

DISCUSSION PAPER SERIES

IZA DP No. 12981

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Determinants and Obstacles**

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## ABSTRACT

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# Employer Provided Training in Europe: Determinants and Obstacles\*

This report looks at employer–provided training in Europe. We start with a brief outline of the economic theory of training. We then look at the recent facts, by combining data from two employer surveys, the European Investment Bank’s Investment Survey (EIBIS) and Eurostat’s Continuous Vocational Training Survey (CVTS). We review the recent empirical literature on the relationship between economic institutions and training and between training and productivity and consider whether financing constraints hamper the training provision by firms. The paper concludes by discussing policy implications.

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## **Introduction**

In 2016, participation by the adult population aged 25-64 in job related education and training in the EU was 35.9%, the vast majority of which (89.1 %) was sponsored by the employer.<sup>1</sup> Firms invest in training to increase productivity and to update continuously the skills of their workers in an economic environment characterized by globalization, population ageing and technological progress (automation and digitalization).

Do they invest enough? The almost ubiquitous diffusion of training policies in EU Member States suggests that they do not, as these policies often provide subsidies to encourage additional company training. In addition, about 20 % of European firms report to have underinvested in training of their workforce (EIB, 2018).

Economists have pointed out that firms invest less than the socially optimal level because of market failures due to financing constraints and externalities. In the presence of financing constraints, access to external finance is problematic or excessively costly, and training investments are hampered despite expected positive benefits.

An example of externalities is when training firms do not take into account in their decision to train the profits made by competing firms hiring their trained workers. Under-investment can happen also because firms, which bear training costs, cannot fully appropriate the benefits of training, which are shared with trained employees as workers and firms can bargain over wages after training has taken place – the so called hold up problem.

Understanding the factors affecting employer-provided training is important in the current economic context, characterized by rising inequalities, ageing of the

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<sup>1</sup> Average training participation for EU 28, from the Adult Education Survey. According to the Survey on Adult Skills, more than 50 % of training activities in 2012, both work related and not, were paid entirely or partially by the employer (OECD, 2012). These data refer to 31 countries and exclude Australia.

workforce, progressive digitalization and automation, which displaces or (substantially) changes jobs and tasks and increases the needs for re-training and the importance of adult learning. Worryingly, the evidence to date indicates that the odds of participating in on the job or off the job training is very uneven and significantly lower among workers in jobs that only require basic levels of education and are often at higher risk of being automated (Nedelkoska and Quintini 2018, Pouliakas 2018).

This report looks at employer – provided training in Europe. Section 1 provides a brief outline of the economic theory of training. We then look in Section 2 at the recent facts, and examine EU firms’ training provision by combining data from two employer surveys, the European Investment Bank’s Investment Survey (EIBIS) and Eurostat’s Continuous Vocational Training Survey (CVTS). We find considerable heterogeneity across Member States. Section 3 focuses on explaining the differences and reviews the empirical literature on the relationship between economic institutions and other obstacles in firms’ operating environment that could hold firms back from investing in training. Section 4 presents a brief review of training policies in Europe and looks at policy issues. The paper concludes with a short discussion of policy recommendations.

## **1. Training Investment: A Brief Theoretical Framework**

Investments in human capital are central to economic performance and growth. When tastes and technologies are changing rapidly, human capital investments are essential to maintain high levels of competitiveness and of employment. Without a workforce that is continually acquiring new skills, it is difficult to reap all the returns from technological progress. Moreover, not having enough of the right skills in the workforce can aggravate inequalities.

Human capital is an investment that raises expected future productivity, albeit at a cost (Becker 1964). Training costs comprise the opportunity costs of foregone productivity as well as the direct costs of training, such as course

enrolment costs, materials used while learning, training personnel and the like (see Bassanini et al, 2007).

In theory, training can be either general or specific in nature, although in practice it is likely to be a mix of both types. In a competitive economy, *general training* represents skills that can be used at many other firms, and are portable across companies as individuals change jobs. According to human capital theory (see Becker 1964, Sweetland 1996, and Fleischhauer 2007 for reviews), general training would be financed by the worker through the receipt of lower wages during training, although it could be provided by the firm.

The reason for this is that training is embodied in the worker, who could leave at any time to another job where she would be equally productive. No firm would ever finance such training, since its returns to the firm are uncertain and could well be zero or negative. In contrast, *specific training* is by definition only valuable to the firm providing the training and typically, both parties would contribute to the financing of such training. This sharing mechanism ensures that both firm and worker have the incentive to maintain the relationship after training and thereby to reap the returns.

For three decades, orthodox human capital theory, based on the assumption of a perfectly competitive labour market, was thought to fully explain who would pay for the general training. Any stylised facts diverging from the theory's predictions were believed to be due to imperfections such as credit market constraints. Yet there remained some puzzles, which this framework could not explain. First, survey evidence showed employers paying for general training in spite of potential poaching of trained workers. Second, there did not seem to be evidence of workers receiving wage cuts during training.

The orthodox human capital model has been challenged recently by removing the assumption that labour markets are characterized by perfect information.

The key point here is that asymmetry of information about the value of employer - provided training, for example when the firm offering general training knows its value but other firms do not, affect the transferability of training in an otherwise competitive labour market with *identical ability* of workers. If outside firms assign a value of zero to the training – as they might if they have no information – such training is in effect specific to the training firm. Consequently, the firm may be willing to share the costs of its provision and the pay returns in other firms will be non-existent or small.

When worker abilities are heterogeneous, training is rewarded more by current employers than by other firms because the current firm will pay higher wages to retain high-ability workers, whereas low-ability workers will be dismissed. Some of the high-ability workers who need to leave their jobs will be treated as low-ability workers in the outside market. Since training and ability are complements, training will be valued less for workers who have been laid off or who have quit. Consequently, in the outside market these workers will receive lower returns to their training (Acemoglu and Pischke, 1998).

## **2. Training Provision by European Firms**

### *2.1 The Facts*

International surveys providing up-to-date comparative information on training provision and investment in Europe focus either on the individual (for example the European Labour Force Survey and the Survey on Adult Skills – or PIAAC) or on the firm (for example the EIB Investment Survey – EIBIS – and the Continuing Vocational Training Survey – CVTS) as the unit of observation. In this paper, we examine employer-provided training, and therefore focus on the latter.

EIBIS is an employer survey implemented annually from 2016 at the European Investment Bank, which asks firms in the EU to report both on their

total investment and its composition, including the training of its workforce, and on the presence of impediments to investment, due for instance to business and labour market regulations or to the presence of financial constraints.<sup>2</sup>

In addition, Eurostat's CVTS also covers training activities by European firms and this survey has a longer span of time but at lower frequency. Its three most recent waves were carried out in 2005, 2010 and 2015.<sup>3</sup> The survey defines training as measures or activities with the acquisition of new competences or their development and improvement as a primary objective. Training must be planned in advance and must be organised or supported with the special goal of learning. Continuing vocational training (CVT) includes courses and other forms of CVT, and excludes initial training such as apprenticeships. Random learning is excluded and training must be financed at least partly by the enterprise.

The two surveys provide different but somewhat complementary information. While EIBIS focuses mainly on firms' financial investment in training, CVTS looks at training activities by firms and their employees and considers also training intensity, strategies and costs. There are, however, some overlaps as well. For instance, EIBIS can be used to compute the percentage of surveyed firms with a positive training investment (in 2015), which can be compared with the percentage of firms doing any training in CVTS 2015.

The two data sources produce broadly consistent results, with some differences for Greece and several Eastern European countries, where the average propensity to invest reported in the EIBIS is significantly higher than

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<sup>2</sup> For further information on the EIBIS see <https://www.eib.org/en/about/economic-research/surveys-data/about-eibis.htm>. EIBIS data are based on a random sample of non-financial enterprises operating in the EU with at least five employees in NACE sectors C to J. See Ipsos Public Affairs, 2017, for details on sampling and weights. The CVTS survey considers both financial and non-financial enterprises with at least ten employees.

<sup>3</sup> For an overview of CVTS see <https://ec.europa.eu/eurostat/web/microdata/continuing-vocational-training-survey>.

in CVTS (see Figure 1).<sup>4</sup> The figure also highlights the substantial variation in the average provision of employer training within Europe, with the percentage of firms providing training ranging from close to 20 % in Greece to more than 90 % in Latvia. While there is considerable country heterogeneity, the countries showing the lowest shares of firms investing in training are all located in Southern or Eastern Europe.

In 2017, according to the EIBIS survey, the percentage of firms not investing a single euro was above 60% in Greece, above 40% in Bulgaria, Italy and Malta, and below 15% in the Czech Republic and Slovakia (see Figure 2). Average training investment per employee also varied substantially across European countries, ranging from below 100 Euros in several Eastern European countries and Greece to higher than 300 Euros in Belgium, France, Denmark, Luxembourg, the Netherlands and Sweden.<sup>5</sup> The majority of Eastern European countries – and especially Slovenia, Slovakia and the Czech Republic - also spent relatively little on training as a share of total investment, in line with a generally greater focus on tangibles in the region compared to most Western European peers.<sup>6</sup>

What are factors that impede firms' investment in training? We expect the differences across areas in the investment in employer provided training to be associated with the importance of perceived impediments to investment activities originating both from the labour and from the financial market. As shown in Table 1, firms operating in Southern European countries are less likely than West and North European firms to invest in training and more

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<sup>4</sup> One possible reason for this gap is that the CVTS considers only formal CVT.

<sup>5</sup> These values are not PPP adjusted and hence to some extent also reflect cross country differences both in the quantity and quality of training and in its price, which includes for instance the fees paid to trainers. Given lower labour costs and assuming that training provision as a service is primarily local costs of training may also be lower in Central and Eastern Europe. The price for training depends on local demand and supply factors (e.g. availability of training providers, subsidies for training provision). Disentangling the effect of prices from that of quantities is difficult with the data at hand.

<sup>6</sup> For investment in training and investment activity in Central and Eastern Europe, see also Bubbico et. al, 2017, and Gattini et. al, 2019.

likely both to perceive financial impediments and to be restricted in their investment activities by business and labour market regulations. On the other hand, these firms perceive to a lesser extent as a problem the lack of workers with the right skills, probably reflecting persistent labour market slack in their economies. Using data from the Wage Dynamics Network, Savšek, 2018, similarly finds skill shortages less pronounced as an obstacle to hiring for firms that face persistent negative demand shocks, suggesting that a cyclical element related to labour market conditions and the availability of talent is reflected in firms' perceptions of skill shortages (see EIB, 2018 for discussion).

Employee participation to employer provided training also varies within Europe. According to the 2015 wave of CVTS, close to 41% of European employees participated in continuing vocational training (CVT) – ranging from less than 20% in Greece and Hungary to more than 60% in Luxembourg and the Czech Republic (see Figure 3). The average number of hours spent in 2015 for CVT per 1000 hours worked was 6.5, ranging from 3 in Greece and Hungary to 12.2 in Luxemburg and 13.1 in Belgium.

Countries with a high participation rate also tended to have a relatively high number of hours spent for training, with the exception of the Czech Republic, where participation was highest but the number of hours was below the sample mean (Figure 4). Although Greece shows a very low average number of training hours, this is partially due to the high proportion of firms in the country doing no training. When we consider average training hours by firms offering any training, Greece is very similar to Austria and Germany, with about 6 hours of training per 1000 hours worked (Figure 5). Typically, investment in training declines with firm size. Using EIBIS data, Table 2 shows the percentage of firms doing no investment in training in 2017, by

area (Western and Northern Europe, Southern Europe and CESEE<sup>7</sup>) and firm size (5 to 49, 50-249 and 250 employees or more). For each area, this percentage is highest among firms with 5 to 49 employees. It is also highest in information and communication, and lowest in transportation and energy sectors.

What type of training do firms provide? The CVTS survey distinguishes between different types of training, i.e. CVT courses<sup>8</sup> (internal and external) and other forms of CVT.<sup>9</sup> While all types of training have recorded an increase compared to a decade ago, guided on the job training and self-directed learning show the biggest recent increases. The rise of self-directed learning may also reflect increasing use of online training courses in companies.

The skills targeted by CVT include job specific and IT skills, management and problem solving skills. The percentage of firms involved in CVT in 2015 was by far the highest (64.3%) when job specific skills were involved, and the lowest for foreign language skills. Management skills, team working and customer handling skills were also pursued by more than 20% of firms. The focus of training activities relates to what skills are hardest to find when recruiting. According to the special EIB survey on skills and digitalisation, corporates struggle most to find job-specific skills (EIB, 2018).

When firms are not providing training, their main reason is that they perceive the available portfolio of qualifications as in line with the current needs (about

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<sup>7</sup> West and North Europe: Austria, Belgium, Germany, Denmark, Finland, France, Ireland, Netherlands, Luxembourg, Sweden; United Kingdom; South Europe: Cyprus, Greece, Italy, Malta, Portugal and Spain; CESEE: Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia.

<sup>8</sup> CVT courses are usually separated from the active workplace (learning takes place in locations specially assigned for learning, like a class room or training center). They show a high degree of organization (time, space and content) by a trainer or a training institution. The content is designed for a group of learners (e.g. a curriculum exists). Two distinct types of CVT courses are identified: internal (managed by the enterprise itself) and external CVT courses (managed by third-party organizations).

<sup>9</sup> These include guided on the job training; job rotation, exchanges; training at conferences, workshops, trade fairs and lectures; learning / quality circles; self-directed learning.

80% of responding firms). When the skill portfolio is not adequate, training is an option but a viable alternative is hiring the required skills in the market (about 50% of firms).<sup>10</sup>

Another candidate reason is that they expect this training to be provided by public institutions. The EIBIS survey (2017) asks European firms what public investment they would prioritize in the next three years. Professional training and higher education comes out on top, with 23.9%, even higher than transport infrastructure. Yet, when we distinguish between firms investing and not investing in training, we find that the percentage prioritizing public training is higher among the former (26.1 versus 18.2%), suggesting that publicly provided education and training is seen more as complement than as substitute to privately provided training.

Costs can limit firms' investment in training. According to CVTS 2015, the percentage of firms not doing any training that reported as reason the high costs of CVT courses was higher than 60% in Lithuania and lower than 10% in the Czech Republic. Given that the proportion of firms providing no training was 40% in the former country and 10% in the latter (see Figure 1), the share of all firms reporting high training costs was about 24% in Lithuania and 1% in the Czech Republic. Although the share of firms providing no training which reported high training costs was similar in Greece and Germany (33%), the share of all firms claiming high training costs was close to 25 % in Greece and only 6% in Germany.

## *2.2 Training and the business cycle*

How does the business cycle affect firms' training investment? The costs and benefits of training typically vary over the business cycle for instance due to differences in demand conditions, firms' financial resources, hiring needs and

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<sup>10</sup> This is especially the case for some CESEE countries, where the proportion of firms reporting hiring as the key solution of skill vacancies is particularly high (78.3 % in Romania, 70.4 % in Poland, 85.2 % in Lithuania and 82.8 % in Bulgaria).

the availability of labour. Consequently, the intensity of employer provided training can also vary. Mendez and Sepulveda, 2012, use US data to argue that firm-financed training tends to be strongly pro-cyclical. What about Europe?

Panel data covering a longer time-period including economic up- and downturns would be best suited to evaluate the cyclicalities of training investment. The data at hand poses some limitations to assess the cyclicalities of training investment by firms. EIBIS provides continuous coverage but starting from 2016, and therefore captures only the recovery after the great recession. CVTS contains data for 2005, 2010 and 2015, but is affected by problems of comparability over time, due to differences in response rates across years and to specific country issues (see CEDEFOP, 2015).

With these limitations in mind,<sup>11</sup> we estimate a simple regression having either the percentage of trained employees (using CVTS) or a binary variable indicating whether any investment in training has been done in the relevant year (using EIBIS) as outcomes and country dummies, a linear trend and the (log of) the unemployment rate as controls. If training were pro-cyclical, we should find that it falls when unemployment rates increase.

Our results indicate that training exhibits a positive trend, possibly induced by the complementarity between innovation and adult learning. The relationship between training and the national unemployment rate, however, is not statistically significant at the conventional level of confidence.<sup>12</sup> Clearly, better data, covering a longer time-period consecutively, are required to obtain more reliable results on this issue.

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<sup>11</sup> Mendez and Sepulveda use individual training data from 1989 to 2006 and control for individual education and age.

<sup>12</sup> These results are not affected when we add to the unemployment rate the incidence of marginally attached workers, defined by the OECD as persons aged 15 and over, neither employed, nor actively looking for work, but willing/desire to work and available for taking a job during the survey reference week. Additionally, when this applies, they have looked for work during the past 12 months. See ECB, 2012, for a detailed discussion of the relationship between unemployment and labour under-utilization.

### *2.3 Accounting for Heterogeneous Training Outcomes within Europe*

We have shown that there is substantial heterogeneity in training outcomes across European countries, with firms in some countries investing much less than in others. Firms in Greece under-invest with respect to firms in Luxembourg if the benchmark for determining the presence of under-investment is the level of training investment in Luxembourg. If the benchmark is the socially optimal level of training, however, things are less clear-cut. First, since we do not have a full grasp of both private and social costs and benefits, it is hard to establish what the socially optimal level of training is. Second, this level can vary across countries inasmuch as so do private and social costs and benefits, and over time, for instance because technological progress alters the benefits of further investing in skills.

The observation that firms in Greece invest in training much less than firms in Luxembourg begs the question as to why this is the case. Bassanini et al., 2007, address this question using a demand and supply framework. On the one hand, the supply of training by workers increases with the expected wage. On the other hand, employers' demand for training declines with its costs, which include higher wages. Both demand and supply can be shifted by changes in the stock of educated individuals and by technological progress. For instance, the supply of training for any given expected wage increases when training costs decline. Education can reduce training costs by developing learning skills. Therefore, a better educated labour force is associated with a higher supply of training for any given expected wage.

Applying their reasoning to the current example, Luxembourg has a higher share of well-educated workers than Greece, which shifts the supply of training to the right. In addition, Luxembourg spends more than Greece on research and development. If innovation and skills are complements, the productivity of trained employees is higher in the former country and so is the demand for training, which shifts to the right as well. The combined right-ward shift in the

demand and supply of training generates higher training outcomes in Luxemburg than in Greece. These outcomes are privately but not necessarily socially optimal.

Higher training and productivity in Luxemburg can trigger mobility flows away from Greece and into Luxembourg. As expected, between 2007 and 2016, Greece has been a net exporter and Luxemburg a net importer of labour. Most intra-EU movers are well qualified, with 80% of people who moved to a different EU member state in the last ten years having a medium or high level of education.

The benefits and opportunities that labour mobility brings about at the individual level and at the EU level notwithstanding, large and persistent outflows of people can be a substantial problem for countries with net outflows, which bear the burden of higher education via subsidized tuition but do not reap the benefits in terms of higher taxes. As in the case of firms, which under-invest in training because of the threat of poaching by other firms, these countries may reduce their investment in (higher) education. Increased mobility of skilled labour may therefore require rethinking how higher education is financed, for instance by introducing a European tax credit for investment in human capital (see Revoltella et al, 2019).<sup>13</sup>

### **3. What are obstacles to firm training?**

#### *3.1 The role of institutions*

Profit maximizing firms decide the privately optimal level of training provision to equalize the marginal costs and the marginal benefits of training. Costs and benefits are likely to be affected by the aggregate macroeconomic conditions

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<sup>13</sup> The European tax credit is based on the idea that people can donate a share of their income tax to the country of their choosing in return for a 1:1 tax credit on next year's tax. An alternative could be to shift from subsidized tuition to income contingent loans. In this case, the costs of higher education would be mostly funded by students using government guaranteed loans that are re-paid to the issuing country independently of the country of emigration only if earnings are above a certain threshold.

prevailing in the country as well as by product and labour market institutions (see Bassanini et al, 2007, de Haan and Parlevliet 2018 and Hijzen et al 2018 for a further discussion). Furthermore, training depends also on the characteristics of labour supply and on the innovative activity of firms. In this section, we briefly review the literature on the relationship between unions, the minimum wage, the type of contract, product market competition, employment protection and training.

### *3.1.1 Unions and Training*

The channels through which union collective bargaining can affect training and pay are potentially quite complex, and it is not immediately obvious that unionism will be associated with positive or negative returns to training. The implications of unionism for training and pay depend, *inter alia*, on the degree of competition in the labour market and on whether the union effect on training is indirect (through the wage structure) or direct (through the negotiation of training). The economic literature has explored at length the effects of unions on training. Important contributions include Lynch, 1992, who finds evidence of a positive effect of unions on training incidence in the US National Longitudinal Survey of Youth (NLSY); Green, 1993, who shows that unions in Britain have significant positive effects on training in small firms but virtually no effect in large firms. A positive union effect on training is also the key result of the investigation of unions and training in German data, by Dustmann and Schonberg, 2009.

### *3.1.2 Minimum Wages and Training*

With competitive labour markets, human capital theory predicts that the introduction of a minimum wage will reduce investment in training by workers who can no longer contribute to training costs through lower wages (see Rosen, 1972). But if the labour market is imperfectly competitive or workers are credit constrained, a minimum wage can increase investment in the general component

of training. The basic rationale for this is provided by models with asymmetric information, predicting that firms may pay for general training.

Asymmetric information introduces a ‘wedge’ between wages and marginal product. It can be shown that the introduction of a minimum wage also acts as a type of wedge between wages and marginal productivity. Thus, it can actually increase general training over a range of human capital and induce employers to train their unskilled workers (Acemoglu and Pischke, 2003).

It is an empirical question as to which, if any, of these effects dominates training incidence and volumes. Early research by Leighton and Mincer, 1981, and Hashimoto, 1981, finds that age-earnings profiles are significantly flatter among workers whose wages are bound by the minimum wage, which is interpreted as suggesting that an increase in the minimum wage significantly reduces on-the-job training. Sharply in contrast, Lazear and Miller, 1981, find no statistically significant relationship between the slope of age-earnings profiles and an indicator of whether the minimum wage is binding or not. However, research by Grossberg and Sicilian, 1999, shows instead that the effect of minimum wages on wage growth could be unrelated to the effect produced on training.

Arulampalam, et al, 2004, use two different treatment groups, workers stating that they were affected by minimum wages and workers with a wage in 1998 below the minimum. Their study of British Household Panel Survey data finds no evidence that the introduction of the minimum wage in Britain in 1999 has reduced the training of treated workers. If anything, there is evidence that training has increased.

More recently, Schumann, 2017, has studied the effects of the minimum wage on firm-provided apprenticeship training in the main construction sector in Germany, using a large administrative firm-level data set, finding that both a firm's likelihood to train new apprentices and the number of new apprentices decreased. Somewhat in contrast, Bellmann et al, 2017, investigate the short-run impact of the introduction of the new statutory minimum wage in Germany

on further training at the workplace level using data from the IAB Establishment Panel. They do not find a reduction in the training incidence but a slight reduction in the intensity of training at treated establishments.

In summary, there is still no consensus on the effects of minimum wages on training, with results that vary not only across countries but also within the same country.

### *3.1.3 Flexible Labour Contracts and Training*

Non-standard forms of work (temporary employment, part-time and on call labor, multi-party employment relations and dependent self-employment) have become a distinctive feature of modern labor markets. The growth of this type of labor is due both to long run trends shaping modern economies, including globalization and digitalization, but also to regulatory changes – which have favored its use by firms - and to the decline in the role of collective bargaining (see ILO, 2016).

A widespread concern with the recent diffusion of non-standard employment practices is that they may be detrimental to economic performance because the workers involved are less likely to be trained. Earlier work by Arulampalam and Booth, 1998, investigate the relationship between employment flexibility and training using UK data, and find that workers on temporary contracts are less likely to receive work – related training.

More recently, Cabrales, et al, 2014, use data from the OECD's Survey on Adult Skills and report that temporary contracts are associated with a reduction of 8–16 percentage points in the probability of receiving on-the-job training. Fouarge et al, 2012, show that Dutch workers with flexible contracts participate less often in training than those with permanent contracts, and that this is due to the fact that these workers receive less employer-funded training, a gap they can only partly compensate for by their own training investments. ILO, 2016, summarizes the available evidence on the training incidence gap between non-

standard and standard workers around the world, showing that for Europe this gap is about 10 percentage points (see Figure 6).<sup>14</sup>

While the opportunities to train are likely to fall for workers on non-standard contracts, they may increase instead for those with skills that are complementary to technical progress. A consequence of this and of the increased polarization of jobs and wages is that the distribution of training opportunities in the labour force could become increasingly polarized.

### *3.4 Product Market Competition, Employment Protection and Training*

Until recently, the relationship between product market competition and training has been significantly less studied. An exception is the seminal study by Autor, 2004, who presents evidence of a negative and statistically significant correlation between the Herfindahl-Hirschman index, a measure of product market concentration, and the training provided by temporary help firms in the US, suggesting that training provision rises with market competition.

Product market competition declines when regulatory barriers are high. Bassanini and Brunello, 2011, study the impact of regulatory barriers to entry on workplace training by developing a model of training in imperfectly competitive product and labour markets. The model indicates that there are two contrasting effects of deregulation on training. On the one hand, with a given number of firms, deregulation reduces the size of rents per unit of output that firms can reap by training their employees. On the other hand, the number of firms increases following deregulation, thereby raising output and profit gains from training and improving investment incentives. They find that the substantial deregulation in the 1990s of heavily regulated European industries (energy, transport and communication) increased training incidence.

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<sup>14</sup> According to ILO, standard employment refers to continuous and full-time employment relationships. Non-standard employment comprises workers on temporary contracts, part-time and call-on work, temporary agency work and other forms of employment involving multiple parties, disguised employment relationships and dependent self-employment.

Heywood et al, 2017, use German establishment data and show that high product market competition is associated with increased training except when the competition is so severe as to threaten liquidation to a firm. They take this as evidence of an inverted U-shaped relationship. They also show that while this relationship is very evident for the service sector it is largely missing for manufacturing where earlier results of no relationship are confirmed.

The evidence on the relationship between firing costs, employment protection and training is also rather limited. Economic reasoning suggests that higher protection, by raising tenure, should increase the incentives that firms have to train, because longer tenure implies a longer time span to reap the benefits of training. Bishop, 1991, is one study in the area, which reports that the likelihood and amount of formal training are higher at firms where firing a worker is more difficult. Acemoglu and Pischke, 2000, also argue that there are complementarities between regulation regimes and training systems, and that reducing firing costs and increasing employment flexibility could reduce the incentives to train.

Yet stricter regulation on permanent contracts could trigger the emergence of dual labour markets, characterized by the extensive employment of temporary workers. These workers are less likely to be training recipients. Bratti et al, 2018, use Italy's firm size-contingent firing restrictions to identify the causal effect of employment protection legislation (EPL) on firm-provided training using a regression discontinuity design. They find that higher levels of EPL reduce incentives for firms to invest in workers' training, mainly because they increase the share of temporary workers hired by firms in an effort to bypass the strict regulations of permanent contracts.

### *3.1.5 Correlations between Employer-provided Training and Institutions*

While causal analysis of the effect of institutions on training is beyond the scope of this paper, we take a first step to shed further light on this linkage by looking at the correlation between firms with no investment in training (in

2015) and a set of economic and institutional indicators.<sup>15</sup> We find that countries with a higher share of firms providing training invest a higher fraction of their GDP in research and development and have a higher share of individuals with tertiary education, suggesting that innovation, education and training are complements. Sweden, for instance, had in 2015 one of the lowest shares of firms doing no training (21%), invested 3.26 % of its GDP in research and development and had 34 % of its population with tertiary education. Italy, on the other hand, had a high share of firms doing no training (38%), invested only 1.34 % of its GDP in R&D and had only 15.5 % of its population with higher education.

Can Italy catch up with Sweden on training outcomes by catching up on education and innovation activities? The evidence at hand suggests that the gap between these two countries has not declined, which speaks against convergence. On the one hand, the population share with tertiary education has increased in the past ten years in both countries, but more in Sweden (from 30.1 in 2009 to 37.1% in 2018) than in Italy (from 13.9 to 17.1%). On the other hand, the share of R&D on GDP has remained more or less constant in both Sweden and Italy between 2008 and 2017.<sup>16</sup>

Correlations also suggests that training outcomes are less favourable in countries with higher employment protection, lower product market competition and higher average tenure (see Table 3). High employment protection is consistent with both high average tenure and low training incidence because it favours the emergence of dual labour markets,

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<sup>15</sup> Real GDP growth and the unemployment rate (Eurostat), innovation (R&D expenditure as share of GDP (Eurostat), strictness of labour market institutions (strictness of employment protection and union density (source: OECD), product market institutions (strictness of product market regulations (source: OECD), labour supply (percent with tertiary education and share of employees aged 50 to 64 on total employment (source: Eurostat) and average job tenure (for 2016; source: OECD).

<sup>16</sup> Italy has been also experiencing since the 1990s increasing outflows of college graduates toward West and North Europe, mainly Germany and the UK. See Becker, Ichino and Peri, 2003.

characterized by the contemporaneous presence of heavily protected senior workers accumulating long tenures and investing in training and less protected younger workers with temporary contracts and little or no training provision.

The share of firms doing no training in 2015 was lower in Eastern than in Southern Europe (30 versus 36 %) in spite of the fact that both areas had similar average educational attainment and similar investments in R&D. However, Eastern Europe has lower employment protection and lower average tenure than Southern Europe, and has been growing faster than Southern Europe after the 2008 recession. Although specific institutional constellations differ between Southern and Eastern Europe, overall it appears that firms in Northern and Western Europe also operate in a setup that is comparatively more conducive to firm training provision.<sup>17</sup>

### *3.2 Training, Productivity and Profitability*

Institutional factors affect the costs of training and the benefits firms can realize from training provision. The net returns to training for employers depend on the effects of training investment on productivity and wages, as well as on training costs. While crucial to understand differences in training provision, there are relatively few studies on the productivity effects of training due to measurement problems. These studies are usually based on firm level or more aggregate data, and typically regress some measure of output on a vector of inputs, which includes training.

Dearden et al, 2000, for instance, combine British data from various sources and construct a panel of industries covering the period 1983-1996. Training information comes from the Labour Force Survey. They find that increasing the

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<sup>17</sup> However, it should be noted that, with respect to institutional factors, country heterogeneity remains high and it is beyond the scope of this paper to disentangle the interaction of multiple institutional factors.

proportion of trained workers in an industry by 5 percentage points leads to a 4 % increase in value added per hour, and a 1.6 % increase in hourly wages.

Barrett and O'Connell, 2001, analyse a sample of Irish firms and find that training which provided "broad skills and knowledge" has a positive impact on sales growth between 1993 and 1995. In particular, increasing the number of training days per employee by 1 % increased productivity by 3 %. On the other hand, they find that training "directly related to the operation of the company" did not have an impact on productivity.

Black and Lynch, 2001, use a nationally representative sample of US businesses to estimate a production function with sales as the dependent variable. They are able to estimate fixed effects regressions, but do not find any effect of training on productivity. More recently, Konings and Vanormelingen, 2015, use Belgian firm-level panel data to estimate its impact on productivity and wages and find that the productivity premium of a trained worker is substantially higher compared to the wage premium, suggesting that training increases profitability.<sup>18</sup> Blundell and co-authors, 1999, review this literature and conclude that "...not all the productivity gains resulting from training are compensated through a corresponding increase in individual remuneration, so that the investment in training remains profitable for firms..." (p.13).

Apart from some empirical evidence on the gains from training – measured by productivity or profitability – for some developed countries, we still lack systematic (and comparable) evidence on the returns to training for the largest European economies and for the EU member states in comparison. Here, further research could add to explain the observed cross-country differences in training outcomes and understand the impact and interplay of the different institutional factors better.

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<sup>18</sup> The studies of the effects of training on productivity typically use a production function approach, showing that productivity depends on the capital labour ratio, labour quality (which includes training) and total factor productivity.

### *3.3. Training and Financing Constraints*

Another factor that could limit firms' training provision and which has so far received limited attention in the literature are differences in training costs. In particular, when capital markets are not perfect, difficulties in the access to credit may hamper training investment by increasing the marginal costs of training. Are financing constraints an important obstacle to the training activities of firms?

Popov, 2014, uses data from the 2005 EBRD/World Bank "Business Environment and Enterprise Performance Survey" on 8265 small and medium sized enterprises from 25 transition economies and finds that lack of access to finance in general, and to bank credit in particular, is associated with significantly lower investment in on-the-job training. Brunello et al, forthcoming, combine firm-level data on investment in training and self-reported financing constraints drawn from three waves of the EIBIS survey with accounting data from the Bureau van Dijk ORBIS database to study the effects of these constraints on training investment. The analysis finds that the presence of financing constraints has a negative impact on training investment by European firms.<sup>19</sup>

Figure 7 plots training investment as share of fixed assets against the country-specific financing constraint index, showing that the two are negatively

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<sup>19</sup> The paper measures the presence of financing constraints by combining information from EIBIS and the Orbis database. EIBIS includes two measures of self-reported financing constraints, a dummy equal to one if the availability of finance is considered a minor or major obstacle to investment activities, and to zero otherwise, and a binary variable that combines information on quantity constraints (the firm obtained less external finance than desired); rejection of application; price constraints (the firm decided not to seek any external financing because of excessive costs); firms being discouraged and hence not seeking external finance. A potential problem with self-reported financing constraints is that they may not exclusively reflect the financial position of firms. For instance, less capable managers of inefficient firms may report higher constraints in an effort to shift the blame of inefficiency to the credit market (Popov, 2014). Brunello et al, 2019, address this by extracting from self-reported constraints a financing constraints index, defined as the component that can be attributed to more objective measures of the financial situation, such as firm leverage, liquidity and solvency, drawn from the financial accounts.

correlated. Luxemburg, Austria and France for example have relatively low value of the index and high values of training investment, while Greece, Croatia, Lithuania and Latvia show very low training investment and relatively high values of the financing constraint index. Estimating the effects of the financing constraints index on training investment (as share of fixed assets) for a sample of more than seven thousand firms operating in one of the 28 EU Member States for the period 2015-17, the authors find that a 10% increase in the index reduces training investment by 7.7% on average, a statistically significant and sizeable effect. This effect is larger among companies located in Southern Europe and for firms that are domestically owned and are not subsidiaries of other firms.

These estimates can also be used to evaluate the importance of financing constraints for training. The average value of the financing constraints index is lowest in Austria, Sweden and Germany and highest in Croatia, Latvia and Greece. In Greece, where training is very low by European standards, bringing the index back to the mean would imply reducing it by 68.5%. Assuming that this could be done, average training investment as share of fixed assets would increase in this country from 0.89 to 1.36, well below average training in the 28 EU members, which stands at 2.4. Therefore, even with a drastic reduction in financing constraints, Greece would remain distant from the European average.

The analysis concludes that cross-country differences in financing constraints, while important, can explain only a limited share of the observed heterogeneity in training investment across European economies. Here, (persistent) divergences are likely to be driven also by differences in economic institutions, industrial structure, innovation activities and the relative supply of skills (see Bassanini et al, 2007).

#### **4. Training policies and policy intervention**

##### *4.1 The Economic Rationale for Policy Interventions*

According to orthodox human capital theory, which assumes perfectly competitive labour markets, there is no role for policy intervention, because the first best allocation is attained by the interaction of market forces and the Invisible Hand leads to optimal provision of work-related training. Only if there are imperfect capital markets, where workers or firms might be credit constrained, under-provision occurs with respect to the first best and there is a potential role for policy.

However, if labour markets are not perfectly competitive, there may potentially be an additional role for policy. For instance, provided that the productivity returns from training are increasing in training more rapidly than the wage returns, then firms will be willing to pay for general training. But there is no guarantee that the amount of training they provide will be optimal from society's viewpoint.

The argument here is that firms which bear training costs cannot fully appropriate the benefits of training, which are shared either with trained employees or with future employers. The former type of sharing occurs because workers and firms can bargain over wages after training has taken place, which creates a hold-up problem (Leuven, 2003). The second type occurs when quit rates are positive and new employers pay trained employees less than their productivity. Since their profits are not explicitly considered by training firms when deciding whether and how much to invest, there is a poaching externality which reduces training below its social optimum level (Stevens, 1996).

Other externalities mentioned in the literature – network effects and the spillovers originated by the complementarity between training and innovation (Acemoglu, 1997) – can generate multiple equilibria and private levels of training different from the social optimum. In these environments, under-provision of training is one possible equilibrium, and intervention might be

desirable to shift the economy to a high skilled job creation and high training equilibrium.

In addition, public intervention to support training efforts can also be motivated by equity considerations to support people disadvantaged in the labour market. While firms may face some uncertainty regarding the benefits of training, they are unlikely to fully factor in the societal costs of non-provision.

Both privately and socially optimal levels of training can vary with technological change, and the direction of variation will depend on whether this change and training are complements or substitutes. Digitalization and automation may increase the returns to training by raising the productivity of skilled labour, but this could happen at the expense of the less skilled and educated, who face instead the risk of displacement. Along these lines, the risks of job automation are typically higher for the lower skilled. Also, they are lower for jobs which provide access to training (Nedelkoska and Quintini 2018, Pouliakas 2018).

#### *4.2 European Training Policies*

EU policies to support training can help to address common challenges, for instance those linked to technological change and ageing, and support Member States in their efforts to tackle them. European policies offering financial support to individuals and firms usually consist of government sponsored co-financed schemes. The emphasis on the increase of the contribution of firms and trainees to financing training schemes responds both to shrinking government budgets and to the need of providing adequate incentives for training quality.

Co-financing schemes in Europe are oriented both to firms (levy/grant schemes, train or pay and tax deduction systems) and to individuals (subsidies, vouchers, individual learning accounts, grants from specific funds, etc.) (see Bassanini et al, 2007, and Muller and Behringer, 2012, for details). In spite of

the diffusion of these systems, rigorous empirical evaluations of their effectiveness are uncommon, and many investigations provide only descriptive statistics with no counterfactual for the assessment of the policy impact. As a consequence, it is difficult at this stage to tell whether these policies have determined sufficiently high gains to compensate for their costs.

The following key aspects are relevant for the design of effective policies in Europe but also beyond. First, it is important to avoid subsidizing training investments that would have been realized in any case by the parties involved. To do this, the subsidy component of a policy package should compensate only the gap between marginal costs and marginal private benefits that may arise at the socially desirable investment level, leaving to firms or workers the responsibility of financing the rest. While some of the implemented policies respect these principles, others do not and tend to generate large deadweight losses. Since little is known on the relevance of informal training processes, these policies may also produce inefficient substitution between informal learning processes and formal training. This risk is especially relevant for policies directed to firms, since informal training is usually aimed at imparting specific competencies and is generally paid by the employer.

It is important to stress that co-financing schemes directed at firms do not address the low training participation of particular groups of workers. In an economic environment characterised by increased automation and digitalization, which tends to increasingly displace routine jobs filled by less educated workers, firms generally prefer to involve in their training programmes better educated workers who are less at risk and are involved in more complex jobs.

As a consequence, when training policy is aimed at reducing perceived inequalities, it is necessary to adopt co-financing schemes focused directly on individuals (such as loan and individual subsidy schemes). These policies should be accompanied by complementary measures which favour the

diffusion of information on training opportunities<sup>20</sup>, the quality of the training schemes on supply and the portability of the acquired skills.

In markets that are rapidly changing, the access to training opportunities might be improved by government policies which establish information systems with data on “the availability, cost, subsidies and markets for trained personnel in a variety of occupations as well as individual data on providers” (Levin, 1998). A number of countries has experimented with models for forecasting employment by occupation (in the Netherlands, Canada, USA and Australia this work has been enhanced by estimates of labour demand for newcomers or re-entrants in the workforce). However, governments often do not have any advantage over the private sector in anticipating training needs and their contribution is therefore that of collecting information, creating systems incorporating data about training providers and fostering better information sharing with the private sector. Governments can also contribute to reduce the uncertainty surrounding training investments by providing certification and quality assessment of training outcomes.

An additional role for governments is that of increasing the individual benefits of training via qualification systems that make potential employers aware of the skills and competences acquired by learning experiences. Such systems are being developed on a European scale by the European Union<sup>21</sup> and in several countries - including Australia, Austria, Denmark, Hungary, Italy, Netherlands, New Zealand, Norway and UK. The goal of a transparent system of reliable vocational qualification is, however, difficult to achieve, since the definition of “skill standards” poses many measurement problems (Greenhalgh, 1999; Colardyn, 2002).

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<sup>20</sup> For further discussion on the role of information, see for instance van den Berg et al (2018).

<sup>21</sup> This includes for instance work on the European credit system for vocational education and training and a recommendation to invite member States to create the necessary conditions and adopt measures to apply the system to VET qualifications. In addition, initiatives like the Europass aim to present skills effectively and clearly and do so in a manner that is easily understood across the EU.

Some countries (for example the UK) rely on locally administrated vocational qualification systems, which use different methods of assessment, with greater risk for employers and consequently lower wages for trained workers (Conlon, 2000). More satisfactory results are obtained in countries such as Finland, France and Germany, where social partners contribute in deciding the content of training and in supervising its provision. This suggests that unions may play an important role both in solving hold-up problems and in helping workers to obtain a share of training benefits, and by so doing in avoiding poaching problems. A role for the government can also be that of creating framework and legal condition that ensure that private parties are willing and able to finance training. Contracts, such as pay-back clauses, apprenticeships and working-time accounts, go in this direction.

### **Conclusions**

Firms are key for provisioning of training. Understanding the factors affecting employer-provided training is important in the current economic context, characterized by progressive digitalization and automation, which displaces or (substantially) changes jobs and tasks and increases the needs for re-training and the importance of adult learning.

We have shown that there is substantial heterogeneity in the provision of training by firms within Europe, with West and North European firms providing more training than South European and CESEE firms. Is this heterogeneity narrowing over time because of progressing European integration? On a positive note, training incidence has been increasing since 2005 for the EU member States. However, while there are some signs of slow convergence, differences among individual countries as well as country groups remain rather persistent.

We have reviewed some of the factors that can help explaining this heterogeneity, both at the firm and at the country level. With respect to firms, we have devoted particular attention to the role of financial constraints, that

can hamper training investment by restricting access to external finance. Here, new evidence suggests that financially constrained firms invest significantly less in training. Increasing access to the financial market, however, could reduce only partially the substantial heterogeneity in training outcomes across Europe.

On the benefits of training for firms in terms of the impact of training on productivity, the existing literature still provides limited evidence. In turn, a more systematic assessment of the benefits, including their country variation, could contribute to explain the heterogeneity in training investment and activities across the EU.

With respect to country-specific factors, results point to training investment being higher when the economy is growing and in areas which invest more in research and development and are endowed with a higher share of well-educated labour force. Higher product market competition also appears to favour training outcomes. On the other hand, more employment protection, which is conducive to longer average job tenure, is negatively correlated with the share of firms providing any training, possibly because it encourages the development of dual labour markets, characterized by the presence of a substantial fringe of workers on temporary contracts who receive little or no training. The review of obstacles to firm training suggests that there is not one silver bullet to raise firms' investment in training but that a holistic approach is required. Also, country diagnostics are required to understand and address specific combinations of the barriers that hold firms' back.

The presence of financing constraints and of externalities justifies policy intervention aimed at increasing the provision of training. We have reviewed European policies and emphasized the importance of designing these policies so as to avoid subsidizing training investments that would have been realized in any case by the parties involved.

We have argued that improving the effectiveness of training policies requires first of all rigorous empirical evaluations of adopted policies. While some Member States, for example Finland, have moved to strengthen evaluation efforts, these are still relatively uncommon in Europe, and tend to be replaced by descriptive investigations with no counterfactual for the assessment of the policy impact. As a consequence, it is often difficult to implement a rigorous cost-benefits analysis to verify whether these policies have produced sufficiently high gains to compensate for their costs.

Support for training needs to be coupled with assessment to ensure effectiveness. Also, analysis can help to identify best responses to common challenges such as population aging and digitalization and their specific implications for training policies, such as maintaining sufficient levels of training investment with an ageing workforce, low training participation of lower-skilled workers and responding to rapidly changing skill needs linked to digitalization.

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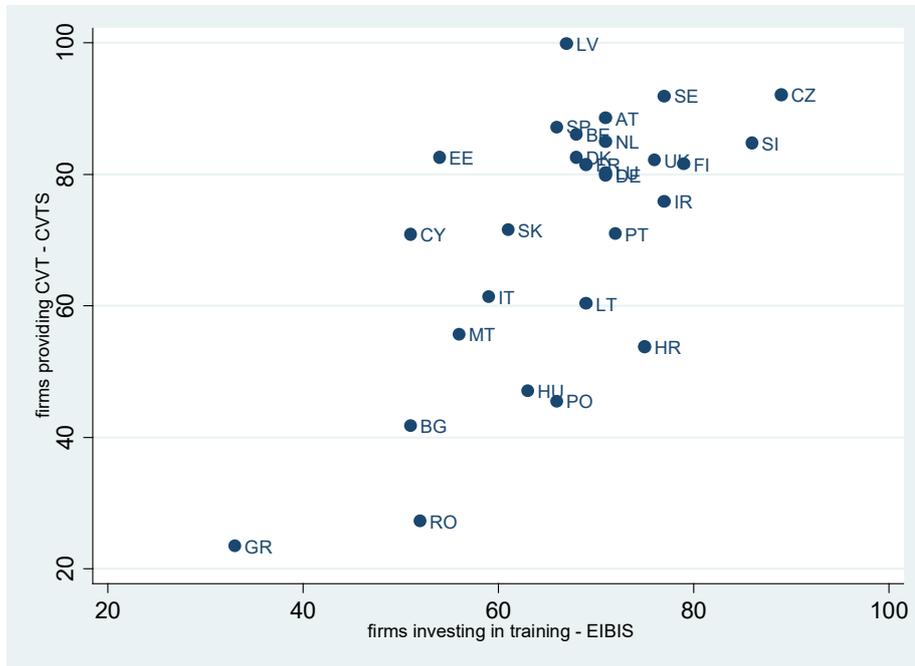
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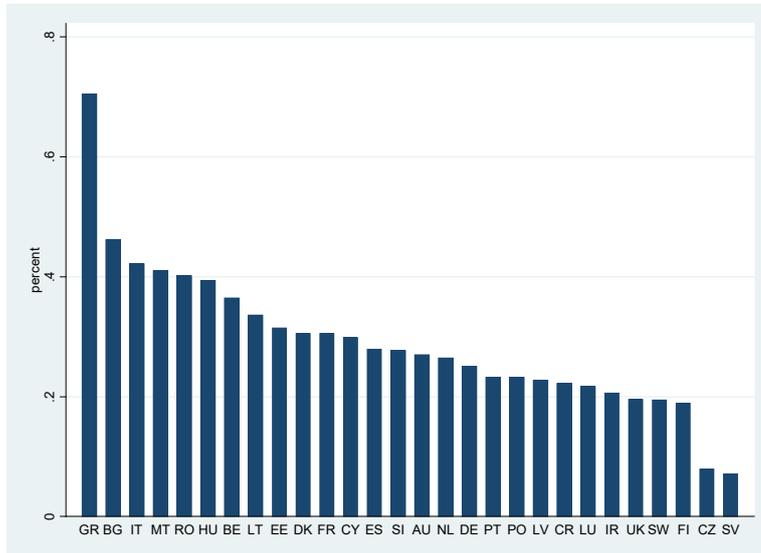
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Figure 1. Percent of firms with any CVT training (CVTS 2015) and percent of firms investing in training (EIBIS 2015)



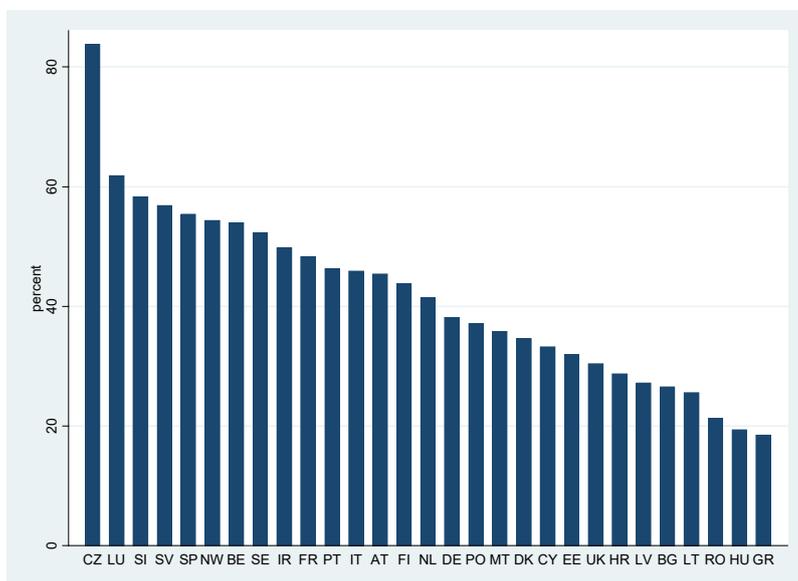
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Figure 2. Percent of firms not investing in training. EIBIS 2017



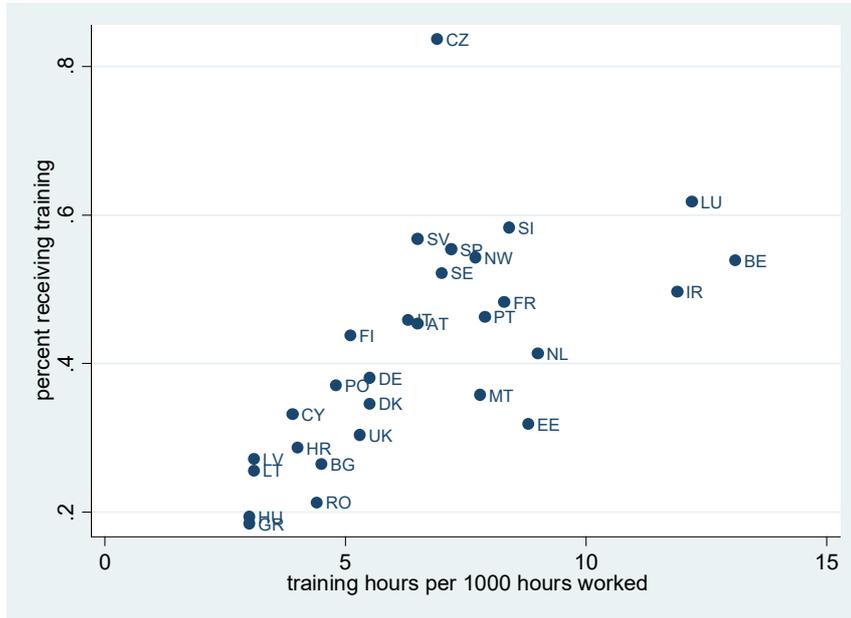
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Figure 3. Percent of employees involved in CVT, by country. CVTS 2015.



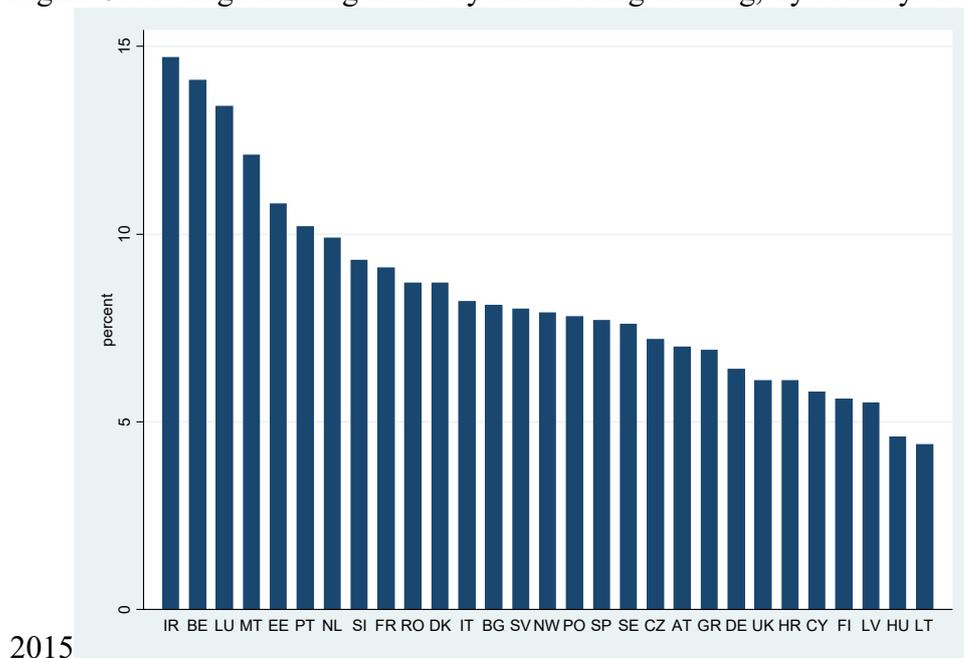
Legend: AT: Austria; BE: Belgium; BG: Bulgaria; CY: Cyprus; CZ: Czech Republic; DE: Germany; DK: Denmark; EE: Estonia; FI: Finland; FR: France; GR: Greece; HR: Croatia; HU: Hungary; IE: Ireland; IT: Italy; LT: Lithuania; LU: Luxembourg; LV: Latvia; MT: Malta; NL: Netherlands; PL: Poland; PT: Portugal; RO: Romania; SE: Sweden; SI: Slovenia; SK: Slovakia; ES: Spain; UK: United Kingdom.

Figure 4. Percent of employees involved in CVT and average training hours, by country. CVTS 2015



Legend: AT: Austria; BE: Belgium; BG: Bulgaria; CY: Cyprus; CZ: Czech Republic; DE: Germany; DK: Denmark; EE: Estonia; FI: Finland; FR: France; GR: Greece; HR: Croatia; HU: Hungary; IE: Ireland; IT: Italy; LT: Lithuania; LU: Luxembourg; LV: Latvia; MT: Malta; NL: Netherlands; PL: Poland; PT: Portugal; RO: Romania; SE: Sweden; SI: Slovenia; SK: Slovakia; ES: Spain; UK: United Kingdom.

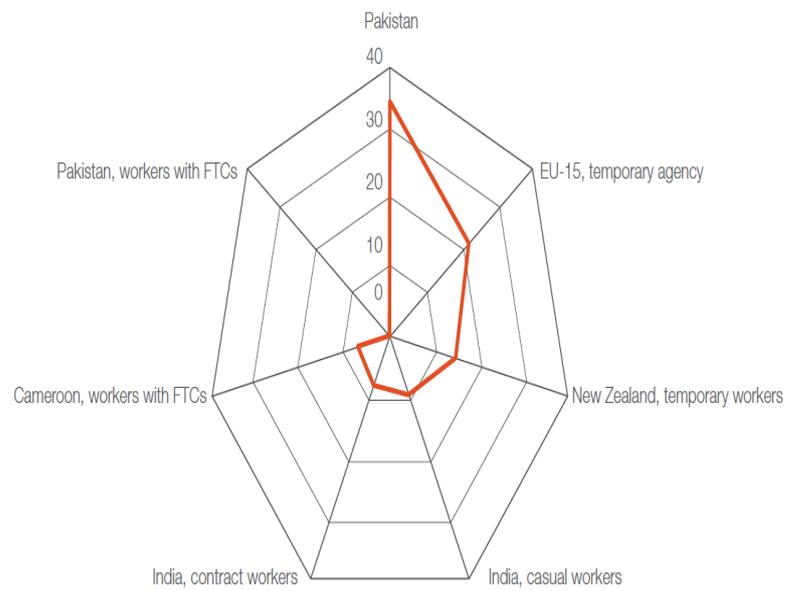
Figure 5. Average training hours by firms doing training, by country. CVTS



2015

Legend: AT: Austria; BE: Belgium; BG: Bulgaria; CY: Cyprus; CZ: Czech Republic; DE: Germany; DK: Denmark; EE: Estonia; FI: Finland; FR: France; GR: Greece; HR: Croatia; HU: Hungary; IE: Ireland; IT: Italy; LT: Lithuania; LU: Luxembourg; LV: Latvia; MT: Malta; NL: Netherlands; PL: Poland; PT: Portugal; RO: Romania; SE: Sweden; SI: Slovenia; SK: Slovakia; ES: Spain; UK: United Kingdom.

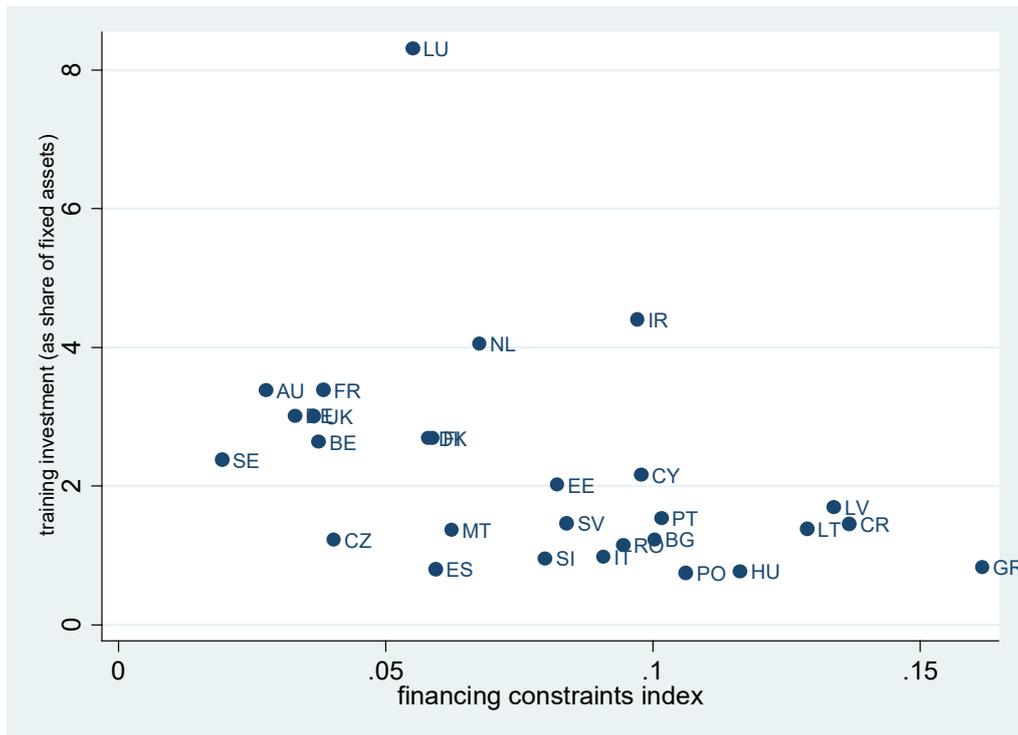
Figure 6. Percentage point differences in training received. Non-standard versus standard workers.



Note: Percentage point differences in training received; raw differences.

Source: ILO, 2016.

Figure 7. Training investment and the financing constraint index. By country, 2015-17.



Source: EIBIS.

Table 1. Training activities and perceived impediments to investments, by area. EIBIS 2015-17

	West and North Europe	South Europe	CESEE
Percent with positive training investments	76.3	65.6	75
Training per employee (euros)	290	172	97
Training investment over wage bill	0.01	0.007	0.009
Finance is an impediment to investment	40.0	62.4	53.4
Labour regulations an impediment to investment	24.7	47.7	27.6
Business regulations an impediment to investment	23.3	48.1	29.6
Lack of staff with right skills an impediment to investment	45.2	39.4	51.4

West and North Europe: Austria, Belgium, Germany, Denmark, Finland, France, Ireland, Netherlands, Luxembourg, Sweden; United Kingdom; South Europe: Cyprus, Greece, Italy, Malta, Portugal and Spain; CESEE: Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia.

Table 2. Percent of firms doing no training, by area and firm size. EIBIS 2017.

Area	5-49	50-249	250-
West and North Europe	35.04	17.03	18.90
South Europe	46.40	25.99	26.74
CESEE	39.88	21.61	16.97

West and North Europe: Austria, Belgium, Germany, Denmark, Finland, France, Ireland, Netherlands, Luxembourg, Sweden; United Kingdom; South Europe: Cyprus, Greece, Italy, Malta, Portugal and Spain; CESEE: Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia.

Table 3. Correlation between the share of firms doing no training and country – specific variables

	% firms with no training investment
Unemployment rate	0.551
Real GDP growth	-0.463
R&D / GDP	-0.456
Employment protection	0.283
Product market regulation	0.406
Union density	0.076
% employees with 50 to 64 years	0.006
% with tertiary education	-0.491
Average job tenure	0.627