Two recent challenges are characterizing the social environment, pushing many countries and organizations to seek new ways to maintain a competitive advantage: the transition of modern economies to knowledge-based globalised economies and besides the demographic aging of societies. Enhancing the levels of skills in the population, required for the jobs both for now and for the future, is therefore a strategic concern in the economic growth and social development of countries all over the world.

On the one hand, globalization is speeding up technology and innovation: new occupations are emerging while replacing others; within each occupation, required skills and competencies are evolving, whereas the knowledge content of production processes and services is rising (ILO, 2011). At the same time, demographic processes related to increasing life expectancy and lower fertility rates are causing, on one side, problems for welfare state budgets; on the other, the shrinking proportion of young workers increases labor shortage (ILO, 2013).

In addition to these trends, there is strong evidence that poor cognitive skills, such as literacy and numeracy, have a negative impact on the quality of life of individuals, in particular on their earnings and employment prospects. A variety of surveys have shown that people with good skills, measured by standardized test scores, tend to have higher wages and better chances of being in work than people with low level of skills (Dearden et al. 2001, Vignoles et al. 2010, Murnane et al., 2000, Hanushek and Zhang, 2008).

In this context the prevailing point is that the success of a country largely depends on the possibility to rely upon a labour force with higher levels of individual competences. As a result, many governments aim at investing resources in order to increase the skill level of their citizens. Adult Education and Training (AET) are a possible strategy of adjusting the skills of the adult population to the needs of either the changing occupational structure and aging societies (Cummins et al., 2015). AET also have important implications for social inequality. On the one hand, this objective is potential promising in order to reduce inequalities emerged also in early life. Moreover, the mentioned macro-trends of globalization and demographic changes are likely to have a strong impact on the need both for older and lower qualified people to take part in lifelong learning activities in order to update their skills to match labor market demands (Organization for Economic Co-operation and Development, 2013). On the other hand, AET may actually increases existing inequalities if well-educated people are the primary group taking advantage of these opportunities (Kilpi-Jakonen et al. 2014).

The Human Capital Framework
One of the most significant contribution of labour economics is the human capital theory (Becker, 1964). According to this perspective, people are considered valuable assets, somewhat recognised as a form of capital, like the physical capital. The OECD provides an efficient definition of this construct: it corresponds to any stock of
knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being (OECD 2001, p.18). The possible sources of human capital differences are innate ability, school, pre-labor market influences and adult education and training (Acemoglu and Autor, 2014). A brief description of each source follows. Workers can have different amounts of human capital because of innate differences. Research in psychology and neuroscience has documented that there is some genetic component of IQ in origin (Plomin and Deary, 2014). Many economists believe that this “unobserved” variable is very important in order to understand the distribution of wages. There is however a problem, we do not have good data on this component of human capital. Furthermore, the relevance of this observation for labour economics is that there is likely to be heterogeneity in human capital even when individuals have access to the same investment opportunities and the same economic constraints. Then the omission of this component in the Mincerian equation can lead to biased estimates (ability bias) of the rate of return to schooling, linked to the “endogeneity” of education1 (Griliches, 1977). Since the seminal work of Mincer (1970, 1974), schooling has been the focus of much research, since the component of human capital investments is the most easily observable and readily tracked over time. The empirical results suggest that education, measured as educational attainment, confers significant advantages to individual. On average, the economic rate of return to an additional education ranges between 5 and 10 percent (Card, 1999; Harmon et al., 2000).

It is, however, widely accepted that what is learnt is equally, if not more, important than the quantity of schooling acquired (Glewwe 1996; Ishikawa and Ryan, 2002). In other words, what matters is not only the “quantity” of years of schooling acquired but, above all, the “quality” of this investment, measured by the level of cognitive skills. Today the cognitive skills, identified by test scores – such as those incorporated into the international assessments – are good measures of relevant skills for the human capital (Hanushek et al., 2011). In this respect, consistent evidence indicates that better skills are significantly related to higher labour market earnings. According to Hanushek’s estimate, a one-standard-deviation increase in numeracy skills is associated with an average increase in hourly wages of 17.8% (Hanushek et al., 2013).

In the main, schooling decisions take place while the young person is still living within the family environment, therefore it is widely accepted that the family plays a major role in determining the human capital development and subsequent inequalities between individuals (Cunha and Heckman, 2007). The empirical evidence reports a strong positive association between parental socio-economic status, typically measured by income or education, and the dimension of children’s human capital, such as health and cognitive and non-cognitive skills (Blanden et al. 2007: Currie, 2009) at a given age; in turns it predicts key economic, social, health and behavioral outcomes in adulthood (Heckman, 2007). Besides the family, recognition is growing among economists that also peer group effects, to which individuals are exposed before they join the labour market, may also significantly affect their human capital. Some studies report positive influences of higher achieving peers, at least for some students, measured by test scores (Zimmerman, 2003: Gaviria and Raphael, 2001). Probably the main difficulty inherent with this approach as detailed in Evans et al. (1992) is that families may choose their residence (and schools) based on observed characteristics of potential peer groups (self-selection). At the same time families may possess unobserved characteristics, such as greater motivation, that positively influence students’ outcomes. Thus peer variables could be positively correlated with unobserved individual determinants of outcomes, perhaps leading to upward biases in estimates of peer-group effects (Sacerdote, 2001).

A significant amount of human capital investment occurs through training or adult education courses, acquired by workers after schooling. In broad terms, there are three different types of AET: formal, non-formal and informal. Formal AET take place in education and training institutions and lead to recognised credentials and diplomas (Commission on European Communities, 2000). Non-formal AET can take place both within or outside of educational and training settings (i.e., on-the-job training), but do not typically lead to formal credentials (Ibidem). Informal AET are any activity involving the pursuit of understanding, knowledge or skill, occurring without the presence of externally imposed curricular or pressure - i.e., learning by experience - (Livingstone, 2001).

In his classic book “Human Capital” (1964), Gary Becker distinguished between firm-specific and general training. The former provides a worker with specific firm skills, that is, such as increasing his/her productivity only with the current employer; the latter will contribute to the

1. The problem of ability bias is basically that more able people could get more schooling and at the same time earn more not because of the additional schooling but just because they are more able. So if the individual’s ability and educational attainment are correlated, estimation of economic return to education would give biased results.
worker general human capital, increasing his/her productivity with a range of employers. According to Becker, whether the firm or worker pays for this form of human capital depends on whether the job training is firm-specific or general. In perfectly competitive labour markets, workers pay for general training by receiving low wages during training periods, but they will reap the returns of this investment by earning higher wages later. And, since general training is fully transferable, workers’ post-training wages will be the same across firms (Becker, 1964). In the case of specific training, the skills acquired will not be transferable to other firms; then, it is efficient for firms and workers to share the costs and the benefits of this kind of training investment (Hashimoto, 1981). Finally, if the training comprises a mix of general and specific components, there should be some sharing of costs (Albert et al., 2010).

**Participation in AET**

The belief among policy-makers, employers and individuals is that a continual skill formation plays an important role in the accumulation process of human capital (Jenkins et al. 2002). Nevertheless, despite the increasing emphasis placed in the last two decades on the positive role of lifelong learning, most of the research attention has been on the acquisition of human capital by young people through formal education. This paper focuses on two different kinds of lifelong activities - the formal and non-formal AET - and it intends to review the factors influencing the participation of individuals in these components of human capital, and the effectiveness of AET in improving the level of individuals’ basic skills – namely, numeracy and literacy. In this paragraph, I examine the literature concerning the determinants of the participation in AET. I focus on three factors shaping participation: age, gender, prior level of education.

Regarding age, the general pattern is that the likelihood of participation in AET decreases in time, which is primarily due to the lower perceived benefits of participation and possible incompatibility of learning with adult-life courses (Hostetler et al. 2006; Elman and O’Rand, 2007). Turning to prior education, there is a wide ranging evidence that individuals with higher educational attainments are more likely to participate in non-formal AET, (Bassanini et al., 2007; Dieckhoff and Steiber 2011; Albert et al., 2010). One possible explanation is that higher educated people tend to work in more demanding and knowledge-intensive jobs, which require more training (OECD, 2013). In literature this is also known as “a cumulative advantage” (DiPrete and Eirich, 2006). According to Blundell et al. (1999), a strong complemen-
The Relationship between AET and Skills

Regarding the benefit of AET, there is a large international literature documenting empirical evidence that these learning activities improve labour market outcomes, such as employment and higher wages. Recent OECD analysis reveals a strong cross-country correlation at the aggregate level between labour force participation and employment on the one hand and both initial education and subsequent adult training on the other hand. At an individual level, there is a strong association between involvement in adult training participation and employment probability: on average, looking at individuals aged 25-54 years, an increase of 10% in the time spent in training is associated both with an increase in the probability of being economically active by 0.4% and a fall in the probability of being unemployed of almost 0.2% (OECD, 2004). Nevertheless, most of the research about AET focuses on their benefits in terms of wage premia. This literature provides strong evidence of wage effects of training, especially in the US and in the UK: an individual undertaking non-formal AET earns, on average, just above 5-10% higher real earnings than one who has not undertaken such learning courses (Blundell et al., 1999; Leuven, 2004). Though, when we consider formal AET, Jenks et al. (2002) suggest that this type of lifelong learning has no measurable impact on individuals’ wage. In other words, taking a qualification during early ages has a remarkable impact on the wage, while taking the same qualification later, for example after 30 age, has no actual consequence as regards the wage. A possible explanation of this pattern is that employers can assume that adult education is a signal of lower ability: a qualification achieved later in life proves less motivation or ability in people.

Another strand of literature shows a strong positive effect of training on firm productivity. The major study for the UK worked out an industry panel data between 1984 and 1996 containing training, wages, labour, capital and value-added. It found that training is associated with significantly higher productivity. In particular, raising the proportion of workers trained in an industry by 1% was associated with a 0.6% increase in productivity (value added per work) and a 0.3% increase in wages (Dearden et al., 2006). Similar positive effects have been found in other longitudinal surveys of firms in Mexico (Tan and Lopez-Acevedo, 2005) and Malaysia (Tan, 2000). But what do we know about the impact of AET on learning outcomes? Most policy-makers believe that training translates into higher productivity, and therefore into higher incomes because individuals assume that the participation in these type of activities increases people’s skills. However, a question is a matter of fact: is this assumption consistent with the evidence? Unfortunately, information on the effectiveness of both formal and non-formal AET is very poor; the evaluation on whether learners acquire substantive skills is rather thin. In general, research from the UK and US try to measure the effectiveness of adult basic skills - literacy and numeracy provision - but they deal with small-scale studies conducted over a short span of time. Furthermore, few of the surveys are high enough quality to capture the complexities of the connections between interventions and outcomes.

Torgerson et al. (2003, 2004, and 2005) report the results of a systematic review about the experimental and quasi-experimental literature in the field of lifelong learning activities, published between 1980 and 2002. The aim of these studies was to investigate the effectiveness of adult learning programmes designed to increase literacy and numeracy skills. A total of 4,555 potentially relevant papers were identified by using electronic and hand searches. From this large database the authors identified: 12 papers reporting nine randomized controlled trials (RCTS) and 27 papers corresponding to 27 controlled trials (CTs). Of the nine RCTs included in the review, eight were undertaken in the US and one in the UK; five evaluated interventions in literacy, two programmes in numeracy and two in both numeracy and literacy. All of them were of highly quality owing to their adoption of an appropriate design for evaluating effectiveness. Focusing on five studies in all, the authors found statistically significant gains in three (when pooled), and non-significant gains in two. However almost all of them had methodological problems, such as small sample sizes, an unclear method of random allocation and high attrition rate. Only one study, conducted in California, was large enough to detect small, but important, improvements in literacy and numeracy among the participants. Regarding the CTs included in the review, 18 of them had no effect sizes (incomplete data) and only nine with full data. Of these nine trials, six evaluated interventions in literacy and three in both literacy and numeracy. Practically all they were undertaken in US, except one in New Zealand. Among the nine studies the results showed, in three cases, a statistically significant positive effect of the learning activities; five trials showed no difference; one showed a positive effect for the control group. The quality of the trials was variable, but many of them lacked methodological accuracy because of large attrition, no equivalence at baseline and lack of matching on pre-test scores. To sum up, the authors found some evidence that adult literacy and numeracy programmes are effic-
Participants’ average performance continued to improve over a two-year post-instruction period. Learners using their literacy skills actively, in and out of the workplace, were most likely to show consistent gains.

Wolf and Jenkins (2014) analysed the effect on reading comprehension skills of British adults who participated in government-funded literacy courses organized in workplace from 2003-2009. The study involved a relatively small sample of 500 learners in 53 different workplaces. After volunteering to participate in the study, they were followed from the enrollment until between two or three
years later. The target learners were low-skilled employees, namely workers doing routine and repetitive jobs, such as people working in food processing companies, cleaners, car assistants, bus-drivers, etc. Since in almost all sites there was a 100% agreement to participate among workers approached, the main drawback in this study is the absence of a control group. Using different statistical method (OLS and Multilevel Model: linear growth model) the authors found two different groups with two different outcomes. Among learners mastering English as a second language, there was a statistically significant, though non-large, improvement in the literacy skills, especially in the period not included in the course, whereas among the native English speakers there were not significant gains. These findings are consistent with those of Wolf and Evans (2011): the difference between the two groups of learners may refer to their linguistic difference in some ways, which explains why the former progressed differently and faster. Wolf and Jenkins stressed that «however it is also probable, and we believe more probable, that their greater improvement simply reflect more time spent in an English-speaking country. For that reason, this group’s gains cannot be confidently attributed to the effects of the course» (Wolf and Jenkins, 2014, p. 604).

A particularly relevant paper is a cross-country comparison by Sgobbi (2014) who investigates how AET impact individual proficiency in individuals’ cognitive skills in eleven EU countries, based on the PIAAC survey promoted by OECD. The aim is to point out the drivers of proficiency in literacy, numeracy and problem solving. A first set of OLS regressions examines the drivers of individual proficiency for the total adult population in selected countries, whereas a second set of regressions focuses on employed individuals. Both sets of regressions include two binary variables concerning adult education and training experienced by respondents in the 12 months preceding the survey, plus a set of covariates (age, gender, educational attainment, employment status, family background). The empirical analysis shows that the relationship between adult education and cognitive skills is either negative or non-significant, whereas the relationship between training and skills displays a positive effect. In addition, the effect of training gets smaller and less significant when the analysis is restricted to employed individuals.

Conclusions

The combination of two factors – the demographic aging of societies and a shift in the age distribution of labour force – results in the need for policies to encourage people to upgrade skills in order to remain at work. Policies providing opportunities for adult individuals to participate in AET programmes are necessary to ensure economic security in retirement, a competitive labour force and economic growth. The implementation of policies focusing on lower income groups and especially unemployed are crucial, as they are the most in need of skills upgrading and most at risk for economic insecurity.

Despite widespread recognition that the investment in human capital for people of all ages is very important, little research has empirically examined the effects of participation in AET programmes on adult’s skills. Gaining a better understanding of how adult individuals benefit from participating in AET is a very important area of study, thus providing policy-makers with informed decisions.

The key question of interest to policy-makers is as follows: whether or not these programmes are actually effective or, at least, so sufficiently effective to justify the cost to the public (Lee, 2005). The evaluation of these programmes has been the aim of a large methodological literature in economics, with specific focus on the impact of AET on wages. However, this approach leaves open the question of whether AET is effective in raising of individuals’ skills. For AET programmes, indeed, to be really effective they need to increase human capital (skills) because only that can improve the productivity of individuals, which in turn can lead to a meaningful raise in their wages.

To make a short summary: previous research, especially from within the UK and US, seek to measure the effectiveness of literacy and numeracy provision in small-scale and over a short time-period, during which learner gains may not be apparent or are difficult to measure. Moreover, most of the investigated studies are of poor quality or insufficiently well-designed to capture the complexities of the connections between interventions and outcomes. Altogether, there is limited evidence of a significant association between participation in AET and proficiency (increased skills).

The combination of these findings makes an important contribution to the existing research by demonstrating the benefits of AET in terms of improved skills for adult people (especially low skilled), which will be essential to allocate funding for such programmes.

PIAAC, for example, is a rich cross sectional dataset, useful because it provides notable opportunities, on one side, to investigate how individuals benefit from participation in lifelong learning activities; on the other, to make comparison across countries. However, future analysis in this field could provide further information on how participation in lifelong activities can change literacy and nu-

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meracy skills, thanks to longitudinal datasets, in order to deal with potential endogeneity of these learning programmes. Furthermore, future research could make use of qualitative research to gain a better understanding of how and where adults participate in AET. Learning more about how individuals become aware of educational opportunities and difficulties to deal with would be useful in developing programmes and strategies to tackle social barriers. Lastly, future research could explore specific AET policies in some countries with the view to test the efficacy in a more timely way and develop a clear strategy by using best practice in the cultural context.

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