



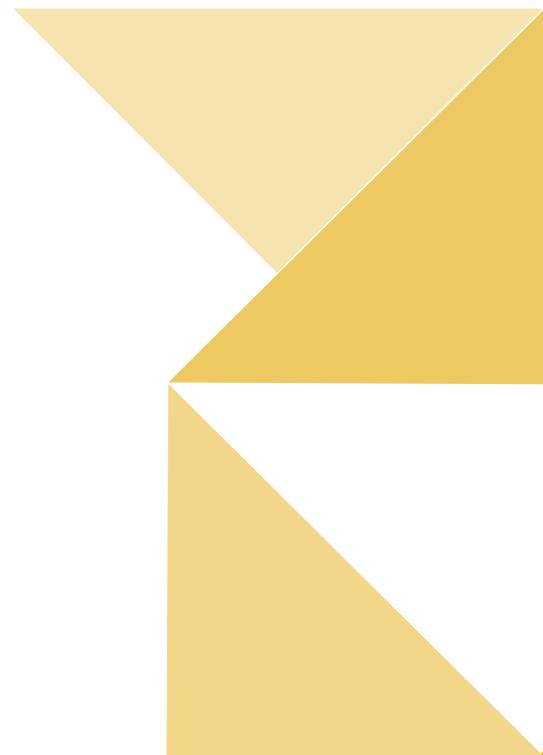
Skill mismatch affects life-long earnings

POLICY BRIEF
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Role of job-specific
skills





IMPRESSUM

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Why do we invest in our skills?

Developing skills enables people to better understand, take part in, and improve economic processes. In the last decades, in particular cognitive skills have been found to contribute to individuals' success in the labor market, participation in society, and economic growth (Hanushek & Woessmann, 2008; Hanushek, Schwerdt, Wiederhold & Woessmann, 2015).¹ This productivity-enhancing effect of skills increases individuals' wages, helps them circumvent unemployment, and increases their chance to find jobs in the first place (e.g., Hanushek & Woessmann, 2015). At the macroeconomic level, better skills lead to faster technological progress and facilitate technology adoption (e.g., Nelson & Phelps, 1966; Benhabib & Spiegel, 2002; Ciccone & Papaioannou, 2009).

What causes skill mismatch?

Job-specific skills take years and sometimes decades to acquire, but there is never a guarantee that there will be a proper demand for the acquired skills at each point of one's career. History offers ample evidence that skills, crafts, and even occupations were made technologically redundant or outsourced to different parts of the globe in the search of low-cost production. The 18th and 19th century handloom weavers in England saw their artisan skills replaced by semi-automated looms and the piano manufacturers and players found themselves hard-hit by the diffusion of the gramophone and the radio at the turn of the 20th century.

In more recent history, a large body of literature starting with the seminal work of Autor, Levy & Murnane (2003) shows that modern computers substituted human job tasks that are routine or machine-codifiable in nature and increased the demand for cognitive tasks that are not yet codifiable. In recent history as well, developed countries have witnessed a massive decline of the manufacturing sector employment and an unprecedented expansion of service employment.

¹ The economic effects of non-cognitive skills (e.g., perseverance, patience, locus of control, self-esteem, or grit) have been stressed, among others, by Bowles, Gintis & Osborne (2001), Heckman, Stixrud & Urzua (2006), and Lindqvist and Vestman (2011).



These major shifts in the types of job tasks and technologies that become available in the market necessarily create mismatches between the skills which people have acquired in the past and those which the new jobs require. Hence, the issue of skill mismatch is gaining importance in the policy sphere. For instance, the European Union's Agenda for New Skills and Jobs (European Commission, 2010) identifies skill mismatch as one of the core challenges faced by today's labor markets. Similarly, the OECD stresses the importance of understanding the causes and consequences of skill mismatch (OECD, 2012).

What is the main contribution of our research on skill mismatch?

Our own work shows that skill mismatch has substantial consequences for individual earnings. Specifically, we investigate whether mismatch between the acquired skills and the skills required at the new job contributes to the large and persistent post-displacement earnings losses which have been observed among people who were displaced from their jobs in the course of mass layoffs or plant closures.

We find that switching to occupations that require additional skills without compromising the use of the previously acquired ones (up-skilling switching) substantially decreases the displacement-induced earnings losses suffered by these workers. In terms of daily wages, up-skilling switchers quickly catch up to their non-displaced peers and earn more than workers who did not switch occupations after displacement. At the same time, switching to occupations where workers cannot use the previously acquired skills (down-skilling switching) substantially aggravates displacement costs. These workers continue to lose in wages as compared to their non-displaced peers and incur losses more than twice as large as those of occupational stayers.

In this Policy Brief, we first describe a novel method to measure skill mismatch borrowed from Nedelkoska, Neffke & Wiederhold (2015).

Using this method, we show how mismatch develops with age and how it is related to macroeconomic conditions. Finally, we show the impact of skill mismatch on individual earnings.

A Definition of Skill Mismatch

Every month, three out of hundred employed Americans and one out of hundred employed Germans change their jobs (Bachmann, 2005; Shimer, 2005). When people change jobs, the work content of the new jobs will be at least in some respects different from the content of the jobs previously held. The extent to which the previously attained skills and knowledge (or human capital as economists like to say) can be used in the new job is referred to as *skill transferability*.

Part of the skills and knowledge may become redundant at the new job (*skill redundancy*). At the same time, this new job may require skills and knowledge that the worker does not yet possess (*skill shortage*). Sometimes these redundancies and shortages occur because the level of skills, e.g., the level of education, is higher (or in the case of redundancies lower) in the new job compared to the old job. However, redundancies and shortages can also arise because the job content changes, and with it the required skill set.

Hence we can characterize job transitions between the old and the new occupation by the type of skill mismatch resulting from job changes: *down-skilling* (e.g., a medical doctor working as a nurse), *up-skilling* (e.g., salesperson becoming a store manager), and *re-skilling* (e.g., a car mechanic who is to become a chemical lab specialist).

Measuring Skill Mismatch

The existing literature offers various ways of measuring skill mismatch (e.g., Poletaev & Robinson, 2008; Gathmann & Schönberg, 2010). Here, we present the measures introduced by Nedelkoska, Neffke & Wiederhold (2015), which are advantageous in certain aspects as compared to previous measures.



The most important advantage is that by operationalizing skill shortage and skill redundancy between jobs, these measures acknowledge that skill transferability between jobs is asymmetric, as explained later in this section.

In most general terms skill mismatch occurs between jobs. In absence of information about the skill requirements of individual jobs, we work with the differences in the skill requirements between occupations. We assume that each occupation has a specific skill profile. A skill profile expresses the level of mastery required to accomplish the tasks associated with an occupation in each skill of the occupation's skill portfolio. An occupation's skill set is not only characterized by the types of things people in this occupation do, but also by the complexity of these tasks. We measure the level of complexity as the number of years of schooling (general and vocational) specific to an occupation.

If one would consider the degree of dissimilarity of occupations in the types of skills that the occupations require as the only dimension of mismatch, a move between two occupations would entail the same degree of mismatch independent of the direction of the move. This happens because such measure of dissimilarity in the skill content of occupations ignores the information that is contained in the level (or complexity) of skill use. Thus, a switch from a sales person to a professional negotiator assumes identical skill transferability as does a switch from a negotiator to a sales person. Nevertheless, although the relative importance of social-interaction skills for an ordinary sales person and for a professional negotiator may be similar, the absolute level of skills required is likely to be far greater in the latter occupation, because the negotiator's job is substantially more complex.

This means that a move from occupation O (e.g., a salesman) to an occupation O' (e.g., a negotiator) often causes skill mismatch that is different from the skill mismatch caused by moving in the opposite direction, i.e., from O' to O . To capture this asymmetric nature of skill mismatch, we distinguish between its two aspects: skill shortage and skill redundancy. If we denote the number of independent skills with k and index the type of skill s with i , we can express skill shortage and skill redundancy between any two occupations O and O' in the following way:

$$shortage_{OO'} = \sum_{i=1}^k \beta_i (s_{iO'} - s_{iO}) I(s_{iO'} > s_{iO})$$

$$shortage_{OO'} = \sum_{i=1}^k \beta_i (s_{iO'} - s_{iO}) I(s_{iO'} > s_{iO})$$

Where β_i is a weight of the level of skills (e.g., years of schooling necessary to master skill i) and $I(.)$ is an indicator function that equals 1 if its argument is true. The first expression defines skill shortage when moving from occupation O to occupation O' as the sum of the differences between each pair of skills between the two occupations, as long as the skills in the second occupation (O') are greater than the skills in the initial occupation (O). Similarly, the second expression defines skill redundancy when moving from occupation O to occupation O' as the sum of the differences between each pair of skills between the two occupations, as long as the skills in the second occupation (O') are lower than the skills in the initial occupation (O). The weight β_i , which is assigned to each pair of skills i is used because some skills (e.g., analytical) need longer periods of education to develop than other skills (e.g., crafts). β_i gives more weight to skills which require longer acquisition periods and less to those, which are easier to acquire.



Skill mismatch changes with age and differs by the type of job switch

Skill mismatch is very common on the labor market. In fact, 60% of German employees who change their employer also change their occupation. In the early stages of people's careers, workers seek new jobs where they initially have skill shortage, allowing them to learn on the job and to experience growth in their earnings.

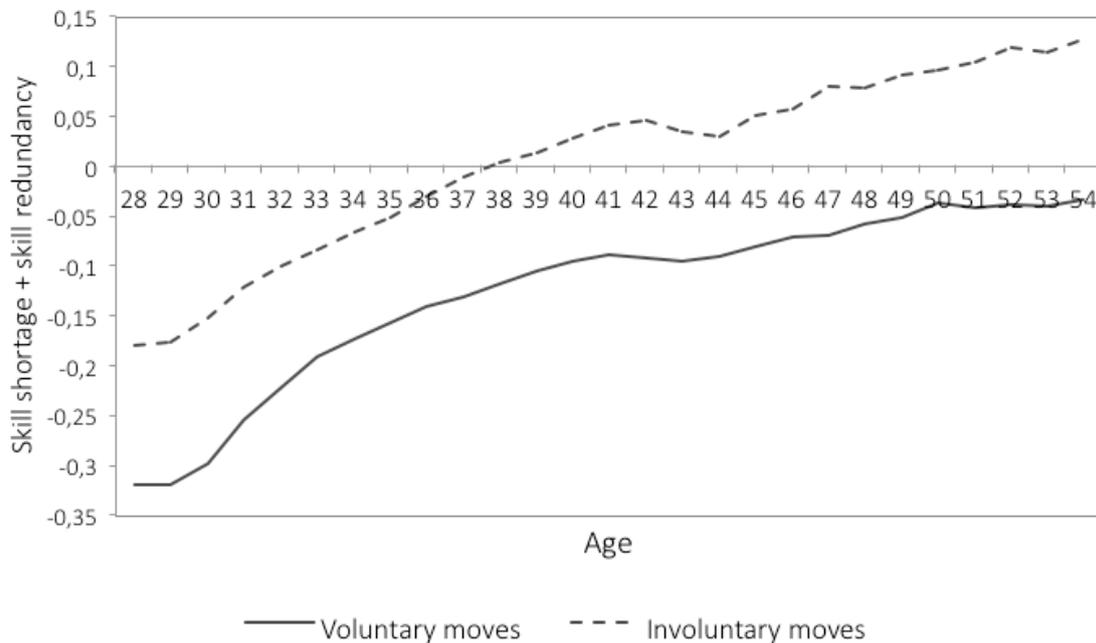
This is depicted in Figure 1. It shows that when young employees switch occupations, they switch to jobs where they have larger skill shortage than redundancy. Among those who switch occupations voluntarily (direct job-to-job switches), skill shortage always dominates skill redundancy. Among those who switch occupations involuntarily (job-unemployment-job switches), skill redundancy starts dominating shortage after the age of 38.

These patterns suggest that skill redundancy at the new job is not desirable, but skill shortage is. Skill mismatch is further determined by the level and diversity of skills. The more skilled people are, (a) the more likely it is that they will incur skill redundancy if matched with another random job; and (b) the less likely they are to incur skill shortage when matched with a random job. This is one reason why skill shortage dominates among the young, less experienced, and hence less skilled employees.

Skill redundancy increases during economic recessions for those who are forced to change jobs

We also observe that the correlation between the skill mismatch of involuntary occupational switchers and the unemployment rate is positive, while the one between the skill mismatch of voluntary occupational switchers and the unemployment rate is negative (see Figure 2). These findings suggest that unfavorable labor market conditions tend to worsen the skill match for those people who are not in a position to choose their next job optimally. In fact, excess supply of labor in recessions gives employers more choice of new hires. As a result, they may tend to hire workers with excess redundancy (i.e., workers who are overqualified for the job). At the same time, in recessions, people only make voluntary moves if they find a particularly favorable match (one with large skill shortage and low skill redundancy).

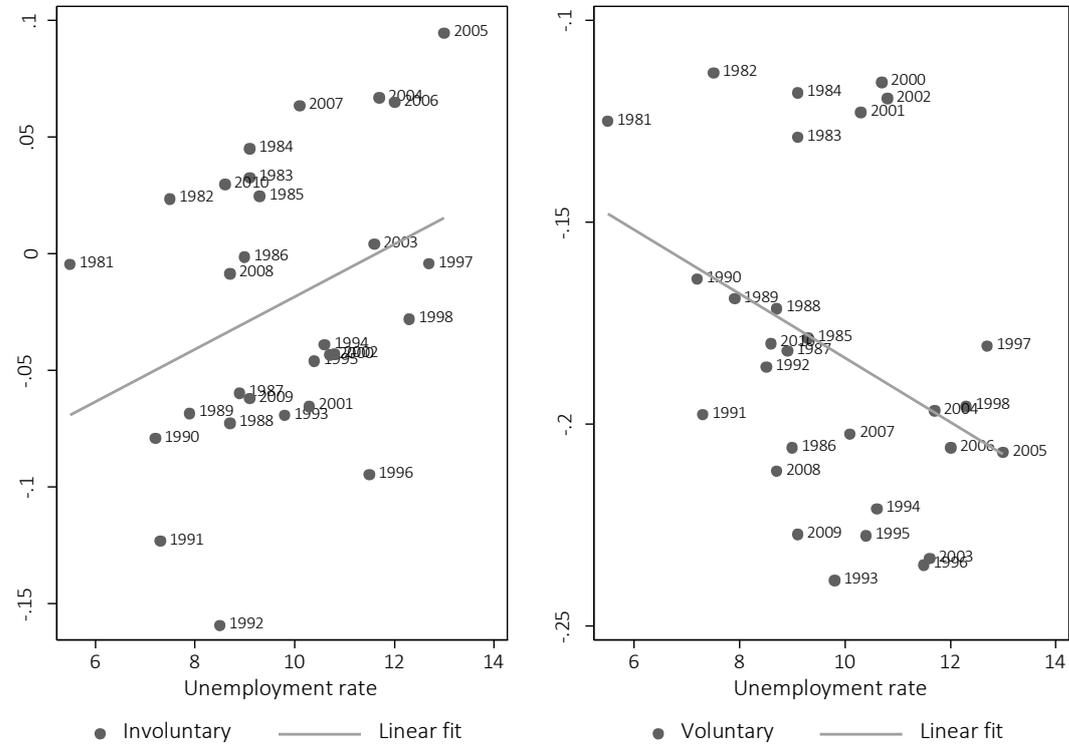
Figure 1: Skill Mismatch by Age and by Type of Occupational Mov



Note: The figure plots skill mismatch by type of occupational move. Skill mismatch is defined as the sum of skill shortage and skill redundancy. Since skill shortage by construction takes only negative values and skill redundancy takes only positive values, a negative sum means that a switch entails more shortage than redundancy. In contrast, a positive sum indicates a switch with excess redundancy. Voluntary (involuntary) moves are switches between occupations without (with) an unemployment spell in between both employment spells.

Source: Nedelkoska, Neffke & Wiederhold (2015).

Figure 2: Skill Mismatch and the Business Cycle



Note: The grey lines show the linear fit between the national average annual unemployment rate in Germany and the average national skill mismatch of occupational switchers (the sum of skill shortage and skill redundancy). Since skill shortage by construction takes only negative values and skill redundancy takes only positive values, a negative sum means that a switch entails more shortage than redundancy. In contrast, a positive sum indicates a switch with excess redundancy. Voluntary (involuntary) moves are switches between occupations without (with) an unemployment spell in between both employment spells.

Source: Nedelkoska, Neffke & Wiederhold (2015).

Is Skill Mismatch Bad for Careers?

A substantial body of evidence suggests that workers being displaced from their jobs in the course of plant closures or mass layoffs endure large and persistent earnings losses. If skill mismatch affects individual earnings, we would expect that the earnings losses after job displacement can at least partly be attributed to the skill mismatch between the acquired skills up to the point of displacement and the skill requirements of the jobs chosen after displacement. To investigate whether this is indeed the case, we estimate the earnings losses of displaced workers with different degrees of skill mismatch in Germany in the period 1975-2010.

Conditional on being employed, job displacement leads to daily wage losses of about 3 Euro (3.7 percent of pre-displacement daily wages) for workers who stay in the same occupation after displacement. Workers who switch occupations after displacement suffer larger wage losses of 3.8 Euro per day (4.9 percent of pre-displacement daily wages).²

In Figure 3, we decompose the earnings losses of displaced occupational switchers by the type of skill mismatch. The figure shows the difference in daily wages of a 'treatment' group and a 'control' group. The notion of treatment and control is analogous to medical trials of new medications, where the treatment group consists of people who get the drug and people in the control group get a placebo. In our case, the treatment is job displacement at time $t=0$. The control group consists of workers who are statistically identical to the treatment group prior to $t=0$, but did not experience such job displacement.³ The solid line shows the wage development of displaced workers (relative to the wages of non-displaced workers) who move to more skill-demanding occupations (up-skilling workers); the dashed line shows the relative wage development of displaced workers who move to less skill-demanding occupations (down-skilling workers). Before displacement ($t=\{-4,-3,-2\}$), up-skilling switchers and down-skilling switchers followed a similar wage development, suggesting that they are on a similar career path.

However, wages of both types of switchers quickly diverge after displacement (and shortly before it as closing a plant is a process rather than a single day event). Up-skilling workers quickly even out the wage losses relative to their non-displaced peers as we can see by observing that the solid line in Figure 3 is very close to zero throughout the post-displacement period. Their average losses in the 15 years after displacement are in fact almost zero.

²Note that earning losses of displaced workers are much larger if we do not restrict the sample to employed only.

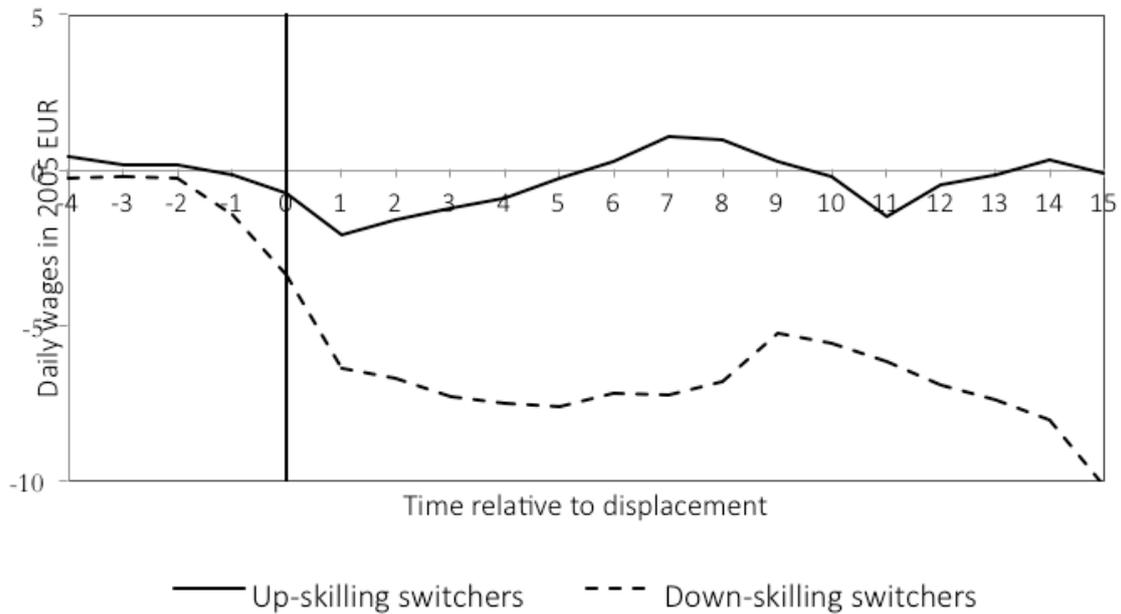
³Each control group was chosen by finding workers with the same gender and educational attainment as the displaced workers who were employed in the same occupation and sector with similar occupational tenure in the year prior to displacement. Workers in the control group also have similar wages and similar levels of participation on the labor market, between years 6 and 2 prior to displacement, as the displaced workers.

Moreover, the wages of up-skilling switchers quickly overtake those of the occupational stayers; on average in the 15 years after displacement, they gain 3.4 Euro (4.4 percent of pre-displacement wages) on stayers (not shown).

In contrast, down-skilling switchers incur substantial wage losses immediately after displacement and have only a very weak tendency for recovery. In fact, they never manage to catch up to their non-displaced peers, reflecting their pre-displacement earnings trend. Down-skilling switchers also fare significantly worse than occupational stayers after displacement. On average, down-skilling workers lose 6.5 Euro per day after displacement compared to their non-displaced peers (8.3 percent of pre-displacement daily wages), which is more than twice as much as displaced occupational stayers lose.

In sum, our results suggest that moving to up-skilling jobs is beneficial for individuals' careers. Such moves allow people to shift to a new learning curve, acquire skills on the job, and consequently enjoy the benefits coming from the returns to skills. In contrast, down-skilling switches are detrimental to earnings. Moving to jobs where a significant share of workers' previously acquired human capital is rendered redundant results in lower returns to acquired skills and hence lower pay.

Figure 3: Effect of Up-skilling and Down-skilling following Displacement



Note: The figure plots relative daily wages (in real 2005 EUR) of workers displaced at time $t=0$ who switch to up-skilling jobs (solid line) and down-skilling jobs (dashed line), respectively, following job displacement. Daily wages of displaced workers are expressed relative to wages of statistically identical workers who were not displaced. That is, negative (positive) wages indicate that displaced workers have lower (higher) wages than non-displaced workers. Job displacements are events where workers lose their jobs in course of events that are unrelated to their individual productivity, i.e., plant closures or mass layoffs. The sample consists of full-time employees, for whom daily wages is a good approximation of their productivity. Wages are measured on June 30th each year in the period 1975-2010. Daily wages of up-skilling switchers are significantly larger (at the 10 percent level) than wages of down-skilling switchers in each post-displacement year.

Source: Nedelkoska, Neffke & Wiederhold (2015).

Recommendations for Policy

Skill mismatch goes hand in hand with job-to-job transitions. Younger workers switch jobs and occupations much more often than do older workers. When switching jobs, they tend to move to more skill-demanding jobs (i.e., they incur skill shortage). Older workers switch rarely and if they do, they often move to less skill-demanding jobs (i.e., they incur skill redundancy); in particular, this is the case when workers change occupations involuntarily. Unfavorable business cycle conditions seem to increase excess skill redundancy.



Skill shortage at the new job correlates with higher future wage growth, most likely because it translates into higher learning potential at the job. Skill redundancy, on the other hand, correlates with future earnings losses because workers incurring redundancies only use part of their acquired skills at the new job.

These results suggest that active policy such as help with job matching can play an important role in helping displaced workers in reducing the earnings losses that are caused by job displacements. In addition to providing timely and accurate information on job vacancies, programs to assist displaced workers in finding new jobs should consider both aspects of the matching process, namely, workers' previously acquired skills and the skill requirements of the available jobs.

These programs should locate matches that allow a great amount of human capital to be transferred to the new job, since jobs that leave large part of the previously acquired skills unused lead to considerable earnings losses. When there are no vacancies that would allow for a large degree of transferability of acquired skills, workers should be encouraged to invest in training, which enables them to attain jobs with higher learning potential. gap and create good prospects for their careers.

Literature

- Autor, D. H., Levy, F., & Murnane R. J. (2003).
The Skill Content of Recent Technological Change: An Empirical Exploration. *Quarterly Journal of Economics*, 118(4): 1279-1333.
- Bachmann, R. (2005).
Labour market dynamics in Germany: hirings, separations, and job-to-job transitions over the business cycle, SFB 649 discussion paper, No. 2005, 045.
- Benhabib, J., & Spiegel, M. M. (2002).
Human Capital and Technology Diffusion. San Francisco: Federal Reserve Bank of San Francisco.
- Bowles, S., Gintis, H. & Osborne, M. (2001).
The determinants of earnings: A behavioral approach. *Journal of Economic Literature*, 39(4): 1137-1176.
- Ciccone, A., & Papaioannou, E. (2009).
Human capital, the structure of production, and growth. *Review of Economics and Statistics*, 91(1): 66-82.
- European Commission. (2010).
New Skills for New Jobs: Action Now: Report by the expert group on New Skills for New Jobs prepared for the European Commission.
- Gathmann, C., & Schönberg, U. (2010).
How General Is Human Capital? A Task-Based Approach. *Journal of Labor Economics*, 28(1): 1-49.
- Hanushek, E. A., Schwerdt, G., Wiederhold, S., & Woessmann, L. (2015).
Returns to skills around the world: Evidence from PIAAC. *European Economic Review* 73, 103-130.
- Hanushek, E. A., & Woessmann, L. (2008).
The role of cognitive skills in economic development. *Journal of Economic Literature*, 46(3): 607-668.
- Hanushek, E. A., & Woessmann, L. (2015).
The knowledge capital of nations: Education and the economics of growth. Cambridge, MA: MIT Press (in press).



- Heckman, J. J., Stixrud, J. & Urzua, S. (2006).
The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. *Journal of Labor Economics*, 24(3): 411-482.
- Lindqvist, E., & Vestman, R. (2011).
The labor market returns to cognitive and noncognitive ability: Evidence from the Swedish enlistment. *American Economic Journal: Applied Economics* 3(1): 101-128.
- Nedelkoska, L., Neffke, F. & Wiederhold, S. (2015).
Skill mismatch and the cost of job displacement. Unpublished.
- Nelson, R. R., & Phelps, E. S. (1966).
Investment in humans, technological diffusion, and economic growth. *American Economic Review*, 56(1/2): 69-75.
- OECD. (2012).
Better skills, better jobs, better lives: A strategic approach to skills policies. Paris: OECD.
- Poletaev, M., & Robinson, C. (2008).
Human capital specificity: evidence from the Dictionary of Occupational Titles and Displaced Worker Surveys, 1984–2000. *Journal of Labor Economics*, 26(3): 387-420.
- Shimer, R. (2005)
The Cyclicalities of Hires, Separations, and Job-to-Job Transitions *Federal Reserve Bank of St. Louis Review*, July/August 2005, 87(4): pp. 493-507.
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Project Identity

LLLight'in'Europe is an FP7 research project supported by the European Union, which has investigated the relevance and impact of lifelong learning and 21st century skills on innovation, productivity and employability. Against the background of increasingly complex tasks and jobs, understanding which skills impact individuals and organizations, and how such skills can be supported, has important policy implications. LLLight'in'Europe pioneered the use of an instrument to test complex problem solving skills of adults in their work environment. This allowed for the first time insights into the development of professional and learning paths of employed individuals and entrepreneurs and the role that problem solving skills play. Additionally, LLLight'in'Europe draws on a series of databases on adult competences from across the world to conduct rich analyses of skills and their impact.

These analyses were conducted in concert with different disciplines. Economists have been analyzing the impact of cognitive skills on wages and growth; sociologists have been investigating how public policies can support the development of such skills and lifelong learning; innovation researchers have been tracking the relationships between problem solving skills, lifelong learning and entrepreneurship at the organizational level; educational scientists have investigated how successful enterprises support their workforce's competences; cognitive psychologists have researched on the development and implications of cognitive skills relevant for modern occupations and tasks; and an analysis from the perspective of business ethics has clarified the role and scope of employers' responsibility in fostering skills acquisition in their workforce. The team has carried out its research and analyses on the value of skills and lifelong learning in EU countries, USA, China, Latin America and Africa.

The result is a multi-disciplinary analysis of the process of adult learning and problem solving in its different nuances, and of the levers which can support the development of these skills for both those who are already in jobs, and for those who are (re)entering the labor market, as well as the development of effective HR strategies and public policy schemes to support them.

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This policy brief is part of the publication suite of the FP7 Project LLLight'in'Europe. The publication suite consists of 21 policy briefs, 6 thematic reports and 1 synthesis report. The 21 policy briefs discuss findings and policy implications proceeding from the project's research; they are organized along three level of analyses (persons; enterprise; country) and seven topics.

01	Resources of society for learning
02	Institutions of learning
03	Circumstances of learning
04	Role of transversal skills
05	Role of job-specific skills
06	Productivity of skills
07	Outcomes of skills

This policy brief discusses findings related to **Role of job-specific skills** at the analysis level **persons**. For further publications and multimedia material related to the project, please visit www.lllightineurope.com