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Explaining Cross-Country Differences in Job-Related Training: Macroeconomic Evidence from OECD Countries

by

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ABSTRACT
This paper presents an empirical analysis on the macroeconomic determinants of aggregate levels of training across fourteen OECD countries. Training data comes from the 1994 International Adult Literacy Survey (IALS), which provides highly comparable cross-country data on the percentage of employed individuals that received job-related training. Our regression model attempts to explain the levels of training across countries and age groups from the average literacy skills of the corresponding population subset and other cross-country variables, including indicators of compression in the wage structure, the unemployment rate, the level of innovation activity, the rate of unionization, and measures of industrial structure. We find that the average level of literacy skills in each age-group has a positive and highly significant effect on the proportion of workers that receive training, which is consistent with microeconomic evidence on the effect of educational attainment on the probability that workers participate in training. More importantly, we examine the relation between compression in the wage distribution and aggregate training activity across countries, in light of the recent literature on training in imperfect labor markets. We find that compression at the bottom of the wage distribution increases aggregate training activity in a country while compression at the top has the opposite effect. Potential policy implications are discussed.

JEL Classification: J24, J31
Keywords: Job-related training, wage compression, macroeconomic evidence

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1- Introduction

The level of employer-supported training is known to vary considerably across countries (e.g. OECD, 2003). However, the sources of these variations are not yet well understood. There is substantial microeconomic evidence on the determinants of training at the individual level. In particular, worker participation in employer-supported training is usually found to be significantly associated with educational attainment, age, gender, the industry of employment, occupation, technology adoption in the firm of employment, among other factors (e.g. OECD, 1999; Bassanini, Booth, Brunello, De Paola and Leuven, 2005).

For policy-making purposes, understanding the factors that determine the aggregate levels of training across economies is also important. If differences across countries are largely explained by factors that determine the total social return from investment in skills, such as the age-distribution of the population, the industrial structure, or the economy's intensity of R&D activities, then the role of policy intervention may be quite limited. On the other hand, if differences in training levels across countries are largely driven by the labor market structure and institutions that affect how the total returns from skills are divided between firms and workers, then the role of public policies may be more important.

In this paper, we attempt to identify the main determinants of aggregate levels of training across fourteen OECD countries. Our training measures are taken from the 1994 International Adult Literacy Survey (IALS), which provides highly comparable cross-country data on the percentage of employed individuals that received job-related training. Our regression model attempts to explain the levels of training across countries and age groups from the average literacy skills of the corresponding population subset and other cross-country variables, including indicators of compression in the wage structure, the rate of unionization, the unemployment rate, the level of innovation activity, and measures of industrial structure.

Empirical evidence on the returns from training in terms of increased productivity and wages suggests that differences across countries in aggregate training activity could have a substantial effect on differences in productivity and growth. For example, Dearden, Reed and Van Reenen (2005) recently found, in a panel of British industries, that an increase of one percentage point in the share of employees that received training increases value-added per worker by 0.6 percent and wages by 0.3 percent, while Almeida and Carneiro (2006) found that increasing training by ten hours per year per employee raises productivity by 0.6 percent in a set of large Portuguese firms. Using data from the European Community Household Panel, Bassanini, Booth, Brunello, De Paola and Leuven (2005) estimated that even relatively short training programs (usually less than two weeks) increases the earnings of workers by 2 to 10 percent. Other papers that found substantial returns from training in terms of higher productivity or wages include Bartel (1995), Veum (1995), Parent (1999; 2003), Barrett and O'Connell (2001), Frazis and Lowenstein (2005), among others.

Of central importance to our analysis is the relation between the wage structure and training. It is well known that in perfectly competitive labor markets, firms cannot capture any of the return on general skills, and therefore have no incentive to support the cost of investment in general training (Becker, 1964). Since wages are equal to the marginal product of workers, the entire cost of general training is supported by workers, either directly or indirectly in the form of lower equilibrium wages. The cost of training will only be shared between firms and workers if the skills acquired from training are firm-specific.

However, if imperfections in the labor market lead to a compressed wage structure in the sense that, as skills increase, productivity increases more rapidly than wages, firms may have incentives to pay some of the cost of general training. Indeed, there is empirical evidence suggesting that employers do support part of the cost of training even when it is general in nature (e.g. Barron, Black and Loewenstein, 1989; Lynch, 1992; Loewenstein and Spletzer, 1998; Barron, Berger and Black, 1999; Booth and Bryan, 2005). On the other hand, a compressed wage structure will lower the private benefits of training for workers and will therefore lower their incentives to invest in their own skills.

Recently, the literature has formalized a variety of specific mechanisms that tend to compress the wage structure and therefore provide incentives for firm investment in general training. For example, search and matching frictions make it costly for workers to find a new job, which tends to provide some monopsony power to the current employer (Acemoglu, 1997; Acemoglu and Pischke, 1999). Hence, such frictions allow firms to capture some of the return from general training and therefore induce them to invest in the skills of their workers. Employers may also have some monopsony power if skills are partly transferable across firms (Stevens, 1994). Asymmetric information between the current employer and potential future employers may also induce firm-sponsored training. If current employers have superior information about the ability or other unobservable characteristics of their workers, adverse selection may make it difficult for workers who leave their job to credibly signal these characteristics to the market. In turn, it will allow firms to capture some of the benefit from training investments (Acemoglu and Pischke, 1998). Similarly, potential employers may simply be unable to perfectly observe the quantity and quality of general skills acquired through training. Therefore, the outside wage of trained workers will not fully reflect those skills and that will tend to compress the wage structure (Katz and Ziderman, 1990; Chang and Wang, 1996). Lazear (2003) argues that firms may be able to capture some return on general training if they use sets of general skills in different combinations. The wage structure may also be compressed by particular labor market institutions, such as unions and minimum wage legislation (Acemoglu and Pischke, 2003).

As will be emphasized in the theoretical background presented in Section 2, the observed relationship between wage compression and training may be informative about whether firms or workers tend to support most of the training costs. In turn, this may provide some indication of the type of government intervention that may be required to encourage training investments. In particular, if we observe that wage compression tends to increase training, employers are likely supporting a substantial share of the cost of training at the equilibrium wages. In this case, policy incentives to increase investment in training should probably be targeted at firms. In contrast, if we observe that wage compression lowers investment in training, workers are probably supporting most training costs. In this case, policy measures targeted at workers may be more appropriate, and policies geared at firms' incentives may not be very effective. In either case, investment in training will tend to be sub-optimal if the returns from training are shared between firms and workers, or if there are other inefficiencies in training decisions, arising from human capital externalities for example. Hence, in both cases there may be an efficiency role for government intervention, but the observed relation between wage compression and training may provide information about the appropriate type of policy intervention required.

There is some recent empirical literature on the relation between wage compression and training. Almeida-Santos and Mumford (2004) find evidence that the probability of British workers receiving training is positively affected by wage compression. However, Peraita (2001) shows that high wage compression in the highly regulated Spanish labor markets does not encourage training. Bassanini and Brunello (2003) report evidence from the European Community Household Panel (ECHP) according to which wage compression does increase the probability that workers receive training. Their approach partitions workers in terms of country, education, occupation and sector.

The results of the empirical analysis presented in this paper indicate that compression at the bottom of the wage distribution (below the median wage) increases the proportion of workers that receive training, but that compression at the top has the opposite effect. This result suggests that the allocation of training costs between workers and firms may differ over the wage distribution. As a result, the nature and the importance of inefficiencies in training decisions may also vary between high-wage and low-wage workers. Hence, different policies may be required in order to encourage training in different segments of workers.

An important feature of our analysis is the use of literacy indicators in explaining levels of training across countries. There is substantial empirical evidence on the positive effect of educational attainment on the likelihood of receiving training at the individual level (e.g Turcotte, Léonard and Montmarquette, 2003). However, literacy test scores are likely to be more comparable measures of the productive human capital of the workforce across countries than educational attainment data, and should therefore be more closely related to returns from training investments. Recently, Green and Riddle (2001) showed that literacy scores from the IALS are closely linked to the productivity of workers in the Canadian labor market, while Coulombe, Tremblay and Marchand (2004) provide evidence that literacy scores are better predictors of the relative long-run growth of OECD countries than schooling attainment data. Moreover, indicators of literacy skills are likely to be more reliable measures of the general human capital that individuals have at the time of receiving training than educational attainment. In fact, because of lifelong learning and human capital depreciation, there may be a substantial gap between schooling attainment and current skills, especially for older workers. As expected, our analysis finds a strong and robust effect of literacy on the proportion of workers that receive job-related training across countries and age-groups.

The next section presents our methodological framework. Section 3 describes the data. Results are presented and discussed in Section 4. Finally, conclusions are presented in the last section.

2- Methodological Framework

In order to clarify the theoretical relationship between wage compression and training, we start by briefly summarizing a version of the model of Acemoglu and Pischke (1999) in which the wage structure is compressed and the allocation of training cost between firms and workers is endogenously determined. Our empirical approach will then be described. Although our main objective is not to test the predictions of the Acemoglu and Pischke model per se, but rather to investigate the macroeconomic determinants of aggregate training activity across country, the model of Acemoglu and Pischke provides a rationale for the inclusion of the main explanatory variable of interest into our cross-country empirical analysis.

Theoretical background

Consider the following model from Acemoglu and Pischke (1999). There are two periods. In the first period, training occurs and production is normalized to zero. A worker that receives an amount of training τ in the first period produces $f(\tau)$ in the second period, with $f'(\tau)>0$ and $f''(\tau)<0$. The production of the worker is the same whether he is employed by his initial employer or by a new employer. Thus, training produces general skills. The cost of training is $c(\tau)$, with $c'(\tau)>0$ and $c''(\tau)>0$.

At the end of the first period, there is a probability q that the worker and the firm be faced with an adverse shock, in which case they separate and the worker searches for a new employer. A worker may also quit his initial job voluntarily at the end of the first period. In either cases, a worker that looks for another job in the second period receives an outside wage equal to $v(\tau)$. It is assumed that $v(\tau)<f(\tau)$, i.e. the outside wage of a worker is lower than his marginal product. As shown by Acemoglu and Pischke (1999), this can result, for example, from search frictions and unemployment, asymmetric information between current and potential employers and efficiency wages. Since $v(\tau)<f(\tau)$, there is a surplus associated with the initial worker-firm pair equal to $f(\tau)-v(\tau)$. If the worker does not separate from his initial employer, this surplus is shared between the firm and the worker through Nash bargaining over the second period wage. With the bargaining power of the worker equal to $\beta<1$, the second-period wage will be equal to $w(\tau)=v(\tau)+\beta\left[f(\tau)-v(\tau)\right]$.

The contributions of the firm and the worker to the cost of training are denoted by γ_f and γ_w, respectively, and $c(\tau)=\gamma_f+\gamma_w$. The worker is assumed to pay for its contribution directly, although he could equivalently pay for it indirectly through a lower first-period wage. These contributions are assumed to be determined in a Nash equilibrium and all agents are risk-neutral. Hence, taking γ_f as given, the level of investment in training that the worker would like to make, γ_w, maximizes $v(\tau)+(1-q)\beta[f(\tau)-v(\tau)]-\gamma_w$. The first-order condition that characterizes the level of training preferred by the worker is

$$v'(\tau)+(1-q)\beta[f'(\tau)-v'(\tau)]-c'(\tau)=0 \quad \text{if } \gamma_w>0$$

$$\leq 0 \quad \text{if } \gamma_w=0$$

The level of investment preferred by the firm maximizes $(1-q)(1-\beta)[f(\tau)-v(\tau)]-\gamma_f$, taking γ_w as given, where $(1-\beta)$ is the bargaining power of the firm. The first-order condition is

$$(1-q)(1-\beta)[f'(\tau)-v'(\tau)]-c'(\tau)=0 \quad \text{if } \gamma_f>0$$

$$\leq 0 \quad \text{if } \gamma_f=0$$

Assuming that $c'(0)=0$, a necessary condition for a strictly positive level of investment by either the firm or the worker is that $v'(0)<f'(0)$. This condition implies that, at $\tau=0$, training increases the worker's productivity more than his outside wage.

Only one of the above first-order conditions will hold as an equality. If the firm's preferred contribution is greater than that of the worker, the firm will support the entire cost of training. Otherwise, the training cost will be supported by the worker. It is straightforward to verify that if the firm supports the cost of training, its level of investment will increase will the degree of wage compression, i.e. all else given, training decreases as the outside wage of the worker $v'(\tau)$ increases. On the other hand, if the cost of training is supported by the worker, training will be lower if wage compression is greater.

In the extreme case in which the worker cannot invest at all in training, either because of credit constraints or because of contractual issues preventing the worker from accepting a lower wage in the first period in return for training, the entire cost of training is necessarily supported by the firm and wage compression increases training. Note as well that the case of perfect labour market competition, considered by Becker (1964), would correspond in the current model to the case where $f(\tau) = \nu(\tau)$.

Finally, note that in a more elaborate version of this model, whether the cost of training is supported by the firm or the worker could vary across groups of workers with different training costs $c(\tau)$ and benefits $f(\tau)$, different bargaining power β or different rate of turnover q. In turn, heterogeneity along these dimensions could exist across workers of different age, in different industries, or with different initial level of skills, among other things.

Empirical approach

The theoretical model presented above highlights the important role of the wage structure in generating incentives for investment in training and suggests that differences across countries in the wage distribution could potentially explain part of the differences in training activity. The main objective of our empirical analysis is to examine whether the variation in wage compression observed across our set of fourteen OECD countries significantly affect aggregate levels of job-related training, and if so, in which direction. Given our objective, we use aggregated data in contrast to the microeconomic training literature which focuses on the determinants of training at the individual level. Our interest is to improve our understanding of differences in aggregate levels of job-related training across countries, and in particular, of the role played by wage compression and other macroeconomic variables including the unemployment rate, the importance of R&D activity in GDP and the industrial structure of the economy.

The data used include variables expressed along the country and the age group dimensions (training and literacy skills), as well as cross-country variables only (wage dispersion indicators, the unemployment rate, the unionization rate, the industrial structure and the ratio of R&D spending on GDP). As a starting point, we first consider the following linear model:

$$TR_{i,g} = LS_{i,g}\phi_1 + u_{i,g} \qquad (1)$$

where $TR_{i,g}$ is the proportion of employed individuals that received job-related training in country i and age-group g, and the $LS_{i,g}$ is the average literacy score in country i and age-group g. We divided the population into five age-groups: 16-25, 26-35, 36-45, 46-55 and 56-65, and our sample includes fourteen countries. Pooling observations according to both countries and age groups will allow the explanatory variables, especially literacy, to have differential effects across age cohorts, and mitigates the small sample problem given the limited number of countries available. The key interest in this simple model is that the disturbances $u_{i,g}$ can be modeled in a two-way error component:

$$u_{i,g} = \mu_i + \lambda_g + \varepsilon_{i,g},$$

where the μ_i are the country-specific effects and the λ_g are the age-group-specific effects. The estimate of $\hat{\mu}_i$ will capture the unobserved country effects after controlling for the literacy and the demographic structure of the workforce (controlled by the common age-group-specific effects). These $\hat{\mu}_i$ are intended to measure the specific performance of a country in term of training under the *ceteris paribus* assumption. Given that we cannot estimate country fixed effects if we also include variables that do not have the age-group dimension, the information that we get from estimating these fixed effects is somewhat limited. They simply measure the cross-country (specific) differences in training that cannot be explained by differences in the age structures and in literacy.

In a second set of regressions, corresponding to model (2), we investigate the extent to which cross-country differences in a number of variables can account for these country specific differences in training. The country-fixed effects are dropped, and we use the following specification to estimate the effect of age group-invariant determinants of training:

$$TR_{i,g} = LS_{i,g}\phi_1 + Z_i\beta + u_{i,g} \qquad (2)$$

where Z_i is a vector of cross-country variables. In (2), the disturbances, $u_{i,g} = \lambda_g + \varepsilon_{i,g}$, are modeled in a one way error component, since the effects of the vector Z_i cannot be estimated with country fixed effects.

A number of variables are included in the vector Z_i and are expected to be important determinants of differences in training across countries. These are wage compression indicators, the unionization rate, the unemployment rate, R&D expenditures as a share of GDP, and the shares of production in particular industries, which are intended to control for different industrial structures across countries.

Most regressions are performed using generalized least squares with cross-section weights to account for cross-sectional heteroscedasticity. Heteroscedasticity consistent standard errors (HCCME) are computed to provide asymptotic valid inference in the presence of the remaining cohort heteroscedasticity. To illustrate robustness, results from pooled least squares estimations, for which we have also computed heteroscedasticity consistent standard errors (HCCME), are reported in the appendix.

There are two important limitations to our approach that should be kept in mind in interpreting the results, especially the estimated relation between wage compression and training. First, both wage compression and the proportion of employees that receive job-related training in a country could be partly explained by some unobserved characteristics of the country. Given that some of our explanatory variables are constant within countries, we are unable to take account of this potential problem by including country fixed-effect in the regression equation. Second, the direction of the causality between wage compression and our job-related training variable could possibly run in both directions. However, given the nature of the data used in our analysis, we cannot take this into account through the use of instrumental variables.

3- Data

Data on training and literacy are taken from the 1994 IALS. Our training indicator is the percentage of employed individuals in each country and age-group that received job-related training in the twelve months preceding the interview.[1] Our definition of job-

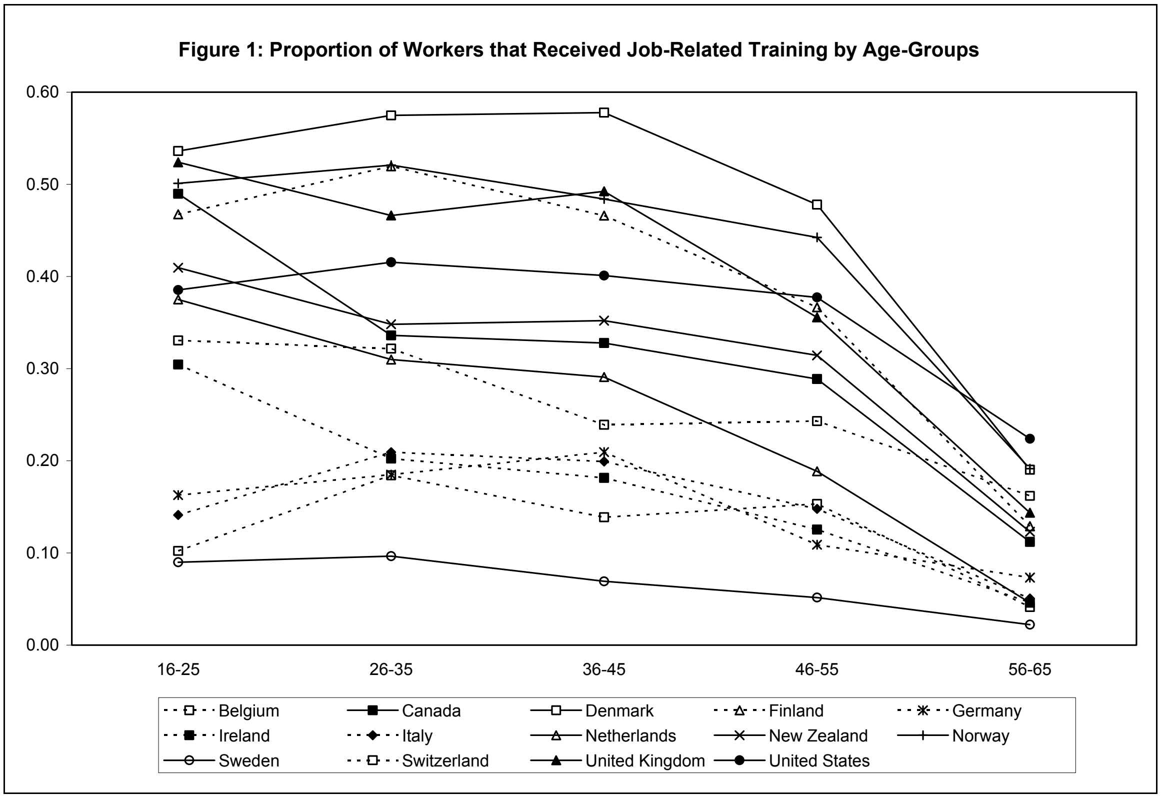
[1] The IALS questionnaire ask respondents the following question: 'During the past 12 months, that is, since August 1993, did you receive any training or education including courses, private lessons, correspondence courses, workshops, on-the-job training, apprenticeship training, arts, crafts, recreation courses or any other training or education'. Individuals that answered yes to that question could report up to three courses or

related training is not restricted to training that was paid by the employer, given that our main interest is not to test the prediction of Acemoglu and Pischke (1999) per se, but to examine whether cross-country differences in wage distributions have a significant effect on overall training activity across countries, whether the costs of training are supported by firm or workers. For the same reason, we do not attempt either to use any of the information contain in the IALS to exclude training that could be considered as firm-specific. In any case, it is not clear that the design of the IALS questionnaire would allow one to distinguish between general and firm-specific training in an accurate way. The training data is available by gender, for individuals aged between 16 and 65 and for fourteen countries.[2] Our training indicators for both sexes are depicted in Figure 1.

The Figure highlights a few important points. First, as expected, training appears to be significantly correlated with age. The proportion of workers trained decreases slowly across the first three age-groups, from a cross-country average of 34 percent in the group of 16 to 25 years old to 33 percent and 32 percent in the 26 to 35 and the 36 to 45 years old. The fall is much more pronounced in the two oldest groups, where the cross-country averages are 26 percent and 11 percent for the 46 to 55 and the 56 to 65 years old. Second, in all age-groups there is substantial variation across countries. The proportion of trained employees is generally highest across age-groups in Denmark, Norway, Finland, the UK and the US. Countries at the bottom of the distribution include Sweden, Belgium, Italy, Germany and Ireland.

training programs they had followed, and were asked about the main reason why they took each of these courses or training programs. We only counted an individual as having received training if he reported that the main reason for following at least one of the courses or training programs was for career or job-related purposes (as opposed to personal interest or other reasons).

[2] These countries are Belgium, Canada, Denmark, Finland, Germany, Ireland, Italy, Netherlands, Norway, New Zealand, Sweden, Switzerland, United Kingdom and the United States.



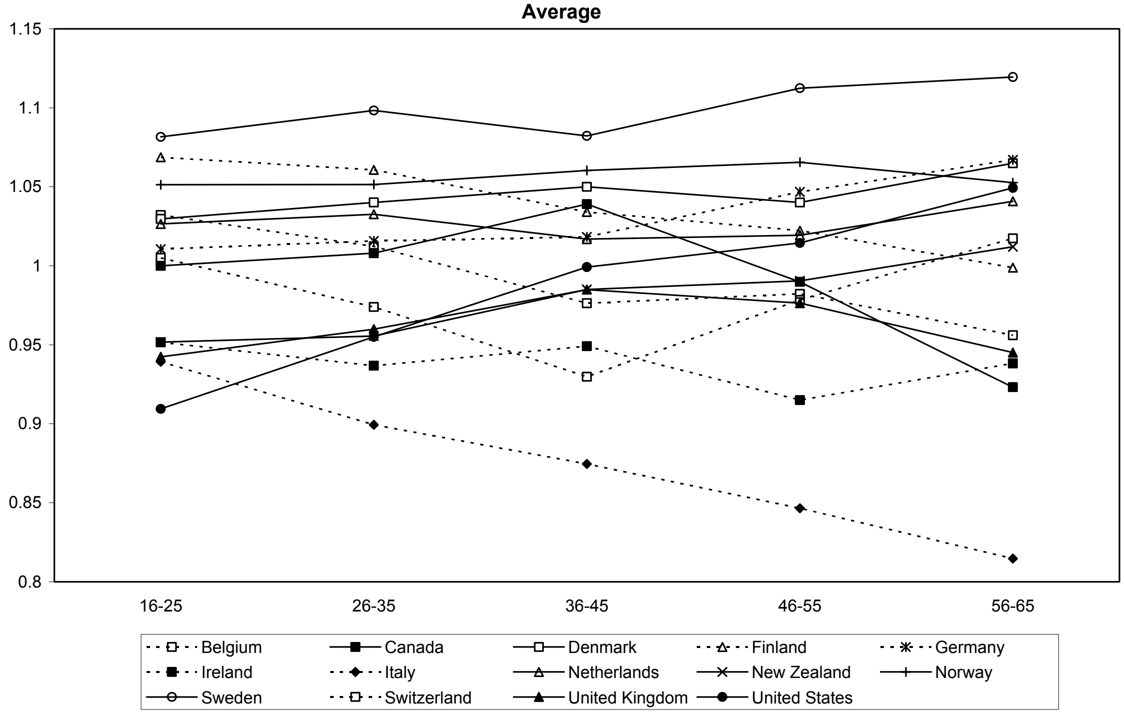
Our first explanatory variable is the average literacy skills of individuals in each age-group, which is intended to capture the complementarity between general human capital and job-related training.[3] As mentioned earlier, the positive relationship between human capital, measured by educational attainment, and training is well established at the microeconomic level. However, for the purpose of explaining cross-country differences in training, literacy test scores appear to be more appropriate measures of human capital than educational attainment, for three reasons. First, the international comparison of educational attainment data may be unreliable given the substantial variations in education systems across countries. Second, the skills acquired through education may vary across age-groups given that their investments in formal education were done in different time periods. Third, the human capital acquired through initial education is likely to depreciate throughout an individual's life, and additional skills may be

[3] Brunello and Medio (2001) have proposed a search equilibrium model, in which there is a complementarity between training and education, to explain international differences in training investments and education levels.

accumulated during ones' career through training and experience. Literacy tests are direct measures of the human capital that individuals possess at the time of receiving training.

The IALS provides literacy test scores over three broad domains: prose, document and quantitative. Our literacy measure is the average score of individuals in each population subset over the three domains. In each of these three domains, the IALS measures a fairly wide range of skills of various difficulty levels, and that are generally expected to increase productivity in most types of occupations. These indicators should therefore be viewed as measures of general human capital. Average literacy scores are presented in Figure 2.

Figure 2: Average Literacy Scores of Workers by Age-Groups Relative to the Cross-Country Average



In contrast to its training performance, Sweden has the highest literacy scores in all age-groups. At the other end, apart from the youngest cohort, Italy has the lowest literacy in all groups, and their scores relative to the cross-country average decrease rapidly as we move from the youngest to the oldest group. Interestingly, old Americans have relatively high literacy scores, with the cohort of 56 to 65 years old ranking fifth. However, the relatively young Americans perform quite poorly, with the youngest cohort ranking last in our set of fourteen countries. Norway, Denmark and Finland rank near the top in all age-groups, while in addition to Italy, literacy scores in Ireland and in the UK are systematically below average.

Unfortunately, indicators of wage compression could not be constructed from the IALS. Data on wage income is not directly comparable across countries and is not available for all countries in our sample. Therefore, we use wage compression indicators taken from the OECD (1999). Following Acemoglu and Pischke (1999) and Almeida-Santos and Mumford (2004), the indicator of overall wage compression is the ratio of the upper wage earnings limit of the ninth to the first deciles. This overall measure of wage compression can also be divided into measures of wage compression below and above the median wage earnings, using respectively the upper earnings limit of the fifth to the first deciles and of the ninth to the fifth deciles. In order to mitigate somewhat the issue of endogeneity when regressing training on wage compression, we use wage compression indicators for the year preceding that of the training measures. Table 1 presents our three wage compression indicators for the fourteen countries.

TABLE 1: Indicators of Wage Compression

	Wage percentiles 90/10	Wage percentiles 50/10	Wage percentiles 90/50
Belgium	2.25	1.43	1.57
Canada	4.02	2.21	1.82
Denmark	2.17	1.38	1.57
Finland	2.29	1.39	1.65
Germany	2.32	1.44	1.61
Ireland	4.63	2.87	1.61
Italy	2.80	1.75	1.60
Netherlands	2.59	1.54	1.68
Norway	3.08	1.77	1.74
New Zealand	1.98	1.32	1.50
Sweden	2.13	1.34	1.59
Switzerland	2.71	1.62	1.67
United Kingdom	3.33	1.79	1.86
United States	4.16	2.05	2.03

Source: OECD (1999).

Dispersion in the overall wage distribution is highest in Ireland, the US, Canada and the UK in decreasing order. Above the median wage earnings, dispersion is highest in the US, the UK and Canada. In contrast, there is generally more wage compression in the Scandinavian countries and in Belgium.

Rates of unionization and unemployment across countries in 1994[4] are taken from OECD (1996) and OECD (1995), respectively. The intensity of R&D activity is measured by total R&D expenditures as a share of GDP. The data comes from the OECD *Research and Development Expenditure in Industry* database. Finally, we control for the industrial structure of each country by including in the set of regressors the value added shares of particular industries relative to the total economy. These value added shares are taken from the OECD *STAN Indicators* database. The industry classification includes nine industries. However, most of them were not found to have a significant effect on training. Therefore, in all regressions reported below, we include as regressors only the three industries that are generally found to have a significant effect on training. These industries are: 1) agriculture, forestry and fishing; 2) manufacturing; and 3) finance, insurance and business services.[5] Table A.1 of the appendix presents descriptive statistics for the dependent and independent variables.

4- Results

As a starting point, we estimated the country fixed effects following equation (1). As mentioned above, the information provided by these fixed effects is somewhat limited given that we can only control for the age structure and literacy. However, as we will see below, age and literacy are among the most important determinants of training levels across countries, and their effect is highly robust. Results are presented in Table 2 for various population subsets. For the training of all employed individuals aged between 16 and 65 (first column), the country fixed effects are positive and significant at the one

[4] Rates of unionization are for 1993 in Canada, Italy, Netherlands and Norway and for 1995 in Finland.
[5] The other industries are: 1) mining and quarrying; 2) electricity, gas and water supply; 3) construction; 4) wholesale and retail trade, restaurants and hotels; 5) transport, storage and communication; 6) community, social and personal services.

percent level for Denmark, Finland, Norway, New Zealand, UK and the US. They are negative and significant at the one percent level in Belgium, Germany, Ireland and Sweden, and at the five percent level for the Netherlands. The fixed effects are generally stable when excluding either the youngest or oldest age-group or when restricting the sample to either men or women (second to fifth columns).

TABLE 2: Country fixed effects

	Dependent variable: percentage of employed individuals that received job-related training – Various sub-populations				
	Total population	Age-groups: 26 to 65	Age-groups: 16 to 55	Men	Women
Belgium	-0.146 [a]	-0.119 [a]	-0.170 [a]	-0.149 [a]	-0.150 [a]
	(0.035)	(0.027)	(0.033)	(0.044)	(0.028)
Canada	0.040	0.014	0.043	0.071 [b]	0.015
	(0.028)	(0.011)	(0.036)	(0.029)	(0.029)
Denmark	0.178 [a]	0.179 [a]	0.211 [a]	0.153 [a]	0.205 [a]
	(0.033)	(0.043)	(0.016)	(0.029)	(0.042)
Finland	0.099 [a]	0.102 [a]	0.121 [a]	0.076 [a]	0.130 [a]
	(0.025)	(0.031)	(0.018)	(0.023)	(0.032)
Germany	-0.140 [a]	-0.127 [a]	-0.157 [a]	-0.148 [a]	-0.127 [a]
	(0.022)	(0.024)	(0.016)	(0.030)	(0.017)
Ireland	-0.073 [a]	-0.089 [a]	-0.084 [a]	-0.076 [a]	-0.076 [a]
	(0.021)	(0.019)	(0.026)	(0.026)	(0.026)
Italy	-0.067 [c]	-0.044 [c]	-0.093 [b]	-0.047	-0.103 [b]
	(0.036)	(0.025)	(0.042)	(0.039)	(0.045)
Netherlands	-0.044 [b]	-0.058 [a]	-0.033	-0.017	-0.070 [a]
	(0.019)	(0.013)	(0.021)	(0.022)	(0.024)
Norway	0.129 [a]	0.129 [a]	0.149 [a]	0.117 [a]	0.147 [a]
	(0.020)	(0.025)	(0.014)	(0.026)	(0.029)
New Zealand	0.046 [a]	0.035 [a]	0.055 [a]	0.047 [a]	0.046 [c]
	(0.014)	(0.011)	(0.012)	(0.016)	(0.027)
Sweden	-0.253 [a]	-0.240 [a]	-0.277 [a]	-0.290 [a]	-0.209 [a]
	(0.031)	(0.037)	(0.019)	(0.035)	(0.037)
Switzerland	-0.005	-0.003	-0.018 [c]	0.019	-0.030 [c]
	(0.015)	(0.019)	(0.010)	(0.016)	(0.018)
United Kingdom	0.141 [a]	0.123 [a]	0.160 [a]	0.146 [a]	0.129 [a]
	(0.028)	(0.028)	(0.023)	(0.026)	(0.033)
United States	0.095 [a]	0.098 [a]	0.094 [a]	0.098 [a]	0.093 [a]
	(0.005)	(0.006)	(0.010)	(0.010)	(0.019)

Notes: White heteroscedasticity standard errors are shown in parentheses below the estimated coefficients; a: significant at 1% level; b: at 5% level; c: at 10% level.

More interestingly, let us now consider regression results based on the setup of equation (2). Results for samples of all individuals, men and women separately, and excluding either the youngest or oldest age-groups are presented in Tables 3 to 5, respectively. In all cases, we included in the list of regressors either the indicator of overall wage compression, measured by the earnings ratio of the ninth to the first deciles of the distribution, or the indicators of compression below and above the median wage earnings. Since the incentives to train may differ substantially between the youngest workers (aged 16-25) who have recently joined the labor market, the oldest workers (aged 56-65) that are approaching retirement, and the rest of the population, we estimated some regressions for samples that exclude these groups. However, as will be seen below, results are generally not affected significantly by sample changes.

The first important point to note from our analysis is that the average literacy level within each age-group has a positive and highly significant effect on the percentage of individuals that receive training, and that holds for all population subsets considered. This result, which concords with the microeconomic evidence regarding the effect of education on the likelihood that individuals receive training, is not surprising given that the general skills of individuals are likely to determine their ability to acquire new skills through job-related training. Hence, the return on a training investment is likely to be higher for individuals who initially have greater human capital.

TABLE 3: The determinants of job-related training across countries

	Dependent variable: percentage of employed individuals that received job-related training	
Literacy	0.230 [a]	0.171 [a]
	(0.046)	(0.048)
Wage ratio 90/10	3.741 [a]	
	(1.211)	
Wage ratio 50/10		-13.972 [a]
		(3.795)
Wage ratio 90/50		57.468 [a]
		(10.554)
Unionization	-0.147	-0.087
	(0.119)	(0.105)
Unemployment	2.211 [a]	0.648
	(0.591)	(0.551)
R&D intensity	5.111 [c]	-4.184
	(2.676)	(3.450)
Agriculture, forestry and fishing	1.651 [b]	0.340
	(0.702)	(0.722)
Manufacturing	-3.435 [a]	-1.305 [b]
	(0.370)	(0.498)
Finance, insurance and business services	-0.172	-2.406 [a]
	(0.328)	(0.467)
Age group 26-35	-0.972	-2.710
	(1.398)	(2.026)
Age group 36-45	-2.702 [b]	-3.520 [c]
	(1.327)	(2.023)
Age group 46-55	-4.390 [a]	-6.787 [a]
	(1.237)	(2.023)
Age group 56-65	-16.046 [a]	-19.197 [a]
	(1.380)	(3.001)
Adjusted R^2	0.97	0.92

Notes: White heteroscedasticity standard errors are shown in parentheses below the estimated coefficients; a: significant at 1% level; b: at 5% level; c: at 10% level.

Note that, in contrast to empirical studies of training performed at the individual level, the estimated effect of literacy in our macro-approach may capture the potential complementarity between job-related training and the overall level of human capital in the workforce that would result from human capital externalities. Job-related training may be more valuable to workers in economies that are well-endowed in human capital.

Moreover, one could argue that the positive relation between the educational attainment of individuals and their likelihood of receiving training partly reflects the fact that employers use educational attainment as a signal about which workers have the greater ability to succeed in training programs. Our results establish a clear relation between training and a direct measure of human capital, which suggest that there is a genuine link between general human capital and the return from job-related training.

Let us now turn to the effect of wage compression on training. Note first that the value of our indicator decreases with the level of compression. Therefore, a positive relation between compression and training would produce a negative regression coefficient. In the first column of Table 3, we report the results of the regression that includes the indicator of overall wage compression. The estimated coefficient is found to be positive and highly significant, which suggests that compression over the entire wage distribution tends to discourage training. However, if we include compression below and above the median wage earnings, the results (reported in the second column of Table 3) indicate that compression at the top of the distribution leads to lower training, but that compression at the bottom has the opposite effect. Regressions reported in Tables 4 and 5 show that these results holds in all population subsets considered. The estimated coefficients of compression below and above the median wage are highly stable and significant at the one-percent level for all sub-samples.

TABLE 4: The determinants of job-related training across countries for men and women

	Dependent variable: percentage of employed individuals that received job-related training			
	Men		Women	
Literacy	0.247 [a]	0.165 [a]	0.210 [a]	0.176 [a]
	(0.050)	(0.054)	(0.048)	(0.046)
Wage ratio 90/10	3.601 [a]		3.234 [b]	
	(1.257)		(1.249)	
Wage ratio 50/10		-11.047 [a]		-17.070 [a]
		(3.890)		(4.163)
Wage ratio 90/50		56.143 [a]		59.941 [a]
		(11.661)		(10.471)
Unionization	-0.197	-0.093	-0.134	-0.109
	(0.122)	(0.115)	(0.118)	(0.098)
Unemployment	2.336 [a]	0.929	2.218 [a]	0.464
	(0.635)	(0.618)	(0.586)	(0.544)
R&D intensity	3.948	-4.791	6.507 [b]	-3.152
	(2.788)	(3.582)	(2.545)	(3.438)
Agriculture, forestry and fishing	1.368 [c]	0.036	2.080 [b]	0.636
	(0.740)	(0.739)	(0.791)	(0.822)
Manufacturing	-3.390 [a]	-1.641 [a]	-3.423 [a]	-1.015 [c]
	(0.427)	(0.534)	(0.367)	(0.520)
Finance, insurance and business services	-0.182	-2.162 [a]	-0.160	-2.715 [a]
	(0.352)	(0.490)	(0.389)	(0.511)
Age group 26-35	-0.333	-0.110	-2.251	-3.797
	(1.988)	(2.652)	(2.091)	(2.407)
Age group 36-45	-1.560	-2.614	-1.922	-3.825
	(2.049)	(2.380)	(2.066)	(2.489)
Age group 46-55	-7.560 [a]	-8.484 [a]	-3.666	-5.444 [b]
	(1.891)	(2.355)	(2.654)	(2.750)
Age group 56-65	-15.542 [a]	-18.174 [a]	-13.869 [a]	-18.483 [a]
	(1.982)	(3.210)	(2.705)	(3.230)
Adjusted R^2	0.93	0.88	0.82	0.86

Notes: White heteroscedasticity standard errors are shown in parentheses below the estimated coefficients; a: significant at 1% level; b: at 5% level; c: at 10% level.

These results suggest that the costs of investments in the training of low-wage workers tend to be supported by employers, whereas high-wage workers tend to pay for their own training. As a result, compression at the bottom of the wage distribution increases the incentives of firms to invest in the skills of low-wage workers. In contrast, compression at the top of the wage distribution tends to reduce the private benefits that individuals can capture by investing in their own skills. Of course, even if firms do not support the costs of training for high-wage workers, some of the training costs may still be paid directly by firms but shifted to workers through lower wages.

Note that the absolute value of the coefficient of compression above the median is much larger than that of compression below the median in all regressions, which explains that overall compression lowers training. Moreover, the fact that the effect of compression at the top of the wage distribution dominates is consistent with the well-established result that training participation tends to be concentrated among individuals with relatively high human capital and wages.

The rate of unionization is usually thought to affect training. In principle it could affect training indirectly through its effect on wage compression, or more directly if, for a variety of reasons, unions bargain for higher training investments by firms. If the indirect effect tends to dominate, then as for wage compression, the effect could go in either direction, depending on whether firms or workers support the bulk of training costs. At the empirical level, evidence of a positive effect of unionization on training has been found in Green, Machin and Wilkinson (1996) and Booth, Francesconi and Zoega (2003) for the UK and by Dustmann and Schoenberg (2004) for Germany, among others. In all our regressions, the estimated coefficient of unionization is negative but insignificant. This finding appears consistent with our results regarding the effects of wage compression.

Note that if unionization affects training only through its effect on wage compression, it may be inappropriate to include both the rate of unionization and indicators of wage compression as explanatory variables. Therefore, we conducted a series of regressions, reported in Table A.2 of the appendix, where the rate of unionization is excluded. Results, especially the effect of wage compression, remain essentially unchanged.

The effect of the unemployment rate on training is always positive but only significant when overall wage compression is included in the set of independent variables. The positive effect of unemployment on training could capture the fact that the opportunity cost of training for both firms and workers may be lower when production is relatively low. Instead of laying-off workers, firms may choose to make investments in skills that will be profitable later. Likewise, employees may work fewer hours, leaving them more time to undertake training programs.

There is some empirical evidence on the relationship between innovation or technology adoption and training (e.g. Baldwin and Johnson, 1996; Rao, Tang and Wang, 2002; Turcotte, Léonard and Montmarquette, 2003). Typically, firms that innovate and adopt new technologies face new skill requirements that are fulfilled through training. Hence, we should expect to observe a positive link between the intensity of R&D activity across countries and the levels of training. However, our results are somewhat mixed on that issue. The estimated coefficients for R&D expenditures as a share of GDP vary substantially in the different regressions and are usually not significant. In a series of regressions that are not reported, we replaced the R&D intensity variable by the share of investment in GDP as a way to capture more generally the level of technology adoption across countries and the potential broader complementarities between physical capital and skills. However, doing so did not significantly change the results.[6]

[6] We used both the share of investment in GDP in 1993 and the average over the period 1990-1995 in order to smooth business cycle effects. The estimated effect was not significantly different between the two measures.

TABLE 5: The determinants of job-related training across countries for different age-groups samples

	Dependent variable: percentage of employed individuals that received job-related training			
	Age-groups 26 to 65		Age-groups 16 to 55	
Literacy	0.220 [a]	0.157 [a]	0.252 [a]	0.173 [a]
	(0.061)	(0.048)	(0.050)	(0.053)
Wage ratio 90/10	3.519 [b]		3.957 [a]	
	(1.535)		(1.172)	
Wage ratio 50/10		-16.680 [a]		-16.876 [a]
		(2.920)		(4.678)
Wage ratio 90/50		60.172 [a]		65.609 [a]
		(8.160)		(12.031)
Unionization	-0.102	-0.076	-0.173	-0.098
	(0.143)	(0.105)	(0.135)	(0.129)
Unemployment	2.009 [b]	0.389	2.646 [a]	0.751
	(0.758)	(0.514)	(0.640)	(0.623)
R&D intensity	2.413	-4.178	5.909 [b]	-4.553
	(2.484)	(2.809)	(2.824)	(3.958)
Agriculture, forestry and fishing	0.693 (0.582)	0.199 (0.575)	2.076 [a] (0.719)	0.534 (0.814)
Manufacturing	-3.073 [a]	-0.963 [a]	-4.019 [a]	-1.439 [b]
	(0.445)	(0.320)	(0.380)	(0.613)
Finance, insurance and business services	-0.030 (0.417)	-2.519 [a] (0.421)	-0.232 (0.347)	-2.750 [a] (0.581)
Age group 26-35			-1.222	-1.497
			(1.311)	(1.946)
Age group 36-45	-0.410	-1.289	-2.872 [b]	-2.070
	(1.335)	(0.899)	(1.302)	(2.038)
Age group 46-55	-2.481	-3.761 [a]	-4.423 [a]	-6.391 [a]
	(1.607)	(0.888)	(1.058)	(1.903)
Age group 56-65	-13.987 [a]	-16.460 [a]		
	(2.454)	(1.671)		
Adjusted R^2	0.93	0.97	0.98	0.94

Notes: White heteroscedasticity standard errors are shown in parentheses below the estimated coefficients; a: significant at 1% level; b: at 5% level; c: at 10% level.

As mentioned earlier, we control to some extent for differences in industrial structure across countries by including in the list of independent variables the share of value added of particular industries in total GDP. The share of production in agriculture, forestry and fishing is found to have a positive effect on training, although this effect is not always significant. In contrast, the shares of production in manufacturing and in finance, insurance and business services are found to have a negative effect on training, although only the effect of manufacturing is always significant.

Finally, all our regressions include dummy variables for all age-groups except the youngest. Results clearly show that age has a negative effect on training, which is not surprising given that the return on training should be substantially affected by the number of years remaining in the productive life of individuals. Again, this result is consistent with microeconomic evidence (e.g. Turcotte, Léonard and Montmarquette, 2003).

A series of pooled least squares estimations are reported in Table A.3 of the appendix. The general direction of the results remains unchanged, although the effects of most variables are estimated less precisely with pooled least squares than with generalized least squares. The negative effect on training of wage compression above the median remains significant at the one-percent level in all cases, while the positive effect of compression below the median wage is significant at the five-percent level for both sexes and women, and at the ten-percent level for men. Not surprisingly, the R-squared are also lower under pooled least squares.

5- Policy Discussion and Conclusions

The main result of this paper is that wage compression below the median has a positive effect on the proportion of workers that receive job-related training, while compression above the median wage has the opposite effect. This finding suggests that the allocation of training costs between firms and workers differs over the wage distribution. As a result, the nature of inefficiencies in training decisions and appropriate corrective policies may vary for different segments of workers. Moreover, if policy measures cannot be easily targeted at particular groups of workers, the choice of policy instruments may involve a trade-off between the training of high-wage versus low-wage workers.

The positive relationship between compression at the bottom of the wage distribution and training suggests that the cost of training for low-wage workers is largely supported by employers and that investment in the general skills of these workers is likely to be sub-optimal. Therefore, there is an efficiency role for policy, and instruments to promote the training of low-wage workers should probably focus on firms' incentives to invest in skills. On the other hand, the negative estimated effect of compression at the top of the wage distribution on training suggests that high-wage workers largely support the cost of investment in their own skills. Wage compression reduces the private benefit of skills to workers and therefore lowers training. Thus, appropriate policies to promote training among high-wage workers should probably focus on the barriers to training faced by these workers. The most significant barriers may well be credit constraints and time constraints.

Several instruments are potentially available to increase the incentives of firms to invest in skills. For example, allowing the use of pay-back clauses may be a useful policy to directly target one of the main causes of firms' under-investment in training. Pay-back clauses essentially stipulate that workers who leave their job after receiving employer-paid training are required to reimburse part of the costs of training. Pay-back clauses are allowed in a number of countries, including Germany, Italy, Netherlands, Norway and Switzerland (OECD, 2003). Such arrangements reduce the ability of other firms to poach trained workers and therefore lower the positive externality of training investments towards potential future employers. The disadvantage of pay-back clauses is that they may reduce the incentives of credit-constrained workers to invest in their own skills by accepting lower wages from firms that provide training. Hence, our results suggest that pay-back clauses would be particularly inappropriate if the objective is to promote training among relatively high-wage workers.

In contrast to pay-back clauses, a training certification program would tend to have the opposite effects. In particular, it would increase the incentives of workers to invest in training by improving their ability to capture the return on their investment when settling wages with future employers. As a result, it would likely have a positive effect on training among relatively high-wage workers. However, it would tend to reduce the incentives of current employers to invest in training by improving the outside options of trained workers. Hence, it could lead to lower training among relatively low-wage workers. Therefore, our results suggest that training certification programs may be desirable if they can be restricted to relatively specialized skills.

Several other policy instruments would not be subject to such a sharp trade-off between the training of high-wage versus low-wage workers. Examples include corporate tax credits or subsidies for training expenditures. In fact, tax credits and subsidies offered either to employers or employees would tend to encourage training whether the economic incidence of training costs falls on firms or workers. Training investments may also be increased, among both high-wage and low-wage workers, through legislation that makes it mandatory for firms to invest some specified annual amount on training, possibly as a share of their payroll. This type of legislation has been used previously in a few countries, including Canada, France, and the UK. Note however that such a policy will tend to result in wasteful expenditures if low investment levels in particular sectors or for specific groups of workers reflect low returns on skills, rather than distortions in investment decisions.

As mentioned above, our results suggest that in order to promote training among relatively high-wage workers, policy measures may need to focus on the barriers to training faced by workers, rather than altering firms' incentives. Some specific measures could be used to target the credit and time constraints faced by workers who would otherwise choose to invest in their own skills. It is well known that borrowing for the purpose of investing in human capital is difficult given that human capital cannot usually be used as collateral. Therefore, government loan programs or training-savings accounts, possibly co-financed by the government and workers, may be justified.

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Appendix

TABLE A.1: Descriptive statistics for the dependent and independent variables

Variable	**Mean**	**Standard Deviation**
% of employed that received training – 16 to 25	34.42	15.50
% of employed that received training – 26 to 35	33.50	14.30
% of employed that received training – 36 to 45	31.63	14.67
% of employed that received training – 46 to 55	26.01	12.89
% of employed that received training – 56 to 65	11.10	6.32
Average literacy score – 16 to 25	288.36	14.76
Average literacy score – 26 to 35	288.06	15.31
Average literacy score – 36 to 45	281.81	15.15
Average literacy score – 46 to 55	270.74	16.83
Average literacy score – 56 to 65	250.09	18.83
Wage compression – 90/10	2.89	0.82
Wage compression – 50/10	1.71	0.42
Wage compression – 90/50	1.68	0.14
Unemployment rate	9.88	3.63
Unionization rate	46.29	22.09
R&D expenditures/GDP	1.95	0.61
Agriculture	3.40	2.01
Manufacturing	19.87	3.59
Finance, insurance and business services	23.21	3.05

TABLE A.2: The determinants of job-related training across countries – excluding the unionization variable

	Dependent variable: percentage of employed individuals that received job-related training				
	Both sexes	Men	Women	Age-groups 26-65	Age-groups 16-55
Literacy	0.138 [a]	0.131 [a]	0.137 [a]	0.128 [a]	0.137 [a]
	(0.025)	(0.030)	(0.032)	(0.027)	(0.019)
Wage ratio 50/10	-13.743 [a]	-11.050 [a]	-16.573 [a]	-16.308 [a]	-16.694 [a]
	(3.699)	(3.872)	(4.027)	(2.703)	(4.500)
Wage ratio 90/50	60.212 [a]	59.256 [a]	62.875 [a]	62.173 [a]	68.761 [a]
	(10.171)	(11.069)	(10.267)	(8.306)	(11.873)
Unemployment	0.331	0.578	0.090	0.081	0.436
	(0.374)	(0.394)	(0.423)	(0.288)	(0.437)
R&D intensity	-4.939	-5.937	-3.949	-4.548	-5.552
	(3.533)	(3.609)	(3.570)	(2.945)	(4.117)
Agriculture, forestry and fishing	0.162	-0.233	0.428	0.090	0.290
	(0.731)	(0.742)	(0.816)	(0.602)	(0.824)
Manufacturing	-1.134 [b]	-1.398 [a]	-0.844 [c]	-0.830 [a]	-1.247 [b]
	(0.462)	(0.477)	(0.490)	(0.306)	(0.559)
Finance, insurance and business services	-2.289 [a]	-2.045 [a]	-2.569 [a]	-2.409 [a]	-2.614 [a]
	(0.439)	(0.479)	(0.484)	(0.374)	(0.507)
Age group 26-35	-2.928	-0.160	-3.858		-1.952
	(1.979)	(2.525)	(2.471)		(1.931)
Age group 36-45	-3.838 [c]	-2.929	-4.057	-1.361	-2.811
	(1.967)	(2.210)	(2.478)	(0.835)	(1.911)
Age group 46-55	-7.370 [a]	-9.290 [a]	-6.174 [b]	-4.005 [a]	-7.228 [a]
	(1.894)	(2.125)	(2.659)	(0.721)	(1.676)
Age group 56-65	-20.672 [a]	-19.912 [a]	-19.991 [a]	-17.357 [a]	
	(2.387)	(2.546)	(2.825)	(1.139)	
Adjusted R^2	0.92	0.88	0.86	0.97	0.94

Notes: White heteroscedasticity standard errors are shown in parentheses below the estimated coefficients; a: significant at 1% level; b: at 5% level; c: at 10% level.

TABLE A.3: The determinants of job-related training across countries – Pooled least squares estimations

	Dependent variable: percentage of employed individuals that received job-related training					
	Both sexes		Men		Women	
Literacy	0.249 [a]	0.107 [c]	0.267 [a]	0.131 [b]	0.226 [a]	0.090
	(0.054)	(0.061)	(0.055)	(0.064)	(0.055)	(0.061)
Wage ratio 90/10	3.519 [c]		3.794 [b]		3.356 [c]	
	(1.788)		(1.718)		(1.972)	
Wage ratio 50/10		-10.761 [b]		-9.134 [c]		-12.216 [b]
		(4.575)		(4.648)		(4.917)
Wage ratio 90/50		57.195 [a]		53.666 [a]		59.918 [a]
		(13.720)		(14.592)		(13.450)
Unionization	-0.205	-0.063	-0.277 [b]	-0.132	-0.132	-0.004
	(0.127)	(0.130)	(0.128)	(0.134)	(0.129)	(0.129)
Unemployment	2.083 [a]	0.927	2.215 [a]	1.055	1.985 [a]	0.850
	(0.678)	(0.705)	(0.688)	(0.743)	(0.703)	(0.704)
R&D intensity	2.279	-2.956	2.476	-2.980	2.419	-2.756
	(3.314)	(3.598)	(3.302)	(3.666)	(3.461)	(3.721)
Agriculture, forestry and fishing	0.973 (1.046)	0.555 (0.812)	0.967 (1.035)	0.401 (0.827)	1.081 (1.129)	0.729 (0.907)
Manufacturing	-2.919 [a]	-1.772 [a]	-3.067 [a]	-1.904 [a]	-2.817 [a]	-1.683 [b]
	(0.524)	(0.640)	(0.516)	(0.652)	(0.566)	(0.669)
Finance, insurance and business services	-0.387 (0.438)	-1.782 [a] (0.623)	-0.429 (0.454)	-1.704 [a] (0.636)	-0.306 (0.467)	-1.871 [a] (0.660)
Age group 26-35	-0.415	-0.794	2.214	1.986	-3.180	-3.777
	(4.874)	(4.329)	(5.119)	(4.641)	(4.808)	(4.233)
Age group 36-45	-0.720	-1.988	0.092	-0.930	-1.630	-3.142
	(4.849)	(4.308)	(4.907)	(4.375)	(5.009)	(4.468)
Age group 46-55	-3.586	-6.428	-3.499	-5.625	-3.990	-7.368 [c]
	(1.891)	(4.187)	(4.684)	(4.300)	(4.670)	(4.397)
Age group 56-65	-13.347 [a]	-19.126 [a]	-12.237 [b]	-16.934 [a]	-15.027 [a]	-21.318 [a]
	(4.485)	(4.791)	(4.787)	(4.889)	(4.358)	(4.773)
Adjusted R^2	0.48	0.58	0.47	0.56	0.47	0.57

Notes: White heteroscedasticity standard errors are shown in parentheses below the estimated coefficients; a: significant at 1% level; b: at 5% level; c: at 10% level.