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Discussion paper

Original citation:

Brennan, John, Durazzi, Niccolo and Séné, Tanguy (2013) *Things we know and don't know about the wider benefits of higher education: a review of the recent literature*. BIS Research Paper, URN BIS/13/1244. Department for Business, Innovation and Skills, London, UK.

Originally available from [Department for Business, Innovation and Skills](http://www.bis.gov.uk)

This version available at: <http://eprints.lse.ac.uk/55427/>

Available in LSE Research Online: January 2014

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RESEARCH

BIS RESEARCH PAPER NUMBER 133

Things we know and don't know about
the Wider Benefits of Higher
Education: A review of the recent
literature

OCTOBER 2013

This study was commissioned through LSE Consulting, a trademark of LSE Enterprise, the subsidiary of the London School of Economics and Political Science.

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BIS Research Paper Number 120

URN BIS/13/1244

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1 Introduction

This literature review starts from an awareness that besides the economic benefits of higher education at both the individual (e.g. “graduate premium” in the form of higher wages) and the aggregate level (e.g. contribution to economic growth), there is also a variety of wider benefits that do not relate *directly* to the economic sphere but which nevertheless may have significant impacts at the individual and societal levels. This point is made clear in Barr (2012):

“[...] [E]ducation outcomes comprise knowledge and skills *and* attitudes and values. Higher education therefore contributes both to national economic performance and to the promotion of core values, and thus has a significant cultural dimension” (Barr 2012: 300)

Reflecting the terms of reference for the literature review, the impacts which this review focuses on are primarily those concerned with the wider impacts of higher education upon students (i.e. ‘private non-monetary benefits to the individual and family’) and the impact that higher education has via students upon the wider society (‘how impacts on students can also affect others’). It needs to be acknowledged at the outset, however, that higher education institutions have impacts on the wider society through a whole range of functions and interactions. The impacts occur through a range of routes, reflecting higher education’s main functions of education, research and knowledge transfer.

While this report focuses mainly on the first of these, it is important to acknowledge this wider picture. The aim of this literature review is therefore to collect evidence from the academic and policy literature on the wider benefits to individuals and society which stem from higher education, mainly through its students and graduates but also through its functions of research and knowledge transfer.

Starting from McMahon’s categorisation of market benefits, private nonmarket benefits, and social benefits of higher education (McMahon 2004; 2010), we then attempt to systematise the wider benefits identified in the literature along two dimensions. The first dimension has to do with the *level* at which benefits are manifested, i.e. at the individual or societal level. The second dimension looks at the *type* of benefits, i.e. whether it is a market or nonmarket benefit¹.

The paper is structured as follows. First, we pose some preliminary questions and considerations that frame the paper. Second, we review the wider impacts that higher education has on students as identified in the recent literature (which is the main focus of this review). Third, we look at the broader impact that higher education has on society. Finally, we provide a systematisation of the main findings according to the two dimensions just introduced before drawing some conclusions highlighting some gaps that emerge from the review.

As already indicated, research evidence is unevenly distributed across higher education’s different functions and contexts. In some places we will note that the evidence gaps

¹ See McMahon (2010) for a monetary estimation of the *nonmarket* benefits of education.

appear to be much more substantial than the evidence itself and it may be the gaps that require more consideration than the evidence. The main focus, therefore, will be on the second of the above sections.

2 Preliminary considerations and questions to be posed

The review focuses on recent literature (published after 2003) and is mostly concerned with 'evidence-based' literature. However, it is important to recognise that evidence is not always presented in an entirely neutral manner.

There is a significant literature in this field which reflects the interests and values of particular groups and sectors of society and which is about promoting those interests and values. In such cases, evidence may be presented selectively and in ways representing the interests of the presenters. And as we shall note, evidence needs analysis and interpretation before safe conclusions and implications can be drawn. This requires awareness of context and of relevant theory in order to avoid the potential distortions which can arise from these interests. Even where there is evidence of impact, questions need to be asked about how the impact occurred, whether it is universal – applicable to all students irrespective of the nature of their higher education experience – or whether it differs according to what students study, where and when they study it, how they study and in what circumstances (part-time or full-time, stage in life course, alongside paid employment or domestic commitments, living at home or away at college, etc). The methodological issues posed by studies of the wider benefits of education are acknowledged in the BIS Economics Paper supporting the 2011 White Paper (BIS, 2011). Thus, as the present report's title implies, the focus is not only on what the literature shows us, but also on what the literature does *not* show us, with a view to identifying knowledge gaps and important issues that will need to be addressed by future research.

Higher education is conventionally assigned three main functions, namely those of (i) education (ii) research; and (iii) knowledge transfer. The main focus of this review is on the education function, where there is a significant body of recent research which has been focusing on the wider benefits of higher education to its students by examining aspects such as citizenship, civic engagement, health, and other factors, and comparing higher education graduates with other members of society in these respects. This literature is the focus of the next section of this report.

However, it is also recognised that wider benefits from higher education may also derive from the research and knowledge transfer functions. Indeed, the current emphasis on impact measures is a reflection of this. Although these impacts are not the main focus here, we have included some discussion of the wider benefits which accrue from these other higher education functions. Furthermore, it should be noted that while the focus of the review is on higher education, some of the studies analysed refer more broadly to education, not necessarily higher education.

Questions about the wider benefits and social and cultural impacts of higher education can be offered at different levels, from the universal (all students everywhere) to the national (UK students) to the local/institutional (different courses, different institutions, different study modes) to the individual (e.g. age, gender, race, class).

However, the available evidence does not always distinguish between the different levels and, in particular, aggregate data may hide important differences in impact and benefit. Equally, disaggregation may be informative in policy terms, for example – if the impact of higher education in Spain is significantly different from that of higher education in the UK, this information might tell us some very interesting things about the respective countries and their higher education systems. Thus, while the literature review draws on literature from both national and international sources, there will be different traditions and circumstances underlying them in different places.

As well as questions of level and disaggregation, there are also important questions about process and causality. Ideally we need to distinguish between

- Intended and unintended impacts
- Direct and indirect impacts
- Impact on whom (including the possibility of 'winners' and 'losers')

In the absence of answers to these kinds of question, the policy significance of the available evidence on benefits and impact is likely to be limited and quite possibly misleading. Thus, in reviewing the available research evidence on the wider benefits of higher education, we will need to consider how far it really provides us with a full understanding of the social and educational processes which are generating these benefits.

3 The wider benefits of higher education to students

This section summarises the main findings of the literature review. Over 50 publications were reviewed. Annex 1 contains a brief methodological note which outlines how the search has been carried out and how the publications have then been appraised. A detailed overview of each publication, including a brief assessment of the robustness of the methodology, is in turn provided in Annex 2. Additionally, a dozen existing datasets of relevant empirical material were also reviewed and an overview of these is provided in Annex 3.

While much of the literature focuses on the significance of gaining a higher education qualification for progression in the labour market and for the resultant effects on lifestyle and aspirations, there is also a significant body of literature which provides evidence of significant differences between higher education graduates and other members of society on a range of other dimensions. The most frequently cited ones appear to be citizenship, civic engagement, crime, health and general well-being. We consider each of them in turn below.

3.1 Citizenship

The impact of higher education on citizenship is documented in a fairly extensive way in the relevant literature published after 2003. The link between higher education and citizenship is usually expressed in terms of attitudes towards voting. Closely related to – and often treated together with – the issue of citizenship is that of civic engagement. The latter takes more the form of attitudes and values and as such will be treated in closer detail in the next section.

Findings that can be strictly catalogued under the citizenship heading show a positive correlation between the amount of higher education received and the propensity to vote. A study conducted by the OECD (2012) shows that a significant gap – as much as 14.8% – in voting rates in OECD countries exists between adults (25 – 64 year olds) with high and low levels of education². If the cohort examined is limited to younger adults (25 – 34 year olds) the gap widens to 26.8%. This pattern is broadly confirmed in Milligana et al. (2004) who conducted a regression analysis on voting turnout predicted by educational attainment. Their study focused on the US and the UK and it found a robust and stronger relationship between education and voting turnout in the US than existed in the UK. Borgonovi and Miyamoto (2010) also find that the association between higher education qualifications and political engagement (in terms of voting turnout) is found to be stronger in the US than in Europe. This finding for the US is confirmed further in Dee (2004) who identifies a significant increase in voting participation among those who attend college, by 17 – 22%.

² The OECD Education at a Glance report defines a high level of education as “tertiary education attainment and low education as “below upper secondary education” attainment” (OECD, 2012: 204).

An interesting variation on the theme in this respect is offered in Tenn (2007) who, although with some possible methodological limitations pointed out in Annex 2, challenges the civic education theory, i.e. that the idea of the likelihood to vote increases with additional education. In his study focused on US students “aged 18–24 with at least 11 years of education” (Tenn 2007: 453), it is found that the key factor that determines an individual’s propensity to vote is “being a student”, but that an additional year of school has little impact on voter turnout and voter registration. He therefore puts at the centre of the analysis the environment (i.e. having been in higher education) as opposed to the amount of education received (i.e. how many years of schooling).

More generally, we may note here quite a range of questions of causality which appear not to have been addressed by this literature. Most importantly is the question of whether the higher education experience is itself the determinant of voting propensity or whether both the higher education experience and voting behaviour are influenced more by antecedent variables such as social and educational background. Other ‘gaps’ concern the process itself and raise questions of what factors in the student experience affect voting – what the student is studying (so are political science students more likely to vote than chemistry students?), their engagement with the wider student life, whether they are working alongside study, their age at the time of study, and so on.

3.2 Civic engagement

The notion of civic engagement is often analysed in the literature together with that of citizenship. As with citizenship, there is a strong consensus on the positive impact that higher education has on civic engagement, interpreted here as an encompassing concept entailing a number of values and attitudes such as propensity to volunteer, participation in public debates, mutual trust and tolerance towards ‘the other’, etc. A starting point from which to discuss the impact of higher education on civic engagement is a theory-based article by Calhoun (2006) that examines the role of the university in providing public goods to society at large. Universities are seen as key institutions that develop and strengthen civic engagement along several dimensions, including the distribution of knowledge, a sense of criticality in the public and professional spheres, and participation in public debates.

Calhoun’s conceptual and historical analysis is confirmed by many empirical pieces of work that provide a quantitative estimate of the impact of higher education on civic engagement. Borgonovi and Miyamoto (2010) and Borgonovi (2012) look at the impact of higher education on levels of trust and tolerance. Based respectively on OECD countries and a set of 21 European countries, the findings point strongly towards better educated people being more trusting and tolerant. It is interesting however to look more in detail into the marginal effect of different types of education, as shown in Table 1, where it emerges that the marginal effect of higher education changes vis-à-vis the marginal effect of lower to upper secondary education across different citizenship dimensions.

Table 1: Estimation of the marginal effect of each additional year of education in Europe on various citizenship dimensions:

Dimension	Marginal effect of higher education	Marginal effect of lower to upper secondary education
Volunteering	8%	3%
Civic participation	11%	13%
Voting	3%	5%
Political interest	15%	12%
Party membership	2%	1.5%
Interpersonal trust	17%	13.5%
Type of immigration ³	36%	15%
Positive valuation of immigration	41%	18%

Source: based on Borgonovi and Miyamoto (2010)

As shown in the table, while there is a positive correlation with higher education across all the citizenship dimensions analysed, it is along the attitude towards immigration that higher education shows the largest marginal effect. This finding is confirmed also in Borgonovi (2012) where it emerges that better educated individuals are generally more trusting and are more tolerant towards migrants than the poorly educated.

A potential interpretation of these associations is provided in a OECD (2010: 74-76) study, based on psychological studies, which found that one's beliefs and values about how a society functions are largely formed between 18 and 25 years of age. Moreover, propensity to tolerance may be favoured by the experience of interactions with foreign-born people, which is favoured by the higher education environment.

Moving from cross-country analyses to country-specific studies, Ogg (2006) finds confirmation in the UK of the patterns outlined above. His study, based on the British Social Attitudes (BSA) survey, concludes that higher education graduates are more likely than people with lower educational qualifications to be interested in politics and to think that their participation is worthwhile. They are also more likely to support more active forms of political engagement (e.g. demonstrations). They tend to show more confidence in the functioning of the welfare state and they are more positive towards immigration. Ogg's methodology is interesting in the attempt at identifying a 'social fracture' in individuals' attitudes by using the BSA and grouping individuals according to three education groups (i.e. graduates, those with qualifications above GCSE but below degree

³ The extent to which respondents welcome the arrival of different types of immigrants in their country.

level and those with only GSCEs or no qualification). A potential shortcoming, however, is the lack of a perspective over time that would identify the evolution of individuals' attitudes according to their educational background.

An interesting angle on the positive correlation between higher education and civic engagement is presented by Green et al. (2003) and Preston and Green (2003). Both articles are concerned with the distinction between micro- and macro- level social effects. The question posed is whether the correlation at the individual level can be transferred to the societal level. Interestingly, their findings show that individual-level correlation between education levels and social capital indicators do not hold when using aggregated data. This mismatch between micro- and macro- levels may be due to the fact "that education effects may well be greatly outweighed by more powerful institutional and cultural factors at the national level" (Green et al. 2003: 28).

The question of how the impact of higher education on civic engagement translates from the individual to the collective level seems to be an interesting and relatively under-investigated one and – as highlighted in Preston and Green – an issue with great policy relevance:

"[...] there are clear lessons for policy makers, in particular that raising educational, skills and training levels is neither a necessary nor sufficient condition of promoting macro-social benefits. However, improving the distribution of educational outcomes may be one way in which education and training can make some contribution to more general economic and social redistribution" (Preston and Green 2003: 44).

3.3 Crime

Several articles focusing specifically on the UK find a positive correlation between education attainment and lower crime rates. These findings tend to be accompanied by a call for the deployment of educational policies and human capital enhancement as a potentially important tool to accompany policies directly targeted at crime prevention, suggesting that there is a potentially untapped potential for increased policy coordination between educational policies and policies aimed more directly at crime reduction.

Feinstein and Sabates (2005) analyse through difference-in-difference estimation techniques the effects of the Educational Maintenance Allowances (EMA) programme, a government programme aimed to increase participation in post-compulsory education. The number of burglary convictions by males aged 16 to 18 in areas piloted by EMA fell significantly more than in other areas (controlling for the fact that areas where EMA was introduced had average higher crime rates). Similarly, Machin et al. (2010) find that criminal activity is negatively associated with higher levels of education, quantifying the social benefit resulting from crime reduction that would follow from a 1% reduction in the percentage of individuals with no education qualifications. The potential for higher education to produce a significant social benefit by reducing crime is also found in Feinstein et al. (2008) who show how, among other effects, graduates are on the whole the least likely to commit crimes.

A more fine-grained analysis (in terms of the type of crime that higher education has a stronger impact on) is presented in Sabates (2008). It is found that the increase in

educational attainment between cohorts is associated with reductions (at decreasing rates) in conviction rates for most offences (burglary, theft, criminal damage and drug-related offences) but not for violent crime. The average increase in educational attainment between cohorts is associated with 0.106% drop in *average* conviction rate, but while the decrease occurs for most offences (burglary, theft, criminal damage and drug-related offences) but violent crime conviction rate is not affected.⁴

Once again, a lot of questions of causality remain. Are the differences caused by the experience of higher education or are both factors (crime and education) a function of other factors, such as social background? And if the differences remain, are they caused by educational experiences while at university or by the fact that graduates are less likely to be unemployed or experience poverty after they leave higher education?

3.4 Health

Health is an area where there has been a significant body of research literature on the wider impact of higher education in recent years. Miyamoto and Chevalier (2010) find a general positive correlation between education and health across OECD countries. In their work, it was found that 25 year-olds with tertiary education are expected to live longer than those without. They also find a potentially important effect of tertiary education on obesity (though no effects were found on obesity in Germany for women and in the Netherlands).

Other studies look more specifically into particular aspects of health. In this respect Cutler et al. (2010) find, among others, that better educated people in the US and UK are less likely to smoke, less likely to be obese and less likely to be heavy drinkers. Other studies come to similar conclusions. In Kuntsche et al. (2004), an analysis of European countries surveyed by the European School Survey Project on Alcohol shows a strong association between low levels of education and heavy drinking. Further impacts of higher education on health point towards lower mortality from strokes among higher educated individuals (Mackenback 2006) and lower probability of smoking, with one year of college reducing on average smoking prevalence by 4% and increasing the probability of smoking cessation by 4.1% (de Walque 2004). Smoking behaviours also have an impact on parenting, as outlined in Currie and Moretti (2003) where it is found that in the US an additional year of education reduces the incidence of low birth weight by approximately 10%, explained by the way education influences maternal behaviours (e.g. reducing smoking). On the other hand, Feinstein and Sabates (2006) find that the effect of an extra year of education on mothers' educational attitudes and behaviour is mainly a socio-economic selection effect (i.e. parents from better-off background are more likely to engage in non-compulsory education but is also associated with specific parenting attitudes).

In an OECD report, (OECD, 2007), it was found that more years of education were substantially associated with better health, well-being and health behaviours. Further, Devaux et al. (2011) found a broadly linear relationship between the number of years spent in full-time education and the probability of obesity, with most educated individuals showing lower rates of this condition.

⁴ The average increase in educational attainment between cohorts is associated with 0.004% drop in convictions for burglary, 0.059% drop in convictions for theft, and 0.004% drop in cases of vandalism and drug-related convictions (Sabates 2008).

An additional stream of literature takes the approach of looking at the likelihood of higher educated individuals accessing preventive care. Fletcher and Frisvold (2009) find that attending college is associated with a 5 – 15% increase in the likelihood of using several types of preventive care. Feinstein and Sabates (2004) find that educational attainment is positively associated with the uptake of cervical screening, while Baum et al. (2010) find that individuals with higher levels of education are more likely to undertake leisure-time exercise in the US⁵.

A further noteworthy point is that of policy complementarities. As has been already noted with respect to crime, higher education may display significant policy complementarities with other social policy areas. It is proposed in Furnee et al. (2008) and Chevalier and Feinstein (2006) that a more integrated approach between higher education and health policies should be pursued, considering the large spill-over effects between education and health.

Several of the studies mentioned, however, are confronted with the challenge of establishing clear causal links, which is often recognised by the authors themselves (e.g. Cutler et al. 2010). A systematic review of the methodological challenges that confront each article is provided in Annex 1. These challenges can be broadly categorised into two groups: (i) the challenge of assessing a clear direction of causality and (ii) the challenge of controlling for contextual and cultural factors.

3.5 Well-being

Some recent studies have been undertaken on the impact of higher education on well-being in the UK, such as the panel analysis conducted by Mandemakers and Monded (2010) on two waves of the 1958 British National Child Development programme. The findings, made robust by a number of controls included in the analysis, show that individuals with a degree (or higher) appear to cope better with distress, with the effects of distress being on average 75% smaller than among individuals without higher education qualifications⁶.

Morris (2011) conducted a qualitative research specifically focussing on doctoral students (by conducting interviews for two years) and he found that the length of doctoral studies could impact negatively on students' emotional behaviours and self-esteem, with effects on their well-being (e.g. lack of sleep, poor nutrition). However the qualitative nature of the study limits its generalisability.

⁵ As an example, it is found that “[a]mong young adults between the ages of 25 and 34, 63% of four-year college graduates reported exercising vigorously at least once a week before being surveyed in 2008, and another 18% reported light or moderate exercise. Among high school graduates in this age range, 37% reported vigorous exercise and 17% reported light or moderate exercise” (Baum et al. 2010: 28).

⁶ The analysis uses panel data analysis, based on two waves of the 1958 British National Child Development Study. In total 423 respondents (4.6%) experienced the onset of a physical disability between the ages of 23 and 33 (i.e. age for which the effect of higher education is tested). The authors add a number of controls for factors that can shape the impact of disability on well-being (e.g. gender, having a partner, father's occupational class, pre-existing self-perceived health).

Box 1. What we know and don't know about the wider benefits of the education function of higher education

In summary, we can note that

- Clear correlations exist between the amount of education a person has received and their propensity to vote, to be civically engaged, to be in good health and well-being, and not to commit crime
- The correlations seem to hold up across most developed countries although their strength does differ to some extent between countries
- However, evidence on 'why' these relationships exist seems quite limited, with a failure to explore whether it is the educational experience itself that is the causal factor or whether there are other factors at work which are affecting these relationships
- It should also be noted that much of the literature does not explicitly refer to higher education, rather using measures of 'years of education' without any explicit reference to the level of education
- The research literature also seems to take little account of the growing diversity and differentiation of higher education in that it fails to explore whether the relationships hold irrespective of what is studied, the kind of institution attended, the mode of study, whether living at home or away, school-leaver or mature student, social background, whether in part-time work and a host of other factors which differentiate today's student populations
- Where relevant datasets exist, a greater use of multivariate analysis techniques might go some way to filling some of these gaps in our understanding

3.6 The effects of the student experience

One way of attempting to fill these gaps in our understanding of the impacts of higher education on students is to listen to the views of students themselves. In this section, we look at one recent ESRC study⁷ into the 'social and organisational mediation of university learning' (the 'SOMUL' project) which gathered both qualitative and quantitative data from students in 15 UK universities. Then we summarise some of the conclusions drawn from a

⁷ The project was part of the ESRC's Teaching and Learning Research Programme (TLRP). A book based on the project was published in 2010, (Brennan et al, 2010)

major American review of the research literature on the effects of higher education on students in the US.

While much of the SOMUL study examined the experiences of being at university, a major focus was on identifying changes in students. This was done by following up the same students over a number of years during their undergraduate degree courses. Asking final year students and recent graduates what important changes they perceived, the things that were stressed the most were: 'the ability to get on with a much wider range of people', 'greater self-confidence' and 'new lasting friendships'. Though also important, deciding on future career paths and commitment to the subject of study were emphasised much less. There were some differences between students according to what they had been studying (with bioscience students among the most committed to their subjects) but on the whole the patterns held for most students. There were rather larger differences by type of university, with students living at home and effectively studying part-time reporting much less change than other students. Students living away from home at more traditional residential universities reported very high degrees of loyalty to and identity with their university. The study concludes:

"What is clear is that for a majority of students, the experience of university is associated with the achievement of greater self-confidence, independence, communication skills, understanding of other people and maturity. Some students, particularly older ones, have already achieved many of these things well before they have ever entered university. But such traits are in any case multi-dimensional. The self-confidence that comes from travel and living away from home is something different from the self-confidence that comes from getting good grades and a university degree." (Brennan et al, 2010, p155 - 156)

What the literature on student experience of higher education demonstrates is its multi-faceted nature and its multi-faceted impact. The US literature on the impact of higher education is a rich one, especially in respect of the impact upon students. And for several decades now, the student impact literature has been the subject of periodic major reviews by eminent scholars, most recently in 2005 (Pascarella and Terenzini, 2005). The authors reviewed nearly 2,500 studies published in the previous decade of the impact of higher education on students, covering the cognitive, psychosocial, attitudinal, moral, employment and quality of life dimensions. As well as covering a wide range of impact measures, the authors explore differences according to subjects studied, institutions attended, racial and gender composition of students and academic environments and they also distinguish between short-term and long-term impacts. It is not possible to do justice to the richness of data and analysis presented in this work but it is worth recording some general conclusions. In the words of the authors,

"...this synthesis indicates that postsecondary education has a broad range of enduring impacts. Attending college influences not only occupation and earnings but also cognitive, moral and psychosocial characteristics as well as values and attitudes and various indices of the quality of life. Evidence also suggests that postsecondary education's influences extend beyond the individuals who attend college to the nature of their children's lives." (Pascarella and Terenzini, 2005, p582)

The authors go on describe how the long-term impact is manifested, emphasising two main ways. The first are impacts which can be traced directly to college attendance or degree attainment. The second are more indirect impacts “through socioeconomic positioning and the interests, experiences, and opportunities made more likely by being a college graduate” (ibid). The review also examines the features of the student experience, both within and beyond the classroom, which contribute to the long-term changes that occur.

The authors provide a useful summary of the areas of net change that can be attributed to exposure to higher education. The list is an extensive one and covers five broad dimensions. The dimensions are interconnected with academic and cognitive changes generating further social and quality of life changes in the lives of students as well impacting on employment opportunities. Table 2 lists the main areas of change reported by Pascarella and Terenzini. (For further information see Annex 4)

Table 2: Net changes attributable to higher education		
Academic and cognitive	Attitudes and values	Quality of Life
Verbal skills	Civic and community engagement	Future time orientation
Quantitative skills	Racial understanding	Health
Content knowledge in various fields	Openness to diversity	Longevity
Critical thinking	Support for gender equality	Attention to child care and development
Reflective judgement		Efficient consumer choices
Principled moral reasoning		Personal savings
Psychosocial	Career and economic	Long-term investments
Academic self-concept	Employment	Discretionary resources and time spent on developmentally enriching activities
Social self-concept	Occupational status	Subjective well-being
Self-esteem	Earnings	Disposition to lifelong learning
Independence	Discretionary income	
Sense of control over one's life	Job satisfaction	
Interpersonal skills	Return on personal investment in education (private rate of return)	
Leadership skills	Employment stability	
	Job search abilities and skills	
	Career mobility	
	Socioeconomic positioning	

Source: Based on table 12.1 *Areas of net change attributable to college exposure*, p629, op cit

It is also noted that these outcomes are interconnected and the product of multiple influences, each making distinct contributions to the changes. In commenting on their table, the authors make some interesting points about the interconnections between different impacts:

“The clusters of changes listed (in the table), moreover, are *clearly* not restricted to a few dimensions of students’ lives. Rather, they suggest that people who go to college, compared with those who do not, learn better, know more, earn more. College adds value to their lives, enhances their self-esteem, and increases their understanding of others and their engagement with their communities. The college-educated are also more disposed to learning as a lifelong activity and tend to lead longer and healthier lives.

In addition, the evidence strongly suggests that these outcomes are interdependent, that learning is holistic rather than segmented, and that *multiple forces* operate in *multiple settings* to shape student learning and change in ways that cross the “cognitive-affective” divide.” (ibid, p628)

The holistic and interconnected nature of the impacts of higher education means that there is an interactive effect of different variables. For example, the domestic and working lives of some students may affect ‘what is learned’ from their studies in academic, attitudinal and career terms. This is just one example of the importance of recognising the increasing diversity of higher education, both in its student body and its institutional forms. Pascarella and Terenzini call for greater research into the effects of these diversities, pointing out that

“growing evidence that diversity in the faculty and student body is a potentially powerful force in shaping important cognitive and non-cognitive outcomes.” (ibid, p631)

Within mass systems of higher education, it is inevitable that diversities of students and institutions are accompanied by diversities of outcomes. Differences may be both positive and negative, but there is currently only limited evidence about them.

4 The wider benefits to society as a whole

The benefits from higher education are not limited to people who are or have been students. While this proposition is generally accepted in relation to the economy, it has been much less examined in terms of broader social and cultural impacts. Some of these impacts derive from the influences of graduates themselves, but they also derive from the other functions of universities and from the total institutional impact and image.

Below we briefly consider the social and cultural impacts of higher education on society in respect of the main functions of higher education.

4.1 The education function: the societal impact of students

It would be generally accepted that a local student population impacts upon consumption patterns in a town or sub-region. This has recently been studied as part of an ESRC project on the regional impact of universities⁸. Thus, services and products become available to all within an area as part of the process of meeting the demands from students – whether for theatre and music, food and drink, or sport and recreation. This can mean more choices for local residents, or fewer in cases where students ‘take over’ local facilities and services (as instanced by excess demand for accommodation in some university towns).

Students can also change the population mix of an area, often bringing greater diversity and multiculturalism. There may also be citizenship effects, whether through graduates acting as school governors or student protests in the streets! As with other areas of local impact, these may be welcomed by some local people and resented by others.

Another effect can come from the image of having a university in a town. It can make it seem a more attractive place for people to come to live in or for business to invest in. It can also have an effect on young people in the area by providing a possible model for their own aspirations and futures which would be otherwise invisible to young people from some backgrounds. (Cochrane and Williams, 2010, Brennan et al, 2013 forthcoming)

We might note in passing some considerable geographical differences in these kinds of impacts. In countries such as the UK, where it has been traditional for students to ‘go away’ to study, the impacts may be greater than in places where students tend to stay at home and study locally, as in much of the rest of Europe. In the US, the tradition of ‘service learning’, popular in institutions in the liberal arts tradition, leads to student engagement with social problems and disadvantaged groups with potential significant benefits in terms of social cohesion as well as student learning (Prentice and Robinson, 2010, Zlotkowski et al, 2006).

8. The Higher Education and Regional Transformation (HEART) project. A book on the project, Brennan et al (forthcoming), will shortly be published.

The other side of this is that higher education as an opportunity for mobility away from 'home' can also act to deprive areas of some of their most talented individuals, with higher education providing an 'exit strategy' for some to the detriment of the lives of those who remain.

A potential major area of impact lies in the provision of opportunities for social mobility and, again, all in society may be affected. Thus, the acquisition by some individuals of new knowledge and skills, and the credentials that go with them, will have implications, both positive and negative, for those in society lacking those credentials. Negatively, those without the credentials may be disadvantaged in the job market because of their lack of them. More positively, they may benefit from a higher quality of services, public and private, on which they depend. A useful distinction can be made between social mobility that provides 'giant leaps for the few' (which is likely to be acquired through attendance at an elite university) and social mobility that provides 'small steps for the many' (acquired through attendance at 'mass' institutions) (Van der Graaf et al, 2009). However, it must also be recognised that social mobility is dependent on more than higher education. It is dependent, principally, on there being greater 'room at the top' to support higher levels of upward mobility for the more able. This is going to be achieved in one of two ways: either by changes in the occupational structure such as occurred at several points in the second half of the twentieth century; or by a significant rise in the rates of downward mobility for the less able. The education system so far has been less successful in achieving the latter!

Many of the impacts of higher education on individuals previously described have clear implications for society as a whole. Thus, the greater propensity to vote has implications for the operation of democracy. The likelihood of a longer and healthier life has implications for health service provision for all. Greater racial understanding helps create a more tolerant and workable multicultural society. Most personal impacts have impacts on society as a whole and these seem generally to be beneficial.

4.2 The impact of research and knowledge transfer functions

While again most commonly referred to in connection with economic aspects, the other functions and activities of higher education institutions can also have impacts, locally and beyond. Thus, university academics may engage with local networks and interest groups (e.g. local history groups, arts centres etc). They may have local and national media input and enter into collaborative relationships with other research groups, e.g. in think tanks, private enterprises, local councils etc. It is interesting to note that many universities have only quite limited knowledge of the activities and impacts of their staff (and to some extent students) in these respects. It is 'spare time' activity but it would not be happening if the university was not there. Some institutions have attempted to carry out staff audits of these kinds of activities.

The annual Business and Community Interaction (BCI) survey undertaken by HEFCE provides some, though fairly limited, information on these functions, although the focus seems to be more on business than on community and on revenue generated by these activities rather than their social and cultural impact. Nevertheless, it is worth noting an increase of 38% over the previous year in the numbers attending free public lectures provided by universities and an increase of 28% in numbers attending chargeable public lectures in the most recent BCI report.(HEFCE, 2012)

The growth of so-called 'mode 2' knowledge (Gibbons et al, 1994) - which is applied and trans-disciplinary knowledge generated in many different types of organisations - and the changing boundaries and networks within modern knowledge societies are generally regarded as bringing universities into a more active engagement with other organisations (Weber and Duderstadt, 2006). In the regional impact study mentioned above, research and knowledge transfer relationships with local organisations could mean better local services for all (e.g. schools, hospitals) and better informed political decisions. And more generally, the knowledge produced by universities becomes an input to the 'stock of knowledge' available to all. New information technologies play an important role here and the arrival of the 'Massive Open Online Courses' (MOOCs) is likely to strengthen this function even more.

As already noted, the very existence of a university can impact on the image and reputation of a town or sub-region. It provides partnership opportunities for other organisations. An ongoing international study⁹ is providing information on the strong partnerships with non-academic organisations which existed for a majority of the study's 28 universities across five countries (UK, Germany, Finland, Portugal and the US). A university also has considerable impact on its local labour market through the employment opportunities it offers itself and through the increased demand it brings to other kinds of organisations.

Universities have traditionally played a role in making 'high culture' available to all members of society. They have run museums and art galleries, provided concerts and theatre. However, this role – described by Chatterton as the 'paternalistic civilising mission of higher education' – is increasingly being complemented by a more public and 'mass cultural' role through contributions to new 'cultural quarters' in many major cities, providing cultural management and commentary as well as cultural consumers. Students' unions also often contribute to the provision and enhancement of popular culture in the areas around their universities.

The roles played by universities differ significantly between institutions and between regional locations. These reflect both the features of different institutional missions and histories and the characteristics of different regional needs and opportunities. Box 2 lists a number of key elements in the impacts of higher education on their regions.

⁹ 'Change in Networks, Higher Education and Knowledge Societies' (CINHEKS) is an international project of the European Science Foundation and is part of a larger research programme on 'Higher Education and Social Change' (EuroHESC).

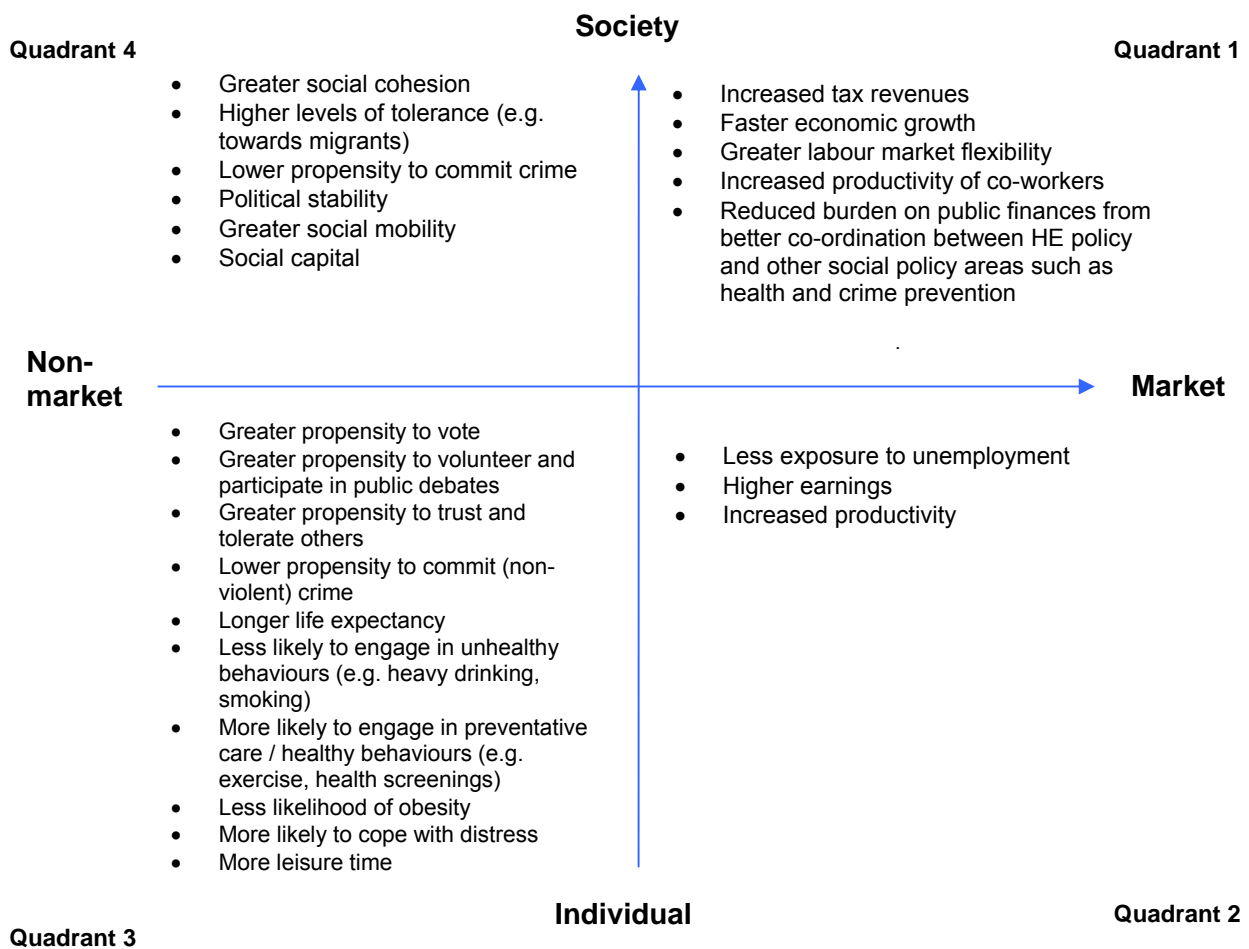
Box 2. What we know and don't know about the wider benefits of higher education to society as a whole

- There is emerging evidence that universities have significant impacts upon the towns and regions in which they are situated
- These can be related to all university functions although differences exist according to the characteristics of both the university and its location
- By providing opportunities for both geographical and social mobility, higher education may be advantaging some people while disadvantaging others
- In a wider sense, by adding to the 'stock of knowledge' available to all, higher education enriches the evidence base for action – by politicians, business and civic organisations and by all individuals
- However, evidence on the effectiveness of communication strategies between universities and other parts of society suggests that 'openness' in terms of the research function of universities has some way to go before it is fully achieved
- Social and cultural impacts frequently have implications for the economic, for example by enriching the image and attractiveness of a town or region
- The role of universities as providers of 'high culture' continues but is being extended in some places to a wider cultural provision which can engage wider sections of local communities
- Universities provide significant opportunities for social mobility, although these will differ in scale and availability
- Overall, engagement with the local university is not limited to 'being a student' or to a particular phase in the life course; it takes many different forms and has many different stakeholders

5 Taxonomy of the wider benefits of higher education

As discussed in the introduction, we capture in a synthesised way the benefits of higher education that have been discussed. Using McMahon's approach of market vs. nonmarket benefits, and introducing a second dimension on individual vs. societal level, we provide a snapshot view of the issues analysed in this paper. The schematic nature of the figure calls for cautious treatment because the categorisation is helpful only if coupled with awareness that while some benefits neatly belong to a particular quadrant, others do not¹⁰.

Figure 1: A bi-dimensional categorisation of the wider benefits of higher education



Source: prepared by the authors

¹⁰ For instance, 'higher earnings' in Q.2 is hardly controversial, while 'faster economic growth' in Q.1 is a more complex issue since "while the value for individuals of obtaining more education is amply and repeatedly demonstrated, the 'macro' picture is much less clear" (Wolf and McNally 2011 - cited in Barr 2011: 273).

6 Conclusions and implications: what we know, don't know and need to know

Higher education makes a difference, both to those who participate in it and to those who don't. Higher education produces and transmits knowledge and that knowledge is acted upon in all spheres of both public and private life. But higher education also transmits status and confidence to those who receive it. And those who receive it differ from those who don't on many dimensions. Thus, in viewing the literature on the differences between graduates and non-graduates, the classic problem of distinguishing input factors from process factors remains. The same is true of the literature on the broader effects of higher education. The processes by which effects, intended and unintended, are achieved are often far from clear.

A recent report published by the European Science Foundation (ESF, 2008) considered the social impact of higher education in terms of 'the construction of knowledge societies', 'the construction of just and fair societies', and 'the construction of critical societies'. Taking each in turn, the 'knowledge society' of course points us towards the economic impact, whether through the generation of new knowledge or the preparation of increasingly large sectors of the workforce. On the first of these, the report notes that the boundaries of knowledge may be changing and the roles and relationships between higher education and other 'knowledge organisations' may be becoming increasingly blurred. And on the second point, while the greater employability of graduates is clear, the basis of it is less so, in particular whether it is a function of the relevance of the knowledge and skills transmitted by higher education or the use made by employers of educational credentials as a selection device signalling potential and the possession of social and cultural capital.

With respect to 'just and fair societies', we must note the considerable and growing inequalities in British society and a body of literature which would point to education as an important agent in the reproduction and legitimisation of these inequalities (Institute of Fiscal Studies, 2008; Toynbee and Walker, 2008; Brennan, 2013) However, at the same time, education is also the major route to upward social mobility. The ESF report also notes that higher education's contribution to social justice is not just through the extension of participation, pointing out that higher education impacts on cultural change and citizenship in ways that affect everyone in society, whether or not they have ever attended a higher education institution (e.g. Calhoun, 2006). And finally in referring to the notion of 'critical societies', the report reminds us of higher education's longstanding role in the provision of 'critical space' within which new and potentially controversial views can be elaborated, of 'taking truth to power', of supporting innovation and change across all sectors of society.

The evidence base for the claims that higher education makes a difference, both to the lives of those who participate in it and to society at large, is considerable. The economic impacts are important but form part of a larger economic, social and cultural picture of impact within which the different elements frequently overlap and interact. While there is

much evidence of impact, our understanding of the processes through which impact occurs is more limited. Differentiated mass systems of higher education interact with society in many different ways and are evolving in new ways and in new directions. There are things we know and things that we don't know. The former will help us to address the latter and to reconstruct higher education to more effectively serve the rest of society.

Arising from this review is an agenda of questions which need to be asked in order to better understand the processes through which the impacts of higher education are achieved, how they can be maximised in the future, and how they can take better account of the growing diversity and differentiation of both higher education and society.

The following list covers the main issues where 'not enough is known' and where further research is needed.

Box 3. Further research is needed in order to:

Obtain a better understanding of impact processes, causality, antecedent and intervening variables

There is a particular need to distinguish between the effects of input factors and the effects of the experience of higher education. In order to achieve this, existing datasets (such as the National Child Development Study or the 1970 British Cohort study, see Annex 3 for further information) could be used to systematically correlate input factors (e.g. socio-economic background of an individual) *with* educational attainments *and* impact on the various spheres that have been presented in this report (e.g. civic engagement, health behaviour). Yet, it is also noted that these datasets (such as the longitudinal study just mentioned) may not have the exact data required to disentangle these relationships and therefore it is suggested that novel datasets are developed containing the externality parameters (e.g., again, civic engagement, health behaviour) as categories in systematic relation with educational attainment.

Disaggregate the relationships between higher education and a given social benefit

While most of the studies analysed in this review are conducted at a highly aggregated level (e.g. one extra year in higher education makes an individual X% more likely to display a certain social attitude), it should be of interest to policy-makers and researchers in the higher education sector to decompose these correlations in terms of: type of higher education institution attended (e.g. is there a difference in individuals' social outcome between attending an institution at the top of a league table or attending one at the bottom?); type of studies that were conducted (e.g. is there a difference in individuals' social outcomes between students in different degrees?). The American literature referred to in annex 4 makes distinctions between 'change', 'net effects', 'between college effects', 'within college effects', 'conditional effects' and 'durability of effects'. It would be extremely revealing if these kinds of analysis could be applied to UK data.

Box 3. Further research is needed in order to:

Obtain a better understanding of long term v short term impacts as well as the cumulative impact of higher education v the discrete impact of 'having been in higher education'

This entails investigating the (social, civic, health) attitudes and behaviours of different cohorts of individuals, for instance those who did not go to higher education, those who completed an under-graduate degree, and those who completed a post-graduate degree.

Achieve a better integration of the economic with the social and the cultural and a clearer understanding of the interaction between them

Address system differentiation and student diversity – who gains the most from higher education?

Different people get different things out of higher education and at different stages in their lives. For instance, are there differences in the social impact of higher education upon full-time students and part-time students; or upon students who attended higher education right after high school and those who did so later on in their life?

Obtain better information on the civic role and relationships of higher education, locally, regionally, nationally and globally

How can the knowledge base of higher education be accessed by wider society?

To achieve the above, some of the boundaries that currently exist between higher education and other social institutions may need to be weakened. Thus, greater policy coordination between higher education and other social policy areas may be required, both nationally and locally.

Box 4. Greater policy coordination is likely to require:

- Greater clarity about the 'private' and the 'public' goods produced by higher education and about the interactions between them
- A greater recognition of the need for both autonomy and responsiveness in higher education's relationships with the rest of society
- A willingness to better understand the diversity which exists in higher education, the multiplicity of roles which are performed and the impacts which occur

At the current state of knowledge about the wider benefits and societal impacts of higher education, it may be unwise to place undue emphasis on quantitative measures and

institutional comparisons – e.g. university X has a greater impact than university Y. There is a need for better understanding of what is actually being measured and the causal relationships which lie behind the measurements before the data produced can be safely used for management and decision-making. But encouragement is needed at all levels – system, institution, department, individual academic – to gather evidence about the impacts of higher education and the processes which produce them.

Box 5. Evidence about the impacts of higher education and the processes which produce them needs to include:

More attention to and a systematic analysis of the transferability of findings from the individual to the societal level

The social impact of higher education at the individual level may reverberate at the societal level in different ways, according for example to the degree of stratification of the national higher education system. A systematic analysis of how individual and societal levels interact across countries should be undertaken in order to create this evidence base

More multi-method research

(i.e. integrating quantitative and qualitative, survey and case study etc)

More engagement between higher education and its external stakeholders, including the collection, sharing and analysis of data on impact

Extending cross-national surveys among secondary education students to higher education

For instance, the International Civic and Citizenship Education Study (ICCS) carried out in 2009 on more than 140,000 Grade 8 (or equivalent) students in more than 5,300 schools from 38 countries should have a higher education equivalent to compare results.

As is clear from this literature review, the impacts of higher education are considerable, both on the individuals who experience it and upon society as a whole. Impacts may not be entirely positive. Some people will be affected more than others. Different parts of an increasingly differentiated higher education system may be making different impacts and upon different parts of society.

In summary, what is known is that higher education makes considerable social, cultural and economic impact but what is not known sufficiently is *how* it makes this impact, *on whom* it makes its impact, *when* it makes its impact and the *different forms* which impact takes from an increasingly diverse higher education system. There is a need to know these things in order that a large higher education system can be managed in ways that will promote *all* of its functions and achieve the greatest benefits for the rest of society.

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Annex 1. Methodological note

The research targeted two types of documentation: articles and studies (academic as well as non-academic) and data sets. Special attention was paid to the research methodology in order to provide detailed, robust and critical results.

The three main axes guiding the methodology, explained below, are the following: research tools, selection criteria and validity evaluation.

Research tools. The research was performed using two main tools: the Web of Knowledge (today's most comprehensive research platform) and Google's Advanced Search function. Both instruments present the advantage of having an extremely large scope of references while enabling a multiple-criteria selection e.g. by date or necessary/facultative terms, which was most useful to identify the relevant post-2003 literature by type of outcomes. In addition, an 'intra-referencing' inquiry sought to detect all connected research works by looking into the reference list and citations of each article, in order to widen as much as possible the knowledge network that has been developed about the wider benefits of education – which was especially useful to identify the data sets (i.e. longitudinal studies) that are commonly resorted to by research. Obtaining material documentation (e.g. books stocked in libraries) turned out to be rarely necessary.

Selection criteria. Given the current gaps between assumptions on externalities of higher education and the statistical means to evaluate them, selection criteria were carefully applied. They were of three kinds. First and foremost, the unit of analysis had to fit the precise object of the review (private and public externalities of higher education with a focus on the UK): this implied that articles dealing with only pre-higher education data (i.e. empirically studying the impacts of primary school reforms) were dismissed, and general impact of educational attainment (not specific to higher education) were retained where the scope of data included higher education (e.g. studies measuring the average impact of additional years of schooling, encompassing secondary as well as tertiary education). Studies focusing on developing countries were equally dismissed for comparability reasons. Second, appropriate documents needed to be (academic or non-academic) research-oriented and not politically-sided. Third, they had to be as much empirically-grounded as possible *or*, in the case they were concepts-based, efficiently contribute to the research framework of higher education (for instance in terms of classification of outcomes).

Validity evaluation. Once the relevant articles, studies and data sets were selected, their validity was appraised in various ways. 'Construct validity' was carried out by evaluating data collection and sampling issues, methodology (i.e. theoretical assumptions) and statistical controls. Causality issues ('internal validity') were especially the object of statistical critique. A short 'Credibility/validity' was thus introduced in the Methodology column of Annex 2 in order to highlight the potential limitations of each literature document. On the other hand, such criteria was not applied to data sets as they do not aim at *demonstrating* certain results and data collection problems *in practice* are little available. Last, research gaps and lacks of data sources were mentioned when appropriate.

Annex 2. Literature Review

Articles are ordered by theme.

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>McMahon, W. 2004</p> <p>The Social and External Benefits of Education 2004</p> <p>Johnes, G. and Johnes, J. (eds.), <i>International Handbook on the Economics of Education</i>, Cheltenham: Edward Elgar, pp 211-259</p>	All types of outcome	<p>Reviewing the relevant contemporary literature and summarizing the quantitative evidence on educational externalities. The paper presents especially a table summarizing the net impact of education on society in general over 40 years per type of outcome (e.g. public health, political stability, lower crime rates), drawing on various authors.</p> <p>Estimation of the social return rates (which reflect both private (e.g. foregone earnings costs) and public (e.g. institutional costs and scholarships) investments, by type of education (primary, secondary, higher education), including monetary and non-monetary benefits. Monetary valuations of non-monetary returns are based on the Haveman-Wolfe method (1984). This method assumes that on average over large numbers of individuals, families will substitute among alternatives until they approximately the ratios of marginal products of each item they 'purchase' (including the marginal product of additional education) equate to their economic values. Thus an income coefficient valuing the additional higher education years in monetary terms can be obtained - e.g. for a 10% improvement in health resulting from a given number of additional years at university, how much would it cost using one's income (e.g. paying doctors, drugs, hospital services)?</p> <p>Credibility/validity: a paper that convincingly shows the shortcomings of research about private and non-private externalities of education. However, averaging the effects of education on a range of countries over the world and a timespan of 40 years seems leads to results that hide a diversity of situations. Resorting to the results of a series of authors without explaining each methodology exposes to potential lack of validity.</p>	Author, Various authors	78 countries worldwide	<p>Usual estimates of social rates of return include only a fraction of the total social effects of education, and tend to be restricted to the monetary (private and external) returns. The empirical measurement of the non-monetary private benefits is still incipient, e.g. the external (non-private) benefits of education (which affect the whole society and not only those with a higher education experience). One problem which is stressed is that existing studies tend to focus on externalities that can be monetarily quantified.</p> <p style="text-align: center;">Findings</p> <p>The author presents an estimate of market-measured (monetary) pure externalities returns (social monetary returns minus private monetary returns) of 14% in OECD countries (about 61% of total monetary social returns). Further research on education externalities are needed using a dynamic interpretation of the neoclassical model to trace education impact over long enough periods. Based on several research papers, he estimates the total value of the private non-market benefits of education to be roughly 80% of the value of the market outcomes (social benefits external to the family are excluded).</p> <p>Some policy options are recommended:</p> <ul style="list-style-type: none"> - increasing information about non-monetary returns of higher education among students - guaranteeing student loan programmes at post-secondary level (to make for the usual low access to capital markets for students, who lack collaterals) - developing private sector training capacities 	Individuals, graduate; wider society
McMahon, W. 2010	All types of	Monetary estimation of the private and social non-market benefits by the Haveman-Wolfe	Author, various	US	'If the estimates of the value of private and social non-market benefits beyond earnings are added to the jobs and earnings	-

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>The Private and Social Benefits of Higher Education: The Evidence, Their Value, and Policy Implications</p> <p>Advancing higher education, 03/2010, TIAA-CREF Institute, http://www1.tiaa-cref.org/ucm/groups/content/@ap_ucm_pctcp_docs/documents/document/tiaa02029326.pdf</p>	outcome	<p>(1984, 2006) method. The article importantly draws on McMahon, 2009. The Haveman-Wolfe (1984, 2006) method assumes that on average over large numbers of individuals, families will substitute among alternatives until they approximately the ratios of marginal products of each item they 'purchase' (including the marginal product of additional education) equate to their economic values. Thus an income coefficient valuing the additional higher education years in monetary terms can be obtained - e.g. for a 10% improvement in health resulting from a given number of additional years at university, how much would it cost using one's income (e.g. paying doctors, drugs, hospital services)? The data used to apply this method and deduct the size of higher education benefits come from a range of professional journals that include a control for per capita income. Since there is generally more than one article for each type of benefit, the effects of years of education are averaged across the literature. Also, the author takes the view that the human capital formed by higher education is more used (in terms of number of waking hours) by individuals at home or their community than at the workplace.</p> <p>Credibility/validity: one limit of the approach is that it tends to underestimate the value of external benefits of higher education for it does not take into account the indirect, long-term effect of new civic institutions, ideas and environmental conditions set up by past generations (making the presented results conservative). In addition, the article assumes that the negative social externalities generated by higher education ('white-collar crime' e.g. hedge funds scandals, Madoff) are inferior to the positive ones.</p>	authors		<p>benefits, the 'true' social rates of return significantly increase and change our measurement of investment in higher education. Consequently, the US government has underinvested in higher education over the past decades.</p> <p style="text-align: center;">Findings</p> <p>The author finds with the Haveman-Wolfe method that the value of the private non-market benefits are about 120% above and beyond the earnings benefits for both; the value of social non-market benefits of Associate and Bachelor's degrees are about 88% above and beyond their earnings benefits. Private and social non-market benefits together account for more than half (68%) of the total benefits.</p>	
<p>Santiago, P., Tremblay, K., Basri, E. and Arnal, E. 2008</p>	All types of outcome	<p>Summarizing the state of research on the private and public non-monetary benefits of higher education.</p> <p>Credibility/validity: this state of the art focuses</p>	OECD, various authors	OECD member countries	<p>Few studies look at the specific externalities generated by tertiary education</p> <p style="text-align: center;">Findings</p>	Individuals, graduate and non-graduate; wider society

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>Tertiary Education for the Knowledge Society</p> <p><i>OECD Education & Skills, 12/2008, Volume 2008, Issue 9, pp. i – 723-</i></p>		too much on McMahon's work			The causal effect of education is not fully established empirically in studies of the non-monetary benefits of higher education.	
<p>McMahon, W. 2009</p> <p><i>Higher learning, greater good : the private and social benefits of higher education (chapters 4 and 5 especially)</i></p> <p><i>Higher learning, greater good : the private and social benefits of higher education, Baltimore, Md. : Johns Hopkins University Press, 2009</i></p>	All types of outcome	<p>Regression analyses based on monetary estimation of the private and social non-market benefits by the Haveman-Wolfe (1984, 2006) and dynamic simulation methods. Use of data estimations collected in the relevant literature. The economic values of these education outcomes are estimated by the Haveman-Wolfe (1984, 2006) method - assumption that on average over large numbers of individuals, families will substitute among alternatives until they approximately equate the ratios of marginal products of each item they 'purchase' (including the marginal product of additional education) to their economic values. Thus an income coefficient valuing the additional higher education years in monetary terms can be obtained - e.g. for 10% improvement in health resulting a given number of additional years at university that result in a, how much would it cost using one's income</p> <p>The dynamic simulation method consists in estimating the interactions of higher education on other variables, which continually feedback over time (e.g. health or democratization). But this method has difficulties in disentangling the effects of secondary education and the impact of new technologies on each new cohort.</p> <p>Credibility/validity: one limitation consists in summarizing into few figures of the benefits of educational attainment without breaking it into/taking into account the discrepancies between different types of studies (e.g. literature/engineering studies).</p>	Author, various authors	US (mainly), OECD member countries	<p>Adopting a human capital perspective enables to examine the full values of returns on higher education, considering into account non-market benefits for individuals (private non-market benefits; e.g. longevity) and benefits to society as a whole (social benefits; e.g. political stability). Considering and publicizing these re-calculated returns would improve information about higher education, and thereby the education markets as well as public and private investment</p> <p style="text-align: center;">Findings</p> <p>A bachelor's degree brings private non-market benefits of \$38,080 (122% of the earnings associated to this same degree). In terms of social benefits, a bachelor's degree adds on average non-market social benefits (e.g. contribution to democracy, human rights, political stability, increased happiness, lower crime rates, reduced reliance on welfare) valued at \$27,726, against \$16,832 of market ones. Social benefits constitute about 52% of the total benefits of higher education.</p> <p>Policy recommendations ensue.</p> <ul style="list-style-type: none"> - dedicating a small part of public investment to increase awareness of private non-market benefits of higher education among local campuses, parents, students – in order to increase private investment - improving the availability of information about specific social benefits of higher education at the level of public policies in order to improve overall economic efficiency (e.g. when making fiscal decisions) - making larger public investment in human capital through higher education (e.g. increased state support of loans) - considering the optimal degree of privatization that needs 	Individuals, graduate; wider society

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
					applying to higher education taking into account the social benefits the latter produces (making it a public good)	
<p>BIS Department 2011</p> <p>Supporting analysis for the Higher Education White Paper</p> <p>British government, Department for Business, Innovation and Skills, Bis Economics paper no.14</p>	All types of outcomes	Reviewing and summarizing findings from the academic research.	Authors, various authors	Mainly US and UK	<p>Despite measurement challenges, the available evidence suggests there are significant non-market benefits favoured by higher education apart from economic growth (e.g. civic engagement, health). In this perspective, higher education has a crucial role to play in the government's 'Big Society' agenda. Further academic research is needed to assess these impacts.</p> <p>Findings</p> <p>Higher education attainment favours more racial tolerance, voter participation, trust between citizens, intergenerational effect on offspring's educational attainment and cognitive skills, increased longevity, less propensity to obesity, healthier behaviours (i.e. less propensity to smoke for instance), increased community participation at the local and regional level (although it is hard to measure) .</p>	Individuals, graduate; wider society
<p>OECD 2012</p> <p>Education at a Glance 2012: OECD Indicators</p> <p>OECD Publishing</p>	Citizenship, health	<p>Graphs representing difference in life expectancy by educational attainment at age 30 (2010) and the 'voting gap' between graduates and less educated individuals (2008-2010). Regression models were estimated to predict each dichotomous outcome variable (e.g. high versus low level of interest in politics) from individuals' educational attainment level, with and without control variables for age, gender and family income.</p> <p>The indicators were calculated using micro-data from the ESS 2008 and 2010, EUROSTAT's Statistical Database, STATCAN's CANSIM Database for Canada , CDC/NCHS, National Longitudinal Mortality Study, National Vital Statistics System, and the U.S. Census Bureau for the United States.</p> <p>Surveys selected on the basis of the comparability of social outcomes variables across a large number of OECD countries, and with a minimum sample of approximately 1,000 observations per country.</p>	European Social Survey (ESS) 2008 and 2010, EUROSTAT's Statistical Database, STATCAN's CANSIM Database for Canada , CDC/NCHS, National Longitudinal Mortality Study, National Vital Statistics System, and the	OECD member countries	<p>Educational attainment is positively associated with diverse social outcomes, including voting, and life expectancy.</p> <p>Findings</p> <p>Among 15 OECD countries (the UK is not included), on average a 30-year-old male with a high level of education (tertiary graduate) can expect to live another 51 years, whereas a 30-year old man with a low level of education (upper secondary education not completed) can expect to live an additional 43 years. Gender difference: male tertiary graduates can expect to live 8 years longer than those who have not attained upper secondary education, while a tertiary-educated woman can expect to live 4 years longer than a woman without an upper secondary education.</p> <p>Voting rates among graduates are more important than among non-graduate. On average in OECD countries, the gap in the voting rate between adults with high and low levels of education (25-64 year-olds) is 14.8 percentage points; it goes up to 26.8 percentage points among younger adults (25-34 year-olds).</p>	Individuals, graduate and non-graduate

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
			U.S. Census Bureau for the United States.			
<p>OECD 2011</p> <p>Education at a Glance 2011: OECD Indicators</p> <p>OECD Publishing</p>	Citizenship, wellbeing	<p>Graphs represent the proportion of adults (25-64-year-old) satisfied with life, by level of education (2008) and the proportion of adults (25-64-year-old) voting and volunteering, by level of education (2008). Regression models were estimated to predict each dichotomous outcome variable (e.g. high versus low level of interest in politics) from individuals' educational attainment level, with and without control variables for age, gender and family income.</p> <p>The indicators were calculated using micro-data from the ESS 2008, GSS 2008 for Canada and New Zealand, EVS 2009 for Luxembourg, Lifelong Education Survey 2009 for Korea, and CPS 2008 for the United States.</p> <p>Surveys selected on the basis of the comparability of social outcomes variables across a large number of OECD countries, and with a minimum sample of approximately 1,000 observations per country.</p>	European Social Survey (ESS) 2008, General Social Survey (GSS) 2008 for Canada and New Zealand, European Values Survey (EVS) 2009 for Luxembourg, Lifelong Education Survey 2009 for Korea, and CPS 2008 for the United States.	OECD member countries	<p>Adults with higher levels of educational attainment have more probabilities than those with lower levels of attainment to display greater satisfaction with life, stronger civic engagement (voting, volunteering) And better perceived health.</p> <p>Findings</p> <p>Proportion of adults (25-64-year-old) satisfied with life, by level of education (2008). For many countries, there is no statistically significant relationship between education and satisfaction with life for those with lower levels of education (upper secondary or below) once differences in income are taken into account. But there is a significant association for those with higher level of education (tertiary education attainment), even after accounting for age, gender and income. This can suggest that higher education contribute to life satisfaction beyond their effect on income.</p> <p>Proportion of adults (25-64-year-old) voting and volunteering, by level of education (2008). Educational attainment is generally positively associated with electoral participation and volunteering. With the exception of electoral participation in Korea, all surveyed countries show statistically significant and positive associations between education and electoral participation. For instance, in the UK, for example, only 61.2% of adults who have not attained an upper secondary education vote in national elections, but the figure rises to 81% among adults with a tertiary education.</p>	-
<p>Milligana, K., Morettib, E., and Oreopoulosc, P. 2004</p> <p>Does education improve citizenship? Evidence from the United</p>	Citizenship	Regression analysis (citizenship outcomes e.g. voting turnout) predicted by educational attainment). Based on the annual National Elections Studies, the November Voting Supplements to the Current Population Survey (US); the British General Election Studies and the Eurobarometer Surveys (UK). Controls for age, election year, state of birth, and year of birth.	National Elections Studies, the November Voting Supplements to the Current Population Survey (US); the British	UK, US	<p>Results in the US confirm that education enhances political involvement</p> <p>Findings</p> <p>Strong and robust relationship between education and voting turnout in the US, but not in the United Kingdom (a result impacted by the registration procedure though). Regression analysis indicates that an extra year of schooling in the UK has a small but significant effect on probability of voting. In the UK, for registered voters who finished school at age 18 or later, the voting rate is 88%, against 87%, 83%, 85% and 88% respectively for those who finished school at 17, 16, 15 and 14.</p>	Individuals, graduate and non-graduate

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>States and the United Kingdom</p> <p><i>Journal of Public Economics</i>, 2004, Volume 88, Issue 9, pp. 1667 - 1695</p>			General Election Studies and the Eurobarometer Surveys (UK).			
<p>Tenn, S. 2007</p> <p>The Effect of Education on Voter Turnout</p> <p><i>Political Analysis</i>, 10/2007, Volume 15, Issue 4, pp. 446 - 464</p>	Citizenship	<p>Regression analysis</p> <p>Credibility/validity: lack of data availability for potentially important unobserved factors linking educational attainment and voting, such as family background characteristics that influence both education and voter turnout. Second, the analysis does not take a representative sample of the general population to estimate the effect of education (the data set only contains individuals who are quite young) - and marginal effect of education for the young may differ from the effect of education on the wider population.</p>	Current population survey (CPS)	US	<p>Challenging the civic education theory (as an individual obtains additional schooling, he is more likely to vote) - for the author, there is no such linear correlation</p> <p>Findings</p> <p>Being a student has a significant positive effect on both voter turnout and voter registration; but an additional year of education has little impact on voter turnout and has only a small effect on voter registration. The primary effect of education thus consists in the environment, not in the accumulation of years of schooling.</p>	Individuals, graduate and non-graduate
<p>Borgonovi, F. and Miyamoto, K. 2010</p> <p>Education and civic and social engagement</p> <p>OECD, <i>Improving Health and Social Cohesion through Education</i>, chap.3, pp. 65-110</p>	Citizenship, civic engagement and cohesion	<p>Regression analysis on civic and social engagement variables (e.g. voting, volunteering) predicted by number of schooling years, and based on European Social Survey data (2002-2006). Controlling for individual differences (gender, age, socioeconomic status, family background, residential characteristics).</p>	OECD, European Social Survey (2002-2006)	OECD member countries, 2002-2006	<p>Education can significantly raise the level of civic and social engagement (through cognitive, socio-emotional skills, school norms, ethos and an open classroom climate)</p> <p>Findings</p> <p>Civic and social engagement positively related to the number of schooling years (controlling/taking into account individual characteristics (e.g. gender, age, socioeconomic, etc.)). BUT the relationship between education and political engagement exhibits diminishing returns; the relationship between education and trust/tolerance shows increasing return, and the strongest association at the higher education level AND the effect on political engagement is more salient in the US than in Europe. The estimations of the positive marginal effect of each additional year of higher education in Europe:</p> <p>1) on civic engagement (volunteering, civic participation): 8% on volunteering (against 3% for lower to upper secondary education), 11% on civic participation (against 13% for lower to</p>	Individuals, graduate and non-graduate

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
					<p>upper secondary education)</p> <p>2) on political engagement (voting, political interest, party membership): 3% on voting (against 5% for lower to upper secondary education and 7% for schooling until secondary education), 15% on political interest (against 12% for lower to upper secondary education and 21% for schooling until secondary education), 2% on party membership (against 1.5% for lower to upper secondary education)</p> <p>3) (significantly) on interpersonal trust and tolerance (interpersonal trust, type of immigration, value of immigration): 17% on interpersonal trust (against 13.5% for lower to upper secondary education), 36% on type of immigration i.e. the extent to which respondents welcome the arrival of different types of immigrants in their country (against 15% for lower to upper secondary education), 41% on positive valuation of immigration (against 18% for lower to upper secondary education)</p>	
<p>Green, A., Preston, J. and Sabates, R. 2003</p> <p>Education, Equity and Social Cohesion: A Distributional Model</p> <p>Centre for Research on the Wider Benefits of</p>	Citizenship, civic engagement and cohesion	<p>Correlation and regression analyses. As a dependent variable, education inequality is measured as the ratio of the mean scores in prose literacy of those who have completed tertiary education (i.e. short and long cycle first degree higher education – PROTERT) to the mean for those with only the basic level of secondary education (i.e. those who have not completed the post-15/16 upper secondary phase of education – PROLEUS) (data from International Adult Literacy Survey (IALS)). The explanatory variable, the 'social cohesion index', is constructed upon measures of trust in others and institutions, civic cooperation (not forgiving cheating on taxes and fares) (both taken from World Value Surveys) and violent crime (Interpol Crime statistics).</p> <p>Credibility/validity: using data from the International Adult Literacy Survey (IALS) enables to measure directly skills instead of using the number of schooling years, which gives more credibility for cross-national comparison no causal relationship between educational distribution and societal cohesion can be established - number of units in the statistical analysis is too small to draw hard conclusions (15 countries), and causality social cohesion/education can be interpreted the other way round.</p>	World Values Survey (WVS), the International Adult Literacy Survey (IALS) and Interpol Crime statistics.	15 developed countries including the UK (Australia, Belgium, Canada, Denmark, Finland, Ireland, the Netherlands, Norway, Poland, Portugal, Sweden, Switzerland, the UK, the USA, and Germany)	<p>Individual level correlations between education levels and social capital indicators do not hold when using aggregated data at the societal level. This can be explained by a cross-national model of analysis showing the (negative) relationship between social cohesion and education in terms of distribution (inequalities) rather than absolute levels.</p> <p>Findings</p> <p>No significant relation between mean levels of education and societal cohesion. However, there is a significant linear negative correlation of -0.765 between societal cohesion and education inequality (excluding the outliers Norway and Germany). This relationship is confirmed using linear regression analysis and robust regression analysis (in this case, a 0.1 increase in education inequality will decrease the social cohesion index by -0.583 units).</p>	-
Calhoun, C.	Citizens	Conceptual and historical analysis	Author	Industrializ	The university has a public mission that must be taken into	Wider society

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
2006 The University and the Public Good <i>Thesis Eleven</i> , 02/2006, Volume 84, Numéro 1, pp. 7 - 43	hip, civic engagement and cohesion	Credibility/validity: a theoretical framework that does not provide empirical evidence or measurement of the social benefits higher education brings		ed countries (mainly US)	account in reforms Findings Universities fosters a number of citizenship dimensions (distribution of knowledge, critical sense in the public and professional sphere, participation in public debates, etc.)	
Borgonovi, F. 2012 The relationship between education and levels of trust and tolerance in Europe <i>The British Journal of Sociology</i> , 03/2012, Volume 63, Issue 1, pp. 146 - 167	Citizens hip, civic engagement and cohesion	Various statistical association models (IGLS, random intercept only) between education (dependent variable) and trust/tolerance - construction of an 'interpersonal trust' index and a 'tolerance' index based on questions relative to trust/perception of immigration in the first three rounds of the European Social Survey (ESS). Controls used: gender, minority status, age, labour market participation, partnership status, and religiosity + national features (inequality of income (Gini coefficient), religious diversity, and economic development). Credibility/validity: quite robust, but an average response rate to the ESS of about 70%, but great variation (from 33.5 to 80% in Greece in ESS1) that may undermine the representativeness of the results. Second limitation: levels of interpersonal trust and perceptions of immigration are based on self-reported variables - results can be biased if better educated individuals are less likely to express negative views on immigration even they think or act this way (Jackman 1973; Jackman and Muha 1984).	European Social Survey (ESS)	21 European countries (including the UK)	We must examine to which extent education explains great differences in levels of trust and tolerance across European countries. Findings On the whole, better educated individuals are generally more trusting and are more tolerant towards migrants than the poorly educated. But the association between education and levels of trust grows stronger when income is more unequally distributed and in the presence of greater religious diversity; on the other hand, as income inequality rises, the education gap in levels of tolerance decreases. The education gap in tolerance levels is smaller in countries with a higher share of foreign born individuals. But as religious diversity increases, the education gap in tolerance levels gets more important: the better educated are significantly more likely to hold positive views over migrants than the poorly educated.	Wider society
Brand, J. 2010 Civic Returns to Higher Education:	Citizens hip, civic engagement and cohesion	Logit regression models estimating 1) the probability an individual completes college relative to individuals who completed high school but did not complete college 2) effects of college completion on civic participation under an assumption of college effect	National Longitudinal Survey of Youth from 1979 to 2006	US	Prior research has not considered heterogeneity in civic returns from higher education depending on selection into college – it is an important omission as they are heterogeneous effects of higher education on the less and most likely to go to university.	Individuals, graduate and non-graduate

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>A Note on Heterogeneous Effects</p> <p><i>Social Forces</i>, 12/2010, Volume 89, Issue 2, pp. 417 - 433</p>	<p>n</p>	<p>homogeneity. The third step is to assess whether or not heterogeneity in the propensity for college is associated with heterogeneity in effects of college.</p> <p>Use of panel data from the National Longitudinal Survey of Youth from 1979 to 2006 (nationally representative sample of 12,686 respondents who were 14-22 years old when they were first interviewed in 1979, and have been annually or biennially interviewed since then). Use of two civic participation indicators of the 2006 interviews: performing any unpaid volunteer work in the past 12 months for (1. civic, community or youth groups, and (2. charitable organizations or social welfare groups.</p> <p>Credibility/validity: there may be some problems of selection bias in the data collected by the survey (e.g. low propensity non-college goers (the least civically active) are deemed to be prone to non-response.</p>			<p>Findings</p> <p>On the whole, graduates are more likely than non-graduate to engage in civic activities (in 2006, about 13 per cent of college graduates compared to 5 percent of non-college graduates volunteer for civic, community, or youth groups; 9 percent of graduates compared to 4 percent of non-graduates volunteer for charitable organizations or social welfare groups).</p> <p>But heterogeneity of effects on the graduate is pointed out: college completion has the largest impact on volunteering among individuals least likely to complete college. The effect of college on average decreases as the propensity for college increases.</p>	
<p>Preston, J. and Green, A. 2003</p> <p>The Macro-Social Benefits of Education, Training and Skills in Comparative Perspective</p> <p>Centre for Research on the Wider Benefits of Learning (www.learningbenefits.net), Wider Benefits of Learning</p>	<p>Citizenship, civic engagement and cohesion; crime</p>	<p>Review of relevant sociological literature by theme.</p> <p>Credibility/validity: the article is essentially conceptual; confronted with the difficulty of having concrete elements enabling the measurement of social cohesion.</p>	<p>Various authors</p>	<p>UK, Western Europe, US (mainly)</p>	<p>One must distinguish between the macro-social effects and the micro-social effects (that refers to individual attitudes and behaviours) of education in terms of social outcomes. Examples of macro-social effects: social cohesion, trust, crime. Models of interpretation are needed, complemented by cross-national comparison of micro-social data (preferably longitudinal ones)</p> <p>Findings</p> <p>For three social dimensions (social cohesion, active citizenship and political participation, crime), the authors conclude that taking the correlations at the individual level cannot be transposed at the macro-social level (where one major difficulty consists in disentangling the factors at this level). Example: evidence for the association level of education/active citizenship is less important at a societal level than at an individual level (i.e. a more educated country does not necessarily have higher voting turnout rate).</p>	<p>Individuals, graduate and non-graduate; wider society</p>

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
Research Report No.9						
Ogg, J. 2006 A Brief Profile of the New British Establishment <i>The Political Quarterly</i> , 06/2006, Volume 77, Issues 1, pp. 81 - 89	Citizenship, civic engagement and cohesion; Individual/societal impacts	Based on the British Social Attitudes (BSA) surveys; samples are divided by the author into three education groups (graduates, qualified with lower than a degree but higher than GCSE, GSCE or no qualification), controlled by age Credibility/validity: interesting in the perspective of identifying a 'social fracture' in individuals' representation. But there is a lack of longitudinal perspective (evolution over time should be tested).	British Social Attitudes (BSA) surveys	UK	Educational attainment defines population categories associated with different attitudes towards political involvement, the welfare state, and immigration. Findings Graduates are more likely than lower educational categories to be interested in politics and to think that their participation is worthwhile, and does have an effect (e.g. voting); they also more believe in active forms of politics (e.g. demonstrations). They tend to also show more confidence in the functioning of the welfare state. They are more positive towards immigration.	Individuals, graduate and non-graduate
Brennan, J. and Naidoo, R. 2008 Higher education and the achievement (and/or prevention) of equity and social justice <i>Higher Education</i> , Volume 56, Issue 3, pp. 287 - 302	Citizenship, social engagement and cohesion; individual/societal impacts	Conceptual approach. Review of the theoretical and empirical literature on higher education's role in relation to social equity and related notions of citizenship. Credibility/validity: a writing which presents the terms of the debate and the shortcomings of contemporary research but does not establish empirical findings.	Authors	-	Higher education does not only <i>import</i> equity and justice principles from the wider society, it also <i>exports</i> these notions to the wider society. Findings The question of wider benefits of higher education presents major challenges for knowledge (especially in terms of measurement and identification; lack of substantial data). Universities can play a role in shaping social hierarchies or democratic identities, and can also have contradictory trends as a critical space (i.e. bringing new truths to the political space or supporting current relations of power).	Wider society
Dee, T. 2004 Are there civic returns to education? <i>Journal of</i>	Citizenship, social engagement and cohesion;	Bivariate prohibits where the adult civic behaviours are the dependent variable of interest and college entrance is an endogenous regressor. Based on the use of the High School and Beyond (HS&B) longitudinal study to estimate the effects of college entrance on adult voting and volunteer participation, by relying on the geographic	High School and Beyond (HS&B) longitudinal study	US	Educational attainment presents important and statistically significant effects on subsequent voter participation and support for free speech, which stresses the role of education in the functioning of a democracy..... College entrance has relatively small (though imprecisely measured) effects on the probability of volunteering, but significantly increase voter participation (by approximately 17 to 22 percentage points).	Individuals, graduate

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<i>Public Economics</i> , 2004, Volume 88, Issue 9, pp. 1697 - 1720	individuals/societal impacts	proximity and density of junior and community colleges as a teen. Credibility/validity: a series of controls enables the testing of data robustness. Drawback: imprecise measures of higher education effects on volunteering.				
Bloom, D., Hartley, M. and Rosovsky, R. 2006 Beyond private gain: the public benefits of higher education Forest, J. and Altbach, P. (eds) (2006), <i>International Handbook of Higher Education: Global Themes and Contemporary Challenges Pt. 1</i> , New York: Springer	Citizenship, social engagement and cohesion; individuals/societal impacts	Correlations established between educational attainment and entrepreneurship/governance indicators. Credibility/validity: the methodology and the measurement tools on which it rests is not fully explained, which can raise doubts about the solidity of the findings.	Authors, Current Population Survey (CPS) 1982, 1992, 2002; Total Entrepreneurship Activity (TIA) Index	US	Public benefits of education are inadequately addressed relatively to the private ones. Sound public policy should take both aspects into account. Findings The first finding is a cross country correlation between higher education and entrepreneurship activity. Using the Total Entrepreneurship Activity (TEA) Index (which measures the share of adults involved in new firms or start-up, activities), it reveals for the 17 countries studied that individuals with higher levels of education have higher levels of entrepreneurial activity. The second finding is a correlation between tertiary education enrolment and positive governance indicators, as measured by the International Country Risk Guide (ICRG) covering 130 countries on the period 1990-1995, e.g. absence of corruption, rule of law, bureaucratic quality, and low-risk of repudiation of contracts by governments. These associations do not establish a causality but help support this view, for the authors.	Wider society
Moiseyenko, O. 2005 Education and Social Cohesion: Higher Education <i>Peabody Journal of Education</i> , 01/2005,	Civic engagement	Sociological approach. Credibility/validity: a number of empirical examples, but fails to quantify the potential costs of underinvestment in education.	Author	US	Values and attitudes conveyed by higher education favours the students' participation in their local community life and social cohesion. Findings The author provides examples, for instance: the Joint Educational Project set up by the University of Southern California to foster a community partnership with South Central Los Angeles. Vanderbilt university organizes with community organizations or faith-based group's programmes in three underprivileged Nashville districts focused on community organizing, crime prevention, chronic health problems. The	Wider society, graduates

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
Volume 80, Issue 4, pp. 89 - 104					author also emphasizes the effects in terms of employment: , research and development activities at Vanderbilt are responsible for more than 5,700 jobs in Middle Tennessee (based on a report based on statistics from the U.S. Department of Commerce).	
Feinstein, L. and Sabates, R. 2005 Education and youth crime: effects of introducing the Education Maintenance Allowance programme Centre for Research on the Wider Benefits of Learning (www.learningbenefits.net), Wider Benefits of Learning Research Report No.14	Crime	Difference-in-differences estimation techniques, evaluating the effects of the Educational Maintenance Allowances (EMA) programme – a government programme set up in 1999 and designed to increase participation in post-compulsory education. Credibility/validity: precise approach of the educational effect on crime by selecting age-related crime rate + controls are introduced to take into account the fact that areas that introduced the EMA had on average higher crime rates.	Offenders Index dataset, LEA School Information System, Office of National Statistics	UK	Educational policies can have substantive external effects and could complement direct interventions for crime prevention. Findings Burglary convictions by males aged 16 to 18 in areas piloted by the EMA programme fell by significantly more than in other local areas; same positive effect in terms of theft crimes. Examples: relative reduction in burglary rates of about 1 less conviction per 1,000 pupils in EMA areas relative to other LEAs; (without controls) convictions for thefts were reduced by nearly 2 per 1,000 pupils in EMA areas relative to non EMA areas. But no significant difference in convictions for violent crimes. The authors advocate for more interconnectivity between police and education programmes targeting crime areas.	Local areas
Machin, S., Marie,O. and Vujić, S. 2010 The Crime Reducing Effect of Education CEP Discussion Paper No 979 , 05/2010, Center for	Crime	Regression analysis (logit and least squares) - offending rate per 1,000 individuals in function of educational attainment (measured in schooling years).	Offenders Index Database (OID) 1972-1996 , General Household Survey (GHS)	UK	Crime is significantly related to education (especially in the case of property crimes) Findings Criminal activity is negatively associated with higher levels of education. Therefore, policies that subsidize schooling and human capital investment should have significant potential to reduce crime. The article shows an estimate of the social benefits from crime reduction that would follow from a 1 percent reduction in the percentage of individuals with no educational qualifications (from £109 to £54 million).	Wider society

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Economic Performance, London School of Economics						
Sabates, R 2007 Educational Attainment and Juvenile Crime: Area-Level Evidence Using Three Cohorts of Young People <i>British Journal of Criminology</i> , 12/2007, Volume 48, Issue 3, pp. 395 - 409	Crime	Mixed-effects regression models (random and fixed effects) to estimate the impact of cohort-specific educational attainment on cohort-specific conviction rates over time. Based on educational data came from the LEA School Information System (LEASIS). Information was aggregated from school level to LEA (number of GCSEs obtained; those achieving 5 or more are likely to go into higher education), and conviction rates aggregated at the level of Local Education Authorities (LEAs) in England. Credibility/validity: strong methodology that enables the capture of heterogeneity in conviction rates and collects over time data (which is a good way of complementing UK longitudinal studies which include a very small proportion of criminals). But causality is hard to establish (possibility of reverse causality is not explored), e.g. behavioural factors in childhood are strong determinants of both achievement of educational qualifications and criminal record in adulthood (Feinstein and Bynner (2004)).	Offenders Index Database, Pupil Level Annual School Census (PLASC), LEA School Information System	UK	The impact of educational attainment varies according to the type of offence. Findings The increase in educational attainment between cohorts is associated with reductions (at decreasing rates) in conviction rates for most offences (burglary, theft, criminal damage and drug-related offences) but not for violent crime average increase in educational attainment between cohorts is associated with 1.06 fewer total conviction rates per 1,000 students (-0.106%). The average increase in educational attainment between cohorts is associated with 0.04 per 1,000 students fewer convictions for burglary (-0.004%) and 0.59 per 1,000 students fewer convictions for theft (-0.059%); 0.04 per 1,000 students the case of vandalism and drug-related convictions (at decreased rates, again) (-0.004%). No significant statistical association with violent crime rates (more linked to poverty factors according to the author).	Individuals, graduate and non-graduate
Miyamoto, K. and Chevalier, A. Education and health OECD, Improving Health and Social Cohesion through Education, chap.4, pp.111-180	Health	State of the art (summarizing the findings of research about different dimensions of health affected by education e.g. mental health, mortality, obesity)	OECD, various authors	OECD member countries	Educational expansion attainment affects positively the level of individuals' health. Findings (Findings that are specific to higher education) 25 year-olds with tertiary education are expected to live longer than those without; correlations suggest a potentially important effect of tertiary education on obesity (though no effects found on obesity for Germany (women) and the Netherlands).	Individuals, graduate and non-graduate
Cutler, D. and Lleras-Muney,	Health	Regression analysis of health behaviour on number of schooling years, resorting to a	US: National	US, UK	Strong positive association between education and healthier behaviours (e.g. less smoking, less likely to become obese)	Individuals, graduate and non-

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<p>A. 2010</p> <p>Understanding Differences in Health Behaviours by Education</p> <p><i>Journal of health economics</i>, 01/2010, Volume 29, Issue 1, pp. 1 - 28</p>		<p>number of data sets (in the US: the National Health Interview Survey (NHIS), the National Longitudinal Survey of Youth (NLSY), the National Survey of Midlife Development (MIDUS); in the UK: the Health and Retirement Study (HRS), the Survey on Smoking (SOS), and the National Childhood Development Study (NCDS)). Controls for demographic factors, economic factors.</p> <p>Credibility/validity: comprehensive regression analysis. But disentangling multiple factors expressed through the education gradient (economic resources, cognition, and social interaction) confronts the analysis with the lack of a causality relationship (several mechanisms are at play simultaneously). The authors also recognize that they use proxies which can be potentially quite noisy.</p>	<p>Health Interview Survey (NHIS), National Longitudinal Survey of Youth (NLSY), National Survey of Midlife Development (MIDUS). UK: Health & Retirement Study (HRS), Survey on Smoking (SOS), and National Childhood Development Study (NCDS)</p>		<p>Findings</p> <p>Controlling for age, gender, and parental background, better educated people are less likely to smoke, less likely to be obese, less likely to be heavy drinkers, more likely to drive safely and live in a safe house, and more likely to use preventive care. In the UK, those with A-level qualification are 12 % points less likely to be smokers than less educated individuals; 4 % less likely to become obese (figures that can be decreased (smoking) or increased (obesity) by adding economic controls). Economic resources and cognitive abilities explain respectively up to a third of the education gradient (education attainment has thus mainly indirect effects).</p>	graduate
<p>Fletcher, J. and Frisvold, D 2009</p> <p>Higher Education and Health Investments: Does More Schooling Affect Preventive Health Care Use?</p> <p><i>Journal of Human</i></p>	Health	<p>Regression analysis (use of preventive health care function of educational level), plus family fixed-effects estimator that compares the preventive care use of siblings with differing levels of education. Based on data from the Wisconsin Longitudinal Study (WLS), study of a one-third random sample of the graduating high school class of 1957 in Wisconsin (information from 10,317 of the graduates was collected in 1957, 1964, 1975, 1992–93, and 2003–4, plus information on randomly selected siblings).</p> <p>Credibility/validity: limitations of the data (including focus on a cohort from one state, low proportion of non-white individuals, high school dropouts).</p>	Wisconsin Longitudinal Study (WLS)	US	<p>There are important spill over effects of increased education on preventive health care choice.</p> <p>Findings</p> <p>Attending college is associated with approximately 5–15 % increase in the likelihood of using several types of preventive care. Nuance: females are found to be more likely to receive a physical exam (by nearly 5 percentage points), like older individuals. No family background features are statistically significant.</p>	Graduates

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<i>Capital</i> , 2009, vol. 3, no. 2, pp.144-176						
Furnée, C., Groot, W. and Van Den Brink, H. 2008 The health effects of education: a meta-analysis <i>European Journal of Public Health</i> , 08/2008, Vol. 18, No. 4, pp. 417-421	Health	Meta-analysis using a random and a fixed-effects model to quantify the marginal effect of education on self-reported health. Controls for income/parental education. Credibility/validity: limitation of using logistic regression analysis - they provide information on the relative effect of education on health and not on the absolute health effect of education.	Authors, ECONLIT, MEDLINE	US and European countries mainly	Large spill-over effects between education and health; so in terms of public policy, health and education should be treated in a more integrated way. Findings The quality adjusted life years weight (QALY weight) of a year of education is 0.036 ; so the cost-benefit ratio of investments in education on health is highly positive.	Individuals, graduate or non-graduate
Chevalier, A. and Feinstein, L.2006 Sheepskin or Prozac: The Causal Effect of Education on Mental Health <i>CEEDP</i> , 08/2006, 71, Centre for the Economics of Education, London School of Economics and Political Science	Health	Regression analysis: level of mental health (definition of a malaise score as well as an indicator for depression) in function of the highest diploma obtained; use of the longitudinal study British National Child Development Survey. Control by gender.	British National Child Development Survey (NCDS)	UK	The benefits of education on mental health are not only indirect (i.e. through the channels of income, family or work effects) but also direct. Findings Education significantly reduces the risks of adult depression especially for women. The effect is non-linear and is larger at low to mid-levels of education; policies increasing the education of individuals would have positive effects on their future mental health. Effect on malaise as well: having a qualification above O-levels decreases the malaise score by 0.15 standard deviation for both men and women.	Individuals, graduate and non-graduate + financing of mental health care (monetary estimates)
Feinstein, L. and Sabates, R. 2004	Health	Regression analysis (probit model) based on data from the British Household Panel Survey (BHPS), which includes prior educational qualifications as the only predictor of the	British Household Panel Survey	UK	Education has a direct effect on preventative health by raising awareness of the importance of undertaking regular health check-ups; it also favours it through self-efficacy and confidence.	Individuals, graduate and non-graduate

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<p>Education, training and the take-up of preventative health care</p> <p>Centre for Research on the Wider Benefits of Learning (www.learningbenefits.net), Wider Benefits of Learning Research Report No.12</p>		<p>probability of taking-up none, one or two, or more than two smear tests in 11 years. Then, application of controls for age and parental SES as controls to check educational effect. Third step: inclusion of socio-economic variables.</p> <p>Credibility/validity: the methodology does not use all the available data (the outcome and all explanatory variables are limited to take one value when in fact there are 11 years of information), so it may oversimplify the data.</p>	(BHPS)		<p>Findings</p> <p>Education attainment is positively associated with the uptake of cervical screening, even after the inclusion of factors that channel educational effects such as income, SES and occupation. Higher levels of education (level 2 or above) increase the probability that women have more than 2 tests in 11 years by between 5.7 and 5.9 percentage points. This result is robust to the inclusion of controls like income and socio-economic status, demographic information and personal life circumstances. These results can inspire policy makes in the prevention of cancer for instance (116 and 152 for every 100,000 women cases of cancer could thus be prevented through adult learning, according to the authors).</p>	
<p>Kuntsche, E., Rehm, J. and Gmel, G. 2004</p> <p>Characteristics of binge drinkers in Europe</p> <p><i>Social science & medicine</i>, 07/2004, Volume 59, Issue 1, pp. 113 - 127</p>	Health	<p>Surveys (notably European Comparative Alcohol Survey (ECAS) and European School Survey Project on Alcohol and Drugs (ESPAD)) whose methodologies are cross-nationally harmonized)</p> <p>Credibility/validity: weak evidence of the direct influence of education attainment on binge drinking (rather, than, say national cultural context).</p>	European Comparative Alcohol Survey (ECAS), European School Survey Project on Alcohol and Drugs (ESPAD)	European countries surveyed by the European School Survey Project on Alcohol and Drugs (18 at that time)	<p>Educational attainment has an influence on drinking behaviour among young people.</p> <p>Findings</p> <p>Strong association between low levels of education and binge drinking. In the Netherlands, individuals with lower levels of qualifications were almost three times more likely to start excessive alcohol consumption than those with a university degree.</p>	Individuals, graduate and non-graduate
<p>Arendt, J. 2005</p> <p>Does education cause better health? A panel data analysis using school reforms for identification</p>	Health	<p>Regression analyses based on a two-period data set of Danish workers interviewed in 1990 and 1995 (The Danish National Work Environment Cohort Study (WECS))</p>	Danish National Work Environment Cohort Study (WECS)	Denmark	<p>The relationship between education and health can be interpreted causally, but analysis reveals no unambiguous conclusion about this.</p> <p>Findings</p> <p>Education is significantly associated with both self-reported health (SRH) and body-mass index (BMI). But the article is inconclusive about the causal effect of education on health.</p>	-

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<i>Economics of Education Review</i> , 2005, Volume 24, Issue 2, pp. 149 - 160						
de Walque, D. 2004 Education, Information, and Smoking Decisions Evidence from Smoking Histories, 1940-2000 World Bank Policy Research Working Paper 3362, 07/2004, World Bank (http://econ.worldbank.org/external/default/main?pagePK=64165259&theSitePK=469072&piPK=64165421&Health)	Health	Regressions based on smoking supplements of National Health Interview Surveys conducted between 1978 and 2000.	National Health Interview Surveys (NHIS)1978-2000	US	Education affects decisions about whether to smoke or stop smoking. Findings Smoking histories on the 1940-2000 period (reconstructed from retrospective data in the National Health Interview Surveys in the US) show that after 1950, the prevalence of smoking declined earlier and more dramatically for college graduates (controlling for income) - on average one year of college education reduces smoking prevalence by 4.0 percentage points and increases the probability of smoking cessation by 4.1 percentage points. The coefficients on the education categories are increasing with the year of birth of the cohorts; females and African Americans are less likely to start smoking but they are less likely to quit if they have ever started.	Graduates
Mackenbach, J. 2006 Health Inequalities: Europe in Profile DG Health and	Health	An independent, expert report commissioned by the UK Presidency of the EU (February 2006). Review of studies.	Authors	Europe	Health inequalities in Europe are partly due to educational inequalities. Findings Higher educated individuals benefit from higher average life expectancy, lower mortality from stroke (but not for ischemic heart disease) and tend to be 1 to 3 cm taller.	Graduates

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<p>consumers,</p> <p>European Commission (http://ec.europa.eu/health/p_h_determinants/socio_economics/documents/ev_060302_r06_en.pdf)</p>						
<p>Russell, G. and Shaw, S.2009</p> <p>A study to investigate the prevalence of social anxiety in a sample of higher education students in the United Kingdom</p> <p><i>Journal of Mental Health</i>, 06/2009, Volume 18, Issue 3, p. 198</p>	Health	<p>Prevalence survey of social anxiety in a sample of 1,007 students studying at a large university and its partnership colleges, based on the scoring of the Liebowitz social anxiety scale (LSAS) (that measure fear and avoidance of commonly experienced situations)</p> <p>Credibility/validity: raw data checks were conducted on a random sample of 10% of the data to ensure the accuracy of data entry and the absence of systematic errors. But potential flaws of 1) representativity (postgraduate students not included in the survey) 2) comparability of results with other studies (due to important variation in the methodology to measure social anxiety)</p>	Authors	UK	<p>Social anxiety is present in a relatively small, but significant proportion of students studying in higher education. Mental health agencies should closely collaborate to enhance student and staff awareness of social anxiety.</p> <p>Findings</p> <p>Approximately 10% of students reported marked to severe social anxiety, a figure broadly in line with evidence from recent community surveys of adults and young people. Statistically significant differences found for 1) gender (with females having the higher LSAS median score (34 compared to 27 for males)), the female median score for total fear (21) was higher than that for males (16); 2) age (the median total score tends to increase with age up to age 40, then decrease for those aged 40–49 and increase sharply again for those aged 50 and over) - so mature students are more likely to be victims of social anxiety.</p>	Graduates
<p>Devaux, Marion , et al. 2011</p> <p>Exploring the Relationship Between Education and Obesity</p> <p><i>OECD Journal: Economic</i></p>	Health	<p>Logistic regression models controlling for a range of covariates, including gender, age, ethnicity, socioeconomic status and survey year. An interaction term between education and gender was also included in the regression model (other graphs) to assess variations between the two genders in the relationship between education and obesity.</p> <p>Credibility/validity: applying the same models to all countries' data presents comparability issues: 1) differences in data and survey methods (e.g. data on height and weight are</p>	Australian National Health Survey (NHS) 1989-2005, Canadian National Population Health Survey-cross-	Australia, Canada, England, and South Korea	<p>Over the past 30 years, obesity has spread more and more; but a better education seems to be associated with a lower likelihood of obesity, especially among women.</p> <p>Findings</p> <p>Broadly linear relationship between the number of years spent in full-time education and the probability of obesity, with most educated individuals showing lower rates of the condition (only exception being men in Korea). The education gradient in obesity is stronger in women than in men. This gender difference is minor in Australia and Canada, more pronounced in England</p>	Individuals, graduate and non-graduate

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<p><i>Studies</i>, 12/2011, Volume 2011, Issue 1, pp. 1 - 40</p>		<p>measured by examination in the UK and Korea, but self-reported in Australia and Canada). However, differences in data and survey methods sometimes make it difficult 2) measuring educational attainment by the number of years of schooling is problematic (the same number of years does not necessarily mean the same achievement across countries). Same type of comparability problem for socio-economic classification. Ethnicity could be used in England, proxies in Canada and Australia (minority or migrant status), but no comparable indicator could be obtained in Korea.</p>	<p>section (NPHS) & Canadian Community Health Survey (CCHS) 1995-2005, Health Survey for England (HSE) 1991-2005 & Korean National Health and Nutrition Examination Survey (KNHANES) 1998-2005</p>		<p>and major in Korea. But the causal link education/obesity, if it appears to be direct, is yet not fully established (socio-economic components can mediate this relationship).</p>	
<p>OECD, Centre for Educational Research and Innovation 2007</p> <p>Understanding the Social Outcomes of Learning</p> <p>OECD (2007), <i>Understanding the Social Outcomes of Learning</i>, OECD Publishing</p>	<p>Health, civic and social engagement</p>	<p>Regression analysis and summarizing the outcomes of the relevant studies, in the perspective of an ARC set of models (threefold mechanism: absolute (direct effect of education), relative (indirect) and cumulative effects of education (outcomes materializing in certain peer groups).</p> <p>Credibility/validity: the association more years of schooling /better health, well-being and health behaviours is robust. But 1) measuring educational attainment in terms of years of schooling (as commonly done) overlooks certain issues (variation of outcomes according the fields of study? Qualitative study is needed) 2) difficult to establish a causality link, i.e. better health could lead to better education (so, the other way round; or future-prone people could tend to invest both more time in education and health). The part of causality due to other factors is not clear (family income, genetic endowment, or social environment). Limitations for civic and social engagement impact: cost/benefit analysis cannot be applied</p>	<p>European Social Survey (ESS), IEA Civic Education study, various authors</p>	<p>OECD member countries</p>	<p>The understanding of the relationship education/health or civic and social engagement (CES) rests on a relatively weak knowledge base. So we must develop coherent models in order to better apprehend it and make good investment choices.</p> <p>Findings</p> <p>More years in education are substantially associated with better health, well-being and health behaviours (although the type of health might bring nuances, e.g. stress among students (worsens mental health), uncertain links with alcohol or illicit drugs consumption). More years in education are not automatically linked to higher levels of CSE. Linkages are more complex, depend on the level of causality and the type of CSE (cf methodology: ARC model), e.g. indirect effect for competitive forms of political engagement (belonging to a political party), direct effect for less competitive forms (demonstrations) ; mixed results on voting, depending on the study.</p>	<p>Individuals, graduate and non-graduate</p>

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		(contrary to health). It is hard to disentangle the effects of education from those of socio-economic status.				
Feinstein, L., Budge, D., Vorhaus, J. and Duckworth, K. (eds) 2008 The social and personal benefits of learning: A summary of key research findings Centre for Research on the Wider Benefits of Learning website (http://www.learningbenefits.net/Publications/FlagshipPubs/Final%20WBL%20Synthesis%20Report.pdf)	Health, crime, parenting, social cohesion and civic engagement	Collection of recent findings by the Centre for Research on the Wider Benefits of Learning	Institute of education, Centre for Research on the Wider Benefits of Learning, various authors	UK	Higher education has outcomes that may also have important economic impacts (for example, through reducing costs of health care or crime), but they also enhance the quality of life of the wider society. A narrow focus on academic achievement is ill-advised. Findings Graduates are on the whole the least likely to commit crimes and the most likely to tap into a range of social networks. They also tend to be the healthiest and longest-living members of society. On the whole, graduates are less likely to smoke (those less educated are 75% more likely to become smokers at age 30), to be obese (on average, their Body Mass Index (BMI) is 3% lower than that of similar, less educated individuals) and to be prone to depression (from a 35% difference in probabilities among women to 55% among men).	Individuals, graduate and non-graduate
Bynner, J., Dolton, P., Feinstein, L., Makepeace, G., Malmberg, L. and Woods, L. 2003 Revisiting the benefits of higher education	Health; citizenship, civic engagement and cohesion; parenting	Use of multivariate statistical analyses to observe the benefits of higher education in terms of health, labour market outcomes, citizenship and values, benefits to graduates' children. It is based on longitudinal data, a 1958 cohort (National Child Development Study) at ages 33 and 42, and a 1970 cohort (British Cohort Study) at age 30 (respective sample sizes: 11,330, 11,380 and 11,217). Control for the effects of other relevant influences (mainly family background, material circumstances and early educational	National Child Development Study (NCDS), British Cohort Study (BCS)	UK	In terms of health, the labour market, citizenship and parenthood, young people with experience of higher education seem to enjoy greater benefits than less educated people. Expanding higher education should be part of the political agenda. Findings Health: graduates are generally less depressed and present a higher sense of wellbeing than people with lower qualifications; they are less likely to be obese or smoke. Citizenship and value: graduates appear to be more racially tolerant, more critical of	Individuals, graduate

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Bedford Group for Lifecourse and Statistical Studies, Institute of Education, University of London (http://dera.ioe.ac.uk/5167/1/rd05_03.pdf)		attainment). Credibility/validity: rigorous analysis thanks to the use of adequate control variables. Limitation: it does not manage to disentangle the effect of education on parenting from other variables (e.g. socio-economic status).			authority and less politically cynical; they are more active in their communities (participation in voluntary association). Benefits to graduates' children: graduates tend to read more to their children, who tend to own more books than children of less educated groups (and perform better at reading and mathematics tests).	
Baum, S., Ma, J. and Payea, K. 2010 Education Pays 2010. The Benefits of Higher Education for Individuals and Society The College Board Advocacy & Policy Centre website (http://advocacy.collegeboard.org/sites/default/files/Education_Pays_2010.pdf)	Health; citizenship, civic engagement and cohesion; parenting	Gathering relevant literature and providing correlations in a very accessible, didactic way (figures and chart for each different variable chosen e.g. obesity, voting, etc.). Credibility/validity: in terms of credibility, the fact that it is a publication by an advocacy center representing education professionals may raise doubts about its impartiality and objective treatment of data (the data itself is taken from official national sources). In terms of methodology, very little information is available.	Authors, Bureau of Labor Statistics (BLS), National Center for Education Statistics (NCES), US Census Bureau	US	In addition to generating economic returns to individuals, higher education also entail an improved quality of life (though not all dimensions can be easily quantified) and reinforce civil society. Findings (Various figures and charts are associated with each of the following findings) Smoking rates among graduates have been significantly lower than smoking rates among other adults since information about the risks became public; individuals with higher levels of education are more likely than those with lower levels of education to engage in leisure-time exercise; graduates are less likely than others to be obese; children of parents with higher levels of educational attainment are better prepared for school; both the percentage of people who donate their time to organizations and the number of hours people spend in volunteer activities are higher among individuals with higher levels of education; in every age group, adults with higher levels of education are more likely to vote than those with lower levels of education.	Individuals, graduate; wider society
Currie, J. and Moretti, E. 2003 Mother's Education and the Intergenerational	Health; parenting	Regression analysis of the effect of maternal educational attainment on birth outcomes using Vital Statistics Natality data on the period 1970-1999. Four channels through which maternal education can improve birth outcomes are examined (use of prenatal care, smoking, marriage, fertility). To take into account the endogeneity of educational attainment, the authors use data about the availability of colleges in each woman's county	Vital Statistics Natality data 1970-1999	US	Higher educational attainment of mothers improves infant health. Findings The authors estimate that an additional year of education reduces the incidence of low birth weight by approximately 10% and reduces the incidence of preterm birth by 6% on average. This can be explained by the way education influence maternal behaviour (especially higher education in the case of reducing	Individuals, graduate and non-graduate; wider society (children)

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<p>Transmission of Human Capital: Evidence from College Openings</p> <p><i>The Quarterly Journal of Economics</i>, 11/2003, Volume 118, Issue 4, pp. 1495 - 1532</p>		<p>in her 17th year in order to control for it when assessing maternal education.</p> <p>Credibility/validity: one limitation with the Vital Statistics data is that we observe the mother's residence at the time of the birth of the baby, and not at the time when she was seventeen. So the authors are compelled to assume it is the same as when she was 17, which is a problematic assumption given the high mobility rate for young women.</p>			smoking).	
<p>Brennan, J. 2008</p> <p>Higher education and social change</p> <p><i>Higher Education</i>, 09/2008, Volume 56, Issue 3, pp. 381 - 393</p>	Individual/societal impacts	<p>Conceptual analysis.</p> <p>Credibility/validity: relevant as an appropriate theoretical framework, that must be completed with empirical evidence.</p>	Author	-	<p>The social impact of higher education is under-researched and benefit from more empirical analyses.....The social impact of higher education takes different dimensions (constructing the 'knowledge society', the 'just and stable' society or the 'critical society') at different levels of social spaces (from local to global). But, 'obstruction' rather than 'construction' can be an impact of higher education (i.e. social reproduction via the university vs. 'just society', c.f Bourdieu)</p>	Wider society
<p>McArthur, J. 2011</p> <p>Reconsidering the Social and Economic Purposes of Higher Education</p>	Individual/societal impacts	<p>Philosophical approach.</p> <p>Credibility/validity: the main criticism would be that it essentially consists in a normative approach, with no empirical back up - it is rather a debate about the ends of education.</p>	Author	-	<p>The problem for higher education is not the trend towards that privileges its economic role, but rather the narrowness of the way in which that role is understood.</p> <p>Findings</p> <p>Corporate vision of higher education, that consists in instrumentalising it in market terms, faces contradictions (i.e. promotion of the learning experience, state intervention in the construction of 'consumers' tastes) and is detrimental to the public good (notion of a 'privileged' class)</p>	Wider society

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<i>Higher Education Research and Development</i> , 2011, Volume 30, Issue 6, pp. 737 - 749						
Cortese, A. 2003 The Critical Role of Higher Education in Creating a Sustainable Future <i>Planning for Higher Education</i> , 2003, Volume 31, Issue 3, pp. 15 - 22	Local and regional cultural impact; individual/societal impacts	Conceptual approach, grounded in some precise empirical examples of higher education institutions initiating sustainable development policies. Credibility/validity: the perspective of the paper is mainly normative, future-oriented, which makes its validity not easy to assess.	Author	US (mainly)	Higher education provides a unique environment that can make it a core of social change towards sustainable societies. They should design their programmes in a multidisciplinary, practical perspective, as well as promote partnerships with local and regional communities. Findings Different steps can be made in order to form a 'complex web of experience and learning' about sustainable development. Several examples of achievement in this direction are provided. Unity College, a small, private, liberal arts college in Unity, Maine, has created a cross-disciplinary program based on sustainability, which is combined with the study of the local lake (Lake Winnecook) so as to engage students in their local environment. Another example : Carnegie Mellon University as developed a programme in parallel with opportunities for its students to work on the design of its Centre for Environmental Studies, an environment-friendly building (for more than five years, 250 students were involved in the planning and design of the building and interacted with different design professionals of the local town).	Individuals, graduate; wider society
Caniëls, M. and van den Bosch, H. 2011 The role of Higher Education Institutions in building regional innovation systems	Local and regional cultural impacts	Conceptual analysis referring to empirically-based literature. Credibility/validity: empirical evidence (qualitative or quantitative) is needed.	Author	-	More research is needed to gain more understanding about the micro-dynamics of HEI-industry relationships (especially the learning processes at play within firms and the collaborative processes within the relationship). Research in this field should be based on interview and surveys among a large number of academic researchers as well as firm representatives, in a longitudinal perspective. Findings Higher education institutions (HEI) contribute to regional development through 3 channels : research (that can be regionally-focused and/or resort to regional actors); relationships HEIs/enterprises at a regional level; collaboration with (regional)	Wider society

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<i>Papers in Regional Science</i> , 06/2011, Volume 90, Issue 2, pp. 271 - 286					public and private actors (e.g. attendance of university researchers at industry sponsored meetings and conferences; making the university premises available for local activities)	
Apostolakis, C. 2008 The Role of Higher Education in enhancing Social Entrepreneurship 3rd European Conference on Entrepreneurship and Innovation The University of Winchester, UK 15-16 September 2008	Local and regional cultural impacts	Qualitative research via conducting semi-structured interviews	Author	UK (Dorset) and Canada (Avalon)	The role education can play in fostering social entrepreneurship is deemed important by university students and staff. Findings Attitudes towards entrepreneurship and its social benefits for the wider local community are dominant in Bournemouth University (UK), not in the Memorial University (Australia) that is more market-driven oriented.	Wider society
Hudson, C. 2006 Regional Development Partnerships in Sweden: A Way for Higher Education Institutions to Develop their	Local and regional cultural impacts	Sociological and historical approach combined with a case study about Umea University. Credibility/validity: a limited study in terms of empirical assessment of outcomes; but relevant in terms of governance and institutional acknowledgement of higher education's regional role.	Author	Sweden (Umea)	The active involvement of higher education institutions in regional partnerships, by integrating them into policy-making networks and relationships with public sector actors and businesses, involve universities in the processes of regional governance. Findings Umea exemplified the involvement of higher education at the regional level - it is the first provider of human capital in the region, it has a good record and networks at both the national and international levels, which brings expertise and contacts to	Wider society

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>Role in the Processes of Regional Governance</p> <p><i>Higher Education</i>, 04/2006, Volume 51, Issue 3, pp. 387 - 410</p>					regional growth projects. The author focuses on the EU co-funded regional projects (projects belonging to the University have obtained over SEK 600 million (almost 67 million) in funding for the period 2000–2005 (a third from EU funds; a third from other regional actors – e.g. County Administrative Board, County Council and municipalities; a third from the University itself).	
<p>Cochrane, A. and Williams, R. 2010</p> <p>The role of higher education in social and cultural transformation</p> <p>Center for Higher Education Research and Information, The Open University</p>	Local and regional cultural impacts	Historical and conceptual approach and empirical assessment of the HEART project.	Center for Higher Education Research and Information, The Open University	UK	<p>Quoting the Department for Education and Skills' White Paper (2003): '[...] in all cases, universities and colleges are key drivers for their regions, both economically and in terms of the social and cultural contribution they make to their communities'.</p> <p>Findings</p> <p>(Results of the ESRC funded HEART (Higher Education and Regional Transformation)), a project structured around four case study higher education institutions and the regions in which they are located, to analyse the economic and social impacts) The universities engage variously with the regional level (depending whereas the regional development authority is a potential source of funding) and in practice the focus is more on the city region; community engagement of students as well as partnerships in urban projects can be a regional and local influence by universities; regional historical context of higher education institutions matter: institutions which lay more emphasis on skills development both for regional populations and in reaction to perceived (regional) employer demand tend to be those for whom the recruitment of local students is the norm.</p>	Wider society
<p>Feinstein, L. and Sabates, R. 2006</p> <p>Does education have an</p>	Parenting	Comparison of results educational attainment/educational behaviours towards children given by a (less robust) ordinary least squares (OLS) regression method and those provided by (more robust) instrumental variable (IV) methodology, based on data from the National Child Development Survey (NCDS) (information reported mainly by the	National Child Development Survey (NCDS)	UK	<p>The effect of an extra year of education on mothers' educational attitudes and behaviour is mainly a socio-economic selection effect (i.e. privileged background favours engaging in non-compulsory education but is also associated with specific parenting attitudes)</p> <p>Findings</p>	Individuals, graduate and non-graduate, and their children

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>impact on mothers' educational attitudes and behaviours?</p> <p>Centre for Research on the Wider Benefits of Learning (www.learningbenefits.net), Wider Benefits of Learning Research Report</p>		<p>mother in 1965)</p> <p>Controls for risk factors affecting children's performance at school or of emotional and behavioural disorders (e.g. low parental education and socio-economic status, young mother, absence of the mother/father).</p> <p>Credibility/validity: the analysis presents interesting angles to examine the role of education in parental attitudes - most NCDS at the time of the survey (1965) were completed by mothers (so that limits measurement errors about mother/child relationship), the data collected by NCDS enlarge the potential number of control variables.</p>			<p>Results from the IV estimates showed that the average effect of an additional year of (post compulsory) full time education on mothers' educational attitudes is not significant (contrary to what shows a OLS regression).</p>	
<p>Vila, L.E. 2005</p> <p>The Outcomes of Investment in Education and People's Well-being</p> <p><i>European Journal of Education</i>, 03/2005, Volume 40, Issue 1, pp. 3 - 11</p>	Social inclusion	<p>Summarizing the pre-2005 literature findings about the non-monetary outcomes of education.</p> <p>Credibility/validity: a number of assumptions on the positive effect of higher education in terms of social cohesion, but lack of empirical evidence (quantitative of qualitative). On positive link with reduction of violent crime, contradiction with empirical evidence (see Sabates, 2008).</p>	Various authors	US and Europe	<p>[T]raditional pecuniary measures do not capture all the utility-enhancing effects of education.'....Greater education investment is related to a greater stability of social structures; development of a sense of citizenship.</p>	-
Hertz, T.,	Social	Regression analysis for all 42 countries	World	42	It is a world trend that educational attainment is still as much	Individuals,

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., & Verashchagina, A. 2007</p> <p>The inheritance of educational inequality: International comparisons and fifty-year trends</p> <p><i>The B.E. Journal of Economic Analysis & Policy</i>, 01/2008, Volume 7, Issue 2, p. 10</p>	<p>mobility</p>	<p>(equation predicting children's schooling according to their parents' schooling) over the past 50-year period, based on surveys carried out from 1985 to 2004. Educational attainment measured in number of years of schooling.</p> <p>Credibility/validity: confirmation of the UK decreased intergenerational mobility by Blanden, et al. (2004), who observe that rising educational attainment between the late 1950s and early 1970s was driven primarily by increases in tertiary education among the children of higher income, well-educated families (so indeed increase in intergenerational educational persistence). On the negative side, on the causal impact of parents' education on their children's education there is omission of socio-economic factors positively correlated with schooling (wealth, geographic area, etc.).</p>	<p>Bank Living Standards Measurement Surveys (LSMS), similar household surveys conducted by national statistical agencies, and country surveys affiliated with the European Social Survey (ESS), the International Social Survey Program (ISSP), and the International Adult Literacy Survey (IALS)</p>	<p>countries (including Western Europe and the US)</p>	<p>correlated with one's parents attainment over the past 50 years (in the UK, it is actually more correlated today)</p> <p>Findings</p> <p>On average, the standard deviation has not changed for 50 years: still 0.4, i.e. parents schooling still play the same role in the variance of children's schooling. The UK correlation coefficient is not especially high regarding the mean, and much lower than the US one. But both countries display a statistically significant increase over time in the correlation (a phenomenon previously seen only in countries at very low levels of schooling) - sign of a decreasing social mobility?</p>	<p>graduate and non-graduate</p>
<p>Silver, H. 2007</p> <p>Higher Education and Social Change: Purpose in Pursuit</p> <p><i>History of Education</i>, 07/2007, Volume 36,</p>	<p>Societal impacts</p>	<p>Historical approach (covers the 19th, 20th centuries and touches on aspects of the 21st)</p> <p>Credibility/validity: good historical analysis (though especially focused on discourses) that points out holes in the state of the research</p>	<p>Author</p>	<p>UK, US and Western Europe</p>	<p>Investigation of higher education's impact on or contribution to British social change has been weak, especially in the history field.</p> <p>Findings</p> <p>The author presents different examples supporting the idea those universities changes have occurred in response to social changes - not initiating them. Example: introduction of new subjects (environmental, business-related) in the polytechnics due to new social awareness, transformations about structures and processes due to the massification of higher education (e.g. competition for financial support, preparation for detailed</p>	<p>Wider society</p>

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
Issue 4-5, pp. 535 - 550					external scrutiny). In 1970 the CVCP (Committee of Vice-Chancellors and Principals) points out the 'more central and significant role in society' of universities than a decade earlier because of massification effects. Quoting the vice-chancellors' organization Universities UK in 2006 : 'One of the core aims of UK higher education has been to meet the needs of the wider community, and the expansion of higher education has meant an increasing impact on that community.' So, role of support, but not of initiative in terms of social change.	
Mandemakers, J. and Monden, C. 2010 Does education buffer the impact of disability on psychological distress <i>Social Science & Medicine</i> , 2010, Volume 71, Issue 2, pp. 288 - 297	Wellbeing	Panel data analysis, based on two waves of the 1958 British National Child Development Study. In total 423 respondents (4.6%) experienced the onset of a physical disability between the ages of 23 and 33 (age for which the effect of higher education is tested). Adding a number of controls (gender, having a partner, father's occupational class, pre-existing self-perceived health - all factors that can shape the impact of disability on well-being). Credibility/validity: robust association higher education/buffering effect on psychological distress (reduced but still substantial if cognitive ability and occupational class are controlled simultaneously). Possible limitations: non-response bias (people with poorer health during the first survey wave are less likely to respond to the second wave) - but this tend to reinforce the results, as it favours underestimation of effects of disability on psychological distress, hence underestimation of buffering effects. In addition, the NDCS contains little information about the severity of disability, which can be another source of bias.	National Child Development Study (NCDS)	UK	Hypothesis that the start of a physical disability in early adulthood (age 23 to 33) has a smaller effect on psychological distress among higher educated people. These results enrich the little literature about the socio-economic factors/disability and its effect on well-being, by taking a longitudinal perspective and not focusing on the elderly. Findings Significant relationship between the level of education and the onset of disability on distress. Individuals with higher education and with a degree or higher appear to cope with better than the others (effects about 75% smaller than for people with no qualifications).	Individuals, graduate and non-graduate
Randle, J. 2003 Changes in self-esteem during a 3-year pre-registration Diploma in Higher Education	Wellbeing	Correlations made on SPSS between respondents' scores and variables (e.g. cohort, age of student, nursing branch studied). Samples were taken from all the branches of a nursing programme in a higher education establishment. Questionnaires were completed at the start and at the end of the 3-year course - the Professional Self-Concept Nursing Inventory (PSCNI), which measures students' 'professional self-esteem' and the Professional Self-Concept Nursing Inventory (PSCNI), used to measure students' global self-esteem.	Author	UK	Positive patient care is linked to the healthy self-esteem of the nurses, but this study aims at showing that students enrolled in a nursing training see their self-esteem decrease. The author suggests the need for setting up specific educational structures and processes to support students in nursing. Findings The PSCNI showed that students held a consistently healthy professional self-esteem throughout the course, whereas the Tennessee Self-Concept Scale scores showed although most	Individuals, graduate

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>(Nursing) programme</p> <p><i>Journal of clinical nursing</i>, 01/2003, Volume 12, Issue 1, pp. 142 - 143</p>		<p>Credibility/validity: a lack of explanation of differences in measurement analysis between the two inventories, that makes the contradictory results harder to interpret. A very short paper that does not question its measurement methodology.</p>			<p>students start their nurse training with normal self-esteem, they leave the course with below average self-esteem (in parallel with family, personal and social components of their self-esteem). No clear relationships were found regarding cohort, branch of nursing being studied, age and number of referrals during assessments.</p>	
<p>Morris, C. 2011</p> <p>Wellbeing and the research student</p> <p>Marshall, L. and Morris, C. (eds) (2011), <i>Taking Wellbeing forward in higher education: reflections on theory and practice</i>,</p>	Wellbeing	<p>Longitudinal approach (2 years) through semi-structured interviews of originally 33 students recruited in this cross-discipline project, 22 remaining until the end of the project. The students who stayed with the project were interviewed at least three times over the two-year period. Interviews were conducted face-to-face, by telephone and email. Certain students shared their experiences through blogs and email correspondence with the researcher.</p> <p>Credibility/validity: interesting from a qualitative viewpoint, the experience of students being presented in the form of their personal discourses. But the sample size and the method do not enable to reach general conclusions.</p>	University of Brighton	UK	<p>The experience of becoming a doctoral student (notably independent work) can importantly affect students' confidence and wellbeing. But good supervision, including peer support or personal coping strategies can improve the wellbeing of these individuals.....The length of doctoral studies can impact negatively on students emotional resources, their sense of identity (students or researchers?), their self-esteem and confidence, affecting sometimes physical wellbeing (e.g. lack of sleep, poor nutrition).</p>	Individuals, graduate
<p>Muurlink, O. and Poyatos Matas, C. 2011</p> <p>A higher degree of stress:</p>	Wellbeing	<p>Review of relevant literature and empirical evidence (mainly surveys) to demonstrate a relationship between high levels of stress in the academic environment (postgraduate and teachers) and 1) a lack of clarity in academic roles 2) chronic overwork.</p> <p>Credibility/validity: a well-constructed article but which does not provide measurement tools</p>	University of Brighton	Australia	<p>High levels of stress in the academic environment is linked to a lack of clarity in academic role and a phenomenon of chronic overwork caused by changing university structures and expectations. But there is a current positive trend of universities developing more and more wellbeing policies (following a 'Google' model).</p> <p>Findings</p>	Individuals, graduate and staff

Author(s)/Title/Source	Type of outcome	Method	Data owner	Area	Summary of main argument	Impact on whom
<p>academic wellbeing</p> <p>Marshall, L. and Morris, C. (eds) (2011), <i>Taking Wellbeing forward in higher education: reflections on theory and practice</i>, Centre for Learning and Teaching, University of Brighton (www.brighton.ac.uk/ct/index.php/download_file/view/79/179)</p>		<p>of 'negative externalities' of higher education.</p>			<p>Teachers' reported experience of stress is mainly due to workload pressure, difficulties with management and poor staff-student relationship, which translates into irritability or anxiety (survey of the Independent Education Union in Victoria and New South Wales, Australia (IEU 2009). For postgraduate students, anxiety seems to be strongly linked to the absence of defined structure (for instance, the frequency of meetings with the supervisor appears to be positively associated with a higher satisfaction). Attrition rates are relatively high in the humanities, where less laboratory work often equates to less contact time between supervisors and students. Another study in Australia showed that completion rates were significantly higher for the 'hard' sciences and lower for arts, social science and legal studies.</p>	

Annex 3. Data Set Review

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
<p>Web http://discover.ukdataservice.ac.uk/catalogue?sn=6691</p> <p>Social Participation and Identity, 2007-2010: Combining Quantitative Longitudinal Data with a Qualitative Investigation of a Sub-Sample of the 1958 National Child Development Study</p> <p>1958-2013</p>	Centre for Longitudinal studies, Institute of Education	Citizenship, civic engagement and cohesion	Qualitative investigation about social participation of a sub-sample of the 1958 National Child Development Study.	UK	The National Child Development Study is a longitudinal study following up the lives of 17,000 people born in England, Scotland and Wales in a single week of 1958, at various ages. Collects information (surveys) on physical and educational development, economic circumstances, employment, family life, health behaviour, wellbeing, social participation and attitudes.	Individuals, graduate and non-graduate
<p>Web http://www.esds.ac.uk/longitudinal/access/ncds/l33004.asp</p> <p>National Child Development Study (NCDS)</p> <p>1958-2013</p>	Centre for Longitudinal studies, Institute of Education	Health, family interactions, wellbeing, social participation	A longitudinal study based on questionnaires, that follows the lives of 17,000 people born in England, Scotland and Wales in a single week of 1958. It collects information on physical and educational development, economic circumstances, employment, family life, health behaviour, wellbeing, social participation and attitudes.	UK	<p>The initial birth survey (1958) was followed by eight attempts to trace all members of the cohort. The first five NCDS 'sweeps' were carried out in 1965, 1969, 1974, 1981, and 1991.</p> <p>In 1998 the management of the NCDS was transferred to the Centre for Longitudinal Studies (CLS) at the Institute of Education. CLS has carried out the three most recent sweeps, in 1999-2000, 2004 and 2008. The ninth is due for 2013 when cohort members turn 55.</p>	Individuals, graduate and non-graduate, and parents/children
<p>Web http://www.esds.ac.uk/longitudinal/access/bcs70/l33229.asp</p>	Centre for Longitudinal studies, Institute of Education	<p>Relationships, parenting and housing; Health and health behaviour;</p> <p>Citizenship and values</p>	Surveys	UK	These surveys follow the lives of more than 17,000 people born in England, Scotland and Wales in a single week of 1970. Over the course of cohort members lives, the BCS70 has collected information on health, physical, educational and social development, and economic circumstances (etc). Among the questions asked by the questionnaires, questions about social activities, health, political views and happiness - which can be related to the	Individuals, graduate and non-graduate, and their children

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
<p>The 1970 British Cohort Study (BCS70)</p> <p>1970-2012</p>					higher education degrees of the respondents (another component of the questionnaires).	
<p>Web (http://qtr.rcuk.ac.uk/)</p> <p>Public perceptions of the benefits of higher education</p> <p>2010</p>	Higher Education Funding Council for England (HEFCE), Ipsos MORI	Health; individual/social impacts	<p>Poll. 2,003 interviews were conducted from 31 July and 6 August 2010 with a representative sample of adults aged 15+ in Great Britain (GB). Interviews were administered face-to-face in home by trained Ipsos interviewers using Computer Assisted Personal Interviewing (CAPI).</p>	UK	Aim of the research: provides a basic understanding of 1) the level of support for public investment in higher education; 2) any perceived benefits that higher education brings to the UK economy.	Wider society

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
Web http://www.hefce.ac.uk/media/hefce/content/pubs/2010/rd2410/rd24_10.pdf Public perceptions of the benefits of higher education 2010	Higher Education Funding Council for England (HEFCE), Ipsos MORI	Health; individual/social impacts	Poll. 2,003 interviews were conducted from 31 July and 6 August 2010 with a representative sample of adults aged 15+ in Great Britain (GB). Interviews were administered face-to-face in home by trained Ipsos interviewers using Computer Assisted Personal Interviewing (CAPI).	UK	Aim of the research: provides a basic understanding of 1) the level of support for public investment in higher education; 2) any perceived benefits that higher education brings to the UK economy.	Wider society
Web http://ec.europa.eu/health/indicators/echi/list/index_en.htm ECHI (European Community Health Indicators) 2004-2011	European Commission	Health	Data representing life expectancy, access to healthcare (ECHI 80) and dental care by country and by educational level (i.e. proportion of people whose highest completed level of education is ISCED class 5 or 6 (tertiary education) with self-declared unmet needs for health care services)	EU	This data set uses an interactive application to present relevant and comparable information on health at European level.	Individuals, graduate and non-graduate
Web (http://www.esds.ac.uk/findingData/bhps.asp) British Household Panel Survey (BHPS)	Institute for Social and Economic Research, University of Essex	Health, wellbeing, citizenship, parenting, civic engagement and cohesion	A study based on questionnaires that follows the same representative sample of individuals – the panel – over a period of years; it is household-based, interviewing every adult member of sampled households. The core questionnaire contains annually asked questions on	UK	In 1991, the British Household Panel Survey began. In 1999, extension samples of 1,500 households in each of Scotland and Wales were added to the main BHPS sample (5,500 households and 10,300 individuals drawn from 250 areas of Great Britain) to enable independent analysis of each country. In 2001, a sample of 2,000 households was added in Northern Ireland. The total sample size for the BHPS	Individuals, graduate and non-graduate

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
1991-2009			social science topics (including educational attainment, socio-economic conditions), but there is also a variable component which is asked less frequently than annually (relevant in terms of 'wider benefits' of education, e.g. additional health measures, ageing, retirement and quality of life, children and parenting, neighbourhood and social networks).		including the extension samples is now around 10,000 households across the UK.	
<p>Web (http://epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database)</p> <p>Eurostat database on education and training</p> <p>Depending on the variable</p>	-	-	The complete range of EU education indicators presented in tables by Eurostat, which contains notably a section about outcomes and returns of education by level of education (e.g. labour status, transition from education to work)	EU	Eurostat is a Directorate-General of the EU since 1958 which aims at providing a high-quality statistical information service to the institutions and harmonizing statistical methods at European level to enable comparisons between countries and regions	Individuals, graduate and non-graduate
<p>Web (http://www.learningbenefits.net/Index.htm)</p> <p>Website of the Center of Research for the Wider Benefits of Learning (WLB)</p>	Centre for Research on the Wider Benefits of Learning, Institute of Education	Virtually all types	Reports, monographs and flagship publications about wider benefits of higher education are accessible on the website.	UK	The Centre for Research on the Wider Benefits of Learning (WBL) was created in 1999 by the Department for Education and Skills - now known as the Department for Children, Schools and Families (DCSF) - to investigate the benefits gained from learning across the life course. WBL's research explores the multi-level, social benefits of learning in terms of the well-being and quality of life of individuals, their	-

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
-					families and communities across local, national and international areas.	
Web (heer.qaa.ac.uk/) Higher Education Empirical Research Database -	Quality Assurance Agency for Higher Education (QAA)	-	Browser that can provide summaries of articles by year of publication, theme (e.g. Economic and Social Context of Higher Education), sub-theme (e.g. Civic and Community Engagement) or publisher.	UK	The Higher Education Empirical Research (HEER) database comprises summaries of the latest published research on a range of topics related to higher education. It is intended for use by policy-makers, academics and researchers in higher education.	-
Web (http://www.oecd.org/education/educationataglanceindicatorsrawdata.htm) Education at a Glance Indicators Raw Data 2009-2010	OECD	Citizenship, civic engagement and cohesion(indicator A.11)	Summary of education indicators used by the OECD Education at a Glance Report	OECD countries	Annual education report of the OECD.	Individuals, graduate and non-graduate
Web (http://www.oecd-ilibrary.org/education/data/education-database_edu-db-data-en)	-	-	Summary of education indicators used for statistical purpose.	-	The UNESCO/OECD/EUROSTAT (UOE) database on education covers the outputs of educational institutions, the policy levers that shape educational outputs, the human and financial resources invested in education, structural characteristics of education systems, and the economic and social outcomes of education, learning and	-

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
<p>OECD Education Statistics - Education Database</p> <p>-</p>					training throughout life.	
<p>Web (http://ess.nsd.uib.no/)</p> <p>European Social Survey (ESS)</p> <p>2002-2010</p>	Centre for Comparative Social Surveys, City University, London	Health, citizenship, civic engagement, relationships, wellbeing	Biennial multi-country surveys covering over 30 nations.	Europe	The ESS was established in 2001. It is funded jointly by the European Commission, the European Science Foundation and academic funding bodies in each participating country. The ESS applied in 2013 for selection as a European Research Infrastructure Consortium (ERIC).	-
<p>Web (http://ec.europa.eu/public_opinion/archives/ebs/ebs_369_en.pdf)</p> <p>Attitudes towards vocational education and training - Special Eurobarometer 369</p> <p>2011</p>	European Commission	Citizenship, civic engagement and cohesion	Surveys based on the interview of 26,840 European citizens aged 15 and above about Vocational Education and Training by the TNS Opinion & Social network bin June 2011 in all 27 European Union Member States.	EU	Eurobarometer is a series of public opinion surveys conducted regularly on behalf of the European Commission since 1973	Wider society

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
<p>Web (http://www.hefce.ac.uk/data/)</p> <p>2012 occupational stress survey</p> <p>2012</p>	University and College Union	Wellbeing; Health	<p>Survey (conducted in 16 April – 4 May 2012) based on responses by UCU</p> <p>members about (14,000 higher education academic and academic-related staff) to the Health and Safety Executive's questionnaire, the Management Standards</p> <p>Indicator Tool. The MSIT seeks to measure the level of well-being of respondents at work</p> <p>on the basis of their response to statements in the questionnaire.</p>	UK	The University and College Union (UCU) is a British trade union formed by the merger in 2006 of the Association of University Teachers (AUT) and the National Association of Teachers in Further and Higher Education (NATFHE), a combined membership of around 120,000 individuals (making it the largest teachers trade union in the UK). This survey is part of a campaign against excessive workload and stress in the education sector.	Teaching staff
<p>Web (http://www.wvsevsdb.com/wvs/WVSDData.jsp?Idioma=1)</p> <p>World Values Survey - Data files</p> <p>1981-2008</p>	World Values Survey	Civic engagement	Aggregated results of national surveys based on interviews about social values (e.g. 'do you think it is possible to trust the others?') in 97 countries, totalling more than 256,000 interviews.	97 countries representing almost 90% of the world's population	The World Values Survey Association (WVSA) is a non-profit association located in Stockholm, Sweden. It has been founded to help social scientists and policy-makers better understand worldviews and changes that affect values in the worlds. It has carried out 5 waves of surveys since 1981, and another is currently in preparation.	Wider society
<p>Web (http://www.natcen.ac.uk/series/british-social-attitudes)</p>	Natcen	Virtually all types	Based on interviews (over 3,000 conducted each year), using random probability sampling. The questions cover an extensive number of social issues (e.g. education, health, government spending and	UK	The British Social Attitudes survey series has been conducted annually since 1983 and is NatCen's longest running survey. Each year over 3,000 interviews are conducted with individuals in the UK.	Wider society

Source/Title/Timespan	Owner of Data	Type of Outcome	Method	Countries/geographic Areas	Short narrative of dataset	Impact on whom
<p>British Social Attitudes Surveys</p> <p>1983-2012</p>			<p>voting habits).</p>			

Annex 4. The US Literature: How College Affects Students, by Ernest Pascarella and Patrick Terenzini

US research evidence on the impacts of higher education

The substantial US research literature on the impacts of higher education on students has been periodically summarised in a series of major research syntheses commencing with Feldman and Newcomb's *The Impact of College on Students* (1969)¹¹ – which reviewed 1500 research studies – followed by the first volume of Pascarella and Terenzini's *How College Affects Students* (1991)¹² – which reviewed a further 2600 studies – and then by a second volume by the same authors (2005)¹³ – which reviewed another 2500 studies. The exercise has been a cumulative one with successive volumes recording both changes and continuities in the messages emerging from research.

In our report, we have noted the 'net changes' in US students recorded by the most recent research summarised by Pascarella and Terenzini. The focus on 'net changes' is significant because it distinguishes changes which are attributable to the experience of higher education rather than to other influences, such as maturation, social background and other factors, in ways which much of the UK literature fails to do. As we have noted in the main report, UK research often leaves open questions about causality in many of the relationships which are reported about the differences between graduates and non-graduates or, more generally, in the differences related to the number of years of formal education experienced.

As well as identifying 'net effects', other relevant distinctions which are addressed by the questions posed by Pascarella and Terenzini in their latest volume are: how far changes are differentially related to the kind of institution attended ('between-college' effects), how far changes are related to differences in the student experience within any given institution ('within-college' effects), whether changes are differentially shaped by individual student characteristics ('conditional' effects), and whether the effects of higher education are durable ('long-term' effects). These are important distinctions that need to be made in discussions about the impacts of higher education. Below we provide some more information on Pascarella and Terenzini's conclusions about the 'net effects' of higher education, i.e. those changes in students which can actually be attributed to the influence of higher education.

¹¹ Feldman, K and Newcomb, T, 1969, *The Impact of College on Students*, San Francisco: Jossey-Bass

¹² Pascarella, E and Terenzini, P, 1991, *How College affects Students: findings and insights from twenty years of research*, San Francisco: Jossey-Bass

¹³ Pascarella, E, and Terenzini, P, 2005, *How College Affects Students: a third decade of research*, San Francisco: Jossey-Bass

The net effects of higher education

The authors note that

“the evidence supporting the net impact of postsecondary education on learning and cognition, moral development, career and economic returns is more expansive and consistent than the evidence concerning changes in attitudes, values and psychosocial characteristics”. (p579)

However, they also note that this may reflect

“variations in the extent and quality of the available evidence across areas of inquiry rather than significant differences in the actual impact of exposure to college”. (ibid)

Bearing in mind the above reservations, we can note Pascarella and Terenzini's conclusions about the net effects of higher education in five areas.

(i) Learning and cognitive changes

This was a major area where research supported a significant impact of higher education rather than a maturational effect or other relationship. The following qualities were all enhanced by the experience of higher education: general verbal and quantitative skills, oral and written communication, critical thinking, use of reason and evidence in addressing ill-structured problems, and intellectual flexibility. The changes recorded in these dimensions could not be explained by rival hypotheses related to academic ability, sex, race or maturation.

(ii) Psychosocial changes

Here, conclusions are more mixed, depending on the particular psychosocial changes being considered. The following are the areas of change where there existed good evidence that they represented 'net effects' of higher education: growth in leadership skills, sense of control over academic performance, and declines in student authoritarianism, dogmatism and ethnocentrism.

On the other hand, some reported psychosocial changes were either very small or could not be clearly distinguished from maturational effects or the influences of students' family backgrounds. These included changes in self-esteem, sense of control and identity.

(iii) Attitudes and values

The recent evidence of higher education's impact on students' attitudes and values indicated some changes in the extent of the impacts from those which had been reported in earlier studies. Whereas the earlier reviews had found consistent evidence that students acquired more 'open, liberal, and tolerant attitudes and values' (ibid, p581) as a result of their higher education experiences, more recent research found few changes in attitudes and values additional to those occurring in society more generally. There were two exceptions. There was evidence that higher education increased student civic and

community involvement and that it promoted racial understanding and openness to diversity.

(iv) Moral reasoning

American research has consistently reported a statistically significant and positive effect of higher education on growth in the use of 'principled reasoning in addressing moral problems' although the authors point out that principled reasoning alone is not necessarily sufficient to ensure principled behaviour!

(v) Career and economic impacts

The review reports that attaining a bachelor's degree, compared with a high school diploma and controlling for an individual's background and other confounding influences, conferred 'about a 34 percentile point advantage in occupational status or prestige, a 20 to 40% advantage in earnings and a private rate of return between 9.3 and 10.9%' (ibid, p447). The advantages were evident both for 'first jobs' after graduation and over the occupational life span and further advantages were recorded for years of further study beyond the bachelor's degree.

Recent research confirmed that higher education conferred benefits in terms of occupational status, workforce participation (i.e. occupational stability) and earnings. Evidence about the effects on job satisfaction was more mixed and quite complex. On the one hand, higher education had a positive impact on job satisfaction because of its impact on things such as job prestige, earnings, autonomy and non-routine work. On the other hand, net of such factors the effect of having a degree on job satisfaction tended to be negative, possibly relating to a disjunction between raised expectations and actual work experience. It is also interesting to note that the review uncovered very little research evidence on the influence of higher education on job performance.

Diversity, causality and timeframes

As well as distinguishing the 'net effects' of higher education, the reviews of the US literature also shed light on the many complexities in analysis and interpretation of the 'evidence' on the impact of higher education. A central point is that a lot of research is effectively just reporting averages. In other words, the many advantages to be attained from acquiring a college degree are not attained equally by everyone. And this is where the 'between college' effects, 'within college' effects and 'conditional effects' become important. These are discussed extensively in the most recent volume. Evidence is not always available to determine elements in the causal chain. But there is much of interest and of potential relevance to UK debates and policies. One example concerned 'quality differences' where quality was most often defined in terms of institutional selectivity or reputation. Institutional quality so defined appeared to have relatively little impact on 'learning, cognitive development, values, and psychosocial change' but had rather more impact on 'socioeconomic outcomes such as educational attainment, occupational status, career mobility, and the like' (ibid, p593).

The growing differentiation of higher education is a feature of many higher education systems, although its extent and nature do differ considerably between nations. The analyses over time presented by this series of US synthesising reports reveal both

changes and continuities in the impacts and beneficiaries of higher education. While the answers may well be different, the questions addressed in the US research literature are highly pertinent to higher education in the UK.

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URN BIS/13/1244