

Which Apprenticeship Training Pays-Off? Determinants of Successful Apprenticeship Training

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Expanded Abstract

^{*} Corresponding author, E-mail: robert.wagner@bwl.lmu.de, address: LMU, Munich School of Management, Ludwigstr. 28/RG, D-80539 Munich. We use data provided by the Forschungsdatenzentrum der BA am IAB (FDZ), Nuremberg. The data basis of this publication is the LIAB longitudinal (version 2) sample of the IAB (years 1993-2007). Data access was provided via guest research spells at FDZ and afterwards via controlled data remote access at the FDZ.

1 Introduction

It is often argued, that not all apprenticeship training programmes are of equal quality or standing and can be characterised as high and low-quality (Soskice, 1994). Quality differences between apprentices in the dual apprenticeship system can be the consequence of heterogeneity between individual traits of apprentices, establishment specific training quality and occupation specific training contents. One implication of differences in training quality are consequences for the labour market careers of apprenticeship graduates.

The aim of this paper is to determine the impact of training firm characteristics on labour market outcomes in the first skilled job after graduating. Not all apprentices want and can work as skilled employees in their trained occupation and with their training employer. Considering the type of job mobility at the second labour market barrier is of significant economic relevance. Separations can be caused by layoffs or imply a loss of human capital and thus lead to a wage penalty (Becker, 1964; McLaughlin, 1991). On the other hand, separations can be caused by quits leading to an improved career or firm match and imply higher wages (Jovanovic, 1979; Neal, 1999). Therefore we distinguish between the labour market success of stayers, employer changers and occupation changers (Harhoff & Kane, 1997; Acemoglu & Pischke, 1998; Clark & Fahr, 2001; von Wachter & Bender, 2006; Goeggel & Zwick, 2010).

Little causal evidence about different transition patterns of apprenticeship graduates at the second labour market barrier and first labour market outcomes is available. Literature on wage consequences for apprenticeship graduates who change firm differ, depending on data, estimation strategy and model specification¹. As the institutional framework in Germany causes apprenticeship training to be mainly general (Wachter, 2008), apprentices gain occupational specific skills which can be carried over to other firms (Lazear, 2003; Kambourov & Manovskii, 2009).

According to findings on changing to related occupations after apprenticeship training, changers can expect a relative wage gain compared to stayers. The opposite is true for occupational changers who change to a distant occupation (Werwatz, 1997; Clark & Fahr,

¹ Positive wage consequences for firm changers compared to stayers were identified by Harhoff & Kane (1997), Acemoglu & Pischke (1998) and Euwals & Winkelmann (2004). Negative effects were shown by Dustman, Euwals & van Soest (1997), Bougheas & Georgellis (2004) and von Wachter & Bender (2006).

2001, Fitzenberger & Spitz, 2003; Geel & Backes-Gellner, 2009). Goeggel & Zwick (2010) are the first who estimate wage consequences of firm- and occupation-changers. They found a wage disadvantage for firm and occupation changers.

Furthermore, it has been shown that post-apprenticeship wages are positively affected by age, educational background, firm size, different occupations and training wages (Harhoff & Kane, 1997; Acemoglu & Pischke, 1998; Fitzenberger & Spitz, 2003; Bougheas & Georgellis, 2004; Euwals & Winkelmann, 2004; Geel & Backes-Gellner, 2009; Goeggel & Zwick, 2010). However, literature on post-apprenticeship wages so far neglects to evaluate the effect of further training firm characteristics such as the presence of a works council, unionisation, retention rate, training intensity or employee structure on post-apprenticeship wages. We are the first who simultaneously control for job mobility, individual, occupational and training firm characteristics when estimating post-apprenticeship wage consequences in the first skilled job.

Knowledge of training circumstances in firms and their consequences for labour market success have far-reaching consequences for all stakeholders of vocational training. Information about success factors during the apprenticeship period reduces the risks involved in the decision between apprenticeship training and other alternatives for pupils. Furthermore, knowledge of the drivers of labour market success of certain apprenticeship trainings enables policy-makers to improve training conditions.

2 Estimation Strategy and first Findings

We use the longitudinal version of the linked employer-employee (LIAB) data provided by the IAB in order to separate the measurement of the impact of job mobility, individual traits, training enterprise and occupational training programme. Our estimation strategy concentrates on the conditions during the apprenticeship period and estimates the effect of training conditions on the wages in the first skilled job. It controls for a substantial list of individual, establishment and occupation characteristics and looks at the homogeneous sample of apprenticeship graduates who directly come from school and directly start to work after graduation. In addition, we take into account endogeneity of switching occupation or employer after apprenticeship training and time-invariant unobserved heterogeneity by applying firm fixed effects and instrumental variable

techniques. This estimation strategy allows us to draw causal inferences of the impact of different drivers of post-apprenticeship labour market success.

Our first – mainly descriptive – findings are in accordance with prior literature, applying comparable model specifications. Without taking into account additional firm characteristics such as training wages, training wage mark-up, retention rate, works council and unionisation we find a coefficient of -0.067 for firm changers, using wage deviation in the first skilled job from the occupational mean as the depended variable. Using real daily wages in the first skilled job as depended variable, while the right side of the wage equation remains unchanged, we find a wage mark-down of 5.5% for firm changers. Using a pooled OLS regression, Goeggel & Zwick (2010) found a wage mark-down of around 8% for firm changers, von Wachter & Bender (2006) found a negative effect of around 6%.

Model 1 in Table 1 shows that the effect of changing firm weakens if adding additional firm factors. Splitting the sample in occupation stayers and changers reveals that the coefficient for changing firm becomes more negative if simultaneously changing occupation (Model 2). This can be explained by an additional loss of occupation specific human capital. On the other hand, the effect of changing firm becomes weaker if firm changers remain working in their training occupation (Model 3). In all three models, training wages and retention rate have a significant positive effect on post-apprenticeship wage deviations. This could indicate a positive effect of training intensity on post-apprenticeship labour market outcomes². The presence of a works council, unionisation and the share of investments on turnover all have a significant positive effect on post-apprenticeship wages compared to the occupational mean. This can be seen as first indicators for training firm characteristics affecting later labour market outcomes.

The negative coefficient for training wage mark-ups is contra intuitive. Training wage mark-up is a dummy variable taking the value one if an apprentice receives a higher wage than his peers in the same firm, occupation and year. Assuming that a wage mark-up at the end of apprenticeship training indicates higher innate abilities one would expect this coefficient to be positive, as better graduates should receive a wage premium. A similar contra intuitive pattern emerges when looking at the coefficients for the employee structure. According to the findings in Model 1, a higher share of skilled workers relative to

² Firms with a high retention rate are likely to bear considerable training investments (Mohrenweiser & Backes-Gellner, forthcoming).

unskilled workers reduces post-apprenticeship labour market success. If expecting knowledge spill overs from skilled workers to apprentices, a positive effect should appear (Frosch, 2009).

Occ. Wage Deviation	(1)	(2) Occ. Change Yes	(3) Occ. Change No
Firm Change	-0.050*** (0.002)	-0.118*** (0.005)	-0.021*** (0.002)
Ln(Training Wage)	0.207*** (0.003)	0.195*** (0.008)	0.201*** (0.003)
Training Wage Mark-up	-0.015*** (0.002)	-0.004 (0.004)	-0.018*** (0.002)
Retention Rate	0.061*** (0.005)	0.042*** (0.012)	0.044*** (0.005)
Share of Investments	0.042*** (0.003)	0.054*** (0.006)	0.012*** (0.003)
Unionisation	0.094*** (0.003)	0.104*** (0.009)	0.081*** (0.003)
Works Council	0.062*** (0.004)	0.054*** (0.011)	0.063*** (0.004)
Employee Structure (Ref.: Unskilled Workers)			
Share Apprentices	0.055*** (0.020)	-0.113*** (0.043)	0.152*** (0.022)
Share Skilled Workers	-0.068*** (0.004)	-0.087*** (0.008)	-0.050*** (0.004)
Constant	-0.458*** (0.121)	-1.489*** (0.278)	0.134 (0.128)
R-squared	0.3439	0.4704	0.2377
Observations	64,642	16,131	48,511

Standard errors in parentheses. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$. Dependent variable: Deviation of individual wages in the first skilled job from the occupational mean. All models include controls for time (1993-2007), 17 economic sectors, 5 occupational groups, firm size and individual controls for age, sex, nation and educational background. Model 1 uses the full sample, models 2 and 3 are restricted to occupational stayers (Model 2) respectively occupational changers (Model 3).

Table 1: Regression Output

One shortcoming of the LIAB data can be seen in information regarding the separation of a worker from a firm. It can only be observed if and when a separation happened, but not the reason for the separation. Hence, it is not possible to distinguish between quits and layoffs. Von Wachter & Bender (2006) showed an estimation bias for changing firm if not controlling for this source of endogeneity. One possibility to overcome that issue is to apply an instrumental variable approach to measure the local average

treatment effect (LATE) for a group of graduates, separating due to exogenous reasons. Two possible approaches are applied in previous literature. Von Wachter & Bender (2006) used the firm internal variation in the demand for labour force as an instrument. They measured the LATE for a group of workers who moved because their firms' retention rate was lower than average. This group should represent neither a positive nor negative selection. The authors assumed that the measured effect was valid for group of changers who had to leave due to a temporary decline in demand, but would otherwise have stayed with the company.

Goeggel & Zwick (2010) define "mass lay-off as a reduction in employment in one establishment larger than 30 percent of the labour force within one year" (Goeggel & Zwick, 2009, p. 15), and use this information as an instrument for changing firm. They argue that the instrument highly correlates with the likelihood of separating and has no relationship to graduates' innate abilities. We implement both instruments in our estimation strategy to compare the results on the basis of the same data set.

Furthermore, the panel structure of the LIAB data allows control for firm-fixed effects, which may lead to self-selection of apprentices at the first labour market barrier and unobservable time-invariant firm heterogeneity such as wage policy. Results of more sophisticated specifications using firm fixed effects and instrumental variables are not available, yet.

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