-survivors, and the difference in labor turnover rates between new and incumbent establishments still vanishes in the third year in western Germany and in the fourth year in eastern Germany.

Although less than 50 percent of establishments in western Germany and just about 25 percent of establishments in eastern Germany are covered by collective agreements, these agreements determine wages and working conditions of about 70 percent of employees in western and 45 percent of employees in eastern Germany: In addition, several firms that are not officially bound by collective agreements use them as a point of reference in setting wages and working conditions (see Kohaut and Schnabel, 2003).

Making use of representative data from the IAB Establishment panel and concentrating on our restricted sample of establishments with less than 200 employees, table 6.4 compares the bargaining coverage of newly founded establishments with that of incumbent establishments in several size intervals. It can be seen that in 1997 only 39 percent of newly founded establishments in western Germany were covered by a collective agreement, whereas among incumbents the bargaining coverage rate was 59 percent. This overall difference of 20 percentage points is statistically significant, and similar differences show up in each size interval. In eastern Germany, where the bargaining coverage is generally lower, newly founded establishments are also significantly less likely to be covered by a collective agreement than incumbent ones.

Table 6.4: Bargaining coverage of establishments (share of establishments covered by a collective agreement, in percent)

Western Germany	1997		1999		2001	
Establishment size interval (employees)	Newly founded	Incumbent	Newly founded	Incumbent	Newly founded	Incumbent
1 to 4	37	46	34	31	40	40
5 to 9	39	64	47	50	60	58
10 to 19	54	70	27	57	42	51
20 to 199	---	76	---	73	---	67
Average	39	59	38	46	46	51
Eastern Germany	1997		1999		2001	
Establishment size interval (employees)	Newly founded	Incumbent	Newly founded	Incumbent	Newly founded	Incumbent
1 to 4	27	32	13	18	25	21
5 to 9	39	41	28	27	21	29
10 to 19	34	50	32	45	18	38
20 to 199	62	66	52	53	38	53
Average	31	41	19	30	24	30

Note: weighted data (cross-section weights); --- indicates that data may not be published due to an insufficient number of observations

Source: IAB Establishment Panel.

Over time, there is a certain convergence between both types of plants, which is partly due to the falling coverage rates of incumbents reflecting the

gradual erosion of the German system of industry-wide wage bargaining. Even in 2001, however, the bargaining coverage rate of newly founded establishments was significantly lower than that of incumbents in western and eastern Germany. This result is consistent with econometric evidence from Kohaut and Schnabel (2003) showing that young establishments (i.e. those founded in the last five years) are less likely to be bound by collective agreements.

While coverage by a collective agreement does give a good general impression on the quality of wages and working conditions in a plant, a more precise indicator is the level of wages. Newly founded firms are usually equated with small firms, and we know that these tend to pay lower wages, *ceteris paribus* (standard references include Brown et al., 1990 and Oi and Idson, 1999; for Germany, see Schmidt, 1995 and Wagner, 1997). It is an open question, however, whether newly founded firms pay higher or lower wages than incumbent firms of the same size.[12]

There are several reasons why wages in newly founded firms may differ from those in incumbent firms (for more general discussions see Brown and Medoff, 2003 and Brixy et al., 2004). On the one hand, newly founded firms may have to pay higher wages than incumbent ones in order to attract employees from the external labor market. If potential employees take into consideration that newly founded firms are much more likely to expire than older ones and have a higher labor turnover, they can be expected to demand higher wages than those that they receive from their current employers (or are offered by other firms) in the sense of a wage differential compensating for the increased risk of a job loss. Wage demands will also be higher if potential employees recognize that newly founded firms offer fewer fringe benefits (such as pension plans) than long-established firms. With a falling risk of failure (and an increase in fringe benefits) over time, the size of this compensating wage differential can be expected to fall.

On the other hand, wages in newly founded firms may be lower than those in incumbent firms because of their lower ability to pay. In the start-up phase of a business it is essential for survival to keep labor costs as low as possible, and any claim of inability to pay higher wages is much more credible (and more likely to be accepted by the employees) when made by a newly founded firm than by a long-surviving firm. Furthermore, newly founded firms do not have to pay the wage premiums for tenure and firm-specific knowledge which

12 There is an emerging literature that tries to find out whether the age of a firm has an influence on the wages paid to its employees and that provides some information on the wage differential of young firms (see, e.g., Audretsch et al., 2001 for the Netherlands, Brown and Medoff, 2003 for the US and Kölling et al., 2002 for Germany). However, these studies do not pay special attention to newly founded firms and do not follow an age cohort of firms over time.

employees in incumbent firms command.[13] Over time, this negative wage differential should become smaller since a firm's ability to pay can be expected to rise and since its employees acquire tenure and valuable firm-specific human capital.

These contrasting theoretical hypotheses suggest that an empirical investigation may be worthwhile. As in the analyses of labor fluctuation we estimate OLS regressions for the period from 1997 to 2001, making use of stacked cross section models for each year as well as pooling the data. The dependent variable is the log of daily wages per (full-time equivalent) employee at the establishment level. It is calculated by dividing the annual sum of all wages and salaries in an establishment by the sum of (calendar) days worked by all employees in this establishment. Since the number of days with part-time work is divided by 0.5, we in fact calculate a sort of "full-time equivalents" of employment. Because of part-time work and fluctuations in employment, our denominator is more precise than just using the number of employees at some point in time. The data stem from the "German Employment Statistics" and include all wages and salaries paid to each employee during a job up to the contribution assessment ceiling of the social security system. Since higher earnings are censored at this ceiling, wages in firms of high-income sectors are underreported. Although there is a certain downward bias in our wage variable, this should not systematically and seriously affect our results on the wage differential.[14]

Again our main explanatory variable of interest is the dummy variable indicating whether an establishment hired its first employee between July 1, 1995, and June 30, 1996. The control variables are quite similar to those in the labor turnover regressions above. They include the number of employees in the establishment and its square (which are expected to exhibit the well-known positive but decreasing establishment size effect on wages) as well as

13 In this case, the new firm may not be able to poach employees from other firms but may rely more on attracting workers who are currently unemployed, who are out of the labor force or who search for their first job. Non-monetary incentives that help newly founded firms to hire employees in spite of lower wages may also exist. These include enthusiasm for the business idea and the attractiveness of a situation with flat hierarchies where structures can still be formed. Some employees could also speculate that they are first in line and therefore in a good position for a career within the firm. Others may prefer to stay in the region where they finished their education and/or where they are well integrated in networks of friends and family. For a detailed analysis of incentives and incentive schemes in new firms, see Bau (2003).

14 This contribution assessment ceiling is relatively high, amounting to 148 € in western and 124 € in eastern Germany per calendar-day in 2001. As the wage variable used is calculated at the establishment level, whereas the contribution assessment ceiling refers to the individual level, there is no clear-cut truncation point which could be taken into account by choosing appropriate estimation methods (such as Tobit or truncated regression). At the other end of the spectrum, there was a small number of wages reported that were obviously too low and that probably reflected errors in the data base. We therefore omitted all incomes that were lower than twice the wages paid for so-called "mini jobs" (for which only flat-rate taxes are paid). This lower threshold was 21.18 € per day in 2001 in both parts of Germany.

a dummy variable indicating whether the establishment is a branch plant or subsidiary (thus probably paying higher wages than similar independent firms). The structure of the workforce is represented by the employment shares of female and low-skilled employees (both of which are expected to receive lower wages), of high-skilled employees (with higher wages), and of fixed-term and part-time employees. Although there is no such thing as a unionized establishment in Germany, it is necessary to control for the existence of sectoral or firm-level collective bargaining agreements, both of which are expected to raise wages. The establishment's ability to pay is expressed by a dummy variable reflecting its profit situation. We also take into account the state of production technology in the establishment, which should be positively correlated with wages, as well as the regional unemployment rate, which can be expected to reduce wages. Additional explanatory variables are the export share of an establishment, which should be associated with rising wages, the existence of wage subsidies and the legal form of the firm, although we have no clear-cut priors on the likely influence of the latter variables on the wages paid. We also include ten industry dummies and three dummies for the degree of urbanization at the location of the establishment. Since wages in western Germany are still substantially higher than in eastern Germany and since both labor markets still differ considerably, we again provide disaggregated estimates for both regions.

The results of the pooled estimations for the period from 1997 to 2001 (which also include dummies for each year) are presented in table 6.2. For western and eastern Germany alike, the goodness of fit of the regressions is relatively high, and almost all coefficients estimated are significant and of the expected sign. The principal result is, of course, the negative effect of the newly founded establishment dummy on log wages. Over the entire period, wages paid in newly founded establishments in western Germany were 8.6 percent lower than in other establishments, whereas in eastern Germany this average wage differential was just 5.5 percent.[15] This difference probably reflects the fact that wages in eastern Germany are about 20 percent lower, *ceteris paribus*, and that new establishments thus may have less scope for paying even lower wages there.

In addition to the average effects over the whole period shown in table 6.2, table 6.5 presents the results of cross section estimations for each single year. The models estimated are almost identical to those shown in table 6.2,[16] and by and large they are equally well determined. In order to economize on space, table 6.5 just presents the estimated coefficients of the dummy variable for newly founded establishments (full results are available from the authors on request). It can be seen that the point estimates of the wage differential

15 The percentage wage effect is calculated from the estimated coefficient β as $(e^{\beta}-1)\cdot 100$.

16 As before, the only differences are that the year dummies are not included, of course, and that for all years except 1999 (where information is lacking) a dummy variable on the existence of overtime work is included which always proves to be significant.

tend to fall and lose significance over time: While in 1997 wages were 9.4 percent lower in newly founded western German establishments than in other plants, *ceteris paribus*, in 2001 the point estimate of the wage differential between these two groups of plants was just 4.4 percent. In eastern Germany, the wage differential fell from 5.7 percent in 1997 to 3.8 percent in 2001.[17] Moreover, the wage differential between newly founded and incumbent establishments becomes statistically insignificant after four years in western Germany, whereas in eastern Germany this process takes five years.

Table 6.5: Wage differentials of newly founded establishments over time (coefficients of OLS estimations similar to table 6.2, columns 4 and 5)

	1997	1998	1999	2000	2001
Western Germany	-0.0988**	-0.0891**	-0.0864*	-0.0576	-0.0452
	(-3.52)	(-2.55)	(-2.04)	(-1.21)	(-0.98)
	[N=1962]	[N=1588]	[N=1316]	[N=1006]	[N=858]
Eastern Germany	-0.0591**	-0.0472**	-0.0595**	-0.0726**	-0.0390
	(-3.97)	(-2.54)	(-3.09)	(-3.50)	(-1.52)
	[N=2558]	[N=2074]	[N=1715]	[N=1332]	[N=1170]

Note: Heteroscedastic-consistent t-values in parentheses; **/* denote statistical significance at the 0.01 and 0.05 levels, respectively.

Source: IAB Establishment Panel, German Employment Statistics.

5. Concluding Remarks

The question whether job quality differs between newly founded and incumbent firms of the same size and whether such differences vanish over time once the new businesses mature has received surprisingly little attention so far. We provide a first empirical analysis that tackles these issues following a cohort of establishments with less than 200 employees in western and eastern Germany from 1997 to 2001. Our results indicate that start-ups are characterized by higher labor fluctuation, lower bargaining coverage and lower wages than incumbent establishments. These differences are shown to decline and become insignificant over time as the newly founded firms mature. This result implies that – at least concerning our indicators of employment quality – it takes a new firm only a few years to become an incumbent firm. The fact that this convergence is the result of market forces and not of government intervention, suggests that economic policy does not need to introduce special measures for protecting job quality in start-ups.

17 Since these estimates might be biased in various ways due to the failure (or non-reporting) of newly founded and other establishments in the panel, we made several checks using the full sample of all plants on which data were available (see Brixy et al., 2004 for details). We found that the wages paid in surviving plants do not differ significantly from those in other plants, thus confirming the result of Audretsch et al. (2001, 818) that "differentials in employee compensation are far more attributable to firm size than to whether the firm ultimately survives or fails."

In order to establish the stability and generality of our results, the analyses should be replicated with cohorts for other years, with data for other countries, and with other indicators of job quality (including subjective measures). Furthermore, it would be interesting to know more about the reasons for the initially higher labor turnover and the negative wage differential found, but these are difficult to identify and disentangle. One reason could be that newly founded firms rely more on workers that are recruited from the pool of unemployed or from out of the labor force; these may be less expensive but also less likely to survive the crucial initial period of a new employment relationship. Unfortunately we are not able to analyze this possibility since we do not have reliable information on the origin of employees in an establishment yet.

Like this, some of our other questions could be answered more precisely by tracing the employment of individuals in various (newly founded and incumbent) establishments over the years. For instance, by investigating how the wage of a given employee changes when he or she moves from an incumbent to a newly founded establishment we may be able to identify the wage differential more precisely. It would also be interesting to see how often employees in newly founded firms experience job losses, and how their wages evolve over time compared to that of similar employees that did not choose to work in a start-up. These issues point to promising areas for further research that we intend to investigate in the future.

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