

Labour as an Asset: Can it Partition the Labour Market?

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**Melbourne Institute of Applied Economic and Social Research
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Melbourne Institute Working Paper No. 4/98

ISSN 1328-4991

ISBN 0 7325 0966 1

January 1998

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Abstract

Labour is becoming an important asset vis-à-vis physical capital as the asset structures of firms change over time. The peculiarities of labour assets are that they appreciate with usage rather than depreciate. By contrast to physical capital, over-use leads to an increase in their value and under-use leads to an erosion. The more able or those considered to have the most potential are generally recruited to this asset sector of the labour market where positive work experiences are reinforcing while the less able or those considered to have less potential are excluded. Accordingly, the work experiences and skills of the labour force becomes more polarised. Regarding the aggregate labour market in this light may account for some of the observed changes in the labour market over the last few decades.

Introduction

Recent decades have revealed several notable changes within the Australian labour market. First there has been a growing dispersion of labour incomes, secondly, there has been a polarisation of the work experience both with respect to hours per week and weeks per year and finally, there are some indications that the Beveridge curve is heading north-east over time. While the evidence is neither universal nor uniform¹, the overwhelming balance of the literature concludes that these changes have substance.² As these circumstances have also been observed in other OECD countries, it is likely that the causes are found among deeper economic forces that local Australian condition and institutions.³

Although a limited number of positive answers have been found for these phenomena, most research tends to reject hypotheses rather than find positive evidence in favour. Additionally, there appears to be little research undertaken which links the three developments.

Our central hypothesis in this paper is that the growing sophistication of consumer demand and technical change over time, has lead to an increasing demand for workers who will not only perform the role as an input into the production process, but will also develop into an on-going asset for the firm. The production process has always required a certain level of labour assets: A pool of workers who understand the whole production, distribution

* I would like to thank Joe Isaac and Mirah Evans for comments and Mirah Evans and Jonathan Kelly from ANU for the use of the ISSS 1995 data set.

¹ See McGuire (1994) and Webster (1997).

² See Borland & Norris (1996).

and marketing process. Workers who can manage and supervise, solve problems, cope with complex situations as well as develop forward looking strategies.⁴ However, there is circumstantial evidence to suggest that the composition of firms' asset structures has changed in favour of labour embodied capital over time.

It would be unusual if this did not have profound implications of the demand for labour. In particular, we will consider that possibility that this changing role for labour may be creating some level of partitioning or bifurcation of the labour market. Positive employment experiences are self-reinforcing for labour-as-an-asset for they appreciate with usage unlike physical capital which depreciates.

While this reinforcing disposition is enough in itself to create a polarisation of the labour market, the basis for a division may exist prior to the labour market experience. Some types of labour may not be considered suitable investment material and will therefore be restricted to merely providing intermediate inputs into the production process. On the other hand, labour which can gain and retain access to the asset job sector accumulates reinforcing good experiences which express themselves as high pay, development of complex and sequential job skill and high demand by relevant employers. Workers who are excluded from this sector have flatter wage profiles and are largely occupied in jobs that do not reward work experience.

In the remaining parts of this paper we will consider the three forms of labour market change over the last few decades, discuss the theory of labour as an asset and consider evidence for the existence of labour market partitioning.

Labour market changes

Dispersion of earnings: skills versus union power

Most OECD countries including Australia have recorded widening dispersions in hourly earnings over the past one to two decades.⁵ Records of this trend in Australia exist from 1979 but lack of earlier data does not allow us to rule out the possibility that the process was well in train before then. Growing inequality may be attributable to either market or monopoly forces which are reflecting substantive changes in the labour market or because of a reduction in the power of institutions, such as unions, which have hitherto suppressed unequalising forces.

³ Of course it is possible that fashions in institutional and social arrangements cross national boundaries.

⁴ A national longitudinal study in the USA has found that basic cognitive skill were more important predictors of wages during the mid-1980s than in the 1970s, Murnane, Willett & Levy (1995).

⁵ See OECD (1997, 1996), Borland & Wilkins (1996), Borland & Norris (1996), EPAC (1996), Gregory (1993), Howell & Wolff (1991).

With respect to the first possible explanation, a polarisation of earnings may reflect either an increased dispersion in observable characteristics such as education and qualifications and/or and increased dispersion in the type of unobservable characteristics which cause people to be more productive and thus attract higher levels of remuneration. Gregory (1993), Borland (1996), Borland & Wilkins (1996) have found Australian evidence that the growing variance in earnings between 1982 and 1990 was due to a widening dispersion of unobservable characteristics, which may include confidence, commitment, reliability, common sense and motivation. According to Borland, these findings are consistent with those found in Canada but research in the USA and UK has suggested that both changes in observable (usually formal education and work experience) and unobservable characteristics have been important.

Direct evidence on the change in the skill structure, based on detailed occupation descriptions from the Australia, USA and UK tends to suggest on balance, that there has been an upgrading of the skills used by employed people especially the most highly skilled.⁶ Howell & Wolff (1991) measure the skill levels required for each occupation in the USA economy from 1960 to 1985 using direct or expert measures of the required levels of cognitive, interactive and motor skills for each job. It is difficult to test directly for point in time bi-modality because the constructed indices depend in part on arbitrary weightings given to each of the 11 selected attributes. Nevertheless, their analysis has indicated that occupations requiring high cognitive and interactive skills have grown faster than those requiring low skills.⁷ Furthermore, the average required level of cognitive and interactive skills for the managerial, supervisory, professional, technical and sales occupations had risen over the 1960 to 1980 period much faster than the level required for the remaining occupations.

Other researchers have also reached the conclusion that some polarisation of skills has been occurring since the early 1970s.⁸ In general, this polarisation of demand for skills has not been due to deskilling per se, but because the top part of the skill structure is running away from the rest of the field. It is remarkable that a broad range of studies report this finding given that rather slippery nature of concept we are measuring. Direct measures of skill can never be objective and thus it is difficult to get a unanimous set of findings.^{9 10}

⁶ Elias (1994), Gallie (1994), Karmel (1995 as cited in Borland & Norris (1996), Spenner (1995), Penn, Rose & Rubery (1994b), Howell & Wolff (1991).

⁷ Howell & Wolff (1991; table 6).

⁸ See Spenner (1995) for a summary of studies from the UK and USA.

⁹ Whether one claims that the skills required for a particular occupation have increased over time of the relative demand for more highly skilled occupations has grown it partly a matter of where one draws the occupational boundaries. How much skill has increased across the spectrum of jobs ranked according to skill, also depends partly on arbitrary indices of skill.

Related to these changes in the skill structure is the finding by Gregg & Wadsworth (1995) in the UK, that part of the increased dispersion has been due to static real wages for entry level jobs and low relative demand for inexperienced workers. Related studies in both Australia and the UK have found that career breaks or time away from employment is associated with lower wages or a reduction in job skill levels.¹¹

Market forces may also be expressed as a growth in bilateral monopoly situations if the importance of tacitly acquired firm-specific skills is becoming more pervasive. In this case the *laissez faire* labour market may not approximate a competitive market but rather a series of partitioned bilateral monopolies. Employees endowed with the desirable specialist attributes are in a better position to negotiate for relatively higher wages than those without, and on efficiently wage grounds, many employers are happy to pay them. The skill and bilateral monopoly theories are mutually reinforcing rather than mutually exclusive.

The second type of explanation suggests that the change in the dispersion of earnings is attributed to a reduction in the role of trade unions and centralised wage negotiating processes, in repressing 'natural' market forces.¹² Market forces may have always been consistent with a wide spread of earnings but they have been restrained in the past in the name of comparative wage justice by successful action by unions and their associated institutions. Alternatively, it is possible that the ethos of labour organisations has changed in favour of supporting action to exploit bilateral monopoly power between select collections of workers and their employers (rather than the whole workforce), where this power is believed to exist.

A recent OECD study has found that more centralised and co-ordinated economies have significantly less earning inequalities than decentralised ones.¹³ However, this does not necessarily mean that centralisation eliminates the growth of wage inequalities. The wage dispersion of males did increase during the Accord period, the very time when the peak union movement in Australia was in a powerful position to promote its traditional policies of 'wage justice'.¹⁴ Other international studies suggest that the nature of wage setting institutions does not affect inter-industry and inter-occupational wage differentials.¹⁵ It would seem then that despite its best attempts, there were more basic forces operating in the labour market to broaden the spread of earnings, whether these operated through select labour organisations

¹⁰ However, as most studies point out, the correlation between direct measures of skill (based on expert or employee assessment) and wages is not overly high. Other factors, as indicated below, such as market power and efficiency wage considerations are likely to be relevant as well.

¹¹ Miller & Volker (1993), Dex (1987), Elias (1994).

¹² See for example Robinson (1994).

¹³ OECD (1997: 64).

¹⁴ Borland & Wilkins (1996), OECD (1996: 64).

¹⁵ Norris (1986), Dawkins, Norris & Stromback (1993),

which took advantage of the growth in bilateral monopoly situations or through disaggregated market forces is not clear.

Working time

Almost parallel with the increased dispersion of (hourly) wages has been a polarisation of working time. On the one hand many employees and self-employed are working longer hours and on the other, there has been a growth of people working less hours in part-time and casual positions and the unemployed.¹⁶ In Australia, managers, administrators, professional and tradespeople have been most likely to increase their hours of work since 1980. On the other hand, non-English speaking background immigrants, aboriginal and Torres Strait Islanders, people with few formal qualifications and people over the age of 55, have become more work deficient. According to Dawkins (1996), the rise in very long hours of work has been concentrated among workers with high levels of both general and specific skills.

We are not certain why there has been a polarisation of hours worked. There is considerable evidence that the experience of being unemployed, out of the workforce or in a low paid unstable job are correlated over time but we do not know to what extent the experiences are reinforcing (state dependent) or just systematically fall upon the same types of people for the same pre-labour force experience reasons.¹⁷ Additionally, we have few clues as to why some groups are continuing to extend their working hours up to and beyond 60 hours per week.

Beveridge curve

There is also evidence across many OECD countries that perhaps from as early as the late 1960s, vacancy rates for given rates of unemployment have been rising.¹⁸ Information on whether there have been fundamental changes in the nature of vacancies is scarce. It is still not entirely clear that vacancies have risen above their frictional level and if they have, whether it is because they are increasingly dominated by hard-to-fill vacancies. It is possible that an increasing portion of low paid, high turn over jobs in the economy over time has led to a higher frictional vacancy rate, but there is little research on this in Australia.¹⁹

Issues of structural mismatch are frequently cited, especially overseas, but the evidence in favour of mismatches based on the traditional occupation and region demarcations are far from conclusive.²⁰ This is not surprising. There is no apparent reason why these sorts of

¹⁶ Dawkins (1996).

¹⁷ See Baker & Elias (1991).

¹⁸ See Webster (1997) and Björklund (1994) for a summary of these studies.

¹⁹ See however Webster (1997) and Gregg & Wadsworth (1995) in the UK.

²⁰ See for example Robinson (1996).

mismatches should persist or worsen over extended periods of time. School leavers generally have the means and motivation to train for occupations in high demand. On the other hand, there is considerable anecdotal and survey evidence from recruitment agencies to indicate that employers prize work experience and non-observable characteristics such as motivation and reliability as much or more than formal qualifications.²¹

Typically, both Australian and overseas econometric estimates find that the Beveridge curve will shift out in response to a rise in the replacement ratio and a rise in the incidence of long term unemployment.

To summarise our situation so far, the rising disparity of hourly earnings in Australia is likely to be due to a rise in the dispersion or returns to characteristics other than formal qualifications and work experience. There appears to be an increased dispersion of returns to these characteristics possibly because the market is rewarding additional and correlated characteristics. This polarisation of hourly earnings may well be correlated with the polarisation of working time, although we only have indirect evidence for this. Finally, it is likely that the deterioration in the Beveridge curve have been influenced by the rising portion of the reserve army of labour who are long term unemployed. Either the prolonged experience of unemployment or the underlying forces which have 'destined' them for the most meagre labour market opportunities, have also caused employers to prefer to continue to search rather than offer them a job.

A divided labour market?

We intend in this paper to explore the possibility that figuratively speaking, the labour market is partitioning into two or three occupational sectors. The description of the labour market as a series of non-competing segments is not new in labour economics. Early attempts, primarily in the USA and UK, to establish the existence of segmented labour markets during the 1970s and 1980s however largely failed to uncover widespread empirical support.²² This is possibly because researchers tended to regard segmentation as a literal separation usually based upon the primary/secondary workplace division established by Doeringer & Piore (1971). A more sophisticated notion of labour market partitioning however, would regard barriers as heuristic devices to aid the understanding of particular labour market processes (Ryan 1981). Not only may there be several segments, but also barriers need not be absolute to exist as a problem or a contentious economic force.

²¹ Robinson (1996), Morgan & Banks (1997).

²² Bosworth, Dawkins & Stromback (1996), Lewis & Flatau (1993), Taubman & Wachter (1986), Cain (1976).

More recent theories, which depict the labour market as a series of partially insulated markets, include the insider-outsider hypotheses argued by Lindbeck & Snower (1986) and Layard & Nickell (1986). In these theories, divisions are based upon whether or not the person was in employment or not, and/or the degree of union power in the workplace. Less defined examples have represented the aggregate labour market as two sectors, skilled and unskilled.²³

Our argument in this paper is that certain sectors of the labour market, or certain individuals have acquired increasing power because labour and the organisation of the work environment, are increasingly becoming more important assets to the firm vis-à-vis physical capital. While firms are compelled to invest in a portion of their labour force in order to survive, not all members of the labour force are suitable investment material. Jobs in which labour performs the dual roles of input and asset are more complex, analytical and demanding than conventional jobs. Hiring a person for an asset type of position who is incapable of understanding, processing and acquiring the required knowledge and fitting into the work team can do more harm than good. Not only will firms incur wage costs but also recalcitrant and inept workers can impart considerable negative externalities upon other employees.²⁴

Aside from the vocational qualification thresholds required for many occupations, our hypothesis maintains that employers will notionally divide the labour market up into people who are capable or incapable of performing complex rather than routine jobs. This does not mean that the assignment of people is rigid, or that the same level and variety of criteria are applied in every firm or market. It rather asserts that these are common tendencies that overlay many markets.

In the next section we will discuss the theory of intangible investment activity in firms and the implications it has for the employment decision.

Labour and work organisation as an asset

Investments are outlays made by economic units in anticipation of future rewards or profits. The early established convention that investments were only embodied in tangible goods can probably be attributable to Smith (1776) who thought that in practice capital could only be stored in physical entities. He gave passing acknowledgement to skills and useful talents but did not carry the line of reasoning to its logical conclusion.

Marshall (1890) did however. He recognised and devoted considerable space to the importance of knowledge and business organisation for the nation and the firm. According to

²³ See for example Nickell & Bell (1995).

²⁴ Bellman, Drago & Wooden (1992) have found that cohesive workplaces exhibit higher productivity levels than less cohesive ones.

his view, labour and land (gifts of nature) are the only primary factors of production, but produced goods, that is stocks of material and immaterial goods (acquired knowledge and business organisation) were both part of aggregate productive assets and wealth.²⁵ He considered immaterial assets to be more important than material capital for the destruction of knowledge and ideas he argued has always left more lasting scars on the economy than mere destruction of plant and equipment. Western civilisation took centuries to recover from the Dark Ages, but it has rarely taken more than a few decades to recover from wars.²⁶

Recognition of the role that labour and workplace organisation are playing in the profitability of a firm is usually discussed separately by economists under the separate topics of innovation, advertising, education and training, organisational change and rent-seeking behaviour. According to Abramovitz, the shifting emphasis in the literature towards these forms of intangible assets reflects the changing character of technical progress over time.²⁷ During the nineteenth century new technologies were largely embodied in fixed capital while this century they have been embodied in intangibles and labour.²⁸

Business and management advisors and theoreticians now readily accept that the firm invests in labour related capital goods in order to reduce costs of production, increase productive capacity, enhance demand for the firm's existing products, discover new profitable areas of expansion and mitigate market risk and uncertainty associated with the firm's activities.²⁹ In the ultimate pursuit of profits, firms invest to enhance their productive capacity, to increase their knowledge, both market and technical and to control product, input and internal markets. A sizeable portion of these assets is embodied in their workforce. It is the ability of the workers or the team of workers to know and understand the facts and apply them to new situations that has increasingly been recognised as the major source of a firm's success. The organisational structure, including incentive schemes the culture of a workplace and the level of co-operation between team mates has also been cited as having a pivotal part in the scheme.³⁰ Achieving economic distance in the product spectrum from one's rivals, by discovery, innovation and marketing, is a major route to monopoly profits.

Essentially, conceptual skills are replacing manual ones and as such, labour can be regarded as two different types of factor. One type is simply an input into the production

²⁵Marshall (1890; 56-58, 138-39, 341-42, 411, 625).

²⁶Marshall (1890; 138, 780, 1919; 593).

²⁷Abramovitz (1993). Intangible inputs and assets reflect not only a growth in importance of the value to consumers of product design and quality (in preference to *quantity* of goods) but the importance of intangible goods in the production function.

²⁸Kendrick (1972), Auerbach (1988; Ch 5).

²⁹Porter (1990: Ch 2).

³⁰See Arrow (1974; 178-79), Dosi (1988; III d), Hamel & Prahalad (1988), Eliasson (1988; 61), Dunning (1988), Adams (1989; 149-50), Ray *et al* (1989), Borner (1989; 67), Best (1990; 11-14, 60), Moir (1990;

process in the spirit of traditional microeconomics theory. The other is both an input as well as an investment good. However, unlike physical capital, labour assets appreciate not depreciate with usage. The act of labouring produces joint products: the immediate output and the asset with its potential contribution to future output. Most of these labour investments are orchestrated by and embodied in managers, supervisors, professionals and technicians.

The analogy with physical capital can be carried further to illuminate some more interesting properties about firms' investment in labour related goods. Like physical capital, the value to the firm of a labour asset is the discounted stream of future profits or earnings and as such any changes to the assessed discount risk factor or expected profits per period are magnified in its present value. Thus a change to the firm's current profitability can wipe off a large part of a labour asset's value. Furthermore, like physical capital, the desired asset structure is not fixed; it changes over time and according to management methodology or perceived product market demands. The infusion of Japanese lean production methods has had major effects on the desired structure of labour assets in many large companies who express this by retrenching executives.

However unlike physical capital, labour assets are different in three important respects. First, there is the well-recognised grey area over appropriability because labour cannot be owned. This injects an additional layer of uncertainty into any decision to employ some one for a labour asset type position. The propensity to quit and indicators of a person's commitment and reliability will be significant factors.

Second, as long recognised by labour economists, labour cannot be switched on and operated like a machine. Industrial relations, the form of the work organisation and the employment contract can have important effects on individual productivity and the synergy between employees in a workplace.

Third, like land, but unlike plant and equipment, which can be produce *ad nauseam* with complete uniformity, labour is inherently heterogeneous. Like land, labour with the most desirable and scarcest qualities attracts the highest use. In the process, firms compete vigorously for people who are perceived to have the greatest ability to become the most profitable asset for the firm, regardless of the number and cost of people who suitable for the non-assets type of position.

Some people present as more fertile grounds for investment and their natural scarcity attracts a disproportionate amount of attention. We would expect *a priori* that these people are those who are most able to learn, adapt store and retrieve relevant knowledge, organise people and things and make decisions which are sensible. The process of investing in a

105), Chandler & Hikino (1990; 24, 594), Porter (1990; Ch 2), Odagiri (1992; Ch 3), Nelson & Winter (1982; Ch 5).

person magnifies the value of their scarce qualities. These qualities may be associated with one's level of general education which not only develops one's analytical skills and abstract reasoning capabilities, but also has made the recipient more able to learn. Scarcity may also be associated with unobservable characteristics such as attitude, confidence, the ability to organise and adaptability.

Because of the direct and indirect costs to the firm of hiring an unsuitable person for an asset position, firms will generally screen out assumed-to-be high-risk candidates (which may or may not be justified on statistical discriminatory grounds).³¹

Nevertheless, this theory of the labour market may explain why firms will be reluctant to hire people with poor work histories, chronic health problems, poor language and communication skills and minimal formal education for some positions. Poor work histories and chronic health problems may be indicators that the worker will be unreliable, uncommitted and liable to quit. Poor language and communication skills are major impediments for jobs that required interactive duties and where many of the skills are tacit in nature and can only be accumulated by communication with fellow employees. Low formal education can be an indicator of low potential to learn especially conceptual skills. According to Spenner (1995: 123) while there is little to suggest the education make workers doing the same job more productive; studies have shown that more education labour is better able to cope with technical change in both their current and prospective jobs. Education improves their intellectual flexibility and problem solving capacities and enables them to transfer skills from one job or situation to another.

Firms are not merely placing these types of people at the end of the labour queue, they are saying: If we cannot hire some one who is suitable from the ranks of the unemployed, we will poach other firms' employees or continue to search. In the process, there is additional pressure on wages, a greater demand for hours of work by existing employees and higher vacancy rates, instead of more employment.

In sum, we are arguing that there are distinct jobs within each production process which call for labour of this type and the circumstantial evidence to date suggests that this portion is on average increasing, over time. The level at which firms and production processes call for these types of skills is expected to vary across industries and occupations. Some firms will call for workers who on balance, are more adaptive, innovative, and analytical and require more (self) supervisory skills than others. Clearly there are also other barriers to entry to some labour markets based on vocational skills. This is not to deny they exist or to marginalise their importance. The labour market can also be viewed according to the type of prevailing institutional forces and structures which have been wrought by cultural, educational, government, industry and professional and trade decisions over time. The partition we are talking about is a notional concept. There are clearly no rigid or visible borders in the labour market based along these lines. To divide the labour market in this way

³¹ The very slow integration of women into the mainstream jobs and occupations, illustrates how it can takes decades for employers as a whole to realise that their discriminatory hiring rules of thumb and short cuts screening devises are *ex post* inefficient.

is more of a way to organise our thoughts and understand common (but not all) phenomenon in the macro labour market.

Effects on the labour market

In terms of the assignment of labour to different sectors and the transfer of labour between occupational sectors, our theory would predict that:

1. Occupational sectors differ according to the degree of complexity and responsibility involved in the work.
2. The most extreme wages, skills and hours of work are found in the experienced assets sector.
3. The destination of labour at the time of formal labour market entry to the assets or input sectors may be based on *ex ante* characteristics including formal education and personal traits.
4. There is limited mobility between the two sectors. An excess demand for asset labour will have limited spillover effects into the input sector as many employers opt instead to compete for the limited pool of suitable workers. This is an especial problem if employers are seeking more experienced asset labour. In this case it may make more sense to divide the market into three sectors, input, inexperienced asset and experienced asset. Regardless of whether entry barriers exist or there is systematic selection into the inexperienced asset sector the fact that entry into the experienced assets market is restricted (by the precondition of having attained experience) and slow to increase, is enough to cause a polarisation in the labour market. Those who work consistently in the inexperienced and later experienced assets sectors appreciate steadily with respect to their skills and net worth to the firm, while those who fail to attain an assets position or drop out of this career track have a relatively flat life cycle skill and wage profile.

To test these propositions fully is a rather longer and more involved process that we have room to cover in the remaining sections of this paper. Nevertheless, we will make a start by examining individual work history data to see if the observed pattern conform to the outcome of our theory. We provide evidence for points 1 and 2 in the following section and deal with issues related to career progression, and points 3 and 4, in the subsequent section. Two different data sets are used. The first is derived from telephone interviews conducted during August and September of 1997 of a stratified sample of 2400 adults across Australia. Respondents were asked their first job since completing formal education and their jobs at the age of 25, 35, 45, 55 and 65 years of age. Records can be classified by current education,

age, and sex. The second data set is part of the Ann's ISSS³² and is based on a self-enumerated questionnaire of 2300 people in 1995. This only contains information of first and currently job but includes in addition, a rich array of attitudinal, educational and family data.

Both data sets rely upon retrospective work history records. People are asked to nominate their job at specified discrete dates during their life. This form of data has the disadvantage of a larger recall error and it is usually difficult to obtain contemporaneous data on related characteristics such as education and training, but it does allow consistent intertemporal occupational coding.³³

Characteristics of occupational sectors

To assess the nature of jobs in separate sectors, we computed an index of job complexity from the ISSS data set based on a set of responses including how highly people rated the complexity and responsibility of their current job. The former included questions on the degree of complexity and difficulty of the job, and whether it required a lot of thinking, good sense, judgement and special talent and abilities. The latter included responses on whether they managed other people, how high they were in their management tier, whether they had to plan other people's work and how responsible they were for their own work. Together these indices give a possible ordinal ranking of the nature of the duties involved in each type of job.

Results for 5 occupational sectors are given below in Table 1. We used a combination of wages and current occupation as the dependent variable to try to differential between the experienced and inexperienced asset type of occupations. Specifically, the top occupational sector includes professionals, higher administrators and clerks and technicians who earned over \$40 000 in 1995. The second group includes all other occupations earning over \$40 000, the third are professionals, higher administrators and clerks and technicians earning under \$40 000. The fourth are sales, service workers, skilled and semi-skilled workers earning under \$40 000 and the final category are the remaining unskilled and farm labourers earning under \$40 000.

Table 1 shows that aside from the small numbers earning above \$40 000 per year but in a less skilled occupation, there is a clear ranking of sector according to the complexity and responsibility of their job. Next we obtained estimated the hours of work across each sector. We found that the two top sectors earning over \$40 000 per year hand relatively more people working very long hour and fewer people working part time.

³² ANU International Social Science Survey 1995.

³³ Panel data giving significant life cycle information is scarce There are a few isolated panel data sets overseas which have recorded work histories for up to 50 years (see Tuijnman 1989), but none in Australian.

Table 1. Job complexity, responsibility and hours of work by sector, 1995.

Occupational sector	Number	Complexity/re sponsibility score* (standard deviation)	Percentage working < 35 hours per week	Percentage working > 50 hours per week
1. Professionals, technicians, higher administrator and clerks, >\$40 000 pa	291	27.6 (5.8)	6.7	17.1
2. Other occupations, > \$40 000 pa	84	31.6 (7.4)	2.4	22.4
3. Professionals, technicians, higher administrator and clerks, <\$40 000 pa	476	34.2 (7.4)	31.2	4.2
4. Sales, service, skilled and semi-skilled workers, <\$40 000 pa	276	36.3 (8.1)	24.6	11.3
5. Unskilled and farm labourers, <\$40 000pa	67	40.7 (7.7)	24.5	7.8
ALL	1260	33.4 (8.1)	18.4	7.6

* Low score means more complexity and/or responsibility

Source: ISSS 1995.

Determinants of mobility between sectors

Nature of occupation changes

Using the first telephone data set, we compared job changes from one point in a person's career to another (i.e. from first job to job at 25, from job at 25 to job at 35, etc). This gave us nearly 6000 valid occupation changes. We disaggregated these changes according to four main occupational sectors and a not working sector, and educational attainment. Our results showed that retention in one's occupational sector is high. Two thirds of people remain in the same broad occupational sector from one point in time to another. The major exceptions are when their education qualifications are patently under-utilised in the initial job, for example people with post graduate qualifications or trade certificates working in clerical, sales and services and plant and machine operate and labouring occupations.

Nevertheless, putting this high retention aside, the lower the level of the person's formal education or qualifications, the more likely that he or she will move out of their occupation into 'not working' instead of moving up. Employers offering skilled and complex jobs seem to prefer inexperienced workers with qualifications rather than upgrade people already in the work force. However, post school qualifications does not give one automatic entry into a skilled job. During 1991, 18.6 per cent of males with a post school qualification

were employed in these two lesser skilled occupational sectors, a rise of about 2 percentage points since 1986.³⁴

Estimating career paths: model 1

To test for whether career paths are conditional on one's first occupation and work experience, we estimated a series of occupational attainment equations. Our simple career model assumes that occupation is determined by a set of relevant labour market characteristics and one's previous work history. Assume in the first instance that occupation is a continuous variable such that for each individual i , occupation at time period t , can be written as:

$$(1) \quad O^*_{it} = X_i b_t + \sum_{n=0}^{t-1} \gamma_{t-n} O^*_{it-n} + U_i a_t + v_{it}$$

with occupation in the first three periods determined by

$$(2) \quad O^*_{i1} = X_i b_1 + U_i a_1 + v_{i1}$$

$$(3) \quad O^*_{i2} = X_i b_2 + U_i a_2 + g_2 O^*_{i1} + v_{i2}$$

$$(4) \quad O^*_{i3} = X_i b_3 + U_i a_3 + g_3 O^*_{i2} + e_3 O^*_{i2} + v_{i3}$$

In these equations X is a vector of labour market characteristics such as birth cohort, sex, education, presence of children, O^*_{t-n} are the occupational work histories and U is a vector of relevant unobservable characteristics such as reliability, commitment, motivations etc which are required if labour is to develop into an asset for the firm. v_t is an independent random error term to represent non-systematic factors that can affect ones' ability to work in an occupation. We have assumed that the relevant personal characteristics X and U are time invariant but not their coefficients. This allows for the fact that for example, sex or formal education may be more or less important at different parts of the life cycle. Unfortunately we have no way of testing for whether U is correlated with X or not and this must be borne in mind when interpreting coefficients on X .

We can express U in terms of O^*_1 , X and v_1 and substitute U out of equation (1). For example O^*_3 becomes

$$(5) \quad O^*_{i3} = X_i (b_3 + e_3 b_2) + (O^*_{i1} - X_i b_1 - v_{i1})(a_1)^{-1} (a_3 + e_3 a_2)$$

- $O^*_{i1} (g_3 + e_3 g_2) + (e_3 v_{i2} + v_{i3})$

$$= X_i [(b_3 + e_3 b_2) + b_1 (a_1)^{-1} (a_3 + e_3 a_2)]$$

- $O^*_{i1} [(g_3 + e_3 g_2) + (a_1)^{-1} (a_3 + e_3 a_2)]$

³⁴ ABS 1991 census of Populations and Housing, 1% households sample file

$$+ [(e_3 v_{i2} + v_{i3}) + (a_1)^{-1}(a_3 + e_3 a_2)].$$

In our particular data set, occupation is best represented as a set of m discrete variables³⁵, so with the additional assumption that:

$$O_{kt} = 1, \text{ if } x < O_t^* < y, O_{kt} = 0 \text{ otherwise, } \forall k = 1, \dots, m.$$

we can estimate the multinomial logit model such that:

$$\text{Prob}(O_i = k) = \frac{e^{b_k' X_i + g_k' O_{ii}}}{\sum_{j=0}^m e^{b_j' X_i + g_j' O_{ii}}}$$

$$\text{where } b = [(b_3 + e_3 b_2) + b_1 (a_1)^{-1} (a_3 + e_3 a_2)] \text{ and } g = [(g_3 + e_3 g_2) + (a_1)^{-1} (a_3 + e_3 a_2)].$$

We included in X sex, birth cohort, formal education at the time of the survey, and the presence of children under the age of 18 in the household if female. Birth cohort and the presence of children were not significant, in the last case probably because it captured motherhood status only for 1997 and not earlier years. Results for occupation at 45 as dependent variable are presented in Table 2.³⁶

³⁵ Nickell (1982) portrays it as continuous by assuming that the occupation category offers a cardinal ranking of occupations by skill.

³⁶ While we have data for job at 55 and job at 64, relying upon this data set limits the sample size too much.

Table 2. Marginal probability of being employed in each occupational sector at age 45 by significant worker characteristics, 1997*

Associated significant characteristic	Professional, technician, higher Admin	Para-professional, tradespeople	Clerks, sales and service workers, plant, operators, labourers	Unemployed/ not in the labour force
Sex. Male : female	14.6	8.6	1.4	-24.7
Education. Bachelor degree or higher : less than year 10	35.1	-2.6	-23.1	-9.4
First job. Professional/Admin: unemployed/not in the labour force	43.5	-14.9	-11.7	-16.8

$n = 1112$; Percentage of correctly predicted cases = 54.4

* For information on the coefficients, apply directly to the author.

Results indicate that being male increases the probability that a person of a given education and first occupation will be employed in a managerial or professional occupations at age 45 by 14.6 percentage points. While educational attainment is clearly important, one's first occupation appear just as important in terms of the magnitudes of effects. Entering the labour market through a managerial or professional job rather than not working increases one's probability of being in a managerial or professional job at 45 by 43.5 percentage points. Even after the effects of formal education and sex are controlled for, one's early employment path is critical. As shown in (5), this may capture the effects of work experience (gs) and /or time invariant unobservable characteristics such as motivation, ability to learn, organisational abilities and reliability (as).

Estimating career paths: model 2

A similar model can be developed for the second set of data. This gives detailed information on ones' early and on-going education, family background, work history and current employment. We extend the model above with the addition of an equation to represent early formal education:

$$(6) \quad E_i = X_i b_0 + U_i a_0 + v_{i0}$$

$$(7) \quad O_{it}^* = X_i b_1 + U_i a_1 + v_{it}$$

$$(8) \quad O_{it}^* = X_i b_t + \sum_{n=0}^{t-1} \gamma_{t-n} O_{it-n}^* + \sum_{n=0}^{t-2} \theta_{t-n} Z_{it-n} + U_i a_t + v_{it}, \forall t$$

In our case, the same set of observed (X) and unobserved (U) variables have the potential to affect both initial education and one's first occupation. We specifically include in X the number of book in the house when growing up, whether parents were married when one was 14, mother's education, father's education, self stated attitude to schooling, self stated aptitude for school work, birth cohort, sex, whether parents helped with homework and gave career advice, and level of formal education completed (not included in (4)).

Z includes work related experiences since entering the labour force, such as attendance at job related courses, years worked for pay, whether unemployed last year and years one has been doing this sort of work.

We only have work related data for two periods, first job and job 'now' (1995), so we will assume that 'now' is the second period and the effects of different ages and previous work experiences can be collapsed into Z . Accordingly from (8):

$$(9) \quad O_{i2}^* = X_i b_2 + U_i a_2 + g_2 O_{i1}^* + q_2 Z_{i2} + v_{i2}$$

We expect that for people who are employed in asset type occupations (in comparison with people found in input occupations), that the positive attributes discussed in the previous section will be more important in explaining their occupation. Thus we expect that unobservable characteristics such as motivation, commitment, reliability and attitude will become increasingly important as one progresses up an asset career ladder, thus a_2 will be larger than a_1 or a_0 . Cumulated work experiences such as attendance at job related training courses, years of experience in relevant arises will also be more important later in one's career in asset occupations relative to input occupations, accordingly q_2 will be large. Finally we expect that early entry through one's first job into the inexperienced assets sectors will be very important in affecting whether one ends up as an experienced type of labour asset and thus g_2 will be significant.

We can substitute out U using equation (6) to get:

$$(10) \quad O_{i2}^* = X_i [b_2 - (a_2/a_0)b_0] + (a_2/a_0) E_i$$

$$\bullet \quad Z_{i2} q_2 + g_1 O_{i1}^* + [v_{i2} + (a_2/a_0)v_{i0}].$$

Estimates for equations (6), (7) and (10) are presented below. Both education and occupation are modelled as a discrete variable when it enters as the dependent variable but as continuous variables when it enters the right hand side of the equations.³⁷

Results for the determination of education shown in Table 3 indicate that family background (as reflected in fathers' education, the number of books in the parental

³⁷ The ranking of occupations and educational attainment is ordinal.

household, and whether the mother worked full-time before the respondent was 15 years old) have been important factors in determining educational attainment. In addition the ability measure (one's assessment of their aptitude for schoolwork) had a large and significant effect. Sex and birth cohorts also have a significant but smaller influence. Parents' marriage status at 14 and whether of not parents helped their child with their schoolwork were not significant and mother's education were not significant. The model correctly predicts 40.1 per cent of cases, which is reasonable, given there, are seven possible outcomes and thus six possible incorrect predictions for each case.

Table 3. Marginal probability of attaining each educational level by significant worker characteristics, 1995*

Associated significant characteristic	Higher degree/post graduate diploma	Bachelor degree (university or CAE)	Under grad. Diploma	Apprenticeship/other vocational qualification	Year 12	Year 10 or 11	Less than year 10
Sex. Male: female	1.5	4.3	2.2	9.3	-2.5	-14.9	-0.1
Father's education. Higher degree: primary	5.9	10.4	9.2	-14.9	-0.0	-9.3	-1.3
Number of books in parental house. Over 1000: none	8.0	10.0	8.4	-5.3	3.6	-22.4	-2.3
Attitude to school at 14. Very enjoy: not enjoy at all	0.5	-8.7	-6.6	7.2	-6.5	13.3	0.9
Aptitude to school work. Top student: below average	15.3	37.2	1.7	-15.6	-13.0	-20.9	-4.6
Full time working mother. Yes: No	1.3	4.1	-1.2	0.0	-1.8	2.0	0.1
Year born. 1970: 1930	-2.2	14.8	-0.2	-11.4	14.1	-11.9	-3.1

$n=1834$, Percentage of correctly predicted cases = 40.1

* For information on the coefficients, apply directly to the author.

Similar variables and educational level itself are included in the equation for one's first occupation. We tried to see whether these additional variables influenced one's first occupation directly as well as through their educational attainment. Our result presented in table 4, indicate that while formal education was for most people the most significant factor, sex, respondent's attitude and aptitude to school work influenced early career choice directly as well as indirectly via educational attainment. Parents' marital status at 14, parent's education and other background characteristics such as books in the house, parental assistance with school work, were not significant. Holding educational attainment constant, more recent cohorts of people are more likely to be found in sales, service and less skilled

jobs. This model correctly predicts 43.6 per cent of cases, which is reasonable, given there are six possible categories and thus five possible incorrect assignments.³⁸

Table 4. Marginal probability of entering particular first occupations by significant worker characteristics, 1995*

Associated significant characteristic	Higher professional/Administration	Lower professional/technician & higher clerical	Sales & service workers	Skilled worker	Semi-skilled, unskilled and farm worker	Not have a first job
Sex. Male: female	2.1	-20.1	-5.0	13.9	14.6	-5.0
Education. Higher degree: less than year 10	51.1	11.7	-11.7	-3.3	-26.7	-21.1
Attitude to school at 14. Very much enjoy: not enjoy at all	7.9	6.5	3.1	-8.1	-13.0	3.6
Aptitude to school work. Top student: below average	13.8	1.6	-10.1	-2.2	-2.0	-0.1
Year born. 1970: 1930	-4.7	-1.1	16.5	0.0	5.7	-16.6

$n=2056$, Percentage of correctly predicted cases = 43.6

* For information on the coefficients, apply directly to the author.

Finally we tested for which factors have influenced one's career progression using equation (10). Broadly we found that the coefficients on formal education, cumulated work experiences (attendance at job related course, weeks of unemployment in last 12 months and years of experience in current line of work) were all significant and displayed the correct sign for people working in the top assets sector. That is compared with people in the bottom occupational sectors, these factors are very important in determining their career attainment. In addition, one's first job was not only highly significant, but also one of the dominating factors. People who entered the job market as a higher professional rather than as an unskilled worker were 29.2 percentage points more likely to be in a professional, administrative or higher clerical job earning over \$40 000 a year in 1995, *ceteris paribus*. Entering one of the inexperienced assets sector jobs initially has a large effect on one's probability of ending up in the top sector and the lower professional sector even after we have controlled for formal education. Similarly, holding constant one's first job, career progression was independently influenced by one's formal education but the effects were smaller than for first job. Other variables cited in Tables 3 and 4 above were not significant.

Table 5 presents the marginal probabilities of varying the significant characteristics in career attainment.

³⁸ Robertson & Symons (1990) define three occupational outcomes and get a correct fit for 57.9 per cent of cases, which they consider high.

Table 5. Marginal probability of being employed in each occupational sector during 1995 by significant worker characteristics, 1995*

Associated significant characteristic	Professional, technician, higher Admin and clerk, >\$40 000 pa	Other occupations, > \$40 000 pa	Professional, technician, higher Admin and clerks, <\$40 000 pa	Sales, service, skilled and semi-skilled workers, <\$40 000 pa	Unskilled and farm labourers, <\$40 000pa
Sex. Male : female	19.0	5.7	-27.9	3.1	0.1
Education. Bachelor degree : less than year 10	8.0	-0.1	9.8	-8.7	-9.0
First job. Higher professional unskilled	29.2	-5.4	13.4	-29.7	-7.5
Attended job course. Yes : No	5.7	0.0	4.3	-6.0	-4.1
Unemployed in last year. Zero : over 26 weeks	17.0	2.0	-11.7	8.7	-16.2
Experience in line of work. 10 years : under a year	7.4	1.0	4.0	-11.7	-0.1
Weekly hours of work. Over 50 : under 35	6.8	2.2	-6.2	-1.8	-1.0

$n = 1374$; Percentage of correctly predicted cases = 55.8

* For information on the coefficients, apply directly to the author.

Finally we used a similar model to estimate factors affecting progression up a career path according to broad occupational sectors. In this case we used 1995 wages as an indicator of how far up a career path people had progressed and we split the labour market into two sectors. The first contained all professionals, higher administrators and clerks and technicians and the second contained the remaining sales, service, skilled, semi-skilled, unskilled workers and farm labourers.

We estimated each model as an ordered logit using the same set of explanatory variables as in the equation above. We found that in the high skilled sector higher wages were positively associated with one's first job, attendance at a job related course, formal education, being male, having fewer weeks of recent unemployment in the last year, having longer years of work experience in one's line of work and longer hours of work. In the less skilled sector a smaller collection of variables were significant, those that were significant had in general smaller coefficients. In particular, one's first job was not a significant determinant of wages attainment in this sector. In addition, the cut points for graduation into higher wage brackets were higher so the positive effect of relevant work experience and negative effect of recent unemployment had a smaller effect on one's wages if they were employed in the less skilled

sector. It is difficult to estimate marginal probabilities for our equation as there are 20 wage outcome categories and we present the original estimates in Table 6.

Table 6. Estimated ordered logit estimated coefficients, 1995*

	Professional, technical, higher Admin & clerical		Sales, service, skilled semi & unskilled, farm labourers	
<i>Associated characteristic</i>	<i>Coefficient</i>	<i>z</i>	<i>Coefficien t</i>	<i>z</i>
Education	0.08	4.45	0.10	2.07
First job	-0.06	-2.34	-0.02	-1.47
Attended course	0.40	3.10	0.30	1.82
Sex	-1.48	-10.99	-1.22	-6.12
Unemployed in last year	-0.43	-2.77	-0.37	-2.18
Experience in line of work	0.27	4.71	0.17	2.32
Weekly hours of work	0.06	13.43	0.05	10.23
<i>Range of cut points</i>				
<i>Cut 1 to</i>	<i>-4.098</i>		<i>Cut 1 to</i>	<i>-2.84</i>
<i>Cut 19</i>	<i>6.711</i>		<i>Cut 19</i>	<i>7.89</i>

n=893,

n=481

* For information on the coefficients, apply directly to the author.

Conclusion

Results from two separate samples of Australian workers provide evidence that that how we enter the labour market is either an important influence on our working career or reflects important *ex ante* worker characteristics. Advancement is not just a question of educational attainment. Even when we hold educational attainment constant, we find that the higher up the skill ladder one's point of entry, the greater his or her chances of progressing through an asset style career path. This finding is consistent with the view that it occurs because their employers regard some types of labour more as assets than as production line inputs.

Our results are broadly consistent with the limited range of occupational mobility studies undertaken overseas and a previous Australian study by Miller & Volker (1985).³⁹ Two papers from the USA and UK have argued that starting in a low paying job which requires qualifications and skills below one's formally stated status, is not generally part of a career strategy to gain training and work experience before moving up.⁴⁰ Respective authors tend to regard their results as evidence of the importance of firm specific skills for promotion and

³⁹ See Nickell (1982), Mayhew & Rosewell (1981), Sicherman (1990), Harper (1995), Elias (1994) Schömann (1994).

quit rates, internal labour markets and/or importance of transferable skills in determining the propensity to change occupations. While these explanations are not inconsistent with our theory, they fail to answer why the transferability of skills or retention of labour within its incumbent firm should be so important. We have suggested here that it is because these attributes are part of the process, which turns certain types of labour into assets for the firm.

Nevertheless, for whatever reason, different people enter different occupational sectors and by enlarge, remain there. If this version of the aggregate labour market is valid, it has important implications for microeconomic policies used to reduce unemployment. If most employment growth and subsequent wages pressures are in the assets sectors, especially the experienced assets sectors, then short programs such as conventional labour market programs, are more likely to rearrange the deck chairs in a sinking input sector than lead to higher total employment. They do not make unemployed input type of labour suitable for asset positions. Nor do they create vacancies in the input sector by ‘promoting’ employed input labour up into the assets sector.

⁴⁰ See Mayhew & Rosewell (1981) for the USA and Robst (1995) for the UK.

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