

**Economics of Education Research:
A Review and Future Prospects**

Lorraine Dearden*, Stephen Machin and Anna Vignoles*****

* *Institute of Education, Centre for the Economics of Education and Institute for Fiscal Studies*

** *Department of Economics, University College London, Centre for the Economics of Education and Centre for Economic Performance, London School of Economics*

*** *Institute of Education and Centre for the Economics of Education*

Corresponding author: Anna Vignoles, Institute of Education, 20 Bedford Way, London, WC1H 0AL.

Abstract

In this paper we offer an appraisal of the economics of education research area, charting its history as a field and discussing the ways in which economists have contributed both to education research and to education policy-making. In particular, we highlight the theoretical and methodological contributions that economists have made to the field of education during the last 50 years. Despite the success of the economics of education as a field of inquiry, we argue that some of the contributions made by economists could be limited if the economics of education is seen as quite distinct from the other disciplines working in the field of education. In these areas of common interest, economists need to work side by side with the other major disciplines in the field of education if their contribution to the field is to be maximised, particularly in terms of applying improved methodology. We conclude that the study of education acquisition and its economic and social impact in the economics of education research area is very likely to remain a fertile research ground.

Acknowledgements

This work was supported by the Centre for the Economics of Education.

1. Introduction

Recently there has been a resurgence of research by economists on education and education policy. It follows a relatively fallow period when UK research in this area was much less active, compared to the initial heydays of the field in the 1960s and 1970s. We explore these trends, asking why there has been a recent increase in interest and highlighting key theoretical and methodological contributions in the field.

The economics of education is about how best to allocate scarce resources in education. It can help us understand how education might best be produced, who gets more (or less) education and the economic impact of education on individuals, firms and society as a whole. There are many key economic ideas that have become commonplace in education, in both research and policy-making. These include: the idea of education as an investment (the human capital approach of Becker, 1964); the notion of economic returns to education in the form of improved labour market outcomes (the earnings function of Mincer, 1958, 1974); the evaluation of education policy in terms of cost effectiveness; and many others.

Overall we conclude that the economics of education has seen a resurgence, linked to the increasing dominance of quantitative methods in policy oriented research and potentially the decline in quantitative sociology of education research during this period, as discussed in the chapter by Lauder et al. in this volume. We make the case that the economics of education is a rapidly advancing field with significant influence on policy-making in many countries. Nonetheless it remains the case that some aspects of economics of education research need closer integration into the other disciplines of education.

The rest of the paper is as follows. Section II places the economics of education field into its appropriate historical context. We also show bibliometric evidence on the increased numbers of economics of education publications in top economics journals. Section III discusses some key theoretical advancements, while Section IV considers methodological innovations. Section V considers wider impacts of the economics of education field. Section VI concludes.

2. The Origins and Resurgence of Economics of Education Research

Historical Context

Many of the principles of the economics of education can be traced back at least as far as Adam Smith in his *Wealth of Nations* treatise published in 1776. Certainly, he alluded to the idea that one might invest in education to increase the productive capacity of society. However, the founding father of the economics of education is arguably Gary Becker, who wrote the hugely influential book *Human Capital* in 1964¹, in which he purported to explain why individuals invest in education and training in a manner analogous to investments in physical capital, i.e. to earn a financial return. Human Capital Theory has become and remained the dominant paradigm in the economics of education, despite challenges along the way from commentators who were concerned with the notion that people (like machines) can be viewed as capital, and from economists who claim that the main role of education is not to enhance productivity per se but to sorting individuals of differing skills and abilities into jobs (Spence, 1973; Blaug, 1976).

¹ Commentators on the origins of the economics of education (e.g. Teixeira, 2001) also refer to Theodore Schultz's presidential address to the 1960 American Economic Association (Schultz, 1961) and to the Special Issue of the 1962 Journal of Political Economy edited by Schultz entitled 'Investment in Human Beings'.

The heyday of the economics of education is seen as the 1960s and 1970s, given some of the classic writings that emerged at that time (like Blaug, 1972, 1976; Freeman, 1976; Layard and Psacharopoulos, 1974; Psacharopoulos, 1973; and Schultz, 1961, 1963). Significant developments were also made on the empirical side during this time. Mincer's (1958, 1974) highly influential work developed the earnings function that relates $\log(\text{earnings})$ to schooling and experience and is one of the most widely used tools amongst empirical economists (see Card's (1999) discussion on the causal impact of education on earnings). That said it is during recent decades that the principles of the economics of education have been so widely applied in education policy-making.

The Current Upsurge

Following the 1960s and 1970s, there was a significant decline in research activity in the economics of education, especially outside of the United States. More recently this decline has been reversed and there has been an upsurge of interest in the field: in the UK and US at least, accompanied by an increase in the use of economic evaluation in educational reform and policy-making.

Table 1 illustrates these trends using bibliometric evidence.² The Table shows the number of publications per year with the word education, schooling or school in the title of papers published in leading mainstream economics journals across six decades beginning in the 1950s.³ The Table shows a very clear pattern. In the 1950s hardly any education papers were published. In the 1960s 3.4 papers per year appeared in the most

² Another way of measuring activity in the field would be student numbers. However, the optimal training path for an education economist remains a mainstream economics degree and Masters with specialisation occurring at PhD level. Therefore it is problematic to count the number of researchers trained specifically in the economics of education.

³ The journals are the following: [American Economic Review](#); [Economic Journal](#); [Econometrica](#); [Económica](#); [Journal of Political Economy](#); [Quarterly Journal of Economics](#); [RAND Journal of Economics](#); [Review of Economic Studies](#).

prestigious journals and this almost doubled to 6.3 in the 1970s. After this, however, there was a sharp fall in the 1980s (down to 2.5 papers per year), something of a pick up in the 1990s (up to 5.2 a year, although with a lot of these towards the end of the decade) and then a very sharp increase to 9.7 a year in the 2000s.⁴

- **table 1 to go here** -

Whilst the upsurge in interest in education amongst economists in the 1960s and 1970s can partially be explained by key theoretical advances, the policy context may also explain trends in academic activity. Whilst the decline in the economics of education in the 1980s (at least in terms of the volume of academic work published) may be attributable to trends within the profession, it also coincided with a period of *laissez-faire* economic policy. Public policy was less interventionist in this era and there would have been less demand for the tools of the education economist (or indeed the education sociologist). The resurgence of the field in the 1990s can, at least in the UK, be partially explained by the trend towards regulated markets in the public domain. The introduction of market principles into education in the late 1980s called for both active policy intervention (i.e. regulation) alongside the application of economic principles of markets. In the 2000s in the UK there was also an increase in the number of education interventions, prompting a rise in the demand for economic evaluation of these policies. Trends in the economics of education may also be linked to other disciplines of education. As explored by Lauder et al. in this volume, there has been a period of decline

⁴ Of course, the number of papers per journal has also risen through time (especially in those journals that now have more issues per year than in the past), but not by enough to explain the scale of the recent upsurge. Similarly specialist journals that were set up in this time period and that have published a lot of economics of education papers (e.g. the Journal of Human Resources, the Economics of Education Review and the Journal of Labor Economics) were not considered in this suggestive analysis.

for quantitative sociology, just as there was increased interest in economic analysis of education.

From Table 1 another key trend of interest is the growth in the economics of education outside the US. The second row of the Table shows the number of papers with authors from outside of North America and the trend upwards over time is striking. Hardly any education papers were published by this group until recently and the 2000s sees 3.2 papers per year published. Given that the majority of the journals in the list are American, this is very striking, suggesting that the economics of education is currently a thriving field.

3. Theoretical Contributions to the Field of Education

Economics has contributed to the field of education theoretically, introducing economic ideas and the principles of the market. Economics has also made significant methodological contributions, particularly in the area of quantitative education policy evaluation, which are considered in Section 4.

A key strength of the economics of education is that it has clear theoretical underpinnings and a well utilised framework (supply and demand) for theory development and quantitative testing. Economists can utilise and apply robust theoretical models to questions that are of policy relevance. Economics can also generate testable hypotheses in the field of education that can be subjected to rigorous quantitative analysis. Indeed one explanation as to why economics has increased its influence as a discipline in a wide range of fields and in particular in education, is that it provides answers to policy questions in quantifiable terms. This is clearly appealing to policy-

makers who have to justify resource allocations. Furthermore, since economics is the science of scarcity, it is no wonder that its influence in fields such as education and health has been huge. In the public sector, with limited resources, the analytical tools of economics are enormously useful in providing answers that help policy-makers decide where to invest next.

It is, of course, difficult to select specific examples from the economics of education literature to illustrate the contribution of the discipline without appearing partial. However, there are several areas where economics has made a clear theoretical contribution. The first is in improving our understanding of the impact of education on individuals and the economy as a whole. Certainly most practitioners in the field subscribe, at least partially, to the notion that individuals and governments invest in education to earn a return on their investment. This return is generally in the form of higher earnings but may be in the form of non-monetary benefits, such as job quality.

With the right data, and the right methods, economists can measure this rate of return to different types of education investment. This area of research has burgeoned and has shown that more education significantly raises individuals' wages (Card, 1999; Harmon and Walker, 1995; Dearden et al., 2002; Blundell et. al., 2005), although there is less agreement on the contribution of education to economic growth (see Sianesi and Van Reenen, 2003). The rate of return literature has also moved beyond estimating the impact of an additional year of schooling on individuals' earnings (5-10%) to establish how economic returns vary by qualification type, level subject area and over time (see, for example, Dearden et al., 2002, Blundell et. al., 2005, and Machin, 2003, 2008b) and in

particular the extent to which early investments are potentially more valuable than those made in later in adulthood (Heckman, 2007).

Economists have also made an impact in modelling education production (see, *inter alia*, Todd and Wolpin, 2007, or Haveman and Wolfe, 1995). Although this may be anathema to some, the process of producing education can be analysed in a similar way to the production of other goods and services. If we accept the premise that the production of education is a process with inputs and outputs, we can consider issues about efficiency (i.e. the amount of input produced from a given level of input), as well as distributional issues, such as how education is distributed across the population. There have been a number of major contributions in this area, including estimates of the impact of additional resources (for example, smaller class sizes) on pupil achievement and/or the impact of teachers on pupil achievement (e.g. Angrist and Lavy, 1999; Dearden, Ferri and Meghir, 2002; Rivkin, Hanushek and Kain, 2005). This evidence suggests that, unless the reductions are sizable and hence extremely costly, reducing class sizes has little effect on achievement and that spending money on improving teacher quality is likely to be more effective than reducing class sizes. Economists have also recently started to recognise and provide theoretical models explaining the importance of the production of non-cognitive skills as well as education achievement (Heckman et al. 2001).

Another important and closely related theoretical contribution from economics has been models of the potential role of markets to improve the efficiency of education production (and in particular schools) and the implications that this marketisation of education might have for equity considerations (Epple and Romano, 1998, 2003; Hoxby,

2000). This is an issue we return to later when considering the practical impact of the economics of education on policy-making.

Further, there has been a growing (sometimes controversial) literature on the role of education in promoting or preventing social mobility and inequality (Blanden et al, 2005; Blanden et al, 2007, 2008; Ermisch and Nicoletti, 2007; Eriksson and Goldthorpe, 2008). This work on educational inequality tends to show education has had a disequalising impact on mobility since it has disproportionately benefited individuals from richer families and therefore reinforced, rather than countered, inequalities (Blanden and Machin, 2005). These findings have been of great policy importance and continues to be a theme pursued by all major political parties in the UK and indeed elsewhere.

We have been necessarily selective (and UK-centric) here but, in summary, a major way that economics has contributed to the field of education has been by clarifying and measuring the effect of state and private investments in education on pupil outcomes.

A key strength of the economics of education, namely that it produces quantifiable evidence, may also constitute its greatest weakness. One illustration of this is in the application of human capital theory to the analysis of education investments. This theory analyses education investments in an analogous way to investments in physical capital. However, education investments are of course not exactly the same as physical capital. Education has potentially unquantifiable benefits, such as giving individuals a greater sense of self-worth. These benefits would be missed in standard economic analysis. Economists have responded by trying to quantify non-monetary benefits, e.g. studies have investigated the impact of education on crime rates or levels of civic participation (for crime see Lochner and Moretti, 2004, Feinstein and Sabates, 2005, or

Machin and Vujic, 2005; for civic participation see Brehm and Rahn, 1997, Bynner and Egerton, 2001, Bynner and Parsons, 1997, or Dee, 2004). Such exercises may aid policy-makers in making the case for different types of education investment and have the appeal that they produce quantifiable impacts. However, they force the analyst to put monetary value on all benefits arising from education. This is of course a difficult (likely impossible) task. Too narrow an approach to the potential benefits of education can then alienate economists from researchers in other disciplines, such as sociologists, who take a broader (albeit less focussed) perspective.

4. Methodological Innovations from the Economics of Education

A second contribution of the economics of education has been methodological. Economists bring with them techniques that improve the quantitative rigour of analyses (see, for example, Heckman et al. 2007). There is, of course, a long tradition of quantitative research in education and the development of quantitative methods in education has increased with the availability of high quality survey data, particularly longitudinal data. More recently, quantitative education research has made use of administrative data sets that are available in a large number of countries. This is particularly the case in the UK, which has world class data in this regard.

The economics of education also places particular emphasis on establishing causality in analyses. The key question for economists is generally: what is *the causal impact of* a particular education policy or ‘treatment’? That is: what is the outcome if a person receives a particular educational treatment versus the outcome if they had not? The problem is that we never observe the missing counterfactual, that is the outcome a

person would have got if they had *not* experienced a particular policy or education investment.

In medical research, and sometimes in social research, randomised control trials are used to estimate the causal impact of an intervention. But in education it is more difficult to use randomised control trials. The notion of randomly allocating pupils to schools or to universities is not credible. In economics there are a range of other analytical methods that estimate this missing counterfactual in a convincing manner. In many circumstances just using multivariate regression techniques will not be sufficient to do this.

Why are economists so concerned with finding causal impacts? It is simply the fact that unless one can establish a causal impact, rather than a simple correlation, incorrect policy conclusions will be drawn. If participants in an educational intervention are systematically different from non-participants in observable and/or unobservable ways and these factors also affect the outcome of interest, then the outcome observed for non-participants does not represent a good approximation to the counterfactual for participants. For instance, if students with challenging behaviour are allocated to smaller class sizes, we will observe a positive correlation between class size and pupil achievement. Larger classes will appear to be more effective. This is only because we cannot take account of the fact that children in the smaller classes may be more difficult to teach. Even if we have information on pupils' prior achievement, this may not be enough to allow for the unobserved characteristics of pupils in the smaller classes that mean they have lower achievement. This is what economists call selection bias or endogeneity and has been a particular focus of the economics of education.

For instance in November 2002, Margaret Hodge, the then minister for Education and Skills in justifying the introduction of fees for Higher Education stated that a graduate earned a £400,000 premium over their working life. However, this figure was obtained by just comparing the earnings of graduates versus non-graduates in the Labour Force Survey and failed to take into account other differences between graduates and non-graduates (such as ability and family background). The Department for Children, Schools and Families now says “Over the working life, we believe that the average graduate premium remains comfortably above £100,000 in today’s valuation, compared to what a similar individual would have earned if they just had A levels.” In terms of policy development whether the average lifetime return to undertaking HE is £400,000 or £100,000 makes a big difference.

So how do economists deal with selection bias? There is no ‘one size fits all’ solution to finding the causal impact of an educational treatment on an outcome. The most appropriate methodological approach will depend on a number of factors. There are six distinct but related approaches that economists generally take (see Blundell et al, 2005, and Blundell and Costa Dias, 2009). These are

- (i) Social experiments
- (ii) Natural experiments/Difference in Difference Methods
- (iii) Instrumental Variable methods
- (iv) Control Function Methods
- (v) Matching Methods
- (vi) Regression Discontinuity Design

Each of these approaches involves different assumptions and the decision of which approach to use depends crucially on the question being considered.

The social experiment is the social scientists' version of a clinical trial in that it relies on some randomized assignment rule that determines whether people receive an educational treatment. The most well known social experiment in education is the Tennessee class size experiment which randomly allocated children in Tennessee to different class sizes (and randomly allocated teachers to teach these classes). The results from this experiment suggested that large class size reductions in early schooling would yield small significant gains in terms of pupil achievement (Card and Krueger, 1992).⁵ In the UK random experiments in education are rare. More common are pilot schemes, where the results of an educational intervention can be compared to a control group that did not experience the intervention (e.g. the Educational Maintenance Allowance scheme, see Dearden, Emmerson, Frayne and Meghir, 2009). Social experiments could be used more widely by combining pilot schemes with randomisation.

Natural (or quasi) experiments rely on some 'natural' randomisation to estimate the impact of an educational intervention. It involves finding some naturally occurring event which changes the policy environment for one group but not another (e.g. a change in rules for one group of individuals but not another or in one jurisdiction but not another). We can then estimate the impact of the policy change by comparing the two groups before and after the change (the so called difference in difference estimator). Machin and McNally's (2008) study of the literacy hour in England, where children in some schools had the literacy hour up to two years before other children in other schools,

⁵ The magnitude of the effects was such that this evidence does not contradict the general notion that reductions in class size are not the most cost effective way of improving pupil achievement.

adopts a difference-in-difference type approach. The crucial assumption is that any unobserved characteristics of the group that received the literacy hour treatment and that might also influence outcomes (e.g. the quality of their school) remain unchanging over time and are therefore taken account of in the modelling.

The instrumental variable approach has similarities to the natural experiment approach in that it relies on finding something (an instrument) that causes a 'natural' or random difference in the variable of interest i.e. an education experience or intervention. For instance, Harmon and Walker (1995) use changes in the compulsory school leaving age as an instrument to estimate the causal impact of education on earnings. The correlation between education and earnings it is certainly positive. However, we may not believe that having higher levels of education actually causes a person's earnings to be higher because of the education they experienced; rather it may be because clever people who will earn more anyway also see themselves as having the most to gain from education. As a consequence these individuals invest in more education than other people. Thus some of the apparent correlation between education and earnings is actually attributable to factors other than education, such as a person's ability or perhaps their motivation. So how can we measure only the causal impact of education on earnings? Using an instrumental variable (IV) approach, Harmon and Walker exploit the idea that because of the law change, individuals who left school at 15 in 1972 had to stay at school until age 16 in 1973 (the year of the law change). This allows us to estimate the impact of extra education for this group who were forced to stay on i.e. who experienced an essentially random increase in their education level not because of their ability or motivation but because of the law. If the impact of education is the same for all

individuals then this estimate will tell us the causal impact of an additional year of education. If it is not, it will still tell us the return for those who were forced to stay on and who would not have stayed on without the reform.

Control function methods allow for selection by explicitly modelling the selection process. In other words, with the example above, they rely on modelling the decision that individuals' make to stay on longer in school or to acquire a degree. By modelling this selection process, this method can then be used to determine the true impact of education on earnings as opposed to the (non causal) correlation between these measures. For control functions to work however, and analogous to the IV approach, they also require an instrument – something that determines the person's decision to invest in more education, but does not directly impact on the outcome of interest, namely earnings (see Blundell et al., 2005, and Blundell and Costa Dias, 2009). Like the IV approach, the difficulty in applying the control function method in practice is finding a suitable instrument.

Matching methods involve comparing the group that gets the educational intervention with a control group that is very similar, on the basis of characteristics observed in the data. Matching may be a powerful approach but it relies on the researcher being confident that s/he has data on all the important characteristics of individuals or groups. So for example, if the researcher is evaluating the impact of an intervention such as an after school club on pupil achievement, the data need to include information on all the characteristics of pupils that affect both whether they make use of the after school club and that might also determine their academic outcomes (e.g. their socio-economic background). If there are unobservable characteristics that determine both whether the

pupils enrol in the after school club *and* their outcomes (e.g. their attitude towards school) matching methods will not necessarily work. The evaluation of the Education Maintenance Allowances scheme is just one example of the use of matching methods in the UK (see Dearden, Emmerson, Frayne and Meghir, 2009).

Finally, Regression Discontinuity Design relies on some discontinuity in policy design that provides a source of randomisation that can be explored to estimate the impact of an educational intervention. Examples of this in the education field include exploiting the rigid rules that operate in England as regards when a child starts school. These rules can be used to look at whether it is better to start school younger or older (children born on the 31st August start school up to a year earlier than those born a day later on 1st September in England). From this research we see that in England it is much better starting school at an older age than a younger age and this negative effect of starting school young continues into Higher Education (see Crawford, Dearden and Meghir, 2009).

So where have these distinct methods made a contribution in education? One example is the issue of whether additional resources in schools lead to better pupil achievement, as mentioned above. This has been subject to study for many decades, largely by educationalists working on issues of school effectiveness and school improvement (e.g. Nutall et al. 1989; Gray et al. 1996; Thomas et al. 2007, to name but a few). In recent years however, economists have started to make a major contribution in this area (Angrist and Lavy, 1999; Card and Krueger, 1992; Dearden, Ferri and Meghir, 2002). They have applied most of the methods outlined above to the same question and come up with ways of trying to determine a genuinely causal relationship between

resources and pupil achievement. They have concluded that resources do not have a large impact on pupil outcomes.

Economists have also used these techniques to evaluate particular education programmes. For instance, in the US major education investment programmes, such as HeadStart⁶ have been subject to rigorous evaluation by economists, using statistical and econometric methods. Likewise here in the UK, economic evaluations of government education investments are often carried out, such as for the Excellence in Cities programme (Machin, McNally and Meghir, 2007), the Education Maintenance Allowances scheme (Dearden, Emmerson, Frayne and Meghir, 2009) and the Literacy Hour (Machin and McNally, 2008).

It is only after establishing genuine causal impact, that we are then able to assess the true costs and benefits of a particular education policy or intervention and compare the return with other investments. This is crucial for sound policy decision making.

5. Wider Impacts of the Economics of Education

The main route by which economics has recently been influential is via its influence on policy. This is particularly the case in the US and indeed the UK, where there has been greater emphasis on the economic aspects of education, both in terms of designing policies and from the perspective of evaluating the impact of policy.

The increased marketisation of education in the UK (Adnett and Davies, 2002) is just one example of the important role economists have played in education policy-making. It is perhaps however, one of the most illuminating examples of the wider impact

⁶ An early year's policy intervention to help children in poor families akin to Sure Start in the UK (see Birkbeck College National Evaluation of Sure Start (2008)).

of economics in education. In the late 1980s, the then Conservative government of the UK introduced some market mechanisms into the UK education system.⁷ These quasi-market mechanisms included parental choice, parent representation on governing bodies and linking school funding with student enrolment numbers. Alongside this, publicly available test score information was made available with which parents could compare the performance of one school with another. These quasi-market reforms were designed to improve pupil achievement, drawing heavily on the economic principles of incentives and competition. More recently, further legislation has been introduced, following the White Paper, *Higher Standards, Better Schools for All* (2006), with the purpose of further increasing school autonomy and parental choice.

Of course such economic concepts have not been applied without limits. For instance, in the UK schools are generally not allowed to go ‘bankrupt’. Furthermore, there continue to be many “market failures”. For example, many parents still lack full information on the quality of schools. These limitations weaken the incentive for schools to improve and may reduce the impact of economically motivated reforms designed to raise standards. It is worth noting at this point however, that whilst it is certainly the case that economic analyses have influenced policy-making, the quality of the policy-making that has emerged as a result of economic thinking is hotly debated, no more so than on the issue of markets in education. Indeed the evidence on the impact of marketisation of education on pupil performance suggests only limited positive effects of choice and competition on pupil achievement, at least in the UK (Bradley, Johnes and Millington, 2001; Gibbons, Machin and Silva, 2008). Yet despite this, policy-makers’ commitment to

⁷ Many of these policies were only introduced in England and Wales and the Scottish education system is in any case differently structured. We refer to England and Wales where a particular policy does not apply to Scotland.

the basic tenet that incentives and competition can improve school quality has remained firm.

Of course policy-makers have also become increasingly aware of the need for better understanding of the exact nature of the incentives faced by schools, recognising that teachers and head-teachers often have conflicting objectives and that market principles sometimes sit uneasily in schools. Thus, as Besley and Ghatak (2003) state, the critical issue has been to work out the best means by which the economic principles of competition, incentives and accountability can enhance educational outcomes in the broadest sense. Economists and policy-makers have recognized the difficulties in applying economic principles to education (Le Grand, 2003) but there has as yet been no backlash away from the notion that the efficiency of the system can be improved by applying such principles.

The evidence (mainly from the United States, e.g. Hoxby, 2000, 2003a, 2003b) also shows that while increased competition among schools and moves to decentralize school finance can enhance attainment, it can increase inequality because richer parents are better able to take advantage of a more market-oriented system. This potential trade off between efficiency and equity has long been recognized by economists (Le Grand, 2001, 2003). It is interesting however, that in response to concerns about inequality in the UK school system, the current government has responded, not by reducing the marketisation of education but by trying to mitigate its potentially negative effects on equity. This is exemplified by major initiatives such as the Every Child Matters agenda and The Children Act (2004), which seek to consider the achievement and welfare of all children, including those who are most vulnerable and underachieving. Whether or not

such attempts are going to be successful remains an open question as such initiatives have generally not been evaluated.

6. Key Contributions and Future Prospects

There are a number of challenges facing education as we move through the 21st Century. Whilst economists certainly do not have all the answers, they can provide guidance on a whole range of important issues. For example, educationalists continue to grapple with the key question facing practitioners, policy-makers and parents, namely how do we raise pupil achievement, particularly the achievement of those currently lagging behind? Economists have contributed to the literature which shows that teacher quality is central to any attempt to improve school quality and raise standards and that teacher pay in turn plays a huge role in determining the quality of the teacher work force. Much more needs to be done however, from a research perspective, to better understand the link between teachers, teaching and pupil achievement and on what kinds of education policies (whether targeted or universal) can deliver cost effective improvements in education delivery and performance.

A question that is likely to become pressing in the face of the current economic downturn and rising educational participation is whether our continued emphasis on education and in particular qualifications really has a genuine positive effect on individuals' lives. For example, despite increased investments in education over time, why does inequality in educational and cognitive achievement emerge so early (Feinstein, 2003, Barea et. al. (2009), Dearden and Sibietta (2009)) and why, in the UK at least, do we have more or less as unequal a society now as we did 20 years ago (Blanden and

Machin, 2004; Blanden, Gregg and Machin, 2005; Machin and Vignoles, 2004)? As we encourage more and more young people to invest in degrees will this genuinely provide them with economic benefits and a route to better quality jobs and greater life satisfaction? Or will it simply lead to “qualification inflation” as it becomes the norm for everyone to have a degree, even for lower level jobs? Indeed the most fundamental question of all is whether our education investments always benefit society as a whole?

We have made the case that economists play a key role in the field of education research as a whole. Statisticians and researchers from other disciplines also undertake quantitative evaluation of education policy. However, the contribution of economists is distinct. Firstly, economists take a different theoretical perspective and therefore may be more focussed on incentives and other related issues, as well as trying to distinguish between the benefits and costs of education. Furthermore, from a methodological perspective, economists bring a different set of tools to bear on evaluations. For instance, it is increasingly recognised that random control trials (RCTs) are not possible in all circumstances and economists provide a range of methods that can be applied in a non-experimental setting, as we outlined above.


It is also of note that such quantitative rigour was historically seen as lacking by those working within the education research establishment (as summarised in Furlong and Oancea, 2005). Whether economics has contributed to improved methodology in education, for example by introducing more robust methods, or whether economists have simply taken over parts of the education field is an arguable point. It is however, an important distinction. Economics has the potential to offer theoretical models and methodological rigour to the study of education. However, the contribution may be

limited if the economics of education is seen as distinct from the other disciplines in education. Economists are often seen as positivist in their approach and relatively simplistic in their analysis. Furthermore, since economists generally use quantitative methods of analysis, antagonism towards quantitative methods is often inter-twined with suspicion about the real contribution that economists can make. Economists need to work in conjunction with the other major education disciplines (and vice-versa) if their contribution to the field is to be maximised.

References

- Adnett, N and Davies, P. (2002) *Markets for Schooling* (London, Routledge).
- Angrist, J. and V. Lavy (1999) Using Maimonides' Rule To Estimate the Effect of Class Size of Scholastic Achievement, *Quarterly Journal of Economics*, 114, 533-76.
- Barreau, S., Dearden, L., Sibieta, L. and Sylva, K (2009), "The Socio-economic gradient in early childhood outcomes: evidence from the UK", IFS Working Paper.
- Becker, G. (1964) *Human Capital: A Theoretical Analysis with Special Reference to Education* (New York, Columbia University Press).
- Besley, T. and M. Ghatak (2003) Incentives, Choice, and Accountability in the Provision of Public Services, *Oxford Review of Economic Policy*, 19, 235-249.
- Birkbeck College National Evaluation of Sure Start (2008) National evaluation report: The impact of Sure Start local programmes on three year olds and their families, Report 027, Research Report NESS/2008/FR/027, Nottingham, United Kingdom: Great Britain, Department for Children, Schools and Families.

- Blanden, J. and S. Machin (2004) Educational Inequality and the Expansion of UK Higher Education, *Scottish Journal of Political Economy, Special Issue on the Economics of Education*, 51, 230-49.
- Blanden, J., P. Gregg and S. Machin (2005) Educational Inequality and Intergenerational Mobility, in S. Machin and A. Vignoles (Eds.) *What's the Good of Education? The Economics of Education in the United Kingdom* (Princeton, USA, Princeton University Press).
- Blanden, J., P. Gregg and L. MacMillan (2007) Accounting for Intergenerational Persistence, *Economic Journal*, 117, C43-C60.
- Blanden, J., P. Gregg and L. MacMillan (2008) Intergenerational Persistence in Income and Social Class: The Impact of Increased Inequality, CMPO mimeo.
- Blaug, M. (1972) *An Introduction to the Economics of Education* (Harmondsworth, Penguin).
- Blaug, M. (1976) The Empirical Status of Human Capital Theory: A Slightly Jaundiced Survey, *Journal of Economic Literature*, 14, 827-855.
- Blundell, R., L. Dearden and B. Sianesi (2005a) Evaluating the impact of education on earnings: Models, methods and results from the NCDS, *Journal of the Royal Statistical Society Series A*, vol. 168, Issue 3, 473-512.
- Blundell, R., L. Dearden and B. Sianesi (2005b) Measuring the Returns to Education, in S. Machin and A. Vignoles (Eds.) *What's the Good of Education? The Economics of Education in the United Kingdom* (Princeton, USA, Princeton University Press).

- Bradley, S., G. Johnes and J. Millington (2001) School Choice, Competition and the Efficiency of Secondary Schools in England, *European Journal of Operational Research*, 135, 527-544.
- Brehm, J. and W. Rahn (1997) Individual-Level Evidence for the Causes and Consequences of Social Capital, *American Journal of Political Science*, 41, pp. 999-1023.
- Bynner, J. and M. Egerton (2001) The Wider Benefits of Higher Education, Higher Education Funding Council For England, London.
- Bynner, J. and S. Parsons (1997) *It Doesn't Get Any Better: The Impact of Poor Basic Skills on the Lives of 37 year Olds* (London, Basic Skills Agency).
- Card, D. (1999) The Causal Effect of Education on Earnings, in O. Ashenfelter and D. Card (Eds) *Handbook of Labor Economics*, Volume 3A. (Amsterdam, Elsevier).
- Card, D. and A. Krueger (1992) Does school quality matter? Returns to education and the characteristics of public schools in the United States, *Journal of Political Economy*, 100, F1–F40. 
- Chubb, J and T. Moe (1990) *Politics, Markets and America's Schools* (Washington DC, The Brookings Institution).
- Dearden, L., S. McIntosh, M. Myck and A. Vignoles (2002) The Returns to Academic and Vocational Qualifications in Britain, *Bulletin of Economic Research*, 54, 249-274.
- Dearden, L., J. Ferri and C. Meghir (2002) The effect of school quality on educational attainment and wages, *Review of Economics and Statistics*, 84, 1-20.

- Dearden, L., C. Emmerson, C. Frayne and C. Meghir (2009) Conditional Cash Transfers and School Dropout Rates, *Journal of Human Resources*, forthcoming.
- Dearden, L. and L. Sibieta, (2009), Ethnic Differences in Early Childhood Environment and Outcomes, forthcoming in Dex, S., K. Hansen and H. Joshi (eds), (2009) "Children of the Millennium Cohort Study: the first five years".
- Dee, T., (2004) Are There Civic Returns to education?, *Journal of Public Economics*, 88, 1697-1720.
- Department for Education and Skills White Paper (2005) Higher Standards, Better Schools For All: More choice for parents and pupils, Cm 6677.
- Dixit, A. (2002) Incentives and Organizations in the Public Sector, *Journal of Human Resources*, 37, 696-727.
- Dynarski, S. (2003) Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion, *American Economic Review*, 93, 279-88.
- Epple, D. and Romano, R. E. (2003), 'Neighbourhood schools, choice, and the distribution of educational benefits'. In C. M. Hoxby (ed.), *The Economics of School Choice*. Chicago: University of Chicago Press.
- Epple, Dennis, and Richard E. Romano. 1998. "Competition between private and public schools, vouchers, and peer-group effects." *American Economic Review* 88,no.1 (March):33-62.
- Erikson, R. and J. Goldthorpe (2008) Income and Class Mobility Between Generations in Great Britain: The Problem of Divergent Findings From British Birth Cohort Studies, Nuffield College mimeo.
- Ermisch, J. and C. Nicoletti (2007) Intergenerational Earnings Mobility: Changes across Cohorts in Britain, *B.E. Journal of Economic Analysis and Policy*, 7, 2 (Contributions) Article 9.

- Feinstein, L. (2003) Inequality in the Early Cognitive Development of British Children in the 1970 Cohort, *Economica*, 70, 73-97.
- Feinstein L. and R. Sabates (2005) [Education and Youth Crime: Effects of Introducing the Education Maintenance Allowance Programme.](#) Centre for Research on the Wider Benefits of Learning Research Report No.14.
- Furlong, J. and A. Oancea (2005) Assessing Quality in Applied and Practice-based Educational Research: A Framework for Discussion, University of Oxford, Department of Educational Studies, <http://www.bera.ac.uk/pdfs/Qualitycriteria.pdf> .
- Gibbons, S., S. Machin and O. Silva (2008) Choice, Competition and Pupil Achievement, *Journal of the European Economic Association*, 6, 912-47.
- Gray, J., H. Goldstein and D. Jesson (1996) Changes and improvements in schools' effectiveness: trends over five years, *Research Papers in Education*. 11, 35-51.
- Hargreaves, D. (1996) *Teaching as a research based profession: possibilities and prospects.* (London, Teacher Training Agency).
- Harmon, C. and I. Walker (1995) [Estimates of the Economic Return to Schooling for the United Kingdom](#), *American Economic Review*, 85, 1278-86.
- Haveman, R. and B. Wolfe (1995) The Determinants of Children's Attainments: A Review of Methods and Findings, *Journal of Economic Literature*, 33, 1829-1878.
- Heckman, James J. and Rubinstein, Yona (2001) 'The Importance of Noncognitive Skills: Lessons from the GED Testing Program.' *American Economic Review*, 91(2), 145-149.

- Heckman, James J. (2007). 'The Economics, Technology and Neuroscience of Human Capability Formation.' *Proceedings of the National Academy of Sciences*, 104(3), 13250-13255.
- Heckman, James J. and Vytlačil, Edward J. (2007). 'Econometric Evaluation of Social Programs, Part I: Causal Models, Structural Models and Econometric Policy Evaluation.' In *Handbook of Econometrics*, vol. 6B, edited by J. Heckman and E. Leamer. Amsterdam: Elsevier, 4779-4874.
- Hoxby, C. (2000) Does Competition Among Public Schools Benefit Students and Taxpayers?, *American Economic Review*, 90, 1209-38.
- Hoxby, C. (2003a) *The Economics of School Choice* (Chicago, Chicago University Press).
- Hoxby, C. (2003b) School Choice and School Competition: Evidence From the United States, *Swedish Economic Policy Review*, 10, 9-66.
- Layard, R. and G. Psacharopoulos (1974) The Screening Hypothesis and the Returns to Education, *Journal of Political Economy*, 82, 985-998.
- Le Grand ,J. (1991) *Equity and choice*. (London, Harper Collins).
- Le Grand ,J. (1993) *Quasi-markets and social policy*. (London, Macmillan).
- Lochner, L. and E. Moretti (2004) The Effect of Education on Criminal Activity: Evidence from Prison Inmates, Arrests and Self-Reports, *American Economic Review*, 94, 155-189.
- Machin, S. (2003) Wage Inequality Since 1975, in R. Dickens, P. Gregg and J. Wadsworth (Eds.) *The Labour Market Under New Labour*. (London, Palgrave MacMillan).

- Machin, S. (2008a) The New Economics of Education: Methods, Evidence and Policy, *Journal of Population Economics*, 21, 1-19.
- Machin, S. (2008b) An Appraisal of Economic Research on Changes in Wage Inequality, *Labour*, 22, 7-26.
- Machin, S. and S. McNally (2008) The Literacy Hour, *Journal of Public Economics*, 92, 1441-62.
- Machin, S., S. McNally and C. Meghir (2007) Resources and Standards in Urban Schools, Centre for the Economics of Education Discussion Paper 76.
- Machin, S. and A. Vignoles (2004) Educational Inequality: The Widening Socio-Economic Gap, *Fiscal Studies*, 25, 107-28.
- Machin, S. and A. Vignoles (2005) *What's the Good of Education? The Economics of Education in the United Kingdom*. (Princeton, USA, Princeton University Press).
- Machin, S. and S. Vujic (2005) Crime and Education in the United Kingdom, draft paper, Centre for Economic Performance.
- Mincer, J. (1958) Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy*, 66, 281-302.
- Mincer, J. (1974) *Schooling, Experience and Earnings*. (New York, Columbia University Press, NBER).
- Nutall, D., H. Goldstein, R. Prosser and J. Rasbash (1989) Differential school effectiveness, *International Journal of Education Research*, 13, 769-776.
- Psacharopoulos, G. (1973) *Returns to Education: An International Comparison*. (Joessey-Bass, Elsevier).

- Rivkin, S., E. Hanushek and J. Kain (2005) Teachers, Schools, and Academic Achievement, *Econometrica*, 73, 417-458.
- Schultz, T. (1961) Investment in Human Capital, *American Economic Review*, 51, 1-17.
- Schultz, T. (1963) *The Economic Value of Education*. (New York, Columbia University Press).
- Sianesi, B. and J. Van Reenen (2003) The Returns to Education: Macroeconomics, *Journal of Economic Surveys*, [17, 157-200](#).
- Spence, M. (1973) Job Market Signalling, *Quarterly Journal of Economics*, 87, 355-374.
- Teixeira, P. (2001) The Economics of Education: An Exploratory Portrait, *History of Political Economy, Annual Supplement*, 257-287.
- Thomas, S. (2007) Modelling patterns of improvement over time: value added trends in English secondary school performance across ten cohorts, *Oxford Review of Education*. 33, 261-295.
- Todd, P. and K. Wolpin (2007) [The Production of Cognitive Achievement in Children: Home, School, and Racial Test Score Gaps](#), *Journal of Human Capital*, 1, 91-136.
- Walker, I. and Y. Zhu (2005) The college wage premium, over education and the expansion of higher education in the UK, University of Warwick mimeo.

Table 1: Education Publications in Mainstream Economics Journals

| | Decade | | | | | |
|------------------------------------|--------|-------|-------|-------|-------|-------|
| | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s |
| Papers Per Year | 0.2 | 3.4 | 6.3 | 2.5 | 5.2 | 9.7 |
| Non-North American Papers Per Year | 0.0 | 0.4 | 0.7 | 0.5 | 1.2 | 3.2 |

Notes: Reproduced from Machin (2008a). Publications with the word Education, Schooling or School in the title in the following list of journals: American Economic Review; Economic Journal; Econometrica; Economica; Journal of Political Economy; Quarterly Journal of Economics; RAND Journal of Economics; Review of Economic Studies. Source: JSTOR, Ingenta Connect, Business Source Premier, Blackwell Synergy.