Chapter 1: Introduction

1.1 Motivation

The Australian education and training sector has experienced a substantial increase in student numbers since the late 1980s. The expansion of the sector was predicated, at least in part, on the view that Australia needed a more skilled work force if living standards were to continue to increase. This view reflected the dominant economic view of the role of education in the labour market; namely that education increased the productive skills of individuals, making them more capable, adaptable and innovative.

While it is the dominant view, the human capital one has its challengers. Screening theories argue that education is one means by which individuals identify their pre-existing capabilities, and thereby allows them to signal their ability levels to employers. In turn, employers use education to screen potential employees. Education might improve the overall match of workers to jobs, but it may add little to overall output.

The problem in deciding which of the theories is closest to the truth is that they have similar predictions about individual behaviour and labour market outcomes – more able individuals tend to acquire more education and those with higher levels of education have better employment prospects, work in more skilled occupations and enjoy higher wages.

This thesis sets out to examine evidence about the role of education in the Australian labour market, with a view to determining how well founded is the productivity-augmenting view on which the expansion of the education and training sector has been based. It does this by reviewing existing tests of the human capital and screening theories and their outcomes. In addition, three tests of aspects of the theories are undertaken.

The task of assessing the validity of the theories is important, despite the difficulties of doing so. The next Section describes the essential features of human capital and screening theories and explains why testing between them is so difficult. The third Section sets out briefly the dimensions of the expansion of the Australian education and training system since the late 1980s and evidence that the labour market outcomes achieved by its graduates may have deteriorated. The following Section argues why tests of the theories are important and the final Section provides an outline of the remainder of the thesis.
1.2 Essential features of the screening and human capital theories

The main theories that challenge the human capital view of the role of education in the labour market are built on the proposition that individual productivity is either not observed by employers or it is very difficult to observe. This proposition is central to screening (Stiglitz 1975), signalling (Spence 1973), or filtering or sorting models (Arrow 1973), hereafter described generically as screening models.¹

Since employers do not observe individual productivity, workers use education, which is correlated with unobserved ability, to signal their productivity to potential employers. Firms use education as a source of information about the likely productivity of individuals to screen or choose between workers. Education is therefore used as a means of assigning workers to jobs, with high ability workers being assigned to more complex and better paid jobs.

This screening function of education explains the observed positive relationship between education and wages. Education has an information role in the market and may or may not enhance individual productivity directly.² Education affects the distribution of output (and consequently income), rather than its size necessarily.

These models have been linked to explanations of labour market phenomena where organisations are seen as offering a restricted or rationed number of training places to potential employees at entry points in job hierarchies or internal labour markets (Thurow’s ‘job competition’ model). Firms use educational attainment as an important factor in selection for such positions since it provides a good guide to the training costs of individuals (see Thurow 1972, Blaug 1985, and Maglen 1991).

In contrast, education does enhance productivity in human capital theory. Individuals invest in education with a view to maximising their utility or discounted lifetime earnings (net of

¹ The distinction between screening and signalling models depends on which party makes the first ‘move’. In signalling models, individuals ‘choose’ their level of education before offering their services to employers. In screening models, employers make wage offers to individuals that depend on their level of education. Sorting models emphasise the role of education in the ‘matching’ of employers and employees.

² Early presentations of the theories ignored such a role to emphasise that the models were capable of explaining observed labour market phenomena, such as the better wage, occupational and employment outcomes achieved by those with higher levels of education.
education costs). Education affects earnings directly through the increases in individual productivity it generates. Earnings accurately reflect individual productivity, which employers are able to measure, if not immediately, then without the same difficulties assumed in screening models.

The theories therefore differ about the reasons why employers are prepared to pay those with higher schooling levels more. However, the motivation for individuals to acquire more education is the same under both theories – it leads to higher levels of lifetime income. The optimisation process individuals engage in under both theories is similar – they weigh up the respective benefits and costs of the various education choices open to them, knowing that higher levels of education lead to increased lifetime income.

Therefore, both theories predict that more educated individuals receive higher wages than those who are less educated, but for quite different reasons. This similarity in the predictions of the theories makes it very difficult to test between them, particularly since there is no reason why they cannot both operate at the same time. That is, education may both increase productivity and provide information to employers about likely individual productivity. Employees may only reveal their productivity over time, so education may be used as a guide to the likely productivity of individuals early in their careers.

1.3 The expansion of the Australian education and training system

The number of students who engage in forms of education and training beyond the compulsory schooling ages has increased substantially in Australia since the mid-1980s. This has been the outcome of deliberate reforms to the education and training sector designed to increase participation.

The expansion has been substantial. In 1987 there were 393 700 university students. In 1999, there were 686 300 students, an increase of 74 per cent over 1987. Between 1987 and 1999 the number of Vocational Education and Training (VET) students increased from 967,000 to

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3 Source: Department of Employment, Education, Training and Youth Affairs (DEETYA) (1996) and Department of Education, Training and Youth Affairs (DETYA) (2000). The DETYA Census date is 31 March. Therefore, these figures represent the number of students enrolled at that date in each year.
1,650,000 students, an increase of 70 per cent.\(^4\) The number of students remaining at school to Year 12 was 182,000 in 1999, an increase of 28 per cent over 1987 levels.\(^5\)

As a result of the expansion of the sector, education participation rates have increased substantially. Changes between 1987 and 1997 are shown in Table 1.1. For 20 to 24 year olds, 9.9 per cent of the population attended university in 1987. By 1997, this had risen to 19.3 per cent of the 20 to 24 year old population. The university participation rate for 15-19 year olds also increased considerably. Participation rates in Technical and Further Education (TAFE) also increased among young people over this period, though the increase is less marked than the increase in university participation.\(^6\)

**Table 1.1: Participation rates in post-school education by age group (years): 1987 and 1997**

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>15-19 per cent</th>
<th>20-24 per cent</th>
<th>25-64 per cent</th>
<th>Total per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Education</td>
<td>7.7</td>
<td>9.9</td>
<td>2.2</td>
<td>3.8</td>
</tr>
<tr>
<td>TAFE</td>
<td>10.3</td>
<td>7.1</td>
<td>3.1</td>
<td>4.5</td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Education</td>
<td>13.3</td>
<td>19.3</td>
<td>3.2</td>
<td>6.1</td>
</tr>
<tr>
<td>TAFE</td>
<td>11.2</td>
<td>8.7</td>
<td>2.7</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Source: ABS, (1999), Table 5.4 p 50.

The growth in the system led, not surprisingly, to an increase in the number of graduates entering the graduate labour market each year, which has affected its operation. A number of

\(^4\) Source: National Centre for Vocational Education Research (NCVER) (2000) and earlier years. VET student enrolments include anyone enrolled at any time in the year, but exclude those engaged in recreational and leisure courses at VET providers. Data that provide a better basis for comparisons between the sectors are contained in Australian Bureau of Statistics (ABS) (2000). It shows that there were 793,000 students enrolled in higher education and 536,000 in Technical and Further Education (TAFE) in May 2000.

\(^5\) Source: ABS *Schools Australia, 1999* and earlier years. The Census date for these data is 1 July in each year.

\(^6\) That the change in TAFE participation does not seem to capture the change in VET enrolments mentioned earlier may reflect increased participation in non-TAFE forms of VET, such as through enrolments with private providers.
studies have identified ways in which the experience of recent graduates in the labour market departed from their predecessors. For example:

• an increasing proportion of graduates have found jobs outside the traditional occupations graduates had worked in and this has contributed to a decline in the starting salaries of graduates relative to the overall workforce (Andrews and Wu 1998);

• the occupational distributions of 21 year olds in 1982 and 1991 were practically identical, despite the higher education levels of the latter group (Vella and Karmel 1999);

• close to a third of graduates aged 15-24 years were employed in “sub-professional” occupations in 1996 (Birrell and Rapson 1998); and

• the incremental income associated with a degree, trade certificate or other post-school diplomas were all lower in Australia in 1991 than they had been in 1981 (Preston 1997). Other authors, for example Gregory (1995), Karmel (1997) and Borland (1996) present similar evidence of a decline in the return to university degrees from the late 1960s to the early 1990s. Gregory’s results also pointed to a decline in the return to non-trade diplomas or certificates.

There are numerous explanations for such effects. The way educational qualifications are rewarded in the labour market is just one of them. Another explanation is that there may have been some change in the average ability level of graduates of the education and training system, given its expansion. This explanation might lead to a reduction in labour market rewards under either human capital or screening explanations of education’s role in the labour market. Alternatively, the performance of the system itself may have changed, which could result in lower levels of human capital accumulation among its graduates than was previously the case.

This thesis does not attempt to disentangle how these various phenomena might have changed over time. In light of concerns, however, that the ‘value’ conveyed by education to individuals may have changed, it is important to establish the basis of that value – specifically whether it arises from its productivity-augmenting or informational roles. The focus in the thesis is therefore on the extent to which there is evidence in Australia of the productivity-augmenting and informational roles of education at any point in time.
1.4 Why tests of the theories are important

While human capital and screening theories might have similar implications for individual decision-making, their social implications are quite different. The social return to education, in theory, includes both economic and social dimensions. The social dimensions have been identified as including lower crime rates, better public health and higher levels of political and cultural engagement (McMahon 1995, Quiggan 1999). Since these are generally difficult to measure, more emphasis is typically given to the economic dimension of the social return to education in its estimation (for example, Miller 1982, Borland et al. 2000). The economic elements include all the private and public monetary costs and benefits of education, ranging from the additional post-tax income received by individuals over their lifetime, increases in taxation revenue and the costs of public provision of education and other public subsidies to it. The magnitude of the social return to education depends on the existence of some increase in the value of output arising from it.

Therefore, if education enhances productivity, it may provide a net social return to the community. However, if education merely identifies the pre-existing abilities of individuals, the social returns are likely to be less than the private returns to individuals. Consequently, individuals may over-invest in education if screening occurs compared to what is socially optimal.

Expenditure on education by Australians is substantial. In 1996-97, over 5.5 per cent of Australian GDP was spent on education, with five sixths of that money representing public outlays (ABS 1999). While more than half of that public expenditure was on schools, just over one third went to universities and vocational education providers. Not all of that money is allocated for the education of individuals, but most of it is. Therefore, approaching 2 per cent of Australian GDP is publicly funded expenditure on the post-school education of individuals. If education conveys only private gains to individuals (it signals their ability), this represents quite a substantial expenditure on a socially questionable activity. Evidence that education actually increases individual productivity therefore seems important to justify continuing levels of public subsidy to this type of education.

Of course, the sorting process of workers into jobs is a valuable one and will increase output above that available if workers were randomly assigned to jobs, but it is possible that other, cheaper mechanisms can achieve this allocation. Moreover, while the sorting process might

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7 These might involve the use of performance bonds, personal references and company tests.
justify some public expenditure on education, policies that lead to an expansion of the system seem likely to only muddy the quality of the signal provided by education and would seem to be particularly wasteful.

There are also private costs involved in undertaking education and not all of them are financial. If individuals fail to obtain a job that matches their expectations upon the completion of any post-school studies they undertake, their disenchantment is likely to be substantial. If that experience is widespread, the social costs are also likely to considerable.

Consequently, effective tests between human capital and screening theories are important if only to justify present levels of public expenditure on post-school education.

Both theories appear to have something to contribute in explaining real world phenomena. The question of the relative strength of their contributions to what we observe is critical for assessing the effect of government educational policies, such as the funding of an expansion of the post-school education and training sector. Evidence that education augments individual productivity is necessary to provide at least a partial justification of such an expansion.

1.5 Tests of the two theories

In Chapter 2, a simple model in which education is assumed to be both productive in the labour market and to convey information to employers is set out. This framework is used to highlight the difficulties of testing between human capital and screening theories and to characterise and assess the various tests that have been undertaken in the literature to date.

Subsequent Chapters present tests of aspects of the theories. A test of the kind of strategic behaviour implied by screening theory is undertaken in Chapter 3. It looks at whether a policy-induced change in the schooling level obtained by the earliest school leavers influences the schooling obtained by others. The approach does not involve a test of whether education is productive or not.

In Chapter 4 a test of education’s productivity-augmenting effect is undertaken based on human capital’s predicted effect on the variance in wages. This prediction requires employers to observe worker productivity in some form. Since the unobservability of productivity is a cornerstone of screening theories, a finding that supports education’s productivity effect is a negative one for screening in this case.
A test of the value of use by graduates of the skills developed during their courses is undertaken in Chapter 5. It looks at whether graduates working in their field are paid more than those who are not.

The final Chapter draws some conclusions from the existing literature on tests between the theories and the empirical work presented in this thesis. The principal conclusion is that, whatever support might exist for the screening or informational role of education, the evidence that education does not increase productivity is scant.