Does the Quality of Employment Differ Between New and Incumbent Firms? First Results for Germany Based on the Establishment History Panel*

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Abstract

The present contribution is addressing the question whether and how qualitative aspects of employment—like part-time, wages or employees' qualification structure, among others—differ between new and established firms. Although a wide strand of literature in entrepreneurship research analyzes the employment effects of new firms vs. incumbents, our knowledge about differences in these qualitative aspects of employment is rather poor. On the other hand, various studies in labor market research account for the consequences of technological and organizational innovations on the characteristics of jobs, but they rarely account for the relevance of firm start-ups. Based on the Establishment History Panel, which has been made available only recently, we are able to address some of these questions in more detail than it has been possible so far. We find significant differences between newly-founded and incumbent firms regarding a "flexibility component" which is derived from a Principal Components Analysis. However, we do not find young firms and incumbents to vary significantly in terms of a general "quality component".

Keywords: Start-ups, Employment, Germany, Establishment History Panel, Qualification, Wages, Explorative Data Analysis, Principal Components Analysis

JEL Classification: J24, J31, L26, L80, O30

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1 Background and objectives

It has become a commonplace in entrepreneurship research that new firm start-ups contribute to economic development and progress in various aspects. Not only are they believed to enhance technological change by introducing new products, novel processes or organizational innovations (e. g. Acs & Audretsch 2005), but there is also a wide strand of literature discussing and analyzing their effects on the development of employment: this literature can be roughly classified in contributions analyzing the determinants of employment changes *inside* the new firms (e. g. Koch & Strotmann 2006, Otto & Fornahl 2008, Stam, Gibcus, Telussa & Garnsey 2008) and contributions concerned with the (sectoral and regional) employment effects of new firm formation (cf. Birch 1979, Fritsch 2007, Fritsch & Weyh 2006, Geroski 1995).

As a matter of fact, both lines of research yielded a wide variety of empirical studies with a number of stylized facts (e. g. new firm growth is affected by a bundle of individual-specific, firm-specific, and environment-specific factors; the contribution of a cohort of new firms to total employment creation after five years equals more or less the initial employment in this cohort etc.), but also with ambiguous results in many respects. Yet, although most of the contributions concerned with employment creation and development in new firms do well account for *quantitative aspects* of new employment relationships (e. g. how many new jobs are created? how long do these jobs persist?), they widely disregard aspects concerning the *quality* of these jobs.

Only more recently, some scholars also deal with questions regarding the qualifications, the job positions, the scope (e. g. part-time vs. full-time) or the sustainability of the new employment relationships in entrant firms. F. i., Brixy, Kohaut & Schnabel (2007) compare the development of wages in new firms vs. incumbent firms on the basis of German employer-employee data. They find that newly founded firms tend to pay lower wages than incumbent firms, but that wage differentials decline in the course of the first few years of the new firms' development. However, their study uses a relatively small sample of 826 newly established firms and 5,897 incumbents. Likewise, Kölling, Schnabel & Wagner (2002) analyze the nexus between wages and firm age in Germany. The authors state that "older firms pay on average higher wages for workers with the same broadly defined degree of formal qualification. This firm age differential vanishes after controlling for further worker characteristics and other firm characteristics besides age; if anything, younger firms pay more ceteris paribus" (Kölling et al. 2002, p. ii). On the basis of a similar dataset, Schnabel, Kohaut & Brixy (2008) analyze the persistence of employment relations in new firms. The main finding of that study is that an "individual's employment stability was higher in incumbent than in newly founded firms while their risk of becoming unemployed was lower" (Schnabel et al. 2008, p. 21). In contrast, Böheim, Stiglbauer & Winter-Ebmer (2008) find that new jobs in new firms last considerably

longer than new jobs in incumbent firms using employer-employee data from Austrian firms.

Summing up, there is some empirical evidence suggesting that qualitative aspects of employment relationships are influenced by firm status (new firm vs. incumbent firm) or firm age, respectively. However, this evidence is rather anecdotal and there is no systematical or well arranged research around these questions. The disregard of the outlined aspects in existing research can be partly attributed to the lack of adequate and representative micro-level data including both information on firm status or age and on employment. As the availability of firm-level and even individual-level data has improved considerably during the last few years (not least due to a remarkable increase in computing capacity), it is now also possible to better account for the outlined aspects.

Hence, the present contribution will build upon the outlined initial evidence and analyze various aspects of the quality of employment in new firms, particularly in comparison to established firms. For example, we expect entrants to represent higher levels of qualification than incumbents, as they are commonly thought of as highly innovative firms securing efficiency in a market and promoting structural economic change (Shane & Katila 2003). On the other hand, however, the share of high-qualified employees in start-ups might be lower than in incumbents as first evidence (cf. Brixy et al. 2007) suggests that start-ups pay lower wages and thus might not be able to attract high-qualified labor in a satisfactory manner. Thus, the net effect remains unclear.

Furthermore, concerning the scope of work, we would expect start-ups to have a lower share of full-time employees than incumbents, since—after all—starting up a business is a risky undertaking implying insecure jobs and newly-founded firms in most cases are not able to compensate the higher risk with higher wages. Likewise, start-ups might have a higher tendency towards the use of part-time and marginal employment since they are commonly more exposed to financial risk and thus have higher needs for flexibility. Since women are more likely to have part-time jobs we expect the share of female employees to be higher in start-ups, too. Concerning elderly employees, we expect to find a lower share in start-ups as we assume employees' risk aversion rises with their age and as new employment relationships are likely to be made with younger employees.

For our analysis, we will resort to establishment level data provided by the Federal Employment Agency of Germany. This data is based on information on individual employment relationships and covers most parts of the German economy.

The remainder of the contribution is structured as follows: Different aspects of job quality and a conceptual background are outlined and discussed in section 2. Our data is introduced in section 3, whereas section 4 presents the empirical results. Section 5 concludes.

2 On the quality of employment

Employment does not equal employment—this insight has driven the literature already for quite a long time. The majority of studies that are concerned with employment quality in general and that (hence) do not focus on firm start-ups distinguish between two types of employment: standard and non-standard employment.[1] Thereby, it has become common knowledge that non-standard employment forms have experienced a considerable rise in the industrialized countries since the 1970s (cf., Carroll (1999), Felstead & Jewson (1999) or Horwitz, Allan & Brosnan (2000); furthermore Campbell & Burgess (2001), Tucker (2002), Oschmiansky & Oschmiansky (2003) and Fuchs (2006); a recent overview on non-standard forms of employment can be found in Keller & Seifert (2007)). Since national systems of social security rely strongly on standard employment, this rise has always caused concern, especially among scholars who are in touch with social security systems and only few studies do not find such a rise of non-standard employment (cf. Erlinghagen & Knuth (2002), Auer & Cazes (2003) or Winkelmann & Zimmermann (1998)). In order to understand the role of non-standard employment in the economy, it is crucial to ask for the reasons of its appearance and its increase in recent years. The extant literature provides the following major lines of explanation:

- factors on the part of **labor supply**, indicating that not only employers may profit by non-standard employment, but that also employees may benefit due to improved work/life balance possibilities (cf., Bururu (1998), Carroll (1999) or Mangan (2000) for some empirical evidence in the case of part-time work as well as own-account self employment).

- On the part of **labor demand**, non-standard employment constitutes a huge potential of increasing the flexibility of establishments in times of economic risk and can thus help to improve their efficiency.

- Last but not least, an important reason for the emergence and rise of non-standard employment can be seen in the overall **evolution of socio-economic structure**.[2] This term is associated with a certain rise in the requirements for human capital due to economic globalization, ageing and diminution of the population, the heterogeneity of life styles, the revolution of information and communication technologies and a trend towards tertiarization of the economy (Sesselmeier 2007). Since the increasing requirements to human capital lead into more general rather than specific human capital (deprofessionization trend,

[1] Furthermore, many studies point out the role of precarious employment—an aspect which will not be tracked in the paper at hand.

[2] Also, trade unions seem to play an important role in that context. However, the only study known to the authors that examines this aspect is that by Wooden & Hawke (1998).

> Sesselmeier 2007, p. 74), establishments can resort to the labor market more strongly, and hence non-standard employment rises. Deprofessionization is assisted by a growing standardization of occupational images, especially in the service sector. Certainly, young businesses play a crucial role in promoting this kind of socio-economic structural change.[3]

Summing up, non-standard employment is of outstanding and increasing importance to employees, employers and the economy as a whole.

The various definitions of standard employment used in the literature are quite similar to each other. Hence, only the most far-reaching definition which is known to us shall be outlined here. It traces back to Mückenberger (1985) and states that a standard employment exists if the following criteria are met:[4]

- full-time job with adequate income,
- integration into the social security system,
- perpetual job,
- no temporary work,
- employee subject to the employer's directives.

There are also many definitions of non-standard employment. However, Mangan (2000) states that they are similar to the extent that they all represent "a departure from traditional employment" (Mangan (2000), p. 172, cited in Hannif & Lamm (2005), p. 326). Thus, Mückenberger (1985), f. i., considers part-time work, marginal employment and employment limited in time as well as temporary employment to be non-standard. Krahn (1995) refers to non-standard employment if it is a matter of part-time or limited work, of own-account self-employment or if the employee is holding several jobs at one time (broad definition). In a more narrow definition, he restricts to part-time and limited work. Vosko et al. (2003, p. 19) apply a typology of employment forms distinguishing between perpetual and limited employment, each of them being further discriminated in full-time and part-time work.

The two types of employment presented above—standard and non-standard employment—are the ones most broadly discussed in the literature.[5]

[3] Studies promoting this approach are Bizer, Sesselmeier & Rürup (2004) or Sesselmeier (2007).

[4] Only slightly different definitions can be found in Economics Council of Canada (1990), Schellenberg & Clark (1995) and Vosko, Zukewich & Cranford (2003). Fuchs (2006) chooses an even broader definition.

[5] Since the issue of precarious employment is not of major concern for our purposes we will not delve into this aspect here.

Our data allows for the identification of several elements of employment quality: we account for full-time and part-time work; the integration into the social security system is operationalized via the share of marginal employment (as opposed to the share of employment relationships liable to social security within a firm). Unfortunately, the aspects of temporary work and own-account self-employment are not covered by our data.

The general literature concerned with employment quality widely does not account for aspects of employment quality beyond the ones outlined above. Nevertheless, in order to deepen our understanding of the role of start-ups for the labor market it is indispensable to consider alternative aspects of employment quality. In this respect, our data allows for considering the average wage per establishment and the share of low-, mid- and high-qualified employees per establishment as well as the share of women and elderly persons (aged more than 50 years) per establishment.[6]

3 Data and methodology

The paper at hand is based on the "Weakly Anonymous Establishment History Panel" (in German: *Betriebs-Historik-Panel—BHP*) provided by the Research Data Center of the German Federal Employment Office.[7] We use annual data for the years of 1999–2005 for Western Germany. The Establishment History Panel is a unique data set that has become available to the scientific community only recently, namely in autumn 2006.

Its original source is individual-level spell data on employment relationships in all establishments in Germany. This individual-level data derives from the mandatory social security notifications which have to be submitted by all employers for all hires and separations as well as—annually—for all existing employment relationships subject to social security obligation. Via an establishment number, the individual level data is aggregated on the establishment level.

The data provides a wide variety of information about the quality of employment such as the volume of work (full-time, part-time or marginal employment[8]), employees' sex, age and qualification structure and wages (for an overview cf. Spengler 2007).

[6] We would like to emphasize that our notion of employment quality refers to *attributes of employment* rather than to more or less desirable forms of employment.

[7] Data access was provided via on-site use at the Research Data Center (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) and via remote data access. For further information, consult `http://fdz.iab.de`

[8] Marginal employment has become subject to the mandatory social security notification in 1999. Thus, there is a considerable structural break in the data as before 1999 only employment subject to social security obligation is covered by the data. Hence, investigating on different types of employment, one has to choose which period shall be analyzed: the period until 1998 or the period from 1999 onwards. Certainly, there are far more data points available in the period preceding the structural break. However, the latter period has the advantage of containing (1) more recent data and (2) data on marginal

Being a panel data set, the BHP allows for in-depth regional and sectoral accounts of both the *evolution of the population of establishments* as well as of the *development of any single entity* over time (although with some limitations—see next paragraph). As the data is based on process-generated administrative data, it avoids "typical survey data problems such as memory gaps, refusing to give information or deliberately giving false information" (cf. Spengler 2007, p. 6). The BHP covers all establishments in Germany with employees subject to social security obligation. The number of establishments amounts to approximately 2.5 million in 1999 and 2005 with sums of 31.1 and 30.5 million employees, respectively.[9]

With some restrictions, the BHP can be used for analysing firm demography. Using the consistent ID-numbers, establishments can be traced over time. Thereby, new establishment-IDs can be interpreted as entries whereas dissappearing IDs can be taken as exits. As the identification of firm exits is quite unconfident in the data, this aspect will not be considered in our paper. Regarding the identification of new establishments, some problems have to be considered:

- The **allocation of a new ID number** to an establishment by the Federal Employment Agency must not mean that the establishment is a start-up. New IDs are also assigned in cases of change of ownership, change of company name or a merger of two existing companies, inter alia. Vice versa, not every new establishment is being reassigned a new number (for further information on the allocation of establishment numbers cf. Bender et al. (1996) or Fritsch & Brixy (2002)). Whereas we cannot account for the latter case, we are able to mitigate the first problem by separating entities starting with 20 or more employees in the first year of appearance from the group of entrants.[10]

- A particular issue in identifying new establishments is the fact that some establishments (respectively their numbers) have **"perforated histories"**, i. e. they miss in some years between the first and the last year of their appearance in the data. It is unknown whether these perforated establishment numbers refer to one and the same establishment before and after the break or whether they rather have to be considered as newly-founded entities.[11] We follow the suggestion made by Fritsch

employment. Since in this contribution, marginal employment lies in our interest, too, we will focus merely on the period from 1999 onwards in the following analyses.

[9] External researchers usually do not get access to the full dataset due to reasons of nondisclosure and restricted computing capacity at the Research Data Center.

[10] Clearly, these entrants do not represent "real" entries and should rather be considered as "spurious entrants".

[11] While there is a broad consensus in the literature in that the longer a period of an establishment's non-appearance in the data lasts, the less probable it is that it is still the same establishment after the break, there exists—to the best of our knowledge—no

& Brixy (2002) and treat establishments whose history is interrupted for less than three years as one and the same after their re-appearance. Establishment numbers that fail to appear for three years or more, however, are considered as closures with subsequent re-start.

- **Left-censoring** in 1999 can be avoided (although only partially—see next bullet), as we have access to data from earlier years and are thus able to identify establishments that already existed in the years before.

- Last but not least, we have to account for the fact that the data does not contain **information on marginal employment** before 1999. Thus, we do not know whether an establishment appearing for the first time in 1999 and consisting of marginal employees merely is actually a start-up or—which is clearly more probable—if it represents a business whose foundation date reaches back to the years before 1999. To handle this problem, we restrict our definition of entrants to units with at least one employee subject to social security. Firms that enter the data set in 1999 or later and that consist of marginal employees only are discarded.[12]

Finally, what exactly is the difference between an incumbent establishment and a new establishment, and accordingly: *when does a young firm convert to an incumbent*? Previous studies comparing these two groups of firms (cf. Böheim et al. 2008, Brixy et al. 2007) treat all establishments appearing for the first time in the data as start-ups, whereas all other units are defined to be "incumbents", which we find rather unsatisfactory, as after one year of existence[13] neither a single firm nor a cohort of entrants has gained any stability in its evolution. In the present paper, we define all firms as incumbents which exist *for at least five years*. Establishments in the first four years after their foundation, on the other hand, are treated as start-ups. The five-year limit is definitely somewhat arbitrary (there would have been arguments for a period of three years as well as for ten years), but it seems feasible as it is a rather stylized fact that the first few years are the most critical period in the development of new firms. Between 30 and 40% of entrants fail within five years (cf. Geroski 1995), and failure rates decline significantly thereafter. Also on the level of the single firm, it is acknowledged that most units have managed to stabilize their business within that five-year period.

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empirically justified cutoff value which discriminates between establishments whose history is merely interrupted and closings with adjacent re-founding.

[12] The easiest way to resolve this problem would be to exclude all marginal employment from our data. However, as marginal employment constitutes a crucial aspect of overall employment quality, this is not a viable solution.

[13] Which in fact might be far less than a year as an entrant could also have entered the data only on the day before the reporting date of June 30th.

Summing up, the BHP is a capacious dataset allowing for in-depth analyses of various aspects of employment in both incumbent as well as in new establishments. Nevertheless, some important drawbacks of the data shall not be concealed:

- As a matter of fact, the data is confined to **employment subject to social security obligation**. Hence, various other forms of employment (as, for instance, self-employment, home work or public service) are not covered by the data. It is estimated that the BHP covers about 75% of the total employment in Germany (of course, with considerable sectoral differences, cf. Fritsch & Brixy 2002, p. 57).

- The BHP refers to the **level of establishments** (local physical units of economic activity) and not to the level of firms (legal independent—and not necessarily physical—entities). Thus, we are only able to account for the entry of new physical units of economic activity—which must not necessarily represent independent legal units. However, as almost 98% of all establishments in Germany are physical and legal entities at the same time (companies consisting of only one unit, cf. Koch & Migalk 2007, p. 41), this can be regarded as a minor problem.

- The annual data of the BHP refer to all employees included in the data on **June 30th**. This may affect the analyses, as both the numbers of establishments and employees might be overestimated due to higher seasonal employment in summer. As the qualification structure and other characteristics of the employees might be biased in this respect, this may also impact on the analysis of qualitative aspects of employment.

- Last but not least, due to the **cross-sectional structure** of the BHP, the number of entrants might be underestimated as establishments entering *and* exiting the market between July 1st and June 29th of the following year are not covered by the "snapshot" data.

However, with regard to the objectives of the present paper and considering the novelty of the questions to be analyzed here, the BHP is certainly the best, most representative and most comprehensive dataset in Germany and is thus of invaluable usefulness.

For our analyses, we use a 50% random sample stratified by establishment size and the frequency of the establishments' appearance in the single cross-sectional data sets of the BHP. Special attention during stratification was paid to not reducing the number of panel cases too severely.

4 Empirical results

First of all, we give a descriptive overview of our aspects of employment quality in incumbents and newly-founded firms by summarizing the most important results. The findings in this first step are descriptive by nature and do not account for the possible influence of firm size on our measure of the quality of employment. Furthermore, each aspect of employment quality is analyzed separately ignoring possible relationships between themselves: there might be different groups of establishments that cluster in one or more of the quality aspects analyzed above and that have a high inter-class inertia.

To account for these shortcomings of the descriptive analysis, we run separate regressions for each of our measures of employment quality on firm size, thereby obtaining residuals representing quality measures with a correction for firm-size. On these residuals, a principal components analysis (PCA) is run after aggregating the data to a level representing combinations of the type of establishment—i. e. incumbent, young firm or young firm with more than 20 employees in the year of entry—the federal state and 1-digit industry codes.[14] Afterwards, we assess whether the differences in the components extracted by the PCA are significant between incumbents, young firms and young firms with more than 20 employees in the year of entry.

Table 1 on page 13 presents descriptive statistics of our quality measures for the period 1999-2005. From these we can deduce the following findings for the *volume of work*:[15]

- young firms have a lower share of full-time (FT) employees than incumbents (about 54% vs. 65% on average). Consequently the part-time (PT) share in young firms is higher than in incumbents (some 39% vs. 28% on average).[16]
- Considering the share of employees in big part-time (BPT), there are no huge differences between incumbents and entrants.

[14] Data were aggregated for the period 1999-2003, since after 1999 this is the longest period in the data with a consistent industry classification. Furthermore, a PCA of establishments consisting of only up to 20 employees did not alter the results. Moreover, we find nearly the same component loadings when running the PCA on data *before* the structural break in 1999 (of course, without accounting for marginal employment, which is recorded only since 1999).

[15] Besides the distinction between incumbents and entrants, the table also provides information on entities starting with more than 20 employees, which sometimes are quite different from entrants as well as from incumbents. These results also persist in the PCA after controlling for the influence of firm size. Therefore, we suggest to exclude theses entities from future analyses. However, since the main focus of the paper at hand is to distinguish between incumbents and entrants, we do not comment the results this group explicitly.

[16] The shares of full-time and part-time employees do not exactly add up to 1 since they had to be calculated using slightly different denominators.

- The share of employees in little part-time (LPT), however, is considerably higher in start-ups than in incumbents (29% vs. 16% on average).
- The same holds for marginal employment (ME, 27% vs. 14%).

Concerning the *qualification structure* in incumbents and start-ups we find that

- young firms have a considerably lower share of mid-qualified (MQ) labor than incumbents (59% vs. 44% on average);
- young firms have a slightly lower share of low-qualified (LQ) labor than incumbents (17% vs. 13% on average);
- differences between the share of employees without formal qualification (NFQ) and the share of high-qualified labor are very small.

However, these results should be viewed with a little caution since the portion of employees with unknown qualification in young firms is considerably higher than in incumbents, which may distort our findings on qualification levels in an unknown direction.

When we look at the shares of *female and elderly employees* within the firms as well as the average values of the *median wage* and the *variation of wages* (as measured by their inter-quartile range) within the firms we see that

- the median daily wage(MW) of full-time employees is considerably lower in young firms than in incumbents (on average about 10€ per day pre-tax);
- the variation of wages as measured by their inter-quartile range (IQRW) is lower for entrants, too;
- the share of female employees (W) is higher in start-ups than in incumbent firms (roughly 51% vs. 47% on average);
- finally, the share of elderly employees (50+) is lower in young firms (18% vs. 23% on average).

Table 2 shows now the correlation matrix of the residuals from the individual regressions of our measures of employment quality on firm size. Of course, the share of full-time employees in a firm is—by definition—highly negatively correlated with any of the shares of part-time employees and marginal employees. Also, the share of women employed in a firm is substantially negatively correlated with the share of full-time employees, since women traditionally tend to work more on part-time. The greater the share of full-time employees, the higher is—as a matter of course—the median

wage per establishment. The share of employees with unknown qualification within a firm tends to shrink with increasing shares of full-time employees, whereas it rises with increasing shares of marginal employees.

The median wage per establishment clearly shows a positive relationship with the share of mid- and high-qualified employees and it is negatively correlated with the share of low-qualified individuals, which reflects the wage structure induced by differing skills. Moreover, the inter-quartile range of wages within a firm tends to increase with the share of mid- and high-qualified employees: naturally, the greater the variation of qualifications in a firm, the greater will be the wage difference measured by the inter-quartile range, too. The greater the share of employees with unknown qualification, the lower the median wage within a firm—this is, however, at least partly to be attributed to the high correlation with the share of part-time employees and the share of women within a firm. Last but not least, it is interesting to see that there is no close relationship between the share of elderly employees and the median wage in a firm, which appears to be driven by the fact that elderly people do not resort specifically to either part-time or full-time work as, f. i., women do.

		n	mean	sd	min	max
FT (share)	incumbents	3,966,125	0.65	0.28	0.00	1.00
	young firms	1,778,612	0.54	0.35	0.00	1.00
	young firms $>$ 20	58,670	0.75	0.27	0.00	1.00
LPT (share)	incumbents	3,974,319	0.16	0.23	0.00	1.00
	young firms	1,784,991	0.29	0.33	0.00	1.00
	young firms $>$ 20	58,846	0.10	0.18	0.00	1.00
BPT (share)	incumbents	3,974,319	0.12	0.16	0.00	1.00
	young firms	1,784,991	0.09	0.18	0.00	1.00
	young firms $>$ 20	58,846	0.11	0.16	0.00	1.00
PT (share)	incumbents	3,974,319	0.28	0.27	0.00	1.00
	young firms	1,784,991	0.39	0.36	0.00	1.00
	young firms $>$ 20	58,846	0.21	0.26	0.00	1.00
ME (share)	incumbents	3,974,319	0.14	0.22	0.00	1.00
	young firms	1,784,991	0.27	0.30	0.00	1.00
	young firms $>$ 20	58,846	0.08	0.16	0.00	1.00
LQ (share)	incumbents	3,974,319	0.17	0.19	0.00	1.00
	young firms	1,784,991	0.13	0.23	0.00	1.00
	young firms $>$ 20	58,846	0.18	0.21	0.00	1.00
MQ (share)	incumbents	3,974,319	0.59	0.27	0.00	1.00
	young firms	1,784,991	0.44	0.36	0.00	1.00
	young firms $>$ 20	58,846	0.56	0.28	0.00	1.00
HQ (share)	incumbents	3,974,319	0.08	0.13	0.00	1.00
	young firms	1,784,991	0.05	0.14	0.00	1.00
	young firms $>$ 20	58,846	0.09	0.16	0.00	1.00
UQ (share)	incumbents	3,974,319	0.16	0.28	0.00	1.00
	young firms	1,784,991	0.37	0.40	0.00	1.00
	young firms $>$ 20	58,846	0.16	0.29	0.00	1.00
NFQ (share)	incumbents	3,974,319	0.16	0.22	0.00	1.00
	young firms	1,784,991	0.16	0.27	0.00	1.00
	young firms $>$ 20	58,846	0.21	0.26	0.00	1.00
50+ (share)	incumbents	3,974,319	0.23	0.15	0.00	1.00
	young firms	1,784,991	0.18	0.22	0.00	1.00
	young firms $>$ 20	58,846	0.20	0.12	0.00	1.00
W (share)	incumbents	3,974,319	0.47	0.29	0.00	1.00
	young firms	1,784,991	0.51	0.34	0.00	1.00
	young firms $>$ 20	58,846	0.37	0.27	0.00	1.00
MW (€)	incumbents	3,343,768	67	28	0	3000
	young firms	1,292,022	57	32	0	614
	young firms $>$ 20	57,964	82	31	0	210
IQRW (€)	incumbents	3,343,768	19	202	0	1008
	young firms	1,292,022	12	20	0	4736
	young firms $>$ 20	57,964	25	16	0	153

Table 1: Arithmetic means of quality measures for incumbents and young firms in Western Germany, period 1999-2005. Source: Establishment History Panel, authors' calculations.

	FT	LPT	BPT	PT	ME	LQ	MQ	HQ	UQ	NFQ	50+	W	MW	IQRW
FT	1,00													
LPT	-0,86	1,00												
BPT	-0,52	0,08	1,00											
PT	-0,97	0,86	0,57	1,00										
ME	-0,78	0,94	-0,03	0,76	1,00									
LQ	-0,01	-0,04	-0,06	-0,07	-0,05	1,00								
MQ	0,54	-0,56	-0,08	-0,50	-0,54	-0,29	1,00							
HQ	0,05	-0,26	0,40	-0,02	-0,30	-0,20	0,00	1,00						
UQ	-0,53	0,68	-0,08	0,52	0,67	-0,14	-0,80	-0,36	1,00					
NFQ	0,21	-0,06	-0,35	-0,23	-0,02	0,53	-0,40	-0,34	0,27	1,00				
50+	0,05	0,05	-0,02	0,03	-0,06	0,12	0,13	-0,19	-0,09	0,06	1,00			
W	-0,79	0,60	0,66	0,82	0,45	-0,07	-0,36	0,06	0,34	-0,34	0,08	1,00		
MW	0,60	-0,65	-0,11	-0,59	-0,65	-0,27	0,66	0,35	-0,65	-0,37	0,06	-0,44	1,00	
IQRW	0,29	-0,4	0,06	-0,30	-0,39	-0,21	0,41	0,30	-0,42	-0,35	-0,13	-0,17	0,63	1,00

Table 2: Correlation matrix of single aspects of employment quality (residuals from individual regressions on firm size). Source: Establishment History Panel, authors' calculations.

On the basis of that correlation structure among our variables we run the principal components analysis. We chose to extract two components, which implies a percentage of total inertia explained of about 63%. The component loadings can be found in Table 3. For component 1 we suggest as interpretation the term "flexibility via non-standard employment (except big part-time) and lower-qualified work" whereas, for component 2, "big part-time and high-qualified work" seems to be adequate. A higher value of component 1 also means a lower median wage and a lower inter-quartile range of wages within a firm.[17]

	Component 1	Component 2
FT	-0,91	-0,33
LPT	0,92	0,03
BPT	0,29	0,70
PT	0,90	0,38
ME	0,86	-0,06
LQ	0,06	-0,50
MQ	-0,73	0,30
HQ	-0,23	0,59
UQ	0,77	-0,30
NFQ	0,06	-0,84
50+	-0,01	-0,09
W	0,71	0,51
MW	-0,81	0,34
IQRW	-0,52	0,45

Table 3: Component loadings. Source: Establishment History Panel, authors' calculations.

Figure 1 shows the result of the PCA graphically. Obviously, there are no specific clusters of establishments in the graph region. However, the figure states that young firms are located rather to the right than to the left, i. e. they have a slightly greater interest in increasing their flexibility by resorting to non-standard and rather unqualified work than incumbents and newly founded firms with more than 20 employees in the year of entry.

The differences of the group means of component 1 are also statistically significant, mainly at the 1%- level. Furthermore, young firms with up to 20 employees in the year of entry appear to be located slightly more downwards than incumbents and entrants with more than 20 employees in the year of

[17] An extraction of two additional components would have resulted in a 19 percentage point increase in the total inertia explained. However, this would have led to a somewhat contradictory component capturing the influence of low-qualified work and big part-time. On the other hand we would have got a component representing specifically the elderly employees.

entry in the graph. However, there are no statistically significant differences between the group means of component 2 implying that the degree of high-qualified work in big part-time is the same for incumbents and start-ups.[18]

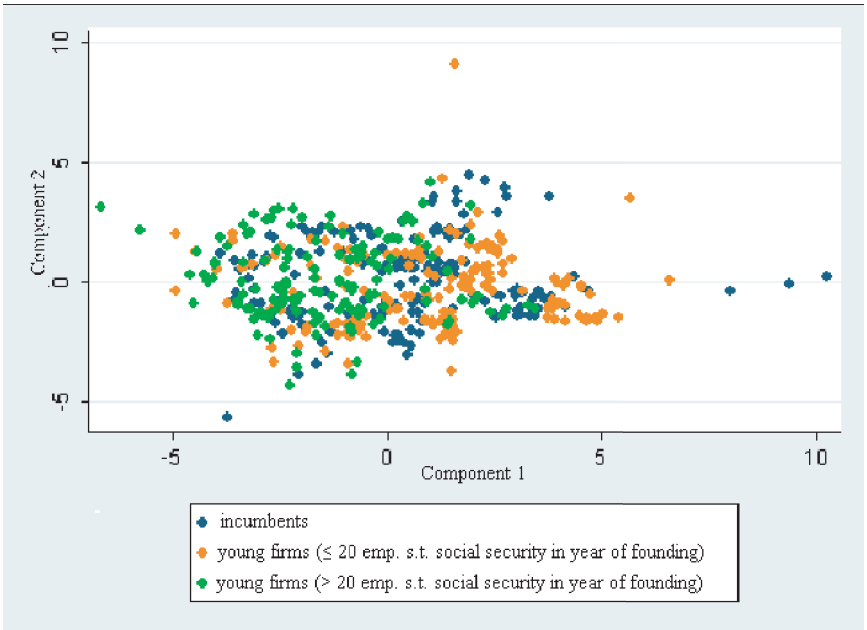

Figure 1: Score plot after Principal Components Analysis: incumbents vs. young firms. Source: Establishment History Panel, authors' calculations.

[18]Since the components extracted by the PCA are not exactly, but only somewhat approximately normally distributed, we apply both the usual t-test for equality of means across groups and a nonparametric test for the equality of medians. In the case of component 1, where deviations from the theoretical normal distribution are marginal, both tests result in highly significant differences. In the case of component 2, however, deviations from the normal distribution are somewhat more pronounced and the usual t-tests point towards slightly significant (10%-level) differences between groups, whereas no such differences are found by the median test which is more reliable in this specific area of application.

5 Summary and conclusions

In the paper at hand, we presented initial evidence for differences in employment quality between start-ups and incumbents. After controlling for the effect of firm size on the variables representing employment quality by running individual regressions, we performed a principal components analysis on the residuals. Our results suggest that there are substantial differences between young firms and established firms regarding different aspects of employment relations. These differences are highly significant even when controlling for firm size. Thus, according to our previously stated hypotheses, younger firms tend to rely more on flexible, non-standard employment and lower-qualified employees than incumbents do. Moreover, in accordance to what we expected, they pay lower wages than incumbents. However, no significant differences regarding the use of high-qualified work and big part-time could be found. If this can be seen as a the result of the two counteracting effects we suggested above remains unclear, especially since our data contain a considerable amount of employees with unknown qualification.

This contribution leaves space for future research. Thus, one may ask about the evolution of the differences between incumbents and young firms in time: Do differences become even greater or do they dissolve? Furthermore, it is of interest what the effects of different structures of human resources within firms exert on the post-entry performance (e. g. employment growth, survival time) of new businesses and on regional development. Thereby, important conclusions could be drawn both for potential entrepreneurs and entrepreneurs.

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