Introduction

The modern analysis of the economics of education had its birth with Theodore Schultz's address to the American Economic Association in December 1960. That address introduced to a wide audience within the economics profession the notion that education can be regarded as an investment in human capital, an investment that is analogous to investments in physical capital. Individuals decide to invest in their own education, at the margin, just as firms decide to invest in new machinery; the investment in each case entails current costs, and yields future benefits; and an internal rate of return to the investment can in each case be calculated.

The study of the economics of education has expanded considerably in scope over the last four and a half decades – as is evidenced by the wide range of material in this volume. But the key insights of human capital theory remain central to any analysis of the demand for education, and it is therefore appropriate that this is where the volume should begin. Psacharopoulos and Patrinos outline the basics of the human capital model, emphasizing the role that education has to play in raising individuals' productivity. They also provide empirical estimates of the rate of return to education in a variety of countries. Estimates such as these have been particularly influential in shaping the educational policies of international organizations such as the World Bank, informing in particular the policy of loans to support education in developing countries and the goal of universal primary education.

Yet human capital is not the only game in town. Since the early 1970s, economists have also considered another family of models that aims to explain the relationship between education and earnings. This is the body of literature characterized by signalling and screening models. Such models emphasize the role played by educational credentials as indicators of individuals' innate ability or productivity. Firms that cannot or do not measure productivity directly can then reward productive individuals by using education as a signal of their likely productivity. In the more refined screening models, the allocation of tasks may be influenced by workers' credentials. By invoking the assumption that education is more costly for less able individuals, this broad class of models is able to explain how workers self-select into alternative education regimes. The general area of signalling and screening models is surveyed by Brown and Sessions.

Whatever the relative merits of the human capital and the signalling and

screening models in the context of general education, one would expect vocational training programmes to contribute directly to productivity. There has emerged a substantial literature, surveyed by Dolton, on the evaluation of such programmes. Much of this literature is concerned with some severe statistical problems that attach to the evaluation process.

A key argument in favour of the human capital view of education is the evidence that has emerged in the last decade or so of the impact that education can have on economic growth. The rapid emergence of several South and East Asian economies, all of which have shared experience of rapidly expanding educational provision, has served to emphasize the key role that education can play in stimulating economic development. Stevens and Weale survey this literature in their chapter.

The growth of (some) developing countries may not have occurred without costs elsewhere, however. A number of authors have argued that the move towards globalization has allowed lower income countries to compete effectively for the production of tradeable goods by lower skill workers, and that this has served to widen the distribution of incomes in the developed world. An alternative argument, analysed in the chapter by Machin, is that technical change in the recent past has been biased in terms of its effects on workers with different skill levels. So, for instance, the development of information technology has allowed firms to switch into more capital-intensive forms of production, in which the new capital is a substitute for unskilled labour but a complement of skilled labour. This has generated shifts in the relative demand for labour of different skills, and has had a marked impact on both the returns to education and the income distribution in the West.

The first few chapters of the book therefore all concern, in one way or another, the return to education: its measurement at micro level, and its impact at macro level. Chapter 6, by McMahon, reminds us that there can be significant differences between the private returns to education and the social returns. Often forgotten in discussions of this distinction is the issue of externalities associated with education. McMahon presents a comprehensive assessment of such externalities and finds that the impact of education on society is pervasive.

The next two chapters, by Mitch and by Greenaway and Haynes, present an analysis of funding models for compulsory education and for higher education, respectively. In many countries there are debates about the appropriate mechanism for financing education, with an increased interest in voucher systems and in cost recovery. These two chapters together provide an insight into the variety of funding instruments that are available and that are in use in various countries around the globe. Clearly the role played by externalities, discussed in Chapter 6, is the key in understanding the choice of mechanism employed in each country.

Education presumably produces educated individuals who, if the human capital model has any empirical relevance at all, will have enhanced productivity. Yet the process by which education transforms (relatively) unproductive individuals into (relatively) productive ones is not one that is particularly well understood. Some gains have been made in recent years in understanding the educational production function, but a particularly controversial aspect of this literature has concerned the effect that class size has on pupil performance. Averett and McClennan discuss this literature in their chapter, and conclude that, while results have been ambiguous, the most sophisticated studies have found that smaller class sizes are associated with an improvement in pupil performance.

The next two chapters both build on the notion of educational production functions in order to examine the determinants of educational success. Bradley and Taylor examine this in the context of secondary education, while Naylor and Smith do so in the context of higher education. At any level, a concern in evaluating the performance of students is that the measure by which the evaluation takes place remains constant over time – that is, that standards are adhered to over time. This is an issue that is considered in detail in the chapter by Geraint Johnes.

The issue of standards also provides a reason to evaluate educational performance using means other than examination results. The transition into the labour market provides a natural alternative indicator of educational success, and this forms the topic of the chapter by Bradley and Nguyen. There are many pathways that individuals can take through education into work, including further education, higher education, apprenticeship schemes and so on. Individuals with different characteristics have different likelihoods of passing through any one of these pathways, and economists have had considerable success in recent years in modelling this transition.

The labour market for teachers, surveyed here by Santiago, is distinct from many occupation-specific labour markets, for a number of reasons. First, teacher training is a lengthy process, and so adjustments in the market take time. Secondly, many women are attracted into teaching by the coincidence of teachers' holidays and those of their children; the consequent concentration of women in the teaching profession, many of whom interrupt their careers for an unspecified period, has left the market with a large pool of latent supply. Thirdly, government often has an important part to play in both the demand and supply sides of the market. All these features make the market for educators substantially different from other labour markets, and require careful analysis.

The next chapter, by Cohn and Cooper, concerns the role of universities as multi-product firms. By definition, universities produce graduates in a variety of different fields and at a variety of different levels. They also,

typically, produce new knowledge in the form of research. Drawing on work from the industrial organization literature, this chapter surveys the various attempts that have been made to estimate the cost function of such complex organizations, thereby yielding insights about the nature of scale and scope economies.

In estimating cost functions of this type, most recent studies have employed a form of frontier analysis, appropriate in this context because a theoretical cost function is by definition a frontier that describes how an efficient producer would produce each given vector of outputs. Frontier analysis and the evaluation of efficiency form the twin themes of the chapter by Jill Johnes. Two techniques have emerged from the literature that allow such analyses to be conducted: data envelopment analysis (DEA) and stochastic frontier analysis (SFA). Both are surveyed in some detail in this chapter.

The two chapters that finish the volume consider themes that have appeared earlier. The chapter by Jafarey and Lahiri develops themes that appear in the literature on human capital, specifically concerning the rate of return to human capital in developing countries. The authors focus specifically on the issue of child labour, and how policies can be developed to alleviate this. Hoyt develops some issues raised in the chapters on funding models in order to examine the local public finance aspects of education, focusing specifically on the complex effects that education can have on the housing market.

It is clear that, as it approaches its half-centenary, the economics of education has come a long way. In this volume, we have assembled chapters that say something about the state of the art. But this is a fast evolving subject of study, and it is clear that in a few years time we can expect much more to have been learned about subjects such as the relationship between education and growth, the impact on welfare of various funding models, and the educational production function.

In concluding this introduction, we would like to thank the team at Edward Elgar for their help in putting this volume together. Alexandra Minton, in particular, has been wonderful. We would also like to thank all the chapter authors for the way in which they have made easy our task as editors. We, the editors, were both introduced to the subject by one of these authors, Jim Taylor, and, as he approaches his retirement, we feel it appropriate to dedicate to him, with great thanks, our own input into this volume.

Geraint Johnes and Jill Johnes