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# ***Economic Returns to Education in the United Kingdom***

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***Foresight***  
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***Aditi Bhutoria***  
*PhD  
University of Cambridge*

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## ***Executive Summary***

This literature review has sought to answer the key question: What are the economic returns to the (1) individual, (2) employer and (3) economy of different modes of learning (formal, informal and non-formal education and training) across different ages of acquisition?

### **Overview of the review method and the robustness of evidence**

Evidence assessment was conducted using targeted literature searches to produce this review. Based on the draft specifications provided by Foresight, a range of bibliographic databases were searched, as were the websites of key organisations and institutions. References suggested by experts, and Foresight were also reviewed. The searches were focussed on the 'economic' returns to education in the UK, alongside some global level evidence, where required. More than 80 texts were sourced during the searches, and the most relevant ones were scrutinised in detail. Overall, most studies were found to be based on robust secondary analysis of large-scale datasets or included surveys and literature reviews. For school education and vocational qualifications, a large number of the texts reported the private returns to earnings, providing 'strong evidence'. Fewer studies explored the private employment returns to education. Evidence on returns to non-formal or informal education was found to be scarce, given the difficulties of defining and measuring the impacts of such learning. Incidentally, limited and 'weak evidence' was found with regards to the impacts of the different types of qualifications on firm productivity in the UK.

It is also important to acknowledge that most of the evidence on the topic presents correlations rather than causal effects of education. Obviously, there are econometric difficulties in establishing causal estimates and in controlling for all factors that could possibly influence the level of education achieved as well as outcomes like wages. These issues can potentially bias the economic returns to qualifications. As McIntosh & Garrett (2009) discuss, if individuals who acquire qualifications are more able than individuals who do not, then the estimated returns to qualifications could be potentially biased upwards. Particularly if the qualification variable picks up the effect of an individual's unobserved ability on wages. In contrast, if certain qualifications are more likely to be acquired by individuals with lower ability, then the estimated returns to such qualifications could be biased downwards.

### **Key findings**

Overall, the evidence review has revealed that there are potential economic returns for all stakeholders. The key findings below are grouped by returns to the individual, employer and the economy.

**Returns to the individual:** Positive economic returns to formal education have been consistently found at the individual level.

- Returns vary with the type and level of the qualification obtained, by subject area, age profile and gender.
- The effect of qualification attainment can be particularly strong when this leads to completion of a qualification and upgrading of a person's education level.
- Regarding academic qualifications, wage returns (marginal and accrued) are highest for completed tertiary education. The marginal return to a degree (first or higher degree or equivalent tertiary qualifications in Level 5) has been found to be around 21 per cent for men and 29 per cent for women, which is the average across the papers that were reviewed. However, the wage differential between those with and without academic qualifications varies over time.
- Regarding vocational qualifications, positive wage returns have been found specifically for vocational qualifications and apprenticeships at Level 3 and above. In contrast, the recent evidence has triggered an academic debate on the impact and effectiveness of qualifications at Level 2 and below. While earlier evidence like Sianesi (2003) suggests that Level 1 and 2 qualifications have very little or no returns, Buscha & Urwin (2013) have found that achievers of Full Level 2 qualifications earn premiums as high as 22.2 per cent in the 16 to 18 age group. The returns are positive but lower for short cycle Level 2 and below Level 2 qualifications. Also, for most qualifications, the acquired skills tend to depreciate over time.
- There are significant employability/entry into work related returns to academic qualifications, although there is limited causal evidence to support this.
- Regarding non-formal and informal education, there remains a dearth of consolidated evidence on their economic impacts. However, some research shows that potentially large economic benefits can be realised from increasing occupational, practical and basic competencies including multiple literacies like reading, numeracy skills or financial literacy.

**Returns to the employer:** Workers and employers tend to share the returns from training and its costs. Better occupational skills may lead to positive returns to employers. Raising the proportion of workers trained in an industry by five percentage points (say from the average of ten per cent to 15 per cent) is associated with a four per cent increase in value added per worker (Dearden, Reed, & Van Reenen, 2000). The evidence for qualification specific benefits to the employers in the UK is very limited as there are few studies that have had this focus.

**Returns to the economy:** Human capital investments are associated with higher Gross Domestic Product and lower inequality. Recent estimates suggest that each additional year of education is associated with an 18 per cent - 35 per cent higher GDP per capita. In terms of larger economic

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benefits, the human capital of the work-force can act as a trigger for innovation, adoption of new technologies and enhanced growth. Moreover, higher levels of qualifications and skills (tertiary education or level 4-5 vocational qualifications) can help to propel national economic growth. In this case, direct impacts of training and informal learning on economic growth remains ambiguous due to a lack of robust evidence.

**Returns across different ages of acquisition:** In terms of the age-returns profile, the age of acquisition plays an important role in understanding when and how learning can be most effective. The theoretical argument for human capital accumulation is one that supports the ‘Cradle to Grave’ approach. Development of skills starts before birth and accumulates as a life-long process of learning acquisition. Hence, a disadvantage early on can potentially limit the educational development of an individual leading to lower economic returns in youth or old age. Thus there are higher returns for learners who invest in qualifications when they are young. However, recent research validates that the benefits remain fairly positive for adult learners as well. There is not much robust evidence on exactly at what ages does the learning acquisition lead to better returns, nevertheless.

## **1. Introduction**

The aim of this review is to provide a non-technical assessment of the state of knowledge on:

- i. The economic impact of academic, vocational, non-formal and informal education on the labour market opportunities of individuals, in particular on earnings and employment. This includes a study of the impacts on access and entry into work; in-work progression; wage premiums; progression in learning and overall skills gains. Within this, the review also aims to evaluate how the economic returns change with the age and gender of the learners.
- ii. The economic impact of academic, vocational, non-formal and informal education on firms and employers. This includes a study of the impacts on firms' profitability and productivity.
- iii. The economic and non-economic contributions of education at state level. This includes a study of the impacts on economic aspects like domestic output and productivity growth. State related returns are only briefly covered in this review.
- iv. This review does not cover the important area of non-economic returns to education. A separate research study should be undertaken to understand these wider benefits<sup>1</sup> of education.

## **2. Background**

### **2.1 Brief Consideration of Theory**

**Enhancements in 'human capital' can lead to increased labour productivity and economic growth.** Human Capital Theory suggests that education and training are investments that increase the productivity of the learners (Becker, 2002; Mincer, 1958). In fact, labour productivity is one of the key contributors to the Gross Domestic Product (GDP) of any country (see, Figure 7). There are three main components of 'human capital' — early ability (whether acquired or innate); qualifications and knowledge acquired through formal education; and skills, competencies and expertise acquired through non-formal or informal education, like training on the job (Blundell, Dearden, Meghir, & Sianesi, 1999). The individual learners or firms that invest in education or training expect to gain through higher earnings, employability or productivity. The private economic returns to the learners are measured as their net gain in lifetime earnings, accruing as a result of their investment. Such gain is accrued after allowing for initial costs of learning, such as tuition or training fees and opportunity costs in terms of forgone earnings or productivity.

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<sup>1</sup> There are good theoretical reasons why education could lead to wider, non-economic benefits. Better-educated people tend to be better informed about health and nutrition, are less likely to run health risks, and have better information on where to secure good medical care. Those with more schooling are less likely to smoke, less likely to be heavy drinkers, and are more likely to exercise. Moreover, there is also an intergenerational transfer of value: children's cognitive and emotional development is associated with their parents schooling or children whose parents attend further education are more likely to attend further education.

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**Government can play an important role in addressing market failures and increasing human capital.** Human Capital Theory suggests that investments in education or training, very much like investments in physical capital, are only undertaken if the expected return on the investment (or 'net internal rate of return') is greater than the market rate of interest. However, in the case of incomplete information or credit constraints faced by the individuals, there is a possibility of market failure and potential under-investment in education (for example, leaving school too early). In such cases, the theory suggests that government investment can be targeted to enable individuals to stay longer in education, up to a point where the rate of return on the last pound invested in education equals the return that the pound could have earned if it were invested elsewhere.

Globally, more funds are being spent on education than ever before. In the UK, the total spending on post 16 learning increased from GBP 52.7 billion to 55.2 billion, between 2010-11 and 2014-15 (New Economy Calculations, 2016<sup>2</sup>). There is a need to understand how best this extra resource might be deployed to produce more human capital. There are numerous aspects for consideration for understanding how and where the public spending on education should be channelled. Aspects like qualification levels, accumulated number of years of learning, the age of learning acquisition, skill types like cognitive skill levels or non-cognitive skills, need to be considered (Borghans, Duckworth, Heckman, & Weel, 2008; Cunha, Heckman, & Schennach, 2010; Heckman & Rubinstein, 2001).

**Skills Beget Skills: early investments in human capital reap accrued long-term benefits.** Human Capital Theory suggests that early investment in education and training is needed for developing initial human capital and skills. Such investments during infancy can make later inputs more productive and may yield accrued benefits throughout life. Almond & Currie (2010) provide a comprehensive review of studies that have examined the impact of human capital investment in early years on a range of child development outcomes. They find that participation in pre-school interventions is positively associated with longer run educational achievement. Empirically too, differences in human capital between more and less advantaged children have been found to emerge during the early years mainly. Cunha & Heckman (2007) have theoretically established the advantages of early childhood investments.

A closer reading of the aforementioned Heckman literature also suggests that a balanced approach with investments throughout the lifecycle is preferable to interventions at any one stage. The high return on investment at an early age may erode during later phases of childhood unless topped up with subsequent investments. Thus, the process of human capital investment should ideally be an ongoing one. Further, it should be noted that practical applications of the full Cunha and Heckman model are still relatively rare and it needs to be validated across different contexts.

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<sup>2</sup> Estimates have been based on internal report prepared by New Economy for Foresight.

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**While cognitive skills are likely to be developed early on, non-cognitive skills may be more malleable later in adolescence.**

Human capital consists of both cognitive and non-cognitive skills (Heckman and Rubinstein 2001, Borghans et al. 2008, Cunha et al. 2010). Theoretically, sustained investments over time are likely to produce the greatest amount of human capital especially if later investments are needed to reap the full benefits of early investment. Further, the process of skill development varies according to the type of skill being produced. Cunha et al. (2010) conclude that the earliest years are optimal for interventions for the development of cognition. By contrast, they present evidence suggesting that some non-cognitive skills may be more malleable later in adolescence, which is consistent with evidence from psychology (Blakemore, 2010).

## *2.2 Brief Consideration of Context*

Evidence from the UK re-affirms that investment in education potentially yields a positive return to the owner of human capital. In comparison to other European countries, the education systems in the UK have performed well in terms of participation in early childhood education for children aged 4 and over, digital skills acquired at school, tertiary education attainment rates and adult participation in lifelong learning<sup>3</sup> (European Commission, 2015). As per the OECD (2016; 2013), the UK has seen high investments in pre-primary, primary and secondary education with a rapidly growing participation rate. Virtually all 15-16 year-olds in the UK are enrolled in education, given education is compulsory.

Some challenges for the UK's education systems include: a persistent early school leaving rate, low literacy of 18-24 year-olds with only lower secondary education and, poor numeracy skills among 15 year-olds, (European Commission, 2015). As per OECD (2014) data, only 34 per cent of 18-year-olds were enrolled in secondary education and 30 per cent were enrolled in tertiary education. Taken together, these figures show a drop of nearly 40 per cent in enrolment rates between the ages of 16 and 18, i.e. within the two years following the end of compulsory education at that point.

Initial levels of education alone can no longer satisfy the rising and changing demand for skills. The UK also has an above average participation in non-formal continuing education and skill-based training, compared to other OECD countries. However, the availability of higher vocational and technical education in the UK trails behind other European systems (European Commission, 2015). Little consideration has also been given to human capital investment encompassing lifelong learning including non-formal and informal learning. The reviewed evidence on the economic returns to these different types of learning for the individual, employer and the economy are discussed in the following sections.

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<sup>3</sup> Eurostat (the statistical office of the European Union) measures the 'adult participation in lifelong learning' as the percentage of the population aged 25 to 64 participating in education and training.

### 3. Returns to the Individual

This review takes account of the available evidence, which aims to measure the economic impacts of formal, non-formal and informal education.

#### 3.1 Estimates of the Returns to Formal Education

##### 3.1.1 Wage Returns to Academic Qualifications

The strong association between formal education (measured as highest qualifications achieved) and earnings is well established.

##### There are positive wage returns to academic qualifications

There is a large literature on rates of return to formal education and related academic qualifications. It is clear from the existing literature that individuals who achieve academic qualifications benefit from higher earnings than those who leave schooling mid-way, without a formal completion. Much of the broader evidence base suggests that the higher the level of learning the greater are the cumulative returns (Conlon & Patrignani, 2013; Dorsett, Lui, Weale, & others, 2010; London Economics & Ipsos MORI, 2013). In comparison to other OECD countries, the UK reports one of the largest differences in earnings between students who pass upper secondary schooling and those who don't, according to Education at a Glance statistics (OECD, 2014). It also shows that an individual without upper secondary education in the UK earns only 70 per cent of what someone with upper secondary education does. Meanwhile, a tertiary educated individual in the UK earns more than 55 per cent more than a person with upper secondary education (the OECD average is 59 per cent). A review of papers that quantify the Rate of Return (RoR) to formal qualifications in the UK, re-affirms the possibility of large marginal wage benefits (Table 1).

**Table 1: Wage Returns to Academic Qualifications**

Level	Qualification	Return for Men								Return for Women							
		Dearden (1999)	Sianesi (2003)	Walke et al (2003)	McIntosh (2002)	Blundell et al (2004)	Blundell et al (2000)	Dearden (2002)	Mean Marginal Return	Dearden (1999)	Sianesi (2003)	Walke et al (2003)	McIntosh (2002)	Blundell et al (2004)	Blundell et al (2000)	Dearden (2002)	Mean Marginal Return
5	Higher Degree	25.4	14.3	15.0	24.0-28.0	21.7	8.2	11.0-32.0	20.7	35.4	15.6	20.0	25.0-27.0	21.7	34.4	29.0-30.0	28.5
	First Degree (Undergraduate)		26.9				10.4				27.9				33.4		
4	Other HE	-	7.5	-	-		15.3		14.8	-	11.2	-	-		21.3		14.7
	HE Diploma		0.0								11.7						
3	2+ A Levels	33.6	16.6	20.0	15.0-17.0	5.7	-	17.0-18.0	17.1	37.0	14.8	15.0	14.0-16.0	5.7	-	19.0-20.0	19.1
	1 A Level		5.5								6.8						
	A/S Levels		0.0								0.0						
2	5+ GCSE A*-C	20.1	27.5	10.0	26.0-31.0	17.8	-	13.0-23.0	19.0	25.8	23.2	10.0	25.0-30.0	17.8	-	11.0-21.0	17.5
	1-4 GCSE A*-C		14.8								11.2						

Level	Qualification	Return for Men							Return for Women								
		Dearden (1999)	Sianesi (2003)	Walker et al (2003)	McIntosh (2002)	Blundell et al (2004)	Blundell et al (2000)	Dearden (2002)	Mean Marginal Return	Dearden (1999)	Sianesi (2003)	Walker et al (2003)	McIntosh (2002)	Blundell et al (2004)	Blundell et al (2000)	Dearden (2002)	Mean Marginal Return
	5+O levels	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-
1	GCSE D-F	15.0	0.0	-	-	-	-	15.0	11.2	0.0	-	-	-	-	-	-	11.2
	1-4 O levels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*These are marginal returns and are cumulative. By no means do the estimates claim to be comprehensive – they have been derived only for a broad level understanding and to facilitate discussions.

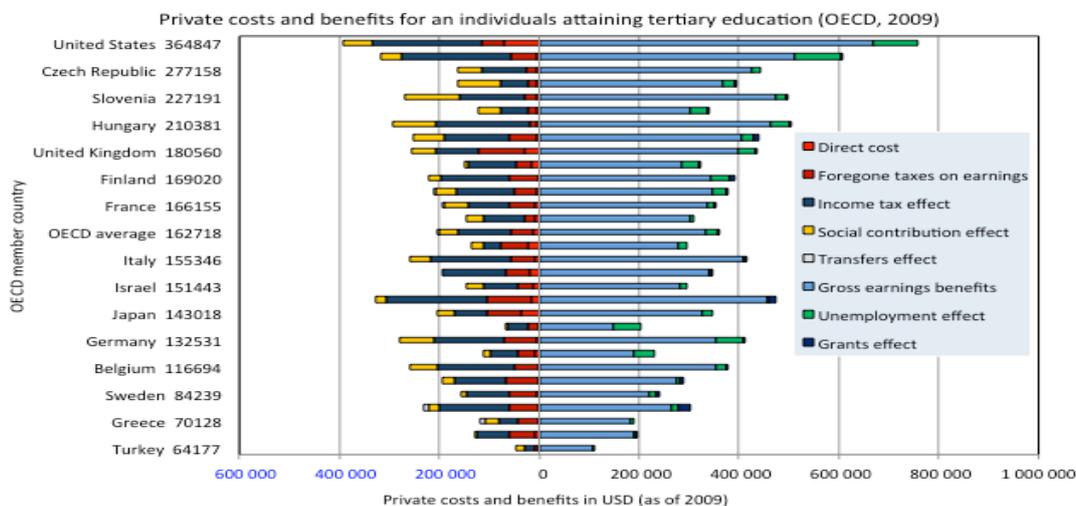
**The returns are high yet heterogeneous across levels and qualifications**

The papers that have been reviewed in Table 1 and which steered the initial discussions on the RoR from academic qualifications in the UK are dated between 1999-2003. Table 1 shows that men who complete five or more O levels (or equivalent qualifications in Level 2) receive an average return of around 19 per cent compared with individuals who complete no qualifications before leaving school at 16. The corresponding figure for women is 17.5 per cent. O-level qualifications would normally be completed by the age of 16. For those who continue schooling and complete an A-level school qualification (or equivalent qualifications in Level 3), the additional return is around 17 per cent for men and 19 per cent for women (compared with individuals with Level 2 qualifications), which is around 9-10 per cent per annum on an average.

**The wage returns (marginal and accrued) are highest for completed tertiary education**

The marginal return to a degree (first or higher degree or equivalent tertiary qualifications in Level 5) based on the reviewed papers has been found to be around 21 per cent for men and around 29 per cent for women (Table 1). OECD data also confirms substantial private returns to tertiary education (Figure 1). Individuals who are expected to attain higher degrees usually belong to better socio-economic backgrounds with stronger pre-qualifications, notwithstanding.

**Figure 1: Private costs and benefits for an individual attaining tertiary education (OECD, 2009)**



Source for Figure 1: Based on 2009 data, reported in OECD (2013)

In comparison, undertaking a Higher Education (HE) qualification or diploma (Level 4) yields lesser returns of about 15 per cent for both men and women, as per the reviewed papers. In this respect, Blundell, Dearden, Goodman, & Reed (2000) find that for men, starting HE but not completing it yields a negative return 9 per cent relative to those who did not start HE.

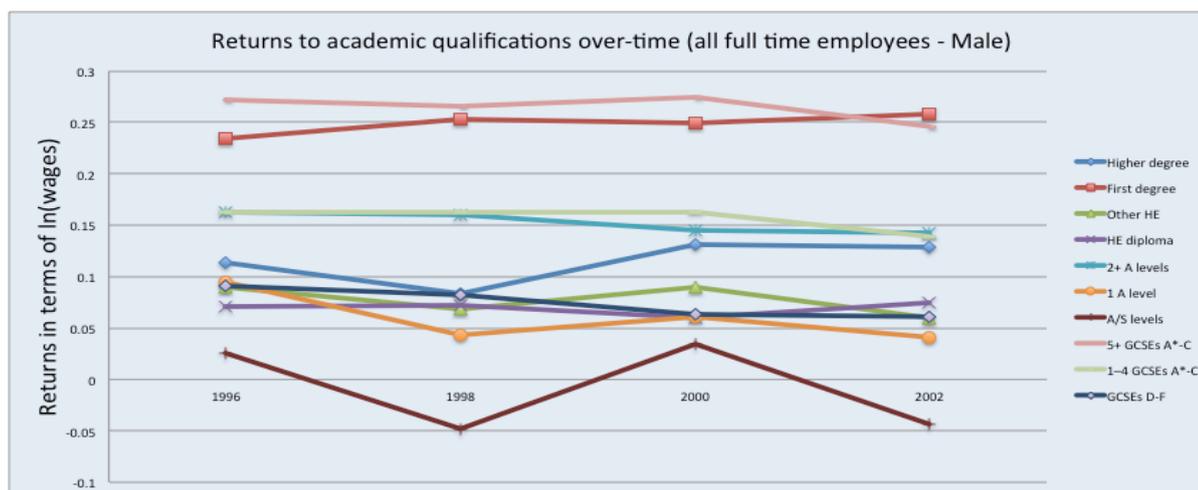
### Other findings on wage returns

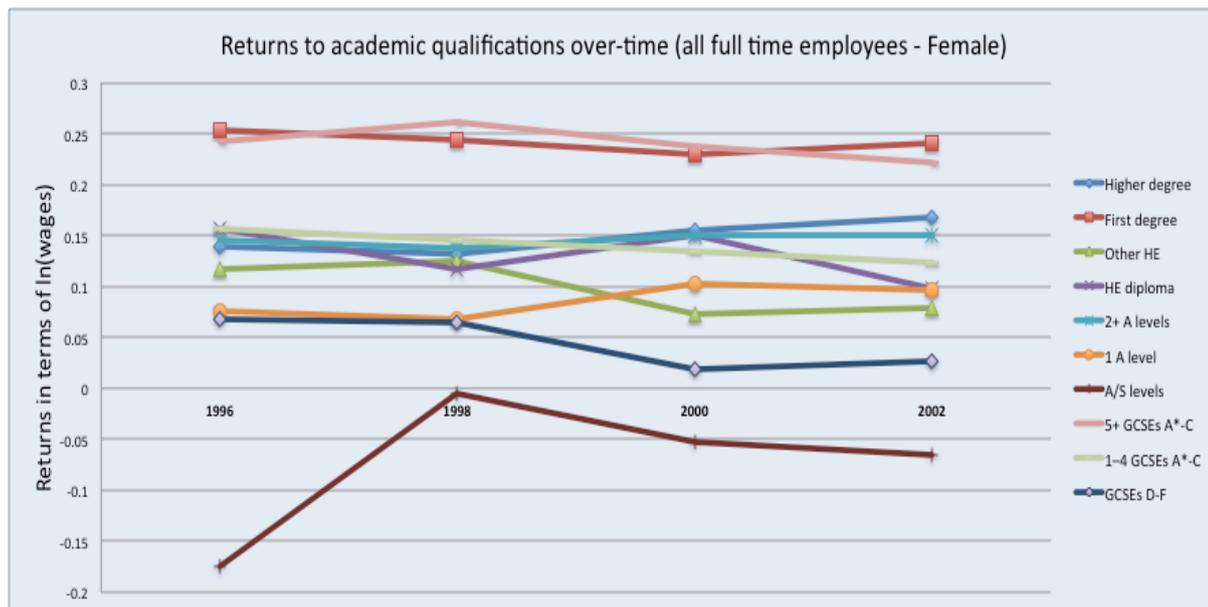
- The effect of qualification attainment can be particularly strong when this leads to an upgrading of education level (Dorsett et al., 2010).
- The average estimate of the gross rate of return or earnings premium is around 10 per cent per additional year of education (Walker & Zhu, 2003).
- In general, investments in women's education tend to yield overall higher rates of return than investments in men's education.
- Differences in wages and rates-of-return have been found for different subjects undertaken as a part of higher education. Subjects like Medicine, Economics, Law, Maths and Business, tend to deliver substantial premiums over typical graduates. However, other disciplines like Creative Arts delivers earnings, which are roughly typical of non-graduates (Britton, Dearden, Shephard, & Vignoles, 2016).

### High returns to academic qualifications remain reasonably stable over time

To make fully informed decisions about education participation, individuals need to know the extent to which the returns to a particular qualification are stable over time. McIntosh (2006) used the Labor Force Survey data and showed that a large growth in the numbers of UK residents (between 1996-2002) holding academic qualifications, did not have a dampening effect on their returns, with the returns to academic qualifications appearing the most stable (Figure 2 below).

**Figure 2: Stable returns to academic qualifications over time (Male and Female)**





Source for Figure 2: Based on data in Mcintosh (2006)

**However, wage differential between those with and without academic qualifications vary over the life course**

It is not enough to know whether returns are stable over time. For the individual, it is important to know how the wage premium for a particular qualification varies over their lifetime. Taking account of specific age-qualification profiles, Mcintosh (2006) finds that the wage differential between a graduate and a non-graduate rises steadily over a number of years after graduation, before reaching a plateau when individuals are aged in their mid-thirties and early forties<sup>4</sup>. This wage differential by age can be attributed to a combination of factors like the positive impact on wages of qualifications; a decline in human capital investment as individuals age; decline in physical or mental capacity and working hours as individuals become older, to name a few.

### 3.1.2 Other Economic Returns to Academic Qualifications

**There are significant employability/entry into work related returns to academic qualifications.**

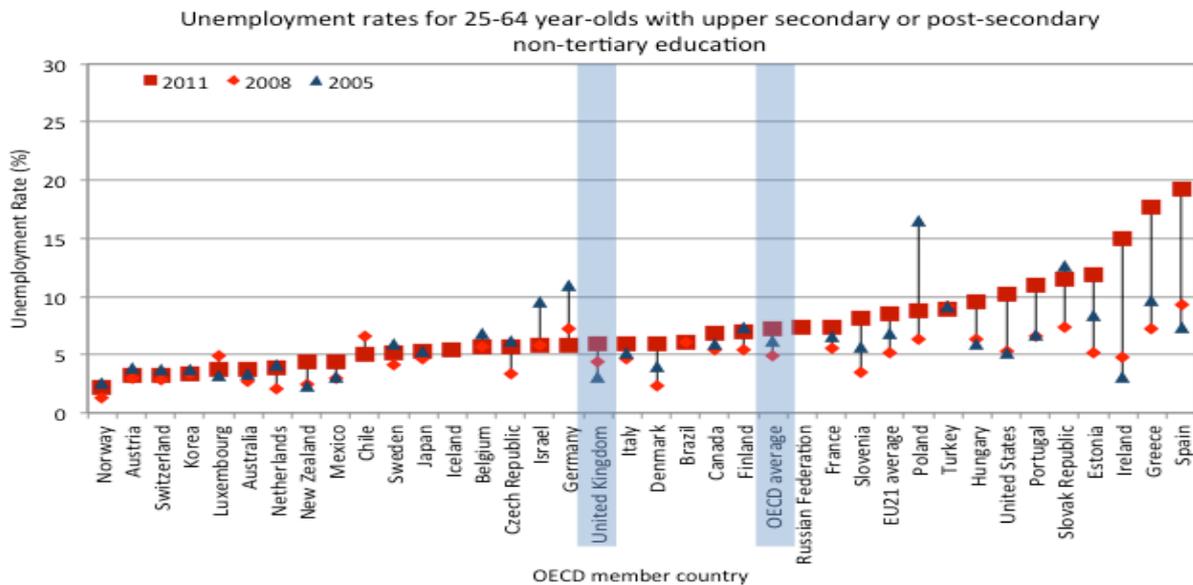
Higher academic qualifications (especially with respect to completing A levels and obtaining a degree) tend to be associated with more job choices and lower unemployment rates<sup>5</sup>. In comparison, individuals with upper secondary or post-secondary non-tertiary education have some insurance against weak labour markets (Figure 3). Adults with no upper secondary education tend to suffer

<sup>4</sup> For example, at age 23, the wage differential between a graduate who is in the first or second year of his career, and a non-graduate who has perhaps been working since age 16 or 18, is not too large. As individuals age, however, and acquire more work experience, the disadvantage to graduates of starting their careers later becomes proportionally less important, and the wage differential rises. Later in the forties, the wage differential remains constant (Mcintosh, 2006)

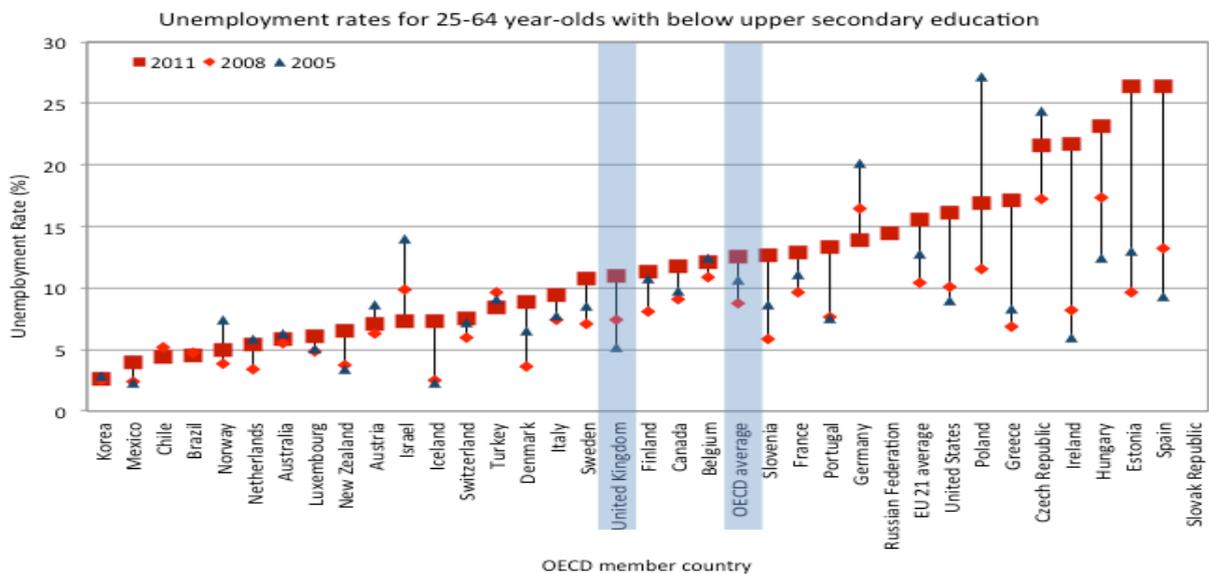
<sup>5</sup> Ofcourse, the correlation between socio-economic factors and attainment of better qualifications remains. Given the Heckman argument, it is likely that better economic status in childhood as well as parental education levels are important pre-cursors to employability and skill acquisition of the learners.

greatly in weak labour markets (Figure 4), though these findings indicate correlation rather than causality.

**Figure 3: Unemployment rates of 25-64 year olds with upper and post secondary non-tertiary education**



**Figure 4: Unemployment rates of 25-64 year olds with below upper secondary education (OECD, 2009)**



Source for Figure 3 and 4: OECD (2013)

### 3.1.3 Wage Returns to Vocational Qualifications

A review of papers that quantify the rate of return to vocational qualifications in the UK (summarised in Table 2 in Appendix) demonstrates that returns differ widely based on the level of learning, delivery format, qualification type, subject, age or gender. Moreover, a comparison of Table 1 and Table 2 shows that additional returns associated with academic qualifications, taking no account of the time taken to acquire such qualifications, are typically higher than those associated with vocational qualifications at the same level. When consideration is given to the time required to obtain

the various qualifications, the returns per year of study for vocational qualifications move closer on average to those accruing to academic qualifications, although the extent of the variation tends to remain higher in the vocational track.

While some studies such as Sianesi (2003) have found negative returns to Level 1 qualifications, others like Conlon & Patrignani (2013) have found positive returns when compared to individuals with no formal qualifications. Moreover, lower returns have been found to be associated with Level 1 and 2 NVQs in general, compared to the greater returns from NVQ Level 3 qualifications (Blanden, Buscha, Sturgis, & Urwin, 2010; Mcintosh, 2006). Overall the returns to low levels (i.e. Levels 1 and 2) of vocational qualifications are small compared to the returns to GCSE or other equivalent academic achievements (Conlon & Patrignani, 2011).

There is some contradictory evidence in this respect. While earlier survey based studies generally found low or minimal returns to low level vocational qualifications, more recent evidence based on administrative data is more positive. For example, recent research (Bibby, Buscha, Cerqua, Thomson, & Urwin, 2014; Buscha & Urwin, 2013) has estimated labour market returns to vocational learning, by comparing those who achieve their highest Further Education (FE) learning aim, relative to those who have the same highest learning aim, but do not achieve it. The latter usually dropout of the educational program. Buscha & Urwin (2013) have found good labour market returns across most learning undertaken within Further Education and have even obtained positive and significant estimates of the impact of learning at level 2, unlike previous studies. For instance, the authors find that achievers of Full Level 2 qualifications earn premiums as high as 14.9 per cent to 22.2 per cent in the 16 to 18 years age group. However, further evidence supporting these results is required to overcome the existing issues of measurement and selection bias so as to conclusively solve the debate on the efficiency, effectiveness and impact of low levels of vocational qualification.

Finally, the qualification yielding the highest returns for either males or females appears to be a professional qualification (43-49 per cent). The returns for women undertaking teaching qualifications (8-32 per cent) or nursing qualifications (15-18 per cent) also appear to be particularly high. It must be noted however that these high estimates seem to be driven by the large returns found by Sianesi (2003). As a caveat the author does acknowledge that the professional qualification group considered in her study was highly heterogeneous, making the 'average' return across the sample difficult to interpret.

To make fully informed decisions about education participation, individuals also need to know how the return varies over the lifetime. Mcintosh (2006) suggests that for vocational qualifications, returns remain fairly constant throughout a person's working life. Further, the author finds that individuals, who do not acquire any qualifications while at school, can receive positive returns to

vocational qualifications at Levels 2 and 3. These qualifications, however, tend to yield no benefit to individuals who achieve five or more good GCSEs or A levels at school.

### **A Note on Apprenticeships & On-Job Training**

Although positive wage returns have been found for Level 2 and specifically Level 3 vocational qualifications, the apprenticeship returns at these levels are greater (Lodovici, Comi, Origo, Patrizio, & Torchio, 2013). Conlon & Patrignani (2011) also show that compared to individuals in possession of Level 1 or 2 qualifications, both foundation level and recognised trade apprenticeships yield greater wage benefits. Furthermore, where employment is connected to the discipline of apprenticeship study, earnings premia are higher than for those working in unrelated sectors (Higton, Emmet, & Colahan, 2013). Apprenticeships with advanced level qualifications correspond to greater returns than for intermediate level courses (Buscha & Urwin, 2013; Higton et al., 2013).

The impacts of on-job training are more difficult to estimate. Conlon & Patrignani (2013) find significantly higher returns to the workplace and accredited work-related trainings. Beneficial returns to on-job training have also been found in terms of hourly earnings for women (Blanden et al., 2010). Specifically, Level 3 qualifications delivered through combined classroom and work-based training can deliver greater marginal returns than workplace learning alone (Conlon & Patrignani, 2011).

The reviewed evidence on wage returns to vocational qualifications and training also indicates:

- For most vocational qualifications, the estimated returns increase in size as we move up the wage distribution, at least until the very top end of the wage distribution is reached (McIntosh, 2016).
- A-levels and vocational equivalents at Level 3 are equally strong predictors of staying on in education up to the age of 18 and achieving a Level 3 qualification before the age of 20. However, most individuals pursuing Level 2 qualifications at age 17 do not progress any higher up the education qualification ladder (Hupkau, McNally, Ruiz-Valenzuela, & Ventura, 2016).
- The largest increase in earnings is associated with vocational qualifications in traditionally male-dominated sector subject areas like Engineering, Construction, Planning and the Built Environment or Gas and Power Industries. Subjects leading to service sector occupations, such as Teaching and Learning in the Classroom, Childcare or Art, Design and Media, Hospitality or Catering demonstrate lower returns (Bibby et al., 2014; Conlon & Patrignani, 2011, 2013; Higton et al., 2013; McIntosh & Morris, 2016).
- With respect to apprenticeships, individuals accessing intermediate or Level 2 apprenticeships are lower achieving on average, and those with advanced apprenticeships are likely to be higher achieving than the average. Students who take apprenticeships usually have a different profile

than those students who undertake A-levels and go to university. Apprenticeships may not always appeal to high achieving students (Hupkau et al., 2016).

### 3.1.4 Other Economic Returns to Vocational Qualifications

**There are positive employability/entry into work related returns to vocational qualifications.**

Vocational qualifications are potentially strong predictors of being employed (Conlon and Patrignani 2013; Dorsett et al 2010; 2011; CE and IER 2013; Devins et al 2011). More so for higher-level vocational qualifications particularly when it leads to upgrading of educational attainment. Rates vary by sector subject area and qualification type. Broadly, employment rates are higher for younger learners (16 – 25 years) (BIS, 2011). Women have higher employment rates than men. On the contrary, registering for lower level vocational qualifications may also signal, unobserved characteristics associated with less successful labour market outcomes which could explain the lack of employment returns found in some studies for low level vocational qualifications.

**Vocational qualifications potentially lead to in-work progressions.**

Vocational qualifications are usually associated with an increase in work promotions and job satisfaction. Across qualifications, there tends to be small to moderate returns (in terms of job promotions or new responsibilities) to lower level qualifications (level 1). Comparably there are greater returns to higher qualifications (level 3 and 4) or completed apprenticeships (Higton et al., 2013; Wiseman, Parry, Speckesser, & Gloster, 2013).

## 3.2 Economic Returns to Qualifications Acquired at Different Ages

**Completing schooling at the appropriate age yields significant long-term economic returns.**

Like gender, findings on returns to education with regards to the age of acquisition also demonstrate notable variation. With regards to academic qualifications, both men and women seem to experience about a 50 per cent wage increase (upon joining work) when they leave school at age 21 rather than at age 16 (Walker & Zhu, 2003). The proportion of 15-29-year-old women in the UK who are Neither Employed nor in Education or Training (NEET) is 19.1 per cent, which is much larger than that of young men of the same age i.e. 13.6 per cent. This gap is even greater among the subset of 25-29-year-old where data from OECD (2005) shows that 25 per cent of women of this age are NEET compared to 12% of men. The greater economic inactivity of women in their late twenties is particularly affected by life events and child rearing activities. Anyhow, a greater school dropout rate for women (especially in the age group of 16-21 years) puts them in a disadvantageous position concerning wage returns, early on.

**Disparate returns across vocational qualifications with mixed evidence on age-return profiles.**

### Wage gains:

With regards to vocational qualifications, the evidence seems to change as per the type of qualification. Considerable evidence suggests that there are higher returns for learners who invest in qualifications when they are young. However, some recent research validates that the benefits remain positive for adult learners as well. For example, female learners aged 40 have also been found to experience increased earnings following FE, whether or not it led to upgrading (Dorsett et al., 2010). In fact, the level of qualification achieved and the status of completion of the qualification play an important role in determining whether the impacts of education are significant or not.

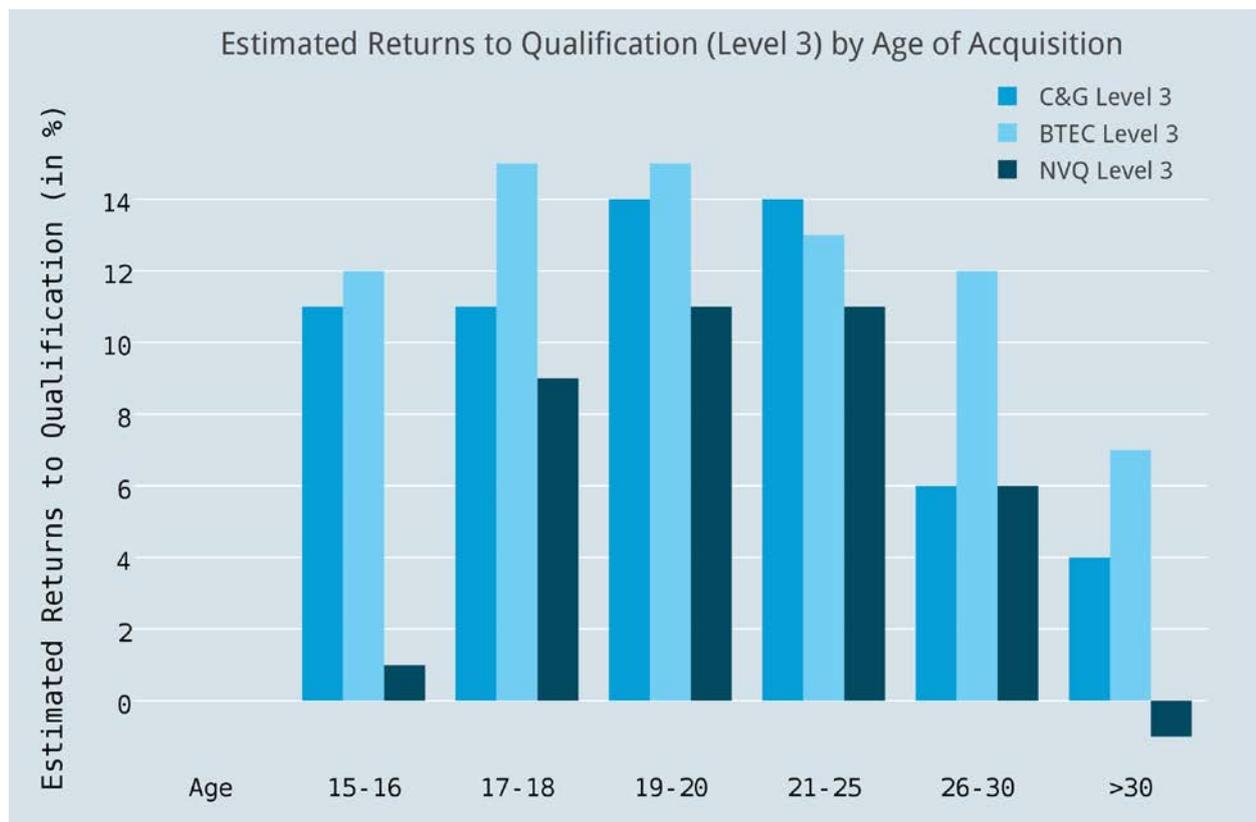
Buscha & Urwin (2013) find no consistent or over-arching pattern in premiums from Full Level 2, Level 2 and Below Level 2 qualifications. In fact, they acknowledge that the variations can be attributed to a lot more than just age per se. Buscha & Urwin (2013) show that for Full Level 2 qualifications, premiums for achievers in the 16 to 18 age group range from 14.9 per cent to 22.2 per cent while for the 19-24 age group the comparable figures are 14.2 per cent to 20.5 per cent. Although slightly lower, there are significant premiums associated with gaining a qualification after the age of 25 as well. For achievers aged 25 years or above, the premiums range from 10.3 per cent to 13 per cent. On the other hand, the earnings premia are lower but still positive for achievers aged 16-24 years, who complete the short cycle Level 2 or are below Level 2. Achievers amongst the one million to 1.5 million short cycle Level 2 learners aged 25 years or above in their study secure a negligible premium on average. The authors explain that this average potentially hides a significant amount of heterogeneity. Moreover, the returns from the Level 2 qualifications across most age groups also tend to erode over time.

For Level 3 qualifications (see Figure 5) Conlon & Patrignani (2011) show that the returns are higher for achievers aged below 25 years compared to those who are older. Even NVQs at Level 3 yield positive returns, and often similar in magnitude to BTECs and City and Guilds qualifications, below age 25. The returns from NVQs are negative on an average over the age of 30<sup>6</sup>. There is some contradictory evidence as well. A study conducted by London Economics & Ipsos MORI (2013) finds that individuals receiving lower earnings<sup>7</sup> are substantially more likely to be aged between 19 and 24 than aged over 40 when they undertake training. Late attainment could lead to more intense learning with lasting effects. However, there is not enough evidence thus far, to support this conjecture.

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<sup>6</sup> The flexibility allowed in the NVQ design for the qualification to be achieved by filling in gaps, is often considered to be a key reason, which leads to lower economic value. Younger learners are more likely to take up the full training. Incidentally, at present NVQs are mainly taken by older adults (41% of those attaining them between 2001 and 2009 were aged 30+), which may be one reason to explain low overall returns estimates on average for NVQs.

<sup>7</sup> The authors considered an income of less than £10,000 to classify low earnings.

**Figure 5: Estimated Returns to Qualifications (Level 3) by Age of Acquisition of Learning**

Source for Figure 5: Conlon & Patrignani (2011)

**Employment gains:** The evidence for vocational education acquired at different ages seems to be mixed in terms of employment gains. Given a large variety of factors influencing employment of individuals at different ages, it is difficult to estimate a causal relationship. The BIS (2014) report shows that while learners aged 19 to 24 and 25 to 49 are likely to have similar employment rates, those aged 50 and older have lower employment rates. Likewise, where Full Level 2 and 3 completers were found to have higher employment rates than Level 2 or 3 achievers, the latter cohort were on average five and ten years older (Bibby et al., 2014). Conlon & Patrignani (2011) also find that City and Guilds (C&G) qualifications hold greater benefits for younger learners. On the contrary, the employment effect of Level 2 and 3 NVQs has been found to increase with age. There is also a positive impact associated with NVQs at level 2, with a positive relationship between marginal employment probabilities and age (9.2 percentage points at age 21-25 increasing to 19.0 percentage points age 56-60). Young apprenticeship learners (in the 16 to 18 cohort) are also more than twice as likely to be unemployed than those aged 25 years and above (Higton et al., 2013)<sup>8</sup>.

<sup>8</sup> There is a very important role of cognitive factors like attitudes and motivations, which vary across age groups. One of the key arguments against looking at only the 'economic' returns to education is that it does not factor for such underlying latent influences. For example, Anderson et al (2011) found differences in attitudes of individuals, where older learners were less likely to feel that they would find work in the following six months of the study. Thus, while training can be useful to increase skills or productivity or for 'signalling', mind sets may not be affected leading to weaker outcomes for the more aged or less confident individuals.

### 3.3 Estimates of the Returns to Non-Formal & Informal Education

**Non-formal & informal education is becoming increasingly relevant.**

The increasing requirement for newer skills, the potential of the Internet, enhanced funding and a policy focus on lifelong learning has led to greater interest in the effectiveness of non-formal & informal education. Massive Open Online Courses (MOOCs) have taken scalability to the extreme, permeating through structures of non-formal and informal education (Holland & Tirthali, 2015). Green & McIntosh (2006) show that individuals undertaking non-formal or informal learning earn, on average, between 5 and 6 per cent higher wages than those who do not. The authors find that whether an individual receives non-certified learning or not is potentially more important for determining wages, compared to the duration of the learning period.

Further, non-formal learning initiatives that foster multiple literacies on financial, legal, social matters have attracted billions of dollars across the globe, both in real and opportunity costs (Fernandes, Lynch Jr, & Netemeyer, 2014). Amidst all of this, basic literacy and numeracy skills still continue to be valued in the labour market (Steven McIntosh & Vignoles, 2000). However, a review of recent studies corroborates that there remains a dearth of consolidated evidence on the economic impacts of non-formal or informal learning and the nature of skills utilisation in the workplace.

**Multiple literacy and numeracy skills play an important role, even in the job-market. The relevance is higher for the young people (16-25 years) in the UK**

*“As the demand for skills continues to shift towards more sophisticated tasks..those individuals with poor literacy and numeracy skills are more likely to find themselves at risk ...and countries with lower levels of skills risk losing in competitiveness as the world economy becomes more dependent on skills.” (OECD Skills Outlook, 2013)*

Young people (16-25 years) in England have particularly poor literacy and numeracy skills compared to other OECD countries (OECD Skills Outlook, 2013). Dropouts from formal education are high in this age group, and the leavers are more likely to come from low socio-economic backgrounds, with low literacy levels. Given the significant dropouts from the education system, any intervention that can enhance human capital is potentially useful, even if it is not qualifications driven. Moreover, skill levels that some young adults in England reach at the end of compulsory schooling are potentially insufficient for everyday life and work. This implies that there is a need for continuous improvement on these skills through further education, or when they enter the workplace.

McIntosh & Vignoles (2000) derive the link between basic skills and earnings using data from the National Child Development Study (NCDS) and International Adult Literacy Survey (IALS) both carried out in 1995. The authors estimate the wage returns to both literacy and numeracy. They find that literacy and numeracy have a strong association with individual's earnings. Even after

controlling for an individual's ability and family background, an additional standard deviation in literacy results in approximately 14 per cent higher earnings. Moreover, an additional standard deviation in numeracy results in 12 per cent higher earnings. Bibby et al. (2014) also note higher returns to maths and English certificates than from key skills, gained through other vocational qualifications.

In terms of multiple literacies, this review specifically looks at financial literacy - given its direct economic impacts on individual's savings. Literacy and skills for undertaking basic financial activities (like opening a bank account) and managing savings, debts or investments are critical. Miller, Reichelstein, Salas, & Zia (2014) conduct a meta-analysis of 188 papers to find that financial literacy training has a significant impact on savings, with studies reporting up to 29 per cent increase in personal savings. Specifically, in the UK, the Citizens Advice (CA) is a well-known programme for providing free consumer and legal advice with a particular focus on debt and building financial capability. Interestingly, a return on investment for every pound spent on CA services has been found to be over seven pounds in benefit to Scotland (The Fraser of Allander Institute, 2014). Within this, the Older Persons' Advice Project (OPAP) saw a return on investment of GBP 27.53 for every pound spent, in a one-year period. Finally, older CA clients in Glasgow have been found to be better off by at least GBP one million, as a result of advice (Citizens Advice Bureau, 2015).

#### **Skills Beget Skills: Returning to the Heckman argument for non-formal and informal learning**

Any non-formal learning (for basic literacy or multiple literacies) is deeply interlinked with the fundamental educational (academic or vocational) choices. Individuals with better educational qualifications generally report better literacy levels.

Reviewed studies have consistently stated that the acquired skills considerably depreciate over time (within a decade or so), which results in declining returns over time. Thus from an economic perspective, such learning is often considered as a complement to formal education rather than a substitute. Economic benefits from on-the-job or personal training investments usually include positive influence on occupational status and the likelihood of promotion. Also, workers trained by their employers are less likely to change or quit their jobs or to be made redundant.

#### **New and existing data needs to be collated and explored to measure the economic impacts of informal education**

As for measuring impacts of informal learning, endeavours are being taken in the US to measure access and penetration of online learning or MOOCs using Google Analytics. However, this research is still at a nascent stage, where researchers have started defining the desired outcomes to evaluate delivery mechanisms, whether one-to-one or at scale. Specifically for the UK, the Labour Force Survey supplemented by the Adult Education Surveys (AES), contain some questions to measure

non-formal and informal learning (Green & McIntosh, 2006). Such datasets can be explored to undertake further research to quantify the returns.

## 4. Returns to the Employer

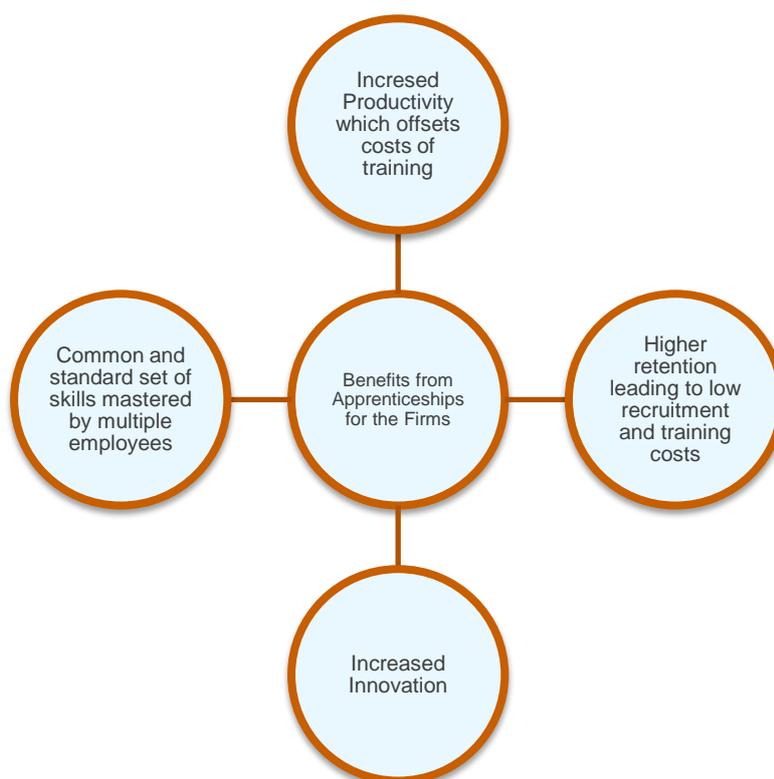
Firms benefit from the human capital amassed by their employees. Returns to employers could be in terms of becoming more profitable, productive or competitive in the long run. However, the evidence on the impact of education on employers in the UK remains limited and relatively dated.

### 4.1 Impact on Firm Profitability and Productivity

**Better occupational skills may lead to positive returns to employers**

The effects of apprenticeships and training on wages have been discussed earlier in this review. The effects are potentially large for employers as well. Lermen (2014) reviews studies across OECD countries and concludes from the empirical evidence available that apprenticeships, in particular, bring various benefits for the firms (Figure 6).

**Figure 6: Benefits of apprenticeships for the firms**



This conclusion is consistent with earlier work which suggested that increasing the proportion of workers trained in an industry by 5 percentage points (say from an average of 10 per cent to 15 per cent) is associated with a 4 per cent increase in the value added per worker and a 1.6 per cent increase

in wages (Dearden et al., 2000). The National Institute of Economic and Social Research (NIESR) take a number of UK manufacturing firms and match them with continental firms producing similar products to measure productivity directly (Mason & van Ark, 1994). In all of the examined sectors in the UK, lower levels of workforce skills were found to negatively affect labour productivity, the types of machinery chosen, the smooth running of machinery and the introduction of new technology. Carnevale, Smith and Strohl (2010) in the US context find that occupational competencies and employability skills such as communication, teamwork, allocating resources and problem solving are the most useful skills for employers.

Overall evidence suggests that previous on-the-job training increases firms' initial productivity but often has little lasting effect. Finally, individuals with higher ability, or higher educational attainment, who have undertaken training in a previous period (with their current or former employer) are significantly more likely to assimilate further human capital, contributing to firms' profitability and productivity.

### **Emerging research is trying to unravel the interlinkages between human capital investment and firms' productivity**

In the US, emerging literature is focusing on understanding returns on investments based on firm type (Busso, Neumayer, & Spector, 2015). The argument states that return on investment may vary with the size, maturity, industry, and other business needs. By making the size distribution of firms endogenous or using search-bargaining model, economists are also trying to determine the impact of labour market distortions on the returns to education for the firms (Bobba, Fabbi, & Levy, 2016). There is scope for much work in this direction in the UK as well. London Economics (2012) is one of the very few studies that have used data from the Train To Gain (TTG) programme to match information on government funded training to firm level data on productivity in the short run. The study found some evidence that the government funded training in small firms was associated with higher productivity, while the training was correlated with lower productivity on average, for larger firms. However further research is required to determine causality and to unravel the underlying mechanism of impact.

## ***5. Returns to the Economy***

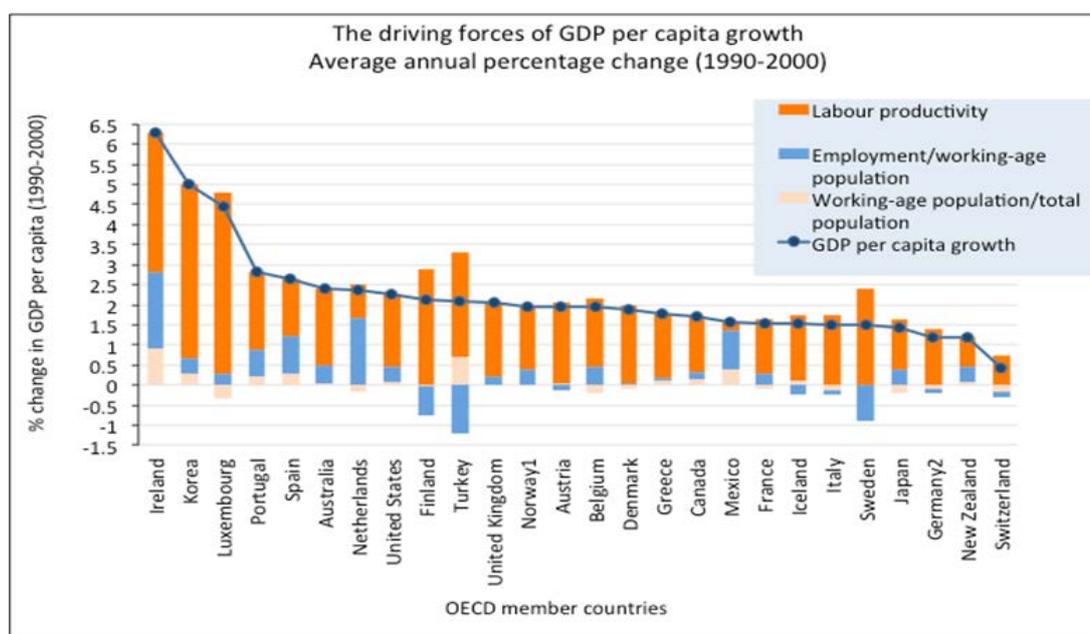
There are several wider benefits to education. More educated individuals usually report better health outcomes, greater civic participation, stronger social networks, to name a few. In this review, only the evidence focusing on the contribution of education to economic growth is reviewed and briefly discussed.

**Human capital investments are associated with higher Gross Domestic Product and lower inequality** Starting with Schultz in 1961 and Becker in 1964, many economists have studied education's role in rising incomes, including Heckman & Klenow (1997), Sianesi and Van Reenen (2003), Hanushek & Woessmann (2008) and Patrinos & Psacharopoulos (2013), to name a few. Overall, these studies confirm that additional years of education have a significant influence on Gross Domestic Product (GDP) per capita or its growth. There is a large variability in estimated impacts, depending on the model used for estimation, as well as the countries included in the analysis. Recent estimates are provided by Crespo Cuaresma, Lutz, & Sanderson (2012) and Patrinos & Psacharopoulos (2013) who suggest that each additional year of education is associated with an 18 per cent and 35 per cent higher GDP per capita, respectively. Also, Patrinos & Psacharopoulos (2013) have used data for 114 countries in the 1985–2005 period to show that one extra year of education is associated with a reduction of the Gini coefficient (a measure of inequality) by 1.4 percentage points.

**'Growth Models' show that education may enhance economic growth by increasing labour productivity**

A summary of the main findings of the growth accounting research concludes that the increased education levels of the labour force during the last 50 years has accounted for a significant proportion of the overall productivity growth in developed countries. Labour productivity is, in turn, a key contributor to the growth of Gross Domestic Product (GDP) per capita in OECD countries (Figure 7).

**Figure 7: The driving forces of GDP per capita growth.**



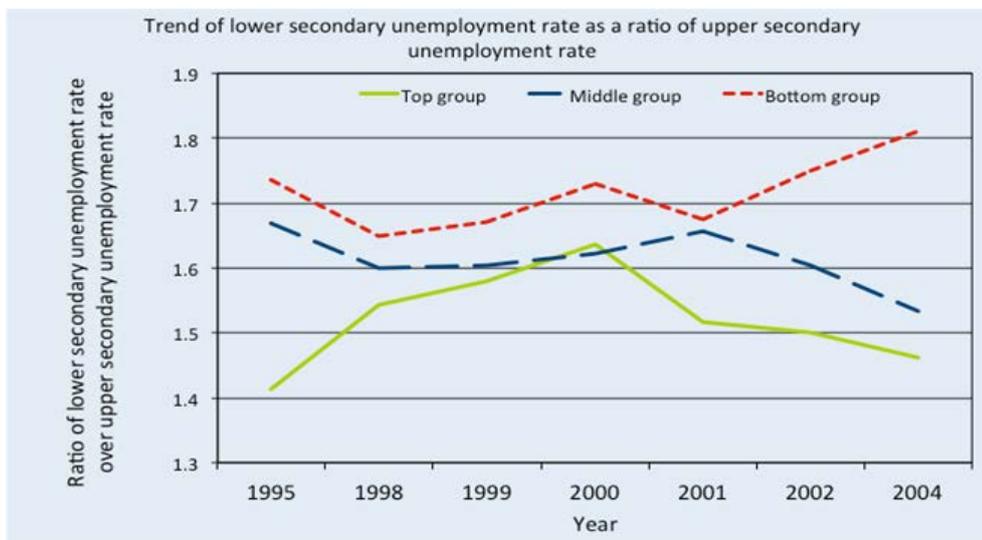
Source for Figure 7: OECD (2005)

**Investments in tertiary education seem most important for economic growth of OECD countries.**

Further, evidence from OECD countries also suggests that while primary and secondary education skills are related to growth in developing countries, tertiary education skills seem most important for

growth in developed nations. Unemployment rates tend to be lower in countries with bigger tertiary sectors. Figure 8 shows that in countries with a smaller tertiary sector investment (the bottom group) have a higher relative unemployment rate when compared to the top group (countries that made highest investments in tertiary education). The middle group includes the UK and seven other countries, which made modest increases in tertiary education.

**Figure 8: Trend of lower secondary employment rate as a ratio of upper secondary employment rate**



Source for Figure 8: OECD (2005)

### Highly educated and skilled workers can contribute to economic growth through research and innovation

Education and training may indirectly contribute to economic growth if it encourages investment in capital equipment and Research & Development (R&D). Higher academic and professional qualifications usually help in the adoption of new technology. There is a dual causality, as educated workers may lead to productivity augmenting technological change, which in turn can lead to higher employment of high skilled workers.

### Direct impacts of training and informal learning on economic growth, remains ambiguous

Finally, there is hardly any evidence gathered on the impact of training investments on economic growth. Evidence suggests that the aggregate measures that are used as a proxy for human capital in the growth regression models have not been able to capture participation in training and Further Education comprehensively.

## 6. Concluding Remarks

The key messages from this review are largely positive with regards to the value of education for learners, employers as well as the economy. Economic returns are highest and more long-term for those who achieve a Level 3 or higher formal qualifications. Greater value from a full qualification,

emphasizes the importance of the providers and employers informing the learners of the benefits of completing their whole course. The evidence also highlights the disparities in the returns across the various levels of qualifications and age. Given skills beget skills, a younger age for acquisition of learning may be more advantageous, even though returns for adult achievers are also fairly positive. Further research may explore these differences, to explain why they exist. Finally, the lifelong learning approach has become prominent in the education system and can help to address the problems raised by an ageing population in countries like the UK. This means that future research will also need to define and measure and robustly report (and in some cases generate consensus) on the economic impact of learning activities across further education, whether formal, non-formal or informal.

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## Appendix: Wage Returns to Vocational Qualifications

Table 2: Wage Returns to Vocational Qualifications

Level	Type of Qualification	Return for men								Return for women									
		Dearde n (1999)	Sianesi (2003)	Lodovi ci et al (2013)*	McInt osh (2002)	Greenwo od (2007)	Conlon et al (2011)	Wisem an et al (2013)	Conlon et al (2013)*	BIS (2011)	Dearden (1999)	Sianesi (2003)	Lodovici et al (2013)	McIntos h (2002)	Greenwoo d (2007)	Conlon et al (2011)	Wiseman et al (2013)	Conlon et al (2013)	BIS (2011)
5	Professional Qualifications	8.5	43.0	-	36.0-45.0	-	-	-	-	10.4	49.3	-	42-49	-	-	-	-	-	-
	NVQ 5		3.1								4.2								
4	Teaching Qualifications	8.5	7.7	-	5.0-8.0	-	-	7.5		10.4	29.3	-	27-32	-	-	7.5			
	Nursing Qualifications		8.8		6.0-14.0						17.8		15-18						
	RSA Higher		0.0								0.0								
	HND/HNC		14		13.0-15.0						9.3		7-9						
	NVQ 4		3.1								4.2								
3	RSA Higher	4.3	0.0	15.5		18.0	4.5	-	3.7	0.0	6.9	0.0	15.5	18.0	4.5	-	3.7	12.3	
	C&G advan. craft		4.5			19.0				11.6		0.0		19.0				0.0	
	BTEC					19.0				15.6				19.0					
	ONC/OND		10.1								5.4								
	NVQ 3		3.1			12.0				7.0		4.2		12.0				10.0	
	GNVQ/GSVQ (advanced)					7.0								7.0				2.0	
2	RSA Higher	0.01	0.0	6.0		17.0	-5.2	-	3.5	16.9	1.1	0.0	6	17.0	-5.2	-	3.5	19.0	
	C&G Craft		6.8			7.0				9.7		0.0		7.0				0.0	
	BTEC Diploma		14.8			14.0				8.0		11.2		14.0				5.5	
	NVQ 2		-8.5			2.0				-16.5		-6.4		2.0				-2.7	
	GNVQ/GSVQ (intermediate)		1.0			1.0								1.0					

Level	Type of Qualification	Return for men								Return for women									
		Dearde n (1999)	Sianesi (2003)	Lodovi ci et al (2013)*	McInt osh (2002)	Greenwo od (2007)	Conlon et al (2011)	Wisem an et al (2013)	Conlon et al (2013)*	BIS (2011)	Dearden (1999)	Sianesi (2003)	Lodovici et al (2013)	McIntos h (2002)	Greenwoo d (2007)	Conlon et al (2011)	Wiseman et al (2013)	Conlon et al (2013)	BIS (2011)
1	RSA Lower	0.01	-6.6	-			-6.2	7.2	3.25		1.1	0.0	-			-6.2	7.2	3.25	
	C&G Other		-3.8									-8.0							
	BTEC Diploma		0.0									0.0							
	NVQ 1		-6.7									-8.3							