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Keskusteluaiheita – Discussion papers

No. 1184

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THE EFFECTS OF GENERAL AND FIRM-SPECIFIC TRAINING ON WAGES AND PERFORMANCE: EVIDENCE FROM BANKING

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ISSN 0781-6847 20.04.2009

JONES, Derek C. – **KALMI,** Panu – **KAUHANEN,** Antti, **THE EFFECTS OF GENERAL AND FIRM-SPECIFIC TRAINING ON WAGES AND PERFORMANCE: EVIDENCE FROM BANKING.** Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 2009, 34 p. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847; No. 1184).

ABSTRACT: By using new panel data for Finnish banks we study the impact of training on wages and performance. To the best of our knowledge, ours is the first paper to compare explicitly the effects of general and firm-specific workplace training on outcomes for both employees and firms. Unlike much existing literature, we find stronger evidence that training improves worker outcomes rather than organizational performance. Depending upon specification, the estimated wage elasticity with respect to training is in the range of 3-7%, whereas the performance effects vary widely depending on the measures of training intensity. The other key finding is that general training is associated with higher wage and performance effects than is firm-specific training.

JEL Codes: M53, J24, G21

JONES, Derek C. – **KALMI,** Panu – **KAUHANEN,** Antti, **YLEISEN JA YRITYS-KOHTAISEN KOULUTUKSEN VAIKUTUKSET PALKKOIHIN JA MENESTYK-SEEN: NÄYTTÖÄ PANKKITOIMIALALTA.** Helsinki: ETLA, Elinkeinoelämän Tutkimus-laitos, The Research Institute of the Finnish Economy, 2009, 34 s. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847; No. 1184).

TIIVISTELMÄ: Käytämme uutta paneeliaineistoa suomalaisista pankeista tutkiaksemme työpaikkakoulutuksen vaikutusta palkkoihin ja organisaation menestykseen. Tietääksemme tämä on ensimmäinen paperi, jossa eksplisiittisesti vertaillaan yleisen ja yrityskohtaisen koulutuksen vaikutuksia sekä työntekijöihin että yrityksiin. Muusta kirjallisuudesta poiketen havaitsemme, että työpaikkakoulutus parantaa työntekijöiden tulemia pikemminkin kuin organisaatioiden tulemia. Spesifikaatiosta riippuen palkkojen estimoitu jousto koulutuksen suhteen on 3-7%, kun taas vaikutukset yrityksen menestykseen vaihtelevat suuresti riippuen koulutuksen intensiivisyyden mittareista. Toinen keskeinen havainto on, että yleinen koulutus on voimakkaammin yhteydessä palkkojen ja menestysmittareiden kasvuun, kuin yritys-kohtainen koulutus.

JEL koodit: M53, J24, G21

I Introduction

Two important issues are raised in most economic studies of training. First, does training increase efficiency and by how much? Second, who reaps the gains from training? In addressing these issues, the standard (Beckerian) theory concludes that in competitive markets, employers will not pay for general training. By definition, general training increases employee productivity by the same amount in the current workplace and elsewhere. If employees participate in general training, their employers have to bid up employees' wages reflecting the productivity increases due to training. If they fail to do so, other potential employers can "poach" these workers and free-ride in training expenses. Hence, according to this theory, in competitive labour markets, employers would finance training only if there are some specific elements in it. By contrast, the early empirical evidence on training revealed that employer-provided training is mostly general in nature and that, nevertheless, employers paid the costs of training (e.g. Lynch 1992; Loewenstein and Spletzer, 1998, 1999; Barron et al. 1999).

To explain this inconsistency between theory and empirics, many subsequent theorists point to imperfections in labour markets. It is argued (e.g. Acemoglu and Pischke, 1999; Manning, 2003) that search frictions, certain labour market institutions (e.g. unions, minimum wages), imperfect competition in small labour markets (Stevens 1994), or asymmetric information in training among current and potential employers may lead to situations where employees capture only a fraction of the productivity gains. These models also imply that wages do not equal marginal revenue product, and this has motivated recent literature that studies the impact of training on productivity and wages[1]. Consistent with theory grounded in imperfect labour markets, more recent empirical evidence on the impact of training on wages and productivity finds that there is a wedge between wages and productivity effects and that employees and employers seem to share the benefits from training. This applies both to

[1] For theoretical literature see e.g. Acemoglu and Pischke (1999) and Booth and Zoega (2004).

industry levels studies (Conti 2005; Dearden et al. 2006) and firm level studies (e.g. Ballot et al. 2006).

However, while recent empirical studies typically have found that training increases both wages and performance, an important limitation of most of this work is that researchers have been unable to specify whether the training received was general or firm-specific. The existing literature on the wage effects of general and specific training has produced conflicting results (compare, for example, Lynch 1992, Loewenstein and Spletzer 1999 and Budria and Pereira 2007). To our knowledge the only studies linking the generality of training to firm performance are Lynch and Black (1995), who find that off-the job (general) training improves performance whereas on the job training does not, and Barrett and O'Connell (2001), who also find that general training is associated with better performance whereas firm-specific training is not. In turn, these studies have not considered how the benefits from training are shared between employees and firms. There are also other limitations: for instance, Lynch (1992) and Loewenstein and Spletzer (1999) use rather restricted samples of young employees. In performance studies, Lynch and Black (1995) estimate cross-sectional models and Barrett and O'Connell (2001) have data from only two time points. In addition, Keep et al. (2002) identify several significant gaps in the literature. Relatively few studies have studied firm-level outcomes, have utilized information on employer investments in training or used dependent variables that are of most interest to employers, such as costs and profitability.

In this paper we study the effects of training on wages and performance in a large sample of Finnish co-operative banks and our data enable us to overcome some significant limitations of the previous literature. As far as we know, ours is the first paper to compare the wage and performance effects of employer provided training that is able to distinguish between general and specific workplace training. In addition, we use different measures of

training intensity and our panel data enable us to control for unobserved firm-level heterogeneity by estimating fixed effects models.

A further contribution of this paper is that we take a different view of the appropriate measure of organizational performance. Most earlier studies that investigate the performance effects of training have focused on the impact of training on productivity. This is understandable from a societal perspective, where the main interest is on how training affects the size of the overall pie and typically abstracts from distributional issues. However, in studies where the focus is explicitly on how gains are shared, it is more natural to use objective functions that center on organizational performance from the point of view of the employer, such as cost and profit efficiency. This is also consistent with long-established traditions in the banking literature (see especially Berger and Mester 1997). In banking studies, cost and profit estimations have been preferred over productivity estimations, because there are no readily available measures for value added in banking, due to the difficulties of constructing a single measure of bank output (Berger and Humphrey 1992). In this paper, we use cost and profit efficiency as our measures of organizational performance.

A study of training in banking is particularly interesting and relevant because much of the literature, especially that studying performance effects, is focused on manufacturing industries (e.g Black and Lynch, 1996; Bartel, 2000). Moreover, in cross-industry comparisons, in banking the intensity of employee training has been found to be very high. For instance, in a comprehensive study on workplace training in Europe, Bassanini et al. (2007, p. 207) find that the likelihood that an employee receives training is higher in banking than in any other industry.[2] In part this reflects the fact that banking and finance have been in considerable turmoil in recent years and the ways work is conducted have changed rapidly (e.g. Hunter et al. 2001). For example, there has been a remarkable increase in the number and

[2] See also Conti (2005).

complexity of products that bank employees sell. Also there has been rapid technological change, especially the rise of internet banking, which has changed the way individuals interact with banks. Still, there appears to be no quantitative studies on the impact of training on employee incomes and bank efficiency.

We use field research to understand the process and context and combine qualitative data derived from interviews with employees and managers with objective panel data on performance. By adopting this econometric case study method we expect reduced measurement errors in both dependent and independent variables. Arguably this approach enables more accurate results compared to firm- or individual-level surveys and more accurate interpretation of results (see Ichniowski and Shaw 2003; Jones et al. 2006). In our case, the performance data are reported to the supervisory authorities and therefore they are highly reliable. Moreover, the data on training is unusually detailed and also very homogeneous, since the bulk of training is offered by one provider.

II Case description

We investigate Finnish co-operative banks in the OP Group. During our observation period 2000 – 2004, there were 239 such banks. The OP Group is the larger of the two groups of co-operative banks in Finland. One advantage of this sample is that we have a fairly large number of cross-sectional observations for each year. The banks are rather homogeneous in their operations, all of them orienting towards retail market serving a rather broad class of consumers, and the type of training their employees obtain is similar. The OP Group is among the leading Finnish banks, and its market share in both loans and deposits has been over 30% throughout the 2000s. The position of OP Group in the Finnish banking market is comparable with many other European countries, where co-operative banks are among the market leaders.[3]

[3] Other European countries where co-operative banks hold over one-fourth of the deposits include France (where they have more than 50% of the market), the Netherlands, Austria, and Italy (Fonteyne, 2007).

Some centralized functions in the OP Group are divided between two divisions. OKO Bank (now Pohjola Bank) operates as the central bank for co-operative banks, guaranteeing liquidity for banks in the group. It also takes care of more specialized operations (e.g. investment banking), whereas individual banks are responsible for retail operations. The Group Central is responsible for joint marketing activities, development of internet banking and IT services and, importantly for our purposes, providing training services for the group. Within the group, the banks are also cross-insuring themselves. For co-operative banks, there are significant benefits from group membership as they help the small banks to overcome size limitations and to obtain economies of scale.

Importantly, even though the network of co-operative banks is tightly integrated, each bank is still an independent unit. Each local bank is owned by local customers (members). There are also non-member customers, and the mean ratio of members to all individual customers is around 40%.[4] Members appoint the board of directors, which is independent from the central units. The banks make their operational decisions (e.g. setting the interest rates for loans and deposits, decisions on loans, hiring CEO etc.) independently. They also can decide to what extent they will use services offered by the Group Central. In turn, the Group Central is owned by the local co-operative banks.

Although there are significant differences in the size of co-operative banks, all of them share a focus on retail activities and serving individual customers and small local businesses, rather than large corporations. Much of the focus is on basic transactions, such as taking deposits and offering other saving services, mortgage lending etc. However, even in the retail market the products are developing fast and the employees must update their product knowledge.

[4] Membership requires that the customer purchases a share in co-operative equity capital, typically of nominal value of 100 euro. Only individual persons can be members, not organizations. Each member has one vote.

To understand the content and aims of training in the case, we conducted interviews with bank managers and clerks in three co-operative banks of different sizes within a 100 km radius from Helsinki. In addition, we conducted interviews with group managers who had experience from co-operative banks all over the country. All managers highlighted the importance of training in a rapidly developing industry. According to one manager, most of the (older) employees have been hired for their numerical skills, whereas the work now is very sales-oriented. Also, bank clerks must also be able to give their clients financial advice. Co-operative banks have (in practice, even if not formally) no lay-off policies and rely heavily on internal promotions rather than recruiting outside the group, so they must rely on training in helping to improve marketing skills of their workers. In new recruitment the sales skills can be emphasized, but the job requires also a lot of both general knowledge of the industry and customer-specific knowledge, that raises the value of low employee turnover. In practice this means that the training effort in these banks spreads over a large number of employees with different tenures and is not concentrated only on new employees who are sometimes the focus of the literature (e.g. Loewenstein and Spletzer, 1998). However, the type of training required by new and older employees may differ.

For several decades the Group Central has operated its own training institute for co-operative banks, which has been called the OP Academy since 1995. While the main location of the Academy is in Helsinki, they also organize training in regional locations, so it is not necessary to send trainees to the capital. The training takes place outside the bank premises in designated training centers. Twice a year the OP Academy publishes its teaching curriculum, for spring and autumn terms. While the Group Central strongly encourages the co-operative banks to take advantage of the training courses organized by the Academy, and the courses are offered at subsidized prices, it cannot require the banks to purchase training services. Each co-operative bank decides independently how much training they will purchase from the OP Academy.

The course descriptions reveal a strong emphasis on the development of sales skills and in advising customers on new financial products as well as other broad and general skills (e.g. language and communication skills, IT skills, human resource management skills). Courses organized by the Academy are structured in modules and completing a module means that the trainee receives a "degree". There are different types of degrees for employees in different positions in the organization. Participation by employees in courses is usually agreed in development talks involving the employee and her/his supervisor so that career moves follow completion of appropriate degrees.

In addition, banks may organize their training internally and purchase training services from outside consultants. This more specialized training is geared towards the needs of individual banks and takes place mostly in the bank premises. Since training organized by the OP Academy is subsidized and also economies of scale exist, individual banks appear to organize training by themselves only when they cannot find courses from the Academy that suit their needs. While we know less about the precise content of this internally organized training (compared to group-level training), from our interviews it appears that at the broad level of course titles, the training organized by individual banks is not very different from that organized by the group, although there are likely to be subtle differences in content. One manager reported that they used bank-specific training to improve communication and sales skills. Another manager stated that bank-specific training was used mainly to train upper level employees. Bank-specific training also differs from group-level training provided by the Academy insofar as bank-specific training is usually tailored to a much smaller group of employees.

Interviews also revealed that training beyond formal training programs is supported by the work organization. Much of this informal training is entry-level. New employees usually work very closely during the first couple of weeks with a more experienced employee who acts as a tutor. The employee's responsibilities and degree of independence are gradually

broadened as more experience is gained. We do not have information on the scale informal training activities, nor how it varies among OP banks.

Training costs are almost always borne by the banks and not by employees.[5] This is clear from the collective wage agreements for banking sector employees (in practice these bind irrespective of whether or not individuals belong to unions). Many banks have the pay of individual employees partly tied to their skill assessments, and that might reinforce the link between pay and training. The most important costs employees are likely to bear from training are possible unpaid overtime and increased mental effort, although we do not have any quantitative estimates of these items.[6]

III Conceptual issues and hypotheses

In the analysis that follows, we highlight differences between general and specific workplace training. We argue that group-level training is more general than training organized independently by the banks. In so doing we build on earlier literature that distinguishes general and firm-specific training, notably Lynch (1992) who argues that on-the-job training is more specific than off-the-job training and Loewenstein and Spletzer (1998) who argue that company training is more specific than school training. One argument in support of this claim builds on the suggestion by Lazear (2003) that firms use general skills in different combinations and hence even general skills can be firm-specific in the sense that a particular mix of general skills might be especially useful in only a given firm. In our case, the training provided by the OP Academy is geared to a large number of participants, and emphasizes skills that are needed in all kind of banks, whereas bank-specific training answers to more specialized needs.

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[5] In some cases employee might want to undertake very specialized training that is not directly related to her / his current job description. In such a case the employer is not required to cover the cost of the training. However, in our interviews the respondents indicated that often in such cases the employer covers the training costs at least in part.

[6] Our interviews indicate that participation in coursework takes place within working hours, but the courses often include assignments that employees sometimes do outside working hours.

Another compelling argument reflects considerations based on asymmetric information. Completion of group-level training results in documentation—awarding of a degree certificate. Thus the public, including potential employers, has knowledge of the skills learned by trainees, thereby reducing informational asymmetries and making the skills more general. By contrast, bank-specific training typically does not result in such documentation and thus the informational asymmetries are greater.[7] While it is difficult to establish differences using an absolute scale, it seems clear that, relatively speaking, group-level training is more general.

In turn, this leads to our first hypothesis that when employers actually pay for training, group-level training is expected to have a much stronger association with wage increases than does bank-specific training. This is because employees can use the skills and the documentation on their skills they obtain in group-level training more effectively in enhancing their value in the labour market, compared to bank-specific training.[8]

It is more difficult to predict the effects on organizational performance of general versus specific training. If the key difference between the two types of training is in how employees are able to signal their skills to potential employers, then there might be little reason to expect fundamental differences in performance. However, in their empirical analysis on this question, Barrett and O'Connell (2001) find that general training is associated with higher performance but specific training is not. They argue that employees may regard employer-sponsored general training as a gift, because employers improve the position of employees, while leaving their own positions more vulnerable. Consequently, employees are

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[7] Some previous literature makes use of the difference between general and specific skills (e.g. Loewenstein and Spletzer 1999; Barrett and O'Connell 2001) with their argument typically focusing on the content of training. At the same time it is clear that in practice it is often rather difficult to demonstrate which type of training is more specific. For example, the degree of generality indicated in surveys may also be interpreted by different managers in different ways. This may induce measurement error: for instance, Loewenstein and Spletzer (1999) find that a large majority of training is general in content, whereas Barrett and O'Connell (2001) find the reverse.

[8] In addition, at the individual level the link between training and wages may be enhanced through skills assessments and career path planning. However, in our empirical analysis we measure the variation in wages at the level of banks. Because the hierarchical structure within the banks is likely to remain stable, this ensures that the possible wage effects we find should not reflect career advancement.

expected to show their gratitude by exerting more effort. If we apply this gift exchange argument to our case, we are led to expect greater performance effects from general training.

We also note that institutional features and market conditions surrounding our case may modify these hypotheses and influence our empirical results. For several reasons, we expect employee turnover to be a lesser problem in our sample of Finnish co-operative banks than, for instance, in the US banking sector described by Keltner and Finegold (1996). First, in Finnish labour markets in general employees value loyalty and average tenures are relatively high compared to the US. Second, often co-operative banks operate in rural areas with relatively limited employment opportunities and limited local competition from other banks, so the competition for labour is not keen.[9] Our interviews indicate that the main form of mobility is between banks within the co-operative group. Sometimes if immediately after receiving training an employee leaves one co-operative bank to go to another cooperative bank, the receiving bank compensates the bank losing the employee for at least part of the cost of training. This provides a further incentive for banks to train. Finally, in co-operative banks employees are usually members, and this may enhance their loyalty (Fonteyne 2007). The existence of a dedicated training institution is also likely to result in more intensive use being made of training and also to serve as a signal from the central level that high levels of training are expected.

The co-operative structure of banks may also influence the effects of training. Co-operative banks do not aim to maximize profits but member welfare. Employees, usually through their role as customers, often constitute one group of owners. Because member governance is often passive, sometimes employees may actually capture substantial decision-making powers (Gorton and Schmid 1999; Fonteyne 2007). This means that the employee-members might be in a position to influence the sharing of surplus in their favor. This is even

[9] Stevens (1994) provides a formal model suggesting that general training is enhanced by smaller labour markets. See also Groen (2006) for empirical support for this proposition.

more pronounced through the fact that the distribution of the profit in co-operative banks is limited and formally related to members' use of services. All this would indicate that in the context of co-operatives, a disproportionally bigger share of surplus may actually go to employees. Therefore the link between training and wages may be expected to be even more pronounced and, correspondingly, the link between training and firm performance would be expected to be weaker in the case of co-operative banks in comparison to the previous studies of conventional firms.

IV Data and Descriptive Statistics

Three broad types of data have been assembled and come directly from the Group headquarters. First, there are economic data collected from income statements and balance sheets. Since these data have been collected by the OP Group and also transmitted to the Financial Supervision Authority of Finland, there is a high level of confidence in the accuracy of the data. Second, and most unusually, we have detailed data on training. Data include two measures of the amount of training, the monetary expenses of training as well days spent in training. While the data on training expenditure come from the accounting department of the Group Central, the data on training duration come from the personnel department and are based on time use surveys. Furthermore, since we can divide training data according to the organizer of training, this allows us to make inferences about the nature of the generality of training. Finally, we have bank level data on variables we will use as controls in our statistical work, e.g. the average characteristics of the workforce (education, age, tenure, gender), as well as other controls such as municipal unemployment rates.

The time span for the study covers the five years, 2000 - 2004. We have annual data for both economic and training variables, except that the training duration data cover only 2001 – 2004. Data for 223 banks are used in the regression analysis.

One of the important questions in the empirical analysis of training is whether to use stock or flow variables for training. The theory of human capital suggests that employees accumulate their capabilities at work through training, and that this is a cumulative process. In addition, the fact that skills depreciate must be taken into account. This is complicated because the depreciation of human capital is different from the depreciation of physical capital since the use of acquired skills tends to reinforce original skills rather than undermine them. At the same time, at some point the skills learned in training are likely to become obsolete or outdated. A second point is that because we are measuring the impact of skills at the organizational level, but human capital is embodied in individuals, employee turnover reduces the returns to training at the organizational level. However, as we have previously noted, this problem is not likely to be pronounced in Finnish co-operative banks, due to the relatively low turnover figures. While we unfortunately do not have any bank-level data on employee turnover, our interviews indicated that the extent of employee turnover annually varies between 5-10% and the bulk of that is within the OP Group.

If we were to use data on training flows in our empirical analysis, we would effectively assume that all training depreciates within a year. Since this is highly implausible, we construct a measure of training stock using the perpetual inventory method as follows:

$$Training\ stock_{t} = Training\ flow_{t} + (1- d)\ training\ stock_{t-1,}$$

where d is the assumed depreciation rate and includes both the effects of skills becoming outdated and the effects of turnover. In addition to assigning a depreciation rate, we need to make a decision concerning the initial value of training stock. Following Dearden et al. (2006), we can approximate this initial value from the observed flow of the first year (t=1) by assuming a steady state growth of human capital stock:

$$Training\ stock_{t=1} = Training\ flow_{t=1} / (d + g),$$

where g is the growth rate of human capital stock. In the following, we assume that d = 20 % and g = 5 %. This implies that the training stock in the first year is four times the training flow that year.[10]

Table 1, Panel A presents the development of training expenditure within the OP Group and the corresponding development in the training stock. Training flows are quite stable over the period 2000 – 2004, around 1000 euro per person annually. There is a slight shift towards more bank-specific training over the period. Table 1, Panel B presents the data on training days which show a very similar development, the average training days oscillating around five days, of which approximately one day is bank-specific training. These figures indicate that general training is more common than specific training in the case of OP Group.

The duration and expenditure data may not always be strictly comparable, because the data come from two different sources. A representative of the OP group explained that if the group has helped to establish contacts with external providers of training, the personnel department may record this as group-level training even if in the banks' accounts this training may show up as external cost. This would mean that the days spent in bank-specific training are underestimated. Keeping in mind these concerns on the comparability of the duration and expenses data, it appears likely that the unit price for bank-specific training is substantially higher than that for group-level training. The cost of a day of group-level training is in average around 120 – 150 euro, whereas the cost for bank-specific training is in average 500 – 600 euro. While in part this may reflect measurement differences as discussed above, it is likely that there genuinely is a substantial price difference. There are at least two reasons for this difference. Our interviews also indicated that the training organized by the group is usually delivered to a large number of employees at one time, while the more specialized training is often targeted to a smaller number of individuals. Thus, economies of scale in training provision may explain some of the cost differences.

[10] We have checked the robustness of our results for two alternative values of d, 10 % and 30 %, and adjusted the initial stock accordingly. Our results are robust to these changes in assumptions.

Second, group-level training is subsidized by the group. Since the Group Central that organizes training is fully owned by individual banks, the subsidy amounts to income transfers from low-training banks to high-training banks. This also suggests that we should use both cost-based and duration-based measures of training in our analysis.

We may contrast these data with information from other sources on workplace training in Finland. According to Bassanini et al. (2007), the average duration of training per employee in 1999 was 16 hours annually for firms below 50 employees and 20 hours for larger firms. Maliranta and Asplund (2007), also using data from the late 1990s, report an average of 2.0 days spent in training annually. Both of these samples contain information from private firms in all industries. These figures are substantially below the average of 4.7 days in the OP Group. In expenditure data the gap is smaller but still substantial: Bassanini et al. (2007) report average expenditures of 698 euro per employee annually or 2.4% of personnel costs, whereas Maliranta and Asplund (2007) report average expenditures of 654 euro per employee. In our data the average expenditure is 1043 euro per employee, or 3.0% of personnel costs. However, as pointed out by Bassanini et al. (2007), the banking industry has higher training intensity than other industries. According to a recent study made by Statistics Finland in collaboration with Eurostat, 59 % of employees in banking participated in workplace training courses in the banking and insurance industry, whereas the average over all industries was 39% (Statistics Finland 2008). This suggests that the training practices of OP Group may not be that different from those of other large bank groups in Finland. A final comparative point to note is that, according to Bassanini et al. (2007), the training intensity in Finnish firms during the late 1990s was higher than the EU average.

Descriptive statistics are presented in Appendix 1. We note that the average tenure of 20.5 years is very high, as is the average age of 46.8 years. However, the variation in both of these variables is fairly low. The average share of women in the labor force is around 84%.

Finally, the average return on asset (ROA) is 1.85 and indicates very solid profitability within the banking sector.[11]

V Empirical Approach

In our empirical work analyzing the impact of training on wages at the bank-level, we control for time-invariant bank-level sources of unobserved heterogeneity by implementing a fixed effects estimating method. We will report findings that use a variety of measures of training intensity, both general and specific, as well as training expenditure as opposed to training duration. Always we include a host of other variables that the literature finds are usually likely to impact wages as well. At center-stage are measures of human capital (where education is measured by the percentage of employees that have obtained a secondary degree or more, mean tenure at the bank and the mean age of bank employees.) The remaining controls are the proportion of female employees, the local unemployment rate, and year dummies. All monetary variables have been deflated by the consumer price index.

The estimation equation for our fixed effects specification is:

$$W_{it} = \alpha + \beta_1' Train_{it} + \beta_2' Workforce_{it} + \beta_3 Unempl_{it} + v_i + \mu_t + \varepsilon_{it}$$

where W denotes bank-level average wages, *Train* is a vector of measures of training intensity, *Workforce* is a vector of bank-level average characteristics of the workforce, *Unempl* is the municipal unemployment rate, v_i is the bank-level unobservable component, μ_t is the year dummy, and ε_{it} is the error term. All variables are entered into the regression in logarithmic form. Our main interest is the vector of coefficients for the training intensity variables, β_1'. Since in our main regressions we enter training as a stock variable (and this in

[11] For instance, Iannotta et al. (2007) report that the average ROA for 181 European large banks during 1999 – 2004 was 1.10.

part reflects past training), this lessens concerns surrounding possibilities of simultaneity bias of training and outcomes, and thus enhances our ability to draw causal inferences. Because we measure the wages at the level of bank, we effectively filter out the component of spurious correlation between training and wages at the individual level, that is due to promotions. This is because at the bank-level, the hierarchical structure remains stable during the observation period.

In analyzing the impact of training on organizational performance, we will use measures of profitability and cost efficiency as our measures of organizational performance. The performance variables are motivated by the co-operative nature of the banks we study. Co-operative banks may be thought of maximizing member utility by offering them competitively priced services. In principle co-operative banks do not share their residual earnings and do not have tradable equity. They pay out bonuses that are tied to the use of banking services rather than to profitability. For these reasons, cost minimization rather than profit maximization is often the focus in the studies of efficiency of co-operative banks (e.g. Esho 2001). On the other hand, in order to be able to serve customers efficiently the co-operative banks should also be able to show a healthy profit. For this reason, we follow Bos and Kool (2006) who, when studying Dutch co-operative banks, investigate both profit and cost efficiency.

A representative specification for a cost function we estimate is as follows:

$$TC_{it} = \alpha + \beta_1' Train_{it} + \beta_2' OutQ_{it} + \beta_3' InP_{it} + \beta_4' InQt_{it} + \beta_5' Workforce_{it} + \beta_6 Unempl_{it} + \nu_i + \mu_t + \varepsilon_{it,}$$

where *TC* denote total costs for a bank; *Train* is the vector of training variables, *OutQ* is the vector of output quantities, *InP* is the vector of variable input prices, and *InQ* is the vector of fixed input quantities. As before, *Workforce* is the vector of average workforce characteristics, *Unempl* is the municipal unemployment rate, ν_i is the bank-level unobservable component, μ_t is the year dummy, and ε_{it} is the error term. We then use these same variables for profit

efficiency regressions. In all regressions, we have deflated the monetary measures by Consumer Price Index and made the logarithmic transformations.[12] Again, our main interest is the coefficients of the training variables, β_1'.

Our approach draws on the standard empirical literature in banking though, to reflect institutional features of our case, we undertake a number of modest adaptations to the approach. The dependent variable in the cost regressions is total costs (including interest and non-interest costs) and the dependent variable in profit regressions is earnings before interest and taxes. Since we have data on bonuses paid out to members, we adjust our measures of total costs and profits accordingly. Even though bonuses are technically counted as costs, they are payments to owners and therefore it is more appropriate to treat them as dividends rather than costs. Accordingly, in our statistical analysis, bonuses are subtracted from cost figures and are added to profit figures.[13]

Consistent with the intermediation approach of banking, we treat deposits as inputs and loans as outputs. The output measures we use are the stock of loans to the public, the stock of interbank loans, and commission. The last item can be justified by the fact that an increasing proportion of bank income is derived from non-interest sources and the largest part of that is commission income. Excluding commission income would ignore this sort of activities.[14]

We do take into account two types of variable input prices: wages and deposit interest rates. Recent literature has emphasized that input prices may be endogenous and has recommended that instead of bank-level data on input prices, one should instead use average prices for other banks competing in the same market. For our analysis, this is an important issue because we want to take into account the effects of training on costs. If training is likely

[12] Except for the real deposit interest rates that are mostly negative.
[13] The median share of bonuses is 3.2% of total costs and 6.9% on operational profits.
[14] Cuesta and Orea (2002) also augment the intermediation approach by including non-interest income as an output to control for off-balance sheet activities. The managers we interviewed also considered commission income as an essential measure of bank output.

to affect wages, using bank-level data on wages would mean that this impact would be controlled for and the impact of training on costs would be underestimated. In the spirit of Bos and Kool (2006) and Koetter (2006), we construct these prices from regional clusters of banks from the 20 regions of Finland and calculate for each bank the average price faced by other banks in the region, excluding the observation itself from the calculation.

We also include measures of the equity capital of the co-operative bank and fixed assets in the analysis. Our measure of equity is the part of equity belonging to members, namely the basic co-operative capital (valued at par) and the additional cooperative capital members have invested in excess of required minimum.[15] Fixed assets consist of real estate and other fixed assets. Consistent with Berger and Mester (1997), these are interpreted as fixed inputs. We also include the control variables we use in the wage regressions. Workforce characteristics are included since they have been found to influence establishment productivity (e.g. Hellerstein and Neumark 1999), and they also measure other aspects of human capital that are not due to workplace training. To measure the local market conditions, we also include the unemployment rate.

Finally, we note that we use the same set of independent variables for both cost and profit function estimations. This means that our profit function estimations apply the concept of alternative profit efficiency that is appropriate when output markets are not perfectly competitive or accurately measured, both likely to be relevant concerns (Berger and Mester 1997).[16] This empirical approach provides a straightforward estimating framework in the fixed effects estimations where our main interest is in the parameter coefficients for our training variables.

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[15] In addition to these components, the equity capital of co-operative banks consist of collective reserves that is indivisible among members. See Fonteyne (2007) for further discussion.

[16] The term 'alternative' means differentiates this way of measuring profit efficiency from 'standard' profit efficiency, where output prices are controlled for instead of quantities (Berger and Mester 1997).

VI Findings

In Table 2 we report our findings from estimating the effects of training on wages. We first report the results where training intensity is measured by training expenditure. The coefficient reported in Column 1 indicates that the point estimate of the elasticity of wages in respect of training intensity is 7.0%. In Column 2 we divide training into its two components, general (group-level) and specific (bank-organized) training. We find that both types of training have statistically significant effects on wages, but the wage elasticity is larger for general training (4.6%) than for specific training (2.2%).

In Columns 3 and 4 we report the results where we use training duration as a proxy for training intensity. The estimated elasticities drop somewhat, but qualitatively the results remain rather similar. Thus the estimated wage elasticity in respect to total training is 3.2%, whereas for general training it is 3.5% and for specific training 1.5%, and the last coefficient is not statistically significant.

Our results on the magnitude of training effects are consistent with the results of Bassanini et al. (2007) who estimate the elasticity of wages with respect to training for Finnish firms to be 3.8% in their fixed effects estimations. However, our findings that receiving general training raises earnings in the current job and does so more than firm-specific training, are different from the previous literature. Thus using U.S. data Lynch (1992) found that receiving general training raises earnings in future jobs but not in the current job, whereas firm-specific training raises earnings in the current job. Loewenstein and Spletzer (1999), also using US data, find that general and specific training tend to have similar returns, while Budria and Pereira (2007), using data for Portugal, find that firm-specific training increases wages substantially while general training has a notably smaller impact. Our finding that general training has stronger effects on wages than does specific training is consistent with theory that highlights the ability of employees with more general

training to improve their bargaining position, resulting in higher wage gains. The result may also differ because our data includes very seasoned employees, whereas the two earlier US studies included only recent labour market entrants.

The coefficients on the control variables are very consistent across various specifications, and they are mostly of the expected sign. Thus a higher share of educated employees, higher mean tenure and a lower share of women are associated with higher bank-level average wages. Mean age and unemployment rate are insignificant in all specifications.

We undertook a variety of robustness checks.[17] First we note that data for training duration are available only for 2001 – 2004, whereas we have expenditure data for 2000-2004. Since these differences in coverage may be one reason why the reported training coefficients differ, we repeated the analysis using training expenditure data for the shorter period. Using total expenditures for training, we find the wage elasticity in respect to training to be 7.2%, which is not very different from that for the whole sample (i.e. when data for 2000 are included). However, when we divide the training into general and firm-specific training, the coefficient is in both cases 2.8%. Thus, in these specifications we do not find a difference between general and specific training.

We also investigate what happens when we use training flows instead of training stocks although, as discussed earlier, we do not regard flow measures as the preferred measures of training intensity. The results remain qualitatively similar, although the estimated coefficients drop a bit. We also estimated several OLS models for the wage regressions. Again, we find that the coefficients are smaller (5.3% for total training expenditures and 1.8% for total training duration) but the results are qualitatively similar to those reported in Table 2. Because the OLS estimations do not control for unobserved bank-level heterogeneity, we regard fixed effects

[17] The results of all robustness checks reported here and in the following sections are available from the authors upon request.

estimations as our preferred estimations.[18] Finally, we experimented with different depreciation rates for human capital and, reassuringly, the results remained very similar.

Before reporting findings from the regression analysis of the effects of training on performance, we present some evidence on the overall costs of training to the banks. Denote the bank at the 1st quartile (25%) of training intensity as a "low-training" bank and the bank at the 3rd quartile as a "high-training" bank. The sample mean for the ratio of direct training costs to total costs is around 0.84%. However, the low-training bank spends only 0.66% of their total costs on training, whereas for the high-training bank the comparable figure is much higher at 1.01%. The indirect effects may be even more substantial. If we use approximate values for the sample data, then we calculate that the high-training bank trains around 60 % more than does the low training bank. If we use an estimate for the wage elasticity in respect to training of 5%, then the high-training bank pays 3% higher wages for their workforce than does the low-training bank. Because personnel costs are roughly 25% of all costs, this indicates that the total costs of the high-training bank are 0.75% higher compared to the low-training bank.[19] Finally, an average employee in the low-training bank spends an average of 4.0 days in training, while in the high-training bank the comparable figure is 6.2 days. This difference of 2.2 days is equivalent to 1% of annual workload. Because employees receive full pay during this period, this raises total costs of the high-training bank by approximately 0.25% compared to the low-training bank. It is also likely that the recorded costs understate the true costs by excluding items such as travelling costs and unpaid overtime.

These costs of high-training strategies are presumably fully or in part offset by the higher efficiency of high-training banks. However, almost all of the literature looks at the impact of training on productivity, and not alternative measures of organizational

[18] Based on F tests the fixed effects estimates are also our statistically preferred estimates.

[19] A more conservative estimate for wage elasticity, 3%, would indicate 0.45% of total costs for the high-training bank.

performance, such as cost efficiency or profitability.[20] Studies on productivity are likely to capture only the opportunity costs of time spent in training, whereas the wage increases and direct training costs are not included. By using costs and profits as our dependent variable, we are focusing more on the issues of organizational performance from the perspective of owners.

Table 3 presents the results of the cost function estimations. In Column 1 we measure training intensity by total training expenditure. The coefficient indicates a cost elasticity in respect of training of -2.2%, but the coefficient is not significant. In Column 2 we again divide the expenditure measure into general and specific training. The coefficient for general training is also -2.2% and it is significant at 10 % level. In turn, the coefficient for specific training is not significant. This is consistent with the interpretation that general training, rather than specific training, is likely to have positive effects on performance. This result is in line with earlier work by Lynch and Black (1995) and Barrett and O'Connell (2001).

However, the results reported in Columns 3 and 4 of Table 3, where training duration is used as a proxy for training intensity, do not support the hypothesis that either form of training would be associated with lower costs. All of the coefficients for training intensity in those specifications are close to zero.

The signs of the coefficients for other variables are largely as expected. Thus total costs correlate with increases in the quantity of outputs, especially loans to the public. As expected the coefficients on input prices are positive, though for regional wages the coefficient is statistically insignificant. Evidence is also found that a higher level of fixed assets is related to higher costs and that a higher share of educated workers decreases costs, though these findings are only significant in specifications 1 and 2. Other variables in the specifications remain insignificant.

[20] A recent exception is Maliranta and Asplund (2007).

Again we perform a variety of robustness checks. To check the comparability of findings using duration data, we re-estimate the specifications presented in Columns 1 and 2 of Table 3, but use data only for the period 2001 – 2004. The results remain basically unchanged from those that are reported in Table 3. The coefficient for total training expenditure remains insignificant, while the coefficient for general training now becomes significant at 5% level and increases in absolute value to -2.6%. Second, we replace the values of training stocks with annual flows. Since this ignores the cumulative effects of training on human capital but captures the direct cost effects, we would expect the results on organizational performance to be less favourable. This is the case, although all coefficients remain far from significant.

When net profits is used as the dependent variable, the results, reported in Table 4, are very similar to the cost regressions presented in Table 3. The only significant coefficient is in Column 2, for general training using a measure based on training expenditure. The estimated elasticity is 10.5% and it is significant at the 5% level. As in the cost regressions, all other measures of training intensity are statistically insignificant. In particular, in regressions where training duration is used to measure training intensity, no training coefficients are found to be significant at conventional levels of significance.

Most of the other variables are statistically insignificant although, as expected, both input prices have negative signs. Higher co-operative equity is also negatively related to profitability, as is a higher level of fixed assets in Columns 1 and 2.

Again, we carry out a variety of robustness checks. First, we check whether the results change if Returns on Assets (ROA) is used as the dependent variable. Concerning signs and significance, we find exactly the same set of results. The coefficient for general training, using expenditure as the measure of training intensity, is the only significant coefficient. Then we rerun specifications 1 and 2 using data only for 2001 – 2004. Using training expenditure

measures, for specification 1, now we observe that the coefficient on training is 19.7% and is strongly statistically significant. In specification 2, general training remains significant at the 5% level with a coefficient of 12.1%, while specific training remains insignificant. However, when we use duration data, all training intensity variables are again statistically insignificant. When we use training flows instead of training stocks, all training variables are statistically insignificant.

Finally, when we estimate OLS models, we find that the training coefficients are more often found to be statistically significant at conventional levels than was the case with the fixed effects models. In addition to the finding that total measure training and general training improves performance when we use the measure of training expenditure, we also find that general training improves performance when measured by training duration. These findings pertain to both cost and profit regressions. However, as the OLS regressions cannot control for unobserved bank-level heterogeneity, an interpretation for these results might be that successful banks tend to train more. Therefore we have much more confidence in findings based on the fixed effects estimations.

In sum, the interpretation of the performance regressions is much less clear cut than for the wage regressions. There is some evidence that training intensity, especially general training, is positively associated with performance, but this evidence is based solely on regressions that use training expenditure as the measure of training intensity. Models that are estimated using measures based on training duration are found to have statistically significant coefficients only in the OLS regressions. Therefore, we conclude that while there is certainly no evidence that a higher level of training hurts performance, the evidence supporting the hypothesis that a higher level of training enhances performance is not particularly strong.

VII Conclusions

Using data for a large sample of Finnish co-operative banks, we report findings from the first empirical investigation that compares the effects of general and firm-specific workplace training for *both* employees and organizations. We measure training intensity by duration and expenditure used on training. Our measure of general training is based on training organized by the Group Central of Co-operative Banks, whereas the measure of specific training is based on training organized by individual banks. For the most part, we find that general training is associated with higher wages and better performance, while the effects of firm-specific training are smaller and usually not statistically significantly different from zero. However, the evidence is less clear concerning the performance effects of training because, in such models, training coefficients are seldom statistically significantly different from zero, when we use a measure based on training duration.

Our findings have both similarities and differences to previous studies that have investigated the effects of general or firm-specific training on wages or performance separately. Our wage results differ from previous research that has either found no difference in returns of general vs. firm-specific training, or higher returns for firm-specific training. Concerning performance effects, using training expenditure data, our main finding is that general, rather than specific training, is associated with positive performance effects. While this result is consistent with previous work (Lynch and Black, 1995 and Barrett and O'Connell, 2001), our finding of improved performance effects from general training must be taken cautiously, because when training duration is used as a measure of training intensity, this finding does not arise.

This brings us to the second major finding of the paper: the impact of training on wages appears to be more robust than its impact on costs or profitability. This finding is somewhat different from most previous literature that compares the effects of training on

firms and workers (Conti 2005; Ballot et al. 2006; Dearden et al. 2006) that has found stronger evidence of positive effects on organizational performance rather than on wages.

We offer a number of reasons why our results differ from findings reported in the previous literature. The first point concerns the most appropriate measure of performance. Since most earlier studies focused on productivity they may have omitted important cost items, such as the direct costs of training or effects on wages. By contrast, in our study we take a more complete account of the different types of costs and explain costs and profit efficiency, instead of productivity. This difference in empirical approach may partially explain differences in findings.

Our second point reflects the nature of our data. Some earlier studies on wage effects have focused on labour market entrants, whereas we look at broad categories of the workforce and in a context where average tenures are very high. Concerning the performance effects, we study a rather homogenous group of firms within one industry, whereas many earlier studies have covered various industries. An advantage of our study is that our measures of training are very consistent, and our observations are comparable.

We recognize that the co-operative banks in our sample may not suffer from underinvestment in training to the same degree as do other private firms. As the high tenures indicate, mobility of bank clerks is relatively low and is mostly within the group. The Group Central organizes training at subsidized prices that encourages banks to use these services. If the training decisions of the banks are already close to the optimum, then increases in training intensity may not result in further efficiency gains. However, it should also be noted that our study gives no indication that the co-operative banks are training their employees too much in the sense that costs would exceed benefits.

In addition, the structure of co-operative banks may also influence these results. Since co-operative banks do not aim to maximize profits and member governance is often passive, it

is often argued that co-operatives may emphasize the interests of their employees who, moreover, are also owners. This argument is consistent with our finding that employees seem to reap significant gains from training.

References

Acemoglu, Daron. and Pischke, Jorn-Steffen. (1999) "Beyond Becker: Training in Imperfect Labour Markets", *Economic Journal* 109 (Feb.), F112-F142.

Ballot, Gérard, Fathi Fakhfakh and Erol Taymaz (2006): 'Who Benefits from Training and R & D, the Firm or the Workers?', *British Journal of Industrial Relations*, 44(3): 473 – 95.

Barrett, Alan and Philip J. O'Connell (2001): 'Does Training Generally Work? The Returns to In-Company Training', *Industrial and Labor Relations Review*, 54(3): 647-62.

Barron, John M., Mark C. Berger, and Dan A. Black (1999): "Do Workers Pay for On-The-Job Training", *Journal of Human Resources* 34 (2), 235-252.

Bartel, Ann P. (2000): 'Measuring the Employer's Return on Investments in Training: Evidence from the Literature', *Industrial Relations* 39(3): 502-24.

Bassanini, Andrea, Alison Booth, Giorgio Brunello, Maria De Paola, and Edwin Leuven (2007): 'Workplace Training in Europe', in Giorgio Brunello, Pietro Garibaldi and Etienne Wasmer (eds.): *Education and Training in Europe*, Oxford: Oxford University Press, 143 – 309.

Berger, Allen N. and Loretta J. Mester (1997): 'Inside the Black Box: What Explains Differences in the Efficiencies of Financial Institutions?', *Journal of Banking & Finance* 21: 895 – 947.

Berger, Allen N. and David B. Humphrey (1992): 'Measurement and Efficiency Issues in Commercial Banking', in Zvi Griliches (ed.): *Output Measurement in the Service Sectors*, University of Chicago Press, 245-

Black, Sandra E. and Lisa M. Lynch (1996): 'Human-Capital Investments and Productivity', *American Economic Review* 86(2): 263-7.

Booth, Alison L. and Gylfi Zoega (2004): "Is Wage Compression a Necessary Condition for Firm-Financed General Training", *Oxford Economic Papers* 56, 88-97.

Bos, J.W.B. and C.J.M. Kool (2006): 'Bank Efficiency: The Role of Bank Strategy and Local Market Conditions', *Journal of Banking and Finance* 30: 1953 – 74.

Budria, Santiago and Pedro Telhado Pereira (2007): "The Wage Effects of Training in Portugal: Differences Across Skill Groups, Genders, Sectors and Training Types", *Applied Economics* 39: 787-807.

Conti, Gabriella (2005) "Training, Productivity and Wages in Italy", *Labour Economics* 12, 557-576.

Cuesta, Rafael A., and Luis Orea (2002):"Mergers and technical efficiency in Spanish savings banks: A stochastic distance function approach", *Journal of Banking & Finance*, 26: 2231–2247.

Dearden, Lorraine, Howard Reed,, and John van Reenen (2006):"The Impact of Training on Productivity and Wages: Evidence from British Panel Data", *Oxford Bulletin of Economics and Statistics* 68 (4), 397-421.

Esho, Neil (2001): "The Determinants of Cost Efficiency Cooperative Financial Institutions: Australian Evidence", *Journal of Banking & Finance, 25 941–964.*

Fonteyne, Wim (2007): 'Cooperative Banks in Europe: Policy Issues', IMF Working Paper 159 / 07.

Gorton, Gary and Frank A. Schmid (1999): 'Corporate Governance, Ownership Dispersion and Efficiency: Empirical Evidence from the Austrian Cooperative Banking', *Journal of Corporate Finance*, 5: 199-40.

Groen, Jeffrey A. (2006): 'Occupation-Specific Human Capital and Local Labour Markets', *Oxford Economic Papers* 58: 722-41.

Hellerstein, Judith K. and David Neumark. 1999. "Wages, Productivity, and Worker Characteristics: Evidence from Plant-Level Production Functions and Wage Equations." *Journal of Labor Economics* 17 (3): 409-446

Hunter, Larry W., Annette Bernhardt, Katherine L. Hughes and Ewa Skuratowicz (2001): 'It's Not Just the ATM's: Technology, Firm Strategies, Jobs, and Earning in Retail Banking', *Industrial and Labor Relations Review*, 54(2A): 402-24.

Iannotta, Guiliano, Giacomo Nocera and Andrea Sironi (2007): 'Ownership Structure, Risk and Performance in the European Banking Industry', *Journal of Banking & Finance* 31: 3127-48.

Ichniowski, Casey and Kathryn Shaw (2003):"Beyond Incentive Pay: Insiders' Estimates of the Value of Complementary Human Resource Management Practices." *Journal of Economic Perspectives*, 17 (1): 155-80.

Jones, Derek C., Panu Kalmi and Antti Kauhanen (2006): 'Human Resource Management and Productivity: New Evidence from an Econometric Case Study', *Oxford Review of Economic Policy*, 22 (4): 526 – 38.

Keep, Ewart, Ken Mayhew and Mark Corney (2002): 'Review of the Evidence on the Rate of Return to Employers of Investment in Training and Employer Training Measures', SKOPE Research Paper No. 34.

Keltner, Brent and David Finegold (1996): 'Adding Value in Banking: Human Resource Innovations for Service Firms', *Sloan Management Review* (Fall): 57-68.

Koetter, Michael (2006): 'Measurement Matters: Alternative Input Price Proxies for Bank Efficiency Analyses', *Journal of Financial Services Research* 30: 199-227.

Lazear, Edward P. (2003): "Firm-Specific Human Capital: A Skill-Weights Approach", NBER Working Papers 9679.

Loewenstein, Mark.A., and James R. Spletzer (1999): "General and Specific Training: Evidence and Implications", *Journal of Human Resources* 34 (4), 710-733.

Loewenstein, Mark A. and James R. Spletzer (1998): 'Dividing the Costs and Returns to General Training', *Journal of Labor Economics*, 34(4): 710-33.

Lynch, Lisa. M (1992): "Private-Sector Training and the Earnings of Young Workers", *American Economic Review* 82 (1), 299-312.

Lynch, Lisa M. and Sandra E. Black (1995): 'Beyond the Incidence of Training: Evidence from a National Employers' Survey' NBER working paper 5231.

Maliranta, Mika and Rita Asplund (2007): 'Training and Hiring Strategies to Improve Firm Performance', paper presented at the COST A23 meeting in the Hague, Oct. 25-26, 2007.

Manning, Alan (2003): *Monopsony in Motion*, Princeton N.J.: Princeton University Press.

Statistics Finland (2008): 'Kurssikoulutukseen osallistuminen yrityksissä vähentynyt', URL: http://www.stat.fi/til/cvts/2005/cvts_2005_2008-05-30_tie_001.html, retrieved November 26, 2008.

Stevens, Margaret (1994): "A Theoretical Model of On-the-Job Training with Imperfect Competition", *Oxford Economic Papers* 46 (4): 537-562.

Tables

Table 1: Summary statistics for training intensity

Panel A: Training expenditure: flows and stock, 2000 – 2004

Year	Flow, total	Flow, group	Flow, bank-specific	Stock, total	Stock, group	Stock, bank-specific
2000	1042	656	386	4168	2624	1544
2001	934	575	359	4278	2654	1624
2002	897	480	417	4287	2582	1706
2003	1060	531	529	4506	2611	1895
2004	972	499	474	4564	2575	1989

Notes: All figures are real euros, deflated by the Consumer Price Index to the 2000 prices.

Panel B: Training duration: flows and stock, 2001 – 2004

Year	Flow, total	Flow, group	Flow, bank-specific	Stock, total	Stock, group	Stock, bank-specific
2001	4.3	3.7	0.6	17.2	14.8	2.4
2002	4.7	4.0	0.7	18.6	15.9	2.7
2003	5.2	4.3	0.9	20.1	17.1	3.0
2004	5.0	4.0	1.0	20.9	17.5	3.4

Table 2: The effects of training on wages: Fixed effects estimates

Specification	1	2	3	4
Training expenditure, total	0.070*** (3.62)			
Training expenditure, general training		0.046*** (3.12)		
Training expenditure, specific training		0.022*** (2.87)		
Training duration, total			0.032** (2.16)	
Training duration, general training				0.035** (2.26)
Training duration, specific training				0.015 (1.19)
Share of employees with secondary education	0.125*** (3.93)	0.118*** (3.71)	0.139*** (4.03)	0.141*** (4.07)
Mean tenure	0.407*** (7.81)	0.403*** (7.74)	0.331*** (5.90)	0.330*** (5.88)
Mean age	-0.034 (-0.24)	-0.030 (-0.21)	0.136 (0.88)	0.145 (0.94)
Share of women	-0.332*** (-5.09)	-0.350*** (-5.37)	-0.319*** (-4.57)	-0.321*** (-4.60)
Unemployment rate	0.056 (1.57)	0.052 (1.47)	0.017 (0.48)	0.019 (0.51)
Observations	1091	1091	880	880
R-squared	0.51	0.51	0.54	0.55
F-test	89.61***	82.18***	86.36***	78.04***

Notes:
1) T-statistic in parenthesis.
2) Significance levels: *** p<0.01; ** p<0.05; *p<0.1.
3) All regressions include year dummies.
4) All variables are in logarithmic form.

Table 3: The effects of training on costs: Fixed effects estimates

Specification	1	2	3	4
Training expenditure, total	-0.022			
	(-1.46)			
Training expenditure, general training		-0.022*		
		(-1.94)		
Training expenditure, specific training		-0.003		
		(-0.47)		
Training duration, total			0.010	
			(0.84)	
Training duration, general training				0.009
				(0.75)
Training duration, specific training				-0.001
				(-0.09)
Credit to the public	0.456***	0.454***	0.451***	0.450***
	(9.80)	(9.74)	(8.41)	(8.39)
Interbank credit	0.024**	0.024**	0.004	0.004
	(1.98)	(1.98)	(0.28)	(0.28)
Commission income	0.053**	0.055**	0.037	0.037
	(2.28)	(2.39)	(1.47)	(1.49)
Deposit rates, regional	13.90**	13.35**	14.76**	14.86**
	(2.48)	(2.37)	(2.36)	(2.36)
Mean wages, regional	0.089	0.095	0.087	0.089
	(1.12)	(1.19)	(0.99)	(1.01)
Cooperative equity	0.000	-0.001	0.001	0.001
	(0.02)	(-0.05)	(0.04)	(0.06)
Fixed assets	0.024*	0.024*	0.013	0.013
	(1.87)	(1.90)	(0.89)	(0.87)
Share of employees with secondary education	-0.045*	-0.043*	-0.023	-0.023
	(-1.84)	(-1.73)	(-0.86)	(-0.86)
Mean tenure	0.043	0.045	0.063	0.063
	(1.05)	(1.11)	(1.42)	(1.43)
Mean age	-0.089	-0.094	-0.19	-0.19
	(-0.80)	(-0.84)	(-1.55)	(-1.57)
Share of women	-0.012	-0.008	0.002	0.002
	(-0.24)	(-0.17)	(0.03)	(0.03)
Unemployment rate	0.022	0.022	-0.032	-0.031
	(0.80)	(0.80)	(-1.11)	(-1.10)
Observations	1091	1091	880	880
R-squared	0.58	0.58	0.68	0.68
F-test	69.98***	66.25***	87.03***	81.76***

Notes:

1) T-statistic in parenthesis.
2) Significance levels: *** p<0.01; ** p<0.05; *p<0.1.
3) All regressions include year dummies.
4) All variables are in logarithmic form, except for deposit rates.

Table 4: The effects of training on profits: Fixed effects estimates

Specification	1	2	3	4
Training expenditure, total	0.112			
	(1.60)			
Training expenditure, general training		0.105**		
		(2.00)		
Training expenditure, specific training		0.020		
		(0.75)		
Training duration, total			-0.029	
			(-0.52)	
Training duration, general training				-0.034
				(-0.60)
Training duration, specific training				0.023
				(0.50)
Credit to the public	-0.303	-0.298	0.022	0.024
	(-1.41)	(-1.38)	(0.08)	(0.09)
Interbank credit	-0.053	-0.053	0.000	-0.000
	(-0.95)	(-0.95)	(0.01)	(-0.00)
Commission income	0.180*	0.166	0.091	0.090
	(1.69)	(1.56)	(0.77)	(0.76)
Deposit rates, regional	-95.01	-92.60***	-78.61***	-80.09***
	(-3.67)	(-3.57)	(-2.65)	(-2.68)
Mean wages, regional	-1.129***	-1.146***	-1.284***	-1.296***
	(-3.07)	(-3.12)	(-3.07)	(-3.09)
Cooperative equity	-0.115**	-0.112*	-0.137**	-0.139**
	(-2.34)	(-2.28)	(-2.16)	(-2.18)
Fixed assets	-0.130**	-0.132**	-0.044	-0.042
	(-2.22)	(-2.25)	(-0.64)	(-0.62)
Share of employees with secondary education	0.021	0.009	-0.126	-0.123
	(0.19)	(0.08)	(-0.98)	(-0.96)
Mean tenure	-0.014	-0.023	0.045	0.043
	(-0.07)	(-0.13)	(0.22)	(0.20)
Mean age	-0.030	-0.011	0.244	0.26
	(-0.06)	(-0.02)	(0.42)	(0.45)
Share of women	-0.174	-0.196	-0.123	-0.127
	(-0.75)	(-0.84)	(-0.47)	(-0.49)
Unemployment rate	0.069	0.068	0.218	0.219
	(0.54)	(0.53)	(1.62)	(1.62)
Observations	1091	1091	880	880
R-squared	0.12	0.12	0.12	0.12
F-test	6.92***	6.65***	5.27***	4.97***

Notes:

1) T-statistic in parenthesis.
2) Significance levels: *** p<0.01; ** p<0.05; *p<0.1.
3) All regressions include year dummies.
4) All variables are in logarithmic form, except for deposit rates.

Appendix 1: Summary statistics

Variable	Mean (standard deviation)
Annual wages (euros)	25678 (3557)
Total costs (excl. bonuses, in 1000 euros)	4096 (8636)
Total profits (incl. bonuses, in 1000 euros)	1714 (2856)
Return on Assets (ROA)	1.85 (0.71)
Training expenditure per employee (flow), euros	980 (542)
Training expenditure per employee (stock), euros	4363 (2260)
Training duration per employee (flow)	4.81 (2.38)
Training duration per employee (Stock)	19.20 (9.46)
Training expenditure per employee (stock), euros, general training	2684 (1371)
Training expenditure per employee (stock), euros, bank-specific training	1793 (1582)
Training duration per employee (stock), euros, general training	16.62 (8.28)
Training duration per employee (stock), euros, bank-specific training	2.96 (4.14)
Employees with secondary education, %	73.52 (15.24)
Mean tenure (in years)	20.55 (3.72)
Mean age (in years)	46.75 (2.84)
Share of women, %	83.78 (8.15)
Unemployment rate, %	14.19 (4.86)
Loans to the public, in million euros	86.74 (188.87)
Interbank loans, in million euros	13.69 (18.10)
Commission income, in 1000 euro	1031 (2189)
Real deposit interest rates, %	-0.41 (0.88)
Fixed assets, in 1000 euros	4229 (9860)
Cooperative equity, in 1000 euro	5264 (9315)

Note: 1) All monetary variables have been deflated to 2000 prices by using the Consumer Price Index.
2) N=1091 except for training duration variables, for which N=880