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ABSTRACT

Does Regional Training Supply Determine Employees' Training Participation?*

Using data from the National Educational Panel Study of 2009/2010, this paper investigates the relationship between regional training supply and employees' training participation. Controlling for other regional factors such as the local unemployment rate, the educational level, the population density and the regional industry composition, the results indicate that training participation is significantly higher in regions with many firms in the training supply market. The predictive power of the other regional factors is rather minor.

JEL Classification: J24, R12

Keywords: training, local labor markets

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1. Introduction

Continuous training investments of employees have reached increasing attention in the political sphere. For instance, increasing on-the-job training participation quotas are featured prominently in the Strategic Framework for European Cooperation in Education and Training 2020 under the Lisbon Strategy of the EU (EU Council, 2009). The challenge of constantly changing economic conditions underlies this policy effort to keep the skill set of the European workforce up-to-date. Focusing on skills is especially important since in most European countries, as in other industrialized countries, human capital intensive sectors are the driving forces of GDP growth (Barro, 2001; Cohen, 2007).

To foster training of employees[1], knowledge on its determinants – i.e. who receives training and who does not – is important for policy makers. In the large literature concerned with training determinants, researchers have concentrated on the "usual" characteristics which are individual, job and firm characteristics (Albert et al., 2010; Bassanini et al, 2007; Buechel and Pannenberg, 2004; Grund, 2010; Yendell, 2012). In this literature, labor economists have largely neglected the spatial dimension of training investments. This paper fills this research gap by investigating how regional factors influence employees' continuous training participation. The focus of this paper lies on answering the research question whether a high regional density of training suppliers will affect employees' training participation conditional on individual, job, firm and regional factors.

From a policy point of view, this is an important research question. In recent years, subsidy and voucher programs fostering training participation have been introduced in different European countries, for instance, in Belgium, Germany, Italy and the Netherlands (Dohmen, 2007). Such programs can be targeted either at the supply-side or at the demand-side, i.e. subsidizing training suppliers or subsidizing training participants, respectively. To the best of our knowledge, we are not aware of any study investigating whether and to which extent training supply affects training participation. Political interventions in the training market can be justified on theoretical grounds. Underinvestment in training could occur e.g. because of credit market constraints or the poaching externality. The latter was developed within the new training literature that assumes – in contrast to human capital theory (Becker, 1962) – labor markets to be imperfect. Thus, employers are equipped with monopsony power allowing them to recoup training investments by paying wages lower than the actual worker productivity (Acemoglu and Pischke, 1998; Booth and Zoega, 2008). If the level of training is sub-optimally low, subsidizing training suppliers – e.g. as it is done in Germany – could be an effective way to achieve the aim of increasing training participation.

In the theoretical context, training participation takes place when training returns exceed training costs (Becker, 1962). Therefore, one of the decisive factors for non-participation are training costs which can be either pecuniary (e.g. tuition fees) or non-pecuniary (e.g. time). Tuor and Backes-Gellner (2009) show empirically that having to devote free time for training discourages participation even more than having to spend money for training. Training costs also arise because training

[1] Employees' training participation contrasts to training participation of the unemployed within the framework of active labor market policies as the intention (staying employed versus becoming re-employed), the content, duration and financing differ to a large extent. Also, selection processes are different which is why these two types of training are usually analyzed in different strands of literature. In this paper, we are exclusively concerned with training of employees.

participants have to travel to the suppliers. Travelling costs should be higher, the lower the number of regional training suppliers.

The literature that is concerned with the more general topic of regional training determinants is small. One strand of literature concentrates on how regional economic density (measured as the number of employees per square kilometer) impacts training incidence. For instance, Muehlemann and Wolter (2011) find that dense local labor markets are negatively associated with the provision of apprenticeship training by firms in Switzerland. Similarly, Brunello and De Paola (2008) and Brunello and Gambarotto (2007) find that regional employee density has a negative effect on training participation in Italy and the UK, respectively. This also holds true for Germany, where employees participate less in on-the-job training when they work in local labor markets with a high number of firms in the same industry (Rzepka and Tamm, 2013). These studies find suggestive empirical support for the existence of the poaching externality. Bellmann et al. (2011) took a broader approach by investigating a variety of different regional determinants for firms' investments in training of their employees; in particular, they examine the population density, the unemployment rate and the industrial concentration. The authors only detect a statistically significantly negative coefficient for the regional unemployment rate.

Using data from the National Educational Panel Study, this paper provides estimates of the determinants of individuals' training participation considering the regional training supply and a variety of other regional factors in addition to the usual characteristics. As there is no single perfect measure of training supply, we will use two alternative data sets on training supply to check the robustness of our results. This paper contributes to the literature in various aspects. This paper is the first to take a closer look at supply-side aspects for training participation. While in the economics of education the proximity to colleges was already identified as a determinant of educational attainment (Card, 1995; Spiess and Wrohlich, 2010), there is no such evidence for training. This is one of the first papers estimating the role of travelling costs approximated by the density of training suppliers for training participation. Furthermore, for policy makers, the provided size of the effect of training supply on individuals' training participation can be compared with the effects from alternative, demand-oriented policy approaches. Since policy makers are also concerned with equity issues of training and equal opportunities (Bassanini et al., 2007), regional variation in training supply that affects training participation creates regional imbalances. This might also be important for regional policies. Furthermore, given the small number of papers being concerned with regional determinants, we also contribute to the literature by considering its importance empirically.

The paper proceeds as follows. In the next section, we describe the data (putting a particular focus on comparing the two measures of training supply) and we discuss the empirical strategy. Section three is devoted to presenting and interpreting the results. The final section concludes the study.

2. Data and Empirical Strategy

Data

The analysis uses the first wave (2009/10) of the adult cohort of the National Educational Panel Study (NEPS, Start Cohort 6). The survey data contains life course information on education, training and

occupation biographies, labor market attachment and family formation processes from birth to adult life for more than 11,000 individuals born between 1944 and 1986 (Blossfeld et al., 2011). The NEPS data provides information on individuals' participation in on-the-job, classroom-type training (e.g. lectures or seminars) for the 12 months prior to the interview that took place while individuals were employed. Furthermore, socio-demographics (e.g. gender, migration background, age), individuals' educational and occupational level, job- and firm-related characteristics (e.g. tenure, part-time contract, temporary contract, firm size and industry) are included as well.

One unique feature of the NEPS data is that they provide information on the respondents' county of work. This information enables us to merge regional characteristics to the survey data. Instead of using the county level for merging, it is preferable to aggregate this information further to the 141 local labor markets as suggested by Kosfeld and Werner (2012). The advantage of using local labor markets is that they do not exclusively rely on administrative borders, but rather incorporate close commuter links. In particular, the local labor markets were defined by combining regions that are characterized by strong commuter flows. Within these local labor markets, the infrastructure is well established so that travelling within these regions – such as from work to a training supplier – might come at a lower cost than travelling to a neighboring local labor market that is closer in terms of kilometers, but not as well connected in terms of the transportation infrastructure.

The main variable of interest, the regional training supply, comes from two different data sources. The first source covers the universe of all German establishments that employ at least one employee paying social security contributions. This administrative data is collected by the federal employment agency (Statistik der Bundesagentur für Arbeit, 2013). Training suppliers are identified based on their industry affiliation. All establishments in "Adult and other education n.e.c." are classified as training suppliers (NACE Rev. 2, code 85.59). In the data, the overall number of training suppliers for every local labor market is available for the year 2009. One shortcoming of this data is the omission of training suppliers that have no employees that pay social security contributions. Even though around 80 percent of all German employees are covered by social security, training suppliers with a small firm size like one-man businesses are often not. In the following, this data set will be referred to as "BA data".

The second measure for the number of training suppliers comes from the wbmonitor data (hereinafter "wbmonitor data") that covers the universe of all training suppliers collected in 2007 (Bundesinstitut für Berufsbildung and Deutsches Institut für Erwachsenenbildung, 2007). This firm data set of training suppliers is more comprehensive as it was not restricted by definition to cover only firms with employees that contribute to social security. The wbmonitor data collection combined a variety of data sources and data bases covering training supply information. First evidence on how the number of training suppliers from the BA data compares to the wbmonitor data is provided in Figure 1. A clear linear pattern emerges. This is also reflected in the linear prediction line ("fitted values") when regressing the number of training suppliers from the BA data by local labor market on the corresponding number from the wbmonitor data by Ordinary Least Squares (OLS). The difference between the data sources is that the BA data contains a smaller number of training suppliers, which one would assume given the under-coverage of establishments with smaller size. A more detailed comparison of the data sets will follow below.

As further control variables the following regional information will also be merged to the survey data: The local unemployment rate, the qualification level of the employees (disaggregated into shares of vocational degree and university degree), the share of migrants in the population and the population density that are provided in the regional database by the German Statistical Office (Statistische Ämter des Bundes und der Länder, 2014). The regional industry composition is also included, which is represented by the number firms in each 1-digit industry and local labor market and obtained from the federal employment agency (Statistik der Bundesagentur für Arbeit, 2013).

The analysis is restricted to individuals that are working as employees at the time of the interview excluding self-employed, unemployed, retirees and apprentices. This reduces the number of observations from 11,649 to 7,959. Employees from the public sector and civil servants are excluded as well which reduces the data set by 2,173 observations. It was shown that training investments differ between the private and public sector (Booth and Katic, 2011) which. Furthermore, 587 observations are lost because individuals refused to report their place of work and 410 observations because of having refused to report information on any of the other control variables (e.g. socio-demographics, education, occupation or job or firm characteristics). The final sample consists of 4,789 private-sector employees.

A more detailed description and summary statistics of all variables can be found in Table 1. To summarize some key descriptive statistics: 36 percent of the individuals in the sample participated in on-the-job training. Figure 2 illustrates that training incidence varies substantially across local labor markets. In the sample, 55 percent are males, almost 10 percent have a migration background, 11 percent have no educational degree, 67 percent have a vocational degree and 22 percent have a college degree. The average age is 45 years and the average tenure is 10 years. The mean local unemployment rate was 7.7 percent in 2009. On average, the share of the high-skilled employees in a local labor market amounted to 9 percent, that of medium-skilled employees to 60 percent and that of employees with a migration background to 6 percent.

Concerning training supply, we focus on the density of training suppliers in the analysis which is calculated by dividing the number of training suppliers by the size of the local labor market (measured in km^2). This is necessary because the absolute number of training suppliers is only an inappropriate proxy of travelling costs. For reasons of interpretation, the density is multiplied with one hundred. The average density of training suppliers in the BA data is 4.7 with a minimum of 0 and a maximum of 19.3. In the wbmonitor data, the average is 8.3 (with 0 as minimum and 33.7 as maximum). Due to differences in coverage of the two data sets the levels of density can hardly be compared with each other. However, the distribution of the density of training suppliers in the BA and wbmonitor data is very similar. Figure 3 documents that the curves of the distributions follow a very similar pattern, even though the fraction of individuals, which are in the different parts of the distribution, is slightly different. In particular, the BA data indicates a much larger fraction of individuals in low density regions. Figure 4 compares the regional variation in the density of training suppliers when using the BA data and the wbmonitor data. The variation is similarly distributed across German local labor markets.

Empirical Strategy

The analysis estimates the determinants of on-the-job training extending the usual controls by the density of training suppliers and other regional factors at the local labor market level. The regression model is set out as follows:

$$T_{i,t,k} = \alpha_0 + \beta_1 D_{t-1,k} + \beta_2 D^2_{t-1,k} + R'_{t-1,k}\gamma + X'_{i,t,k}\delta + \varepsilon_{i,t,k} \quad (1)$$

where *i* stands for the individual, *t* for the time (t = 2009/10) and *k* for the local labor market. *T* refers to a binary variable for having participated in continuous training and *D* indicates the density of training suppliers. The regression is estimated twice: First, it is estimated using the density of training suppliers from the BA data and, second, using data from the wbmonitor. Entering the density in squared form allows us to analyze saturation processes in the training market. The vector *R* encompasses all other regional factors such as the unemployment rate, the qualification and migration structure, the population density and the regional industry composition. The vector *X* further includes socio-economics, education, occupation, job- and firm- related factors as were already described in the data section. The idiosyncratic error term is indicated by ε.

Controlling for other regional factors seems of particular importance to avoid measuring a spurious correlation because of omitting regional variables from the regression that are both correlated with the individuals' training probability and the number of training suppliers. For instance, in regions with a high share of high-skilled workers, the training market might be booming because of the well documented complementary relationship between high education and on-the-job training participation (Görlitz and Tamm, 2011). Furthermore, omitting the regional economic density and the local employer competition (Brunello and Gambarotto, 2007, Brunello and De Paola, 2008, Muehlemann and Wolter, 2011, Rzepka and Tamm, 2013) might also bias the results since these were identified as important regional factors of training incidence. Due to spatial dependencies these variables might be correlated with the density of training suppliers.

Note that we do not control for unobserved individual effects (such as ability and motivation)[2] that were found to matter to a large extent for individuals' training participation (Görlitz, 2011). However, we assume that conditional on individual, job, firm and regional covariates, there is no further correlation between individuals' unobserved effects and the density of the training suppliers. This means that individuals' mobility can be endogenous with respect to the regional factors that are incorporated in the regression, but not with respect to the density of training suppliers. Implicitly, we allow regional mobility to be affected by regional employment prospects, by the qualification structure which could mirror job opportunities for individuals with different skill levels, by spatial agglomeration and the regional industry composition, but not by the local training supply.

The regression is run by OLS and the standard errors are clustered at the level of the local labor market (incorporating 135 clusters). This is necessary to avoid biased standard errors in a model regressing individual specific outcomes on aggregate variables such as regional factors (Moulton, 1990). By clustering at the regional level, the analysis also implicitly controls for heteroscedasticity.

[2] This is because there is no adequate proxy for these factors available in the data.

3. Results

The regression results are presented in Table 2 with the density of training suppliers and its square shown in the first two rows. The first column contains the BA data results and the second column the wbmonitor data results. The regional density of training suppliers is statistically significantly related to individuals' training participation. An F-test of joint significance of the density and its squared term (not shown in the table) indicates statistically significance in the BA data at the 5%- level (F-value of 4.32) and in the wbmonitor data at the 1%-level (F-value of 7.72). Figure 5 compares the results when using the two different data sets. The relationship can be characterized by an inverse U-shape.

In the BA data, increasing the density of training suppliers from a very low level of zero to one, which corresponds to an increase of about 2 standard deviations, the training participation quota will rise by approximately 2.3 percentage points. Raising it from 1 to 2 would further increase training participation by an additional 2 percentage points. Departing from the average density which is 4.7, an increase by one unit would still increase training by 1.2 percentage points. Put differently, an increase of the average density by 10 percent increases the training probability by 0.6 percentage points, a change by 20 percent increases training by 1.1 percentage points and a change by 50 percent by 2.4 percentage points. The peak of the relationship is reached at a density of 10.1. Increasing the density from 10 to 11 would reduce training participation by 0.1 percentage points, an insignificantly small amount, while increasing it from a higher level would even result in a reduction of the participation quota. However, since the data only contains four regions where the density of training suppliers is higher than 11, the coefficients are estimated with less precision. This is why we only regard the part of the relationship before the peak as reliably measured and do not interpret the relationship afterwards.

Due to the different scaling of the densities of training suppliers in the two data sets, the u-shape in the wbmonitor data is shifted to the right. Starting from the average density which is 8.3 in this data an increase by one unit increases the participation rate in training by 0.5 percentage points. A 10 percent, 20 percent and 50 percent increase in the density of training suppliers raises training participation by 0.5, 0.9 and 1.7 percentage points, respectively. The peak is reached at a density of 14.8 which is a rare observation. Only two regions have a value higher than 15 which will lead to imprecise estimates. As in the case of the BA data, we do not interpret, therefore, the part of the relationship after the peak.

Among the other regional control variables, only the share of medium-skilled workers in the local labor market has a significant and positive influence on the individual training participation. This is in line with Bellmann et al. (2011). In contrast, the coefficient on the share of high-skilled workers in the local labor market suggests that in areas with many high-skilled employees training participation is lower. Yet, this effect is insignificant. The sign of the local unemployment rate hints at a negative influence, which is also what Bellmann et al. (2011) find for West Germany. The coefficients on the share of employees with a migration background and the population density are positive but insignificant.

The individual covariates are all in accordance with previous findings of the training determinants literature (see e.g. Bassanini et al., 2007). For example, the coefficient on migration background is

negative and significant which suggests that this, as Grund and Martin (2012) also point out, is indeed an influential training determinant. The male dummy is negative but insignificant indicating that gender is not an important factor. The coefficients on the age and tenure variables suggest a lower participation in training for older employees and for those with more years of tenure. Compared to no vocational training, the coefficients on the educational indicators (vocational training degree and university education) suggest that on-the-job training participation is increasing with education, corroborating findings of Görlitz and Tamm (2011). Furthermore, working on a part-time contract is negatively and significantly associated with training participation, a finding that Nelen and Grip (2009) explain with the reluctance of employers to sponsor training of part-time workers and the lower willingness of part-time employees to participate in training. Finally, while the effect for temporary contracts is insignificant, its negative sign points into the direction which other studies have also found (Sauermann, 2006).

To find out whether the relationship between the density of the training suppliers and training incidence might differ for different population groups, we have re-estimated equation (1) separately for educational groups distinguishing high-skilled from other skill groups and for age groups distinguishing individuals younger and older than 40.[3] Incorporating education and age into the analysis of heterogeneous effects can be grounded on its political relevance. Low-skilled and elderly rank among the individuals with lowest participation rates. Increasing average participation quotas basically depends on the potential of mobilization of non-participants for participation. This is why many training subsidies and voucher programs are designed to increase participation of these groups (e.g. by targeted advertisement). Some programs even limit access to these groups.[4]

Table 3 presents the results for the heterogeneity analysis. For education, there is a slight tendency of a higher effect for the high skilled compared to other skill groups in both data sets alike. For age, the wbmonitor data results do not reveal any differences between the coefficients, while the BA data results hint at a more pronounced effect for older workers. However, interacting the density of training suppliers with high-skilled and with age 40 plus does not produce statistically significant interaction terms (not shown). Therefore, we conclude that there is no evidence of heterogeneous effects in the dimensions educational attainment and age.

4. Conclusion

Using data from the National Educational Panel Study 2009/2010, this paper investigates the relationship between the regional training supply and other regional factors on individual training participation. The most pertinent result relates to the density of training suppliers for which we detect a statistically significant, non-linear positive relationship. Therefore, increasing training supply in regions with a low density raises training participation to a much larger extent than in regions with average or above-average density. The results are robust to using two different measures for the training supply in the local labor market. The findings imply that training participation can be raised by implementing policies supporting market entrance of training suppliers. Such a policy would be

[3] The decision on how to split the sample by age was based on the peak of the age-training profile. According to Table 2, the coefficients of age and quadratic age indicate a decreasing tendency between age and on-the-job training starting for individuals at age 40.

[4] See e.g. the German training program WeGebAU.

more effective in regions with a low density of training suppliers. Since there are no statistically significant heterogeneous effects by education and age, this policy would also be suited for affecting the training incidence of low-skilled and older workers.

It should be noted, however, that the overall size of the relationship for the average region is rather modest. Increasing the density of training suppliers by 10 percent in an average region raises training participation by only 0.4 to 0.6 percentage points (which corresponds to an increase of 1.1 to 1.7 percent compared to an average training incidence of 36 percent). With no further information on the effectiveness of demand-oriented policies, which also aim at increasing training take-up as already mentioned in the introduction, a final conclusion on the most effective approach cannot be drawn. However, our results can be integrated in an assessment evaluating several other policy approaches with respect to their effectiveness of increasing training participation.

While raising the number of training suppliers in low-density regions has the potential to increase training participation, we cannot say that the same is true for increasing the number of courses. As we have argued, the theoretical relationship between training participation and training supply derives from a reduction in travelling costs with a higher density of training supply. Increasing the number of courses in a single training firm does not affect training costs in the same way. This distinction is important for policy makers since policies that subsidize established training suppliers in order to raise the number of offered training courses and those that subsidize market entrance of suppliers are designed differently.

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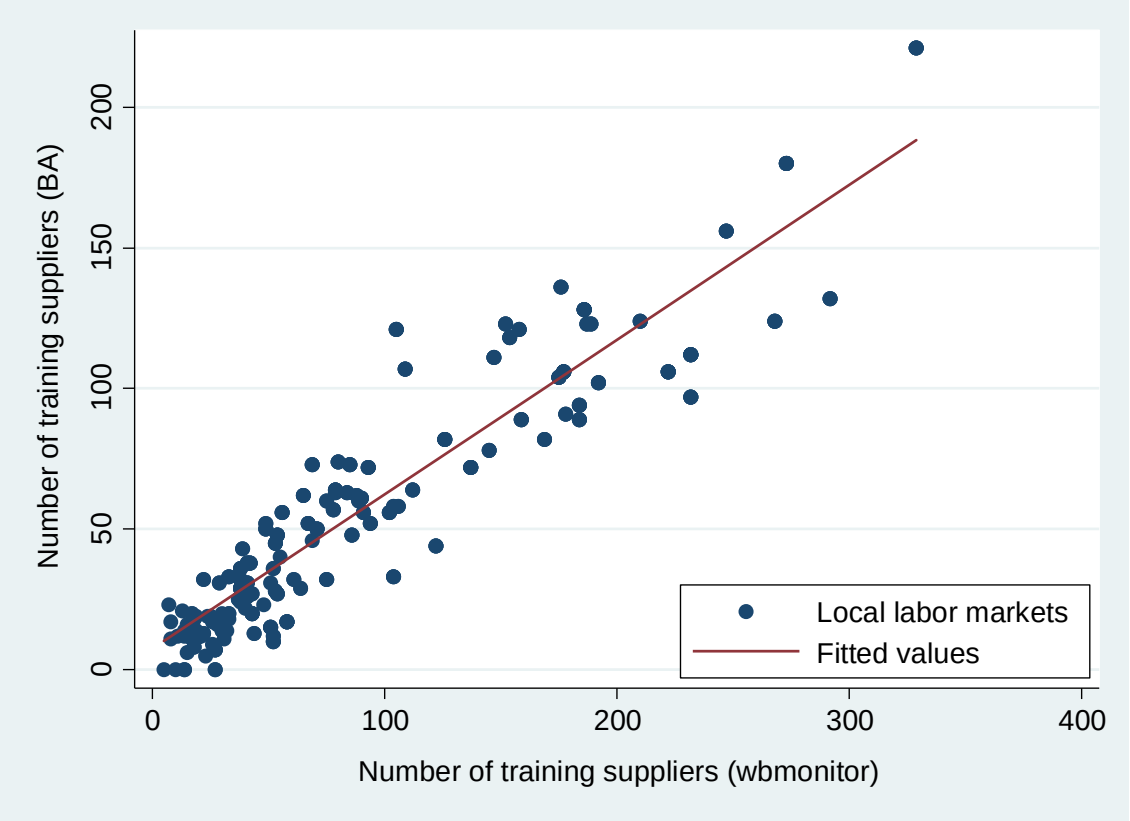
Figure 1. Comparison of the number of training suppliers from BA and wbmonitor data



Notes: "Fitted values" represent the linear prediction based on regressing the number of training suppliers from the BA data on the corresponding number from the wbmonitor data.

Figure 2. Average training incidence per local labor market

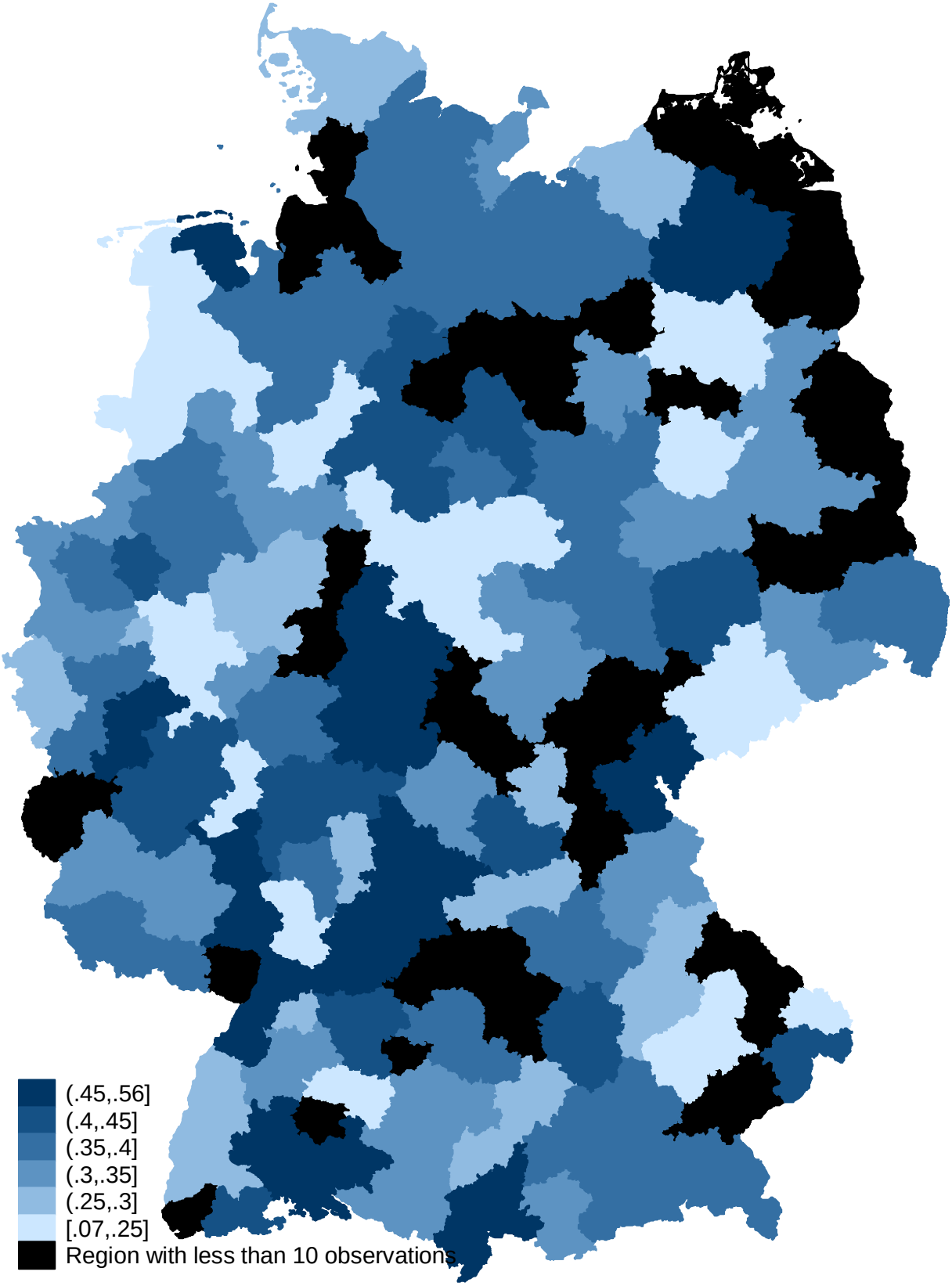
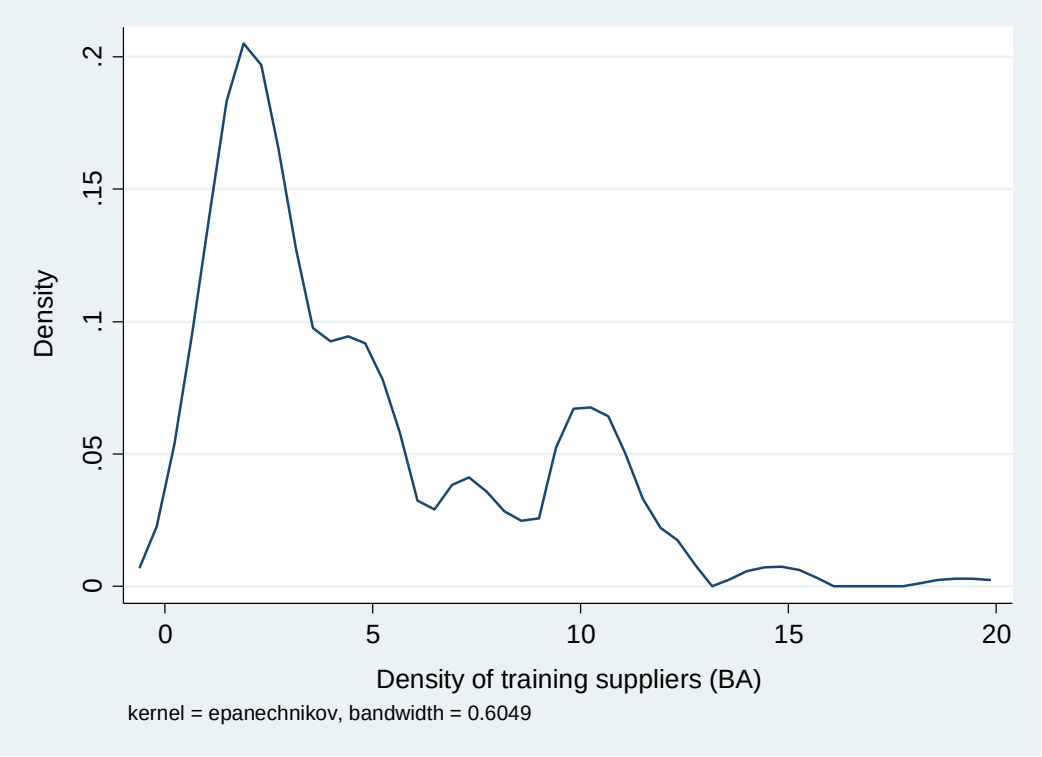


Figure 3. Comparison of the density of training suppliers from different data sources

Panel A: BA data



Panel B: Bibb wbmonitor data

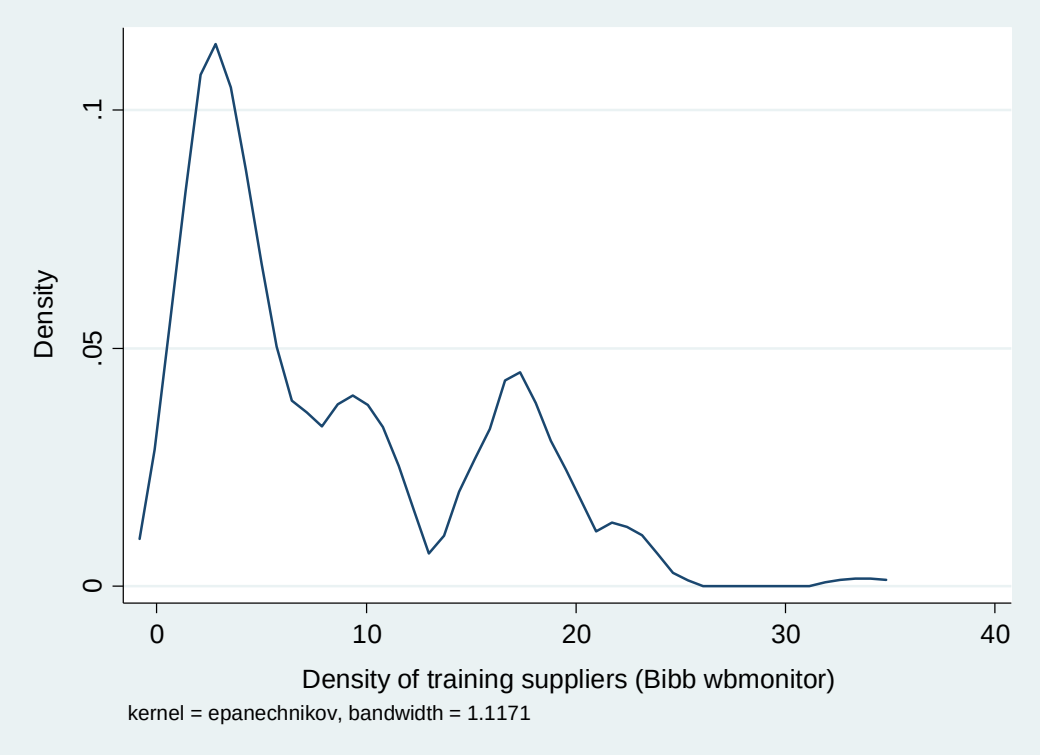
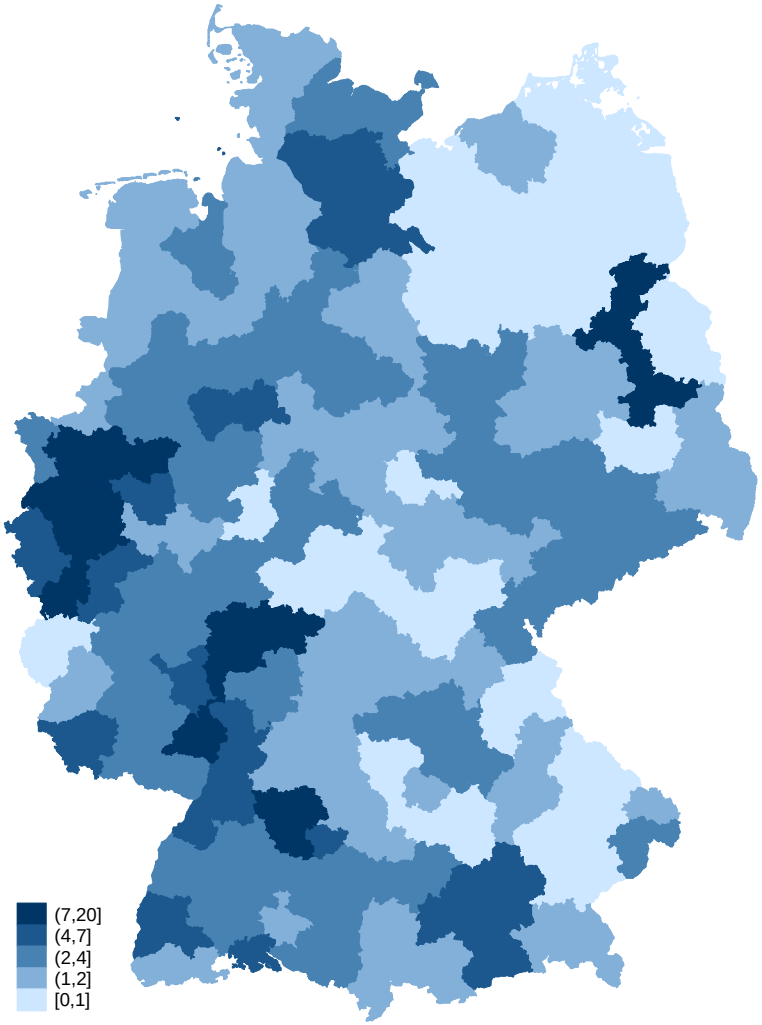


Figure 4. Comparison of the regional density of training suppliers from the BA data and from the wbmonitor data

Panel A: BA data



Panel B: Wbmonitor data

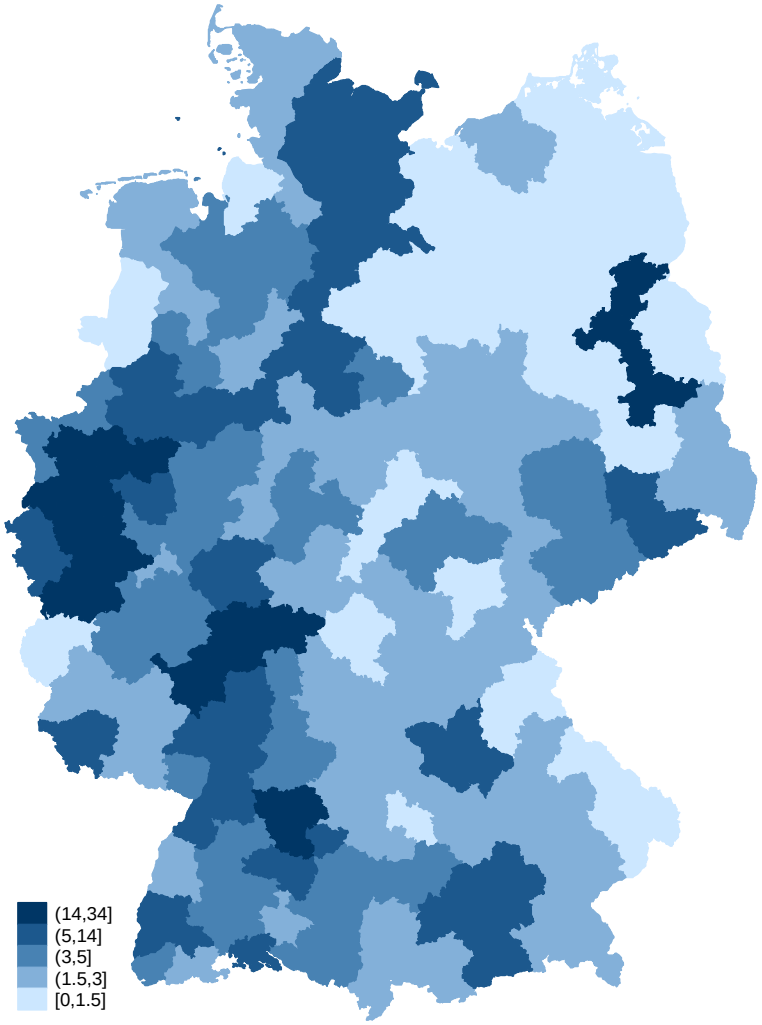
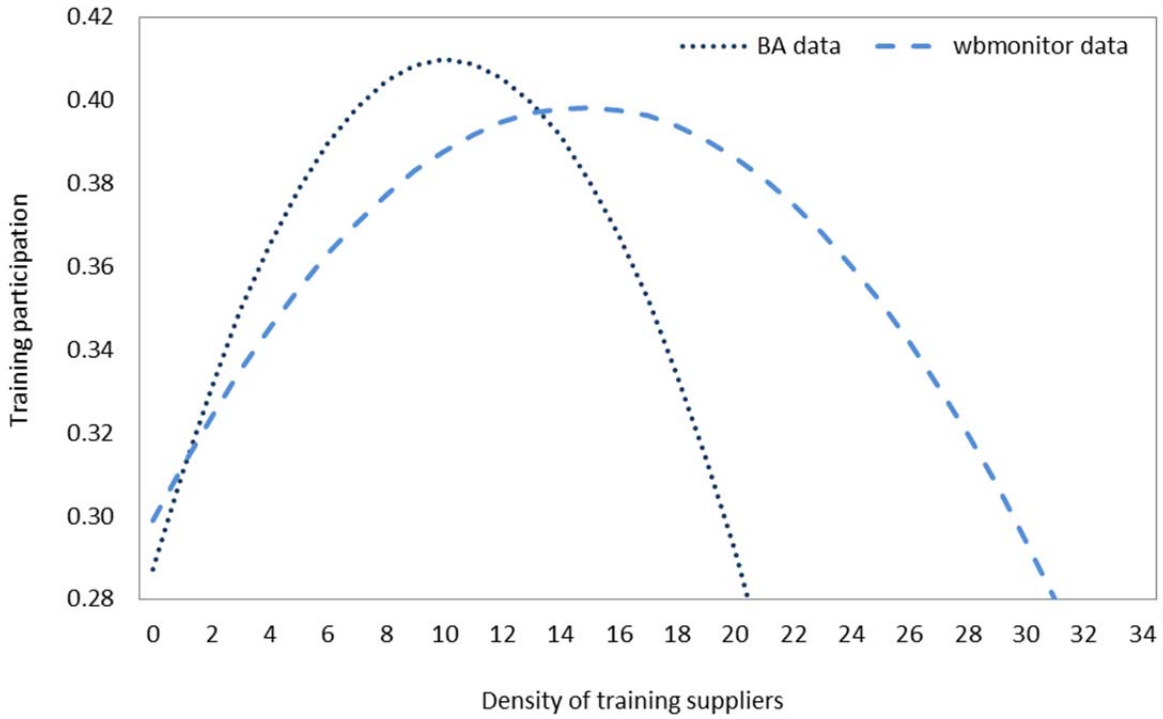


Figure 5. The relationship between the density of training suppliers and training participation



Notes: The prediction is based on the results of equation (1) as shown in Table 2.

Table 1. Description of variables and summary statistics

Variables	Description	Mean	Min	Max
Individuals' training probability	Binary variable: 1- training participation, 0 otherwise	0.36	0	1
BA data				
Density of training suppliers	Number of training suppliers per km^2 in local labor market (x 100)	4.68	0	19.25
Density of training suppliers squared	Number of training suppliers per km^2 in local labor market (x 100) squared	35.29	0	370.58
wbmonitor data				
Density of training suppliers	Number of training suppliers per km^2 in local labor market (x 100)	8.32	0	33.69
Density of training suppliers squared	Number of training suppliers per km^2 in local labor market (x 100) squared	114.90	0	1134.90
Local unemployment rate	Unemployment rate in local labor market in percent (2009)	7.74	3.00	16.45
Share of high-skilled in local labor market	Share of population with university degree in local labor market (2009)	0.09	0.04	0.17
Share of medium-skilled in local labor market	Share of population with apprenticeship degree in local labor market (2009)	0.60	0.53	0.75
Share of migrants in local labor market	Share of population with migration background in local labor market (2009)	0.06	0.01	0.14
Population density	Population per size (in km^2) of local labor market (2009)	420.37	39.90	1,875.31
Regional industry composition	14 variables indicating the number of firms for each 1-digit industry classification	---	---	---
Male	Binary variable: 1- male, 0- otherwise	0.55	0	1
Foreign born	Binary variable: 1- foreign born, 0- otherwise	0.09	0	1
Age	Age in years	45.16	23	67
Age squared	Age in years squared	2,136.08	529	4,489
No educational degree	Binary variable: 1- no eduation, 0- otherwise	0.11	0	1
Vocational training degree	Binary variable: 1- vocational education, 0- otherwise	0.67	0	1
University education	Binary variable: 1- university education, 0- otherwise	0.22	0	1
Tenure	Tenure in years	10.06	0	45
Tenure squared	Tenure in years squared	189.59	0	2,025
Part-time contract	Binary variable: 1- part-time contract, 0- otherwise	0.30	0	1
Temporary contract	Binary variable: 1-temporary contract, 0- otherwise	0.16	0	1
Occupational fixed effects	9 binary variables for occupation according to the ISCO classification (1-digit)	---	---	---
Firm size	4 binary variables indicating individuals' firm size (in groups)	---	---	---
Industry	13 binary variables for industry according to NACE Rev. 2 classification (1-digit)	---	---	---

Notes: The number of observations is 4,789.

Table 2. Determinants of individuals' training participation

Covariates	BA data	wbmonitor data
Density of training suppliers	0.0243 **	0.0134 **
	(0.0119)	(0.0062)
Density of training suppliers squared	-0.0012 ***	-0.0005 ***
	(0.0004)	(0.0001)
Local unemployment rate	-0.0004	0.0005
	(0.0040)	(0.0040)
Share of high-skilled in local labor market	-0.5574	-0.5797
	(0.4490)	(0.4941)
Share of medium-skilled in local labor market	0.7286 **	0.6961 **
	(0.3092)	(0.3051)
Share of migrants in local labor market	0.565	0.5388
	(0.4944)	(0.4675)
Population density	0.00005	0.0001
	(0.0001)	(0.0001)
Male	-0.007	-0.007
	(0.0198)	(0.0199)
Foreign born	-0.0432 *	-0.0428 *
	(0.0241)	(0.0239)
Age	0.0133 **	0.0133 **
	(0.0061)	(0.0061)
Age squared	-0.0002 **	-0.0002 **
	(0.0001)	(0.0001)
No educational degree	Reference Group	Reference Group
Vocational training degree	0.0426 **	0.0423 **
	(0.0170)	(0.0170)
University education	0.0724 ***	0.0723 ***
	(0.0230)	(0.0231)
Tenure	0.0039 **	0.004 **
	(0.0020)	(0.0020)
Tenure squared	-0.0001 **	-0.0001 **
	(0.0001)	(0.0001)
Part-time contract	-0.0706 ***	-0.0704 ***
	(0.0165)	(0.0165)
Temporary contract	-0.0147	-0.0148
	(0.0186)	(0.0187)
Occupation fixed effects	Yes	Yes
Firm size	Yes	Yes
Industry	Yes	Yes
Regional industry composition	Yes	Yes
Observations	4,789	4,789
R^2	0.113	0.1132

Notes: The dependent variable is a binary variable, with 1 indicating participation in on-the-job training and 0 otherwise. Estimates are based on OLS regression results. Standard errors are clustered at the level of local labor markets (135 clusters). Significance levels: *** 1%, ** 5%, * 1%.

Table 3. Heterogeneous effects of the density of training suppliers by education and age

Covariates	BA data	wbmonitor data
Panel A: Heterogeneity by education		
Low and medium skilled workers		
Density of training suppliers	0.0172	0.0112
	(0.0131)	(0.0072)
Density of training suppliers squared	-0.0010 *	-0.0004 **
	(0.0005)	(0.0002)
High skilled workers		
Density of training suppliers	0.0441	0.0221 *
	(0.0307)	(0.0125)
Density of training suppliers squared	-0.0018 *	-0.0007 **
	(0.0010)	(0.0003)
Panel B: Heterogeneity by age		
Age group: up to 39 years		
Density of training suppliers	0.0175	0.0128
	(0.0204)	(0.0111)
Density of training suppliers squared	-0.0015 *	-0.0005 **
	(0.0008)	(0.0002)
Age group: at least 40 years		
Density of training suppliers	0.0242	0.0126
	(0.0164)	(0.0081)
Density of training suppliers squared	-0.0011 *	-0.0004 ***
	(0.0006)	(0.0002)