An Economic Analysis of Employment Conditions of Non-English Speaking Migrant Women in Australia

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Declaration

I declare that this Doctor of Philosophy research thesis is entirely my own work and that it has not been previously submitted for any other degree.

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Abstract

This thesis provides an empirical investigation of the employment status of Non-English-Speaking Background (NESB) and Australia-born women. The analysis adds to the work of Australian authors who have found that NESB women are under-represented in occupations that have relatively high pay and congenial working conditions, and are over-represented amongst the unemployed. This study develops a definition of primary sector employment from the occupation categories in the 1996 Census, and uses the ANU2 occupational prestige scale and earnings data from the Census.

The thesis constructed univariate probit models for labour market participation, primary sector employment and unemployment for both groups of women. The models were estimated using the 1-percent sample from the 1996 Australian Census. The Census provided useful information regarding labour market status and a range of human capital and demographic variables that were relevant to the analysis. These models suggested that NESB women faced disadvantage in the labour market if they had poor English language skills or had arrived in Australia comparatively recently. The models tended to support the works of other authors who have found that education and labour market experience were significant in improving the labour market position of individuals.

In addition, we developed bivariate probit models that deal with outcomes that resulted from simultaneous decisions of different parties. This approach has been used before in empirical studies, we believe it has not been used in Australian studies of employment status, and have not been able to identify any such studies in the overseas literature. In the primary sector employment models, the outcome is the consequence of an individual's decision to participate in the labour market and an employer's decision to hire that person into a primary sector job. In the unemployment models, the outcome is the consequence of an individual's decision to participate in the labour market and the decision of an employer not to hire that person into any job. Generally, the bivariate models tended to confirm the results found in the univariate probit models, however in some cases they revealed results that could not be otherwise achieved.

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1.0 Introduction

This thesis is an Australian economic analysis of the labour market status of Non-English Speaking Background (NESB) migrant women and Australian-born women. The thesis is empirical and will use econometric models to estimate the probabilities that women: (i) participate in labour market, (ii) have primary sector jobs and (iii) are unemployed. The Australian 1996 Census data will be used for the analysis.

This is an important matter because many Australian authors have suggested that NESB women are over represented in occupations that have low pay and poor working conditions. Because Australian governments have become increasingly concerned with equality of opportunity in the labour market, this thesis will shed light on why labour market outcomes appear to be unequal, and what policy measures might be undertaken to redress the imbalance.

This thesis makes two major contributions to studies of the labour market status of women in Australia. First, it establishes a means of classifying women as primary sector or secondary sector employees, and examines the factors that make employment in the primary sector more likely. Second, it uses bivariate probit models that take into account interrelationships between the factors that determine whether or not women choose to participate in the labour market, and the factors that influence the positions within the labour market of participants.

1.1 Problem Definition

There is a common view in the literature that NESB women face difficulties in the Australian labour market that cause them to suffer higher unemployment rates, perform less satisfying jobs, do lower paid outwork or casual work as an economic necessity, receive fewer training opportunities, and exhibit higher rates of self employment than other women workers. This group was estimated to be approximately 880,000 at the time of the 1996 Census, which was almost 20 percent of the total female labour force in Australia.

Based on the 1-percent sample of the 1996 Census, we estimate that the labour market participation rates of NESB and Australian-born women were 52.7 percent and 66.8 percent respectively, which is not necessarily indicative of labour market disadvantage for NESB women and might simply reflect cultural differences. However, after devising a scheme for categorising women into primary sector and secondary sector jobs, we conclude that amongst labour market participants, only 47.7 percent of NESB women had primary sector jobs, whereas 61.1 percent of Australian-born women had primary sector jobs. Further, the unemployment rate for NESB women was 12.7 percent, compared with 7.6 percent for Australian-born women. On this basis, it seems clear that there is a *prima facie* case that NESB women are indeed disadvantaged in the Australian labour market.

NESB women have different characteristics from Australian-born women that might bring about different labour market outcomes, and this has been the subject of considerable academic and public interest. Many studies have been undertaken on the status of NESB women in Australia, however this study takes a different approach as will be explained below.

1.2 Theoretical Considerations

Labour market outcomes are often analysed using three important theories, viz., (i) human capital theory, (ii) dual labour market theory and (iii) segmented labour market theory. The human capital approach gained popularity in the 1960s following the work of Becker (1964), who proposed that people are paid on the basis of their human capital attributes that include education, training and English proficiency. Dual labour market theory received much attention by institutionalist labour economists following the work of Doeringer and Piore (1971) and the essence of their theory is that the labour market is best perceived as a dichotomy, with a "primary" high wage sector and a "secondary" low wage sector. Labour market segmentation models are a development of dual labour market theory and Edwards, Reich and Gordon (1975) noted that this was originally developed between1890 to 1920, to explain ghetto labour markets, which are not homogeneous and are compartmentalized into non-competing groups. As a

consequence, the forces of supply and demand are unable to bring about a balance between wages and skills in different occupations.

1.3 Methodologies

Beggs and Chapman (1987), Vella (1993), Longford (1995), and others used wage equations to identify significant differences between different groups of workers in Australia. The use of wage equations, however, seems problematic because many wages in Australia have been institutionally determined, or the results of workplace agreements. Accordingly, people with different attributes might be paid the same wage. Also, it is difficult to incorporate non-wage benefits such as superannuation, work cover and holiday pay to enable a proper comparison of earnings. Further, anecdotal reports suggest that some NESB women work in the "black economy" and their wages are unknown. In these circumstances, a comparison of earnings between NESB women and others could be misleading.

Because of these problems, in this thesis we take a different approach. First, we classify all workers in Australia into two groups: primary sector employees who have "good" jobs, and secondary sector employees who have "bad" jobs. This follows the occupational classification introduced by Psacharopoulos (1978). We use the 1996 Census data for our analysis. We use the ANU2 occupational scales to divide the workers into primary and secondary sectors based on the median value of the ANU2 scores developed by Broom *et al.* (1977a). The use of the median value seems appropriate because there appears to be a break at this point in the prestige scale distribution in the data set. This has not been done in previous studies of the Australian labour market and we believe this allows us to classify women into the primary or secondary sector more appropriately.

Although there have been many studies of the labour market position of NESB women, none of the studies assigned occupations to a "primary" and "secondary" sector job dichotomy. One of the main aims of the present thesis is to estimate the probability that, after controlling for human capital and other demographic characteristics, NESB women find employment in the primary sector. The thesis also takes a similar approach to the

labour market participation and unemployment of NESB women. We also produce corresponding models for Australian-born women so that comparisons can be made about the impact of particular control variables.

The econometric models are based on univariate probit and bivariate probit models, using human capital and demographic variables. Although probit is commonly used in empirical studies of various labour market phenomena, bivariate probit is less common and we believe that it has not been used in examinations of labour market status and unemployment. Primary sector employment, for example, is based on (1) the decision of an individual to participate and (2) selection into a primary sector job by an employer. In this respect, the thesis seeks to examine the factors that determine whether women are selected into primary sector jobs or are unemployed. It makes an important contribution by estimating the effects of different levels of education on labour market outcomes, and in the case of NESB women, by estimating the effects of different levels of English skills and the length of residence in Australia

1.4 Organisation of the Thesis

The thesis is organized as follows. In Chapter 2 we present a review of the literature that deals with the factors that determine the labour market status for NESB and Australian-born women in Australia. Econometric studies concerning the relationship between labour market status, and human capital, and demographic variables are reviewed in order to develop new econometric models for our analysis. This review deals with four major labour market characteristics: labour market participation, occupational status, employment/unemployment and labour market disadvantage, and covers econometric and non-econometric works from Australia and overseas (principally the US).

In Chapter 3 we develop univariate probit models to estimate the probability of labour market participation for NESB and Australian-born women.

In Chapter 4 we make a significant contribution by assigning employees into primary and secondary sector occupations following Psacharopoulos (1978). This is based on the

list of occupations provided in the 1996 Australian Census, and a modified version of the ANU2 median occupational prestige scale developed by Broom *et al.* (1977a). Then we develop univariate probit models to estimate the probability that NESB and Australian-born women have primary sector occupations.

In Chapter 5 we develop probit models to estimate the probability of unemployment for NESB and Australia-born women.

In Chapter 6 we present bivariate probit models that are the major contributions of this thesis. First, we develop a bivariate probit model to estimate the probabilities of participation and primary sector employment simultaneously. Second, we produce a similar model for participation and unemployment. Although this approach has been used before in a comparative few labour economics empirical studies, we believe it has not been used in Australian studies of primary sector employment or unemployment, and we have not been able to identify any such studies in the overseas literature.

Finally in Chapter 7 we present a summary of our empirical models and the support that they give to theoretical models. Based on the estimated univariate and bivariate probit models, we draw some conclusions regarding how the acquisition more education might assist NESB and Australian-born women to obtain primary sector employment and to minimize the risk of unemployment, and how that might differ between the two groups. Importantly, we draw some conclusions regarding labour market disadvantage associated with women having poor English skills and having recently arrived in Australia.

2.0 Literature Review

2.1 Introduction

In this chapter, we review the literature that deals with the factors determining the labour market status of NESB and Australian-born women in Australia, and investigate the relationship between their labour market status, socio-economic characteristics, demographic factors and human capital variables. It also examines the literature relevant to the extent to which NESB women face discrimination in the Australian labour market.

The human capital approach and the segmented labour market approach are widely used for these types of analyses. There is a large literature along these lines in Australia and overseas. Thus, our review of literature is divided into the following major four groups: studies on participation, studies on occupational status, studies on unemployment and other aspects of labour market disadvantage. These are divided into econometric and non-econometric works.

In this thesis our focus is on economic explanations of labour market status, and on human capital variables in particular. Our principal focus is on the effects of English skills and education on labour market participation, primary sector employment and unemployment. It is of course clear that a range of demographic factors is also relevant in modelling labour market status. In this chapter we introduce the reader to the breadth of the human capital literature that is relevant and for the most part report only on human capital effects. In subsequent chapters where we construct models of participation, primary sector employment and unemployment, we will also refer to demographic variables commonly used in the literature.

2. 2 Studies on Participation

Some of the main literature on labour market participation is reviewed in the following sub-sections: (i) Australian econometric studies of participation, (ii) Australian non-econometric studies of participation, (iii) foreign econometric studies of participation and (iv) foreign non-econometric studies of participation.

2.2.1 Australian Econometric Studies of Participation

Since the 1980s, there has been much econometric analysis of labour market participation. These works include that of Miller and Volker (1983), Evans (1984,1988), Ross and Saunders (1993), VandenHeuvel and Wooden (1995, 1996), Lucich (1997), Wooden and VandenHeuvel (1997), Gray *et al.* (2003), Mumford and Parera-Nicolau (2003) and Birch (2005), which are mainly based on regression, probit and logit models. In this section we outline these important contributions of Australian econometric studies of participation. Further details of the works of these authors will be given in Chapter 3. Also see Table 2.1 for a summary that includes participation studies.

Miller and Volker (1983) examined the participation of married women in the labour market, using the 1976 Census of Population and Housing data. First, they used the Ordinary Least Square (OLS) method to estimate a standard labour supply function for married women. The estimated parameters were then compared with the estimated parameters obtained from the instrumental variable approach endogenising wage rates, and with a three-equation system endogenising fertility as well as wages. They used human capital variables in their analysis and concluded that the most important indirect determinant of the labour supply of married women was education.

Evans (1984) investigated the work experiences of migrant women, which covered a broad range of topics related to women's work roles, using the 1981 Census data. She used a regression model to analyse the migrant women's labour market participation with a range of human capital variables including education and English skills. Evans concluded that women in all groups were more likely to participate in the labour market if they had more education, except Mediterranean and Eastern European women. However, she found that English skills had no significant influence on the labour market participation of any group.

Evans (1988) examined some key influences on married women's workforce participation, using the National Social Science Survey, 1984-85 data. She used a regression model to analyse labour market participation of Australian wives, using

human capital variables and concluded that better-educated wives were more likely to participate in the labour market.

Ross and Saunders (1993) analysed and compared the labour supply behaviour of sole mothers and married mothers, using the 1986 Income Distribution Survey data. They used a probit model to analyse the women's participation in the labour market and used a range of human capital variables that included education and labour market experience. They concluded that more highly educated mothers were more likely to participate in the labour market but experience appeared to have little impact.

VandenHeuvel and Wooden (1995) examined the labour market participation of NESB women in various types of work-related training, using the 1993 Survey of Training and Education (SOTE) data. They used a binary logit model to estimate the odds of participating in a training program. They used a range of human capital variables that included education, occupational experience and English language skills. They concluded that NESB women had lower rates of participation in work-related training than other women. For NESB women, English language difficulties were associated with a reduced probability of training, and better-educated women had a greater probability of receiving training.

VandenHeuvel and Wooden (1996) also investigated the factors that were associated with participation in training among NESB women, using the 1993 Survey of Training and Education data obtained from Australian Bureau of Statistics (ABS).[1] They used a logit model to examine differences in participation in training for part-time and full-time employed women. They concluded that NESB women were less likely to participate in work-related training. English language skills, rather than NESB migrant status *per se,* were more closely associated with less access to job training.

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[1] VandenHeuvel and Wooden also analysed the labour market status and part-time employment of NESB women, which will be discussed in later sections.

Lucich (1997) compared the labour supply and wages of migrant and Australian-born married women, using data from the 1986 Income and Housing Survey. The author used a two-stage probit model to estimate the participation decisions of married women workers.[2] Separate labour market participation, hours of work and wage functions were estimated for these groups.[3] The author used a range of human capital variables including education and labour market experience, and concluded that for both groups of women the probability of participation in the labour market increased with the number of years of education, but experience did not have any significant effect.

Wooden and VandenHeuvel (1997) examined the differences in the labour supply behaviour of migrants and non-migrant married women using the 1991 Australian population Census data. They used a logit model to analyse the labour market participation and used a range of human capital variables that included education and English skills. They concluded that the likelihood of NESB married women's participation on a full-time basis increased with educational attainment and poor English language skills were obstacles to part-time participation.

Evans and Lukic (1998) examined the impact of resources and family-level cultural practices on migrant women's labour market participation, using the 1981 Census data. They used a regression model to analyse the participation patterns of migrant women from the former Yugoslavia in Australia, and compared them to those of women from other countries. They found that participation patterns of migrant women from Yugoslavia were more dependent on education than were the participation patterns of other groups.

Gray and Hunter (1999) analysed the probability of employment and participation in the labour market for indigenous and non-indigenous males and females using data from the 1986, 1991 and 1996 Censuses. They estimated the models by using minimum χ^2 methods, using a range of human capital variables that included education and English

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[2] Lucich employed Heckman's two-stage procedure to correct for sample selectivity bias.

skills. They concluded that for indigenous females, having a degree had no effect on the rate of labour market participation, but having a diploma appeared to reduce the rate of participation. Also, difficulty in speaking English was found to have no effect on participation.

2.2.2 Australian Non-Econometric Studies of Participation

Since the 1980s, there has been much research in Australia on labour market participation that has not used econometric analysis. This includes the work of Eccles (1982), Storer (1985), Alcorso and Harrison (1993), Junor *et al.* (1994), Bertone (1995), Brooks and Williams (1996) and Markey *et al.* (2003). In this section we briefly outline their works. A brief summary of Australian non-econometric studies is shown in Table 2.2 that includes participation studies.

Eccles (1982) examined Australian women's labour market participation status using Census data from 1947 to 1981, and concluded that the labour market participation rate of women rose from 25 percent to 45 percent over that period.

Storer (1985) analysed the labour market status of migrants (male/female), using the 1981 Census data. He observed that women born in Greece, Yugoslavia, India, and Vietnam, had a higher labour market participation rate than the national average of 46 percent.[4]

Alcorso and Harrison (1993) examined the factors affecting the position of NESB women in the labour market, in the context of Australia's changing economy, using published and unpublished ABS statistical information. They concluded that during the period of 1959 to 1970 the participation rates of NESB women tended to be greater than for Australian-born women. However, the participation rates of English Speaking Background (ESB) and Australian-born women continued to increase in the last half of

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[3] An Oaxaca type decomposition of the wage differential was carried out to facilitate comparisons between the two groups.

[4] Storer also examined migrant's unemployment and occupation status, which will be discussed later in other sections.

the 1980s while those of NESB women fell or grew more slowly. The participation rates of NESB women were by 1970 somewhat smaller than those of other women.

Junor *et al.* (1994) investigated NESB women's experience in various labour market programs. They used published and unpublished information from the relevant government departments, discussions with migrant women, community workers and study of relevant policy documents and theoretical literature. They concluded that during 1990-93 recession, NESB women's participation in labour market programs shifted from training to work placement. More importantly, NESB women appeared to be under-represented in work placement programs and they had concentrated in programs, such as JOB TRAIN; which had poorer employment outcomes.

Bertone (1995) tried to identify practical models for dealing with the specific needs of NESB women in relation to training, using information from existing literature, interviews and discussions with NESB women. She observed that unduly high English language requirements for jobs, failure to recognize prior learning and cultural/linguistic skills were important among many other barriers to NESB women's participation in training. She also noted that despite these difficulties, the vast majority of the NESB women expressed a desire to participate in training as long as these barriers and problems were addressed.

Brooks and Williams (1996) examined migrant women's participation in the labour market, using data from the ABS, (The Labour market, Australia). They found that NESB women had lower participation rates than those of ESB and Australian-born women.

Birch (2005) reviewed the published Australian literature on the supply of labour of women. She reviewed the empirical evidence on the influence of an economic, demographic or institutional nature on women's labour supply in Australia. She concluded that, while there was a broad consensus concerning the influence of human capital, there was generally a wide range of findings in relation to each hypothesised

determinant of the supply of labour. The findings appeared to be sensitive to model specification and estimation technique, and this suggests the need for caution in drawing strong conclusions from econometric analysis.

2.2.3 Foreign Econometric Studies of Participation

Since the 1960s, there has been much interesting and econometric analysis of labour market participation. These works include Mincer (1962), Barton and Zabalza (1980), Long and Jones (1981), Tienda and Glass (1985), Stier and Tienda (1992), Gurak and Kritz (1996), Gensler and Walls (1997), Waddoups (1997), Schoeni (1998), Hyslop (1999), Bingley and Walker (2001) and Cerrutti and Massey (2001). These are mainly based on regression, probit, logit, and tobit models. In this section we outline these important contributions of foreign econometric studies of participation. Further details of these works will be given in Chapter 3. Also see Table 2.3 for a summary that includes participation studies.

Mincer (1962) developed a model for married women's labour market participation based on three-way choice between leisure, paid work and unpaid household work. He used a variety of data sets: cross-sectional data from urban Standard Metropolitan areas, the Bureau of Labor Statistics Survey of Consumer Expenditures in 1950, Census sample data, March 1957, and 1955 Census sample data on long-run work experience and short-run labour market participation rates for wives. He set up a model in which the labour market participation of wives depended on incomes of husbands, earnings of wives, and other factors. He used OLS to estimate regression models, using a range of human capital and economic variables that included income of male family heads, median income of females who worked 50-52 weeks, education, and the male unemployment rate. He concluded that wives worked less as husbands earned more and wives labour market participation rates responded positively to wives earning power.

Barton and Zabalza (1980) examined married women's participation and hours of work in the UK using the 1974 General Household Survey data to examine the factors that influenced participation decisions, using regression and logit models. They also

analysed hours of participation in paid employment and hours of participation in unpaid jobs of participants and non-participants (together).

They used a range of economic variables that included wages, husbands' wages, net unearned income, and dummies for unemployed husband and husband currently unemployed. They concluded that the wage and income effects on married women's participation accounted for less than half of the long-term rise in women's labour market participation. They also found that as a wife's wage increased, both the probability of participation in the labour market and the expected hours of work increased.

Long and Jones (1981) investigated the part-time employment patterns of working wives, using the 1970 US Census data. To determine the decisions regarding labour market participation and hours of work of married women, they constructed a multivariate probit model. They used a range of human capital variables that included a wife's education and labour market experience, and concluded that previous experience influenced the probability that the wife worked part-time. In addition, benefits from schooling and experience were relatively smaller in the part-time labour market.

Tienda and Glass (1985) examined the household structure and labour market participation of Black, Hispanic, and White mothers, using the 1980 US Census data. To determine the rates of participation among mothers who resided in extended and nuclear family arrangements, they used a logistic regression model. They estimated separate models for both female heads of households and spouses of heads of households and concluded that educated mothers who resided both in female heads and spouses of heads were more likely to participate in the labour market. They also found that female heads with minor children participate more in the labour market than married mothers.

Stier and Tienda (1992) examined the labour supply of Hispanic (Mexican, Puerto Rican, and other) migrant wives in the US, using the 1980 US Census data. They used a two-stage estimation procedure and a specification that modelled individual and familial

factors, which influenced the labour supply of all women and those unique to migrants. First, they used a wage equation to predict wage offers and second, they estimated wives' labour market participation decisions using a probit model. They concluded that poor English ability constrained the work behaviour of Mexican and Puerto Rican women, but not of other Hispanic migrants.

Gurak and Kritz (1996) studied the social context, household composition and employment conditions among migrants from the Dominican Republic residing in New York City and women residing in the Dominican Republic, using the 1981 Probability Survey of Colombian and Dominican women residing in New York city and, the 1978 Probability Survey of women residing Dominican Republic-Santo Domingo and Santiago.[5]

To assess the impact of household composition on female labour market participation, they used logit models separately for Dominican/Colombian-NY and Dominican –DR residents. They estimated two models: (1) female-headed, and spouse present households, (2) all women female-heads, spouse present, and all-other household. They used human capital variables and concluded that female heads in New York were less likely to be in the labour market, but their counterparts in the Dominican Republic were more likely than other categories of women to be employed. They also observed that in the Dominican Republic, better-educated women were more likely to participate in the labour market than others, while in New York education had a negligible and statistically insignificant role for their participation in the labour market.

Gensler and Walls (1997) analysed the impacts of individual characteristics on both the labour market and welfare participation decisions of low-income females with children, using the US Census Bureau's population survey (1979-1990) data. They used a probit model with a range of human capital variables that included education and labour market experience. They concluded that increasing the tax rate on unearned income

[5] Women were classified into three types: (1) "head" or female head of household, (2) "spouse" spouse present with or without minor children, and (3) "other" neither spouse nor minor children present.

increased labour market participation and decreased welfare program participation, although the effects were very small. Education and experience had a positive impact upon labour market participation of low-income females.

Waddoups (1997) examined the impact of child adoption versus procreation on female labour market participation decisions, using the data from the 1987 National Health Interview Survey. He used a traditional static labour supply model to estimate a labour market participation equation, using a two-stage estimation procedure. He used a range of human capital variables that included education and labour market experience, and concluded that the adoptive females with high levels of education did not differ much from their non-adoptive counterparts. In addition, adoptive respondent with similar levels of labour market experience were slightly less likely to participate than their non-adopting counterparts. He also observed that women with greater propensity to adopt a child into their households were less likely to participate in the labour market than their non-adopting counterparts.

Schoeni (1998) analysed the labour market outcomes of migrant women in the US, using the data from the US Censuses of 1970, 1980 and 1990. He used a regression model to analyse labour market participation and used a range of human capital variables that included education and the ability to speak English. He concluded that, education and English skills played an important role in determining the differences in labour market participation among migrant groups and migrant women were less likely to participate in the labour market. This gap increased to 7 percentage points by 1990.

Hyslop (1999) analysed the inter-temporal participation behaviour of married women, using data from the 1986 Panel Study of Income Dynamics that pertains to 1979-85. He developed a dynamic search framework to analyse the inter-temporal labour market participation behaviours of married women. The sensitivity to alternative distributional assumptions was evaluated using linear probability and probit models. He concluded that fertility was correlated with women's unobserved tastes for work, and was not exogenous with respect to their participation decisions, if the dynamic structure of

participation decision was ignored. He also observed that low-educated women were less likely to participate in the presence of a child aged 0-2 years, than were higher-educated women.

2.2.4 Foreign Non-Econometric Studies of Participation

Since the 1980s there has been a great deal of overseas research on labour market participation that has not used econometric analysis. This includes Simon and DeLey (1984), Malveaux (1999) and Jacobsen (1999). In this section we outline just a few of these contributions.

Simon and DeLey (1984) analysed the labour market participation and demographic characteristics of Mexican women migrants in Los Angeles County. They collected their data by interviewing Mexican legal and illegal migrant women in their homes, churches, community centres and places of work. They observed that most of the undocumented and documented migrant women worked in factories as labourers.

Malveaux (1999) analysed the similarities and differences in labour market participation amongst coloured and white women, using the 1997 US Bureau of Census, and concluded that black and Latino women aged 20-24 and 55- 64 had lower participation rates than white women.

Jacobsen (1999) analysed the trends for the US female and male labour market participation for the post-world war period, using Economic Reports of the President (1997), Current Population Survey 1948-87, and The Statistical Abstract of the US (1996). She observed that female and male participation rates had converging over time, due to the large rise in women's participation and, to a lesser extend, the modest decline in men's participation rates.

2.3 Studies on Occupational Status

Some of the main literature on occupational status is reviewed in the following sub-sections: (i) Australian econometric studies of occupational status, (ii) Australian non-

econometric studies of occupational status, (iii) foreign econometric studies of occupational status and (iv) foreign non-econometric studies of occupational status.

2.3.1 Australian Econometric Studies of Occupational Status

Since the 1980s, there has been much econometric analysis of occupational status. These works include Evans (1984, 1987), Kelley and McAllister (1984), Evans and Kelley (1986), Miller (1987), Evans and Kelley (1991), Jones (1992), Vaughan (1992a, 1992b) and McAllister (1995). This econometric literature is mainly based on regression, probit and logit models. In this section we outline these important contributions of Australian econometrics analysis of occupational status. Further details of the works of these authors will be given in Chapter 4. Also see Table 2.1 for a further summary that includes occupational status studies.

Evans (1984) explored the work experiences of migrant women in Australia, which covered a broad range of topics related to women's work roles. She used a regression model to analyse migrant women's occupational status, using the 1981 Census data. She used a range of human capital variables that included education and English skills, and observed a positive relationship between education, English skills and occupational status. However, Mediterranean women having little education obtained better jobs than their Australian peers, and highly educated Mediterranean women had somewhat worse jobs than their Australian peers. Mediterranean women occupied the lowest status position compared to other migrant women.

Kelley and McAllister (1984) investigated the socio-economic attainment of migrants (male/ female) in Australia, using the 1973 ANU Social Mobility Survey data. They used a regression model to analyse the socio-economic attainment of migrants, using a range of human capital variables that included father's education and own education.[6] They concluded that migrants were more likely to have secondary status jobs and when education was consider for occupational status, they found that Northern and Eastern Europeans were broadly similar to the Australian-born, while Mediterranean did worse.

Evans and Kelley (1986) analysed migrant men's work, equality and discrimination in the Australian labour market, using the 1981 Census data. They used a regression model to analyse migrants' occupational attainments, using ANU2 occupational status as the dependent variable, with independent variables including education, labour market experience, and English proficiency. They concluded that migrants and Australian-born men were treated in the same way in the Australian labour market with similar education and labour market experience. However, English skills differences in the occupational status of migrants and Australian-born reflected differences in endowments, not discrimination.

Miller (1987) studied aspects of occupational mobility and attainment among migrants (male) in Australia using the 1981 Census data. He used an ordered probit model to determine occupational mobility and attainment among migrants, using human capital variables including labour market experience, educational attainment and English language facility. He concluded that migrants from Non-English speaking countries concentrated in low-ranked occupations, and the relatively minor influenced of education on the occupational attainments from these birthplace regions.[7]

Evans (1987) investigated the importance of language usage and skills in the occupational mobility of various migrant groups (male), using the 1981 Census data. She used a regression model to determine the effect of monolingual English usage and English language proficiency on occupational status.[8] She used a range of human capital variables that included English proficiency, education and labour market experience, and concluded that English language proficiency affected the occupational opportunities for some groups more than others. It shaped the life chances of Eastern Europeans and Third World migrants' more than Mediterranean migrants.

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[6] For occupational status they included a measure of parents' standard of living, based on an inventory of possessions. It was scored from a low of zero to a high of 100 (all).
[7] The status attainment was ranked according to ANU2 scales.
[8] To measure the occupational attainment she used ANU2 occupational status scores.

Evans and Kelley (1991) analysed the labour market attainments and discrimination against migrants in Australia using the 1981 Census data. They used a regression model to analyse occupational status and income of migrants, using a range of human capital variables that included education, experience and English skills. They concluded that migrants and their Australia-born children received jobs and earnings that were commensurate with their education, experience, and skills for all ethnic groups.

Jones (1992) studied how fairly various migrant groups were treated in the Australian labour market, using the 1986 Census data. He used a regression model to examine how ethnicity and sex affect processes of occupational attainment. He used the ANU3 status scale as dependent variable, and a range of human capital independent variables that included education, qualifications, and labour market experience. He concluded that for migrant women, post-school qualifications, years of schooling and experiences tended to increase job status.

Vaughan (1992a) investigated factors affecting skill level occupational attainment of overseas born groups (male), using the 1986 Census data. He used a logistic regression model to examine the effects of all variables, which separately influence the relationship between birthplace and occupation.[9] He used a range of human capital variables that included education, labour market experience and English speaking ability, and concluded that difference in occupational attainment between the overseas-born and the Australian-born were largely the products of the difficulties of transferring human capital characteristics to the Australian labour market.

Vaughan (1992b) investigated factors affecting skill level occupational attainment of women compared to men, using the 1986 Census data. He estimated a logistic model to examine the factors that affect occupational attainment.[10] He used a range of human capital variables including education and labour market experience, and found that

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[9] The dependent variable, occupational skill level was measured by the ASCO at the major group level used by the ABS 1986 census.

[10] The dependent variable, skill level is measured by the ASCO, used by the ABS 1986 census.

gender differences in occupational attainment were significant, which were also the product of sex differences in labour market endowments.

McAllister (1995) examined occupational mobility among migrants using the 1988-89 Multicultural Australia Survey data. To analyse the impact of migration on occupational mobility among migrants, he used a regression model that included a range of human capital variables, including educational qualifications and English proficiency.[11] He observed that migrants experiencing reduced job status in their early years of settlement regardless of their inherited human capital, individual achievements, or cultural background. It was this lower occupational status at the beginning of their Australian working career, which determined their subsequent occupational status and eventually they ended up with lower status jobs.

2.3.2 Australian Non-Econometric Studies of Occupational Status

Since the 1970s, there has been much research in Australia on occupational status that has not used econometric analysis. This includes Cox *et al.* (1976), Storer (1985), Webber *et al.* (1992), Barnett (1991), Misztal (1991) and Preston (2003). In this section we outline these important contributions of Australian non-econometrics studies of occupational status.

Cox *et al.* (1976) examined NESB women's past and present work pattern, using data from 1,024 migrant women in South Sydney, and concluded that the majority of women were working in semi-skilled or unskilled blue-collar occupations, primarily as production-process workers and in the garment industry.

Storer (1985) studied the occupational status of migrants in Melbourne's industry according to their birthplace, using the 1981 Census data, and observed that both NESB males and females were more likely to work as tradesman, production workers or labourers, and were under-represented in the professional and technical occupations.

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[11] He used ANU3 status scale to measure occupational status.

Barnett (1991) examined the aspirations, goals and motivation of NESB women in white-collar public sector occupations, using existing literature, case studies, personnel records, and South Australian Public Services Records and found that many of the women who were interviewed expressed a lack of confidence in their abilities, which was a major barrier to pursuing their work-related goals, regardless of the degree of success experienced in their work.

Misztal (1991) investigated the migrant women's ethnicity, class and gender inequalities in Australia. She used available literature written for migrant women's experiences in class and gender inequalities in Australian labour market. She concluded that NESB migrant women employed in much lower-level, lower-status, and lower-paying occupations than Australian-born women.

Webber ***et al.*** (1992) analysed the differences and similarities in the experiences of migrant women and men, using the 1971 to 1986 Census data and the 1988 Survey of Migrants, and found that levels of industrial segregation and occupational immobility occurred for both women and men. After arrival in Australia, women seemed to have relatively less formal to specific training, which reduced their opportunity for occupational improvement.

2.3.3 Foreign Econometric Studies of Occupational Status

Since the 1960s, there has also been much overseas econometric analysis on occupational status. These works include that of Sewell and Orenstein (1965), Treiman and Terrell (1975), McClendon (1976), Featherman and Hauser (1976), Hudis (1976) and Catanzarite and Aguilera (2002). This econometric literature is mainly based on regression models. In this section we outline these important contributions of foreign econometric analysis of occupational status. Further details of the works of these authors will be given in Chapter 4. Also see Table 2.3 for a summary that includes occupational status studies.

Sewell and Orenstein (1965) analysed the occupational choice of persons raised in rural and urban communities, using a survey of 1957 graduating seniors in public,

private and parochial schools in Wisconsin. To determine the rural and urban differences in occupational choice, they used the technique of elaboration.[12] They used occupational choice as the dependent variable and the independent variable was intelligence.[13] They observed that differences in occupational choices for girls were largely accounted for by intelligence and socio-economic status.

Treiman and Terrell (1975) investigated the process of status attainment of workingmen and women, using the 1967 Longitudinal Study of Labor Market Experience of Women, US Bureau of the Census data. They used a regression model to analyse the process of status attainment, using education as one of the independent variables and concluded that for both men and women, occupational status was largely dependent upon educational attainment and only slightly dependent upon social origin.[14]

McClendon (1976) compared white working males and females with respect to the process of occupational status attainment, using 1972-1974 General Social Surveys of the US National Opinion Research Center. McClendon used regression models to analyse occupational attainment and concluded that the occupational status of each sex was quite similar, although males were somewhat more likely to have high and low status jobs. He further concluded that education was the most important determinant of occupational status for both groups.[15]

Featherman and Hauser (1976) examined the sexual inequalities and socio-economic achievement in the US, using data from the 1962-1973 Occupational Changes in a Generation collected by Blau and Duncan (1967) and Featherman and Hauser (1975). They used a regression model to examine the family and schooling effects on occupational status for men and women, and concluded that men and women were

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[12] Three control variables were related to the independent and dependent variables, sex, intelligence and socio-economic status, and were controlled simultaneously. The dependent variable, occupational choice, was coded according to major occupational grouping as specified in the 1950 Bureau of Census.

[13] The variable intelligence was measured as: high (I.Q.: 116 and above), middle (I.Q.: 105-115) and low (I.Q.: below 105)

[14] Occupational status was measured by the Standard International Occupational Prestige Scale (Treiman, 1977).

[15] Duncan's (1961) Socio-economic Index (SEI) were used to measures the occupational attainment.

allocated to levels of education and occupational status in much the same manner. In the process of socio-economic achievement, the net effect of educational attainment on occupational status was larger for wives than for their husbands. [16]

Hudis (1976) investigated the differences in women's earnings by marital-status, using the 1967 Survey of Economic Opportunity data. She used regression models to find the marital status differences in schooling, occupational status, employment and child status on women's earnings.[17] She concluded that currently married women received smaller economic benefits from schooling and occupational status because of interrupted labour market participation and familial constraints.

Psacharopoulos (1978) used three tests (the modality test, truncated model test of schooling on earnings and socio-economic mobility test) based on Goldthorpe and Hope (1974) desirability scale for different occupations established by a popular ranking assessment according to their desirability. They investigated several issues raise for dual labour market, using the 1972 UK General Household Survey data. He concluded that the usefulness of these models of duality was limited, because they were mainly descriptive in character rather than analytical on the causes of the observed phenomenon. The descriptive statistics alone did not guarantee to distinguish the primary and the secondary jobs.

Sewell *et al.* (1980) analysed the process of occupational attainment among men and women from labour market entry to mid-life. They collected data from Wisconsin high school graduates and followed them through 1957 to 1975. They used regression models to investigate the status of the first full-time civilian job held by the respondent after the completion of formal schooling, as well as the status of the current (or last) job. They used social-psychological variables related to school experience and aspiration, as well as a more extensive set of social background characteristics and concluded that marked occupational segregation of men and women in the Wisconsin sample existed, with

[16] Data on all occupation variables were transformed into Duncan's (1961) index of socio-economic status (SEI).

similarity in average levels of current occupational status. In addition, women tended to exclude from the extremes of the occupational status distribution.[18]

Spitze and Waite (1980) examined work-related attitudes and labour market behaviour of young women, using the 1968-1973 National Longitudinal Survey of the labour market experience of young women. They used regression and probit models to estimate the effects of work attitudes on job characteristics, and the effects of early labour market experience of later work attitudes.[19] They concluded that the number of years of schooling completed had a positive effect on employment status. This suggested that formal schooling increased a women's earning power and ultimately increased the attractiveness of market work over homework.

McNabb and Psacharopoulos (1981) investigated the dual labour market hypothesis in UK, using the 1972 UK General Household Survey data. First, they conducted a modality test based on Goldthorpe and Hope (1974) occupational rating scale to assign individuals to either the primary or secondary occupations. Then they estimated earning functions for each group, using the human capital variables schooling and experience, and concluded that there was some form of segmentation in the UK labour market.

Boyd (1982) compared the occupational attainments of Canadian-born, full-time paid men and women, using the 1973 Canadian Mobility Study data. She used a regression model to analyse the current occupational status, using a range of human capital variables that included education and parent's education, and concluded that educational attainments of women were less influenced by social origins, as were their occupational attainments.

Hirschman and Wong (1984) analysed socio-economic inequality among Blacks, Hispanics, Japanese, Chinese and Filipinos, using the US 1960 Census and the 1976 Survey of Income and Education data. They used multivariate regression model, to find

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[17] She used the NORC Prestige scores to measure occupational status, which is shown in Siegel (1971).
[18] To measure the occupational achievement they used Duncan's SEI scale (1961).

the effects of occupational and earning attainment. They concluded that in general, Asian Americans approached socio-economic parity with whites because of over achievement in educational attainment.[20] They also observed that over the preceding decade, there had been a marked decline in the direct negative effect of ethnicity on earnings (except among Chinese Americans).

Sullivan (1984) investigated the occupational prestige of women workers born in Cuba or Mexico, using the 1970 US Census of Population data. She used a regression model to analyse the occupational prestige, using a range of human capital variables that included experience and education. She found that migrant women who had educational credentials did much better than those who did not, although, US labour market experience did not lead to improving their job position.

Neuman and Ziderman (1986) tested the dual labour market hypothesis for Israel, using the 1974 Israel Labour Mobility Survey data. Following McNabb and Psacharopoulos (1981), they drew a sample of males, which was categorized into two groups, primary and secondary labour market segments, on the basis of occupational prestige ratings for Israel (Tyree, 1981). They then estimated earning functions for each group, using a range of human capital variables that included education and experience, and found evidence that there was a dual labour market in Israel.

2.3.4 Foreign Non-Econometric Studies of Occupational Status

There has also been a great deal of overseas research on occupational status that has not used econometric analysis. This includes Stone (1983), Boyd (1984), Craig *et al.* (1985), Cohen (1989), Abbott and Tyler (1995) and Iganski and Payne (1999). In this section we outline a few of these.

Stone (1983) examined the main similarities and differences in the employment position of the West Indian, Asian and white mothers (mainly British) as well as considered the effects of gender and racial oppression in Britain. She used data, from interviews, from

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[19] The occupational status of the respondent's first job, measured by the Duncan SEI (1961)

the Handsworth area in Birmingham during 1978-79, existing literature written for those women. She concluded that all of the workingwomen in the sample shared the same confinement to low paid, low status and gender-specific work.

Boyd (1984) studied the occupational statuses of Canadian female migrant employees in relation to the statuses displayed by Canadian-born women and by Canadian-born and foreign-born men, using the 1973 Canadian Mobility Study data. She observed that occupational statuses of migrant women on the average were lower than those of other sex and Canadian-born groups.

Craig *et al.* (1985) evaluated two aspects of labour market based on women's employment status. First, the secondary sector conformed to a competitive labour market model and second, the division of jobs into primary and secondary categories (or "good" jobs and "bad" jobs) was determined by demand-side factors and was therefore independent of the characteristics of the workers who were employed. They used data from semi-structured interviews of nearly 150 employers from six industries. They found that the pattern of employment organization outside the formal, large-firm and unionised sector did not fit the dual labour market model according to which such work was mainly unskilled and was carried out by interchangeable and casual workers. Labour supply factors were identified as an independent cause of the development of structure or segmented labour market.

Cohen (1989) examined the socio-economic dualism of Israeli-born male/female migrants in the US, using the 1980 US Census of Foreign-born Population and the 1979 Immigration Naturalization Public Service data file. He concluded that Israeli-born Americans had greater educational levels than other Americans, but not all Israelis attained high-status occupations or sufficient incomes.

Abbott and Tyler (1995) examined the occupational characteristics of different ethnic groups by gender, using the1981 and 1991 Census data of Great Britain, and other

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[20] The occupational status measured by the Duncan Socio-economic Index SEI (1961).

reports written for ethnic groups. They found that women were disadvantaged in the labour market and concentrated in a narrow range of occupational groups.

Iganski and Payne (1999) investigated the socio-economic re-structuring and employment of minority ethnic groups in the United Kingdom using data from the Censuses of 1971 and 1991 and the Labour Market Survey of 1981. They concluded that labour market forces including changes in industry and occupations, offered a promising way forward because any consideration of discrimination also revealed the strength of the countervailing force of industrial change in providing opportunities for the minority ethnic groups to overcome the hurdle of their initial disadvantage and subsequent discrimination.

2.4 Studies on Unemployment

Some of the main literature on unemployment status is reviewed in the following sub-sections: (i) Australian econometric studies of unemployment, (ii) Australian non-econometric studies of unemployment, (iii) foreign econometric studies of unemployment, and (iv) foreign non-econometric studies of unemployment.

2.4.1 Australian Econometric Studies of Unemployment

Since the 1980s, there has been much econometric analysis in Australia on unemployment. These works include Evans (1984), Miller (1984), Brooks and Volker (1985), Miller (1986a,b), Inglis and Stromback (1986), Stromback (1986), Brooks and Volker (1986), McAllister (1986), Beggs and Chapman (1987), Wooden and Robertson (1990), Jones and McAllister (1991), Flatau and Hemmings (1991), Jones (1992), VandenHeuvel and Wooden (1996), O'Loughlin and Watson (1997), Williams *et al.* (1997), Gray *et al.* and Thapa (2004). These studies mainly used regression, probit and logit models in the analysis. In this section we outline these important contributions of Australian econometric studies of unemployment. Further details of these works are given in Chapter 5. Also see Table 2.1 for a summary that includes studies of unemployment.

Evans (1984) explored the work experience of migrant women in Australia, which covered a broad range of topics related to women's work roles, using the 1981 Census data. She used OLS to estimate regression model to analyse the migrant women's unemployment status, using a range of human capital variables that included education and English skills. She concluded that each additional year of education reduced the risk of being unemployed by about 0.5 percent. English skills only appeared to affect unemployment among migrants from the Third World.

Miller (1984) examined the distribution of the burden of unemployment across various socio-economic groups, using the 1976 Census data. He used a logit model to analyse teenage unemployment rates, using human capital variables including qualifications and found that teenage unemployment rates differed greatly according to qualifications. Trade and technical qualifications were associated with lower teenage unemployment rates, although only a small proportion of teenagers had such qualifications.

Brooks and Volker (1985) analysed the factors that determined the labour market success of the Australian population, using the 1981 Census data. They used a multinomial logit model to examine the influence of various factors on whether individuals were unemployed, employed or non-participating in the workforce, using a range of human capital variables that included education and English speaking ability. They concluded that education and English speaking ability were found to be consistently important in determining the labour market state of individuals.

Miller (1986a) investigated migrants' unemployment situation in the first year of their arrival in Australia. He used the 1983 Manpower Programs Survey data. He used a logit model to analyse the migrant's (male/female) unemployment situation, and concluded that additional years of education were associated with only modest reductions in the unemployment rates of migrants. However, migrants were able to reduce their predicted unemployment rates considerably by obtaining information on Australian job opportunities prior to migrating.

Miller (1986b) examined youth unemployment patterns of migrant and Australian-born workers, using the 1981 Census data. He again used a logit model to analyse the unemployment rates, and identified consistencies and differences between these two groups. He used a range of human capital variables that included English language facilities, educational attainment and qualifications. He observed that individuals who spoke a language other than English at home had higher unemployment rates. For many birthplace groups, additional years of education were not associated with unemployment rate reductions. On the other hand, possession of trade or other certificate-level qualifications was consistently associated with sizeable unemployment rate reductions.

Inglis and Stromback (1986) analysed the influence of individual characteristics to estimate the probability of an individual being unemployed, using the 1981 Census data. They used a binominal logit model to estimate the probability of unemployment as function of individual characteristics of migrant males and females. They used a range of human capital variables that included proficiency in English, qualifications (Australia or overseas) and education. They concluded that, for migrants the probability of unemployment reduced as education, and proficiency in English increased. Females of NESB origin initially had a greater tendency to be unemployed but this diminishing to the level of Australian-born women in long term.

Stromback (1986) investigated the unemployment experience of migrants and compared them with Australian-born workers, using the 1981 Census data. He used a logit model to analyse factors that contributed to greater incidences of unemployment among migrants, than Australian-born workers, using a range of human capital variables that included English speaking ability, attending educational institute and overseas qualification. He concluded that poor knowledge of English was associated with a likelihood of being unemployed for migrant males and females and the specific migrant variables rather than any other differences between migrants and the Australian-born account for the higher aggregate unemployment.

Brooks and Volker (1986) examined the influence of a number of demographic characteristics, and the duration of unemployment on the probability of leaving unemployment, using ABS March to June 1984 unpublished data. They used a hazard function to estimate the probability of leaving unemployment, using a range of demographic variables that included age and marital status, and found that the probability of leaving unemployment decreased as the duration of unemployment increased, with married females having the highest probability of exit.

McAllister (1986) analysed unemployment conditions between Australian and migrant youths, using survey data from the Australian Institute of Multicultural Affairs, June 1983. He conducted a path analysis to estimate the effect of various factors on unemployment experience, using a range of human capital variables that included education and labour market experience. He found that lack of work experience, little technical education and manual occupations put individuals at greater risk of unemployment for both Australian-born and migrant youth.

Beggs and Chapman (1987) investigated the labour market outcomes of migrants (males) with a particular focus on wages and unemployment, using the 1981 Census data. They used a probit model to determine the probability of being unemployed and used a range of human capital variables that included education and experience. They concluded that probability of unemployment decreased with education for Migrant and Australian-born women. However, at the highest level of education considered migrants had a greater probability of unemployment. On the other hand, migrants with low levels of education did well.

Wooden and Robertson (1990) analysed the labour market status of male and female migrants in Australia, using the ABS Labour Market Survey, March 1987 and the 1986 Census. They used a multinomial logit model to analyse the labour market status of migrants and also to investigate whether there was any tendency for any migrant groups

to turn to self-employment, particularly if their probability of employment was low.[21] They used a range of human capital variables that included education, qualifications and English speaking ability. They concluded that language skills were of crucial importance in affecting post-migration employability. Their analysis supported the importance of educational qualification, though not amongst females.

Jones and McAllister (1991) investigated migrant (male/female) unemployment situation for those who arrived in Australia between 1981 and 1988, using issues in Multicultural Australia Survey, 1988. To measure migrant's level of unemployment, they used a logistic regression model, focusing on two issues: initial post-migration unemployment levels (measured as duration) and point-in-time unemployment (measured as a cross-sectional probability). They used a range of human capital variables that included educational qualifications and English proficiency, and found that educational qualifications remained an important factor in migrant unemployment, but English language did not consistently emerged as a variable of major importance.

Flatau and Hemmings (1991) analysed the differences that existed between and within migrant generation categories in terms of labour market status, using data from the 1985 Australian Longitudinal Survey. They used a probit model to examine differences in unemployment for different migrant categories, using human capital variables that included experience and educational attainment. They concluded that for young females, job experience and post-school qualifications significantly reduced the probability of being unemployed. The first generation female migrants were much more seriously affected than second-generation migrants.

Jones (1992) explored how fairly the Australian labour market treated different ethnic groups of workers, using the 1986 Census data. He used a logistic regression model to measure the unemployment levels among ethnic groups, using a range of human capital variables that included educational attainments, qualifications and labour market

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[21] The incidence of self-employment was a dependent variable that could be an alternative to unemployment.

experience. Jones concluded that schooling and qualifications reduced the individual's risk of unemployment. Overseas employment experience also helped to reduce the unemployment, but not as much as local experience. Poor English speakers were more likely to be unemployed.

VandenHeuvel and Wooden (1996) examined the issue of labour market status between migrant and Australian-born women, using the 1991 Census data.[22] They used a multinomial logit model, using educational attainment and English language proficiency as independent variables. They found that lower levels of educational attainments and English-language difficulties were more likely to associate with greater unemployment probabilities for NESB women.

O'Loughlin and Watson (1997) investigated long-term unemployment in Australia during the 1980s and 1990s, with a particular focus on NESB migrants (both male and female), using the 1991 Census, 1993 Training and Educational Experience, Labour Market Status Survey and other characteristics of migrants, life stories and case studies from NESB migrants for long-term unemployed people. To investigate the factors associated with overall unemployment and long-term unemployment, they used a series of logit models.[23] They used a range of human capital variables that included education and English proficiency, and concluded that both familiarities with computers and tertiary education were associated with reduced odds of being long-term unemployed. An important factor associated with increased odds of being long-term unemployed was having low English language proficiency.

Williams *et al.* (1997) analysed the initial labour market outcomes of migrants, using the 1993-1995 Longitudinal Survey of Migrants to Australia. To estimate the effects of a variety of factors on the probability of a persons being employed, unemployed and not in the labour market, they used a multinomial logit model. They used a range of human

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[22] Same authors also analysed the part-time employment, earning, sick and holiday, superannuation benefits, long service leave and working arrangements, using the same methods, which will be discussed in next section.

[23] To understand the processes of generating long-term unemployment they used qualitative methodology.

capital variables including English speaking proficiency and qualifications. They concluded that those with technical or professional qualifications were significantly less likely than those with tertiary qualifications to be unemployed compared to being employed, and also the likelihood of being unemployed rather than employed increased as proficiency in English worsen.

Gray *et al.* (2003) examined the employment of Australian lone mothers compared with couple mothers, using the 1996 Australian Census data. They used the logit model to analyse the factors, which explained the employment gap, using a range of human capital variables that included education and English proficiency. They also used the decomposition method of Even and Macpherson (1990) to estimate the employment gap between single mothers and mothers who were part of a couple. They concluded that having a low level of educational attainment, speaking English as a second language and, in particular, having poor spoken English, had a larger negative effect upon the probability of employment of single mothers compared with other mothers.

Thapa (2004) examined the labour market success of migrants in Australia, using the 2001 survey of Household, Income and Labour Dynamics in Australia and the 1990 ABS Income Distribution Survey Data. He used a logit model to analyse the risk of unemployment of male migrants, using a range of human capital variables that included education and English proficiency. He concluded that the probability of unemployment for male migrants was consistently higher than that of Australian-born males. The results suggested that English language ability led to a large difference in the employment prospects of migrants.

2.4.2 Australian Non-Econometric Studies of Unemployment

Since the 1970s, there has been much research in Australian on unemployment that has not used econometric analysis. This includes Beaumont (1974), Eccles (1982), Storer (1985), Chapman and Miller (1985), Alcorso and Harrison (1993) and Brooks and Williams (1996) and Evans and Keeley 2001 and 2002). In this section we outline these important contributions of Australian non-econometrics studies of unemployment. Also see Table 2.2 for a summary that includes studies of unemployment.

Beaumont (1974) investigated the non-metropolitan unemployment position of women in Australia, using 1964-1972 Census data, Labour Market Studies: 1970, and Survey of Registered with People C.E.S during 1969-72, and concluded that lack of local employment opportunities found to be a serious problem for female unemployment in these areas, particularly longer duration of unemployment.

Eccles (1982) examined variation in unemployment rates among women, married women and men in Australia, using data from the Labour market Survey of Australia 1978 and 1980 and observed that the unemployment rate for women, especially married women, had been greater than that for men.

Storer (1985) studied the labour market status of migrants (male/female), using the 1981 census data and observed that migrants of NESB had higher unemployment rates in general, and for some groups had extremely high unemployment rates.

Chapman and Miller (1985) analysed the issues that associated with migrant unemployment experience, using the 1981 Census data and observed that migrants experienced relatively high unemployment rates, but the extent of this disadvantage diminished as duration of residence increased.

Alcorso and Harrison (1993) examined the position of NESB women in the labour market, and the factors affecting those positions in the context of Australia's changing economy. They used various published and unpublished ABS data from 1989 to 1992 and found very high unemployment rates among some groups of NESB women compared to NESB men and Australian-born women.

Brooks and Williams (1996) analysed the unemployment situation of migrant women and examined how this situation was changing over time, using the ABS, Labour Market Survey data.[24] They concluded that NESB women had higher unemployment

[24] ABS, Labour Market Survey, data on microfiche, group 600, Table UE8.

rates than those of ESB and Australian-born counterparts. More importantly, they observed that long-term unemployment for NESB women was greater than average and they remained unemployed for relatively longer than any other groups.

2.4.3 Foreign Econometric Studies of Unemployment

Since the 1970s, there has been a great deal of overseas econometric analysis of unemployment. These works include Hosek (1975) and Mohanty (2000). They mainly used regression and probit models in their analysis. In this section we outline these important contributions of foreign econometrics studies of unemployment. Further details of the works of these authors will be given in Chapter 5. Also see Table 2.3 for a summary that includes studies of unemployment.

Hosek (1975) investigated the unemployment experience among individuals, using the 1967 Survey of Economic Opportunity. He used education as one of the independent variables in his regression model to analyse various weekly and annual measures of unemployment of individuals. He established a conceptual framework that accommodated a variety of theoretical approaches, which furnished a means of translating among various weekly and annual measures of unemployment experience.

Mohanty (2000) investigated black-white unemployment rate differentials in the United States, using the 1987 Current Population Survey data. He used a two-stage probit model to estimate employment probability for black-white males and females. He used education, and experience (human capital variables) as independent variables and concluded that employers hiring decision was positively influenced by workers' human capital endowments (education, experience). More importantly, he observed that black people experienced a higher unemployment rates than whites.

2.4.4 Foreign Non-econometric Studies of Unemployment

In this section we outline foreign non-econometric studies on unemployment.

Malveaux (1999) analysed similarities and differences of unemployment rates between colour and white women using the Selected Economic Characteristics of the Population

from the US Bureau of Census, March 1997. The author concluded that the unemployment rate of Hispanic women had been about twice than that of white women, and had been even greater for African American women. More importantly, the unemployment rates among young black women and teens had been greater than among adult women.

2.5 Aspects of Labour Market Disadvantage

This section outlines some important literature concerning labour market disadvantage of women. This literature is vast and we outline some that have a bearing on what we do in later chapters of this thesis. It tends to range more widely than the previously noted works, however it is clear that differences in participation rates, job status and unemployment rates amongst groups of people might be an aspect of discrimination.

In view of the extent of this literature, we restrict ourselves to a few important econometric works from Australia and overseas, and to Australian non-econometric studies.

2.5.1 Australian Econometric Studies of Labour Market Disadvantage

Since the 1990s, there has been some econometric analysis in Australia on labour market disadvantage. These works include VandenHeuvel and Wooden (1996) and Reiman (1998). This econometric literature is mainly based on regression and logit models. See Table 2.1 for a summary that includes studies of labour market disadvantage.

VandenHeuvel and Wooden (1996) investigated the reasons for the under representation of NESB women in part-time employment, and associated labour market experiences and employment conditions, using data from the 1993 Working Arrangements Survey, the Survey of Training and Education, and the 1991 Census. They used logit models to analyse NESB women's part-time employment outcomes, and their access to employment benefits, training, and working arrangements. They also used regression models to examine the level of earning differences among women. They used a range of human capital variables that included educational attainment,

occupational experience and qualifications. They concluded that NESB migrant women were less likely to secure part-time employment, earned less compared to other employed women, and had less access to training, superannuation schemes, flexible working arrangements, sickness and holiday benefits.

Reiman (1998) analysed the gender wage gap in Australia using the 1995 Australian Workplace Industrial Relations Survey Data. He used regression to model the hourly income of all employees and in order to decompose the gender wage gap. He followed the method introduced by Blinder (1973) and Oaxaca (1973), and analysed a range of human capital variables that included schooling, experience and training. He concluded that when the adjusted wage gaps were compared, the English background result was 24 percent greater than non-English background employees. On the whole, his analysis supported the hypothesis that enterprise bargaining had negatively affected the gender wage gap in Australia.

2.5.2 Australian Non-Econometric Studies of Labour Market Disadvantage

Since the 1970s, there has been much research in Australian on labour market disadvantage that has not used econometric analysis. This includes Storer *et al.* (1976), Nord (1984), Martin (1984, 1986), Lampugnani and Mansell (1984), Turpin (1986), Eliadis (1988), Chataway and Sachs (1990), Kermond *et al.* (1991), Alcorso (1991), Yeatman (1992), Bertone and Griffin (1992), Foster and Rado (1992), Clapham *et al.* (1993), Bowen (1993), Keating (1994 a, b), Alcorso and Hage (1994), Ganguly (1995), Stephens and Bertone (1995), Warburton *et al.* (1995), Murphy (1995) and Hawthorne (1996b). In this section we outline these important contributions of Australian non-econometric studies of labour market disadvantage. See Table 2.2 for a summary that includes studies of labour market disadvantage.

Storer *et al.* (1976) studied the employment situation of migrant women workers in a cross-section of manufacturing industries in Melbourne. They collected data from factories and concluded that migrant women had little choice but to work in factories. In most factories where migrant women work, they found conditions to be extremely poor

in terms of temperature, pollution, noise, physical danger, ventilation, lighting, and facilities.

Nord (1984) investigated migrant women's major difficulties in finding jobs and in improving working conditions. She obtained data by interviewing migrant women: at home, work and at English classes and social gatherings. She provided an account of migrant women's experiences and often told of a world of pain, suffering, anger and often despair and hopelessness. These women held back by a number of factors including a feeling of powerlessness, which made them vulnerable to employers' intimidation.

Martin (1984) examined NESB women's contribution in production and social reproduction system.[25] She used Human Relations (1976) data, Trans National Cooperative (1980), Women's Employment Rights Campaign (1979) and literature written for migrant women and showed that since 1947 the majority of NESB migrant women who arrived as dependents of male migrants worked as semi and unskilled workers. She found that these women provided the emotional anchorage for settler migration schemes by marring their male compatriots and bearing their children, thereby securing appropriate nuclear family unit consumption and labour market reproduction.

Lampugnani and Mansell (1984) analysed the pattern of social inequality that existed in the Australian female labour market using the 1976 Census data. They concluded that emergences of particular groups of women who enjoyed equal rights in theory, but were discriminated against in practice were the result of social stratification based on primarily on ethnic identification.

Turpin (1986) studied migrant's advantages and disadvantages of working in different employment sectors, the problems they faced and the strategies they had adopted to cope with them using data from the Victorian Ethnic Affair Commission between September 1984 and January 1985, and case studies. Turpin concluded that segmentation in the

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[25] The term social reproduction system covered labour market reproduction and consumption.

labour market placed culturally distinct waves of migrants in the least desirable occupational structures (including unemployment). Migrants' perceptions of barriers or problems in employment varied according to region of birth, industry of employment, period of arrival and gender.

Martin (1986) examined NESB women's position in the Australian labour market using existing literature and reports written for NESB women, and observed that female migrant populations from these countries were over-represented in low-paid, low-status and unskilled jobs in the manufacturing, building and construction sectors.

Eliadis *et al.* (1988) investigated the specific issues for the NESB women's gender and ethnicity using material written by and for NESB women and concluded that women from NESB countries were "invisible" since they had been in Australia. However, in recent years there was a growing realization that some of the issues and needs of these women from NESB needed specific attention.

Chataway and Sachs (1990) analysed the status of women in Australian manufacturing using the 1986 Census data, and various reports from the Department of Employment, Education, and Training (1987 and 1988). They concluded that migrant women did not have the same access to skilled and managerial positions in manufacturing, as did other women.

Kermond *et al.* (1991) examined the entrepreneurship of migrant women in Australia using longitudinal survey data and qualitative data from discussions with migrant businesswomen. They concluded that a high proportion of these women failed in business partly because of lack of education and work experience, although they received some support from their spouses and families.

Alcorso (1991) investigated the experiences and other employment issues of the newly migrated women using the 1986 Census and 1987 Labour Market Survey data. She concluded that newly arrived women had better education, more qualifications and more

formal job experience than the older settled group, yet this did not appear to improve their employment prospects in Australia.

Yeatman (1992) examined how and in what ways first generation migrant NESB women clothing workers were drawn into the processes of award restructuring. She collected information from government and non-government reports on the clothing industry and interviewing representatives of unions. She concluded that NESB women who fell outside the award were effectively denied the benefits and opportunities of the award restructuring process. This was often because their employers had not registered them as they worked at home, which was outside the effective reach of the award.

Bertone and Griffin (1992) studied various dimensions of the relationship between trade unions and their NESB members. They collected information by interviewing, case studies and multi-lingual surveys of trade unions and their members. They concluded that unions provided limited special services to their female NESB members and these members were not represented in the senior decision-making positions within unions. Female ESB and NESB members held similar attitudes and perceptions towards their unions.

Foster and Rado (1992) investigated the opportunities and access to further education and/or paid employment of NESB women in Victoria, using sources derived from published literature, unpublished materials, relevant conferences, seminars, workshops and face to face and telephone interviews. They concluded that systemic as well as personal factors accounted for the disadvantage that many NESB women experienced in regard to the fulfilment of their literacy, education and training needs.

Clapham *et al.* (1993) analysed the experiences of NESB work-injured women from New South Wales and Victoria, using information collected from government agencies and private organizations, interviews with injured workers and initial library research. They concluded that since work-injured NESB women comprised one of the "least able" groups of injured workers, existing vocational rehabilitation provision amounted to a

system of work-injury management that rendered them economically and socially disenfranchised.

Bowen (1993) examined the vocational experience of migrant women retrenchees in the region of Broadmeadows Migrant Resource Centre, using information from women's experiences and consultation with ethnic groups employed in the textile, clothing and footwear (TCF) industries. She concluded that NESB women, who lost their jobs as a result of the restructuring of the TCF industry, were not getting proper access to available labour market assistance.

Keating (1994a) investigated race and sex discrimination in employment and training in Australia, using information collected from ethnic communities, councils, migrant resource centres and other non-government organizations, consulting with various organizations and existing literature. She concluded that discrimination against NESB women workers in employment and employment related opportunities existed and were often indirect in nature.

Keating (1994b) analysed the need for childcare, which was often a barrier for some NESB women who wanted to enter/re-enter employment or employment related training. She used information from services of employees or students of labour market training programs, literature reviews, and consultations with officers of relevant government departments, union representatives, ethnic childcare and organizations. Keating concluded that the majority of NESB women had problems in relation to childcare, however a small proportion of them found childcare places and went for work.

Alcorso and Hage (1994) examined the experience of NESB women workers with enterprise bargaining, using data collected from a series of interviews with NESB women workers, union officials and NESB women shop stewards and union activists engaged in workplace or enterprise bargaining in Sydney and Melbourne in 1993. They concluded that NESB women worker's experience of enterprise bargaining was

marginally better than that of other women workers largely due to their greater representation in their heavily unionised area of manufacturing.

Ganguly (1995) analysed the NESB women's responses to feminism position and their role in Australian multicultural society using available research literature. She concluded that NESB women were passive victims who were locked in a "time warp", and unable to comprehend and tackle the specificities of their own realities.

Stephens and Bertone (1995) investigated the specific experience and factors responsible for the disadvantaged position of NESB women in the manufacturing industry in relation to work-related training. Their analysis was based on interviews with workers from the food, metal and vehicle manufacturing industries, union officials and members of training committees in Melbourne and discussions of relevant documents. They observed that proportions of NESB women and men who did not receive or understand material about award restructuring, enterprise bargaining or available training were much greater than the corresponding proportion for Australian-born/ESB workers.

Warburton *et al.* (1995) studied the disadvantage experiences of NESB women in the Australian workforce and how that extended into retirement, using information obtained from interviewing NESB women aged over 50, and a comparable sample of ESB women. They concluded that many NESB women retired from work earlier than ESB women due to the problems in obtaining work and poor health. They also received substantially lower retirement incomes.

Murphy (1995) examined the factors that contributed to the lower superannuation coverage for NESB migrant women, using unpublished data from Superannuation, Australia (ABS 1993). She concluded that NESB migrant females who were employed, unemployed and not in the labour market had lower superannuation coverage than their Australia-born and ESB counterparts.

Hawthorne (1996b) discussed the employment position of skilled NESB migrant women in the Australian labour market, using data from the 1991 Census, Bureau of Immigration (1989) and Bureau of Immigration and Population Research (1994). She concluded that despite personal and professional transitions, many NESB women succeed impressively in the Australian labour market.

2.5.3 Foreign Econometric Studies of Labour Market Disadvantage

Since the 1970s, there has been some overseas econometric analysis on labour market disadvantage. These include Oaxaca (1973), Gronau (1974), Heckman (1974), Nukamura and Nukamura (1981), Reimers (1982), Ermisch and Wright (1993), Lester (1996), Buchinsky (1998), Boden (1999) and Solberg (1999). This literature is mainly based on regression, probit and logit models. In this section we outline these important contributions of foreign econometric studies of labour market disadvantage. Also see Table 2.3 for a summary that includes studies of labour market disadvantage.

Oaxaca (1973) investigated the male-female wage differentials in the US urban labour markets using the 1967 Survey of Economic Opportunity. To estimate the average extent of discrimination against female workers and to provide a quantitative assessment of the sources of male-female wage differentials, he estimated a regression model that used a range of human capital variables that included experience and education. He extended Becker's (1957) definition of market discrimination by using the ratio of the wage to the wage when there was no discrimination. He concluded that male-female wage differentials were quite large and unequal pay for equal work did not account for very much male-female wage differential. The concentration of women in lower paying jobs produced the large differentials and a substantial proportion of the male-female wage differential was attributable to the effects of discrimination.

Gronau (1974) examined the wage-offered distribution among married women in the US using the 1960 Census data. He used regression to estimate the wage offer distribution among married women, and a probit model to estimate a housewife's value of time in labour market participation. In both models he used a range of human capital variables that included education and working experience, and concluded that changes

in observed wages tended to understate the changes in the wages offered that were associated with an increased in education. Using the average wage of workingwomen tended to overplay the direct effect of education on labour-force participation.

Heckman (1974) examined the married women's market wages and labour supply using the 1967 US National Longitudinal Survey data. He extended the Tobit model to a simultaneous equations system, which allowed different parameters to affect a decision by women to work, her hours of work, her observed wage rate and her asking wage or shadow price of time. He used a range of human capital variables that included education and experience. He found that more educated women worked more frequently and worked longer hours than less educated women. An additional year of labour market experience raised the market wage.

Nukamura and Nukamura (1981) analysed the labour market behaviour of US and Canadian wives, using the 1970 US Census and the 1971 Canadian Census. They used probit, generalized least squares (GLS) and interactive GLS procedure to analyse the probability of working, offered wage rates, and hours of work of those groups. They concluded that the coefficient of education was more positive for the US than for Canada. The offered wage rates of wives were positively related to an index of local job opportunities, and a wife was more likely to work as her potential wage rate increased. However, the hours of work and the offered wage rate were negatively related for working wives.

Reimers (1982) analysed the wages of Hispanics, Blacks, and Non-Hispanics White males and females in the US using the 1976 Survey of Income and Education data. He used probit and regression models to analyse the probabilities of being a wage earner and wage offer, using a range of human capital variables that included education, experience and command of English. He also used the wage decomposition method introduced by Oaxaca (1973) in order to estimate the wage differentials between minority individuals and White Non-Hispanics. Reimers concluded that English deficiencies did not significantly affect women's wages within groups having the same

education and time in the US, nor did race have a significant impact on wages within Hispanic groups. The differences in education, and not labour market discrimination against the ethnic groups, were found to be the main reasons for the shortfall in wages for Mexican-American women.

Ermisch and Wright (1993) examined wage offers and full-time and part-time employment of British women using the 1980 Women and Employment Survey data. They used an ordered probit model in order to examine whether women in part-time jobs received lower wage offers compared to full-time jobs, using a range of human capital variables that included qualifications, education and experience. To examine the impact of wage offers and other variables on women's choices, they conducted a probit model and concluded that full-timers gained more from additional years of full-time or part-time work experience than did part-timers. This suggested a smaller return to on-the- job human capital investments in part-time jobs. While an additional year of education had similar effects on women's full-time and part-time wage offers, women were rewarded more for their formal qualifications in full-time work. The difference in women's expected wage offers between full-time and part-time employment was an important determinant of whether she worked full-time, while a husband's income mainly affected the decision of whether to participate. In addition, it appeared that women who worked despite having observed characteristics that discouraged employment were much more likely to work part-time.

Lester (1996) explored the part-time employment of married women in the US using 1980 Census data. He used factor analyse and regression analysis for part-time, full-time and total employment of married women, using a range of social and economic variables. Lester concluded that the female labour market participation was an important factor behind the part-time employment of married women across the 48 continental states.

Buchinsky (1998) examined the changes at different points in the wage distribution of the US female wage structure using 1968 to 1990 Current Population Survey data.

Buchinsky developed a model following Gronau (1974) that adjusted for selectivity bias in the job search process. A quintile regression was used to deal with this problem where the conditional quintile of observed wages depended on a range of factors and an unknown form of bias, which could not be corrected using the usual parametric method for sample selection. He used a non-parametric method suggested by Heckman (1979) and Newey (1991) to deal with this problem. He used a range of human capital variables that included education and experience and concluded that the most pronounce decreases in wage inequality were observed for high school graduates, while for younger college graduates there were significant increases in wage inequality through most of the sample period. Also, highly qualified women earned significantly greater wages compared to lesser-qualified women.

Boden (1999) studied the gender differences in self-employment selection using the Contingent Work Survey and the supplement of the February 1995 Current Population Survey. He used a probit model to analysis the impact of having young children on self-employment status and concluded that women with young children were more likely to be self-employed than any other groups.

Solberg (1999) analysed the gender pay gap, using the 1991 National Longitudinal Survey of youth data. He used the Neumark/Cotton extension of the Blinder/Oaxaca decomposition method of wage discrimination using educational attainment, experience and other variables for occupational preferences. He concluded that the inclusion of occupational dummy variables in a human capital wage equation reduced the unexplained portion of the gender pay gap and reduced the estimated effect of market discrimination.

2.6 Conclusion

In this chapter, we reviewed the literature that is relevant of the labour market status of NESB women in Australia. Most of the econometric studies used regression, logit and probit models mainly based on census and labour market surveys data. The non-econometric studies were mainly based on survey and individuals collected data.

Although we believe that we have reviewed the Australian literature that is relevant to this thesis, the overseas literature is enormous. Because of this, we have provided a sample of what exists, largely from US sources.

Australian and foreign econometric literature on participation status examined women's participation and their opportunities in the labour market, including participation decision of low-income females with children, the impact of children on female labour supply and labour market outcomes of migrant women. A common theme in all of these models was the conclusion that human capital variables like education, experience and English skills had a tremendous effect on the labour market participation of individuals.

The literature concerning occupational status used various measures of occupational status and attainment. Most of these authors concluded that occupational status was strongly depended on educational attainments. Importantly, many of the authors observed that after controlling for other factors, migrant women occupied lower status positions.

Unemployment status for migrant women was also reviewed in this chapter. Unsurprisingly, poor educational qualifications were generally found to be important in determining whether individuals were more likely to be unemployed. They concluded that migrant women groups in Australia had higher unemployment rates than those of Australian-born women, which were associated with a lack of skills in English.

The Australian non-econometric studies that we reviewed examined a diverse range of issues including migrant women's occupations, occupational attainment and status, motherhood and wage work, labour market participation, pay, wage-work, employment, unemployment and discrimination. These authors generally concluded that NESB women had not only lower labour market participation rates, but also occupied the low status positions. NESB women had higher unemployment rates than those of other women and they concluded that there was some discrimination against NESB women workers in employment and employment opportunities. Discrimination, however,

involved a range of possibilities and there was not much evidence of discrimination on the basis of ethnicity and the like on the part of employers. For the most part, it was indirect discrimination on the basis of individuals having lesser human capital attributes.

Having noted the importance of human capital variables in these works, it is clear that they are not the sole determinants of labour market status. The econometric analyses use a range of demographic variables that typically include age, presence of children, marital status, place of residence and length of residence in the country. When these controls are added to the models, having better education and greater labour market experience remain as key factors. In the case of migrants, it is also clear that English language skills are also important in determining labour market outcomes.

The literature that we have discussed in this chapter focuses on the relationship between labour market status and human capital and demographic attributes of individuals. It is hard to claim that after half a century of investigation of this matter that there are major gaps in the literature or that its theoretical underpinnings are erroneous.

It is clear that there is a continuum of jobs ranging from, at one end, the tedious and low paid with precarious tenure, to those with high pay and congenial working conditions. Having said that, both the general public and policy makers often speak of "good" jobs and "bad" jobs, and this corresponds with primary sector and secondary sector jobs, which is the basis of dual labour market theory. Certainly, one of the aims of education is to prepare young people for "good" jobs; certainly Australian governments have taken a range of measures over the years to improve working conditions in occupations that were both dangerous, poorly paid and offered no tenure. Although there seems to be considerable interest in "good" and "bad" jobs from several perspectives, we believe that no attempt has been made to categorise jobs as primary sector and secondary sector jobs in Australia.

Outside Australia, some researchers have attempted to categorise jobs as primary sector or secondary sector. Nevertheless, we have been unable to discover any research that

examines the factors that affect the probability that an individual will have a primary sector job using a probit or logit modelling approach. In addition, there has been no empirical analysis of whether the probability that an individual has a primary job is significantly less for NESB migrant women than Australian-born women in Australia.

In the empirical economics literature, researchers have sometimes used a bivariate probit analysis when an observable outcome is dependent on a prior decision. For example, Devaney and Chien (2000) used a bivariate probit model in analysing the decision to participate in a retirement plan for self-employed and wage-earner workers. They considered employment status (wage-earner or self employed) and retirement plan participation (participate in the retirement plan or not), which were likely to be jointly determined and examined whether there were any unobserved factors that influenced both decisions.[26] We conjecture that this is analogous to the decision of an individual to participate in the labour marker and are unaware of any use of bivariate probit that attempts to address this matter.

In the next three chapters, for both NESB and Australian-born women, we address factors that determine labour market participation, primary sector employment and unemployment. In particular, we will investigate whether NESB women are less likely to have primary sector jobs and more likely to be unemployed than Australian-born women. In these chapters we will use binary probit models to test for the effects of a range of human capital and demographic variables on these matters. Finally, we will readdress these issues using a bivariate probit modelling approach.

[26] Further example of the use of bivariate probit analysis will be outlined in Chapter 6.

Table 2.1: Summary of Australian Econometric Literature

Researchers	Year	Dependent	Technique[27]	Data	Results
1 Miller and Volker	1983	Participation	OLS Key indep = education, family income, national origin	1976 Census	Married women's participation in the labour market positively associated with education and negatively associated with husband's income. Overseas-born women were more likely participated than Australian-born women.
2 Evans	1984	Participation, unemployed, occupational status	OLS Key indep = education, English skills	1981Census	Participation and occupational status positively associated with education and English skills and unemployment negatively associated with education and English skills. Eastern European women were the most likely to be in the labour market, unemployed and highest paid. Mediterranean women were the least likely to be in the labour market, low unemployment rates, occupying lowest status position, and receive lowest wages.
3 Kelley and McAllister	1984	Occupational status, income	OLS Key indep = education	1973 ANU Social Mobility Survey	Occupational status and income positively associated with education. However, better-educated Mediterranean women were at a disadvantage, while those with less education and status actually did better.
4 Miller	1984	Unemployment	Logit Key indep = educational qualifications	1976 Census	Teenage unemployment negatively associated with educational qualifications. However, unemployment rates differ according to qualifications, trade and technical qualifications were associated with lower unemployment rates.
5 Brooks and Volker	1985	Unemployed, employed, not in the labour market and hours of work	Logit and ordered probit Key indep = educational qualifications, English skills	1981 Census	Employment and participation of individual positively associated with educational qualifications and English skills and better-educated women spend more time working.

[27] Key indep indicates key independent variables in the analysis.

6 Inglis and Stromback	1986	Unemployment	Logit Key indep = English Skills, Educational qualifications	1981 Census	Migrants' unemployment status negatively associated with specific migrant characteristics: Period of residence, English skills, and birthplace. Newly arrived migrants had higher unemployment rates. However, tendency to be unemployed falls as the period of residence in Australia increases.
7 Stromback	1986	Unemployed	Logit Key indep = English skills, education	1981 Census	Migrant's unemployment status negatively associated with education and English skills. However, no significant relationship between English language and unemployment was found for migrant women.
8 Miller	1986a	Unemployed, employed	Logit Key indep = education	1983 Manpower Programs Survey	Migrant's unemployment in the first year of arrival negatively associated with Education. The significantly higher unemployment rates experienced by females born in Vietnam and Italy who arrived as adult.
9 Miller	1986b	Unemployment	Logit Key indep = educational qualification, English skills	1981 Census	Youth unemployment negatively associated with educational qualifications, English skills and period of residence. Foreign born and females had higher unemployment rates.
10 Brooks and Volker	1986	Unemployment	Hazard function Key indep = age, marital status	1984 ABS Survey	The probability of leaving unemployment positively associated with age and marital status The probability of leaving unemployment decreased as the duration of unemployment increased. Married and older females had the highest probability of leaving unemployment.
11 McAllister	1986	Unemployed	Path analysis Key indep = education, English skills, experience	1983 AIMA Survey	Youth unemployment negatively associated with education, experience and English skills.
12 Evans and Kelley	1986	ANU2 status	OLS Key indep = educational qualifications, English skills, experience	1981 Census	Occupational status positively associated with educational qualification, English skills and experience. The differences in the occupational status of migrants and Australian-born reflected differences in endowments not discrimination.

13 Miller	1987	Status attainment	Ordered probit Key indep = educational attainment, English skills, experience	1981 Census	Occupational attainment of migrants positively associated with education and English skills and negatively associated with experience. They concentrated in low-ranked occupations and the relatively minor influence of education on the occupational attainment.
14 Evans	1987	Occupational status	OLS Key indep = education, English skills	1981 Census	Occupational attainment positively associated with education and English proficiency. Monolingual English usage had no effect on occupational attainment.
15 Beggs and Chapman	1987	Unemployment, income	Probit, regression Key indep = education, experience	1981 Census	Unemployment negatively associated with education and experience and wages positively associated with education. However, at the highest level of education considered migrants had a greater probability of unemployment than Australian-born.
16 Evans	1988	Participation	OLS Key indep = education, feminist ideology	1984-85 National Social Survey	Labour market participation of Australian wives positively associated with education and feminist ideology.
17 Wooden and Robertson	1990	Unemployed, employed and non-participation	Logit Key indep = education, English skills	1986 Census, Labour market Survey 1987	Labour market success of migrants positively associated with English skills and education However, amongst females' education was less important. The age of youngest child, income of husband had marked affects on labour market participation of females.
18 Flatau and Hemmings	1991	Unemployment	Probit Key indep = educational qualifications, experience	1985 ALS	Educational qualifications and experience significantly reduced the probability of unemployment of young migrant females.
19 Jones and McAllister	1991	Unemployment	Logit, OLS Key indep = educational Qualification, English skills	1988 Multicultural Australia survey	Unemployment negatively associated with educational qualifications and English skills.

20 Evans and Kelley	1991	Occupational status, income	OLS Key indep = education, English skills, experience	1981 Census	Migrants' occupational status and income positively associated with education, English skills and experience. Migrants and their Australian-born children received jobs and earning that were commensurate with their education, experience and skills. There was little or no discrimination in jobs and pay.
21 Jones	1992	Unemployment, ANU3 Scale, earnings	Logit, OLS Indep = educational qualification, English skills	1986 Census	Unemployment negatively associated with educational qualifications and English skills. Employment status and earnings positively associated with these variables.
22 Vaughan	1992a	Occupational attainment	Logit Key indep = education, experience, English skills	1986 Census	Migrants' occupational attainment positively associated with human capital variables. However, differences in occupational attainment between migrants and Australian-born were largely product of the difficulties of transferring human capital characteristics.
23 Vaughan	1992b	Occupational attainment	Logit Key indep = education, experience	1986 Census	Gender differences in occupational attainment were significant, which were also the product of differences in years of education and labour market experience.
24 Ross and Saunders	1993	Participation, employment, full-time employment	Probit Key indep = education, experience	1986 Income Distribution Survey	Mothers' labour market participation, employment and full-time employment positively associated with education. However, labour market participation negatively associated with experience and employment and full-time employment positively associated with experience.
25 VandenHeuvel and Wooden	1995	Participation in training (In-house, employer-supported external, unstructured on-the job, employer-supported)	Logit Key indep = highest educational level (Australia and overseas), occupational experience.	1993 ABS Survey of Training and education	Participation in training positively associated with highest level of education and negatively associated with overseas education and occupational experience. NESB women were in a disadvantage position in terms of participation in training.

26 McAllister	1995	Occupational status	OLS Key indep = education, English skills	1988-89 Multicultural Australia Survey	Migrants' occupational status positively associated with educational qualifications and English skills. Their occupational status reduced when they commence work in Australia and by the consequent impact of this lower than expected status on migrants working careers.
27 VandenHeuvel and Wooden	1996	Labour market status (full-time, part-time employment)	Logit Key indep = English skills, qualifications	1991 Census, 1993 ABS survey: Working Arrangement, Training and Education	Labour market status positively associated with English skills and qualification. English skills and high level of qualifications positively associated with part-time employment than full-time employment. NESB women were more likely to secure full-time employment.
28 Lucich	1997	Participation, hours of work, wage	Probit, OLS Key indep = education, experience	1986 ABS Income and Housing Survey	Labour market participation, wages, and hours of work positively associated with education. Participation negatively associated with experience and wages and hours of work positively associated with experience. The level of education did not significantly influence the wages paid to migrant women.
29 Williams, Brooks and Murphy	1997	Employed, unemployed and not in the labour market	Logit Key indep = educational Qualifications, English skills	1993-1995 Longitudinal Survey of Migrants	Unemployment negatively associated with English skills and educational qualifications and employment positively associated with these variables.
30 O'Loughlin and Watson	1997	Unemployed and long term unemployed	Logit Key indep= education and English skills	1991 Census; 1993 Training and Educational Experience, Labour Market Status; and case studies	Long-term unemployment negatively associated with education and English skills. The hidden unemployed were predominantly composed of women with dependent children. Being mature aged was the factor most significantly associated with increased long-term unemployed.
31 Wooden and VandenHeuvel	1997	Part-time participation, full-time participation and not in the labour market	Logit Key indep = educational qualifications, English skills	1991 Census	Full-time participation positively associated with educational qualifications and English skills and part-time participation negatively associated with poor English skills.

32 Evans and Lukic	1998	Participation	OLS Key indep = education, English skills	1981 Census	Labour market participation of Yugoslavian women positively associated with education and English skills.
33 Reiman	1998	Hourly wage rate	OLS Key indep = years of schooling, experience, workplace training, English skills, occupation	1995 AWIRS	Wage rate positively associated with work experience, training, education, and English skills. There were significant wage differences between female/male. Gender wage gaps were greater for English background than non-English background employees. Enterprise bargaining had negatively affected the gender wage gap in Australia.
34 Gray and Hunter	1999	Participation, employed	Minimum χ^2 method Key indep = education, English skills	1986, 1991 and 1996 Census	Labour market participation and Community Development Employment Project for indigenous women negatively affected the education (post secondary) and English skills
35 Gray, Qu, Vaus and Millward	2003	Employed or not employed	Logit Key indep = education, English proficiency	1996 Australian Census	The probabilities of employment were generally similar for Australian single and other mothers. Having a low level of educational attainment and poor spoken English was negatively associated with employment probabilities and had a larger negative effect on lone mothers than couple mothers.
36 Thapa	2004	Unemployment	Logit Key indep = education, English proficiency	1990 Income Distribution Survey, 2001 household, Income and Labour dynamics in Australia	The probability of unemployment for male migrants remained consistently higher than for an average native-born Australian. The risk of unemployment of migrants (male) was negatively associated with education and English proficiency. The employment disadvantage of migrants in Australia has not diminished in spite of greater emphasis on skilled migration in the post-1990 period.

Table 2.2: Summary of Australian Non-Econometric Literature

Researchers	Year	Technique	Data	Results
1 Beaumont	1974	Descriptive statistics to show unemployment situations	1964-72 Census, 1970 labour market studies, 1969-72 survey with C.E.S.	Lack of employment opportunities found to be a serious problem for female unemployment in these areas, particularly longer duration of unemployment.
2 Cox, Jobson and Martin	1976	Descriptive statistics to show the characteristics of the NESB women by work force participation, experience and perception.	Collected from individual migrant women groups	Majorities of women were working in semi skilled or unskilled blue-collar occupations, as production-process workers in the garment industry.
3 Storer, Faulkner, Ilic, Mitchell, Nikalaou and Pozos	1976	χ^2-test to find the association, among all cross correlation variables	Randomly collected from selected factories	In most factories migrant women work, they found conditions to be extremely poor in terms of temperature, pollution, noise, odour and physical danger.
4 Eccles	1982	Descriptive statistics to examine the characteristics of the women's employment, unemployment, work experience and earnings.	1947-1976 CBCS Census; 1966-1980 Census	The labour market participation of women has been grown since the 1947-1980, particularly amongst married women. They formed a greater proportion in almost all occupational groups. However, they had greater unemployment rate and less earning compared to men.
5 Nord	1983	Documenting migrant women's experiences and rights	Surveying over 400 migrant women workers	Provided migrant women's experiences as they told a word of pain, suffering, anger, and often despair and hopelessness, including feeling of powerlessness, making them vulnerable to employers' intimidation.
6 Lampugnni and Mansell	1984	Percentage of occupational inequality	1976 Census	The particular groups of women who enjoyed equal rights in theory, but were discriminated against in practice were the result of social stratification based on primarily on ethnic identification.
7 Martin	1984	Describing the dimensions of oppression suffered by the NESB women.	RED and Human Relation Reports (1976), TNC (1980)	Majority of NESB women who arrived as dependents of male migrants worked as semi and unskilled workers.

8 Storer	1985	Migrant men and women's employment and occupational status by proportion.	1981 Census	NESB Males and females had higher participation and unemployment rates. They were more likely to work as tradespersons, production workers or labourers, and were under-represented in the professional and technical occupations.
9 Chapman and Miller	1985	Descriptive statistics to examine labour market participation, unemployment, earnings and occupational structure.	1981 Census	In the initial periods of residence migrants had high rates of unemployment. Their average-earnings were lower than other groups and occupational distributions approached that of Australian-born as length of residence increases.
10 Turpin	1986	Job related problems showed through graphs, tables and descriptive statistics.	Collected by Victorian Ethnic Affairs Commission, and Case studies	Segmentation in labour market placed culturally distinct waves of migrants in the least desirable occupational structures (including unemployment). Migrants' perceptions of barriers or problems in employment varied according to region of birth, industry of employment, period of arrival and gender.
11 Martin	1986	Summarizing the information on ethnicity and class, work experiences and multiculturalism, migrant women and feminist.	Literature and reports (APIC1976) (TNC 1980), (WERC 1979).	Lacking social and economic capital, married to men employed in low-paid, low-status jobs made NESB women a cheap and dispensable source of labour for manufacturing industries.
12 Eliadis, Colanero and Roussos	1988	Summarizing the NESB women's information on their special needs	Material written by and/or about women from NESB	The specific issues were identified mainly: mental health, languages classes, childcare, health and safety.
13 Chataway and Sachs	1990	Calculated in percentages to show NESB women's education, training, award restructuring, and participation in labour market, and special needs.	1986 Census, 1987 & 1988 reports from the Department of Employment, Education, and Training.	Migrant women did not have access to skilled and managerial positions in manufacturing.

14 Kermond, Luscombe, Strahan and William	1991	Frequency distributions and chi-square tests to identify the significant relationships between small business enterprises.	Longitudinal survey collected over 12 years and a qualitative data from discussion with migrant business women	A high proportion of these women failed in business partly because of lack of education and work experience.
15 Alcorso	1991	Descriptive statistics to show relationship between labour market status and other socio-economic factors.	1986 Census, 1987 labour market survey.	Newly arrived had better education, more qualifications and more formal job experience than the older settled group, yet this did not appear to improve their employment prospects in Australia. They initially found work in manufacturing sector and often performed difficult, unrewarding, socially undervalued work, despite their expertise.
16 Barnett	1991	Percentage of women's occupational groups in public sector to show differences.	1986 Census, case studies of 20 NESB women	Relationship between gender and culture was found to be extremely interdependent, but in work aspirations, attitude, and opportunities, the most influential factors were gender. Many women expressing a lack of confidence, regardless of the degree of success in their work.
17 Misztal	1991	Summarizing the literature to identify the factors affecting the position of migrant women in the labour market in comparison with Australian.	Available literature written for migrant women's class and gender inequalities	Migrant women tended to be employed in much lower-level, lower-status, and lower-paying occupations than Australian women.
18 Yeatman	1992	Summarizing the data to policy analysis and evaluation on NESB women clothing workers.	Interviewing CATU and other clothing industry workers and various reports.	NESB women workers were at risk of low labour market status. Many of them fall outside the award, because their employers had not registered them as they work at home, which was outside the effective reach of the award.

19 Webber, Campbell and Fincher	1992	Frequency distributions to show the level of segregation by gender and birthplace gender differences by skills use of support services and chi-square tests to identify differences and similarities in the experiences.	1971-86 Census, 1988 survey of 272 migrants from Yugoslavia, Greece and Vietnam.	Level of industrial segregation and occupational immobility occurred for both women and men. After arrival in Australia, women seemed to have relatively less formal to specific training, which reduced their opportunity for occupational improvement.
20 Bertone and Griffin	1992	Percentage of Migrants' participation in trade unions.	Interviewing, case studies, and multi-lingual survey of trade union and their members	Unions provided limited special services to their female members and such members were not represented in the senior, decision-making positions within unions.
21 Foster and Rado	1992	Summarizing the data	Published/unpublished materials, face to face interviews with NESB women	Personal factors account for the disadvantage many NESB women experienced as regards the fulfilment of their, education and training needs.
22 Alcorso and Harrison	1993	Descriptive statistics and trend analysis for the NESB and ESB women's experiences of employment status, participation rates, training and responses to the (1990-2) recession.	Various published and unpublished ABS data from 1989-1990.	During the period of 1959 to 1970 the overall participation rates of NESB women tended to be greater than Australian-born women. The very high unemployment rates of some groups of NESB women were identified. In recession, NESB women had suffered disproportionately from job loss compared to others.
23 Bowen	1993	Describing NESB women's experience of retrenchment, employment prospects and English language training	Qualitative information about women's experiences following retrenchment	NESB women who were retrenched did not receive labour market assistance, because they face difficulties in communicating with officers.

24 Clapham, Schofield and Alcorso	1993	Descriptive statistics to examine the similarities and differences between Workcare and Workcover in Victoria and NSW	Information collected from government agencies, private organizations, interviews with inured person, and library research	Since work-injured NESB women comprised one of the 'least able' groups of injured workers, existing vocational rehabilitation provision amounts to a system of work-injury management that rendered them economically and socially disenfranchised.
25 Junor, Gholamshahi, O'Brian and Kringas	1994	Percentage to show participation of NESB women in labour market programs	Department of social security (1993), ABS (1991), Bureau of Employment, Education and training (1992-93).	NESB women's participation in the labour market programs shifted form training to work placements. NESB women appeared to be under-represented in work placement programs and they had concentrated in programs, such as JOB TRAIN, which had poorer employment outcomes.
26 Keating	1994	Describing NESB Women's experiences of discrimination in employment and training	Data from Ethnic Communities Councils, Migrant Resources Centres, and consulting with organization, which supports NESB women	Discrimination against NESB women workers in employment/employment related opportunities existed, which were often indirect in nature.
27 Keating	1994	Percentage to show childcare preferences by employment status, difficulties in organizing care school aged children experienced by student, length of employment, unemployed for 1-2 years, location, country of birth	Surveys of total 90 NESB women who were either employees or students of labour market training programs, from six different locations in Victoria and Queensland.	The majority of women had major problems in relation to childcare, although the childcare needs for a small proportion of NESB women were being met.

28 Alcorso and Hage	1994	Summarizing the enterprise bargaining and aspects of the experience	Series of interviews with NESB women workers, union officials, shop stewards and union activist	NESB women's experience of enterprise bargaining was marginally better than that of other women workers due to their greater representation in their heavily unionised of manufacturing.
29 Ganguly	1995	Summarizing NESB women's positions and role in Australian society with particular attention to work.	Literature and reports on NESB women.	The binary categories viz., men versus women, dominant culture versus minority culture, traditional migrant versus modern Australian; encouraged a clear domination; oppression divide that represented NESB women as passive victims.
30 Bertone	1995	Summarizing NESB women's participation, attitude, and barriers in training and their overall role at the workplace.	Interviews with stake holders, focus group discussion and existing literature	English language skills were important among many other barriers to NESB women's participation in training. The vast majority of them expressed desire to participate in training.
31 Stephens and Bertone	1995	Descriptive statistics to show different employment status.	Interviewing 436 food, metal, vehicle workers and 36 other personnel from manufacturing industries in Melbourne.	NESB women were interested for training. High proportions of them did not get opportunities to perform different type of jobs.
32 Warburton, Winocur and Rosenman	1995	Descriptive statistics to examine NESB women's retirement issues	Interviewing NESB women over 50	Many NESB women retired from work earlier than ESB women due to the problems in obtaining work and poor health. In addition, lower occupational status and lower incomes and shorter work histories, were reflected lower retirement incomes.
33 Murphy	1995	Percentage to examine superannuation coverage rate by age, worker status and industry	1993 ABS, Superannuation Australia	NESB women had lower superannuation coverage than their Australian-born and ESB counterparts.

34 Brooks and Williams	1996	Descriptive statistics to examine the position of NESB women's labour market participation, unemployment, part-time employment, self-employment and employers, superannuation coverage, work related training and employment benefits.	ABS, Labour market Australia (1996), Labour Market Survey (1989-95), Person Not in the Labour Market (1992-94), Training and Education Experience in Australia (1993), Families in Australia (1992), Superannuation Australia (1993), Working Arrangements Survey (1993)	NESB women had higher unemployment and long-term unemployment than ESB and Australian-born. Superannuation coverage of NESB women was lower. The working hours of NESB women appeared to be less flexible than for the other groups and had greater difficulty getting their qualifications recognized than those women from an ESB.
35 Hawthorne	1996b	Describing the rise in skilled female migration, the barriers to employment for skilled NESB women and the work based challenges.	Census (1991), Bureau of Immigration Research (1989), Bureau of Immigration and Population Research (1994).	Despite personal and professional transitions many NESB women succeed impressively in the Australian workforce.

Table 2.3: Summary of Overseas Econometric Literature

Researchers	Year	Dependent	Technique	Data	Results
1 Mincer	1962	Labour market Participation rate	Regression models Key indep = median income of male family heads1949, median income of female worked 50-52 weeks in 1949, percent of population aged 25+ completed high school education.	Cross-section data from Urban of Standard Metropolitan Areas, 1950 BLS Survey of Consumer Expenditure, 1957 Census Sample Survey	Wife worked less as husband earned more and wives' labour market participation rates respond positively to wives earning power.
2 Sewell and Orenstein	1965	Occupational choice	Technique of elaboration Key indep = intelligence, socio-economic status	1957 Survey of Graduating Seniors in Public, Private, Parochial Schools in Wisconsin	Boys, but not girls, from rural areas and smaller communities had lower occupational aspirations than those from larger urban places. This was independent of intelligence and socio-economic differences.
3 Oaxaca	1973	Full-scale wage and personal characteristics wage	Regression models Key indep = experience, education, and occupation	1967 US Survey of Economic Opportunity	Wage rates positively associated with education and experience. Male-female wage differences were quite large. A substantial proportion of the male-female wage differential was attributable to the effects of discrimination.
4 Gronau	1974	Wage offer, labour market participation	Regression, probit Key indep = education Key indep = annual income, education (wife and husband), hourly wage.	1960 Census	Wage offer positively associated with education. Participation positively associated with education and wages. Changes in the observed wage tended to understate the changes in the wage offer associated with an increase in education. Using the average wage of working women tended to overplay the direct effect of education on labour market participation.

5 Heckman	1974	Annual hours worked, annual weeks worked, asking wage and offered wage	Tobit Key indep = wage rate of husband, experience, education, expected work participation rates, education.	1967 US National Longitudinal Survey	The effect of education was to raise the offered wage than the asking wage and the differences were significant. An additional unit of labour market experience raised the market wage. Increased in hours and weeks worked were associated with increased of the wife's time used for consumption and home production.
6 Treiman and Terrell	1975	Occupational attainment, educational attainment, earnings	Regressions Key indep = education, occupation (father's, mother's)	1967 Longitudinal Study of Labour Market Experience of Women and US Census	The level and process of occupational attainment were highly similar for men and women. Moreover, for them occupational status was largely dependent upon educational attainment.
7 Hosek	1975	Annual probability of unemployment, weekly probability of being unemployed, annual weeks of unemployment	OLS Key indep = education	1967 Survey of Economic Opportunity	The effect of education and wages for annual probability unemployment and annual weeks of unemployment of individuals were negative. Hosek established a conceptual framework that accommodated a variety of theoretical approaches, which furnished a means of translating among various weekly and annual measures of unemployment experience.
8 McClendon	1976	Occupational attainment	Regression models Key indep = education	1972-1974 NORC General Social Survey	Male and females occupational attainment positively associated with education. The occupational status of each sex was quite similar, although males were somewhat more likely to have high and low status jobs.
9 Featherman and Hauser	1976	Duncan's SEI, education, earning	OLS Key indep = education, experience, occupation	1962-1973 Occupational Changes in a Generation	Women's occupational attainments were somewhat less related to the characteristics of their family's origin. Education had the largest absolute and relative effects on occupational status of women. Men and women were allocated to levels of education and occupational status in much the same manner.

10 Hudis	1976	Annual earnings	OLS Key indep = educational attainment, occupational status	1967 Survey of Economic Opportunity	Women's earnings positively associated with educational attainment and occupational status. However, currently married women received smaller economic benefits from schooling and occupational status because of interrupted labour market participation and familial constraints.
11 Psacharopoulos	1977	Earnings	Regression Key indep = education experience	1972 General Household Survey	Schooling (which include experience) had positive effect on the earning in lower and upper segment. Schooling was a more profitable investment for those in the lower segment. The duel labour market evidence was found in UK.
12 Sewell, Hauser and Wolf.	1980	Occupational attainment	Regression Key indep = educational attainment	1957-1975 Wisconsin high school graduates	Occupational status of first job positively associated with educational attainment. Marked occupational segregation of men and women in the Wisconsin sample coexisted with similarity in average levels of current occupational status. Women tended to be excluded from the extremes of the occupational status distribution.
13 Spitze and Waite	1980	Occupational status, earnings, typicality and satisfaction	OLS, probit Key indep = education, race	1968-1973 National Longitudinal Survey of the Labour Market Experience of Young Women.	Educational attainment had a large, positive effect on occupational status of young women. Young women who preferred market to homework tended to select first jobs with significantly lower occupational status than those who preferred homework. They also tended to earn less on these jobs, but the effect was not statistically significant.
14 Barton and Zabala	1980	Dummy for actual participation of the women; hours of participants, non-participants	Logit, OLS and tobit Key indep = log wage (predicted per hours), husband's wage (per hour), net unearned income (similar for all equations).	1974 UK General Household Survey	Participation, hours of participants, negatively associated with husband's wage and unearned income. Wage and income effects on married women's participation accounted for less than half of the long-run rise in women's labour market participation. Young child under six and number of children had a positive effect on participation. Wives born in the West Indies and Ireland were more likely to work and coloured women were likely to work longer. Wives wage rises, both the probability of participating and the expected hours if working rise.

15 McNabb and Psacharopoulos	1981	Annual earning	Regression Key indep = schooling and experience	1972 UK General Household Survey	There was a positive and significant relationship between schooling and earning for workers both in lower and upper segments. There was some form of segmentation in the UK labour market.
16 Nukamura and Nukamura	1981	Dummy for working or not working, offered wage and hours of work	Probit GLS Key indep = years of education, income of husband + asset income of family net of income taxes.	1970 US Census and 1971 Canadian Census.	The probability of working, offered wage rate positively associated with education and hours of work negatively associated with income of husband. Hours of work and the offered wage rate were negatively related for working wives.
17 Long and Jones	1981	Not working, working part-time and working full-time, natural logarithm of the hourly wage	Probit, OLS Key indep = wife's wage, husband's earning, vocational training, wife's education. Key indep = years of schooling, current job, years working, not working, practicing a profession or trade.	1970 US Census	Part-time and full-time work positively associated with husband's income and education. Wages positively associated with education and experience for part-time and full-time work. In addition, level of wages and benefits from human capital were relatively smaller in part-time labour market. Wives earned less in part-time jobs than full-time jobs. Over a multiyear period, married women work more weeks when they hold full-time jobs than part-time.
18 Reimers	1982	Wage earner or not wage earner; wage offer	Probit, OLS Key indep = education, experience, command of English, employment status, income, spouse's education.	1976 US Department of Commerce, Survey of Income and Education	Participation in wage or salary earner more positively and few negatively associated with education and more negatively and few positively associated with English not good variables for different migrant female groups. Wage offer positively associated with education and experience and some positively and few negatively associated with English not good variables. Differences in education, and not labour market discrimination against the ethnic groups, were found to be the main reasons for the shortfall in wages for Mexican-American women

19 Boyd	1982	Occupational attainment	Regression Key indep = education, first job	1973 Canadian Mobility Study	Males and females occupational attainment positively associated with education and experience. The socio economic statuses of current occupations on the average were very similar for native-born men and women in the Canadian labour market, sex differences existed in the process by which such occupational statuses were attained. Women who were single, widowed or divorces, current occupational status was achieved wholly on the basis of education and / or first-job characteristics.
20 Hirschman and Wong	1984	Occupations and earning	Multivariate Regressions Key indep = education	1960 and 1970 Census, 1976 Survey of Income and education	Socio-economic status of migrants' positively associated with education. In general, Asian Americans approached socio-economic parity with whites because of the over achievement in educational attainment. Over the preceding decade, there had been a marked decline in the direct negative effect of ethnicity on earnings (except among Chinese Americans).
21 Sullivan	1984	NORC prestige score	Regression Key indep = educational attainment, experience	1970 US Census	Occupational prestige of migrant women positively associated with educational attainment and negatively associated with experience. Migrant women did not fare so well as migrant men in converting their resources into occupational prestige, although nationality difference were larger than gender differences.
22 Tienda and Glass	1985	In or out of the labour market;	Logit Key indep = education, husband's income.	1980 Bureau of the Census Current Population Survey of the US	Labour market participation of women with minor children by headship status positively associated with education and negatively associated with husband's income. Extended household structure positively influenced the probability that spouses worked outside the home, but not female heads. Female heads with minor children participated more in the labour market than married mothers.

23 Neuman and Ziderman	1986	Earnings	Regression Key indep = education, experience	1974 Israel Labour Mobility Survey	Earnings were positively related to education and labour market experience. The duel labour market evidence was found in Israel.
24 Stier and Tienda	1992	Labour market participation, wage offers	Probit Key indep = English ability, husband's wage and education	1980 US Census	Migrant women's labour market participation negatively associated with husband's wage and English ability. Women's wage offer positively associated with education. For all groups, women's resource endowments, earning potential and language ability were most decisive in predicting whether they entered the labour market.
25 Ermisch and Wright	1993	Hourly wage rate; employment decision;	Ordered Probit Key indep = qualifications, years of post-compulsory education, part-time wage), full-time wage÷part-time wage husband's and other income.	1980 UK Women and Employment Survey	Full-time and part-time wage offer positively associated with educational attainment. Greater husband's income significantly reduced a women's probability of working. Difference in women's expected wage offers between full-time and part-time employment was an important determinant of whether she works full-time, while husband's income mainly affects the decision of whether to work.
26 Gurak and Kritz	1996	Labour market participation	Logit Key indep = years of education.	1981 Survey of Colombian and Dominican Women Residing in NY City, 1978 Survey of Women Residing in Dominican Republic Santo, Domingo and Santiago.	Labour market participation in both Female headed or spouse present household in New York and Dominican Republic positively related with education. For all other households participation negatively and positively related with education in New York and Dominican Republic. Female heads in new York were less likely to be in the labour market but their counterparts in the Dominican republic were more likely than other categories of women to be employed.

27 Lester	1996	Part-time, full-time and total employment	OLS, Factor analysis: Key indep = percent of service sector, the female labour market participation and unemployment rate. Key indep = percentage of male-female unemployment rates, labour market participation rates, family income and the personal income.	1980 US Bureau of Census	Female labour market participation rate positively associated with part-time employment of married women, however, failed to support the role of the service sector in explaining part-time employment.
28 Gensler and Walls	1997	Participation in labour market	Probit Key indep = education, experience and unearned income.	1979-1990 US Census Bureau's Current Population survey	The effective welfare guarantee levels and the effective welfare tax rate on unearned income both significantly affected the probability of labour market and welfare program participation, however, such impacts were very small in magnitude.
29 Waddoups	1997	Employment Status	Logit Key indep = education, experience and child	1987 US National Health Interview Survey	Employment decision for women positively associated with education and experience and large number of children reduced the employment decision. Women with greater propensity to adopt a child into their household were less likely to participate in the labour market than their non-adopting counterparts.
30 Buchinsky	1998	Working or not working	Quintile regression: Key indep = education, experience, log of weekly wages, education, experience	1968-1990 US Current Population Survey (CPS)	The most significant changes for the less skilled women took place at the bottom of the wage distribution, for more skilled groups changes occurred at the ends of the distributions. Consequently, wage inequality decreased for the high-school graduates and increased for the younger college graduates. Furthermore, the more highly skilled women experienced the steepest gain in wages regardless of their position in the distribution.

31 Schoeni	1998	Participation, annual hours, log weekly earning	Probit, OLS Key indep = education, ability to speak English.	1970, 1980, and 1990 US Censuses.	In 1970 there was little difference on the labour market outcome between migrant and US-born women. However, differences grew in the subsequent years. Relative to natives, migrant women's participation rate and weekly earnings (among working women) became lower, and their unemployment rates became greater.
32 Boden	1999	Self employment, employment status	Probit Key indep = educational attainment, profession	US Bureau of Census, Contingent Work Survey (WAS), February 1995 Current Population Survey (CPS).	Self-employment negatively associated with educational attainment and positively associated with profession and employment status (employed in wage sector and self-employed) positively associated with educational attainment and profession. Women with young children were more likely to be self-employed. Men's reasons for becoming self-employed showed little association with their parental status.
33 Hyslop	1999	Participation, participation outcomes	Linear probability, Static and Dynamic Probit All specification includes the unrestricted time effects, years of education, non-labour income.	1979-85 Panel Study of Income Dynamics	Fertility was correlated with women's unobserved tastes for work, and was not exogenous with respect to their participation decisions, if the dynamic structure of participation decisions was ignored. The effect of permanent non-labour income on participation decision was significant.

34 Solberg	1999	Natural logarithm of hourly rate of pay	Neumark/Cotton extension of Blinder/Oaxaca decomposition method of wage discrimination wage equation Key Inde = educational attainments, experience, labour market participation, occupational preferences	1991 US National Longitudinal Survey of Youth	Inclusion of occupational dummy variables in a human capital wage equation reduced the unexplained portion of the gender pay gap and reduced the estimated effect of market discrimination.
35 Mohanty	2000	Wages	Probit, OLS Key Inde = educational attainment, experience	1987 Current Population Survey	Employers hiring decision was positively influenced by workers' human capital endowments (education, experience). Blacks experienced a higher unemployment rates than whites.

3.0 Labour Market Participation

3.1 Introduction

In this chapter we analyse the labour market participation of NESB migrant women and draw a comparison with that of Australian-born women. Table 3.2 shows that based on the 1-percent sample of the 1996 Census, the participation for NESB women was 52.7 percent and 66.8 percent for Australian-born women. The models developed in this chapter investigate the extent to which this difference can be explained by a range of human capital and demographic variables.

In studies that analyse labour market participation probit and logit models are commonly used. In this study we use a probit model. It is unlikely that a logit model would produce results and insights different from those generated by a probit.[28]

3.2 The Probit Model

The probit model can be expressed as follows:

$$y_i^* = \beta_o + \sum_{j=1}^{k} \beta_j x_{ij} + u_i \qquad (3.1)$$

Here y_i^* is a "latent" variable that is not observed but determines an outcome. What we actually observe is a dummy variable y_i, which can be defined as $y_i = 1$ if $y_i^* > 0$ and 0 otherwise.

Here we assume the existence of an underlying latent variable that determines labour market participation for which we observe a dichotomous realization. For instance, if the observed dummy variable is whether or not the person is employed, y_i^* could be defined as "propensity or ability to find employment" (see Maddala, 1992, p. 327). In this example, the words "propensity" and "ability" are mentioned. The explanatory variables in (3.1) should explain both of these elements. Some of these explanatory

[28] To analyse labour market participation, authors such as Stier and Tienda (1992), Gensler and Walls (1997), Duraisamy (1994) and Lucich (1997) used probit models. Other researchers such as Gurak and Kritz (1996), Tienda and Glass (1985), Waddoups (1997) used logit models. Ultimately, the choice appears little more than being a matter of personal preference regarding whether we prefer to deal with the probabilities (probit) or the odds (logit) of an event occurring.

variables could be dummy variables used to model qualitative factors such as English proficiency, and others could be quantitative variables such as age. In (3.1), u_i is an error term that is assumed to be independently and normally distributed.

It is useful to note that multiplying y_i^* by any positive constant does not change the corresponding y_i. Hence if we observe y_i, we can estimate the β coefficients in (3.1) only up to a positive multiple. It is customary in probit models to assume var $(u_i) = 1$ which fixes the scale of y_i^*. From Equation (3.1) and calling the probability that an event of interest P_i, we obtain:

$$\begin{aligned} P_i &= Pr(y_i = 1) = Pr[u_i > -(\beta_o + \sum_{j=1}^{k} \beta_j x_{ij})] \\ &= 1 - F[-(\beta_o + \sum_{j=1}^{k} \beta_j x_{ij})] \end{aligned} \tag{3.2}$$

Here F is the cumulative normal distribution. The distribution of u_i is symmetrical because of the normality assumption, and hence $1 - F(-Z) = F(Z)$. Thus we can write the Equation (3.2) as follows:

$$P_i = F(\beta_o + \sum_{j=1}^{k} \beta_j x_{ij}) \tag{3.3}$$

Since the observed y_i are assumed to be realizations of a binomial process with probabilities given by Equation (3.2) and varying from trial to trial (depending on x_{ij}), we can write the likelihood function as:

$$L = \prod_{y_i=1} \prod_{y_i=0} P_i(1 - P_i) \tag{3.4}$$

Maximization of the likelihood function (3.4) is non-linear and we estimate the coefficients using LIMDEP software.

3.3 Data

In this study we use a data set of 8,508 NESB migrant women and 38,775 Australian-born women from the 1-percent sample of the 1996 Australian Census. We restricted the sample to women in the range 18-64 years of age even though females in the age range 15-17 and over 64 are potential and actual labour market participants. Whilst it is true that some in these ranges are active in the labour market, their numbers are relatively

small.[29] Summary statics for the variables used in the models that follow are shown in Table 3.2.

3.4 A General Model of Participation for NESB Women

Our general model for labour market participation (*PART*) can be expressed as:

$$\text{Prob}[PART] = f(English,\ Qualifications,\ Experience,\ Residency,\ Age,\ Marital\ Status,\ Children,\ Region) \quad (3.5)$$

In this model the probability that an individual will participate in the labour market is specified as a function of, English ability, level of educational qualification, labour market experience, period of residency in Australia (for NESB women), age, marital status, whether a woman has children and region of residence. The dependent variable, *PART* takes on the value 1 if a woman is in the labour market and 0 otherwise.[30] Because *PART* is binary, we are able to estimate this model using a binomial probit approach. Our justification for using these particular explanatory variables in the model is discussed in the next section.

In Section 3.7, we will estimate a corresponding model for Australian-born women's participation, in which the variables peculiar to NESB women are removed. In order to make meaningful comparisons between the impacts of particular variables on the probability of participation of both groups, we calculate estimated elasticities at the mean values of the independent variables.

Because this approach does not permit us to test for statistically significant differences, in Section 3.8 we estimate a model in which we pool the NESB and Australian-born women's data. In this model, we use an NESB intercept dummy variable to test whether there is a difference in the probability of participation between the groups that is independent of the variables in the model.[31] We also use slope dummy variables for all

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[29] The ABS 1996 Census of Population and Housing (Cat. 2020.0) suggested that approximately 91.44 percent of women in the 15-17 years range attended school, and 46.96 percent participated in the labour market as part-time or full-time employees. Of those who were 65 or more, only 3.15 percent were employees.

[30] A woman is in the labour market if she is an employee, an own account worker, a contributing family worker or not employed and looking for full-time or part-time work.

[31] *NESB* = 1 if a woman is of NESB, 0 otherwise.

variables that are relevant to both groups.[32] This will enable us to identify significant differences in the impacts of particular variables on the probability of participation between the groups.

It is worth noting before going on that there appears to be a wide variety of other explanatory variables that might impact on a woman's likelihood of participating in the labour market. One such variable might be whether some women find particular jobs for which they are qualified challenging and exciting but information of this type is not available. Despite the limitations of our data, we believe the census data is still capable shedding some light on the probability that an individual NESB woman's choice regarding participation (and status within the labour market) will be affected by her English proficiency, educational qualifications, labour market experience, period of residence in Australia and other control variables.

3.5 Determinants of Labour Market Participation

Economic theory often conceptualises women's labour supply decisions as being based on the allocation of time amongst homework, market work and leisure. A budget constraint ultimately leaves two choices for women's time: homework versus market work. To maintain certain levels of living standard, some women are forced to participate in labour market irrespective of their living arrangements, however some might make participation more imperative than others might.[33] Due to the limitations of the census data, we are not able to address interesting and important questions relating to these matters.

Confining ourselves to the census data we use a range of explanatory variables suggested by human capital theory, demographic factors and individual characteristics to explain women's participation in the labour market. The basis for using these particular variables is outlined next.

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[32] We interact each relevant variable with the NESB intercept dummy variable, for example *DEGREE* × *NESB*.

[33] For example, a young woman who studies and is supported by parents might be less likely to participate, whereas a more mature women who lives alone might be more likely to participate.

3.5.1 English Proficiency

English language proficiency is a factor that might influence an individual's prospects in the labour market. The human capital aspect of this variable is clear. Stier and Tienda (1992) and Evans (1984) used English proficiency as one of the independent variables in their labour market participation models. Stier and Tienda argued that English ability is an individual human capital resource endowment that directly influences the work behaviour of migrant women. Women with low proficiency in English will be less likely to enter the labour market than their (statistical) counterparts with greater levels of English proficiency. English ability is positively related to the probability of labour market participation amongst NESB migrant women.

Stier and Tienda used a single dummy variable to account for differences in English ability to examine how labour market participation of migrant women in the US was affected by this factor.[34] They found that poor English ability reduced the probability of participation by Mexican and Puerto Rican wives, although the negative effect for the latter was only marginally significant. Evans used a three level scale to model English proficiency.[35] She found that English skill had no significant effect on the labour market participation of any group. She conceded however that there were substantial measurement errors in the English skills variable.

Our reasons for including this human capital variable in this analysis encompass those of the previously mentioned authors and we hypothesize that there is a positive relationship between the English abilities of NESB women and labour market participation.

The effect of an English ability variable might occur in several ways. It seems clear that reasonably high levels of English proficiency are required in some jobs, particularly where oral communication is an important part of a job description or where attention

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[34] They coded 1 for does not know English well or at all, and 0 otherwise.

[35] The variable was 0 = "speaks English not well or not at all", 50 = "well", 100 = "very well". We point out that this approach implies that the effect of "very well" is exactly double the effect of "well" and seems unreasonable given the broadness of the definitions.

has to be paid to written information such as manuals and the like. The preferences of employers in jobs where it is important for employees to have good communication skills might cause some individuals who perceive that they have poor English abilities to be discouraged from seeking unemployment in any jobs. On the other hand, in some occupations, particularly those in secondary labour markets, poor English ability might not be an obstacle to employment.[36] Nevertheless because poor English abilities restrict labour market opportunities overall, we expect this variable to be important in determining the probability that an NESB woman will participate.

We use the categories of English used in the census for NESB persons and construct a dummy variable for each group. The categories are English spoken "very well" (*ENGVW*), English spoken "well" (*ENGW*), English spoken "not well" (*ENGNW*) and "others" (*EXCELLENT*). It should be pointed out that the individual concerned or some other member of the household does the assignment of NESB women to these particular categories so it is not clear that terms such as "well" and "not well" mean the same to different people.[37]

We assume that Australian-born women have English abilities that correspond with the "excellent" category of NESB women. Although it seems clear that there is some variation in this regard amongst Australian-born women, the census data does not enable us to explore the effects of this variable for this group. Nevertheless it is possible that an education variable might capture some of this effect.

The *a priori* signs of the coefficients of these dummy variables seem clear and that although some individuals with very poor English skills might participate in the labour market, having poor English skills restricts the job opportunities of such persons. Facing limited prospects of employment would lead to some persons to retreat from or never

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[36] Evans (1984) noted that many migrants reside in concentrated ethnic enclaves and largely speak ethnic languages and find employment within their ethnic communities with ethnically-based work groups. For example, a small business whose principal was say a Vietnamese migrant might be happy to or even prefer to employ other Vietnamese migrants and high levels of English ability might not be a major criterion.

[37] For example, some people whose English seems perfectly satisfactory to other people might specify "not well" because English is not his/her first language.

enter the labour market. Accordingly, when we use *EXCELLENT* as the reference group, we expect the coefficient of *ENGVW* to be negative but small, the coefficient of *ENGW* to be negative but larger, and the coefficient of *ENGNW* to be negative and larger still.

3.5.2 Educational Attainment

Education is an individual human capital resource endowment that has implications for opportunities and tastes for labour market activity. Evans (1984), Lucich (1997), Waddoups (1997) and Gensler and Walls (1997) used education as one of the independent variables in their models of labour market participation. They argued that the decision to seek work rises with the level of education because differences in educational attainment imply very different work opportunities for NESB migrant and Australian-born women. Accordingly, education is positively related to the probability of labour market participation of these groups.

All of these authors defined this variable as years of education, rather than educational levels. They found that labour market participation increased with each year of education *ceteris paribus*.

Human capital theorists have argued that education is an important human capital characteristic that leads to differences in individual productivity and we hypothesize that participation is positively associate with educational attainment. The model assumes that the more educated the individual is the more productive we should expect him/her to be and more education, therefore, increases the probability of an individual having the characteristics sought by employers. Those persons with meagre educational qualifications might not participate in the labour market if they believed that their lack of education would make them unlikely to secure employment. Whether or not low levels of education that might limit the prospects of employment in the primary sector of the labour market is not an issue in this chapter.

We note here that the so-called screening or signalling hypothesis claims that education has little direct effect on individual productivity. Instead the level of education reflects an individual's innate ability and productivity. Whether we accept human capital theory

or the screening hypothesis, we expect to observe a positive relationship between education and productivity, and hence labour market opportunities.

In some cases, the education that migrant women obtain in their countries of birth and bring to Australia is not easily transferable because they are not recognized by Australian accrediting agencies. When this occurs, they cannot participate in the Australian labour market in the manner that might have been possible in the country in which their educational qualification was obtained. This suggests that the relationship between the holding of a particular educational qualification, say a professional qualification, and the probability of participating in the labour market might vary according to the country in which the qualification was obtained. Nevertheless it seems likely that these differences might impact more on the type of employment obtained that participation *per se*.

We are not persuaded that the years of education of an individual is the most appropriate variable with which to model educational differences.[38] Instead we use levels of education as explanatory variables and create four educational dummies for possessing a degree (*DEGREE*), possessing a diploma (*DIPLOMA*), having a skilled vocational qualification (*SKILL*) and having a basic vocational qualification (*BAV*). We note that not all qualifications of a single type, say degrees, are unlikely to make individuals who hold them equally employable *ceteris paribus*, however whether employment is obtained in the primary or secondary sector, whilst important, are not relevant here. The Census data presents us with only very broad educational categories and we are unable to identify the difference alluded to here or the countries in which the qualifications were obtained.

When we use *BAV* as the reference group, the *a priori* signs of the coefficients of *DEGREE*, *DIPLOMA* and *SKILL* seem to be obviously positive, however their relative magnitudes are less certain. Those with little education might find limited job

[38] For example, 13 years of education (dropping out at the end of first year of a university course) seems no different from 12 years (complete secondary education) as far as labour market status is concerned.

opportunities and lead to some persons to retreat from or never enter the labour market. We are therefore unable to rank the coefficients having these variables.

3.5.3 Labour Market Experience

Labour market experience provides an index of human capital skills acquired on the job and labour market information acquired through working and represents an individual resource endowment that is likely to influence participation in the labour market. Lucich (1997), Waddoups (1997) and Gensler and Walls (1997) used experience as an independent variable in their labour market participation models. They argued that productivity is positively related to experience, and this raises the opportunity cost of non-participation, while increasing the benefits of entering the paid work force. Accordingly, they concluded that experience was positively related to the probability of labour market participation. Mincer (1962) and Killingsworth and Heckman (1986) noted that the importance of experience in determining labour market participation is well documented for both men and women, married and single.

Lucich used an experience variable that was full-time equivalent years of employment experience that took into account time out when women had children. She found a negative effect of experience on labour market participation of married Australian-born and NESB migrant women. Waddoups used years of potential experience and found that experience was positively related to the labour market participation of women in the US.[39] Gensler and Walls also used "potential experience" and found that experience had a positive impact upon participation of low-income females with children.

We also include experience as an independent variable because we are persuaded that that experience is a human capital endowment, which might increase probability of labour market participation amongst Australian-born and NESB women. A person with little or no experience might think that she would find difficulties in obtaining employment and as a result might not participate. On the other hand, individuals with a great deal of experience in many cases are already employed and participating, and

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[39] *Experience* = (Age - Education - 6)

others who are not employed at a particular time would know that their past experience would be likely to enhance their employment prospects and make them more likely to participate in the future.

Like educational qualifications, the experience that migrants bring to Australia might not be easily transferable due to variety of reasons, and in some cases those are not recognised. Hence, it seems possible that the effect of experience on labour market participation between NESB migrant and Australian-born women may differ. If this were so, it would be useful to know what proportion of the labour market experience of NESB women was obtained in Australia. The Census did not provide any useful information in this regard.

We define experience (*EXPERIENCE*) as 1996 (Census year) - mid-value of year of highest qualification completed.[40] We recognize that this measure is less than ideal because individuals will often have had time out of the labour market between completion of their highest qualification and the date of the Census, and some will had labour market experience prior to the completion of their highest qualification. However our approach appears to be the only means of measuring experience from the 1996 Census data and we believe that this measure enables us to distinguish those women with a large amount of labour market experience from those who have little.

The *a priori* sign of the coefficient of the experience variable seems to be obviously positive. Those who are presently working and gathering experience are very obviously participating, and those considering a return to employment would have better job opportunities that would make their return more likely.

3.5.4 Length of Residence in Australia

Stier and Tienda (1992) and Evans (1984) proposed that differences in the length of residency of migrants suggested differences in knowledge and resources needed to function in the labour market of the new country. Presumably, with the passing of time,

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[40] The Census shows the year of completion of the highest qualification of an individual.

migrants experience greater-opportunities to acclimate themselves to the labour market, which should translate into better prospects for securing employment: securing employment implies increased labour market participation with local and cultural knowledge of the labour market.

They used length of residency as an explanatory variable in their labour market participation models. They used three dummies for the length of residence of Hispanic migrant wives in the US that were less than 5 years, residency of 6 to 15 years and more than 15 years. They found that "new" Mexican migrants were more likely to enter the labour market compared to their counterparts who entered earliest, however those who entered between 1965 and 1974 were no more likely to participate than those who entered earlier.

Evans used years since arrival for those that had been in Australia for up to 35 years, and set the variable at 40 for those who live in Australia more than 35 years.[41] Evans found that residence in Australia had a positive impact on the participation of Mediterranean and North and West European women, but not for East European women.

We concur with the arguments of the abovementioned authors. With the passing of time migrants might adapt to local conditions that would tend to make them more useful to Australian employers. Further, they would probably gain more information about job opportunities. On the other hand, some migrants might arrive with meagre saving and for these people, immediate entry into the labour market could be a necessity and, indeed, this pressure could abate for some migrant women after the household unit has become more established in Australia. We also note that as time passes since migration, migrants might improve their proficiency in English, however we have attempted to use a direct measure of this variable.

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[41] For migrants who arrived more than 35 years ago, but were less than 40 years old had this variable set as their age in years.

In this study we also use the length of residence in Australia (*RIA*) as an explanatory variable. We define it as 1996 (census year) minus the mid-value of the year of arrival category in Australia used in the census. The *a priori* sign of the coefficient of this variable seems probably to be positive.

3.5.5 Age

Many authors such as Evans (1984), Brooks and Volker (1985), Tienda and Glass (1985), Stier and Tienda (1992), Evans and Saraiva (1993), Ross and Saunders (1993), Wooden and VandenHeuvel (1997) and Lucich (1997) used age as one of the independent variables in their models to explain women's labour market participation. Stier and Tienda used age as an individual resource endowment, reflecting opportunities and tastes for labour market activity. Tienda and Glass considered age as a proxy variable for "marketability of women" and argued that it is well established that age is correlated with labour market participation.[42] In describing the expected effect of age, Brooks and Volker (1985, p. 45) noted: "at older ages participation usually falls somewhat". Further, Brooks and Volker, Stier and Tienda, Evans and Saraiva, agreed that age has major influence in determining the degree of labour market participation. Evans (1988) has shown that Australian women's labour market participation began to drop sharply in their early 50s and fell further by their late 50s.

Migrants often come to Australia as young adults and children and the main waves of migration from particular countries were in different historical periods, so some migrant groups are relatively older than others. Stier and Tienda (1992) argued that age tends to differentiate labour market participation rates among migrant women along ethnic lines. From the above, it follows that no definite *a priori* sign is expected for age.

In their analysis Evans, and Stier and Tienda, Brook and Volker and Evans and Saraiva used age in years. Evans found that age was negatively related to Australian-born and NESB women's labour market participation so that older women were *ceteris paribus*

[42] It is observed from experience that certain jobs are given to women of some specified age group. For example, airhostess, sales girl's jobs are often given to younger women rather than older women and this might lead older women not to seek jobs of this type.

less likely to participate. Brooks and Volker found that age increased the probability of women's labour market participation. Tienda and Glass found age depressed the propensity of women (Black, Mexican, Puerto Rican and other Hispanics) to enter the labour market where they had husbands in their households.

Evans and Saraiva found that labour market participation was more differentiated by age in the most developed regions than the least developed regions in Brazil. The most striking difference was that older women in the least developed regions were more likely to participate in the labour market. Lucich used five dummies for age (15-24, 25-34, 35-44, 45-54 and 55-64) for Australian-born and migrant women, and found lower participation rates for young migrant and older Australian-born women. Wooden and VandenHeuvel used age as a categorical variable coded as dummies (15-19, 20-24, 25-34, 35-44, 45-54, 55-64) for NESB migrant and Australian-born married women's model of labour supply choices and found that likelihood of married NESB women participating in the labour market on a full-time basis compared with not participating fell with increasing age. Ross and Saunders (1993) used the mid-value of the years in age group as a variable as well as five dummies for age coded as dummies (15-24, 25-34, 35-44, 45-54, 55-64). After controlling for other variables, they found that the age profile of participation was very flat up to age forty-five, after which participation declined with age.

We are persuaded by the arguments of Evans, Stier and Tienda, and Lucich that an age variable is likely to explain some of the variation in labour market participation of both NESB women and Australian-born women. The effect of an age variable might occur in several ways: first, it might signal differences in economic needs in different phases of women's life cycles; second, it might signal differences in health and strength; and third, it might signal differences in attitudes towards work. Yet another factor might be a preference of some employers for particular age groups, so that if an individual perceives herself to be in the "wrong" group she might be less likely to seek unemployment.

Clearly, employers are more likely to offer jobs to persons with abundant skills than to other persons with lesser skills, and this is likely to encourage skilled persons to participate. Whilst age is to some extent correlated with the length of labour market experience, we use a separate variable to capture experience that might be regarded as a skills proxy.

We argue that a woman's board age group might be more relevant to her labour market status than age in years.[43] Accordingly we use three dummy variables: *YOUNG* (less than 24 years old), *MIDDLE* (more than 24 years and less than 46 years old, reference group) and *MATURE* (more than 46 years old).[44]

The *a priori* signs of the coefficients of these dummy variables are *not* manifestly certain because we have confined or sample to women between the ages of 18 and 64. Young women might be undertaking education while supported by their families, whereas others might elect to work part-time or full-time as students. Others, of course, might be rearing children as a full-time activity whereas some might be employees too. Much the same could be said of the 25 to 45 age group except that relatively few of these would be students. While some in the 46 to 64 age group may retire before the usual retirement age, this is more likely to be associated with health, attitudes and accumulated wealth than age *per se*.

3.5.6 Marital Status

Marital status is a family characteristic that might influence women's labour market behaviour. Mincer (1962), Evans (1984), Brooks and Volker (1985), Reimers (1985), Bean and Tienda (1987), MacPherson and Stewart (1989), Evans and Saraiva (1993), Waddoups (1997), Winkler (1998), Jacobsen (1999), Gray and Hunter (1999) and Hagan (2000) used a marital status variable to determine its effects on women's labour market participation. Generally, these researchers found that married women participated less than unmarried women in the labour market.

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[43] Whether a person is 20 or 22 years old seems to have little significance to employers, who might view both as "young".

Bean and Tienda suggested that married women were less likely to work than their statistical counterparts who were unmarried or with absent spouses. Brooks and Volker argued that husbands' incomes influenced the labour market participation of married women. While Mincer stressed the importance of women's wage rate and husbands' income as factors influencing the labour market participation of married women. Recently, Winkler suggested that many married women entered the labour market primarily in response to women's rising labour market opportunities, rather than in response to declining job opportunities for their husbands. Eccles (1982) observed that the family responsibilities of married women in Australia appeared to be an important constraint on their labour market participation.

Brooks and Volker pointed out that women often work as secondary workers in female-demanding industries where flexibility of working hours often exists. Gray and Hunter suggested that for females, being married, widowed, divorced, and separated significantly reduced the rate of labour market participation. On the contrary, Jacobsen indicated that the rise in the divorce rate in the US since 1960 provided another explanation for why female labour market participation increased. Divorce tends to reduce life time "unearned" income for women, thus increasing need for "earned" income. In this respect, Reimers, and MacPherson and Stewart observed that the relationship between labour market participation and marital status varied according to countries of origin. Accordingly, the direction of the relationship between marital status and market participation amongst migrant and Australian born women is uncertain.

Being widowed, divorced or separated appears to significantly reduce the rate of labour market participation. Women in those groups are often eligible for supporting parents' benefits or widow's pensions. On the other hand, sometimes being divorced reduces the lifetime "*unearned*" incomes of women, thus increasing the need for these women to seek earned income and therefore labour market participation.

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[44] These boundaries are arbitrary but nevertheless seem reasonable. Sensitivity analysis suggests that different boundaries would not produce different general outcomes.

Ethnicity could also play an important role for women's participation in the labour market, because of differences in language, culture, and possession of modern work skills. In this respect, Reimers and MacPherson and Stewart observed that the relationship between labour market participation and marital status varied according to their country of origins.

Evans used a single dummy variable for marital status and found being married had negative effect on labour market participation for Australian-born and NESB women. Brooks and Volker included marital status as three dummies (married, never married and others). They found that other (separated, widowed and divorced) females appeared more likely not to participate than married women, while the opposite applied to single women, for migrants and Australian-born women. Waddoups used four dummies for marital status (widowed, divorced, separate and ever married) and found that being divorced or separated compared with ever married were positively related to labour market participation. Jacobsen used two dummies for marital status *SINGLE* (never married) and *MARRIED* (spouse present), and found that single women participated more than married women. Hagan used one dummy for marital status and found that Australian women who were currently married had a greater probability of participating in a full-time job compared with single persons. Evans and Saraiva used five dummies (married, single, companheira,[45] separated and widowed). They found that single women were much more likely than married women to participate in the labour market in Brazil. On the other hand, the participation rate for widowed, separated, and companheira fell between these two groups.

There are of course many forms of relationships other than marriage and indeed some whose official status is "married" may be living otherwise such as being single. In short, there should be no presumption that a married woman has a spouse that supports her. Nevertheless it is likely that the majority of married women do cohabit with a spouse and that household income is the focus of labour market activity. If a husband's income

[45] Women in consensual unions.

is high and the spouse might not seek to join in the labour market and concentrate family matters. On the other hand, if a husband's income is low and insufficient to meet consumption requirements then she may participate in the labour market.

Women, who are not married, widowed, divorced or separated and who do not have any family responsibilities might be more likely to participate in the labour market. Being a "single" they might need to work to maintain themselves and this should increase the likelihood of participation in the labour marker *ceteris paribus*. On the basis of these theoretical considerations, it seems apparent that marital status is an important determinant for women's labour market participation.

Like Evans, we use only one dummy *MARRIED*, rather than using many dummies for widowed, divorced, separated and so on. It should be noted that so-called "family responsibilities" of married women differ very understandably between individuals, nevertheless our concern is with the average situation of married women in the labour market status *vis-à-vis* other women.

The *a priori* sign of the coefficient of this dummy variable seems to be obviously less certain now than it might have been 50 years ago. We classify it as being perhaps negative.

3.5.7 Presence of Children

The number of children is another family characteristic that might influence directly women's labour market participation. To determine the effects of number of children in labour market participation, Miller and Volker (1983), Evans (1984), Tienda and Glass (1985), Brooks and Volker (1985), MacPherson and Stewart (1989), Stier and Tienda (1992), Waddoups (1997), Lucich (1997), Jacobsen (1999), Wooden and VandenHeuvel (1997), Evans and Lukic (1998) and Hagan (2000) argued that the presence of children influences the labour market participation of women. Brooks and Volker (1985) and Miller and Volker (1983) proposed that having children produced a strong disincentive to supply labour for paid employment. This is because their presence (especially that of young children) could increase demands for women's time in home production.

Mincer (1962) and Cain (1966) have emphasized the effect of monetary considerations on a wife's decision to work. When there are young children in the home, however, Mincer argues that the income effect is stronger and the wage effect weaker than when there are none. Young children in the home have this effect because according to Cain, prevailing standards of care for children make it difficult and often expensive to find acceptable substitutes for parental care. It is more difficult for a family to arrange care for young children than it is to purchase substitutes for the house cleaning, laundry or home cooking services a wife often provides if she is not employed.

Hagan argued that the likelihood of female participation is significantly and inversely related to the number of dependent children. He suggested that in 1991, the probability of female full-time participation in the labour market in Queensland declined by 2.8 percent with each additional dependent child; however, this probability had risen to 5.9 percent by 1996. Brooks and Volker, Miller and Volker, and Hagan agreed that the probability of female labour market participation usually fell with the number of young children. Accordingly, the number young children are expected to be negatively, related to the labour market participation for women. On the other hand, MacPherson and Stewart argued that the effect of presence of children on the labour market participation decision may vary across ethnic origins because child-rearing preferences and household production functions may vary across the countries of origin. Bowen and Finegan (1969) reported that presence of small children did not have the same inhibiting effect on the labour market participation of married black women as it did for married white women in the US. Evans also reported that in Australia, childbearing appeared much more consequential in some migrant groups than in others. The above arguments suggest the presence of children varies among countries of origin and might have different effects on the participation decisions of women.

Evans and Waddoups used the number of children ever born as their variable. They found that each additional child decreased the probability of labour market participation of mothers. Stier and Tienda included the presence of children as trichotomous dummies

defining the groups as having children aged less that 6 years, having children aged 6-17 years and older or no children present. They found that young children emerged as the main constraint on the market activity of US-born wives, but not for migrants. Lucich used three variables for children (number of dependent children aged 0-4, 5-9, and 10 years and over). She found that presence of children less than 10 years significantly reduced the probability of participation in the labour market for both NESB migrant and Australian-born women.

Jacobson included the presence of children in four ways: married by age of youngest, number of children under the age of 18, the number aged 6-17 and the number aged under 6. She found that the participation rate among married women with children under age 18 was greater than among married women with no children less than 18 years. Tienda and Glass used one dummy for presence of children (children under 6) and found that female heads of households with minor children participated more in the labour market than married mothers. MacPherson and Stewart included four variables for children: number of young children, children aged less than 5, children aged between 6 and 13, and children aged between 14 and 17. They found that having children aged 0-5 and 6-13 were negatively associated with participation, and having children aged 14-17 was positively associated with labour market participation for married female migrants in the US.

Miller and Volker used the presence of children aged less than 15 years and living at home for married women in Australia. They found that the effect of bearing two or more children on the probability of participation in the labour market was inversely related to the wage and participation rates, but positively related to the husband's wage. Brooks and Volker used the presence of children as number of children less than 15 years of age in the primary household. They also used dummies for age of youngest child (less than 2, 2-5, 6-15 and 15 years and over) and found that the age of the youngest child had the greatest influence on female participation.

Hagan included the presence of dependent children aged less than 14 years, and found that this was positively related to male participation and inversely related to female participation. Wooden and VandenHeuvel used dependent children aged under 15 years and found that NESB married women with children were more likely to participate in the labour market on a full-time basis than their Australian-born counterparts, even though they were generally less likely to participate. Evans and Lukic used two variables for children: number of children aged 0-5 and 6-18 for migrant groups. They found that all groups (Yugoslavs, Italian and Greeks) experienced a declining women's participation rate when women had children, but these varied considerably between groups.

Like the abovementioned authors, we hypothesize that the number of children of a woman is likely to be a key family characteristic that influences the probability of a woman's labour market participation. We do not argue that women who have young children should not participate in the labour market, however our model accommodates the proposition that when women do have children there is an impact on the probability of participation in the labour market. Some women may retreat from the labour market to care for their children whereas others might find that the costs of rearing children make them more likely to seek employment.

Like Evans and Waddoups we use only one dummy for the presence of children (*CHILD*). It seems unlikely that the number of children provides much additional information because whether a woman has one or more children the demand for home production of child-rearing service seems little affected. A further reason for taking this approach is that the Census only provides the number of children in the households, but not by their ages.

The *a priori* sign of the coefficient of this dummy variable seems probably to be negative. Although many mothers continue to work part-time or full-time, others do not. It is possible that some mothers might be forced into the labour market because the costs of raising children.

3.5.8 Place of Residence

The place of residence is a geographical characteristic that directly influences the individual's labour market activity. Residence in different geographical areas implies different work opportunities. To examine the effects of place of residence on labour market participation, Miller and Volker (1983), Evans (1984), Brooks and Volker (1985), Miller and Volker (1983), Evans and Saraiva (1993) and Waddoups (1997) used the place of residence as one of their independent variables in their labour market participation models. They proposed that the place of residence constituted a major influence at work in determining the degree of labour market involvement. Evans and Saraiva argued that urban or rural residence is important to many aspects of life in Brazil. It is clear from above discussion that place of residence is likely to have a significant impact on women's participation in the labour market.

Evans used one dummy for rural residence and found that living in a rural area had a negative effect on labour market participation for Third World, East Europe, North-West Europe migrants and English speaking lands except native born and Mediterranean women. Waddoups also used one dummy for Metropolitan Statistical Areas (MSA) and found that residence outside a MSA reduced the probability of participation in the labour market.

Brooks and Volker used two dummies (other urban and rural) and found that women in rural areas participated more than other women. Miller and Volker used the percent of all females residing in dwellings on rural holding and found that women resided in rural areas were more likely to participate. This finding was consistent with the findings of Jones (1981) who pointed out that an unexpectedly large number of rural women recorded in the census were in the labour market. Evans and Saraiva used two dummies (rural and urban) and found that rural women were slightly more likely to be in the labour market in all rural areas of Brazil.

We include a location of residence variable in our models because we believe that the geographical location of an individual can affect the probability of labour market

participation. Clearly, living in metropolitan areas increases the opportunities for women's employment and many young people raised in the country move to metropolitan areas for that reason.[46] Some of those who are unwilling or unable to migrate to metropolitan areas and are unable to secure satisfactory employment in the country might withdraw from the labour market. On the other hand, it is possible that some individuals in the age range we have focused on and who worked in a metropolitan area, might choose to retreat from the labour market by taking "early retirement" and move to non-metropolitan areas.

We use one dummy to describe residence in a metropolitan area (*CITY*).[47] The majority of Australian-born women live in metropolitan areas.[48] Hugo (1994) pointed out that Australia's migrants are overwhelmingly concentrated in the metropolitan areas. In addition to their numerical contribution to city growth, migrants have greatly enriched the life of metropolitan areas adding a greater diversity of life style, cultures, eating habit, and entertainment. Miller and Volker (1983) argued that there was no strong theoretical reason to attach particular prior location variables for overseas-born women. They found, however, that women who were born overseas and married to overseas-born men were more likely to participate in the labour market than Australian-born women. Further, Webber *et al.* (1992) suggested that overseas-born women were more

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[46] For example, the unemployment rate for females in Woolongong Statistical Region was 6.2 percent compared to 3.6 percent in Inner Sydney and Inner Western Sydney in May 2001.

[47] The 1996 1-percent unit record file provides only 41 regions of usual residence (excluding no usual address, and overseas visitors) at census night. Only major metropolitan areas are shown in that list, but many large regional cities are excluded from that list, which are classified as rural. Because of the limitation of the 1996 census data, in this study we define metropolitan areas in Australia as follows: Inner Sydney and Eastern Suburbs, ST George-Sutherland, Canterbury-Banks town and Fairfield-Liverpool, Outer South Western and Outer Western Sydney, Inner, Western and Central Western Sydney, Blacktown-Baulkham Hills, Outer Western Melbourne, North Western and Inner Melbourne, North Eastern Melbourne, Inner Eastern Melbourne, Southern Melbourne, Outer Eastern Melbourne, Brisbane City Inner Ring, Brisbane City Outer Ring, South and East BSD Balance, North and west BSD balance, Northern Adelaide, Western and Eastern Adelaide, Southern Adelaide, Central and East Metropolitan, North Metropolitan, and South Metropolitan.

[48] Evans (1984) indicated that only 15 percent of all Australian-born persons resided in rural areas, whereas only 4-10 percent of migrants did. The 1996 ABS Census of Population and Housing data shows that 12.4 percent of total Victorian population resides in rural areas, whereas only 3.9 percent of all NESB migrants live in these areas. This might be because NESB women in rural areas face many problems, due to lack of established institutions of ethnic network and English language proficiency. Beaumont (1974) stresses the geographical imbalance in the distribution of labour in an examination of the comparatively high unemployment rate amongst women in non-metropolitan areas.

highly segregated in manufacturing employment than either Australian-born women or overseas-born men, but there are not many manufacturing industries in rural areas.

Moreover, women's choice of jobs is sometimes geographically restricted, since their decisions might be affected by the circumstances of partners. As suggested by Inglis and Stromback (1986), migrants who do not belong to an established ethnic group in Australia may lack the informal contracts that facilitate job search. NESB women are more likely to find these facilities if they live in a metropolitan area where migrants are often concentrated.

The NSW Government's Action Plan 2000-2002 indicated that the project, which has a particular focus on women from NESB backgrounds, has sought to enhance the understanding of specific employment-related disadvantage facing women in rural, regional and remote communities. For the reasons outlined above, we use a metropolitan area residence dummy variable (*CITY*) in our model. The *a priori* sign of the coefficient of this dummy variable seems almost certainly to be positive.

3.6 The Model of Participation of NESB Women

The following general model based on Equation (3.6) is used to analyse the NESB migrant women's participation in the labour market.

$$\begin{aligned} PART_i^* = \alpha &+ \beta_1 ENGVW_i + \beta_2 ENGW_i + \beta_3 ENGNW_i \\ &+ \beta_4 DEGREE_i + \beta_5 DIPLOMA_i + \beta_6 SKILL_i \\ &+ \beta_7 EXPERIENCE_i + \beta_8 RIA_i + \beta_9 YOUNG_i \\ &+ \beta_{10} MATURE_i + \beta_{11} MARRIED_i + \beta_{12} CHILD_i \\ &+ \beta_{13} CITY_i + \varepsilon_i, \end{aligned} \tag{3.6}$$

In this model, dependent variable $PART_i^*$ is a latent variable such that $PART_i = 1$ if $PART_i^* > 0$ and 0 otherwise. The error term, ϵ_i is assumed to be normal and the explanatory variables are defined in Table 3.1.

We used a general to specific modelling approach in estimating Equation (3.6). The general model was estimated using the data set for 8,508 NESB women. The estimated

parameters of the general model are shown in Table 3.3, which indicates that most of the explanatory variables are significant except the *ENGVW*, *MARRIED*, *MATURE* and *DIPLOMA* dummies. The estimated coefficients of all explanatory variables have the expected signs. We then deleted the variables that performed poorly to estimate a parsimonious model.

The results obtained from the general version of Equation (3.6) were not entirely satisfactory. The variables *MATURE*, *ENGVW*, *MARRIED*, *DIPLOMA* did not yield significant results at reasonable decision levels. Nevertheless there seemed strong *a priori* grounds for persisting with these variables. For this reason, we created several interaction variables using these variables to investigate whether, for example, the effect of the presence of children might have different effects on labour market participation for women of different ages. As a further example, the effect of being married might depend on whether or not a woman has children. Accordingly, we augmented the parsimonious model with several interaction variables to produce a preferred model.

We investigated a range of interaction variables and found that several interactions were significant and had coefficients with credible signs. They were (i) "mature" age status with marital status, (ii) "mature" age status with the presence of children, (iii) "middle" age status with marital status, (iv) "middle" age status with marital status and with the presence of children and (v) marital status with the presence of children. Our preferred model, which includes these interaction variables, is also shown in Table 3.3.

In Sections 3.6, 3.7 and 3.8, we restrict our observations concerning the coefficients, p-values and elasticities evaluated at the means of the dependent variables, to the preferred models. The same statistics for the corresponding general models are also shown in Tables 3.2, 3.3 and 3.4.

The null hypothesis that all the coefficients in the estimated model are jointly equal to zero was rejected using a likelihood ratio test.[49] The coefficient of determination (R^2)

[49] $\chi^2_{18} = 1143.148$ [0.00].

was 0.124 and can be considered as reasonable fit for models of this type. The model's percentage of correct predictions was 64.9 percent, which was a considerably greater ratio than chance predictions would produce.

3.6.1 English Proficiency

The coefficients of the variables designating speaking English "well" and "not well" compared with "excellent" English were both negative and significant (and were respectively -0.288 and -0.465) This suggested that those NESB women who speak better English were more likely to participate in the labour market. Our results are consistent with human capital theory predictions and supports the view that some NESB women might be so disadvantage by their lack of English skills that they retreat from or fail to enter the labour market.

Our results accorded with those of Stier and Tienda (1992) for Hispanic migrant women workers in the US. Our results however are in contrast with Evans (1984) who was unable to show that English skills had a significant effect on the labour market participation of migrant women. Our findings for the language variables suggested that acquiring better English skills might enable NESB women to have better employment prospects that could increase their probability of participation in the labour market.

3.6.2 Educational Attainment

The differential effects of possessing a degree, a diploma or a skilled vocational qualification compared to having a basic vocational qualification all yielded positive and significant results. This suggested that by obtaining some form of higher education or a skilled vocational qualification, NESB women might increase their prospects of acquiring a good job and thereby increasing the probability of participation in the labour market. These results are consistent with the findings of Evans (1984), Lucich (1997) and Bean and Tienda (1987).

3.6.3 Labour Market Experience

The coefficient of experience variable was positive and significant. This is consistent with human capital theory that suggests that employees can obtain experience through

on the job training that raises their productivity and employment prospects. Mincer and Polachek (1974) argued that experience is related to productivity and wages so that experience also raises the opportunity costs of not participating.

Our finding was in accord with that of Duraisamy (1994), who found that work experience of women in Madras (India) increased the probability of participation in labour market. However, our result did not agree with Lucich (1997) who found a negative and insignificant coefficient for this variable, perhaps because of using unconvincing estimate values of experience variable.

3.6.4 Length of Residence in Australia

The coefficient of residence in Australia dummy was positive and significant, which suggests that the probability of participation in the labour market by NESB women increases as their time since arrival in Australia increases. This is consistent with the findings of Inglis and Strombak (1986), but tends to contradict Long (1980) and Martin (1984).

3.6.5 Age

The coefficient of *YOUNG* was negative and significant, and suggests that that being a NESB woman in the range 18 to 24 years old reduces the probability of participation in the labour market compared with being in the 25 to 45 group (reference group). This is consistent with the proposition that many of the young people are still studying and not participating in the labour market. This finding is also consistent with Lucich (1997) and Malveaux (1999) who found that particular groups of young women were less likely to participate.

The coefficient of *MATURE* was also negative and significant. This implies that the probability of participation for older NESB women was less than in the 25 to 45 year age group. This is consistent with the proposition that "mature" aged women are less likely to seek employment because of a lesser demand for consumption. It is consistent with Malveaux (1999) who found that the participation rate of black and Latino women aged between 55 to 64 years were smaller in the US. However, our result contrasts with

Gurak and Kritz (1996) who found that the participation of Dominican women in New York was greater for older women.

3.6.6 Marital Status

The coefficient of the married variable for NESB women was positive and significant. This suggests that NESB married women are more likely to participate in the labour market *ceteris paribus*. Our result accords with that of Jacobsen (1999) who found that among White women in the US, labour market participation was substantially greater for married women. Our finding contrasts with that of Evans (1984), who found that having a husband decreased the probability of participation of NESB women.

3.6.7 Presence of Children

The coefficient of the presence of children variable was negative and significant suggesting that NESB women were less likely to participate in the labour market if they had children. This was consisting with the findings of Lucich (1997), and Waddoups (1997).

3.6.8 Interaction Variables Containing Age

The coefficient of the "mature" aged and married interaction variable was also negative and significant.[50] This finding is consistent with the proposition that "mature" married women could have lesser economic needs that would require them to work in paid employment, and might therefore be less likely to participate in the labour market. This contrasts with the finding of Lucich (1997) who found that being married and "mature" aged increased the probability of participation.

The coefficient of the interaction of the "mature" aged and presence of children variable was positive and significant, however when taken together with the coefficients of *MATURE* and *CHILD* the combined effect was negative.[51] Being "mature" aged and having a child appeared to decrease the probability of labour market participation, and is

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[50] Being "mature" and married had an effect of -0.778 (*MATURE*) + 0.420 (*MARRIED*) - 0.814 (*MATURE*MARRIED*) = -1.172.

[51] Being "mature" and having a child had an effect of -0.778 (*MATURE*) - 0.800 (*CHILD*) + 0.698 (*MATURE*CHILD*) = -0.880.

consistent with the proposition that these particular NESB women might be more likely to be home-makers, *ceteris paribus*. This result contrasts with Gurak and Kritz (1996) who found that the participation of Dominican women in New York was greater for "mature" aged women who had children.

The coefficient of the marital status and "middle" aged interaction variable was negative and significant, and when taken together with the coefficient of the variable *MARRIED*, the combined effect was also negative.[52] Being "middle" aged and being married appeared to decrease the probability of labour market participation, and is consistent with the proposition that these particular NESB women, like the previously mentioned group, might be more likely to be home-makers, *ceteris paribus*.

The coefficient of the interaction of the "middle" aged with the presence of children variables was positive and significant, however when taken together with the coefficient of the variable *CHILD*, the combined effect was negative.[53] This is consistent with the proposition that "middle" aged NESB women might have family responsibilities with children that decreased their likelihood of participation in the labour market.

The coefficient of interaction of the "middle" aged, marital status and having a child variables was negative and marginally significant, however when taken together with the coefficients of *MARRIED* and *CHILD* the combined effect was negative.[54] This finding is in contrast with the earlier studies by Storer *et al.* (1976) and Alcorso and Harrison (1993) who found that the participation rate was very high for migrant women workers who were married and had children.

3.6.9 Interaction Variables Containing Presence of Children

The coefficient of the interaction of the married with the presence of child variables was positive and significant, however when taken together with the coefficients of the

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[52] Being "middle" and married had an effect of 0.420 (*MARRIED*) - 0.550 (*MIDDLE*MARRIED*) = -0.13.
[53] The effect of being "middle" aged *and* having at least one child had a combined coefficient of -0.800 (*CHILD*) + 0.299 (*MIDDLE*CHILD*) = -0.501.
[54] Being "middle" aged and having at least one child had an effect of 0.420 (*MARRIED*) -0.800 (*CHILD*) - 0.211 (*MIDDLE*MARRIED*CHILD*) = -0.591.

variables *MARRIED* and *CHILD*, the combined effect was almost zero.[55] This indicated that the probability of participation was little affected by being married and having children, *ceteris paribus*. This result is consistent with the proposition that being married and having children might increase the probability of participation due to greater consumption. This result also agrees with the finding of Martin (1984) who suggested that the majority of migrant workingwomen in Australia were married and had young children.

3.6.10 Place of Residence

The coefficient of *CITY* was positive and significant. This is consistent with our proposition that living in a metropolitan area increased the probability of participation because of the greater job prospects. The results accorded with those of Waddoups (1997) and Evans (1984).

3.7 Model of Participation of Australian-Born Women

In this section, we examine Australian-born women's participation in the labour market also using a probit model. We estimate the following general probit model based on Equation (3.6) to analyse the labour market participation of the Australian-born women workers.

$$\begin{aligned} PART_i^* = \alpha &+ \beta_1\, DEGREE_i + \beta_2\, DIPLOMA_i + \beta_3\, SKILL_i \\ &+ \beta_4\, EXPERIENCE_i + \beta_5\, YOUNG_i + \beta_6\, MATURE_i \\ &+ \beta_7\, MARRIED_i + \beta_8\, CHILD_i + \beta_9\, CITY_i + \varepsilon_i \end{aligned} \qquad (3.7)$$

This model is similar to the model shown in Equation (3.6) except the English ability and residence in Australia variables that are not applicable for Australian-born women and were excluded. The reasons for including the remaining variables are the same as those outlined for NESB women.

Again, we used a general to specific modelling approach in estimating Equation (3.7). The model was estimated using 38,775 cases for Australian-born women. The estimated parameters of Equation (3.7) are shown in Table 3.4, which indicates that all of the

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[55] Being married *and* having at least one child had an effect of 0.420 (*MARRIED*) -0.800 (*CHILD*) +

explanatory variables were significant and the coefficients have the expected signs, excepting the variable *MARRIED*.

Because the coefficient of the marital status variable contradicted the more likely *a priori* sign and for this reason we again investigate whether this variable has any significant effect when considered as an interaction effect with other variables. After producing a parsimonious version of Equation (3.7), we augmented the model with the same interaction variables for the model of Australian-born women that we used for NESB women to produce a preferred model. The estimated parameters of our preferred model are also shown in Table 3.4.

In our preferred model, the null hypothesis that all the coefficients are jointly equal to zero was rejected by a likelihood ratio test.[56] The coefficient of determination was 0.116, which can be expected for this type of model. The model's percentage of correct predictions was 68.8 percent, which is a reasonably high ratio.

3.7.1 Educational Attainment

The coefficients of the education variables *DEGREE*, *DIPLOMA*, and *SKILL* are 0.587, 0.465 and 0.103 and are significantly different from zero. This implies that the probably that an Australian-born woman participates the labour market for Australian-born women is, *ceteris paribus*, greatest for those with university degrees, a little less for those with diplomas and less again for those with a vocational skills qualification. This result is consistent with human capital theory and accords with those of finding of Lucich (1997), Evans (1984), Buchinsky (1998) and Gensler and Walls (1997).

3.7.2 Labour Market Experience

Lengthier experience is positively and significantly associated with the probability of participation in the labour market. This is also consistent with human capital theory and suggests that the acquisition of on-the-job informal training leads these women to be

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0.383 (*MARRIED*CHILD*) = 0.003.

[56] $\chi^2_{14} = 4929.487$ [0.000].

more highly sought by employers and make them more likely to participate. This result accords with Gensler and Walls (1997) and is in contrasts with Lucich (1997).

3.7.3 Age

The Table 3.4 shows that the coefficient of *YOUNG* was negative and significant, and suggests that that being an Australian-born woman in the range 18 to 24 years old reduced the probability of participation in the labour market compared with being in the 25 to 45 group.

The table also shows that the coefficient of *MATURE* was negative and significant. This suggests that that being an Australian-born woman in the range 45 to 64 years old reduced the probability of participation in the labour market compared with being in the 25 to 45 year age group.

3.7.4 Marital Status

The coefficient of the married variable for Australian-born women was positive and significant.

3.7.5 Presence of Children

The coefficient of the dummy variable for the presence of children was negative and significant indicating that the probability of participation in the labour market by Australian-born women was less if they had children, *ceteris paribus*. This is consistent with Buchinsky (1998) and Hyslop (1999) who observed similar relationships in the US.

3.7.6 Interaction Variables containing Age

The coefficient of the "mature" aged and married interaction variable was negative and significant, and when taken together with the coefficients of the variables *MATURE* and *MARRIED* the effect was also negative.[57]

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[57] Being "mature" aged and married had an effect of -1.047 (*MATURE*) + 0.246 (*MARRIED*) - 0.299 (*MATURE*MARRIED*) = -1.100.

The coefficient of the interaction of the "mature" aged and presence of children variables was positive and significant, however when taken together with the coefficients of *MATURE* and *CHILD* the combined effect was negative.[58]

The coefficient of the married and "middle" aged interaction variable was negative and significant, and when taken together with the coefficient of *MARRIED* the combined effect was negative but small.[59]

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The coefficient of the interaction of the "middle" aged with the presence of children variables was positive and significant, however when taken together with the coefficient of *CHILD*, the combined effect was negative.[60]

3.7.7 Interaction Variables containing Presence of Children

The coefficient of the interaction of the married with the presence of a child was positive and significant, however when taken together with the coefficient of *MARRIED* and *CHILD* the combined effect was negative.[61]

3.7.8 Place of Residence

The estimated coefficient of *CITY* was positive and significant and indicates that the probability of participation in the labour market for Australian-born women is greater if they live in a metropolitan area, *ceteris paribus*. This is consistent with the proposition that living in a metropolitan area increases the probability of labour market participation because of the greater availability of jobs in metropolitan areas.

3.8 A Comparison of NESB and Australian-born Women's Participation

The following general model based on Equation (3.6) is used to analyse the NESB migrant women's participation in the labour market.[62]

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[58] Being "mature" aged and having at least one child had an effect of -1.047 (*MATURE*) - 1.370 (*CHILD*) + 1.418 (*MATURE*CHILD*) = -0.999.

[59] Being "middle" aged and married had an effect of 0.246 (*MARRIED*) - 0.256 (*MIDDLE*MARRIED*) = -0.010.

[60] Being "middle" aged and having a child had an effect of -1.370 (*CHILD*) + 0.530 (*MIDDLE*CHILD*) = -0.840.

[61] Being married *and* having a child had an effect of 0.246 (*MARRIED*) -1.370 (*CHILD*) + 0.530 (*MARRIED*CHILD*) = -0.594.

$$
\begin{aligned}
PART_i^* = \alpha &+ \lambda\, NESB_i + \beta_1\, ENGVW_i + \beta_2\, ENGW_i + \beta_3\, ENGNW_i \\
&+ \beta_4\, DEGREE_i + \gamma_4\, DEGREE_i \times NESB_i \\
&+ \beta_5\, DIPLOMA_i + \gamma_5\, DIPLOMA_i \times NESB_i \\
&+ \beta_6\, SKILL_i + \gamma_6\, SKILL_i \times NESB_i \\
&+ \beta_7\, EXPERIENCE_i + \gamma_7\, EXPERIENCE_i \times NESB_i \\
&+ \beta_8\, RIA_i + \gamma_8\, RIA_i \times NESB_i \\
&+ \beta_9\, MATURE_i + \gamma_9\, MATURE_i \times NESB_i \\
&+ \beta_{10}\, MARRIED_i + \gamma_{10}\, MARRIED_i \times NESB_i \\
&+ \beta_{11}\, CHILD_i + \gamma_{11}\, CHILD_i \times NESB_i \\
&+ \beta_{12}\, CITY_i + \gamma_{12}\, CITY_i \times NESB_i + \varepsilon_i
\end{aligned}
\tag{3.8}
$$

3.8.1 Unspecified Differences

In the pooled data model shown in Table 3.5, the coefficient of the intercept dummy variable *NESB* is significant and negative. This suggests that after controlling for the human capital and demographic variables in the model, NESB women were less likely than Australian-born women to participate in the labour market.

3.8.2 Educational Attainment

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of the education variables *DEGREE*, *DIPLOMA*, and *SKILL* are significantly different from zero. A comparison of the elasticities evaluated at the means of these variables suggests little difference between the impacts of having a degree on the probability of participation for NESB and Australian-born women (0.208 and 0.207 respectively). On the other hand, the models suggest that the impacts of having a diploma had a lesser effect on the probability of participation for NESB and Australian-born women (0.112 and 0.164 respectively). In addition, the models suggest that the impacts of having a vocational skill qualification had a greater effect on the probability of participation for NESB than for Australian-born women (0.066 and 0.036 respectively).

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[62] *RIA* is not included in this model because when it is large, it has almost the same effect of being Australian-born. We believe that the intercept dummy will capture any effects for recent arrivals.

Although the elasticities are almost identical in the separate models for the effect of having a degree, the pooled data model shown in Table 3.5 suggests otherwise. The variable *DEGREE*NESB* is significant and its coefficient is negative, which suggests that whilst the possession of a degree makes NESB women more likely to participate, the effect is greater for Australian-born women.[63] The variable *DIPLOMA*NESB* is also significant and its coefficient is negative, which suggests that whilst the possession of a diploma makes NESB women less likely to participate, the effect is greater for Australian-born women.[64] The variable *SKILL*NESB* is not significant, which suggests that whilst the possession of a vocational trade qualification has the same positive impact on the probability of participation for NESB and Australian-born women.

Although there is some evidence that the impact of having educational qualifications falls unevenly between the groups, there is clear evidence that they increase the probability of participation in the labour market for both groups. The models provide some support for the hypothesis that the effects of having a degree or diploma are less for NESB women than for Australian-born women.

3.8.3 Labour Market Experience

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of the labour market experience variable *EXPERIENCE* are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of having additional experience had a greater effect on the probability of participation for NESB than for Australian-born women (0.007 and 0.004 respectively).

In the pooled data model shown in Table 3.5, the variable *EXPERIENCE*NESB* is marginally significant and its coefficient is positive, which suggests that whilst the

[63] The effective coefficient for NESB women is 0.456 and 0.586 for Australian-born women.
[64] The effective coefficient for NESB women is 0.442 and 0.465 for Australian-born women.

possession of additional experience makes NESB women more likely to participate, the effect is less for Australian-born women.[65]

3.8.4 Age

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *YOUNG* are significantly different from zero and are negative. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being 18 to 24 years old reduced the probability of participation in the labour market compared with being in the 25 to 45 group, and the impact was greater for NESB women than for Australian-born women (-0.253 and –0.035 respectively).

In the pooled data model shown in Table 3.5, the variable *YOUNG*NESB* is significant and its coefficient is negative, which suggests that being 18 to 24 years of age makes NESB women less likely to participate than Australian-born women.[66]

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *MATURE* are significantly different from zero and are negative. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being over 45 years old reduced the probability of participation in the labour market compared with being in the 25 to 45 group, and the impact was less for NESB women than for Australian-born women (-0.309 and –0.369 respectively).

In the pooled data model shown in Table 3.5, the variable MATURE*NESB is significant and its coefficient is positive, which suggests that being over 45 years of age makes Australia-born women less likely than NESB women to participate.[67] This is consistent with the finding obtained from Tables 3.2 and 3.3.

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[65] The effective coefficient for NESB women is 0.015 and 0.011 for Australian-born women.
[66] The effective coefficient for NESB women is –0.719 and –0.099 for Australian-born women.
[67] The effective coefficient for NESB women is –0.739 and –1.050 for Australian-born women.

3.8.5 Marital Status

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *MARRIED* are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being married increased the probability of participation in the labour market, and the impact was greater for NESB women than for Australian-born women (0.167 and 0.087 respectively).

On the other hand, in the pooled data model shown in Table 3.5, the variable *MARRIED*NESB* is not significant, which suggests that the impact of being married is the same for both groups.

3.8.6 Presence of Children

In the separate models for NESB and Australian-born women in Table 3.3 and 3.4, the coefficients of *CHILD* are significantly different from zero and are negative. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of having a child decreased the probability of participation in the labour market, and the impact was less for NESB women than for Australian-born women (-0.318 and –0.483 respectively).

In the pooled data model shown in Table 3.5, the variable *CHILD*NESB* is significant and its coefficient is positive, which suggests that the presence of a child makes Australia-born women less likely to participate than NESB women.[68] Our result is consistent with Buchinsky (1998) and Hyslop (1999) who observed similar relationships in the US.

3.8.7 Interaction Variables containing Age

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *MAT*MARRIED*, which is the interaction variable for being "mature" aged and married, are significantly different from zero and are negative. A comparison

[68] The effective coefficient for NESB women is –0.714 and –1.373 for Australian-born women.

of the elasticities suggests that the impacts of being "mature" aged and married decreased the probability of participation in the labour market, and the impact was greater for NESB women than for Australian-born women (-0.323 and -0.106 respectively).

In the pooled data model shown in Table 3.5, the variable *MAT*MARRIED*NESB* is significant and its coefficient is negative, which suggests that being "mature" and married makes NESB women less likely to participate than Australian-born women.[69]

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *MAT*CHILD*, which is the interaction variable for being "mature" aged and having a child, are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being "mature" aged and having a child increased the probability of participation in the labour market, and the impact was less for NESB women than for Australian-born women (0.277 and 0.500 respectively).

In the pooled data model shown in Table 3.5, the variable *MAT*CHILD*NESB* is significant and its coefficient is negative, which suggests that being "mature" and having a child makes NESB women less likely to participate than Australian-born women.[70]

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *MID*MARRIED*, which is the interaction variable for being "middle" aged and married, are significantly different from zero and are negative. A comparison of the elasticities suggests that the impacts of being "middle" aged and married decreased the probability of participation in the labour market, and the impact was greater for NESB women than for Australian-born women (-0.219 and -0.090 respectively).

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[69] The effective coefficient for NESB women is –0.673 and –0.307 for Australian-born women.
[70] The effective coefficient for NESB women is 0.699 and 1.419 for Australian-born women.

In the pooled data model shown in Table 3.5, the variable *MID*MARRIED*NESB* is significant and its coefficient is negative, which suggests that being "middle" aged and married makes NESB women less likely to participate than Australian-born women.[71]

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficient of *MID*CHILD*, which is the interaction variable for being "middle" aged and having a child is significantly different from zero and is positive for Australian-born women, but it is not significant for NESB women. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being "middle" aged and married increased the probability of participation in the labour market, and the impact was less for NESB women than for Australian-born women (0.119 and 0.187 respectively).

In the pooled data model shown in Table 3.5, the variable *MID*CHILD*NESB* is marginally significant and its coefficient is negative, which suggests that being "middle" aged and having a child makes NESB women less likely to participate than Australian-born women.[72]

3.8.8 Interaction Variables containing Presence of Children

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *MARRIED*CHILD*, which is the interaction variable for being married and having a child are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being married and having a child increased the probability of participation in the labour market, and the impact was less for NESB women than for Australian-born women (0.152 and 0.310 respectively).

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[71] The effective coefficient for NESB women is –0.606 and –0.262 for Australian-born women.
[72] The effective coefficient for NESB women is 0.214 and 0.530 for Australian-born women.

In the pooled data model shown in Table 3.5, the variable *MARRIED*CHILD*NESB* is significant and its coefficient is positive, which suggests that being married and having a child makes NESB women more likely to participate than Australian-born women.[73]

3.8.9 Place of Residence

In the separate models for NESB and Australian-born women in Tables 3.2 and 3.3, the coefficients of *CITY* are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of living in a metropolitan area increased the probability of participation in the labour market, and the impact was less for NESB women than for Australian-born women (0.026 and 0.300 respectively).

In the pooled data model shown in Table 3.5, the variable *CITY*NESB* is not significant, which suggests that the impact of living in a metropolitan area is the same for both groups.

3.8.10 Summary

One of the most significant economic changes in recent years has been the rise in the share of women's participation in the labour market. However, the *Labour Market, Australia* (produced by the ABS) shows that the participation rate for NESB women has not changed greatly over the last 17 years, but has increased significantly for Australian-born women over the same period.[74] The 1990-92 recession appears to have had a more adverse impact on NESB women than it did for Australian-born women.[75]

In this study, all signs of the estimated coefficients agree with their excepted signs (where they could be identified). The differential effect of being "young" or "mature" compared to "middle" aged indicated that the probability of participation for NESB women was less then those of Australian-born women. The coefficients of interaction

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[73] The effective coefficient for NESB women is 0.289 and 0.088 for Australian-born women.
[74] ABS Cat. No. 6203.0.
[75] In 1982-83, the participation rates for NESB and Australian-born women were approximately 43 percent and 44 percent respectively. In 1994-95, the NESB women's participation rate remained unchanged whereas the Australian-born women's participation rate increased to 57 percent.

effects for "mature" aged and marital status, and "middle" aged and marital status followed similar patterns. The probability of participation of NESB "mature" aged women with children, and married with children, were much greater than those of Australian-born women. On the other hand, probability of participation was much greater for Australian-born "middle" aged women with children compared to their NESB counterparts. Overall, NESB married women were more likely to participate in the Australian labour market than Australian-born women were. The economic circumstances of these women might contribute to this result.

It is interesting to note that degree and diploma holders amongst Australian-born women were more likely to participate in the labour market than NESB women. On the other hand, NESB women with vocational skills were more likely to participate compared to Australian-born women. Both groups had similar probabilities of participation according to length of labour market experience and living in a metropolitan area. Australian-born women were less likely to participate in the labour market compared to NESB women if they ever had borne a child.

After controlling for a considerable range of human capital and demographic variables, we find some support for the hypothesis that NESB women are less likely to participate than Australian-born women are.

3.9 Conclusion

In this chapter, we examined the labour market participation of NESB migrant women and compared it with that of Australian-born women. We were principally interested in the effects of different levels of skills in speaking English and length or residency might have on the probability of participating in the labour market. Second, we were interested in how different educational qualifications might affect the probability of participation of both groups.

The participation model for NESB women provides evidence that, after controlling for the effects of other variables, the probability of participation in the labour market is greatest for those with "excellent" skills in speaking English. The implication of this

seems clear: NESB women would be more likely to participate if they were offered opportunities that might bring about improvements in their English. The likely mechanism is that having a good command of the English language makes job applicants more attractive to many potential employers and the greater likelihood of securing a job might make NESB more likely to seek and secure employment.

Although from a theoretical perspective we were unable to ascribe a sign to the coefficient of the length of residence variable of NESB women, we found empirical support for a positive relationship between the length of residence and the probability of participating in the labour market. This might suggest that as the length of residence increases, migrant women feel less reticent about seeking employment after becoming more acclimatized to their Australian environment. We would, of course, expect that English skills would improve for many NESB women as their length of residence increased, however we have used another set of variables to control for this.

Australian-born women with degrees or diplomas were more likely to participate in the labour market than NESB women were. The reverse was true for those with vocational skills. This suggests two things. First, the possession of a degree or diploma might be less valuable to a NESB woman than an Australian-born woman, perhaps because potential employers might prefer Australian-born graduates. However, it seems likely that some of the degrees and diplomas held by NESB women were acquired in foreign countries and might not be recognized by Australian employers or accrediting agencies. If this was the case and it probably was, it is uncertain what the effect of a NESB woman acquiring a degree or diploma from an Australian educational institution might be. Having said that, NESB women who possessed a degree or diploma were more likely to participate in the labour market than NESB women who did not.

Second, the possession of vocational skills appears to have made NESB women more likely to participate in the labour market, however they were less likely to participate than if they possessed a degree or diploma. Although a paucity of English skills of some NESB women might limit their ability to acquire a degree or diploma, our results

suggest that a policy objective of increasing the participation rate of NESB women might be better served by providing access to degree or diploma programs than by providing trade training.

We found that independent of the human capital and demographic variables in the model, NESB were less likely to participate in the labour market than Australian-born women are. This does not mean that NESB women *should* participate at the same rate as their Australian-born counterparts. There are many plausible explanations for this finding, however difference in attitudes to paid work outside the household seems a promising opportunity for further research.

In the next chapter we will consider how the factors that we have examined in relation to labour market participation affects the probability of NESB and Australian-born women finding employment in the primary sector of the labour market.

Table 3.1: Dependent and Explanatory Variables

Variables	Descriptions of Variables
Dependent	
PART	1 if in the labour market, 0 otherwise
Independent	
EXCELLENT	1 if English spoken "excellently", 0 otherwise (reference group)
ENGVW	1 if English spoken "very well", 0 otherwise
ENGW	1 if English spoken "well", 0 otherwise
ENGNW	1 if English spoken "not well", 0 otherwise
BAV	1 if holds basic vocational qualification, 0 otherwise (reference group)
DEGREE	1 if holds degree, 0 otherwise
DIPLOMA	1 if holds diploma, 0 otherwise
SKILL	1 if holds a vocational skill qualification, 0 otherwise
EXPERIENCE	Experience in years (1996 - mid value of year of qualification completed)
RIA	Residence in Australia in years (1996 - mid value of year of arrival)
YOUNG	Less than 24 years old
MIDDLE	More than 24 and less than 46 years old
MATURE	More than 46 years old
MARRIED	1 if married, 0 otherwise
CHILD	1 if any children ever born, 0 otherwise
CITY	1 if living in a metropolitan area, 0 otherwise
*MAT*MARRIED*	Interaction between *MATURE* and *MARRIED*
*MAT*CHILD*	Interaction between *MATURE* and *CHILD*
*MID*MARRIED*	Interaction between *MIDDLE* and *MARRIED*
*MID*CHILD*	Interaction between *MIDDLE* and *CHILD*
*MID*MARRIED*CHILD*	Interaction between *MIDDLE*, *MARRIED* and *CHILD*
*MARRIED*CHILD*	Interaction between *MARRIED* and *CHILD*

Table 3.2: Summary Statistics for Participation Models

Variables	NESB		Australian-born		Pooled	
Dependent Variable	***Mean***	***Std. Dev.***	***Mean***	***Std. Dev.***	***Mean***	***Std. Dev.***
PART	0.527	0.499	0.668	0.471	0.643	0.479
Independent Variables						
ENGVW	0.303	0.460			0.091	0.287
ENGW	0.266	0.442			0.050	0.219
ENGNW	0.164	0.371			0.030	0.171
DEGREE	0.142	0.349	0.125	0.330	0.127	0.334
DIPLOMA	0.069	0.254	0.083	0.275	0.080	0.272
SKILL	0.030	0.172	0.031	0.174	0.031	0.174
EXPERIENCE	5.032	7.648	4.391	6.960	4.507	7.092
RIA	13.281	7.817				
YOUNG	0.102	0.303	0.190	0.392	0.174	0.379
MIDDLE	0.468	0.499	0.505	0.500	0.499	0.500
MATURE	0.430	0.495	0.305	0.460	0.327	0.469
MARRIED	0.689	0.463	0.548	0.498	0.573	0.495
CHILD	0.720	0.449	0.644	0.479	0.658	0.474
CITY	0.753	0.432	0.476	0.499	0.526	0.499
Cases	8,508		38,775		47,283	

Table 3.3: Probit Models of NESB Women's Participation

Dependent *PART**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	-0.266	0.000	0.314	0.000	
ENGVW	-0.030	0.428			
ENGW	-0.301	0.000	-0.288	0.000	-0.114
ENGNW	-0.472	0.000	-0.465	0.000	-0.185
DEGREE	0.550	0.000	0.522	0.000	0.208
DIPLOMA	0.300	0.624	0.282	0.000	0.112
SKILL	0.174	0.045	0.167	0.055	0.066
EXPERIENCE	0.016	0.000	0.017	0.000	0.007
RIA	0.223	0.000	0.022	0.000	0.009
YOUNG			-0.635	0.000	-0.253
MIDDLE	0.420	0.000			
MATURE	-0.087	0.153	-0.778	0.000	-0.309
MARRIED	-0.026	0.449	0.420	0.001	0.167
CHILD	-0.220	0.000	-0.800	0.000	-0.318
*MAT*MARRIED*			-0.814	0.000	-0.323
*MAT*CHILD*			0.698	0.000	0.277
*MID*MARRIED*			-0.550	0.000	-0.219
*MID*CHILD*			0.299	0.115	0.119
*MID*MARRIED*CHILD*			-0.211	0.000	-0.084
*MARRIED*CHILD*			0.383	0.000	0.152
CITY	0.069	0.037	0.066	0.047	0.026
Log-L	-5348.2		-5313.2		
Restricted-log L	-5884.8		-5884.8		
Chi-squared	1073.2	0.000	1143.1	0.000	
Correct Pred	64.5 percent		64.9 percent		
R^2	0.118		0.124		

Table 3.4: Probit Models of Australian-born Women's Participation

Dependent: *PART**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	0.704	0.000	0.922	0.000	
DEGREE	0.608	0.000	0.587	0.000	0.207
DIPLOMA	0.479	0.000	0.465	0.000	0.164
SKILL	0.125	0.002	0.103	0.013	0.036
EXPERIENCE	0.009	0.000	0.010	0.000	0.004
YOUNG			-0.099	0.000	-0.035
MIDDLE	0.079	0.000			
MATURE	-0.233	0.000	-1.047	0.000	-0.369
MARRIED	-0.060	0.000	0.246	0.000	0.087
CHILD	-0.663	0.000	-1.370	0.000	-0.483
*MAT*MARRIED*			-0.299	0.000	-0.106
*MAT*CHILD*			1.418	0.000	0.500
*MID*MARRIED*			-0.256	0.000	-0.090
*MID*CHILD*			0.530	0.000	0.187
*MARRIED*CHILD*			0.088	0.025	0.310
CITY	0.096	0.037	0.085	0.000	0.300
Log-L	-22533.3		-22177.0		
Restricted-log L	-24641.8		-24641.8		
Chi-squared	4217.0	0.000	4929.8	0.000	
Correct Pred	67.3 percent		68.8 percent		
R^2	0.112		0.116		

Table 3.5: Probit Models of Women's Participation using Pooled Data

Dependent: *PART**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	0.787	0.000	0.9260	0.000	
NESB	-0.362	0.000	-0.284	0.000	-0.104
ENGVW	-0.030	0.245	-0.046	0.079	-0.017
ENGW	-0.349	0.000	-0.361	0.000	-0.132
ENGNW	-0.575	0.000	-0.590	0.000	-0.215
DEGREE	0.607	0.000	0.586	0.000	0.214
*DEGREE*NESB*	-0.124	0.025	-0.130	0.020	-0.473
DIPLOMA	0.479	0.000	0.465	0.000	0.169
*DIPLOMA*NESB*	-0.223	0.001	-0.023	0.001	-0.084
SKILL	0.125	0.002	0.104	0.012	0.038
*SKILL*NESB*	0.034	0.723	0.050	0.603	0.018
EXPERIENCE	0.010	0.000	0.011	0.000	0.004
*EXPERIENCE*NESB*	0.005	0.063	0.004	0.065	0.002
YOUNG	-0.078	0.000	-0.099	0.002	-0.036
*YOUNG*NESB*	-0.408	0.000	-0.620	0.000	-0.226
MATURE	-0.314	0.000	-1.050	0.000	-0.383
*MATURE*NESB*	-0.075	0.030	0.311	0.001	0.113
MARRIED	0.061	0.000	0.253	0.000	0.092
*MARRIED*NESB*	-0.093	0.015	0.130	0.376	0.047
CHILD	-0.665	0.000	-1.373	0.000	-0.501
*CHILD*NESB*	0.494	0.000	0.659	0.000	0.241
*MAT*MARRIED*			-0.307	0.000	-0.112
*MAT*MARRIED*NESB*			-0.366	0.001	-0.133
*MAT*CHILD*			1.419	0.000	0.518
*MAT*CHILD*NESB*			-0.720	0.000	-0.262
*MID*MARRIED*			-0.262	0.000	-0.096
*MID*MARRIED*NESB*			-0.344	0.028	-0.126
*MID*CHILD*			0.530	0.000	0.193
*MID*CHILD*NESB*			-0.316	0.064	-0.115
*MARRIED*CHILD*			0.088	0.025	0.032
*MARRIED*CHILD*NESB*			0.201	0.024	0.074
CITY	0.098	0.000	0.088	0.000	0.032
*CITY*NESB*	0.494	0.000	-0.027	0.447	-0.010
Log-L	-27933.7		-27545.1		
Restricted-log L	-30820.7		-30820.7		
Chi-squared	5773.9	0.000	6551.1	0.000	
Correct Pred	66.6 percent		68.0 percent		
R^2	0.113		0.127		

4.0 Primary Sector Employment

4.1 Introduction

In this chapter, we devise a scheme for categorising women into primary sector and secondary sector jobs, and conclude that amongst labour market participants, only 47.7 percent of NESB women had primary jobs, whereas 61.1 percent of Australian-born women had primary sector jobs. The models developed in this chapter investigate the extent to which this difference can be explained by a range of human capital and demographic variables.

We use probit models to examine factors that determine the probability that NESB and Australian-born women find employment in primary sector occupations. We assign occupations to the primary or secondary sector using the list of occupations provided in the 1996 Australian Census and a modified version of the ANU2 occupational prestige scale developed by Broom *et al.* (1977a). Our focus is on the possible disadvantage of NESB women *vis-à-vis* Australian-born women in acquiring "good jobs" for those migrants whose English skills are weak, and on the role of education in assisting women to gain primary sector employment.

We use a univariate probit model to estimate the probability that an individual will be employed in the primary sector.[76]

4.2 Primary and Secondary Sectors in the Labour Market

Doeringer and Piore (1971) divided the labour market into two sectors or segments, *viz.*, (1) the primary sector, and (2) the secondary sector. They argued that firms with market power tend to form the primary industrial sector where they often have relatively inflexible unit-labour costs but smaller cost levels based on longer production runs, larger batch production and more advanced technological processes. Jobs in these

[76] Our analysis is somewhat different from previous studies such as Evans (1984), Sullivan (1984), Jones (1992), Treiman and Terrell (1975), Sewell *et al.* (1980) and McClendon (1976), who used general regression models to analyse occupational status. We compare our findings with their results to assess whether there are any significant differences due to differences in English skills and education evident from our data.

establishments tend to offer good levels of remuneration, job evaluated wage structures, well-defined procedures for the resolution of disputes, career and promotional opportunities, and the provision of adequate sick and holiday pay. On the other hand, many smaller firms are often dependent on using low-level technological processes and have high labour turnover. They generally pay low wages and may operate in competitive or declining product markets where employees having little chance of advancement and are subject to arbitrary supervision. The conditions of employment are generally limited to minimum standards of pay and holiday entitlements.

In the contemporary Australian labour market, it is comparatively easy to identify "good jobs" and "bad jobs" that correspond to Doeringer and Piore's primary and secondary sectors. It is not clear, however, that market power remains as a critical determinant. Further, their model seems dated because it understates the importance of the service sector in modern western economies. Although there is obviously a continuum of jobs, we believe that the notion of a primary and a secondary sector in the labour market provides a useful means of testing factors that determine the labour market outcomes of women.

Whilst at a conceptual level it is easy to describe the characteristics of primary and secondary jobs, assigning particular jobs to one category or the other is inevitably arbitrary. Nevertheless, some cases are obvious, for example accountants are almost certainly in the primary sector, whereas dishwashers are probably not. Problems inevitably occur at the margin. Other problems arise when some aspects of a job suggest that it is in the primary sector but other aspects suggest it is not. Some jobs have working conditions might be regarded as reasonably congenial but pay rates are quite low, for example the case of hospital cleaners and aides. In others the pay is relatively high but working conditions are dirty and perhaps hazardous, for example, female police officers and security guards.

4.2.1 Occupational Status

Part of human behaviour is directed towards goals, and as such, people develop individual occupational aspirations because of socialization at home, work and school.

There is evidence from Australia and other countries that those aspirations are disproportionately directed towards jobs that are highly regarded in society. For example, Connell *et al.* (1975) surveyed children of ages between 11 and 18 years in Sydney and observed that approximately 16 percent teenagers achieved their desired jobs when they left school.

Occupational aspirations depend on many factors, including education and family background. Social science data over many years indicate that people in developed countries tend to rate the social standing of jobs in a highly consistent manner, meaning that they often agree about the relative "goodness" of jobs. This general agreement seems to reflect a basic stability in how an occupational hierarchy is perceived by people.

Status attainment models imply that *ceteris paribus*, people seek jobs that are more desirable in terms of social standing. Traditionally, measures of occupational status have been of three types: (1) prestige measures; (2) socio-economic scales and (3) sociologically derived class categories. Prestige scales are often continuous and involve evaluative judgments on the general desirability of occupations. Socio-economic scales are also usually continuous and are calculated by computing a weighted sum of socio-economic characteristics of persons with a given occupation. Categorical social class, originally developed by Goldthorpe and Hope (1974), linked jobs to skill levels and sectoral differences.

4.2.2 Approaches to Rating Occupations

In the US, there have been many attempts to measure occupational prestige. Early researchers include Duncan (1961) and Siegel (1971). The general approach was to construct a prestige score for each category in the 1960 Census Occupational Classification.[77]

[77] These ratings were later, updated by Hauser and Featherman (1977), Stevens and Hoisington (1987), and Davis and Tom (1994).

Goldthorpe and Hope (1974) developed prestige scales for a range of occupations. This scale was constructed by classification into occupational grading units according to work tasks and employment status. Each unit was thus given a grade or scale value that reflected its desirability in terms of the prestige attached to it based on a survey in which people were asked to assess the social standing of particular jobs, independent of the rewards and requirements of the job.

Nam and Powers (1983) developed scores for Census occupational classifications from 1940 to 1980 that used the average percentile of the incumbents of occupational groups in the cumulative distribution of workers ranked by median education and income. These ratings are relative measures that may present problems of comparability across time.

Blishen (1958) constructed a socio-economic index for occupations in Canada. This was based on 1951 Canadian census data and used income and educational status to rank 343 occupations.[78]

Treiman (1977) constructed the Standard International Occupational Scale (SIOPS) by averaging the results of prestige evaluations carried out in sixty countries. Respondents were asked to rank occupations or work activity according to prestige and social regard. He constructed a standardized scale with values ranging from 0 to 100 based on occupational titles from national and local prestige studies, which were matched to the three-digit ISCO-68 occupational classifications.[79]

Ganeboom *et al.* (1992) developed a standard International Socio-Economic Index (ISEI) of occupational status that measures the attributes of occupation that "convert" a person's education into income. Wegener (1988) developed a prestige scale for the Federal Republic of Germany based on psychophysical measures of two surveys (ZUMA-Bus 1979, 1980) in which respondents were presented with 50 occupations

[78] These Canadian ratings were, later revised by Blishen (1967) and Blishen and McRoberts (1976).
[79] Ganzeboom and Treiman (1996) updated this scale for ISCO-88 codes.

where respondents judged prestige relative to their own standards rather than with reference to social norms. The results were subsequently matched to ISCO codes.

4.2.3 Australian Occupational Ratings

The Australian Bureau of Statistics (ABS) developed the Classification and Classified List of Occupation (CCLO) that was used to process census results from 1961 to 1981, and provided a coding framework for occupational status. As a result of widespread criticism of the earlier CCLO coding system, the ABS began to develop a new classification of occupation called the Australian Standard Classification of Occupations (ASCO) in 1978 to process the 1986 census data. The CCLO paid more attention to the industrial sector of an employee than to his/her skill level, whereas ASCO was skill based and reflected the different educational and training requirements of jobs. (Australia, 1961; 1980; 1987).

Broom *et al.* (1965) developed the ANU1, a new occupational code based on the 1961 census that could distinguish levels of skill, remuneration and prestige. They took the 348 occupational titles used in the 1961 census and regrouped them into 100 occupational codes. These were then condensed into 16 board categories (1 high to 16 low), which were subsequently collapsed to produce a 6-point version (1 high status). However, unlike the ABS classification, the ANU1 scale was produced for the purpose of describing and measuring the social and economic advantage attributed to different occupations.[80]

Congalton (1969) also developed a prestige scale for Australian occupations similar to his New Zealand study, based on 135 occupations. He surveyed 303 cases of the "man in the street", and 1,189 university students, who were asked to rank the 135 occupations according to their social standing. He produced a 7-point scale (1 high to 7 low) that could be collapsed to a 4-point scale (A high to D low). This scale was later updated by Daniel (1983). Both can be criticized because the prestige of particular jobs was a matter of perception and opinion.

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[80] Some documentation on the internal validity of this scale is available in Broom *et al.* (1977a, p. 82.)

Broom *et al.* (1977a) developed the ANU2 Status Scale that was a more detailed classification of occupations. The ANU2 scale was developed to update the 16-point ANU1 scale and also linked to the census data. They obtained rankings from a sample of 1,668 professional workers who were social workers, teachers, doctors and lawyers. They divided a list of 198 occupations recorded in the 1971 census into four sets and each person in the sample was asked to rate 50 occupations. A high level of consensus was obtained among the ratings made by these professional groups.

Broom *et al.* used Schleindl's (1975) calculation of mean prestige scores for the occupational titles and his description of the database for the 1971 census. In developing the ANU2 scale they fitted a ridge regression to measure the distinctive content of the prestige rating for specific occupational titles by using a wider range of predictor variables (sex, age, birthplace, year of schooling, qualifications, type of housing, access to private bathroom and kitchen, and number of cars owned). The resultant regression equation was then used to estimate prestige ratings for all occupational groups identified in the census. The equation gave a score for each occupation category that was re-calibrated to have a mean of 500 and a standard deviation of 100. In this metric, the range of score is 331(low) to 915 (high).[81] The overall distribution of status scores is somewhat lumpy and skewed with a long primary tail. Lumps occur because all members of the same occupational category receive the same score.

In practice, it is similar to the widely used Duncan SEI scale for the US and compared well with other occupational status scales. It correlates moderately well (+0.83) with the ANU1 scales. It was constructed more objectively than ANU1, because it was derived from the empirical linkage between opinions about the relative social standing of different occupations and the demographic, social and economic characteristics of their respondents.

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[81] Full details of the construction of ANU2 can be found in Broom *et al.* (1977b).

Jones (1989) developed a new socio-economic status scale called the ANU3 Scale for Australian Occupational Classifications.[82] This was the updated version of ANU2 and was suitable for use with the census occupational classification introduced in the 1986 census. A regression equation linking aggregate worker characteristics to prestige ratings was used to estimate socio-economic status scores for all ASCO groups. The dependent variable is a direct coding from the prestige ratings of 214 jobs reported in Schleindl (1975: 225-8) and for 162 jobs reported in Daniel (1983: 64-5). The independent variables are age, sex, highest level of qualifications, age left at school, income and interaction terms between present age and age at leaving school, hours worked and income group. Scores were scaled from 0 (low) to 100 (high). The ANU3 scale bears a close resemblance to its predecessors, despite differences in the detail of its construction.

McMillan and Jones (2000) developed ANU4, which was a socio-economic status scale based on linkages between education, occupation and market income. They also developed a new class scheme scale, which is called CAMSISOZ, based on the principles underlying the new British system of social classification introduced by Rose and O'Reilly (1997).

4.2.4 Application of the ANU2 Scale

The ANU2 status scale provides a continuous measure of occupational status in Australia. The ANU2 scale was widely used by social scientists in Australia for many important policy issues, which are discussed below.

Evans (1984) examined the occupational status of NESB women according to their birthplaces, using the ANU2 occupational status scale.[83] She observed that the average Mediterranean woman's job brings her substantially less status, 24 points or about the level of a cook or a bus driver, compared to 34-38 status points for other groups. To investigate this status gap, she fitted a linear regression model, taking occupational

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[82] A revised version of ANU3 based on the 1996 census data updated by McMillan and Jones (2000).

[83] She adjusted ANU2 occupational status scales so that the tenth percentile gets a score of approximately zero and the 90th percentile a score of 100.

status as the dependent variable, and years in Australia, age, age squared, rural residence, marital status, number of children, educational levels, English skills and hours worked as independent variables. She found that increases in years in Australia was associated with higher occupational status for all migrant groups and she found evidence that a greater level of education was associate with higher job status. Later, Evans (1987) examined how migrants' proficiency in speaking English and preference for retaining their native language affected their occupational attainment in the Australian labour market. To investigate this, she conducted a regression model using occupational status as the dependent variable, and monolingual English, English proficiency, and several components of education, labour market experience (overseas and Australian), and the interactions of these variables as independent variables. Her data was a sample of male migrants from non-Anglophone countries for those who worked full-time and were aged 20-64 years. She found that English language proficiency affected the occupational opportunities of Eastern European and Third World migrant's more than those of Mediterranean migrants.

Kelley and McAllister (1984) made an empirical analysis of the socio-economic attainments of migrants in Australia and the effect of socio-economic position and birthplace on their voting patterns. This analysis extended the work of Broom *et al.* First, they differentiated among a number of migrant groups unlike Broom *et al.*, who dichotomised country of birth by English verses Non-English speaking countries. Second, they provided more detailed and comprehensive measures of class and family background, distinguishing ownership and authority, as well as occupational status. Third, they provided more precise estimate of occupational and income differentials. They suggested that migrants were clearly disadvantaged in the status of the jobs they had and the size of the disadvantage varied from group to group and between men and women. They concluded that, *ceteris paribus*, migrants had secondary status jobs, and received secondary pay than the Australian-born persons.

Evans and Kelley (1986, 1991) used a linear transformation of the ANU2 scale, which provided a more intuitive metric, ranging from zero to 100. They then used a regression model that allowed for curvilinear effects, and slope differences among migrant groups and between childhood and adulthood migrants. First, Evans and Kelley (1986) restricted their analyses to all Australian-born men aged 25 to 64 years, including migrants. They used separate regression models to decompose differences in occupational status among various groups, taking occupational status scale as dependent variable, and a range of educational levels, English skills and labour market experiences as independent variables. They found that the Australian labour market treated migrants in the same way as Australian-born persons with similar education, labour market experience, and English skills. They concluded that differences in occupational status of migrants and Australian-born reflected differences in endowments, rather than discrimination.

Later, Evans and Kelley (1991) restricted their analyses to men aged 16-64, who had jobs. This model included quadratic terms to capture curvilinear effects of education and labour market experience. It separated the effects of foreign and Australian education, and foreign and Australian labour market experience. Interaction terms were used to investigate the effects of Australian labour market experience that differed between those educated in Australia and those educated abroad. They estimated two closely comparable regression models, using occupational status and income separately as the dependent variable. They found that migrant groups and Australian-born people found jobs and earnings commensurate with their education, experience and skills and they concluded that there was no economic discrimination in the Australian labour market.

4.2.5 Approaches to Assigning Individuals to the Primary and Secondary Sectors

The primary sector is generally characterized by high wages, fringe benefits, skills, hierarchy, promotion and stable work patterns; while the secondary sector is characterized by low basic wages, lack of fringe benefits, low general skills, no promotional ladder and unstable work patterns.

Psacharopoulos (1978) used a modality "test" of labour market duality, using the 1972 UK General Household Survey and the Goldthorpe and Hope (1974) desirability scale for different occupations. He estimated the values of the occupational variable and plotted the status ranking of occupation and frequency, and found a single mode (although there was a small multi-modal pattern), which *prima vista* is inconsistent with labour market segmentation. Whilst it would be convenient if the distribution was bimodal with a clear separation of "good" and "bad" jobs, the absence of this means that the line of demarcation must be, ultimately, a matter of judgment. Further, Pascharopoulos found that the primary sector included manual foremen (OCC = 45.7) who were mainly recruited from the ranks of skilled manual workers (OCC = 38.8) and who belonged to the secondary sector. He observed that if such mobility exists between the two sectors, the notion of dualism is not very useful and suggested that earnings instead of the desirability could have better defined the two sectors.

A key problem in proposing the existence of a dual labour market is where exactly to draw the dividing line. The literature does not contain any single operational characteristics, l*et al*one a cut-off point that would distinguish the two sectors (Doeringer *et al.*, 1969 and Wachter, 1974) and although a number of definitions have been used in the literature yet whatever criterion is chosen, the dividing line is arbitrary (Osterman, 1975).

In order to test the duality hypothesis in the UK labour market, McNabb and Psacharopoulos (1981) first used a modality "test" based on Goldthorpe and Hope (1974) occupational rating scale to assign individuals to primary or secondary occupations. The advantage of using this job-ranking scale rather than earnings to define the dividing line is that because of its low correlation with earnings, it is largely immune from truncation bias that has marred many studies (Cain, 1976).

Neuman and Ziderman (1986) broadly employed the methodology developed by McNabb and Psacharopoulos and assigned workers to primary and secondary sectors on the basis of occupational prestige scores, using the Individual Israel Labour Mobility

Survey. The male sample was categorized into primary and secondary labour market sectors on the basis of occupational prestige ratings for Israel (Tyree, 1981). Based upon an inspection of the distribution of prestige scores, the demarcation point was chosen that assigned 29 percent of the sample to the secondary sector. There appeared to be at this point a break in the prestige score distribution, which was approximately bimodal.

4.2.6 Our Assignment of Individuals to the Primary and Secondary Sectors

We do not canvass the matter of whether or not movement from the secondary sector to the primary is difficult as suggested by dual labour market theory. Our focus is on the characteristics of persons that render them more likely to be primary sector employees. Indeed, we take a human capital theory stance on this issue and expected that the acquisition of education, relevant skills including English proficiency, would increase the probability of upward mobility occurring.

For our analysis, we used the ANU2 occupational scales to divide the workers into primary and secondary sectors. Although ANU3 was available, we elected to use ANU2 because there was little conceptual difference between these scales in the way they ranked jobs, and the latter was easier to use.[84] We first arranged the ANU2 scales in ascending order to find the median value that was 492. On this basis, occupations whose status fell below 492 were designated as secondary occupations. It should be noted that this median value divides the total number of occupations into two equal numbers of occupations, but not an equal number of persons. Our selection of the cut off point on the ANU2 scale remains arbitrary. However, the use of median value seems appropriate not only because it appears to be at this point break in the prestige scale distribution, but also because the relative sizes of the resultant labour market sections seem plausible.[85]

We follow the approach of Psacharopoulos (1978) to a modality "test" for duality in the labour market for NESB and Australian-born women. The "test" involves determining

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[84] ANU4 was not released at the time of this statistical modelling.

[85] The mean score is not used here as a demarcation point to distinguish between primary and secondary sectors, because it was affected by extreme values.

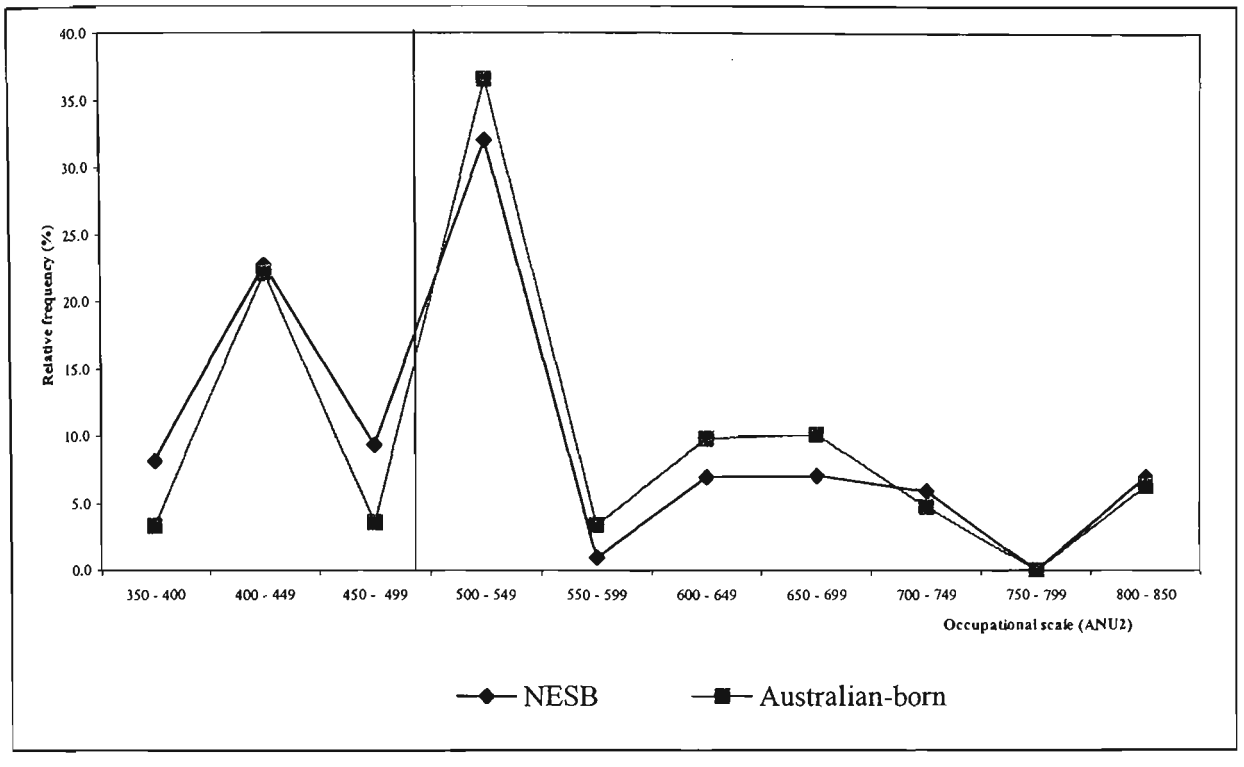
whether the frequency distribution of ANU2 occupational scales is bimodal with one peak on either side of the demarcation line. The distributions are shown in Figure 4.1.[86]

Figure 4.1 suggests that there is a peak below our demarcation point and at least one peak above it, and the profiles for NESB and Australian-born women are remarkably similar. This suggests that our demarcation point, whilst arbitrary, differentiates a significant group of female employees of the order of 30 percent from others with higher status jobs.[87]

[86] We used the average scale for each occupational group shown in Table 4.1. The intervals are arbitrary, however intervals of 25 point produced a similar profile.

[87] Figure 4.1 does not establish that there are large barriers to mobility from lower status jobs to higher status jobs.

Figure 4.1 Frequency Distributions of Occupational Scales



The 1996 census data provided 44 board occupational groups of occupations, which are sufficiently similar in their main tasks to be grouped together for the purposes of the classification.[88] The occupational coding ranges from 10 to 99, and each occupational group has listed major, sub-major, minor and unit group levels. These occupations were already grouped according to ASCO second edition of occupational scales. ASCO is a skill-based classification, which encompasses all occupations in the Australian work force. We divided our 44 broad occupational groups into primary and secondary sectors based on the median (492) value of the ANU2 occupational scales. On many occasions ASCO and ANU2 occupational groups, did not match exactly. In most cases, the ASCO groups are broader and contain many ANU2 occupational status groups. In those cases, we took the average ANU2 status scales and allocated according to the median demarcation line.

[88] There are other four categories: inadequately described, not stated, not applicable and overseas visitor, which are excluded from this study.

The majority of the occupational groups fell clearly into a category. For example, general managers were in the primary sector and factory labourers were in the secondary sector. However, some allocations caused concern because of differences in earnings, and these occupations included farmers and farm managers, automotive tradespersons, road and rail drivers who fell into the primary sector; and other occupational groups such as food trade persons, other trade persons and related workers and intermediate plant operators, fell into the secondary sector. The 1996 census occupational levels are very broad and appear to overlap the two sectors. For example, some farmers might be wealthy and clearly in the primary sector, whereas others might be living at a substance level and hence would fall into the secondary sector; some food trade persons might be highly paid chefs, where as others might be poorly paid kitchen helpers.

For this reason an additional income criteria was also used to distinguish individuals those who are considered as a primary or secondary workers within these overlapped occupational groups. Although there are problems at their margin, it is generally easy to identify "good" or "bad" jobs, however in some cases the appropriate classifications is less clear. In these instances we allocate individuals who work in these occupations whose weekly income was more than or equal to $400 per week to the primary sector. We use this value of weekly income as a demarcation point, because it was the mean income for Australian-born workers in the 1996 census data.

Our primary and secondary occupational classification based on ASCO occupational groups along with ANU2 occupational status scales is presented in Table 4.1. This table clearly shows that in most of the cases ANU2 occupational groups are matching well with the ASCO and the census occupational groups. Our division of the primary and secondary occupations based on the ANU2 median (492) occupational scales along with income criteria is also presented in Table 4.1. This table clearly shows that: (a) the occupational group "educational professional" unambiguously falls within primary sector; (b) the occupational group "elementary service worker" falls unambiguously within secondary sector; and (c) the occupational group "intermediate plant operators"

can not be clearly put in either the primary or in secondary group, and hence the $400 income criteria was used to allocate these persons.

4.3 Data

We use the 1-percent sample from the 1996 Australian Census, and we restrict the sample to women in the range 18-64 years of age and to participants in the labour market. Accordingly, the data set used to estimate they models contains 4,484 NESB migrant women and 25,906 Australian-born women. Summary statics for the variables used in the models that follow are shown in Table 4.2.

4.4 The General Model for Being Employed in the Primary Sector

Our general model for the probability of being employed in the primary sector as we have defined it above (*PRIM*) can be expressed as:

$$\text{Prob}[PRIM] = f(English,\ Qualifications,\ Experience,\ Residency,\ Age,\ Marital\ Status,\ Children,\ Region) \quad (4.1)$$

We define $PRIM = 1$ if a person is employed in the primary sector as we have defined it above, and zero otherwise. In this model the probability that an individual will be employed in the primary sector as a function English ability, level of educational qualification, labour market experience, period of residency in Australia (for NESB women), age, marital status, whether a woman has children and region of residence. Because *PRIM* is binary, we are able to estimate this model using a binomial probit approach. Our justification for using these particular explanatory variables in the model is discussed in the next section.

It is worth noting before going on to this that there appears to be a wide variety of other explanatory variables that might impact on a woman's likelihood of being employed in the primary sector. Some people might be fortunate in being in the right place at the right time while others were not. Some may be well qualified educationally to be employed in the primary sector yet a wide variety of factors that might include ill heath, an obligation to care for elderly parents or various forms of discrimination might mean that a person is employed in the secondary sector, perhaps voluntarily but perhaps not.

Again, despite the limitations of our data, we believe that the census data is still capable shedding some light on the probability that an individual NESB woman will be employed in the primary sector will be affected by her English proficiency, educational qualifications, labour market experience, period of residence in Australia and other control variables.

4.5 Determinants of Primary Sector Employment

We have noted that Doeringer and Piore (1971) proposed that "good" jobs in the primary sector are characterized by stable employment patterns, on-the-job training, opportunities for advancement, many jobs filled by internal promotions and relatively high wages. In this context, there are likely to be positive returns to investment in human capital so we expect that human capital variables will be significant predictors of labour market status. In many of the primary sector jobs that we have identified it seems likely that an ability to communicate effectively in English is an important attribute. This suggests that in order to enter into primary sector employment, there might be an expectation amongst employers that women applicants would be required to have more than basic qualifications including skills in English, and that those with better qualifications would be more likely to secure such employment.

Although some women might have sufficient qualifications for them to enter into the primary sector, their decision to attempt to enter into it or their success in entering it might be affected by their geographical location or other responsibilities such as the care of young children. We next discuss the range of explanatory variables used in the model that are suggested by human capital, demographic and individual characteristics that might explain women's primary sector employment in the labour market.

4.5.1 English Proficiency

Bostock (1978) argued that English language proficiency has been regarded as the main factor facilitating adaptation of migrants to the Australian social environment and the development of local networks. Many authors including Evans (1984, 1987), Evans and Kelley (1986, 1991), Jones (1992), Vaughan (1992a), used English proficiency as one of the independent variables in their regression models to investigate its effect on

occupational status. Zubrzycki (1964), Ware (1974), Martin (1975), Evans (1984, 1987) and Evans and Kelley (1991) suggested that English proficiency was a major factor affecting the employment of migrants and their occupational attainment. Jones (1992) argued that the more human capital, including English skills, workers supplied to the labour market, the better they do. Vaughan (1992a) argued from status attainment and human capital perspectives, that English language proficiency helps to develop job search skills and improves a migrant's job prospects. It also facilitates the acquisition of new skills and knowledge, either through formal education or vocational training. Further, the lack of English language proficiency may be a barrier to some occupations that require good communication skills. All of these authors argue that English proficiency is positively associated with the occupational status of migrant workers.

Evans (1987) used a four level scale to model English proficiency: 0 = "speaks no English at all", 33 = "speaks English not well", 67 = "speaks English well", 100 = "speaks English very well". She found that English language proficiency had a smaller effect on the occupational attainment of male migrants from Mediterranean countries than of migrants from Eastern European or Third world countries. Jones (1992) used one dummy to denote "speaks poor English" and found that being a poor English speaker was negatively related to the socio-economic status of Italian, Chinese and Dutch migrants. Vaughan (1992a) used a two-category variable indicating "speaks English well or better", and "not at all well" to analyse the occupational attainment of male migrants in Australia, and found that those who had a good standard of English were much more likely to attain an occupation at a greater level of skill. Evans and Kelley (1986, 1991) used three dummies: "speaks English very well", "speaks English well", and "speaks English less than well" and found that Australian labour market treated male migrants in the same way as Australian-born people with similar English skills.

O'Farrell (1999) observed that in US migrant women with little knowledge of English often found jobs as machine operators, hand packers, and cannery workers. Ware (1974)

observed that migrant who did not speak much English was predominantly found in low paid jobs.

There are a number of articles about the utilization of migrant skills in Australia. Iredale (1987), Dawkins (1989), Castles *et al.* (1989), and Hawthorne (1994, 1996a) examined the problems of migrants in the Australian labour market and generally concluded that a lack of proficiency in English has created many problems for migrants. Also, many migrants have not been able to resume their former occupation, or have had lengthy delays in doing so, due to non-recognitions of their overseas qualifications.

We include an English skills variable in our analysis because it seems to be an important human capital variable that is clearly related to productivity and makes primary sector employment more likely, *ceteris paribus*. In the service sector, the requirement for an ability to communicate clearly and fluently in spoken English in many jobs is self-evident. In addition, many primary sector jobs require that employees can readily understand written instructions that might relate to a wide variety of tasks, including the use of handbooks, manuals and the like.

We use the same dummies that we used in Chapter 3 for English proficiency to model labour market participation. These were English spoken "very well" (*ENGVW*), English spoken "well" (*ENGW*), English spoken "not well" (*ENGNW*) and "others" (*EXCELLENT*).

The *a priori* signs of the coefficients of these dummy variables seem clear and that although some individuals with very poor English skills might find primary sector employment, having poor English skills is likely to restrict the job opportunities of such persons. Facing limited prospects of employment in the primary sector would lead to some accepting jobs in the secondary sector. Accordingly we expect the coefficient of *ENGVW* to be negative but small, the coefficient of *ENGW* to be negative but larger and the coefficient of *ENGNW* to be negative and larger still when compared with *EXCELLENT* (reference group).

4.5.2 Educational Attainment

Education is a human capital resource endowment that is likely to affect opportunities and tastes for labour market activity. Many authors including Treiman and Terrell (1975), Featherman and Hauser (1976), McClendon (1976), Sewell *et al.* (1980), Boyd (1982), Evans (1984, 1987), Sullivan (1984), Kelley and McAllister (1984), Evans and Kelley (1986, 1991), Jones (1992) and Vaughan (1992a, b) used education as one of the independent variables in their regression model to examine the effect of education on occupational status. [89] These authors argued that education is a human capital resource endowment and the more education workers supply to the labour market, the better they can expect to do relative to others.

Sullivan used education variable as years of school completed and two dummy variables for high school graduation and college graduation when she analysed the occupational prestige of Cuban and Mexican migrant women. She used Hodge-Siegel-Rossi prestige scores for the 1970 census occupational codes (National Opinion Research Center, 1980). Sullivan found that years of schooling completed and college graduation had positive and significant effects for Cuban and Mexican women. For several migrant ancestry groups (Anglo-Celtic, Dutch, Italian, Chinese), Jones used the highest qualification obtained to determine their occupational attainment, using the ANU3 scale as the dependent variable. He found that post-school qualifications tended to be associated with increased job status for Anglo-Celtic, Dutch and Italian women.

Treiman and Terrell (1975) used education in years in a model of occupational status attainment, based on scores from the Standard International Occupational Prestige Scale. They found that for white males and females, each additional year of education added two points in occupational prestige, and the occupational status of black males and females was also strongly influenced by education.

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[89] Vaughan's two papers were the part of a study exploring sex and birthplace differences in occupational attainment, which investigated factors affecting skill level occupational attainment of women compared to men and overseas born groups compared to the Australian-born.

Featherman and Hauser (1976) used an education variable representing years completed. They found that the net effect of educational attainment on occupational status was larger for wives than for husbands. McClendon (1976) used years of education to analyse the occupational attainment in the US and found that education was a major determinant of status for both sexes. Sewell *et al.* (1980) used "years of regular schooling completed", "12 years for high school", "graduates 16 years for college graduates", and found that the status of first jobs of males was more influenced by education and was the case for women as well.

Boyd (1982) used an 18-category classification of education, which was then scaled to approximate years of schooling. Occupational attainment was measured by the Blishen-McRoberts scale (1976), which was similar to Duncan's (1961) socio-economic index used in the US. She found that the current occupational status of women was dependent on education and first-job characteristics.

Evans and Kelley (1986, 1991), Evans (1987) and Kelley and McAllister (1984) used a range of education variables that included "years of education", "educated in Australia", "years of education squared" and "Australian education squared" to measure occupational attainment based on the ANU2 prestige scale. They found that well educated migrants obtained less benefit from their education than did Australian-born person, although poorly educated migrants did rather better.

Vaughan (1992a, b) used the number of years of education as the level of educational qualification.[90] He found that male migrants who were young at the time of migration and who had obtained higher qualifications in Australia were more likely to attain an occupation at a greater level of skill, than migrants who did not have these characteristics. He also found that differences in the occupational distributions of men and women could be explained by sex-based differences in years of education.

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[90] He coded a higher degree as 18 years, a graduate diploma as 16 years, a bachelor's degree as 15 years, a diploma as 14 years, a trade certificate as 13 years, other certificates as 12 years.

In Australia, some of the labour market literature is concerned with problems associated with the lack of recognition of overseas qualifications. There are a number of case studies that deal with these problems, which include Salter's (1978) study of architects, Castle *et al.*'s (1989) study of electrical mechanics, motor mechanics, hairdressers and plumbers and Hawthorne's (1994) study of engineers.

Other studies show that migrants from NESB countries have had problems with the recognitions of their qualifications and work experience (Chapman and Iredale, 1993; Hawthorne 1996a and 1996b; Markovic and Mandenson, 2000). They observed that skilled NESB women sometimes faced problems of qualification recognition and had to pass through language testing and qualification recognition procedures. Hawthorne (1996b) indicated that though attempts have been made since 1989 to reform Australia's qualifications recognition process, which by 1988 saw 90 percent of ESB qualifications being recognized compared with only 50 percent of NESB origin, many incoming NESB women still face the possibilities that their qualifications might be substantially downgraded.

Chapman and Iredale (1993) found that around 39 percent of skilled migrants chose to subject their overseas qualifications to local assessment, and 43 percent of those did not achieve formal recognitions at the level applied for. Markovic and Mandenson (2000) found that structural barriers such as non-recognition of overseas qualifications and skills, restricted migrants access to commensurate employment and hence their social mobility.

We are persuaded by the above discussion that higher levels of educational attainment are necessary for success in securing a primary sector job. Whether or not higher education is a prerequisite, having only basic education would appear to make an individual's prospects in the primary sector fairly limited. In Chapter 3 when we discussed the relationship between education and labour market participation, we note that the screening hypothesis that suggests that the possession of educational qualifications mainly signals the presence of latent talents. Whether this has merit or the

human capital position that higher education enhances productivity, either way the possession of "better" educational qualifications appears likely to affect an individual's job prospects and, in particular, in the primary sector.

As in Chapter 3 we are not persuaded that the years of education of an individual is the most appropriate variable to model educational differences. Again we use levels of education as explanatory variables and create four educational dummies for possessing a degree (*DEGREE*), a diploma (*DIPLOMA*), skilled vocational qualification (*SKILL*) and a basic vocational qualification (*BAV*, reference group). We note again that the census data presents us with only very broad educational categories and we are unable to identify the countries in which the qualifications were obtained.

The *a priori* signs of the coefficients of these dummy variables seem to be obviously positive, however their relative magnitudes are less certain. Those with little education might find limited job opportunities in the primary sector. We are unable to rank having a degree, a diploma or skilled vocational qualification.

4.5.3 Labour Market Experience

Labour market experience provides an index of human capital skills acquired on the job and is likely to influence the probability that a person will be employed in the primary sector. Sullivan (1984), Evans and Kelley (1986, 1991), Evans (1987), Jones (1992), and Vaughan (1992a, 1992b), used experience as an independent variable to examine its effect on occupational status. They argued that experience is an essential component of human capital and variations in labour market experience may partly account for differences in occupational attainment. Chiswick (1978) has argued that length of US work experience is an important indication of acculturation into the labour market, however Sullivan (1984) suggested that experience is not necessarily synonymous work experience because discontinuous labour market participation is more typical of women.

Evans and Kelley (1986, 1991), Evans (1987), used four different variables to capture foreign and Australian experience.[91] They found that the Australian labour market treated migrants in the same as Australian-born with similar labour market experience. Vaughan (1992a, 1992b) measured experience as years of potential experience in the labour market. Two formulae were used to estimate potential labour market experience.[92] Vaughan (1992a) found that differences in occupational attainment between the overseas born (excepting Asian born) and the Australian-born were largely the product of the difficulties of transferring human capital to the Australian labour market. Vaughan (1992b) found that differences in the occupational distributions of men and women resulted from sex-based differences in labour market experience.

According to human capital theory, in the primary sector occupation there are positive returns to investment in skills. We include experience as one of the independent variables in our model, because we believe that experience is likely to signal on-the-job training that could be either formal or informal or both. It seems clear that experience in the primary sector ought to be more important than experience elsewhere, however employers might view any labour market experience as being an indicator of attributes that could be of value to an employer.[93]

As in Chapter 3, we define an individual's labour market experience as 1996 (Census year) minus the mid-value of the year the highest qualification was completed. We recognize that this measure is subject to error, but that is the only way we are able to estimate experience from the 1996 census data. Despite the deficiency, we believe that this measure provides a reasonable indication for individual's actual experience. The *a priori* sign of the coefficient of the experience variable seems to be obviously positive.

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[91] Foreign experience (years), foreign experience squared, Australian experience (years), and Australian experience squared. In addition, Evans and Kelley (1991) used an interaction (Australian experience × educated in Australia) and (Australian experience squared × educated in Australia).

[92] For males, experience = (age - years education - 5), and for females, experience = (age - years education - 5 - (2 × number of children born).

[93] For example, a primary sector employer might give preference to a young applicant even though his/her employment might have been menial and/or part-time or casual.

4.5.4 Length of Residence in Australia

Evans (1984), Miller (1987), and Vaughan (1992a) used length of residence as one of the independent variables in their occupational status model. Evans (1984) argued that like English proficiency, the length of residence might affect attributes of migrants that could directly influence the occupational status of NESB women. Vaughan proposed that longer periods of residence in Australia are an important factor in overcoming difficulties in the transfer of experience and qualifications from overseas labour markets, and enables accommodation to Australian social conditions.

Evans used years since arrival for those that had been in Australia for up to 35 years, and set the variable at 40 for those who live in Australia more than 35 years, and found that the length of residence in Australia had a positive effect on occupational status in all the migrant groups she examined. [94] Miller used the number of years a person lived in Australia and found that as the duration of residence in Australia lengthens, the occupational distribution of the overseas-born converged toward that of the Australian-born. Vaughan (1992a) used years of residence from 1 to 39 and set more than 40 years at 40. He found that period of residence was of little consequence for all groups. Some authors including Jones (1992) and Sullivan (1984) used citizenship as a proxy for length of residence as an independent variable in their models. Sullivan argued that legally, employers are able to discriminate on the basis of citizenship so long as they do not discriminate on the basis of national origin. Widespread discrimination of this type might affect the occupational prestige of migrants.

Jones used "Australian citizen" and found that Australian citizenship had a positive impact on occupational status for Anglo-Celtic and Italian women, but had a negative impact on Dutch and Chinese migrants. Sullivan used one dummy for citizenship in the US and found that for Cuban women, naturalization was associated with structural assimilation to a much greater degree than it was for non-naturalized Mexican women.

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[94] For migrants who arrived more than 35 years ago, but were less than 40 years old had this variable set as their age in years.

We include this variable in our primary sector occupational model because we are persuaded that those with lengthier periods of residence might have become better adapted local skill requirements and acquired a wider knowledge of Australian customs, practices and the like. It is arguable therefore; that those migrants that had been present in Australia for a reasonably lengthy time would be more suited to Australian employers' requirements, in particular in primary sector jobs.[95]

In this study, we use length of residence in years in Australia (*RIA*) and again define it as 1996 (census year) minus the mid-value of the year of arrival category in Australia provided in the Census. The *a priori* sign of the coefficient of the length of residence in Australia variable seems to be obviously positive.

4.5.5 Age

McClendon (1976), Spitze and Waite (1980), Evans (1984), Sullivan (1984), Hirschman and Wong (1984), Vaughan (1992a) used an age variable to examine its effect on occupational status.[96] Spitze and Waite argued that relatively older women are less likely to work, or *age* may represent a cohort effect in which young women are more likely to be employed than older women. Hirschman and Wong proposed that age, as measure of cohort or successive generations, might have a direct effect on socio-economic attainment. Vaughan (1992a) argued from assimilation and human capital perspectives, the age of the person at the time of migration is particularly important, because younger migrants are more likely to have come to terms with Australian social conditions and are less likely to have experience problems of transferring human capital characteristics.

Evans, Sullivan and McClendon used age in years. Evans found that age was positively associated with the occupational status of Australian-born women and negatively associated with the status of NESB women. On the other hand, Sullivan found a negative age effect for Cuban and Mexican women living in the US. McClendon found

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[95] English skills of NESB migrants would tend to improve as their length of residency increased, however we have attempted to measure English skills with a different set of variables.

[96] McClendon (1976) argued age as a surrogate measure for length of time in the work force.

a significant effect of age on occupational status (the effect was stronger for males in each case) in the US. Hirschman and Wong (1984) measured age by three categories: "early adulthood", "middle years" and "maturity". They found that the total ethnic effects were closely parallel with the gross effects, after controlling for other factors.

Vaughan (1992a) used age at migration, (subtracting period of residence from present age) for male migrants. He found that migrants who were young at the time of migration and who had obtained higher qualifications in Australia and who had a good standard of English were much more likely to attain an occupation at a level of skill commensurate with their qualifications and experience. Spitze and Waite (1980) used age as respondent's age in 1968 and found that young women who preferred market work to homework tended to select first jobs with significantly lower occupational status than those who preferred homework.

We are persuaded by the arguments of Evans and Sullivan that an age variable is likely to explain some of the variation in the types of jobs held by both NESB and Australian-born women. The effect of an age variable might occur in several ways: first, it might signal differences in health and strength; and second, it might signal differences in attitudes towards work; and third, preferences of some primary sector employers for particular age groups.

We use three age dummy variables as in Chapter 3 in our model. We argue that a woman's board age group might be more relevant to her prospects for employment in the primary sector than age in years. Again we use three dummy variables: *YOUNG* (less than 24 years old), *MIDDLE* (more than 24 years and less than 46 years old, reference group) and *MATURE* (more than 46 years old).

The *a priori* signs of the coefficients of these dummy variables are *not* absolutely clear. Some young women might be undertaking education and prefer to work in part-time and/or casual jobs during this period of their lives. Others who are older might also prefer part-time and/or casual jobs because their economic needs could be less than

those of younger persons. It should be noted, however, that part-time and/or casual jobs might in many cases be in the primary sector that further clouds the identification of an *a priori* sign for the coefficient. The question of the sign is an empirical matter, however we are reassured that the empirical research in the literature often finds that age is significant.

4.5.6 Marital Status

McClendon (1976), Hudis (1976), Spitze and Waite (1980), Boyd (1982), Evans (1984), Jones (1992), Vaughan (1992b) used marital status variables. McClendon (1976) argued that marital status might affect the status attainments of females for several reasons. Currently, married women often find their occupational endeavours to be secondary in precedence to those of their partners, and possibly secondary in importance to their role of homemaking. Thus, their marital status might constrain their free and full participation in the labour market and possibly lowers their status attainment. Many authors including Hudis (1976), Spitze and Waite (1980), Boyd (1982), Vaughan (1992b) argued that familial responsibilities and a reliance on partner's income will reduce the labour market commitment of currently married women and might reduce their levels of occupational attainment. Green (1991) provided some evidence from Britain that unmarried women experienced fewer interruptions to their careers and so benefited more from promotions and on-the-job training. In that context, Treiman and Terrell (1975) pointed out that well- educated married women were often willing to take jobs for which they were over qualified in exchange for convenient work conditions, whereas never married women were able and seek the best jobs that their qualifications permitted.

Evans used a single dummy variable "now married" and observed a negative relationship between this variable and occupational status for NESB women, but a positive relationship for Australian-born women. Jones used "married" as a single variable and found that married migrant women had lower status jobs. McClendon (1976) used one dummy variable for "married" and found that currently married women had about 3.5 status point's advantage over the non-married women. Vaughan (1992b) used three dummies for marital status: "married", "currently married" and "previously

married". He found that there was no evidence to support the hypothesis that differences in occupational attainment were linked to "family situation" variables. There was also no evidence that women attained less skilled jobs because of sex differences. Hudis (1976) and Boyd (1982) also used dummy variables for marital status and found that married women achieved lower occupational status.

We are persuaded by the findings of Evans and Jones that marital status might affect the probability that a woman would be employed in the primary sector occupation. A decision to seek employment in the primary sector might for some women depend on family responsibilities that might affect their hours of work that they are able to supply. Even if married women fulfil all the criteria for entry into primary sector jobs, they might sometimes be willing to take lower status jobs that might offer greater flexibility with respect to hours of work. On the other hand, women who are not married may have fewer family responsibilities that might make entry into the primary sector jobs more attractive and further, these women seem more likely to seek primary sector incomes to support themselves. On the basis of this and Evans contradictory findings between the effects of marital status on women's occupational status for Australian-born and NESB women, we seek to shed further light on the effects of marital status for these two groups.

Like Evans and Jones we also use one dummy variable for marital status *MARRIED*, and do not use several dummies for the various other categories used in the census. It is arguable, of course, that *de facto* relationships are little different from "being married" and that some women who are married are living as though they were uninvolved in a relationship. Because there is a wide range of possibilities, and recalling that we are attempting to model the probability of employment in the primary sector, we elect to use the simple approach of using married versus not married.

The *a priori* sign of the coefficient of this dummy variable seems unclear. Whilst marital status might have some impact on the probability of participation in the labour market, given that a woman is participating, the reasons why her employment in the

primary sector might be affected are more obscure. This is so because the two of the key factors associated with marital status that might affect employment in the primary sector, namely the presence of children and age, are accounted for by other variables in the model.

4.5.7 Presence of Children

Presence of children is another family characteristics that might influence women's occupational status. Hudis (1976), McClendon (1976), Sewell *et al.* (1980), Spitze and Waite (1980), Evans (1984) and Vaughan (1992b) examined the effects of having children on occupational status. These authors argued that women with children were more likely to work in relatively lower status jobs and claimed that women's primary responsibility is often to fulfil traditional domestic roles as mothers, which might limit their commitment to occupational roles.

Evans used the number of children ever born as variable and found that this variable had a negative effect on the occupational status of Australian-born, East European and Mediterranean women, however for North-western European women the relationship was positive. Vaughan used whether the person had dependent children and age of the youngest as "pre-school", "school" or "post-school". He found that there was no evidence that women choose to invest less of their time in education and the labour market and thus attain less skilled jobs. Hudis (1976) used the number of children under 18 years and the age of youngest child and found negative effects of children on women's employment.

McClendon (1976) used "number of children under aged 6", "number of pre-teenagers aged between 6 and 12" and "number of teenagers aged 13 to 17" and found that variables were not statistically significant in explaining occupational status. Sewell *et al.* (1980) used "ever-married women who were childless", "bore one or two children" and "bore three or more children". They found married women with children account for most of the differences between men and women in occupational status attainment.

We include a presence of children dummy variable in our model because it seems likely that many primary sector jobs are more demanding of an employee's time and this could restrict the choices of mothers who seek to minimize their time away from home. This might extend to mothers preferring less demanding jobs or jobs where there is more flexibility with respect to hours of work. We contend that they might also wish to work close to their homes to minimize travel times and make them more available to their children. This could restrict their access to primary sector jobs. Consequently, some women may formulate their occupational decisions in light of their family responsibilities. Coser and Rokoff (1971) suggested that where conflicts between the demands of these two roles occur, cultural prescriptions generally produce a resolution that favours the requirements of the family. This precedence of the family over women's occupational commitment has the positive effect of minimizing disruptions within the family, but may have negative consequences for women's occupational attainment. For these reasons the *a priori* sign of the coefficient of this dummy variable seems to be negative.

Unlike other authors mentioned above, we use a single dummy variable *CHILD* to denote the presence of children. Clearly this is not ideal, however we are limited in our modelling by the census data. The census provides information on the number of children "ever borne", however we are not able to distinguish between the presence of very young children who might affect the likelihood of women entering primary sector occupations and adult "children" who would seem to have no relevance. Setting aside this problem, whether a mother has one child or several may not make a great deal of difference to her labour market status.[97] In view of these problems, we believe that a yes/no approach to including children in the model seems reasonable.

4.5.8 Place of Residence

The place of residence of an individual is a geographical characteristic that might influence the probability of participating in the primary sector because different

[97] Indeed, a "number of children" variable would imply that, for example, three children would have three times the effect on the probability of being employed in the primary sectors as would having one child. A larger effect is obviously credible, but exactly three times the effect is not.

geographical areas could offer different job opportunities. Lipset (1955), Sewell and Orenstein (1965), Sewell *et al.* (1980), Hirschman and Wong (1984), Evans (1984), Sullivan (1984), Miller (1987), and Evans and Kelley (1991) used place of residence in their occupational status models. Hirschman and Wong argued that the current place of residence provides a crude indicator of differential access to labour markets, which are divided geographically. Sewell and Orenstein argued that the proportion choosing high-status occupations increases as the size of community of residence increases.[98] Generally, these authors argued that place of residence (rural and urban) influences the occupational status. To examine the effect of place of residence on occupational status, Evans (1984) used one dummy variable for residence in a rural location and found that the effect of rural residence on the occupational status for Mediterranean, East Europeans and Australian-born women were positive and that the relationship for North West European women was negative.

Some authors including Miller (1987) and Evans and Kelley (1991) used dummy variables for place of residence in Australia and found that urban residence has a positive impact on occupational status for NESB workers.[99] Hirschman and Wong (1984) used region of residence to measure the occupational attainment based on Duncan's occupational index (1961) and found residence variable explained little of the variation for male migrants (Asian Americans, Blacks, and Hispanics).[100] Sullivan (1984) used one dummy "south" for region of residence and found a negative effect for the southern residence of Cuban and Mexican women migrants. Sewell and Orenstein (1965) used "rural", "smaller urban" and "large urban" and found that the association between community of residence and occupational choices of young women were largely accounted for by intelligence and socio-economic status differences. However, the alternatives for young women in rural communities are severely limited. These

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[98] Lipset (1955) argued that urban-reared youth have a greater acquaintance with the board spectrum of occupational possibilities that exist in metropolitan areas than does rural youth, and this stimulates urban youth to aspire to high-status occupations

[99] Sewell *et al.* (1980) used one dummy "rural", who found rural origin did not significantly reduced the status of first job among women; Miller (1987) and Evans and Kelley (1991) used two dummies: "small urban" and "rural" and "major/large urban" is the control group.

[100] The regions are: California (entire state); Hawaii (entire state); South metropolitan areas; South non metropolitan areas; rest of the United States, metropolitan; rest of United states, non metropolitan.

young women lacked satisfactory rural occupational opportunities and were as likely to aspire as urban young women of similar intelligence and socio-economic status.

We include a place of residence dummy variable because we believe those primary sector job opportunities vary from one geographical area to another. Living in a metropolitan area could increase the opportunities for women's primary sector employment, and our model provides an opportunity to examine possible different effects for NESB and Australian-born women. The *a priori* sign of the coefficient of this dummy variable seems to be positive, however the relative dearth of primary sector job opportunities in rural areas has to be balanced against smaller populations in those areas and that make it possible that rural labour market participants to be more likely to be employed in primary sector jobs.

As in Chapter 3, we use one dummy variable to denote region of residence *CITY*. Only 15 percent of all Australian-born persons live in rural areas and only 4-10 percent migrants live in such areas.

4.6 Employment of NESB Women in the Primary Sector

In this model we define the variable *PRIM* as *PRIM* = 1 if a person worked in the primary sector of the labour market as we have defined it, and 0 otherwise. The following general probit model based on Equation (4.1) is used to analyse the probability that NESB women are employed in primary sector jobs given that they are participants in the labour market.

$$\begin{aligned} PRIM_i^* = \alpha &+ \beta_1 ENGVW_i + \beta_2 ENGW_i + \beta_3 ENGNW_i \\ &+ \beta_4 DEGREE_i + \beta_5 DIPLOMA_i + \beta_6 SKILL_i \\ &+ \beta_7 EXPERIENCE_i + \beta_8 RIA_i + \beta_9 YOUNG_i \\ &+ \beta_{10} MATURE_i + \beta_{11} MARRIED_i + \beta_{12} CHILD_i \\ &+ \beta_{13} CITY_i + \varepsilon_i, \end{aligned} \tag{4.2}$$

In this model, dependent variable $PRIM_i^*$ is a latent variable such that $PRIM_i = 1$ if $PRIM_i^* > 0$ and 0 otherwise. The error term, ϵ_i is assumed to be normal and the

explanatory variables are defined in Chapter 3, Table 3.1. The estimated coefficients of the independent variables in the model are presented in Table 4.2.

In Section 4.7, we will estimate a corresponding model for Australian-born women's primary sector status, in which the variables peculiar to NESB women are removed. Again, to make meaningful comparisons between the impacts of particular variables on the probability of having a primary sector job of both groups, we calculate estimated elasticities at the mean values of the independent variables.

Because this approach does not permit us to test for statistically significant differences, in Section 4.8 we estimate a model in which we pool the NESB and Australian-born women's data. In this model, we use an NESB intercept dummy variable to test whether there is a difference in the probability of having a primary sector job between the groups that is independent of the variables in the model. We also use slope dummy variables for all variables that are relevant to both groups. This will enable us to identify significant differences in the impacts of particular variables on the probability that a woman has a primary sector job between the groups.

Again, we used a general to specific modelling approach in estimating Equation (4.2). In the general model, the results obtained were not entirely satisfactory. The *ENGVW* and *CITY* dummies did not yield significant results and the coefficient of *SKILL* contradicted the *a priori* sign. These seemed to be important human capital variables that on theoretical grounds are probably worth continuing with. As we discussed earlier, the age, marital status and presence of children variables also appear to be important from a theoretical perspective and have been found to be significant in other empirical work. After estimating a parsimonious model, as in Chapter 3, to improve the performance of our model we augmented it with several interaction variables to explore the importance of these factors. In particular, they were (1) "mature" age status with marital status, (2) "mature" age status with presence of children, marital status with presence of children, (3) "middle" age status with marital status, (4) "middle" age status with presence of children and (5) "middle" age status with marital status and with

presence of children. Our preferred model that included the "young" status with marital status and presence of children interaction variable is also presented in Table 4.2.

In Sections 4.6, 4.7 and 4.8, we restrict our observations concerning the coefficients, p-values and elasticities evaluated at the means of the dependent variables, to the preferred models. The same statistics for the corresponding general models are also shown in Tables 4.2, 4.3 and 4.4.

In the preferred model, the null hypothesis that all the coefficients are jointly equal to zero was rejected by a likelihood ratio test.[101] The R^2 was 0.217 and can be considered to be a reasonable fit for models of this type.

4.6.1 English Proficiency

The coefficients of the variables designating speaking English "very well", "well" and "not well" compared with "excellent" (reference group) English were negative and significant (and were respectively -0.053, -0.607, -1.112). This suggested that those NESB women who spoke better English were more likely to have primary sector jobs. Our results are consistent with human capital theory predictions concerning primary sector employment and supports. They support the view that some NESB women might be so disadvantage by their lack of English skills that they were unable to find primary sector jobs. It is possible also that some NESB women with relatively poor English skills might not apply for primary sector jobs because some could believe, perhaps wrongly, that they would be unsuccessful if they applied for such jobs. Our results suggest that there is a positive relationship between better English skills and the probability of obtaining primary sector employment. This is generally consistent with the findings of Evans (1984, 1987), Jones (1992), Vaughan (1992b) and Evans and Kelley (1986, 1991).

4.6.2 Educational Attainment

The differential effects of possessing a degree or a diploma compared to a basic vocational qualification all yielded positive and significant results (and were

respectively 0.893 and 0.642). This suggested that by obtaining some form of higher education, NESB women might increase their prospects of acquiring primary sector jobs. These results are generally consistent with the findings of Treiman and Terrell (1975), Featherman and Hauser (1976), Sewell *et al.* (1980), Evans (1984), Sullivan (1984), Evans and Kelley (1986, 1991), Jones (1992) and Vaughan (1992a, 1992b).

Surprisingly, the differential effects of possessing a skilled vocational qualification compared to and a basic vocational qualification was negative and significant (-0.225). It is unclear why this should be so, and it appears not to be due to multi-collinearity between this variable and others in the model.[102] A possible explanation for this negative result may come from broadly defined reference group, the "basic vocational qualification" that contains a number of sub-groups: levels of attainment inadequately described, level of attainment not stated, and not applicable group. Many members of these sub-groups might have reasonable levels of education at secondary college and could have better means of acquiring primary sector employment. Some might have started lower status jobs but after gaining experience, they might move to primary sector jobs although they lack degrees or diplomas.

4.6.3 Labour Market Experience

The coefficient of the labour market experience variable was positive and significant (0.016). This is consistent with the human capital theory that suggests through experience employees obtain on the job training that raises their productivity and employment prospects in the primary sector. However, this finding is in contrast with Sullivan (1984) who found that experience did not lead to improving their job position for US migrant women workers. Our result is generally consistent with Evans and Kelley (1986, 1991), Evans (1987), Jones (1992) and Vaughan (1992a, 1992b).

4.6.4 Length of Residence in Australia

The coefficient of the variable denoting residence in Australia was positive and significant and suggested that the probability of NESB women being employed in

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[101] $\chi^2_{13} = 1092$ [0.000]

[102] The largest correlation was between *SKILL* and *EXPERIENCE* (0.2271).

primary sector jobs was greater the longer they live in Australia (0.031). This is consistent with the findings of Evans (1984), Miller (1987) and Vaughan (1992a). On the other hand, Sullivan (1984) and Jones (1992) used "citizenship" status as a proxy for this variable and found that the impact of citizenship on occupational status differed between different migrant groups.

4.6.5 Age

The coefficient of *YOUNG* was negative and significant (-0.251), and suggested that that being a NESB woman in the range 18 to 24 years old reduced the probability that participants in the labour market had primary sector jobs, compared with that of the 25 to 45 group (reference group). This finding is consistent with Spite and Waite (1980) who found that young women who preferred market to homework tended to select first jobs with significantly lower occupational status than those who preferred homework. It is also consistent with the proposition that many of the young people may still be studying or not looking for primary sector jobs.

The coefficient of *MATURE* was also negative (-0.167) and significant. This result was in contrast with the finding of McClendon (1976) who found a positive significant effect of age on the occupational status of white American women. This implies that the probability of older NESB women having primary sector jobs was less than in the 25 to 45 year age group.

The differential effect of *YOUNG* compared to *MATURE* was -0.084, indicating that probability of young women having primary sector jobs was smaller than that of mature aged women, other things being equal.[103] Our finding is in contrast with Sprite and Waite (1980), but it is consistent with our proposition that younger women prefer to work more, than mature aged women because of their economic needs.

4.6.6 Marital Status

The coefficient of the marital status variable was positive and significant (0.133). This suggested that married NESB women who were in the labour market were more likely

to have primary sector jobs, *ceteris paribus*. This finding is consistent with McClendon (1976) and Vaughan (1992b), but this tends to contradict Boyd (1982), Evans (1984), and Jones (1992).

4.6.7 Presence of Children

The coefficient of the presence of children variable was negative and significant (-0.241) indicating that NESB women were less likely to have primary sector jobs if they had children. Our finding supports McClendon (1976), Hudis (1976), Sewell *et al.* (1980), Spritze and Waite (1980), Evans (1984) and Jones (1992).

4.6.8 Interaction Variables Containing Presence of Children

The coefficient of *YOUNG*MARRIED*CHILD* was negative and insignificant at 10 percent, but significant at 20 percent level of significance (-0.488). This suggests that being "young", married and having children decreases the probability of NESB women who are in the labour market having primary sector occupations. This is consistent with our proposition that being young and married with children might involve family responsibilities that make some willing to take lower status jobs that could offer other advantages such as conveniences.

This finding is consistent with Sullivan (1984) who found, for US migrant women, family responsibilities might require even the most ambitious women to stay in routine jobs that receive little prestige. This result is also consistent with Spitze and Waite (1980), who found that married mothers of pre-school children's attitude on employment were less ambitious than those of other women. Sewell *et al.* (1980) found that married women with children tend to lose occupational standing.

4.7 Employment of Australian-born Women in the Primary Sector

The following general probit model based on Equation (4.1) is used to analyse the probability that Australian-born women are employed in primary sector jobs given that they are participants in the labour market.

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[103] (-0.251) - (-0.167) = -0.084.

$$PRIM_i^* = \alpha + \beta_1 DEGREE_i + \beta_2 DIPLOMA_i + \beta_3 SKILL_i + \beta_4 EXPERIENCE_i + \beta_5 YOUNG_i + \beta_6 MATURE_i + \beta_7 MARRIED_i + \beta_8 CHILD_i + \beta_9 CITY_i + \varepsilon_i, \quad (4.3)$$

This model is identical to model (4.2) except that the variables relating only to NESB women only have been deleted. The estimated coefficients of the independent variables in the model are shown in Table 4.4.

Again, we used a general to specific modelling approach in estimating Equation (4.3). In the general model, all of the variables in this model are significant at the 1 percent level, except *MATURE*. After estimating a parsimonious model, as in the NESB women's primary sector model, we augmented the model with several interaction variables constructed from the age, marital status and presence of children variables. Our preferred model is also presented in Table 4.4.

In our preferred model, the null hypothesis that all the coefficients are jointly equal to zero can be rejected.[104] The coefficient of determination was 0.1417 and the model's percentage of correct predictions was 66.9 percent.

4.7.1 Educational Attainment

The differential effect for possessing a degree or a diploma skill compared to a basic vocational qualification all yielded positive and significant results (and were respectively 1.026 and 0.527). This suggested that by obtaining some form of higher education, Australian-born women increase the probability of their acquiring primary sector jobs. These results are consistent with the findings of Treiman and Terrell (1975), McClendon (1976), Boyd (1982), Evans (1984), Sullivan (1984). It is possible that this result could have come about because the reference group (*BAV*) might contain many people with valuable practical skills that were not acquired through formal education.

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[104] $\chi^2_{12} = 4134.803$ [0.000].

As found for NESB women, the differential effects of Australian-born women possessing a skilled vocational qualification compared to and a basic vocational qualification was negative and significant (-0.374). It is unclear why this should be so and, like the NESB women's results it appears not to be due to multi- collinearity.[105]

4.7.2 Labour Market Experience

The coefficient of experience variable was positive and significant (0.021). This is consistent with the human capital theory that suggests through experience employees obtain on the job training that raises their productivity and employment prospects in the primary sector.

4.7.3 Age

Table 4.4 shows that the coefficient of *YOUNG* was negative and significant (-0.570) and suggested that that being an Australian-born woman in the range 18 to 24 years old reduced the probability of participants in the labour market having primary sector jobs, compared with that of the 25 to 45 group (reference group). Unlike the findings concerning NESB women, we were unable to find a significant difference between the "middle" and "mature" age groups of Australian-born women.

4.7.4 Marital Status

The coefficient of the marital status variable was positive and significant (0.539). This suggested that married Australian-born women who were in the labour market were more likely than their non-married counterparts to have primary sector jobs. This is consistent with the finding for NESB women except that the effect is somewhat greater for Australian-born women (0.539 versus 0.133). In discussing the theoretical reasons why marital status might be a useful predictor variable, we noted that the *a priori* sign of the coefficient was unclear.

4.7.5 Presence of Children

The coefficient of the variable denoting the presence of children was negative and significant (-0.334). This suggested that Australian-born women with children were less

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[105] The largest correlation was between *SKILL* and *EXPERIENCE* (0.1757).

likely to have primary sector jobs. This matches the finding for NESB women, except that the effect was somewhat less for Australian-born women (-0.344 versus -0.241). Hudis (1976), McClendon (1976), Spitze and Waite (1980), Evans (1984), observed similar relationships.

4.7.6 Interaction Variables containing Age

The coefficient of the "mature" aged and married interaction variable was also negative and significant (-0.498), however the combined effect was slightly positive.[106]

The coefficient of the interaction the "mature" aged and presence of children variables was positive and significant (0.182), however when taken together with the coefficients of *MATURE* and *CHILD* the combined effect was negative.[107] Being "mature" aged and having a child appeared to decrease the probability of being employed in the primary sector.

The coefficient of married and "middle" aged interaction variable was negative and significant (-0.283), and when taken together with the coefficient of *MARRIED* the combined effect was positive.[108] Being "middle" aged and being married appeared to increase the probability that labour market participants would be employed in the primary sector.

4.7.7 Interaction Variables containing Presence of Children

The coefficient of the interaction of the marital status variable with the presence of a child variable was positive and marginally significant, however when taken together with the coefficient of *MARRIED* and *CHILD* the combined effect was also positive and larger.[109] This suggests that the probability that Australian-born woman would be

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[106] Being "mature" aged and married had a combined coefficient of -0.000 (*MATURE*) + 0.539 (*MARRIED*) - 0.498 (*MATURE*MARRIED*) = 0.040.

[107] Being "mature" aged and having children had a combined coefficient of 0.000 (*MATURE*) - 0.344 (*CHILD*) + 0.182 (*MATURE*CHILD*) = -0.162.

[108] Being "middle" aged and married had a combined coefficient of 0.539 (*MARRIED*) - 0.283 (*MIDDLE*MARRIED*) = 0.256.

[109] The effect of being married and having at least one child had a combined coefficient of 0.539 (*MARRIED*) -0.344 (*CHILD*) + 0.059 (*MARRIED*CHILD*) = 0.254.

employed in the primary sector was little affected by being married and having children, *ceteris paribus*, and indeed the probability seems to be greater for this group.

4.7.8 Place of Residence

The coefficient of *CITY* was significant and positive (0.217) and contrasts with the insignificant finding in the general model for NESB women who participated in the labour market. It is unclear why the coefficient of *CITY* for NESB women is insignificant. The possible explanation may be due to low employment opportunity for primary sector jobs in a metropolitan area for NESB women, because of their poor English proficiency and non-recognition of overseas qualifications. A small sample may also be a cause for such an insignificant result.

4.8 A Comparison of NESB and Australian-born Women's Employment

The following general model based on Equation (4.2) is used to analyse the NESB migrant women's employment in primary sector jobs in the labour market.[110]

$$\begin{aligned} PRIM_i^* = \alpha &+ \lambda\, NESB_i + \beta_1\, ENGVW_i + \beta_2\, ENGW_i + \beta_3\, ENGNW_i \\ &+ \beta_4\, DEGREE_i + \gamma_4\, DEGREE_i \times NESB_i \\ &+ \beta_5\, DIPLOMA_i + \gamma_5\, DIPLOMA_i \times NESB_i \\ &+ \beta_6\, SKILL_i + \gamma_6\, SKILL_i \times NESB_i \\ &+ \beta_7\, EXPERIENCE_i + \gamma_7\, EXPERIENCE_i \times NESB_i \\ &+ \beta_8\, RIA_i + \gamma_8\, RIA_i \times NESB_i \\ &+ \beta_9\, MATURE_i + \gamma_9\, MATURE_i \times NESB_i \\ &+ \beta_{10}\, MARRIED_i + \gamma_{10}\, MARRIED_i \times NESB_i \\ &+ \beta_{11}\, CHILD_i + \gamma_{11}\, CHILD_i \times NESB_i \\ &+ \beta_{12}\, CITY_i + \gamma_{12}\, CITY_i \times NESB_i + \varepsilon_i \end{aligned} \tag{4.4}$$

4.8.1 Unspecified Differences

In the pooled data model shown in Table 4.5, the coefficient of the intercept dummy variable *NESB* is positive but not significant. This suggests that after controlling for the

[110] Again, *RIA* is not included in this model because when it is large, it has almost the same effect of being Australian-born. We believe that the intercept dummy will capture any effects for recent arrivals.

human capital and demographic variables in the model, NESB and Australian-born women were equally likely to have primary sector jobs.

4.8.2 Educational Attainment

In the separate models for NESB and Australian-born women in Tables 4.2 and 4.3, the coefficients of the education variables *DEGREE*, *DIPLOMA*, and *SKILL* are significantly different from zero. A comparison of the elasticities evaluated at the means of these variables suggests only a small difference between the impacts of having a degree on the probability of having a primary sector job for NESB and Australian-born women (0.355 and 0.386 respectively). On the other hand, the models suggest that the impacts of having a diploma had a greater effect on the probability of having a primary sector job for NESB than for Australian-born women (0.255 and 0.198 respectively). In addition, the models suggest that the impacts of having a vocational skill qualification reduced the probability of having a primary sector job and the effect was greater for Australian-born (-0.090 and –0.141 respectively).

Although the elasticities are similar in the separate models for the effect of having a degree, the pooled data model shown in Table 4.5 suggests otherwise. The variable *DEGREE*NESB* is significant and its coefficient is negative, which suggests that whilst the possession of a degree makes NESB women more likely to have a primary sector job, the effect is greater for Australian-born women.[111] The variable *DIPLOMA*NESB* is not significant, which suggests that whilst the possession of a diploma makes women more likely to have a primary sector job, the effect is the same for Australian-born women. The variable *SKILL*NESB* is also not significant, which suggests that whilst the possession of a vocational trade qualification has the same positive impact on the probability of having a primary sector job for NESB and Australian-born women.

While there is some evidence that the impact of having educational qualifications falls unevenly between the groups, there is clear evidence that they increase the probability of having a primary sector job for both groups. The models provide some support for the

[111] The effective coefficient for NESB women is 0.784 and 1.022 for Australian-born women.

hypothesis that the positive effects of having a degree or diploma are less for NESB women than for Australian-born women.

4.8.3 Labour Market Experience

In the separate models for NESB and Australian-born women in Tables 4.2 and 4.3, the coefficients of the labour market experience variable *EXPERIENCE* are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of having additional experience had a smaller effect on the probability of having a primary sector job for NESB than for Australian-born women (0.006 and 0.008 respectively).

In the pooled data model shown in Table 4.5, the variable *EXPERIENCE*NESB* is marginally significant and its coefficient is negative, which suggests that whilst the possession of additional experience makes women more likely to have a primary sector job, the effect is less for NESB women than for Australian-born women.[112]

4.8.4 Age

In the separate models for NESB and Australian-born women in Tables 4.2 and 4.3, the coefficients of *YOUNG* are significantly different from zero and are negative. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being 18 to 24 years old reduced the probability of having a primary sector job compared with being in the 25 to 45 group, and the impact was less for NESB women than for Australian-born women (-0.105 and –0.214 respectively).

In the pooled data model shown in Table 4.5, the variable *YOUNG*NESB* is significant and its coefficient is positive, which suggests that being 18 to 24 years of age makes NESB women more likely to have a primary sector job than Australian-born women.[113]

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[112] The effective coefficient for NESB women is 0.015 and 0.021 for Australian-born women.
[113] The effective coefficient for NESB women is –0.336 and –0.574 for Australian-born women.

In the separate models for NESB and Australian-born women in Tables 4.2 and 4.3, the coefficient of *MATURE* is significantly different from zero and negative for NESB women, but not significant for Australian-born women.

In the pooled data model shown in Table 4.5, the variable *MATURE*NESB* is positive but not significant, which suggests that being over 45 years of age has the same impact for NESB and Australia-born.

4.8.5 Marital Status

In the separate models for NESB and Australian-born women in Tables 4.2 and 4.3, the coefficients of *MARRIED* are significantly different from zero and are positive. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of being married increased the probability of having a primary sector job, and the impact was greater for NESB women than for Australian-born women (0.528 and 0.203 respectively).

On the other hand, in the pooled data model shown in Table 4.5, the variable *MARRIED*NESB* is significant and negative. The model suggests that being married has a positive impact on the probability of having a primary sector job for Australian-born women, whereas the impact is small but negative for NESB women.[114]

4.8.6 Presence of Children

In the separate models for NESB and Australian-born women in Table 4.2 and 4.3, the coefficients of *CHILD* are significantly and negative. A comparison of the elasticities evaluated at the means of these variables suggests that the impacts of having a child decreased the probability of having a primary sector job, and the impact was less for NESB women than for Australian-born women (-0.096 and -0.129 respectively).

In the pooled data model shown in Table 4.5, the variable *CHILD*NESB* is not significant, which suggests that the presence of a child has the same negative impact on NESB and Australia-born women.

4.8.7 Interaction Variables containing Age

In the model for NESB in women, the coefficients of *MAT*MARRIED*, *MAT*CHILD* and *MID*MARRIED* were not significant and were not used in either of the models shown in Table 4.2. All excepting *MID*MARRIED* were significant for Australian-born women, and the results are shown in Table 4.4.

In the pooled data model shown in Table 4.5, the variable *MAT*MARRIED*NESB* is significant and its coefficient is positive, which suggests that being "mature" and married makes NESB women more likely to have a primary sector job than Australian-born women.[115]

In the pooled data model, the variable *MAT*CHILD*NESB* is not significant, which suggests that being "mature" and having a child has the same impact for NESB and Australian-born women.

In the pooled data model, the variable *MID*MARRIED*NESB* is not significant, which suggests that being "middle" aged and married has the same impact for NESB and Australian-born women.

In the pooled data model shown in Table 3.4, the variable *MID*CHILD*NESB* is not significant, which suggests that being "middle" aged and having a child has the same impact for NESB and Australian-born women.

4.8.8 Interaction Variables containing Presence of Children

In the separate models for NESB and Australian-born women in Tables 4.2 and 4.3, the coefficients of *MARRIED*CHILD*, which is the interaction variable for being married and having a child are not significantly different from zero.

In the pooled data model shown in Table 4.5, the variable *MARRIED*CHILD*NESB* is marginally significant and its coefficient is positive, which suggests that being married

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[114] The effective coefficient for NESB women is –0.129 and 0.560 for Australian-born women.

and having a child makes NESB women more likely to have a primary sector job than Australian-born women.[116]

4.8.9 Place of Residence

In the separate models in Tables 4.2 and 4.3, the coefficient of *CITY* is significantly different from zero and positive for Australian-born women. It is not significant for NESB women and was not used in the preferred model.

In the pooled data model shown in Table 4.5, the variable *CITY*NESB* is significant and negative, which suggests that the impact of living in a metropolitan area has a larger impact on the probability of having a primary sector job for Australian-born women.

4.8.10 Summary

The empirical work on the employment status of the NESB migrant women that includes Cox *et al.* (1976), Storer *et al.* (1976), Lampugnani and Mansell (1984), Martin (1984), Storer (1985), Chataway and Sachs (1990), and Misztal (1991) have suggested that NESB migrant women tend to be employed in lower-level, lower-status and lower paying occupations than Australian-born women. In this section we have compared NESB and Australian-born women's probabilities of obtaining primary sector employment.

In our models, we used several interaction variables that, whilst supported by theory, performed poorly in the models. Being young, married and having children appeared to affect the probability of having a primary sector jobs. For NESB women, these attributes decreased the probability of having primary sector jobs. For Australian-born women, being mature aged and married, and middle aged and married decreased the probability of primary sector employment. On the other hand, both being mature aged and having a child, and being married with a child increased the probability of primary sector employment.

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[115] The effective coefficient for NESB women is 0.109 and –0.488 for Australian-born women.
[116] The effective coefficient for NESB women is 0.268 and 0.046 for Australian-born women.

4.9 Conclusion

In this chapter we first assigned occupations to the primary and secondary sectors, using the 1996 Census occupational groups, and we used the ANU2 occupational prestige scale and an income criterion as the basis of the allocation. We developed univariate probit models that analysed the probability of primary sector employment of NESB migrant women and Australian-born women who participated in the labour market.

Five main conclusions are drawn from this study. First, young NESB women were more likely to have primary sector employment compared with Australian-born women. Second, Australian-born women were more likely to benefit from having a degree if they sought primary sector employment, however NESB women also benefited but to a lesser extent. The reverse was true for diploma holders. Third, whilst greater labour market experience increased the probability of having primary sector employment, Australian-born women appeared to benefit more than NESB women. These results generally conform to the predictions of human capital theory. Fourth, married Australian-born women were more likely to have primary sector jobs than NESB migrant women. Fifth, NESB migrant women with children were more likely to have primary sector jobs than their Australian-born counterparts.

The NESB model clearly suggests that poor skills in English are associated with a lesser probability of having primary sector employment, other things being equal. By acquiring better skills in English, NESB women may overcome some of the disadvantage they face in seeking primary sector jobs. Although educational qualifications are an advantage, it seems likely that NESB women with degrees and diplomas would benefit less from having these qualifications than would Australian-born women.

Table 4.1: Allocation of Jobs to the Primary or Secondary Sector

Census		ANU2 Occupational Scale			Allocation [117]
Code	**Description**	**Description**	**Scale**	**Average**	**Sector**
10	Managers not further defined	Managers, others, unstated, unknown	672	672	Primary
11	Generalist Managers	Administrative and Executive		718	Primary
		Officers Local Government	681		
		Commonwealth Government	813		
		State Government	772		
		All managers			
		Construction	650		
		Manufacturing	679		
12	Specialist Managers	Managers		695	Primary
		Finance, Insurance, Real Estate	698		
		Sales Managers			
		Agriculture, Mining	697		
		Construction	690		
13	Farmers and Farm Managers*[118]	Farmers & Farm Managers NEC	611	611	Primary
20	Professional not further defined	-	-	-	Primary
21	Science Building and Engineering Professionals	Engineers		817	Primary
		Civil	835		
		Mechanical	832		
		Chemical	806		
		Mining	795		
22	Business and Information Professional	Pharmacists	765	742	Primary
		Accountants			
		Independents Accounts, Auditors	821		
		All accounts, Auditors	752		
		Salaried accounts, Auditors	731		
		Professional Librarians	737		
		Computer programmers	644		

[117] Our allocations are based on both ANU2 and the earnings criterion. The occupational descriptions in the Census do not do not match exactly with those in ANU2, however for the most part it is easy to find the ANU2 descriptions that correspond to the Census codes.

[118] An asterisk (*) indicates that we have some reservations about the whether a clear line of demarcation can be drawn.

23	Health Professional	Independent Medical Practitioners	915	825	Primary
		All Medical Practitioners	880		
		Dentists	866		
		Optometrists	768		
		Pharmacists	765		
		Veterinarians	757		
24	Education professional	Teachers		681	Primary
		(Tert. Quals.) Tech college	717		
		Others (no Tert. Quals.) CAE	710		
		Others (no Tert. Quals.) Techcoll	679		
		(Tert. Quals.) SEC School	675		
		Primary School Teachers	630		
25	Social Arts and Miscellaneous Professional	Religious Workers NEC	596	623	Primary
		Social workers	649		
30	Associate Professional not further defined	-	-	-	Primary
31	Science Engineering and related Associated Professional	Biological & Animal Scientists	731	731	Primary
32	Business and Administration Associate Professional	Sal Auctioneers, Realest Salesmen	629	629	Primary
33	Managing Supervisors (sales and services)	Sales Managers Restaurants, Accommodation, Clubs	519	519	Primary
34	Health and Welfare associate Professional	Nurses General Certificated	636	636	Primary
39	Other associate Professionals	Policemen	508	508	Primary
40	Tradespersons and related workers not further defined	-		-	Primary
41	Mechanical and fabrication Engineering trades	Aircraft Mechanics	567	567	Primary
42	Automotive Tradespersons*	Independent Motor Vehicle Mechanics	556	556	Primary
43	Electrical and electronics Trades	Independent Electricians	616	616	Primary
44	Construction Tradespersons	Independent Bricklayers	539	572	Primary
		Independent Plumbers	605		
45	Food Tradespersons*	Cooks and Chefs	448	439	Secondary
		Bakers & Pastry cooks	430		
46	Skilled Agricultural and Horticultural workers*	Gardeners, Nursery workers	483	461	Secondary
		Shearers	439		

49	Other Tradespersons and related workers*	Independent Barbers, Hairdresser, Beauticians	513	489	Secondary
		Cabinetmakers	466		
50	Advanced clerical and service not further defined	-		-	Primary
51	Secretaries and personal assistants	Bookkeepers, Cashiers, Tellers	527	527	Primary
59	Other advanced clerical and service workers	Insurance Salesmen	595	595	Primary
60	Intermediate sales service workers not further defined	-		-	Secondary
61	Intermediate clerical workers	Clerical Workers Government Sector	525	505	Primary
		Female Receptionists	486		
62	Intermediate sales and related workers	Salesmen NEC	536	536	Primary
63	Intermediate Service workers	Waiters	389	436	Secondary
		Gardeners, Nursery workers	483		
70	Intermediate Production and transport workers not further defines	-		-	Secondary
71	Intermediate plant operators*	Crane and Hoist	411	411	Secondary
72	Intermediate machine operators*	Office Machines	456	456	Secondary
73	Road and Rail transport drivers*	Independent Car, Taxi, Hire car drivers	563	563	Primary
79	Other intermediate production and transport workers	Miners NEC	415	415	Secondary
80	Elementary clerical sales and service workers not further defined	-		-	Secondary
81	Elementary clerks	Clerical workers government	525	512	Primary
		Clerical workers non government	499		
82	Elementary sales workers	Service station attendants	430	430	Secondary
83	Elementary service workers	Other domestic service workers	492	492	Secondary
90	Labourers and related workers not further defined	-		-	Secondary
91	Cleaners	Cleaners office, buildings	414	414	Secondary

92	Factory labourers	Factory labourers		366	Secondary
		Clothing related	353		
		Wood prods, furniture	348		
		Textiles	389		
		Boot & shoe	388		
		Food, Beverage, Tobacco	331		
		Textile & Clothing	343		
		Dairy products	412		
99	Other labourers and related workers	Other labourers		393	Secondary
		Mining & Quarrying	387		
		Chemical, Petrol, Coal	384		
		Electricity, Gas, Water	383		
		Transport, Communication	374		
		Food, Drink	395		
		Construction	436		

NEC: Not elsewhere classified.

Table 4.2: Summary Statistics for Primary Sector Status Models

Variables	NESB		Australian-born		Pooled	
Dependent Variable	***Mean***	***Std. Dev.***	***Mean***	***Std. Dev.***	***Mean***	***Std. Dev.***
PRIM	0.477	0.499	0.611	0.488	0.591	0.492
Independent Variables						
ENGVW	0.356	0.479			0.094	0.292
ENGW	0.230	0.421			0.036	0.187
ENGNW	0.108	0.310			0.017	0.127
DEGREE	0.206	0.404	0.161	0.367	0.168	0.373
DIPLOMA	0.088	0.283	0.101	0.301	0.099	0.298
SKILL	0.036	0.185	0.034	0.180	0.034	0.181
EXPERIENCE	6.209	8.249	4.791	7.124	5.000	7.318
RIA	13.717	7.437				
YOUNG	0.088	0.283	0.218	0.413	0.198	0.399
MIDDLE	0.554	0.497	0.532	0.499	0.535	0.499
MATURE	0.358	0.480	0.251	0.434	0.591	0.492
MARRIED	0.677	0.468	0.517	0.500	0.541	0.498
CHILD	0.689	0.463	0.563	0.496	0.582	0.493
CITY	0.749	0.434	0.502	0.500	0.538	0.499
Cases	4,484		25,906		30,390	

Table 4.3: Probit Models of NESB Women's Primary Sector Status

Dependent: *PRIM**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	-0.412	0.000	-0.390	0.000	
ENGVW	-0.059	0.246	-0.053	0.283	-0.053
ENGW	-0.612	0.000	-0.607	0.000	-0.241
ENGNW	-1.121	0.000	-1.112	0.000	-0.443
DEGREE	0.893	0.000	0.893	0.000	0.355
DIPLOMA	0.640	0.000	0.642	0.000	0.255
SKILL	-0.225	0.049	-0.225	0.048	-0.090
EXPERIENCE	0.016	0.000	0.016	0.000	0.006
RIA	0.031	0.000	0.031	0.000	0.123
YOUNG	-0.282	0.000	-0.251	0.002	-0.105
MATURE	-0.165	0.000	-0.167	0.000	-0.663
MARRIED	0.128	0.010	0.133	0.008	0.528
CHILD	-0.251	0.000	-0.241	0.000	-0.096
*YOUNG*MARRIED*CHILD*			-0.488	0.174	-0.194
CITY	0.045	0.337			
Log-likelihood	-2557.673		-2557.135		
Restricted Log-likelihood	-3103.153		-3103.153		
Chi-squared	1090.96	0.000	1092.04	0.000	
Correct Prediction	70.7 percent		70.7 percent		
R^2	0.217		0.217		

Table 4.4: Probit Models of Australian-born Women's Primary Sector Status

Dependent: *PRIM**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	0.063	0.004	0.081	0.000	
DEGREE	1.032	0.000	1.026	0.000	0.386
DIPLOMA	0.534	0.000	0.527	0.000	0.198
SKILL	-0.364	0.000	-0.374	0.000	-0.141
EXPERIENCE	0.021	0.000	0.021	0.000	0.008
YOUNG	-0.527	0.000	-0.570	0.000	-0.214
MATURE	-0.010	0.622			
MARRIED	0.262	0.000	0.539	0.000	0.203
CHILD	-0.273	0.000	-0.344	0.000	-0.129
*MAT*MARRIED*			-0.498	0.000	-0.178
*MAT*CHILD*			0.182	0.000	0.068
*MARRIED*CHILD*			0.059	0.187	0.022
*MID*MARRIED*			-0.283	0.000	-0.107
CITY	0.219	0.000	0.217	0.000	0.816
Log-likelihood	-15276.12		-15250.31		
Restricted log-likelihood	-17317.71		-17317.71		
Chi-squared	4083.2	0.000	41334.8	0.000	
Correct prediction	66.9 percent		66.9 percent		
R^2	0.140		0.141		

Table 4.5: Probit Models of Women's Primary Sector Status using Pooled Data

Dependent: *PRIM**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	0.067	0.002	0.096	0.000	
NESB	-0.032	0.634	0.014	0.989	0.000
ENGVW	-0.075	0.014	-0.085	0.006	-0.032
ENGW	-0.669	0.000	-0.677	0.000	-0.260
ENGNW	-1.219	0.000	-1.221	0.000	-0.468
DEGREE	1.031	0.000	1.022	0.000	0.392
*DEGREE*NESB*	-0.250	0.000	-0.238	0.000	-0.091
DIPLOMA	0.534	0.000	0.525	0.000	0.022
*DIPLOMA*NESB*	0.044	0.603	0.057	0.502	0.218
SKILL	-0.360	0.000	-0.374	0.000	-0.143
*SKILL*NESB*	0.114	0.348	0.131	0.283	0.050
EXPERIENCE	0.021	0.000	0.021	0.000	0.008
*EXPERIENCE*NESB*	-0.005	0.115	-0.006	0.075	-0.002
YOUNG	-0.525	0.000	-0.574	0.000	-0.220
*YOUNG*NESB*	0.197	0.019	0.238	0.017	0.091
MATURE	-0.014	0.521	-0.110	0.052	-0.042
*MATURE*NESB*	-0.025	0.613	0.126	0.356	0.048
MARRIED	0.263	0.000	0.560	0.000	0.215
*MARRIED*NESB*	-0.171	0.001	-0.689	0.000	-0.264
CHILD	-0.275	0.000	-0.404	0.000	-0.155
*CHILD*NESB*	0.085	0.147	-0.179	0.583	-0.069
*MAT*MARRIED*			-0.488	0.000	-0.187
*MAT*MARRIED*NESB*			0.597	0.013	0.229
*MAT*CHILD*			0.323	0.000	0.124
*MAT*CHILD*NESB*			-0.174	0.607	-0.067
*MID*MARRIED*			-0.307	0.000	-0.118
*MID*MARRIED*NESB*			0.340	0.126	0.130
*MID*CHILD*			0.062	0.429	0.024
*MID*CHILD*NESB*			0.216	0.504	0.083
*MARRIED*CHILD*			0.046	0.313	0.018
*MARRIED*CHILD*NESB*			0.222	0.064	0.085
CITY	0.224	0.000	0.223	0.000	0.085
*CITY*NESB*	0.085	0.000	-0.195	0.000	-0.075
Log-L	-17891.2		-17857.1		
Restricted-log L	-20.560.6		-20560.6		
Chi-squared	5338.7	0.000	5407.1	0.000	
Correct Pred	67.1 percent		67.2 percent		
R^2	0.157			0.159	

5.0 Unemployment

5.1 Introduction

In this chapter, we analyse NESB migrant women's unemployment status and draw a comparison with that of Australian-born women. In the 1996 Census, unemployment is defined as persons aged 15 and over who were not employed during the reference week, and: had actively looked for full-time or part-time work at any time in the four weeks up to the end of the reference week.

Based on the 1-percent sample of the 1996 Census, we estimate that the unemployment rate for NESB women was 12.7 percent, compared with 7.6 percent for Australian-born women. The models developed in this chapter investigate the extent to which this difference can be explained by a range of human capital and demographic variables.

As in the previous two chapters, in this chapter we also use univariate probit models to examine the variables that make women more likely to be unemployed.[119]

5.2 Data

We use the 1-percent sample from the 1996 Australian Census, and we restrict the sample to women in the range 18-64 years of age and to participants in the labour market. Accordingly, the data set used to estimate they models contains 4,484 NESB migrant women and 25,906 Australian-born women. Summary statics for the variables used in the models that follow are shown in Table 5.1.

At the time of the Census in August 1996, the ABS Labour Market Survey data (catalogue no. 6203.0) showed that the unemployment rate for NESB women was 11.7 percent whereas for Australian-born women the rate was 7.5 percent. These rates are slightly lower than those that we estimate based on the 1996 Census data. The ABS definition of unemployment was same for both the labour market survey and the 1996 Census. Whereas the Labour market survey covered people in the age range of 15 years

and over, we restrict our sample from the census to women who were aged in the range 18 years to 64 years.

5. 3 A General Model of Unemployment for NESB Women

Our general model for unemployment (*UNE*) can be expressed as:

$$\text{Prob}[UNE] = f\,(English,\ Qualifications,\ Experience,\ Residency,\ Age,\ Marital\ Status,\ Children,\ Region) \qquad (5.1)$$

This model was estimated as a probit model, which can predict the probability of the unemployment of an individual using a range of human capital attributes and demographic variables. The dependent variable, *UNE* can take two values: 1 if a women is unemployed (i.e. those who are not employed, but looking for full-time work or part-time work), and 0 otherwise. Our justification for using the particular explanatory variables in Equation (5.1) is discussed in the next section.

5.4 Determinants of Unemployment Status

We expect that the probability of being unemployed will be strongly influenced by a person's human capital attributes. If human capital is associated with productivity in the workplace, better-endowed individuals are less likely to become involuntarily unemployed because they are more valuable to employers. In addition, if they choose to become voluntarily unemployed while in the pursuit of better jobs, it is likely that they will secure re-employment more rapidly than if their human capital attributes were weaker. We also include several demographic variables that might impact on the probability of a person being unemployed.

5.4.1 English Proficiency

English proficiency is one of the human capital resource endowments. According to human capital theory, acquiring human capital increases productivity, and this includes English language skills. Persons with this attribute might be expected to have a smaller probability of unemployment.

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[119] Australian authors including Inglis and Stromback (1986), Jones (1992) and O'Loughlin and Watson (1997) used logit models. Their findings would probably have been similar had they used probit models.

Evans (1984), Miller (1986b) and Stromback (1986) argued that many factors affect the likelihood of being unemployed for migrants, which include English language ability. Inglis and Stromback (1986) argued that a person's tendency to be unemployed could be thought of as the net effect of many variables specific to migrants. English-language proficiency for migrants is one of these. Wooden and Robertson (1990) argued that poor communication skills might reduce migrants' productivity in many jobs rendering them less favoured hires. Jones and McAllister (1991) proposed English language as a factor that operated at the individual level and was generally considered to account for large diversity in unemployment among the overseas-born. Williams *et al.* (1997) and Brooks and Volker (1985) proposed that the ability to communicate in English constituted the major influence at work in determining the degree of labour market involvement. O'Loughlin and Watson (1997) argued that low levels of English proficiency, are strongly associated with being unemployed. This is because those deficient in English find it difficult to communicate freely with existing workers. Thus their chances of finding a job are reduced.

Inglis and Stromback (1986) used two dummies for English proficiency: "good" and "poor" for migrant women. They found that "poor" English had very little effect on the probability of being unemployment. They compared English proficiency "good" and "poor" with those who spoke English only. O'Loughlin and Watson (1997) used one dummy for "low" English proficiency and found that female NESB migrants with "poor" English were more likely to leave the labour market altogether rather than remain marginally attached. Jones (1992) used one dummy for "poor" English for women of Dutch, Italian and Chinese background and found that "poor" English speakers were more likely to be unemployed. Evans used the scale zero = "speaks English not well or not at all", 50 = "well" and 100 = "very well" and found that differences in English skills appeared to affect the probability of unemployment among the migrants from the Third World, but not for other groups.[120]

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[120] We point out that this approach implies that the effect of "very well" is exactly double the effect of "well" and seems unreasonable given the broadness of the definitions.

Stromback (1986) found no significant relationship between female migrants' unemployment and English language skills. On the other hand, Brooks and Volker (1985), Wooden and Robertson (1990) found that ability to speak good English appeared to be an important factor for success in the labour market for migrants.[121] VandenHeuvel and Wooden (1996), used two dummies "very good, good", "not good, none" and found that women with poor English skills were twice as likely as those women who only spoke English (the comparison category) to be unemployed rather than employed. Miller (1986a) used two levels of English proficiency: "speaks a language other than English at home" and "speaks either very well or well". He found that individuals who speak a language other than English at home had significantly greater unemployment rates.

Williams *et al.* (1997) used two dummy variables: "English spoken very well or well" and "English spoken not well or not at all". They found that migrants who spoke "English very well or well" were twice as likely as those who spoke only English to be unemployed, while those who spoke "English not well or not at all" were 4.5 times as likely to be unemployed. Jones and McAllister (1991) used two dummies for English proficiency: "excellent" and "fair". They found that recently arrived migrant women, who spoke "excellent" or "fair" English had a smaller probability of unemployment than those with "poor" English.

From above studies, it seems likely that NESB women might reduce their probability of unemployment by acquiring better English skills. Therefore, in this study we include English proficiency variables in our model on the grounds that there is likely to be a negative relationship between the English abilities and the probability of being unemployed for NESB women. We note that a lack of English skills seems likely to limit access to jobs that need verbal English communication, job training, reading manuals and forms, access to computer manuals and the like. In addition, poor English

[121] Stromback (1986) and Brooks and Volker (1985) used two dummies "good" and "poor" in their models. Wooden and Robertson (1990) used one dummy "poor" in their model.

might inhibit the acquiring of labour market information that might otherwise assist in the process of job search. In some occupations, particularly those in secondary labour markets, poor English ability might be a lesser obstacle to employment.[122] Nevertheless because poor English abilities might restrict overall labour market opportunities, we expect that this could be an important determinant of the probability of unemployment for NESB women.

We use the same dummies that are used in Chapters 3 and 4 to model labour market participation and primary sector employment. These were English spoken "very well" (*ENGVW*), English spoken "well" (*ENGW*), English spoken "not well" (*ENGNW*) and "other" (*EXCELLENT*), the latter being the reference group.

The *a priori* signs of the coefficients of these dummy variables seem clear. Although some individuals with very poor English skills might be affected little in their ability to find employment, at a general level it is likely that having excellent English skills increases job opportunities for applicants and decreases the probability of unemployment. Accordingly, we expect the signs of the coefficients of *ENGVW*, *ENGW* and *ENGNW* to be positive, and the values of the coefficients of *ENGVW* and *ENGNW* to be smallest and greatest respectively.

5.4.2 Educational Attainment

Education is an individual human capital resource endowment that relates to individual productivity, and is likely to have a direct influence on the unemployment for migrants. Evans (1984), Miller (1984), Inglis and Stromback (1986), Miller (1986a,b), McAllister (1986), Stromback (1986), Beggs and Chapman (1987), Flatau and Hemmings (1991), Jones and McAllister (1991), Jones (1992), VandenHeuvel and Wooden (1996), Williams *et al.* (1997), and O'Loughlin and Watson (1997), used education variables as independent variables in analysing the unemployment and labour market status for NESB women. These authors agreed that education is a human capital endowment and

[122] Evans (1984) noted that many migrants resided in concentrated ethnic enclaves and speak ethnic languages and find employment in their ethnic communities or in ethnically based work groups.

individuals might reduce their probability of unemployment by supplying more education to the labour market.

Miller (1984) argued that there is an inverse relationship between the probability of unemployment and education. Workers who receive greater levels of on–the-job training will have a smaller probability of being laid off and a reduced incentive to quit, since both employer and employee are likely to share the cost of, and returns to, this training. This suggests that inflows into unemployment may be reduced amongst persons with further education. He further argued that education might provide employers with a screening mechanism to indicate which are the most able and most persistent individuals.

Inglis and Stromback (1986) argued that the chance of becoming unemployed could be expected to have a strong relationship to a person's human capital. The opportunity cost of unemployment increases with the level of human capital. Better-endowed individuals who are well paid are less likely to quit and become voluntarily unemployed, because the opportunity costs are greater. Similarly, persons with lower levels of human capital are likely to be most at risk during downsizing, in which case unemployment is involuntary. A person's unemployment status depends on how that person receives job offers, which are based on his/her human capital endowments. Employers are likely to assess individuals at least partly on the basis of their human capital. Thus, a person who has lower level of education has less chance of receiving job offers. In addition, Inglis and Stromback argued that for migrants, a specific transferability (non-recognition) problem might be associated with qualifications obtained overseas. Migrants with a large transferability gap can be presumed on average to have relatively low levels of human capital and therefore would have a greater chance of being unemployed. As a consequence, migrant women may be relatively more likely to be involuntary unemployed, although they might have educational qualifications.

The authors noted above have used a variety of measures of education. Inglis and Stromback used five dummies for education: "no secondary", "low secondary", and

"other certificate", "trade certificate" and "tertiary qualification". They found that the educational attainment of higher secondary schooling to either of these qualifications (other certificate, trade certificate, tertiary qualification) reduced the chance of being unemployed by about a half. Having attended a higher educational institution also lowered substantially the probability of being unemployed. O'Loughlin and Watson (1997) used three dummies for education: "early school leaver", "tertiary education" and "had used a computer". They found for NESB migrant women, that early school leavers were more likely to experience long-term unemployment than those with tertiary education and had used a computer. Jones (1992) used six dummies for education: "postgraduate", "degree", "diploma", "trade certificate", "other certificate" and "still studying". He found for women of Anglo-Celtic, Dutch, Italian and Chinese ancestry, that schooling reduced the individual's risk of being unemployed. Evans (1984) used years of education and found that each additional year of education reduced the probability of being unemployed.

Stromback (1986) used five dummies for education as: "no secondary", "low secondary", "other certificate", "trade certificate", and "tertiary qualification", and found for female migrants, unemployment likelihood fell with increased education.[123] Jones and McAllister (1991) used three dummies for education: "overseas qualification", "Australian qualifications" and "both types of qualifications" and found that Australian qualifications being more important than overseas qualifications on the probability of unemployment of NESB migrant women. Beggs and Chapman (1987) used education as "years of schooling" and "years of Australian schooling" and found that at the highest level of education considered male migrants had a greater probability of unemployment than was the case for Australian-born persons.

VandenHeuvel and Wooden (1996) used five dummies "left school ≥ 14 years", "left school 15 or 16 years", "vocational qualification", "tertiary qualifications", "type of qualification unstated" and found that education was strongly related to the labour

[123] McAllister (1986) used education in years and found Australian; British and NESB young people's higher education reduced unemployment. It was about one third as important as technical education.

market status, such that women who had left school at a relatively young age were more likely to be either unemployed or outside the labour market, while women with tertiary qualifications were more likely to be employed. Williams *et al.* (1997) used education as highest level of qualifications those are: "higher degree", "postgraduate diploma", "bachelor degree or equivalent", "trade qualification", "12 or more years of schooling", "10-11 years", "7-6 years", "6 or less years of schooling" and "others". They found that with technical or professional qualifications were significantly less likely than those with tertiary qualifications to be unemployed compared to being employed.[124]

Miller (1986b) used eight categories of educational attainment: "school leaving age of 14 years or less", "school leaving age of 15 years", "school leaving age of 17 years", "school leaving age of 18 years", "school leaving age of 19 or more years", "diploma", "degree, diploma, higher degree", "still attending school". He found that possession of trade or other certificate-level qualification was consistently associated with sizeable unemployment rate reductions compared with school leaving age of 16 years. Flatau and Hemmings (1991) used four dummies: *DEGREE*, *DIPLOMA*, *TRADEQ* (a trade qualification) and *HIGH12* (year 12 of high school), and found that young female migrants with post-school qualifications had a significantly reduced probability of being unemployed. Miller (1984) used two categories of educational attainment: "diploma" and "trade, technical". He found that additional years of schooling beyond 16 years of age were associated with relatively minor reductions in the unemployment rate.

Our reasons for including this human capital variable are similar as those of the abovementioned authors. Education has the potential to make individuals more productive, which assists them to find employment more easily. Migrant women bring wide range of educational endowments from overseas countries when they come to Australia, but those educational qualifications are not always easily transferable in Australia. This suggests that the relationship between the holding of a particular educational qualification, (say a professional qualification) and the probability of being

[124] Miller (1986a) found that additional years of educational attainment were associated with only modest reductions in the unemployment rates of migrants.

unemployed might vary according to the country in which the qualification was obtained, and between NESB women and Australian-born women.

We use the same educational dummies that we used in Chapter 3 to model labour market participation. They are: possessing a degree (*DEGREE*), a diploma (*DIPLOMA*), skilled vocational qualification (*SKILL*) and a basic vocational qualification (*BAV*, reference group). We note again that the Census data presents us with only very broad educational categories and we are unable to identify the countries in which the qualifications were obtained.

The *a priori* signs of the coefficients of these dummy variables seem to be obviously negative. We are less certain regarding the relative sizes of the coefficients.

5.4.3 Labour Market Experience

Like education, experience in the labour market is also a human capital endowment, which might influence the probability of unemployment of individuals. Human capital theory argues that gaining experience increases an individual's endowment of general and workplace-specific skills. These skills tend to make individuals more attractive to employers; hence they might acquire jobs more rapidly and would be less likely than others of being retrenched. For these reasons, McAllister (1986), Beggs and Chapman (1987), Flatau and Hemmings (1991), Jones and McAllister (1991), Jones (1992) and Mohanty (2000) used labour market experience as one of the explanatory variables in their unemployment models.

McAllister (1986), Flatau and Hemmings (1991), Jones (1992) and Mohanty (2000) argued that the more experience workers supply to the labour market, the more productive they are relative to others. Therefore, a person who has more experience is less likely to become involuntarily unemployed than a person who has less experience. This is probably because more experienced workers can utilize their wide range of experience to a number of areas than those who are less experienced. Also, employers would like to employ more experienced people due to their relatively greater productivity skills than those are less experienced.

Hosek (1975) developed a theoretical framework to examine unemployment rates using a range of labour market and personal characteristics.[125] He argued that persons with more experience often have higher wage rates, and persons with higher wages are less likely to quit and enter into unemployment. In particular, if a person's wage in a given job were high because of investments in firm specific capital, then his/her probability of quitting would be less.

Various authors have measured labour market experience in a number of ways to when they have examined its effects on unemployment. Jones (1992) used two dummies for experience: "overseas labour market experience" and "Australian labour market experience".[126] He found that overseas labour market experience reduced the probability of unemployment for migrant women, but not as much as local experience did. Beggs and Chapman (1987) used experience as: "years of labour market experience", and "years of Australian labour market experience", and found that pre-migration work experience increased the probability of unemployment for both English speaking males and non-English speaking males. McAllister (1986) used experience in years and found experience reduced the probability of unemployment for Australian, Britain and NESB migrant youth. Flatau and Hemmings (1991) used years of experience and found for young migrant women that labour market experience significantly reduced the probability of being unemployed.[127] Jones and McAllister (1991) used two dummies for experience as pre-migration employment: "employed", and "not employed", and found pre-migration employment decreased the unemployment of recent migrant women, compared with those who were not employed. Mohanty (2000) used two dummies for

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[125] He used (1) the probability of being unemployed (2) expected duration of unemployment per spell of unemployment (3) annual incidence of unemployed (4) expected number of weeks of unemployment per year (5) expected number of weeks of unemployment per year conditional on some unemployment during the year.

[126] He used National Social Science Survey (See Kelley and Bean 1988) results on occupational histories to adjust potential labour market experience to take account the part-time and intermittent work. These adjustments seem appropriate, because it was based on the aggregate relationship of age to the pattern of full and part-time work over the occupational life cycle.

[127] They defined experience as current age minus school leaving age adjusted for years of post-schooling education.

experience *EXP* and *EXP2* and found that workers having greater experience positively influenced the employers' hiring decisions.[128]

Our reasons for including this human capital variable are similar to the abovementioned authors. In addition, we again note that Australian migrants bring a wide range of work experience from their homelands. However, their experiences might not always be easily transferable due to non-recognition and English language problems. Hence, the effects of experience gained in overseas and in Australia are expected to differ between NESB and Australian-born women.

In this study, we define experience of an individual as: Experience = 1996 (Census year) minus the mid-value of year of highest qualification completed as in Chapters 3 and 4. The *a priori* sign of the coefficient of the experience variable seems to be obviously negative.

5.4.4 Length of Residence in Australia

In empirical studies, the length of residence has often been shown to influence the probability of unemployment of migrants. Evans (1984), Inglis and Stromback (1986), Jones (1992), Brooks and Volker (1985), Chapman and Miller (1985), Miller (1986b), Wooden (1990), Jones and McAllister (1991), and VandenHeuvel and Wooden (1996) used length of residence in their unemployment and labour market status models.

Inglis and Stromback (1986) argued that the period of residence could affect migrant's unemployment for three distinct reasons. First, migrants without a pre-arranged job almost by definition become unemployment upon arrival (if they join the labour market). The period of residence, for some newly arrived migrants, therefore reflects the duration of the initial unemployment spell. Second, the skills and experience of migrants may not be perfectly transferable into the Australian labour market. With the passage of time, migrants might adapt their existing skills, acquire new knowledge more suited to Australian employers requirements and gain more information about job opportunities.

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[128] Mohanty defined *EXP* as age - 5 - years of schooling and *EXP2* as *EXP* squared.

Third, if migrants with a high probability of being unemployed for other reasons, are more likely to re-migrate and this would be reflected in a decrease in the tendency to be unemployed with the period of residence for those who remain.

Chapman and Miller (1985) argued that there are three important reasons why unemployment declines with the increases of duration of residence. First, recent migrants may have less information about job opportunities than the Australian-born. Second, employers may have less information about the productivity of recent migrants than they do about otherwise comparable Australian-born persons, implying poorer employment prospects of recent migrants. Third, newly arrived migrants may face employer or employee discrimination in the workforce and therefore experience greater difficulty in finding employment.

Wooden (1990) argued that as the settlement process proceeds, information gathering, skill adoption and acquisition, language learning and experience in the Australian market are all likely to help the migrant to better search and compete for jobs. Brooks and Volker (1985) proposed that period of residence constitutes a major influence in determining the degree of labour market involvement of migrants, because with the passing of time they gain knowledge and skills which assist in obtaining employment. Accordingly, as time passes, migrants gain more knowledge and adapt to local job search techniques to obtain employment.

Evans (1984) used the length of residence variable discussed in Chapters 3 and 4 and found that length of residence in Australia was a key determinant of the probability of unemployment for migrants from the Mediterranean region and the Third World. Inglis and Stromback (1986) also found that the tendency to be unemployed fell as the period of residence in Australia increased. Jones (1992) used "recency" of arrival in Australia and found that the most important influence on the probability of being unemployed was "recency" of arrival for both men and women.

Jones and McAllister (1991) used three dummies of length of residence: "0-1 years", "2-3 years", and "4-5 years" and found that amongst recently arrived migrant women's there were two types of unemployment: both the probability of "point in time" and "duration of initial unemployment" decreased as the length of time in Australia increased. Brooks and Volker (1985) used period of residence and found that a substantial difference existed between migrants who had recently arrived and those who had been in Australia longer.[129] VandenHeuvel and Wooden (1996) used period of residence in 12 dummies (six for each NESB and ESB migrants).[130] They found that period since arrival was strongly associated with the likelihood of unemployment. Chapman and Miller (1985) used period of residence in years as dummy variables: "<3", "3-4", "5-9", and "10+" and found that the unemployment rate of recently arrived migrants was up to four times greater than that of migrants with ten or more years of residence in Australia for some male birthplace groups, and five times greater for some female birthplace groups. Wooden (1990) used period of residence in years as dummy variables: "0-4", "5-9", "10-14", "15-19", and "20+" and found that the South Europeans began to fare better than the Australian- born persons after five to nine years of residence in Australia.

We are persuaded by the arguments of the abovementioned authors that the period of residence might affect migrants' probabilities of being unemployed. First, migrants without a pre-arranged job almost by definition become unemployed upon arrival and the period of residence for the newly arrived migrants therefore reflects the duration of the initial unemployment. On the other hand, upon their arrival some NESB migrant women might accept whatever jobs were available immediately, owing to financial needs of setting up a new home, and perhaps also because poor income prospects of partners. Second, a migrant's length of stay in Australia stands for many aspects of adaptation to Australian customs, and local social network. Migrants also acquire new knowledge, which might be more suited to Australian employers' requirements, and they might gain more information about job opportunities.

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[129] Period of residence was defined as zero for the Australian-born, and as 1/(1 + period of residence) for individuals born overseas.

In this study, as in Chapters 3 and 4, we use the length of residence in Australia, which we defined as *RIA* = 1996 (census year) - mid-value of year of arrival in Australia.[131] The *a priori* sign of the coefficient of this variable is likely to be negative.

5.4.5 Age

Hosek (1975), Evans (1984), Inglis and Stromback (1986) Chapman and Miller (1985), Brooks and Volker (1985), McAllister (1986), Stromback (1986), Wooden and Robertson (1990), Jones and McAllister (1991), Jones (1992), VandenHeuvel and Wooden (1996), Williams *et al.* (1997) and O'Loughlin and Watson (1997) used age variables in their unemployment and labour market status models.

Hosek (1975) argued that the incidence of unemployment has an age pattern roughly similar to have the age pattern of labour market participation. In particular, the incidence of unemployment reaches its peak when someone is in the late teens or early twenties. For all age groups, a gradual decline of unemployment might occur over the ages 30-55 because of the cumulative effect of increased labour market information, a decreasing tendency to migrate to search for work, and a growing stock of firm-specific and general human capital.

In addition, he argued that the probability of finding a new job increased with age because individuals might gradually lower their minimum wage level, as they grew older. However, there appears to be factors working in the opposite direction. Employers may be less likely to offer jobs to older persons because of their shorter time horizons, as well as fewer periods over which to recoup initial hiring and training costs. On the contrary, skill specialization tends to increase with age. While young persons search over a board variety of entry-level jobs requiring essentially general skills, older persons might have developed more specialized skills and therefore search for more specialized jobs, with higher wages.

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[130] NESB and ESB arrived pre-1976, 1976-80, 1981-85, 1986-87,1988-89 and 1990-91.

[131] We again use mid-value of the year of arrival because the 1996 census provides the year of arrival data in grouped form.

Jones (1992) argued that age is functionally equivalent to labour market experience plus years spent at school and in post-school education. For any given level of schooling, recent and less qualified entrants to the labour market tend to be younger than more experienced and better-qualified workers. McAllister (1986) argued that as a person becomes older and perhaps acquires family responsibilities, the "costs" of moving to another job become substantial, and there is an economic incentive to remain in a job, even if it is less than satisfactory. Brooks and Volker (1985) and Williams *et al.* (1997) and Wooden and Robertson (1990) proposed that age constitutes a major influence in determining the degree of labour market involvement, because it is presumed that age determines the capability of ones' performance in the labour market. Some other authors including Inglis and Stromback (1986), Stromback (1986), Jones and McAllister (1991), VandenHeuvel and Wooden (1996) and O'Loughlin and Watson (1997) argued that age is an important characteristic that is likely to influence the probability of unemployment of individuals, as age corresponds with the ability to work at ones full potential.

Evans (1984) used age in years in her analysis of the unemployment of NESB migrant and Australian-born women. She found that age was negatively associated with the probability of unemployment for both Australian-born and NESB migrant women. Inglis and Stromback (1986) also used an age variable and found that migrant women aged 34, 54 and 64 years had greater probabilities of being unemployed. O'Loughlin and Watson (1997) used two dummies, "teenage" and "mature age", to analyse the long-term unemployed of females in Australia. They found that being "mature aged" was the factor most significantly associated with an increased probability of long-term unemployment.

VandenHeuvel and Wooden (1996) found that age was related to unemployment in that both younger and older women were more likely to be unemployed. Williams *et al.* (1997) found that the effect of age on the likelihood of being unemployed was not significant. Wooden and Robertson (1990) found that employment probabilities initially rose with age and then fell again. For males, the point at which unemployment

likelihood was minimized was 41 years of age, while for females it was 48 years. McAllister (1986) found that among these overseas born, the predominant influence on the probability of unemployment was age and younger persons were substantially more likely to suffer unemployment.[132]

Chapman and Miller (1985) used age as categories: "15-19", "20-24", "25-29", "30-34", "35-39", "40-44", "45-49", "50-54", "55-59", "60-64", and found a U-shaped relationship between unemployment rates and age: unemployment rates first declined and then rose as age increases. Brooks and Volker (1986) used age as categories: "15-24", "25-54" and "15+ years" (category refers to all persons 15 years and over, not only those 15 to 54). They found that the difference between the hazard functions of females aged 15 to 24 years and 25 to 54 years was more noticeable, with older females having the highest probabilities of leaving unemployment.[133] Jones and McAllister used age in three dummies: "16-25", "26-35" and "36-45" and found that women in the age range of "36-45" years age group suggested a significantly smaller probability of unemployment than the reference category, who were aged 46 to 60 years. Stromback (1986) also used an age variable and found that for females, the likelihood of being unemployed was lowest for persons aged 35 to 44, and was distinctly greater at young and old ages. Hosek (1975) used age as categories: "16-24", "25-34", "35-54", and "55-64" and found that the age pattern of the annual probability of unemployment appeared somewhat anomalous for white females. However, the observed rise from ages 25-34 to ages 35-54 almost certainly reflected the labour market re-entrance of white females after the child-rearing years. Such a pattern was not observed for non-white females.

We are persuaded by the arguments of the abovementioned authors that age affects women's probability of being unemployment. Our reasons for including this age variable in our analysis are similar to those authors. It seems likely that unemployment affects different age groups of women, differently. The effect of an age variable on unemployment might occur in several ways. For example, in the new technologically

[132] These authors used age in years.
[133] These relate the probability of leaving unemployment to the time already spent unemployed.

advanced world, younger women might be able to find work more readily than older women who do not have technological training. Employers might also be willing to employ young women because of their multi-disciplinary training, which can be used in today's multidimensional business sectors. Also, many young women might be willing to accept comparatively unattractive jobs, including casual work, to meet growing aspirations to higher living standards. Many employers might take advantage of this to employ casual young workers, as they are often less costly than older workers. Moreover some mature aged women might be disadvantaged because of long breaks from work brought about by family responsibilities. Therefore, some mature aged women may find it harder to find suitable work and may become unemployed for longer times than their younger counterparts.

We argued earlier that woman's broad age group might be more relevant to her labour market status than age in years. Accordingly, we use three dummies: *YOUNG* = less than 24 years old, *MIDDLE* = more than 24 years and less than 46 years old (reference group) and *MATURE* = more than 46 years old as in Chapters 3 and 4.

In view of the discussion above, the *a priori* signs of the coefficients of these dummy variables are not manifestly certain.

5.4.6 Marital Status

Evans (1984), Miller (1984), Inglis and Stromback (1986) Brooks and Volker (1985, 1986), Miller (1986b), Stromback (1986), Wooden and Robertson (1990), Jones and McAllister (1991), Jones (1992), VandenHeuvel and Wooden (1996) and Williams *et al.* (1997) used marital status variables in their unemployment models for women.

Miller (1984) argued that marital status is important because it might be associated with lower labour market attachment amongst married women. It might be the case that with poor employment prospects, married women withdraw from the labour market. This could mean that married women have a smaller average duration of measured unemployment.

Jones (1992) argued that marital status is a proxy for differences in economic incentives to seek paid work. Some married women may have weaker incentives to enter into paid employment, because they might be able to fall back on a partner's wage, or even his employment benefit if he is receiving the married rate. Widowed and divorced, women might have the option of claiming a widow's or supporting parent's benefits and be less likely to participate in the labour market. Some employers may prefer married women for part-time employment because they might be more content with short hours, and often have prior work experience.

Inglis and Stromback (1986) argued that the duration of unemployment depends both on the wage rate at which a person receives from job offers and how acceptable these offers are. Employers are likely to assess individuals on the basis of a range of individual characteristics and being married might be considered to be favourable because of its association with stability and commitment to work, and employers might use marital status as a criterion.

Brooks and Volker (1986) proposed that marital status has a wider potential influence upon the probability of leaving unemployment. Although marital status might be expected to be of primary importance, there are other factors, which might play a part of leaving unemployment.

Jones (1992) used a single dummy variable "married" and found that migrant married women of Anglo-Celtic, Dutch and Italian ancestry were less likely to be unemployed, except for those of Chinese ancestry. Evans (1984) used a single dummy variable "now married" and found a negative effect of this variable on the probability of unemployment for both Australian-born and migrant women. Stromback (1986) and Inglis and Stromback (1986) used three dummies for marital status: "single", "husband unemployed" and "husband not in labour market" and found that Australian-born and NESB migrant women those whose husbands were unemployed were more likely to be unemployed. They also found that marital status was strongly associated with the likelihood of migrants' being unemployed.

VandenHeuvel and Wooden (1996) found that women who were separated, divorced or widowed were more likely to be unemployed. [134] Williams *et al.* (1997) used three dummies: "divorced, separated or widowed", "married with spouse in Australia", "married with spouse overseas", and found that relative to "never married", being married with a spouse in Australia or being divorced, separated or widowed all increased the likelihood of being unemployed.

Brooks and Volker (1986) used two dummy variables: "married", "unmarried" and found that married males had a stronger attachment to the labour market than married females and that the duration of all groups leaving the labour market was considerably greater than that of equivalent groups leaving unemployment for employment. Earlier, Brooks and Volker (1985) used three dummies: "married", "never married" and "separated, widowed or divorced", and found that probability of unemployed was smaller for never married and separated, widowed or divorced compared with married women. Wooden and Robertson (1990) used three dummies: "never married", "separated, widowed, divorced" and "earnings of husband", and found that females with husbands with relatively high incomes had relatively low probabilities of unemployment. Miller (1986b) used two dummies: "married", "divorced, separated or widowed" and found that married women have lower unemployment rates compared to never married. Jones and McAllister (1991) used two dummies: "married, children", "married, no children" and found that married women with children reduced unemployment for recent migrant women compared with single women. Miller (1984) used three dummies: "single", "married" and "divorced, separated and widowed" and found that married teenagers had lower unemployment rates.

We concur with the arguments advanced by the abovementioned authors. We note that how marital status affects the probability of unemployment seems to be a complex matter. Married women, perhaps because of family responsibility, might be less willing

[134] They used six dummies that covered different combinations of marital status and income. They found that a married woman, whose husband's income was at least $12,001, was less likely to be unemployed.

to accept inferior jobs and therefore could be unemployed for lengthier periods. Alternatively, some may fall back on a partner's wage or social security benefits if a partner is receiving the married rate, so that accepting an inferior job could be less of a necessity. On the other hand, the costs of maintaining a family unit might lead some women to accept jobs that are less than ideal and would as a result be less likely to be unemployed. Further, being married might for some women mean that they seek part-time work, and given the growth in the supply of part-time employment opportunities in recent years, these women might be more readily employed than others who seek full-time jobs.

Like Evans (1984) and Jones (1992) we use only one dummy for marital status and the *a priori* sign of the coefficient of this dummy variable in the model is uncertain.

5.4.7 Presence of Children

Evans (1984), Brooks and Volker (1985), Stromback (1986), Inglis and Stromback (1986) and VandenHeuvel and Wooden (1996) used variables associated with the number of children to analyse its impact on women's unemployment. Hosek (1975) developed a theoretical framework relating to unemployment rates based on personal characteristics. He argued that annual weeks of unemployment are likely to be lower for women with young children at home and the probability of leaving unemployment for non-participation would rise as the number of young children rises. Brooks and Volker (1985) argued that children are time-intensive for mothers and they create a strong disincentive for mothers to seek employment in the labour market. Their presence (especially that of young children) might reduce the desire of employers to hire mothers, because of a belief that mothers have a primary interest in taking care for their children. Accordingly, the probability of unemployment is more likely for those women who have children.

Stromback (1986) and Inglis and Stromback (1986) used two dummies for the number of children, one for "1 or 2 children" and another for "3 or more children" and found that having children increased the probability of being unemployed for both Australian-born and migrant women. Evans (1984) used the number of children ever born and

found that additional children increased the probability of unemployment for Australian-born and Third World women, but for North Western Europe, East Europe and Mediterranean she found the reverse.

Brooks and Volker (1985) used five dummy variables: "number of children < 15 years"; and age of the youngest child as "< 2 years", "2-5 years", "6-15 years" and "15+ years". They found that the presence of young children and the level of a husband's income appeared to be important determinants of the labour market status (unemployment, employment and non-participant) of women. VandenHeuvel and Wooden (1996) used five dummies: "< 3 years", "3-5 years", "6-12 years"," > 12 years ", "no dependent" and found that women whose youngest child was under 13 years old were more likely than other women to be unemployed.

We concur with the arguments advanced by the abovementioned authors. We note that the presence of children increases the demand for economic resources and may cause women with children to accept job offers more readily than others. This likelihood of a negative relationship between the presence of children and the probability of unemployment would be strengthened if women with children were more likely to seek part-time jobs.

As in the Chapters 3 and 4, we use a single dummy variable *CHILD* for the presence of children. We note again that we are unable to determine the ages of children from the Census data. The *a priori* sign of the coefficient of this dummy variable is not entirely certain, however it seems more likely to be negative than positive. It may be true that for financial reasons, women with children, might accept relatively unattractive job offers, rather than be unemployed.

5.4.8 Place of Residence

The place of residence variable is a geographical characteristic, and it is intended to control exogenous variations in demand for labour market. To examine the effect of the place of residence on the probability of women's unemployment, Evans (1984), Inglis

and Stromback (1986), Flatau and Hemmings (1991), Hosek (1975), and Stromback (1986), and Mohanty (2000) used dummy variables.

Hosek (1975) argued that the level of quits; layoffs and recalls might differ across locations. In a less obvious way, differences in the characteristics of local labour markets might affect firms' decisions to invest in firm-specific capital. A partial list of relevant characteristics would include the number and mix of establishments by industry, the geographic extent of the local market, climate, and the coverage and level of unemployment insurance. The number and mix of establishments by industry serve to define the set of alternative jobs available to an individual in the local market, and variations in the set over the cycle or over seasons might affect the individual's probability of quitting at the firm, as well as the individual's probability of locating an acceptable alternative job if he/she is laid off by the firm. The geographic extent of the market should be related to costs of job search and costs of commuting; these costs are important because the individual will evaluate alternative wages net of the costs. Similarly, the hiring costs of the firm may be related to the geographic size of the market, though firms have the option of paying higher wages if they choose not to spend more on advertising and recruitment.

Evans (1984), Inglis and Stromback (1986), Flatau and Hemmings (1991), and Stromback (1986) and Mohanty (2000) suggested that the location of residence of individuals might impact on their probabilities of being unemployed. None of these authors advanced strong theoretical arguments to support this contention, however it seems likely that some regions have faster economic growth and more job opportunities than others (Beaumont, 1974). In a fully flexible labour market, unemployed women would relocate to areas in which jobs were more plentiful, however in many cases this would be impractical due to the circumstances of partners, families and related matters (A study undertaken by the Department of Labour and National Service, 1970).

Evans (1984) used one dummy for "rural" residence and found a positive relationship for Third World, Mediterranean and East European migrant women. Stromback (1986)

and Inglis and Stromback (1986) used two dummies for place of residence, one for "other urban" and another for "rural" and found that having a residence in "rural" and "other urban" areas increased the probability of unemployment for both migrant and Australian-born women, compared with residing in urban areas.[135] Flatau and Hemmings (1991) used one dummy for metropolitan area residents and found that having a residence in metropolitan areas decreased the probability of young migrant women being unemployed

Hosek (1975) used dummies for location as: "small SMSA " "medium SMSA", "poor city", "suburb", "town", "rural" "poor rural south", and "rest of south" and found location variables were significant for men but not for women.[136] Mohanty (2000) used one dummy for the central city residence as: "centcity" and found that a higher unemployment rate in the worker's state of residence reduced the employment probability of black females.

We include a place of residence variable because we believe that geographical differences in employment opportunities are likely to be important. Living in a metropolitan area increases the opportunities for women's employment. In rural areas, population centres are smaller with less social and economic activity. It is true that unemployment rates tend to be higher in rural areas; for example, the ABS reported that the unemployment rate for females in the Wollongong Statistical Region Sector was 6.2 percent compared with 3.6 percent in the Inner Sydney and Inner Western Sydney Sector in May 2001.[137]

As in the two preceding chapters, we use only one dummy *CITY* to describe residence in metropolitan areas. The *a priori* sign of the coefficient of this dummy variable seems to be negative.

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[135] "Other urban" = 1 if the locality was an urban centre with a population between 1,000 and 99,999.
[136] Standard Metropolitan Statistical Areas (SMSA).
[137] ABS 6291.0.40.001.

5.5 Unemployment Model for NESB Women

In this model we define unemployed variable as UNE and UNE = 1 if a person is unemployed, and 0 otherwise. The following general probit model based on Equation (5.1) is used.

$$\begin{aligned} UNE_i^* = \alpha &+ \beta_1\, ENGVW_i + \beta_2\, ENGW_i + \beta_3\, ENGNW_i \\ &+ \beta_4\, DEGREE_i + \beta_5\, DIPLOMA_i + \beta_6\, SKILL_i \\ &+ \beta_7\, EXPERIENCE_i + \beta_8\, RIA_i + \beta_9\, YOUNG_i \\ &+ \beta_{10}\, MATURE_i + \beta_{11}\, MARRIED_i + \beta_{12}\, CHILD_i \\ &+ \beta_{13}\, CITY_i + \varepsilon_i, \end{aligned} \tag{5.2}$$

The dependent variable UNE_i^* is the latent variable such that $UNE_i = 1$ if $UNE_i^* > 0$ and 0 otherwise. The error term, ϵ_i is assumed to be normal and the explanatory variables are earlier defined in Chapter 3, Table 3.1.

In Section 5.6, we will estimate a corresponding model for Australian-born women's unemployment status, in which the variables peculiar to NESB women are removed. Again, to make meaningful comparisons between the impacts of particular variables on the probability of the unemployment of both groups, we calculate estimated elasticities at the mean values of the independent variables.

Because this approach does not permit us to test for statistically significant differences, in Section 5.7 we estimate a model in which we pool the NESB and Australian-born women's data. In this model, we use an NESB intercept dummy variable to test whether there is a difference in the probability of unemployment between the groups that is independent of the variables in the model. We also use slope dummy variables for all variables that are relevant to both groups. This will enable us to identify significant differences in the impacts of particular variables on the probability that a woman is unemployed between the groups.

Again, we used a general to specific modelling approach in estimating Equation (5.2). The estimated parameters of the general version of Equation (5.2) are presented in Table 5.2, which shows that the explanatory variables *ENGVW*, *SKILL*, *EXPERIENCE*, *YOUNG*, *CITY* and *CHILD* are not significant. The estimated coefficients of all explanatory variables have the expected signs excepting *ENGVW*. Nevertheless, there seemed to be strong *a priori* grounds for persisting with these variables. After estimating a parsimonious model, we augment it with several interaction variables to investigate whether, for example, the effect of the presence of children might have different effects on the probability of unemployment for women of different ages.

We investigated a range of interaction variables and found only two interactions were significant and had coefficients with credible signs. They were: (a) being "mature" aged with being married, and (b) being "middle" aged, being married with the presence of children. Table 5.2 shows our preferred model that includes these interaction variables.

In Sections 5.6, 5.7 and 5.8, we restrict our observations concerning the coefficients, p-values and elasticities evaluated at the means of the dependent variables, to the preferred models. The same statistics for the corresponding general models are also shown in Tables 5.1, 5.2 and 5.3.

In our preferred model, the null hypothesis that all the coefficients were jointly equal to zero was rejected using a likelihood ratio test.[138] The coefficient of determination was 0.08013 and the model's percentage of correct predictions was 87.4 percent.[139]

5.5.1 English Proficiency

The coefficient of the variable denoting speaking English "very well" was not significantly different from the reference group. The coefficient of the variable denoting speaking English "well" compared with "excellent" English was positive and significant (0.264), and the variable denoting speaking English "not well" was larger and

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[138] $\chi^2_8 = 341.4460$ [0.000].

significant (0.608). These results suggested that those NESB women who speak "excellent" English were less likely to be unemployed and the probability of being unemployed was negatively related to English skills. Our results were consistent with the predictions of the human capital theory and supported the view that NESB women might be disadvantaged because of lack of English skills.

Our findings accorded with those of Brooks and Volker (1985), Miller (1986b), Wooden and Robertson (1990), Jones and McAllister (1991), VandenHeuvel and Wooden (1996), O'Loughlin and Watson (1997) and Williams *et al.* (1997). However, our result contrasted with that of Evans (1984) who observed that English skill only appeared to affect unemployment among the migrants from the Third World. Inglis and Stromback (1986) however found that poor English had a very small effect on the probability of unemployment for migrant women.

5.5.2 Educational Attainment

The preferred model suggests that possessing a degree and diploma compared to a basic vocational qualification yielded negative and significant results (-0.336 and-0.244 respectively). This suggested that by obtaining higher education, NESB women might reduce their probability of unemployment.

We were unable to detect a significant difference between having basic education and "skilled vocational training". *Prima facie*, this is a surprising outcome. A possible explanation for this result is that the reference group, the basic vocational qualification group also contains "level of attainment inadequately described", "level of attainment not stated" and "not applicable" group. This could mean that these groups have a reasonable number of well-educated people who might not have degree, diploma or skilled vocational training, but might have completed VCE or equivalent qualifications.

Our findings are consistent with those of Evans (1984), Miller (1986b), McAllister (1986), Stromback (1986), Wooden (1990), Flatau and Hemmings (1991), Jones and

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[139] The model was not particularly successful in predicting unemployment. This is typical in models where

McAllister (1991), and VandenHeuvel and Wooden (1996) and Williams *et al.* (1997). They tend to contradict Beggs and Chapman (1987) who observed that migrant men with higher education earned less and had a greater probability of being unemployed.

5.5.3 Labour Market Experience

In the general model, the coefficient of the labour market experience variable was negative as expected (-0.004), however it was not significant at a reasonable level. Accordingly, it was deleted from the preferred model. This result suggests that at most, there is a weak negative relationship between labour market experience and the probability that a NESB woman will be unemployed.

5.5.4 Length of Residence in Australia

The coefficient of residence in Australia was negative (-0.040) and significant for NESB women. This suggested that probability of NESB women being unemployed decreased as their period of residence increased. Our result is also consistent with Evans (1984), Brooks and Volker (1985), Inglis and Stromback (1986), Chapman and Miller (1985), Miller (1986b), Wooden (1990), Jones and McAllister (1991), and VandenHeuvel and Wooden (1996).

5.5.5 Age

Our preferred model suggested that the "mature" NESB women were more likely to be unemployed than "middle" aged NESB women (coefficient 0.334). The coefficient of "young" (0.093) in the general model suggested that young NESB women were also more likely to be unemployed than those in the reference group, however the "young" aged variable was not significant and deleted from the preferred model.

This finding supports our proposition that "mature" aged women are more likely to be unemployed than "middle-aged" women. Our finding on "mature" age women is consistent with Chapman and Miller (1985), Brooks and Volker (1986), Stromback (1986), Wooden and Robertson (1990), Jones and McAllister (1991) and VandenHeuvel and Wooden (1996), and O'Loughlin and Watson (1997) The general model's finding

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one actual outcome (in this case, being employed) dominates the other.

for "young" women is consistent with the finding of Malveaux (1999) who found that young adult Latin women aged, 20-24 years had an unemployment rates of 11.0 percent, while the rates for White and African American women were 6.4 percent and 17.1 percent respectively. McAllister (1986) and Stromback (1986) also found similar results.

5.5.6 Marital Status

In the general model, the coefficient of the married variable was negative (-0.269) and significant. This result suggests that at most, there is a weak negative relationship between being married and the probability of unemployed for NESB women. Our finding is consistent with Evans (1984), Williams *et al.* (1997), and VandenHeuvel and Wooden (1996). But this result was contrasted with Inglis and Stromback (1986) and Stromback (1986). This variable was deleted from the preferred model, because it becomes insignificant. However, there seemed to be strong *a priori* reasons to investigate the effect of this variable. Hence, we introduced a number of interaction variables with married variables to see the effect of this variable with other variables.

5.5.7 Presence of Children

In the general model, the coefficient of *CHILD* was positive (0.073), however the variable was found to be insignificant and was deleted from the preferred model. Our finding was also consistent with our proposition that having children increased the probability of unemployment for mothers. This finding is consistent with Brooks and Volker (1985), Inglis and Stromback (1986), Stromback (1986) and VandenHeuvel and Wooden (1996). It is in contrast with Evans (1984) who found unemployment had decreased for North Western Europe, East Europe and Mediterranean women who had children. She however observed that unemployment had increased for Australian-born and Third World women when they have children.

5.5.8 Place of Residence

In the general model, the coefficient of *CITY* was negative as expected (-0.041) but was not significant. For this reason, this variable was deleted from the preferred model. This finding suggested that living in a metropolitan area decreased the probability of

unemployment for migrant women perhaps due to better employment prospects in metropolitan areas. This finding is consistent with Flatau and Hemmings (1991) who found that living in a metropolitan area reduced the probability of unemployment for young migrant women. Inglis and Stromback (1986), and Stromback (1986) who also found that living in an "other urban" area rather than a "major urban" area increased the probability of unemployment for NESB women.

5.5.9 Interaction Variable containing Presence of Children

The coefficient of the interaction *MIDDLE*MARRIED*CHILD* was negative (-0.257) and significant and which suggested that being "middle" aged, married and having children decreased the probability of unemployment for NESB women. This result is consistent with our proposition that being "middle" aged married and having children decreased the probability of unemployment. Our result is consistent with Jones and McAllister (1991) who found that married and having children decreased the probability of unemployment of NESB women.

5.5.10 Interaction Variable containing Age

The coefficient of the interaction variable *MATURE*MARRIED* was negative (-0.485) and significant which suggested that being "mature" and married decreased the probability of unemployment for NESB women. This finding is consistent with our proposition that being "mature" aged and married reduced the probability of unemployment. Our finding is consistent with Evans (1984) who found negative coefficients for both age and married variables when she studied unemployment situation for NESB women.

5.6 Unemployment Model for Australian-born Women

In this section, we examine the factors that influence the unemployment of Australian-born women. We estimate the following general probit model for the Australian-born women.

$$
\begin{aligned}
UNE_i^* = \alpha &+ \beta_1\, DEGREE_i + \beta_2\, DIPLOMA_i + \beta_3\, SKILL_i \\
&+ \beta_4\, EXPERIENCE_i + \beta_5\, YOUNG_i \\
&+ \beta_6\, MATURE_i + \beta_7\, MARRIED_i + \beta_8\, CHILD_i \\
&+ \beta_9\, CITY_i + \varepsilon_i,
\end{aligned}
\tag{5.3}
$$

This model is similar to the model shown in Equation (5.2) except the English ability and residence in Australia variables are absent, because these variables are not applicable for Australian-born women. The reasons for including the remaining variables are the same as those outlined for NESB women. The estimated parameters are shown in Table 5.3.

Once more we used a general to specific modelling approach in estimating Equation (5.3). All coefficients of the estimated parameters for the general model are significant at 1 percent level, except *SKILL*. After estimating a parsimonious model, as in earlier sections, we augment the model with several interaction variables using the age, marital status and presence of children. The estimated parameters of our preferred model are also shown in Table 5.3.

In our preferred model, the null hypothesis that all coefficients in the estimated model were jointly equal to zero was rejected using a likelihood ratio test.[140] The coefficient of determination was 0.04058, which is not entirely satisfactory but is not unexpected in models of this type. The model's percentage of correct prediction was 92.4 percent.

5.6.1 Educational Attainment

The preferred model suggested that possessing a degree or a diploma compared to a basic vocational qualification yielded negative and significant results (-0.378 and -0.232 respectively). This suggested that by obtaining higher education, Australian-born women, like NESB women, might decrease their probability of unemployment. These results were consistent with Evans (1984) Inglis and Stromback (1986), Miller (1986b), Stromback (1986), McAllister (1986) and Beggs and Chapman (1987).

We were unable to detect a significant difference between having basic education and "skilled vocational training". *Prima facie*, this is a surprising outcome and we found a similar result for NESB women. As for NESB women, a possible explanation for this result is that the reference group, the "basic vocational qualification" contains "level of attainment inadequately described", "level of attainment not stated" and "not applicable" groups. This means that in these groups have a reasonable number of educated people who do not have degree, diploma or skilled vocational training, but might have completed the VCE or equivalent qualifications.

5.6.2 Labour Market Experience

In the preferred model, the coefficient of experience variable for Australian-born women was negative and significant (-0.014). This implies that the probability of unemployment decreases for Australian women as they gain more work experience and this is consistent with human capital theory.

5.6.3 Age

The estimated coefficient of *YOUNG* of the preferred model was positive (0.199) and significant, which suggests that Australian-born women in the age range 18 to 24 years old are more likely to be unemployed than the reference group ("middle" age women). This finding is consistent with Stromback (1986), who found that unemployment was distinctly greater at young age for Australian women compared with middle-aged women.

The differential effect of *MATURE* compared to *MIDDLE* aged Australian-born women was found to be negative (-0.241) and significant, suggesting that the probability of unemployment for Australia-born women was smaller for older groups. This variable was deleted from our preferred model, because it was found to be insignificant. However, there seemed to be a strong *a priori* reason to see the effect of this variable. For this reason we created an interaction variables mature with child (*MATURE*CHILD*) to examine the effect of this variable with child variable.

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[140] $\chi^2_9 = 1144.041$ [0.000]

5.6.4 Marital Status

The coefficient of the *MARRIED* for Australian-born women was negative (-0.621) and significant. This suggested that the probability of unemployment was less for Australian-born married women. Our result is consistent with Evans (1984) and Miller (1986b). This was contradictory to the findings of Inglis and Stromback (1986) and Stromback (1986) who found a positive effect for Australian-born women, those whose husband unemployed and not in the labour market, compared with those women whose husbands were employed.

5.6.5 Presence of Children

The coefficient of the dummy variable for children was positive (0.650) and significant. This indicated that the probability of unemployment of Australian-born women was greater for women with children. This supports the findings of Evans (1984), Inglis and Stromback (1986) and Stromback (1986), who all observed that the probability of unemployment increased for the Australia-born women if they had children. This is also consistent with our result for the NESB women, except that the effect was somewhat greater for Australian-born women (0.650 versus 0.073).

5.6.6 Place of Residence

The estimated coefficient of *CITY* in the preferred model was negative (-0.147) and significant. It supported our expectation that the greater availability of employment opportunities in metropolitan areas would make an unsuccessful job search less likely. This finding is consistent with Inglis and Stromback (1986), and Stromback (1986) who found that living in "other urban", rather than major urban areas increased the probability of unemployment for Australian-born women. This is in contrast with Evans (1984), who found that living in the rural area decreased the unemployment for Australian-born women.

5.6.7 Interaction Variable containing Presence of Children

The coefficient of the interaction variable *MATURE*CHILD* was negative (-0.630) and significant, however when taken together with the coefficients of *MATURE* and *CHILD*,

the combined effect was also negative.[141] This suggested that being "mature" aged and having children decreased the probability of unemployment for Australian-born women, which is consistent with the proposition that "mature" aged women with children are more likely to accept jobs because of the economic pressure of supporting children.

The estimated coefficient of the variable *MIDDLE*CHILD* was negative (-0.369) and significant. This suggested that being "middle" aged and having children decreased the probability of unemployment for Australian-born women. But when taken together with the coefficients of *MIDDLE* CHILD* and *CHILD* the combined effect was positive.[142]

5.7 A Comparison of NESB and Australian-born Women's Unemployment

The following general model based on Equation (5.2) is used to analyse the NESB migrant women's unemployment status.[143]

$$\begin{aligned} UNE_i^* = \alpha &+ \lambda\, NESB_i + \beta_1\, ENGVW_i + \beta_2\, ENGW_i + \beta_3\, ENGNW_i \\ &+ \beta_4\, DEGREE_i + \gamma_4\, DEGREE_i \times NESB_i \\ &+ \beta_5\, DIPLOMA_i + \gamma_5\, DIPLOMA_i \times NESB_i \\ &+ \beta_6\, SKILL_i + \gamma_6\, SKILL_i \times NESB_i \\ &+ \beta_7\, EXPERIENCE_i + \gamma_7\, EXPERIENCE_i \times NESB_i \\ &+ \beta_8\, RIA_i + \gamma_8\, RIA_i \times NESB_i \\ &+ \beta_9\, MATURE_i + \gamma_9\, MATURE_i \times NESB_i \\ &+ \beta_{10}\, MARRIED_i + \gamma_{10}\, MARRIED_i \times NESB_i \\ &+ \beta_{11}\, CHILD_i + \gamma_{11}\, CHILD_i \times NESB_i \\ &+ \beta_{12}\, CITY_i + \gamma_{12}\, CITY_i \times NESB_i + \varepsilon_i \end{aligned} \tag{5.4}$$

5.7.1 Unspecified Differences

In the pooled data model shown in Table 4.4, the coefficient of the intercept dummy variable *NESB* is negative but not significant. This suggests that after controlling for the

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[141] Being "mature" aged and having at least one child had an effect of –0.241 *MATURE* + 0.650 *CHILD* – 0.630 *MATURE*CHILD* = - 0.221.

[142] Being "middle" aged and having a child had an effect of 0.650 *CHILD* -0.369 *MIDDLE*CHILD* = 0.281.

[143] Again, *RIA* is not included in this model because when it is large, it has almost the same effect of being Australian-born. We believe that the intercept dummy will capture any effects for recent arrivals.

human capital and demographic variables in the model, NESB and Australian-born women were equally likely to be unemployed.

5.7.2 Educational Attainment

In the separate models for NESB and Australian-born women in Tables 5.1 and 5.2, the coefficients of the education variables *DEGREE* and *DIPLOMA* are negative and significantly different from zero. A comparison of the elasticities evaluated at the means of these variables suggests that having a degree has impact on the probability of unemployment for NESB women than for Australian-born women (-0.061 and –0.045 respectively). In addition, the models suggest that the impacts of having a diploma had a greater effect on the probability of unemployment for NESB than for Australian-born women (-0.045 and –0.028 respectively). The variable *SKILL* was not significant, which suggests that having a vocational skill qualification does not impact on unemployment.

In Table 4.4, the variable *DEGREE*NESB* is significant and its coefficient is positive, which suggests that while the possession of a degree makes both groups less likely to be unemployed, the impact is less for NESB women.[144] The variable *DIPLOMA*NESB* is positive but not significant, which suggests that the possession of a diploma makes women less likely to be unemployed, and the effect is the same for NESB and Australian-born women. The variable *SKILL*NESB* is also not significant, nor is *SKILL*, which suggests that whilst the possession of a vocational trade qualification has no impact on the probability of unemployment for both groups.

Although there is some evidence that the impact of having educational qualifications falls unevenly between the groups, there is clear evidence that they decrease the probability of being unemployed for both groups. The models provide some support for the hypothesis that the positive effects of having a degree or diploma are less strong for NESB women than for Australian-born women.

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[144] The effective coefficient for NESB women is –0.178 and –0.380 for Australian-born women.

5.7.3 Labour Market Experience

In the separate models for NESB and Australian-born women in Tables 5.1 and 5.2, the coefficient of the labour market experience variable *EXPERIENCE* is significantly different from zero and is negative for Australian-born women, but not significant for NESB women. This suggests that the impacts of having additional experience had the effect of reducing the probability of unemployment for Australian-born women.

In the pooled data model shown in Table 4.4, the variable *EXPERIENCE*NESB* is significant and its coefficient is positive, which suggests that whilst the possession of additional experience has a smaller impact on the probability of unemployment for NESB women than for Australian-born women.[145]

5.7.4 Age

In the separate models for NESB and Australian-born women in Tables 5.1 and 5.2, the coefficient of *YOUNG* is significantly different from zero and positive for Australian-born women, but not significant for NESB women and is deleted from the preferred model. This suggests that the impact of being 18 to 24 years old increased the probability unemployment for Australian-born, compared with their counterparts in the 25 to 45 group.

In the pooled data model shown in Table 4.4, the variable *YOUNG*NESB* is not significant, which suggests that being 18 to 24 years of age makes NESB and Australian-born women equally more likely to be unemployed.

In the separate models for NESB and Australian-born women in Tables 5,1 and 5.2, the coefficient of *MATURE* is significantly different from zero and positive for NESB women, but not significant for Australian-born women.

In the pooled data model shown in Table 4.4, the variable *MATURE*NESB* is positive but not significant, whereas *MATURE* is negative and significant. This suggests that

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[145] The effective coefficient for NESB women is 0.001 and 0.013 for Australian-born women.

being over 45 years of age reduces the probability of unemployment and the effect is the same for NESB and Australia-born women.

5.7.5 Marital Status

In the separate models for NESB and Australian-born women in Tables 5.1 and 5.2, the coefficient of *MARRIED* is significantly different from zero and negative for Australian-born women, but not significant for NESB women. This suggests that the impact of being married reduces the probability of unemployment for Australian-born women.

On the other hand, in the pooled data model shown in Table 4.4, the variable *MARRIED*NESB* is significant and positive, which suggests that the impact of being married was likely to increase the probability of unemployment for NESB women, but it reduced it for Australian-born.[146]

5.7.6 Presence of Children

In the separate models for NESB and Australian-born women in Table 5.2 and 5.3, the coefficient of *CHILD* is significantly and positive for Australian-born women, but not significant for NESB women. This suggests that the impact of having a child increased the probability of unemployment for Australian-born women.

In the pooled data model shown in Table 4.4, the variable *CHILD*NESB* is not significant, but *CHILD* is significant and its coefficient is positive. This suggests that the presence of a child increases the probability of unemployment equally for NESB and Australia-born women.

5.7.7 Interaction Variables containing Age

The interaction models were not very useful in the separate models, however they performed better in the pooled data model. Therefore, we only report the results of the interaction variables that are shown in Table 4.4.

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[146] The effective coefficient for NESB women is 0.422 and –0.523 for Australian-born women.

The variable *MAT*MARRIED*NESB* is significant and its coefficient is negative, which suggests that being "mature" and married makes NESB women less likely to be unemployed than Australian-born women.[147]

The variable *MAT*CHILD*NESB* is marginally significant and positive, which suggests that being "mature" and having a child increases the probability of unemployment more for NESB women than Australian-born women.[148]

The variable *MID*MARRIED*NESB* is not significant, which suggests that being "middle" aged and married has the same impact on the probability of unemployment for NESB and Australian-born women.

The variable *MID*CHILD*NESB* is not significant, which suggests that being "middle" aged and having a child has the same impact for NESB and Australian-born women.

5.7.8 Interaction Variables containing Presence of Children

The variable *MARRIED*CHILD*NESB* is significant and its coefficient is negative, which suggests that being married and having a child makes NESB women less likely to be unemployed than Australian-born women.[149]

5.7.9 Place of Residence

In the models for NESB and Australian-born women in Tables 5.1 and 5.2, the coefficient of *CITY* is significantly different from zero and negative for Australian-born women, but not for NESB women.

In the pooled data model shown in Table 4.4, the variable *CITY*NESB* is significant and positive, while *CITY* is significant and has a negative coefficient. This suggests that the impact of living in a metropolitan area reduces the probability of unemployment, but the effect is larger for Australian-born women.[150]

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[147] The effective coefficient for NESB women is –0.492 and 0.144 for Australian-born women.
[148] The effective coefficient for NESB women is –0.024 and –0.599 for Australian-born women.
[149] The effective coefficient for NESB women is –0.530 and –0.206 for Australian-born women.
[150] The effective coefficient for NESB women is –0.018 and –0.153 for Australian-born women.

5.7.10 Summary

From ABS data (Cat no.6203.0, January 1996) we observe that NESB migrant women had higher rates of unemployment during the 1990s than Australian-born women. Furthermore, the gap between the unemployment rates of NESB migrant women and other women has widened considerably since then. In 1994 for example, the unemployment rate for NESB migrant women was 1.8 times greater than that of Australian-born women (ABS, Cat no. 6203.0). More recently, we observed from ABS (Cat.6202.2, November 2001) that unemployment rate for Australian-born Females was 5.8 percent compared to 8.2 percent for NESB migrant women in Victoria.

In this study, all signs of the estimated coefficients accord with their expected signs (where they could be identified). It seems beyond doubt that education is an important factor, which influences the likelihood of any individual being unemployed. For both groups of women, having a degree significantly decreased the probability of unemployment, however the effect was slightly greater for Australian-born women. Having a diploma also decreased the probability of unemployment for both groups of women and the effect was slightly greater for NESB women. Like education, experience was also an important factor that influenced the likelihood of being unemployed for both groups of women.

It was also clear in the NESB and the pooled data models that having good English skills reduced the probability of unemployment. Demographic variables that included age, marital status, motherhood and place of residence were also useful in explaining differences in unemployment rates.

5.8 Conclusion

In this chapter, we estimated the probability of unemployment for NESB migrant women and compared it with that of Australian-born women. We were principally interested in the specific variables associated with migration that were the period of residence and English language proficiency. We were also interested in examining how different levels of education can affect the probability of unemployment for both groups.

Three main conclusions are drawn from this study. First, having a degree or a diploma reduced the probability of unemployment for both Australian-born and NESB migrant women. Australian-born women were more likely to benefit from having degrees, however NESB women also benefit from having degrees but to a lesser extent. The reverse was true for diploma holders. Second, greater levels of English proficiency decreased the probability of unemployment for NESB migrant women.

Third, lengthier periods of residence decreased the probability of unemployment for NESB women. This finding accorded with those of many other authors who have investigated this matter. They also reconfirmed the predictions of human capital theory that the opportunity cost of unemployment increased with the level of human capital. Better-endowed women were therefore less likely to become unemployed.

This analysis suggests that English training programs are a useful means of reducing unemployment rates amongst NESB women. It also suggests that both groups are less likely to be unemployed if they acquire higher educational qualifications. Finally, our analysis suggests that by acquiring high level of English for NESB women, and high levels of education for both groups of women might reduce their probability of unemployment.

Table 5.1: Summary Statistics for Models of Unemployment

Variables	NESB		Australian-born		Pooled	
Dependent Variable	***Mean***	***Std. Dev.***	***Mean***	***Std. Dev.***	***Mean***	***Std. Dev.***
UNE	0.127	0.333	0.076	0.264	0.083	0.276
Independent Variables						
ENGVW	0.356	0.479			0.094	0.292
ENGW	0.230	0.421			0.036	0.187
ENGNW	0.108	0.310			0.017	0.127
DEGREE	0.206	0.404	0.161	0.367	0.168	0.373
DIPLOMA	0.088	0.283	0.101	0.301	0.099	0.298
SKILL	0.036	0.185	0.034	0.180	0.034	0.181
EXPERIENCE	6.209	8.249	4.791	7.124	5.000	7.318
RIA	13.717	7.437				
YOUNG	0.088	0.283	0.218	0.413	0.198	0.399
MIDDLE	0.554	0.497	0.532	0.499	0.535	0.499
MATURE	0.358	0.480	0.251	0.434	0.591	0.492
MARRIED	0.677	0.468	0.517	0.500	0.541	0.498
CHILD	0.689	0.463	0.563	0.496	0.582	0.493
CITY	0.749	0.434	0.502	0.500	0.538	0.499
Cases	4,484		25,906		30,390	

Table 5.2: Probit Models of NESB Women's Unemployment

Dependent: *UNE**	General Model		Preferred Model		
Variables	***Parameter Estimates***	***P-value***	***Parameter Estimates***	***P-value***	***Elasticity at Mean***
Constant	-0.571	0.000	-0.646	0.000	
ENGVW	-0.033	0.623			
ENGW	0.237	0.000	0.264	0.000	0.048
ENGNW	0.585	0.000	0.608	0.000	0.111
RIA	-0.041	0.000	-0.040	0.000	-0.007
DEGREE	-0.294	0.000	-0.336	0.000	-0.061
DIPLOMA	-0.204	0.051	-0.244	0.011	-0.045
SKILL	-0.106	0.458			
EXPERIENCE	-0.004	0.335			
YOUNG	0.093	0.311			
MATURE	0.146	0.017	0.334	0.000	0.061
MARRIED	-0.269	0.000			
CHILD	0.073	0.266			
CITY	-0.034	0.564			
*MATURE*MARRIED*			-0.485	0.000	-0.089
*MIDDLE*MARRIED*CHILD*			-0.257	0.000	-0.047
Log-L	-1544.0		-1537.1		
Restricted-log L	-1707.8		-1707.8		
Chi-squared	327.6	0.000	341.4	0.000	
Correct pred	87.1 percent		87.4 percent		
R^2	0.070		0.080		

Table 5.3: Probit Models Women's Unemployment using Pooled Data

Dependent: *UNE**	General Model		Preferred Model		
Variables	***Parameter Estimates***	***P-value***	***Parameter Estimates***	***P-value***	***Elasticity at Mean***
Constant	-1.175	0.000	-1.161	0.000	
DEGREE	-0.384	0.000	-0.378	0.000	-0.045
DIPLOMA	-0.243	0.000	-0.232	0.000	-0.028
SKILL	-0.080	0.265			
EXPERIENCE	-0.013	0.000	-0.014	0.000	-0.002
YOUNG	0.247	0.000	0.199	0.000	0.024
MATURE	-0.241	0.000			
MARRIED	-0.627	0.000	-0.621	0.000	-0.074
CHILD	0.312	0.000	0.650	0.000	0.077
CITY	-0.149	0.000	-0.147	0.000	-0.017
*MATURE*CHILD*			-0.630	0.000	-0.075
*MIDDLE*CHILD*			-0.369	0.000	-0.044
Log-L	-6379.3		-6364.1		
Restricted-log L	-6936.1		-6936.1		
Chi-squared	1113.6	0.000	1144.0	0.000	
Correct pred	92.0 percent		92.4 percent		
R^2	0.040		0.044		

Table 5.4: Probit Models of NESB and Australian-born Women's Unemployment

Dependent: *UNE**	General Model		Preferred Model		
Variables	*Parameter Estimates*	*P-value*	*Parameter Estimates*	*P-value*	*Elasticity at Mean*
Constant	-1.180	0.000	-1.188	0.000	
NESB	-0.007	0.937	-0.145	0.139	-0.019
ENGVW	0.086	0.037	0.103	0.013	0.013
ENGW	0.385	0.000	0.401	0.000	0.051
ENGNW	0.853	0.000	0.855	0.000	0.109
DEGREE	-0.382	0.000	-0.380	0.000	-0.049
*DEGREE*NESB*	0.206	0.167	0.202	0.020	0.026
DIPLOMA	-0.244	0.000	-0.240	0.000	-0.031
*DIPLOMA*NESB*	0.116	0.308	0.107	0.350	0.014
SKILL	-0.083	0.246	-0.081	0.261	-0.010
*SKILL*NESB*	-0.022	0.838	0.028	0.860	0.004
EXPERIENCE	-0.013	0.000	-0.013	0.000	-0.002
*EXPERIENCE*NESB*	0.113	0.014	0.012	0.011	0.002
YOUNG	0.244	0.000	0.213	0.000	0.027
*YOUNG*NESB*	-0.069	0.468	-0.052	0.672	0.007
MATURE	-0.237	0.000	-0.064	0.000	-0.008
*MATURE*NESB*	0.191	0.004	0.033	0.849	0.004
MARRIED	-0.629	0.000	-0.523	0.000	-0.067
*MARRIED*NESB*	0.411	0.000	0.945	0.000	0.121
CHILD	0.315	0.000	0.687	0.000	0.088
*CHILD*NESB*	-0.312	0.000	-0.249	0.388	-0.032
*MAT*MARRIED*			0.144	0.120	0.018
*MAT*MARRIED*NESB*			-0.636	0.015	-0.082
*MAT*CHILD*			-0.599	0.000	-0.077
*MAT*CHILD*NESB*			0.575	0.071	0.074
*MID*MARRIED*			0.018	0.856	0.002
*MID*MARRIED*NESB*			-0.270	0.255	-0.035
*MID*CHILD*			-0.329	0.000	-0.042
*MID*CHILD*NESB*			0.126	0.658	0.016
*MARRIED*CHILD*			-0.206	0.003	-0.026
*MARRIED*CHILD*NESB*			-0.324	0.028	-0.416
CITY	-0.155	0.000	-0.153	0.000	0.538
*CITY*NESB*	0.140	0.026	0.135	0.033	-0.032
Log-L	-7990.7			-7949.1	
Restricted-log L	-8703.7			-8703.6	
Chi-squared	1426.0	0.000		1509.3	0.000
Correct Pred	100.0		91.6 percent		
R^2	0.047			0.053	

6.0 Bivariate Probit Models of Labour Market Status

6.1 Introduction

In Chapter 4 we analysed women's employment in primary sector occupations using a univariate probit model and we restricted the sample to labour market participants only. The dependent variable was a primary sector employment dummy (*PRIM*), where primary sector occupations were derived from a modified ANU2 job prestige scale discussed in Chapter 4.

The model used in Chapter 4 mainly focused on the role of the employers' hiring decisions to estimate the probability of being employed in a primary sector job, ignoring women's decisions about whether or not to participate in the labour market. It is arguable that such an approach might not be appropriate unless labour market participation decisions and employers' hiring decisions are independent. The probability of employment in the primary sector is a conditional probability, which depends on women's prior participation in the labour market. In other words, a woman cannot have a primary sector job if she has not elected to enter the labour market. Thus, estimating a woman's probability of being employed in the primary sector as a univariate probit from a labour market participant might not provide correct probability estimates unless these two decisions are independent in the relevant bivariate distribution function.

We have established that there are strong theoretical reasons why persons with limited human capital attributes are less likely to obtain primary sector jobs, and this is supported by a wealth of empirical evidence. Although there is much empirical evidence regarding the relationship between labour market participation and human capital attributes, the theoretical arguments seem less compelling. It can be argued that any person who needs to support him or herself and does not have access to social security, almost by definition must be a labour market participant. If this is so, human capital attributes might not be very important in the participation decisions of some women.

The independence of women's decisions to participate in the labour market and primary sector employers' hiring decisions implies that the correlation of the disturbances of the

two decision equations is zero. This suggests that the factors that predict that a woman is a participant are not related to a primary sector employers' hiring decision. In that case, a univariate probit model can legitimately be used to estimate a woman's primary sector employment probability. On the other hand, the univariate approach suffers a major setback if a woman's participation decision and employers' hiring decision are not independent. This is because the same variables that influence a primary sector employer's hiring decisions may also influence a woman's decision to participate in the labour market. Ignoring this dependency might lead to erroneous estimates of the relevant parameters. Also, if these two decisions are not independent then the correlation of disturbances of the two decision equations is non-zero, implying that unobserved factors that influence the decision to participate in the labour market are likely to affect primary sector hiring decisions.

In this chapter we will estimate a woman's probability of primary sector employment using a bivariate probit model, which mitigates the problems noted above. It is based on the principle that women decide to participate in the labour market and primary sector employers hire from the pool of participating women.[151] We investigate the proposition that women's participation decisions and employers' hiring decisions are separate, but perhaps interrelated. If these decisions were found to be interrelated, then this chapter might provide improved estimates of the probability of primary sector employment using a bivariate probit model.

In order to determine the probability of employment in primary sector jobs, we must establish whether a woman participates in the labour market as well as whether a primary sector employer hires her. This implies that for women who have primary sector jobs, an observed final outcome does not affect the binary choice of a single decision, but rather the simultaneous binary choices of two decisions. In our data set, the participation variable is fully observed for all women and we have defined $PART_i = 1$ if a woman is employed or actively looking for a job, and $PART_i = 0$ otherwise. Similarly,

[151] Abowd and Farber (1983), Farber (1983), Heywood and Mohanty (1995) estimated employment probabilities based on bivariate probit models from union and government job queues.

the primary sector employment status of a woman $PRIM_i$ is also fully observed with $PRIM_i = 1$ if a woman is employed in a primary sector, and 0 otherwise. In this situation, a bivariate probit model seems appropriate because it allows us to model the factors that determine both participation and hiring into a primary sector job decision processes simultaneously.[152] The bivariate probit model is an extension of the univariate probit model, which allows us to use more than one equation with correlated disturbances, in the same way as seemingly unrelated regression models.[153]

6.2 Applications of the Bivariate Probit Model

Authors including Zellner and Lee (1965), Ashford and Sowden (1970), Poirier (1980), Wynard and Van Praag (1981), Farber (1983), Meng and Schmidt (1985), Boyes *et al.* (1989), Devaney and Chien (2000), Newman and Canagarajah (2000), Orellano and Picchetti (2001), Mohanty (2002), and Wetzels and Zorlu (2003) have used bivariate probit models in a range of fields in applied economics. Although none of these studies concerns primary sector occupational status, they are analogous and present a useful approach for our analysis. Their models are outlined below.

Zellner and Lee (1965) analysed durable good purchase decisions (buy or not buy) and used for credit decisions (use or not use instalment credit) using data from the 1958 Survey of Consumer Finances relating to 281 home-owning primary spending units. They used a bivariate probit model with full observability, taking disposable income as an exogenous variable. They suggested that a joint estimation approach for such relationships provided asymptotically more efficient estimators than single equation estimators if the correlations existed among the variables analysed. They also concluded

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[152] Devency and Chien (2000) used a bivariate probit model to determine the factors that influence workers' participation in retirement plans based on two dichotomous decisions, employment and retirement participation. The decision to participate in a retirement plan is likely to be jointly determined when workers aware that they are more likely to be eligible for benefits when they work for some one else, select between wage earning occupations and self employment. This study examined the link between retirement plan participation and employment status, because workers need to prepare financially for retirement, and most make informed decisions about retirement plan participation when they chose a wage earning occupations or self-employment.

[153] Seemingly unrelated regressions deal with a set of regression equations, which can be estimated by applying Aitken's (1934) generalized least squares method. Zellner (1962) first used this estimation method and showed that the regression coefficient estimators so obtained were at least asymptotically more efficient than those obtained by an equation-by-equation application of least squares method.

that the joint estimation procedure was flexible in the sense that it could readily be adopted to incorporate exact and stochastic restrictions on the parameters of the relationships.

Ashford and Sowden (1970) estimated parameters for a bivariate probit model for two endogenous variables, breathlessness and wheeze of a coal miner with full observability, taking age as the exogenous variable. A coal miner might have a positive response to neither, to one or the other, or to both of the symptoms. There were four possible outcomes, all of which were distinguishable, since number of individuals within each age group could be found with each combination of symptoms.

Poirier (1980) developed a partial observability bivariate probit model based on two examples without providing any empirical illustrations. The first problem emerged from Gunderson (1974) who estimated the probability of an on-the-job trainee being retained by the sponsoring company after training. Here, the employer must decide whether or not to make job offer, and the applicant must decide whether or not to accept a job offer. These decisions were not observed, however what was observed was whether the trainee continued to work after completing training. Here, we can determine whether both the associated binary variables were equal to one, but the other possible outcomes cannot be distinguished from each other when there was a negative choice made by either party. The second example was related to a two-member committee voting anonymously under a unanimity rule. One could only observe whether a motion passed (both members voted "yes") or failed (at least one member voted "no") along with a range of socio-economic, personal and demographic and other characteristics of the voters. Their individual decisions were not observed and were expressed by four possible voting combinations: (yes, yes,), (yes, no), (no, yes) and (no, no). The last three were not distinguishable. In this situation Poirier (1980) suggested using a partial observability bivariate probit model because random utility models in which the observed binary outcome does not

reflect the binary choice of a single decision maker, but the joint unobserved binary choices of two decision makers.[154]

Wynard and Van Praag (1981) used a probit model with a corrective method for sample selectivity analogous to Heckman (1979) to analyse the decision to choose health insurance with a deduction (a specified contribution to cover the medical cost payable by the policy holders) with a reduced premium or stick to old policy conditions without deductibles, but non-reduced premium, using a sample of 8,000 privately insured families. They estimated linear probability and probit models (both with and without a sample selection correction term), and estimated a bivariate probit model. They used income, health status, medical consumption and various socio-economic characteristics of families as independent variables. They found that current health, medical consumption and income had significant influences on the decision to buy a health insurance between the two options. Their results provided an indication of the degree of adverse selection that might take place if health insurance policies were offered with the option to take a deduction in exchange of a premium reduction.

Farber (1983) used a censored probit model to analyse the demand for unionisation, using the 1977 cross section of the Quality of Employment Survey data obtained from approximately 1,500 randomly selected workers (both union and non-union) undertaken by the Survey Research Centre of the University of Michigan. He used two dichotomous variables: $y_{1i} = 1$ if individual i wished to be a union member, and $y_{1i} = 0$ otherwise; and $y_{2i} = 1$ if a union employer was willing to hire individual i, and $y_{2i} = 0$ otherwise. Union membership Z_i was observed for all i, but $Z_i = y_{1i}\, y_{2i} = 1$ if both $y_{1i} = 1$ and $y_{2i} = 1$; and $Z_i = 0$ otherwise. If nothing more was known then this model coincided with Poirier's (1980) model, which was based on two related decisions. However, in Farber's model non-union members were also asked about their desire for union membership, and hence y_{1i} was observed for all i. As well, y_{2i} was observed only if $y_{1i} = 1$. This provided more information than Poirier's model, but less than full observability. The first probit

[154] Connolly (1983) used Poirier's version of the model to analyse the decision to arbitrate or negotiate the contracts between public employees' unions and municipalities in Michigan.

equation was fully observed and could be estimated separately, but would be inefficient unless the correlation (ρ) between the errors of the two decision equations was zero. Moreover, there would be selectivity bias in estimating second equation unless $\rho = 0$. He conducted a joint estimation of both equations based on three types of observations: ($y_{1i} = 0$; $y_{1i} = 1$ and $y_{2i} = 1$; $y_{1i} = 1$ and $y_{2i} = 0$) and found that preference for union representation was greater among the workforce in general than among the non-union workforce.

Meng and Schmidt (1985) reviewed several types of bivariate probit models under various levels of observability, which were based on two related decisions. They investigated the cost of partial observability, where cost was defined as the loss of asymptotic efficiency of the parameter estimates relative to the full observability case and identified several factors, which strongly influenced the cost. This knowledge might be helpful in deciding whether in a particular application of a model, further observability information would be worth pursuing. They found the cost of partial observability to be fairly high and recommended collecting additional observability information where possible.

Boyes *et al.* (1989) applied the Manski-Lerman weighted exogenous sample maximum likelihood (WESML) technique to estimate bank default probabilities using a bivariate censored probit model, putting $y_{1i} = 1$ if a loan was granted, 0 otherwise; and $y_{2i} = 1$ if a loan defaulted, 0 otherwise.[155] For any individual, y_{2i} is observed in this censored probit model only if $y_{1i} = 1$. They used a survey of 4,632 credit card applicants to estimate a model with complete information. They concluded that combining default probability estimates with other parameters of the loan earnings process provided a more meaningful model for credit assessment.

Devaney and Chien (2000) used a bivariate probit model in analysing the decision to participate in a retirement plan for self-employed and wage-earner workers. They used

[155] The WESML was obtained by maximizing a weighted log likelihood function with weights determined by comparing sample propositions with corresponding population frequencies.

data from the US 1995 Survey of Consumer Finances for two dichotomous decisions, employment status (wage-earner or self employed) and retirement plan participation (participate in the retirement plan or not), which were likely to be jointly determined. The model examined whether there were any unobserved factors that influenced both decisions. This was because any unobserved factors that influenced the decision to be either self-employed or a wage earner were likely to be affected by the correlation (ρ) of the disturbances of the two models. They found that ρ was negative and significant for self-employed persons, implying that unobserved factors influenced the decision to be self-employed were likely to decrease participation in retirement plans.

Newman and Canagarajah (2000) used a bivariate probit model to compare trends in rural poverty by gender for Ghana and Uganda. They used two latent variables representing, the decision to work in agriculture, and the decision to work in a non-farm activity.[156] This analysis suggested that in Uganda, female heads of households, and in Ghana, women in general, were significantly more likely than men to participate in non-farm activities and less likely to participate in agriculture.

Orellano and Picchetti (2001) used a bivariate probit model to analyse job turnover in the Brazilian labour market, using PED/SEADE survey data. They only observed directly the cases where both employers and the firms jointly decided to maintain employment relations. Three other possible cases: quitting/maintaining, staying/firing and quitting/ firing were observationally equivalent. They estimated and identified the probabilities of the joint decisions of quitting or staying on the job on the workers' side, and maintaining or firing the employee on the firms' side. The estimated parameters related these estimated probabilities to the characteristics of the workers, their occupations, and to potential macroeconomic determinants at different point in times. They found that *ceteris paribus* female workers were more likely to quit their jobs than male workers.

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[156] They define "non-farm" as all the activities that are associated with wage/ self-employment in works, which are not agriculture but located in rural areas.

Mohanty (2002) used a bivariate probit model to analyse the employment differentials for teenage workers in Los Angeles County, using the 1990 Public Use Microdata Samples (PUMS). He argued that previously estimated employment probabilities based on univariate probit models for labour market participants only encompassed employers' hiring decisions and ignored participation decisions. He estimated a workers employment probability that incorporated both participation (supply) and hiring (demand) decisions. He concluded that participation decisions had a significant impact on teenagers' employment probabilities, and employers were not responsible for a lower employment rate of a particular race or gender. He found that participation decisions were not independent of personal and human capital characteristics, but also on other factors including family, household and neighbourhood characteristics. Finally, he concluded that there was no evidence of employer discrimination against female and Latin teenage workers.

Wetzels and Zorlu (2003) used a bivariate probit model to examine wage differentials between mothers and childless women based on a motherhood decision and a participation in the labour market decision. They argued that a mother's choice of participating in the labour market is determined by both the motherhood decision and the decision to enter into labour market simultaneously. They conducted an empirical study based on 2001 Dutch labour market data, focusing on double selectivity with respect to the two main underlying decision processes. They found that the motherhood decision was strongly correlated with the decision to participate in the labour market.

None of the above studies dealt with labour market participation and primary sector employers' hiring decisions, however, they are analogous to our study For example, Boyes *et al.* (1989) analysed data generated by the following rule: $y_{1i} = 1$ if a loan was granted, 0 otherwise; and $y_{2i} = 1$ if the loan defaulted, 0 otherwise . For a given individual, y_{2i} is observed in this censored probit model only if $y_{1i} = 1$, using three types of observations in the sample, which is similar to ours. In our model we use what is effectively the same rule: $y_{1i} = 1$ if a woman participates in the labour market, 0 otherwise; and $y_{2i} = 1$ if a woman is employed in the primary sector occupation, 0

otherwise. For a given individual, y_{2i} is observed in this censored probit model only if y_{1i} = 1.

6.3 Sample Selectivity Problem

An often-mentioned question in the labour market literature [Johnson (1983), Abowd and Killingsworth (1984), Wynard and Van Praag (1981) and Mohanty (1998, 2000)] is the selectivity problem that may lead to inconsistent estimates of parameters, which can often be solved by applying the original Heckman (1979) and Lee (1978) two-step procedures, assuming that employment in the primary sector results from a single censoring process.

The standard Heckman-Lee procedure cannot be applied when the structure of potential sample selection bias has qualitative dependent variables, which are similar to our study where labour market participation and primary sector employment are simultaneous and together they follow a bivariate qualitative dependent variable models. The selectivity problem cannot occur in our study because our data is a 1 percent random sample of the 1996 Australian Census, those who participate in the labour market and/or having employment in primary sector occupation.[157]

6.4 Participation and Primary Sector Employment

This chapter estimates models of the primary sector employment occupation probabilities for both NESB and Australian-born women workers based on double selectivity with respect to two main underlying decision processes: the decision to participate in the labour market and selection into primary sector employment.

Let us assume that women decide whether or not to participate in the labour market and primary sector employers hire them or do not hire them simultaneously.[158] This simultaneous double selection can be illustrated as follows:

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[157] Some studies estimated wage differentials correcting for selection into employment and indicated that selection problem might not occur for every country [Datta and Smith (2000), Harkness and Waldfogel (2003), and Waldfogel (1994, 1995)].

[158] Of course, in practice, simultaneity would be unusual. A woman might be hired into a primary sector job from another such job, or a secondary sector job, or unemployment.

$$PRIM_i = \begin{cases} 1 \rightarrow HIRE_i = 1 \rightarrow PART_i = 1 \\ 0 \rightarrow HIRE_i = 0 \begin{cases} PART_i = 1 \\ PART_i = 0 \end{cases} \end{cases} \quad (6.1)$$

$HIRE_i$ = 1 if a primary sector employer hires a woman from the labour market, and 0 otherwise. A woman is employed in the primary sector occupation ($PRIM_i$ = 1) if she participants in the labour market ($PART_i$ = 1) and she is also hired by an employer ($HIRE_i$ = 1). Hence the probability of being employed in a primary sector job is:

$$\text{Prob}[PRIM_i = 1] = \text{Prob}[PART_i = 1 \cap HIRE_i = 1] \quad (6.2).$$

We assume that a women's preference function for labour market participation is represented by a latent variable, $PART^*_i$ that depends on a reservation wage. Due to the unavailability of data for reservation wages, researchers commonly use demographic and human capital characteristics (X_{1i}) as proxies. An employer's preference function, on the other hand, is represented by another latent variable, $HIRE^*_i$, which depends on the efficiency of potential employees. This too is unobservable and human capital is typically used as a proxy (X_{2i}). Labour market outcomes depend on the values of these latent variables and in particular:

$$PART_i = 1 \text{ if } PART^*_i > 0, \text{ 0 otherwise} \quad (6.3a)$$

$$HIRE_i = 1 \text{ if } HIRE^*_i > 0, \text{ 0 otherwise} \quad (6.3b)$$

The latent variables can be expressed as follows:

$$PART^*_i = X_{1i}\beta_1 + \varepsilon_1 \quad (6.4a)$$

$$HIRE^*_i = X_{2i}\beta_2 + \varepsilon_2 \quad (6.4b)$$

X_{1i} and X_{2i} denote vector of characteristics that affect participation in the labour market and primary sector hiring decisions, β_1 and β_2 are the corresponding coefficient vectors, and ε_{1i} and ε_{2i} are disturbance terms that are assumed to follow a bivariate standard

normal distribution, with $E[\varepsilon_{1i}] = E[\varepsilon_{2i}] = 0$, and $Var[\varepsilon_{1i}] = [\varepsilon_{2i}] = 1$ and the disturbance terms in the two equations are correlated: $Cov[\varepsilon_{1i}, \varepsilon_{2i}] = \rho$.

If both $PART_i$ and $HIRE_i$ are observed for all i, the primary sector employment probability can be estimated directly from a bivariate probit model in the manner of Zellner and Lee (1965). Unfortunately, $HIRE_i$ is not available in our data set, although $PART_i$ is fully observed. Our data set provides full information on $PART_i$ and $PRIM_i$ for all i, but not $HIRE_i$. Thus, it is not possible to distinguish between $HIRE_i = 1$ and $HIRE_i = 0$ when $PART_i = 0$, even though they can be distinguished when $PART_i = 1$. This implies that women with $(PART_i = 0 \cap HIRE_i = 1)$ cannot be distinguished with $(PART_i = 0 \cap HIRE_i = 0)$. For a given individual i, $HIRE_i$ is observed in this censored probit model only when $PART_i = 1$. Thus, there are three types of observations in the sample with unconditional probabilities given below (Greene, 1993, p. 664).[159]

$$PART_i = 0 \Rightarrow \qquad \text{Prob}[PART_i = 0] = 1 - \phi(X_{1i}, \beta_1) \tag{6.5a}$$

$$HIRE_i = 0, PART_i = 1 \Rightarrow \qquad \text{Prob}[HIRE_i = 0, PART_i = 1] = \Phi(X_{1i}\beta_1, -X_{2i}\beta_2, -\rho) \tag{6.5b}$$

$$HIRE_i = 1, PART_i = 1 \Rightarrow \qquad \text{Prob}[HIRE_i = 1, PART_i = 1] = \Phi(X_{1i}\beta_1, X_{2i}\beta_2, \rho) \tag{6.5c}$$

Here $\phi(.)$ and $\Phi(.)$ denote the univariate standard normal and bivariate standard normal cumulative distribution function respectively. The parameter vectors β_1 and β_2 of Equations (6.5a), (6.5b) and (6.5c) can be estimated by a censored bivariate probit model by maximizing the following Log-likelihood (Log L) function:[160]

$$\text{Log L}(\beta_1, \beta_2, \rho) = \sum_{i=1}^{n} \left[\begin{array}{l} PART_i\ HIRE_i \log \Phi(X_{1i}\beta_1, X_{2i}, \rho) \\ \quad + PART_i\ (1 - HIRE_i) \log\{\phi(X_{1i}\beta_1) - \Phi(X_{1i}\beta_1, X_{2i}, \rho)\} \\ \quad + (1 - PART_i) \log\{\phi(-X_{1i}\beta_1)\end{array} \right] \tag{6.6}$$

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[159] This model was first introduced by: Wynard and Van Praag (1981). In this way, the problem of partial observability can be reduced to a great extent, but not completely.

[160] Meng and Schmidt (1985), Boyes *et al.* (1989), and Mohanty (2002) also used this technique.

Authors such as Wynard and Van Praag (1981), Boyes *et al.* (1989) and Meng and Schmidt (1985) have shown that parameter estimates obtained from the above equation provide efficiency gains over those obtained from two separate equations. This joint estimation provides correlation (ρ) between the two equations, which corrects the sample selection bias that could be incurred in the separate estimation of the default equation.[161] All other options and specifications are the same as the basic bivariate probit model. The results of this sample selectivity model are the same as the results of the basic bivariate model except the diagnostic table, which indicates that the model has been selected.

To re-emphasise the thrust of this section, individuals might have attributes that would enable them to obtain primary sector employment, however that could only occur if individuals had already elected to participate in the labour market. In other words, some individuals who would be capable of achieving primary sector employment might choose not to seek any job at all for a variety of possible reasons. Accordingly, we use a modelling approach that allows us to examine the participation decisions of individuals and the employment decisions of primary sector employers simultaneously.

Once more we use the same data set of 8,508 NESB migrant women and 38,775 Australian-born women from the 1-percent sample of the 1996 Australian Census, restricting the sample to women in the range 18-64 years of age.

6.5 Participation and Primary Sector Employment of NESB Women

If the correlation of the disturbances, ρ of the model is positive and significant, it means that the unobserved factors that influence the probability of participation in the labour market also influence the probability of primary sector occupation.

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[161] It should be noted that reversal of subscripts and a minor change in interpretation, the Meng and Schmidt log-likelihood is the same as that of the bivariate probit with sample selection. [See LIMDEP (1995, pp. 465 and 467)].

Our general model for two dichotomous decisions: the probability of being employed in the primary sector and participation. These can be expressed as follows.

$$\text{Prob[Primary]} = f(\text{Human capital characteristics}) \quad (6.7a)$$

$$\text{Prob[Participation]} = f(\text{Demographics characteristics}) \quad (6.7b)$$

The first equation analyses the factors that influence the decision of primary sector employers. The independent variables included in this equation are human capital characteristics, which we assume are important in an employer's assessment of a job applicant's potential efficiency. The second equation investigates the factors that affect the decision to participate in the labour market. The independent variables included in this equation are demographic characteristics, which we assert are most important in determining whether a woman will enter into the labour market.

In Chapters 3 and 4, we analysed women's participation in the labour market and primary sector employment status respectively, using separate univariate probit models. Both those models contained human capital as well as demographic variables, where we argued that both primary sector employment, and labour market participation were the functions of human capital and demographic variables. However, in the present analysis, we restrict primary sector employment as a function of human capital variables only, whereas participation in the labour market is taken as a function of only demographic variables.

To make the estimation process converge, we have used the probability of primary sector employment status as a function of the human capital variables only, and we have used the probability of participation in the labour market status as a function of only the demographic variables. We assume that the decision to hire people for primary sector employment is based on the potential efficiency of the individual, and that primary sector employment needs resourceful people. It is widely believed that increasing human capital characteristics including English proficiency, education and experience increase productivity. Human capital theory and variables that are associated with human capital

characteristics were discussed in Chapter 4. This review along with our study in Chapter 4 suggest that women with greater human capitals are more likely to obtain primary sector employment than women with less human capitals.

We argue that an individual's participation in the labour market is predominantly based on need, which is likely to be greatly dependent on demographic characteristics. In order to meet his/her need, an individual might accept any type of job. Women's participation in the labour market is analysed in Chapter 3 using both demographic and human capital characteristics, where it is found that demographic factors were important determinants of women's participation.

The following bivariate probit model is used to estimate the probability of NESB women who are employed in primary sector occupations, as well as who participate in the labour market. The estimated parameters together with other statistics of these models are shown in Table 6.1.

$$PRIM_i^* = \beta_0 + \beta_1 ENGVW_i + \beta_2 ENGW_i + \beta_3 ENGNW_i + \beta_4 DEGREE_i + \beta_5 DIPLOMA_i + \beta_6 SKILL_i + \beta_7 EXPERIENCE_i + \beta_8 RIA_i + \varepsilon_{1i} \quad (6.8a)$$

$$PART_i^* = \alpha_0 + \alpha_1 YOUNG_i + \alpha_2 MATURE_i + \alpha_3 MARRIED_i + \alpha_4 CHILD_i + \alpha_5 CITY_i + \alpha_6 RIA_i + \varepsilon_{2i} \quad (6.8b)$$

In Equation (6.8a) we use eight independent variables: English proficiency variables, *ENGVW*, *ENGW*, and *ENGNW*; education variables, *DEGREE*, *DIPLOMA*, *SKILL* and other human capital variables *EXPERIENCE* and *RIA*. We have argued in Chapter 4 that these variables are important because they enhance productivity and are likely to affect an individual's job prospects in the primary sector. Equation (6.8b) contains six independent demographic variables: *YOUNG*, *MATURE*, *MARRIED*, *CHILD*, *CITY* and *RIA*. These variables seem important factors that might influence an individual to participate in the labour market. We have argued in Chapter 3 that these variables are important because they are likely to affect the needs of individuals to earn income.

We have used the period of residence (*RIA*) in both Equations (6.8a) and (6.8b), as an independent variable. This is because a migrant's length of stay in Australia could represent many aspects of adaptation to Australian customs and local social networks. Migrants also acquire new knowledge about the structure of the local labour market and prepare themselves to meet the demands of Australian employers' requirements. They also gain more and more information about job opportunities and other earning prospects as they live longer in Australia. Therefore, it is expected that for migrant women the length of residence in Australia might increase the probability labour market participation as well as increase the probability of primary sector employment.

In our estimated model, ρ was positive and significant, meaning that unobserved factors influenced the probabilities of women having primary sector occupation status and participation in the labour market. Our analysis suggested that the model's percentage of joint frequency correct predictions was 70.5 percent.

The p-values of most of the independent variables for primary sector occupation were less than 0.001. This implies that education and English skills had significant and positive effects on the probability of primary sector employment. However, skilled vocational qualification, experience and knowing English very well (compared with "excellent") did not have significant effects on NESB women's primary sector occupation. Importantly, our model suggested that the percentage of correct prediction for primary sector occupation based on the marginal frequency was 82.4 percent. This indicated that the percentage of correct prediction level of this model was high compared to our Chapter 4 correct prediction level of 64.9 percent for primary sector employment.

The p-values of all independent variables in the participation equation were less than 0.001 except *CITY*.[162] This suggests that living in a metropolitan area did not significantly affect NESB women's participation. The percentage of correct prediction

[162] The p-value was 0.355 for the place of residence variable.

for participation based on the marginal frequency was 70.5 percent, which was almost the same as the prediction rate in Chapter 3 (70.7 percent).

The results obtained from the participation equation will be discussed first, and will be followed by the results from the primary sector equation. These results will also be compared with the results obtained from the univariate probit models. For comparison purposes, the estimated parameters of the bivariate probit model and the preferred models of univariate probit models for participation and primary sector employment from Chapters 3 and 4 are presented in Table 6.1.

6.5.1 Participation and Length of Residence in Australia

The coefficient of residence in Australia for the bivariate probit model was positive and significant and suggested that the probability of participation was greater for NESB women who had living longer in Australia. This is consistent with the result of the univariate probit model, which was obtained earlier in Chapter 3, however the effect was slightly greater for the univariate probit model than the bivariate probit model (0.022 versus 0.017).

6.5.2 Participation and Age

The coefficient of the dummy variable for "young" people was negative and significant. This suggested that the probability of participation for younger NESB women was smaller than the probability for "middle" aged women (reference group). This result is consistent with the result of the univariate probit model, however the effect was greater in univariate probit model than the bivariate probit model (-0.635 versus -0.288).

The coefficient of the dummy variable for "mature" age was negative and significant. This suggested that the probability of participation for "mature" women was less than the probability for the "middle" aged group. This is consistent with the result in the univariate probit model, however the effect was greater for the univariate probit model than the bivariate probit model (-0.778 versus -0.328).

6.5.3 Participation and Marital Status

The coefficient of the marital status variable was negative and significant (-0.062), which suggested that married NESB women were less likely to participate in the labour market. This contradicts with the result of our univariate probit model, where the coefficient was positive and significant (0.420), suggesting that NESB married women were more likely to participate in the labour market.

6.5.4 Participation and Presence of Children

The coefficient of the dummy variable for the presence of children was negative and significant and suggested that NESB women with any children were less likely to participate in the labour market. This result is consistent with the result of the univariate probit model. However, the effect was greater for the univariate probit model than the bivariate probit model (-0.800 versus -0.109).

6.5.5 Participation and Place of Residence

The coefficient of the place of residence variable was negative and insignificant (-0.024), which suggested that living in a metropolitan area did not affect the probability of participation for NESB women. This contradicts with the result of our univariate probit model, which was positive and significant (0.066), which suggested that NESB women who lived in a metropolitan area were more likely to participate in the labour market.

6.5.6 Primary Sector Employment and English Proficiency

The differential effects of the coefficients of the variables designating speaking English "very well", "well" and "not well" compared with "excellent" English (reference group) were negative. Speaking English "well" and "not well" were significant, but "English very well" was not significant. The insignificant result for English "very well" indicates no statistical difference between "English very well" and "excellent". This suggested that those NESB women who spoke better English were more likely to be in primary sector employment. These results were consistent with the results of the univariate probit model for primary sector employment, which were obtained earlier in Chapter 4. The effects were slightly greater for the univariate probit model than the bivariate probit

model [-0.053, -0.607 and -1.112 (univariate Probit) versus -0.003 -0.394 and - 0.840 (bivariate Probit)].

6.5.7 Primary Sector Employment and Educational Attainment

The differential effects of possessing a degree or a diploma compared to a basic vocational qualification all yielded positive and significant results, which suggested that NESB women who held these qualifications had greater probabilities of having primary sector employment. These results were consistent with the previously obtained primary sector employment results. However, the effects were greater for the univariate probit model than the bivariate probit model [0.893 and 0.614 (univariate probit) versus 0.614 and 0.475 (bivariate probit)]. However the differential effect of possessing a skilled vocational was negative and insignificant compared to a basic vocational qualification, which indicates that a skilled vocational qualification had no significant effect on the probability of primary sector employment.[163] This is consistent with the univariate probit model's result in Chapter 4. The effect was greater for the univariate probit model than the bivariate probit model (-0.225 versus -0.068).

6.5.8 Primary Sector Employment and Labour Market Experience

The coefficient of the labour market experience variable was positive and insignificant. This suggested that NESB women's probabilities of having primary sector occupations increased with the increase of their labour market experience. This finding is consistent with the finding of the univariate probit model, but in that case the result was significant. However, the effect was greater for the univariate probit model than bivariate probit model (0.016 versus 0.002).

6.5.9 Primary Sector Employment and Length of Residence in Australia

The coefficient of residence in Australia for the bivariate probit model was positive and significant and suggested that the probability of having primary sector employment was greater for NESB women who had living longer in Australia. This is consistent with the result of the univariate probit model, however the effect was slightly greater for the univariate probit model than the bivariate probit model (0.031 versus 0.023).

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[163] Possible reasons for this negative result are discussed in Chapter 4.

6.6 Participation and Primary Sector Employment of Australian-born Women

The following bivariate probit model based on Equations (6.9a and 6.9b) is used to determine the probability of Australia-born women who are employed in primary sector occupation as well as those who participate in the labour market. The estimated parameters together with other statistics of these models are shown in Table 6.2.

$$PRIM_i^* = \beta_0 + \beta_1 DEGREE_i + \beta_2 DIPLOMA + \beta_3 SKILL_i + \beta_4 EXPERIENCE_i + \varepsilon_{1i} \quad (6.9a)$$

$$PART_i^* = \alpha_0 + \alpha_1 YOUNG_i + \alpha_2 MATURE_i + \alpha_3 MARRIED_i + \alpha_4 CHILD_i + \alpha_5 CITY_i + \varepsilon_{2i} \quad (6.9b)$$

These equations are similar to Equations 6.8a and 6.8b, however the English ability and residence in Australia variables that are not applicable for Australian-born women are omitted. The reasons for including the remaining variables are the same as those outlined for NESB women.

In this estimated model, the value of ρ was positive and significant, meaning that unobserved factors significantly influenced the probability of participation and having a primary sector job. The p-values of all the independent variables in the primary sector employment equation were less than 0.001, indicating that educational variables significantly affect the probability of having primary sector employment. The percentage of correct prediction of primary sector employment based on the marginal frequency was 85.5 percent, which was greater than the corresponding value obtained in Chapter 4 using the univariate probit model (68.8 percent).

Similarly, the p-values of all the independent variables the participation equation were less than 0.001, excepting *MARRIED* and *CITY*. This suggested that demographic variables had significant effects on the probability of labour market participation. However, if an Australian-born woman was married or lived in a metropolitan area, the probability of participation was unaffected. The percentage of correct prediction for participation based on the marginal frequency was 85.7 percent, which was greater than the corresponding value obtained in Chapter 3 using the univariate probit model (66.9 percent).

The estimated parameters of the model (6.9a and 6.9b) are presented in Table 6.2, which will be interpreted separately in the following sub-sections. The estimated parameters for Australian-born women's participation will be discussed first followed by a discussion of the estimated parameters of the primary sector employment equation. We will compare the results of this bivariate probit model with the results of univariate probit model for both primary sector employment and participation. For comparison purposes, the estimated parameters of the bivariate probit model (6.9a and 6.9b)) and the univariate probit models for participation as well as the primary sector employment status (from Chapter 3 and Chapter 4) are presented in the same table. In these comparisons we are unable to compare elasticities evaluated at the means of the dependent variables, and comparisons of the coefficients should be treated with caution.[164]

6.6.1 Participation and Age

The coefficient of the dummy variable for "young" people was positive and significant (0.071), which suggested that Australian-born women in the age range 18 to 24 years, had greater probabilities of participation compared with the "middle" aged women, which contrasted with the result obtained from the univariate probit model (-0.099).

The bivariate probit model suggested that the differential effect of "mature" age compared to "middle" age group was negative and significant. This suggested that the probability of participation was less for "matured" aged compared to "middle" aged Australian-born women. This is consistent with the univariate probit model's participation result. However, the effect was greater for the univariate probit model than the bivariate probit model (-1.047 versus -0.172).

6.6.2 Participation and Marital Status

The coefficient of the marital status variable was negative (-0.015) and insignificant which suggested that married Australian-born women were perhaps less likely to

[164] LIMDEP does not produce marginal effects for bivariate probit models.

participate in the labour market. This contradicted with the result of the univariate probit model, where positive and significant (0.246) result was observed earlier in Chapter 3.

6.6.3 Participation and Presence of Children

The estimated coefficient of presence of children variable was negative and significant, suggesting Australian-born women who had children were less likely to participate in the labour market. This result is consistent with the result of the participation status model obtained in Chapter 3, except that the effect was somewhat greater for the univariate the probit model (-1.370 versus -0.416).

6.6.4 Participation and Place of Residence

The coefficient of the place of residence variable was positive and insignificant, which indicated that living in metropolitan areas did not affect Australian-born women's probabilities of participation in the labour market. The estimated coefficient for the univariate probit model was significant, however the effect was somewhat greater (0.085 versus 0.011).

6.6.5 Primary Sector Employment and Educational Attainment

The effects of possessing a degree or a diploma compared to a basic vocational qualification yielded positive and significant results. These results were consistent with the findings of the univariate probit model, however these effects were greater for the univariate probit model than for the bivariate probit model [1.026 and 0.527 (univariate Probit) versus 0.655 and 0.376 (bivariate Probit)]. The differential effect of possessing a skilled vocational qualification was negative and significant compared to a basic vocational qualification.[165] This is consistent with the result obtained in Chapter 4, however the effect was greater for the univariate probit model than the bivariate probit model (-0.374 versus -0.166).

6.6.6 Primary Sector Employment and Labour Market Experience

The coefficient of the labour market experience variable was positive and significant, which suggested that experience increased the probability of having a primary sector

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[165] Possible reasons for this negative result are discussed earlier in Chapter 4.

employment for Australian-born women. This result is consistent with the finding of the univariate probit model, except that the effect was somewhat greater for the univariate probit model than the bivariate probit model (0.021 versus 0.005).

6.6.7 Primary Sector Employment Status Variables

It seems beyond doubt that education is an important factor that affects primary sector job status. Having a degree or a diploma significantly increased the probability of obtaining primary sector employment for both groups of women. The effect was greater for Australian-born women than for NESB women when they had degrees (0.655 versus 0.614), but the effect was greater for NESB women than for Australian-born women when they had diplomas (0.475 and 0.376). Similar findings were observed for both groups of women from the univariate probit models, however the effects were somewhat greater.

In the bivariate probit models, the probability of having a primary sector job increased with the length of experience for both groups of women, and the effect was greater for Australian-born women (0.005) than for NESB women (0.002). These results were consistent with those obtained from the univariate probit models.

6.6.8 Participation Status Variables

For both groups, being aged 54-64 decreased the probability of participation in the labour market. However, the effect was greater for NESB women (-0.328) than Australian-born women (-0.172). In the univariate probit model, we observed a greater effect for Australian-born women (-1.047) than NESB women (-0.778).

For both groups of women, being married decreased the probability of participation. The effect was greater for NESB women (-0.062) than Australian-born women (-0.015). But, when we employed the univariate probit model in Chapter 3 we observed opposite effects, indicated being married increased the probability of participation for both group of women in the labour market. However, the effect was greater for NESB women (0.420) than Australian-born women (0.246).

The coefficients of having children were negative and significant for both groups of women. The effect was greater for Australian-born women (-0.416) than NESB women (-0.109) and the univariate probit models also achieved similar results.

The coefficient of place of residence was negative and insignificant for NESB women, but for Australian-born women it was positive and insignificant. In the univariate probit model the coefficient of *CITY* was positive and significant for both groups, but the effect was greater for Australian-born women (0.085) than NESB women (0.066).

6.7 Participation and Unemployment of NESB Women

We next estimate the probability of unemployment using a bivariate probit model based on the proposition that a woman's participation decision and whether she is unemployed are separate, but interrelated.

Let us assume that women decide whether or not to participate in the labour market and employers hire or do not hire them simultaneously. This double selection can be illustrated as follows:

$$UNE_i = \begin{cases} 1 \rightarrow HIRE_{2i} = 0 \quad PART_{1i} = 1 \\ \\ 0 \rightarrow HIRE_{2i} = 1 \rightarrow PART_{1i} = 1 \end{cases} \tag{6.10}$$

$HIRE_i$ = 1 if an employer hires a woman from the labour market into any job (not necessarily a primary sector job), 0 otherwise. A woman is unemployed (UNE_i = 1) if she does participate in the labour market, ($PART_i$ = 1), but she is not hired ($HIRE_i$ = 0) by an employer. Hence, the probability of unemployment probability is:

$$\text{Prob}[UNE = 1] = \text{Prob}[PART_i = 1 \cap HIRE_i = 0] \tag{6.11}$$

Again we assume that a women's preference function for labour market participation is represented by a latent variable, $PART^*_{1i}$ that depends on a reservation wage. Due to the unavailability of data for reservation wages, researchers commonly use demographic and human capital characteristics (X_{1i}) as proxies. An employer's preference function,

on the other hand, is represented by another latent variable, $HIRE^*_{2i}$, which depends on the efficiency of potential employees. This too is unobservable and human capital is typically used as a proxy (X_{2i}). Thus, these two latent variables can be expressed as follows.

$$UNE_i = 1 \text{ if } PART^*_{1i} > 0, \text{ 0 otherwise.} \quad (6.12a)$$

$$HIRE_i = 0 \text{ if } HIRE^*_{2i} > 0, \text{ 0 otherwise.} \quad (6.12b)$$

The latent variables can be expressed as follows:

$$PART^*_{1i} = X_{1i}\beta_1 + \varepsilon_1 \quad (6.13a)$$

$$HIRE^*_{2i} = X_{2i}\beta_2 + \varepsilon_2 \quad (6.13b)$$

X_{1i} and X_{2i} denote vector of characteristics that affect participation in the labour market and hiring decisions; β_1 and β_2 are the corresponding coefficients, and ε_{1i} and ε_{2i} are disturbance terms that are assumed to follow a bivariate standard normal distribution, with $E[\varepsilon_{1i}] = E[\varepsilon_{2i}] = 0$, and $Var[\varepsilon_{1i}] = [\varepsilon_{2i}] = 1$ and the disturbance terms in the two equations are correlated: $Cov[\varepsilon_{1i}, \varepsilon_{2i}] = \rho$. Our general model for the dichotomous decisions can be expressed as follows.

$$UNE^* = f(\text{Human capital characteristics}) \quad (6.14a)$$

$$PART^* = f(\text{Demographics characteristics}) \quad (6.14b)$$

The first equation analyses the factors that influence the individual's unemployment status. The independent variables included in this equation are human capital characteristics, which we assume are important factors, which affect a person's chance of being unemployed. The second, equation investigates the factors that affect the decision to participate in the labour market. The independent variables included in this equation are demographic characteristics, which we assume are relatively more important in determining whether a woman will enter the labour market. Again, we were forced into this because of the difficulty of getting the LIMDEP algorithm to converge.

To restate the main theme of this section, individuals might be deficient in attributes that would enable them to obtain primary sector or secondary sector employment, however

their unemployment could only be observed if they had already elected to participate in the labour market. In other words, some individuals who might not be capable of achieving primary sector or secondary employment might choose not to seek any job for a variety of possible reasons, including an expectation that it might be too difficult to find a satisfactory job. Accordingly, we use a modelling approach that allows us to examine the participation decisions of individuals and the employment decisions of employers simultaneously.

The bivariate probit model is as follows:

$$UNE_i^* = \beta_0 + \beta_1 ENGVW_i + \beta_2 ENGW_i + \beta_3 ENGNW_i + \beta_4 DEGREE_i + \beta_5 DIPLOMA_i + \beta_6 SKILL_i + \beta_7 EXPERIENCE_i + \beta_8 RIA_i + \varepsilon_{1i} \quad (6.15a)$$

$$PART_i^* = \alpha_0 + \alpha_1 YOUNG_i + \alpha_2 MATURE_i + \alpha_3 MARRIED_i + \alpha_4 CHILD_i + \alpha_5 CITY_i + \alpha_6 RIA_i + \varepsilon_{2i} \quad (6.15b)$$

The dependent variable UNE_i^* in Equation (6.15a) is a latent variable such that UNE_i = 1 if $UNE_i^* > 0$ and 0 otherwise. Also, the dependent variable $PART_i^*$ in Equation (6.15b) is a latent variable such that $PART_i = 1$ if $PART_i^* > 0$ and 0 otherwise. The error terms, ε_{1i} and ε_{2i} are assumed to be normal.

In Equation (6.15a) we use eight independent variables: English proficiency variables; *ENGVW*, *ENGW*, and *ENGNW*; human capital variables, *DEGREE*, *DIPLOMA*, *SKILL*, and *EXPERIENCE;* and the length of residence in Australia, *RIA*. We argued in Chapter 5 that these human capital variables are important because they enhance productivity and are likely to affect an individual's job prospects. In Chapter 5 we also used a range of demographic variables as explanatory variables. Equation (6.15b) contains six independent demographic variables: *YOUNG*, *MATURE*, *MARRIED*, *CHILD*, *CITY* and *RIA*. These demographic variables are likely to be important in an individual's decision to participate in the labour market. In Chapter 3 we used these variables in addition to human capital variables to model labour market participation. If we use both human capital and demographic variables as we did in Chapters 5 and Chapter 3, the models do

not converge, probably due to the large number of independent variables in both equations. Therefore, in order to make our model converge, we use a lesser number of independent variables in each equation.

We have used the period of residence (*RIA*) in both Equations (6.15a) and (6.15b), as an independent variable. As we argued earlier, a migrant's length of stay in Australia could represent many aspects of adaptation to Australian customs and local social networks. They also gain more and more information about job opportunities and other earning prospects as they live longer in Australia. Therefore, the length of residence in Australia may increase the labour market participation and decrease the unemployment rate for migrant women in Australia.

In this estimated model, ρ was positive and insignificant, meaning that unobserved factors influenced the probabilities of participation and unemployment. The insignificant results suggested that the factors that predict being unemployed were not related to participation in the labour market. Our analysis suggested that the model's percentage of joint frequency of correct prediction was 89 percent.

The p-values of most of the independent variables for unemployment status were less than 0.05. This implies that the human capital variables of education, English proficiency and experience have significant effects on the probability of unemployment of NESB women. However, skilled vocational qualification, knowing English very well did not have significant effects.[166] Our model suggested that the percentage of correct predictions for unemployment status based on the marginal frequency was 93.0 percent. This indicated that the percentage of correct predictions from this model was high compared to the correct predictions from the univariate probit model presented in Chapter 5 (87.4 percent).

The p-values of all independent variables for participation in the labour market were less than 0.001 except for being married and living in a metropolitan area. This suggests

[166] The possible reasons of insignificant results are discussed in earlier Chapter 5.

that being married and living in a metropolitan area did not significantly affect NESB women's participation. The percentage of correct prediction for participation in the labour market based on the marginal frequency was 89.0 percent, which was greater than the result obtained from the univariate probit model presented in Chapter 3 (70.7 percent).

The results obtained from the estimated parameters for participation in the labour market will be discussed first, and then the results of unemployment status will be interpreted. The estimated parameters together with other statistics of these models are shown in Table 6.3.

6.7.1 Participation and Length of Residence in Australia

The coefficient of residence in Australia was positive and significant and suggested that the probability of participation was greater for NESB women who had living longer in Australia. This is consistent with the result of the univariate probit model, which was presented in Chapter 3, however the effect was slightly greater for the bivariate probit model than the univariate probit model (0.023 versus 0.022).

6.7.2 Participation and Age

The coefficient of the dummy variable for "young" people was negative and significant. This suggested that the probability of participation for younger NESB women was smaller than for "middle" aged women (reference group). This result is consistent with the result of the univariate probit model, however the effect was greater in the univariate probit model than the bivariate probit model (-0.635 versus -0.488).

The coefficient of the dummy variable for "mature" age was negative and significant, which suggested that the probability of participation for "mature" aged women was less than the 25 to 45 years age group. This is consistent with the univariate probit model's participation in the labour market's result. However, the effect was greater for the univariate probit model than the bivariate probit model (-0.778 versus -0.539).

6.7.3 Participation and Marital Status

The coefficient of the marital status variable was negative and insignificant (-0.263), which suggested that married NESB women were less likely to participate in the labour market. This contradicted with the result of our univariate probit model, which was positive and significant (0.420), suggesting that married NESB women were more likely to participate *ceteris paribus*.

6.7.4 Participation and Presence of Children

The coefficient of the dummy variable for the presence of children was negative and significant, and suggested that NESB women if they had any children were less likely to participate in the labour market. This result is consistent with the result of the univariate probit model, however the effect was greater for the univariate probit model than the bivariate probit model (-0.800 versus -0.263).

6.7.5 Participation and Place of Residence

The coefficient of the dummy variable for place of residence variable was negative and insignificant (-0.013), which suggested that living in a metropolitan area did not affect the probability of participation for NESB women. This contradicted the result of our univariate probit model, which was positive and significant (0.066) and suggested that NESB women who lived in metropolitan areas were more likely to participate in the labour market.

6.7.6 Unemployment and English Proficiency

The differential effects of the coefficients of the variables designating speaking English "well" and "not well" compared with "excellent" English were positive and significant (0.167 and 0.398). These results suggested that knowing English "well" and "not well" increased the probability of unemployment compared with "excellent" English. Our results were consistent with the results in Chapter 5. The effects were greater in the univariate probit model than the bivariate probit model (0.264 and 0.608 versus 0.167 and 0.398). However, the coefficient of the speaking English "very well" was negative and insignificant, which suggested that the probability of unemployment was unaffected for women who spoke English "very well" (compared with "excellent").

6.7.7 Unemployment and Educational Attainment

The differential effects of possessing a degree or a diploma compared to a basic vocational qualification were negative and significant (-0.186 and-0.127). These results suggested that NESB women, who held degrees and diplomas, were less likely to be unemployed and were consistent with the univariate probit model's results. However, the effects were greater for degrees and diplomas in the univariate probit model than in the bivariate probit model (-0.336 and -0.224 versus -0.186 and -0.127). The differential effect of possessing a skilled vocational qualification was negative and insignificant. This provided little evidence that NESB women who held skilled vocational qualifications were less likely to be unemployed.

6.7.8 Unemployment and Labour Market Experience

The coefficient of the labour market experience variable was negative and significant. This suggested that NESB women's probabilities of unemployment decreased with their labour market experience. This finding is consistent with the general model in Chapter 5 for NESB women's unemployment, but in that case the result was not significant. The effect was greater in the bivariate probit model than in the univariate probit model (-0.006 versus -0.004).

6.7.9 Unemployment and Length of Residence in Australia

The coefficient of the residence in Australia variable was negative and significant. This suggested that for NESB women, living for a longer time in Australia decreased the probability of unemployment and is consistent with the univariate probit model. However, the effect was greater in the univariate probit model than the bivariate probit model (-0.040 versus -0.027).

6.8 Participation and Unemployment of Australian-born Women

The following bivariate probit model based on Equations (6.16a and 6.16b) was used to estimate the probability of participation and unemployment for Australian-born women. This model is the same as the model shown in Equations (6.15a and 6.15b) except that the English ability and residence in Australia variables that are not applicable are excluded from this model. The bivariate probit model is as follows:

$$UNE_i^* = \beta_0 + \beta_1 DEGREE_i + \beta_2 DIPLOMA_i + \beta_3 SKILL_i + \beta_4 EXPERIENCE_i + \varepsilon_{1i} \quad (6.16a)$$

$$PART_i^* = \alpha_0 + \alpha_1 YOUNG_i + \alpha_2 MATURE_i + \alpha_3 MARRIED_i + \alpha_4 CHILD_i + \alpha_5 CITY_i + \varepsilon_{2i} \quad (6.16b)$$

The estimated parameters together with other statistics of these models are shown in Table 6.4. The model's percentage of joint frequency correct prediction was 82.0 percent. The p-value of all independent variables in the unemployment equation was less than 0.001 except *SKILL*. These results suggest that human capital variables have significant effects on the probability of unemployment for Australian-born women. The percentage of correct predictions for unemployment status based on the marginal frequency was 95.0 percent, which was greater than the correct predictions from the univariate model in Chapter 5 (87.4 percent).

The p-values of all independent variables in the participation equation were less than 0.001. This suggests that demographic variables have significant effects on labour market participation of Australian-born women. The percentage of correct predictions for participation based on the marginal frequency was 83.0 percent, which was greater than the correct predictions from the univariate model in Chapter 3 (66.9 percent).

6.8.1 Participation and Age

The coefficient of the dummy for "young" age was negative and significant (-0.196), which suggested that being an Australian-born women in the age range 18 to 24 years had a smaller probability of participation compared with "middle" aged women. This is consistent with the result of univariate probit model's participation in the labour market, however the effect was somewhat greater for the bivariate probit model than the univariate probit model (-0.196 versus -0.099).

The differential effect of the coefficient of "mature" age compared to "middle" age was negative and significant (-0.286), which suggested that the probability of participation was less for "mature" aged compared to "middle" aged Australian-born women. This is

consistent with the univariate probit model's result. However, the effect was greater for the univariate probit model than the bivariate probit model (-1.047 versus -0.286).

6.8.2 Participation and Marital Status

The coefficient of the dummy variable for marital status was positive and significant, which suggested that married Australian-born women were more likely to participate in the labour market. This result is consistent with the result of univariate probit results, however the effect was greater for the univariate probit model than the bivariate probit model (0.246 versus 0.136).

6.8.3 Participation and Presence of Children

The coefficient of the dummy variable for the presence of children was negative and significant, suggesting that Australian-born women who had children were less likely to participate in the labour market. This result is consistent with the result of the univariate probit model for participation, however the effect was somewhat greater for the univariate probit model than the bivariate probit model (-1.370 versus -0.726).

6.8.4 Participation and Place of Residence

The coefficient of the place of residence variable was positive and significant, which indicated that Australian-born women who lived in a metropolitan area had greater probabilities of participation in the labour market. This result is consistent with the result of the participation model obtained in Chapter 3, however the effect was somewhat greater for bivariate probit model than univariate probit model (0.131 versus 0.085).

6.8.5 Unemployment and Educational Attainment

The differential effects of possessing a degree or a diploma compared to a basic vocational qualification were negative and significant. This implied that for Australian-born women, the probability of unemployment was smaller for those who had a degree or diploma compared to these who had basic vocational qualification. These results were consistent with the findings in Chapter 5, however these effects were greater for the univariate probit model than in the bivariate probit model [-0.378 and -0.232

(univariate probit) versus -0.307 and -0.148 (bivariate probit)]. The differential effect of possessing a skilled vocational qualification was positive and insignificant (0.037).

6.8.6 Unemployment and Labour Market Experience

The coefficient of the labour market experience variable was negative and significant for Australian women, which suggested that experience decreased the probability of unemployment for Australian-born women. This result is consistent with the finding of the unemployment status of univariate probit model, however the effect was greater for the bivariate probit model than the univariate probit model (-0.025 versus -0.014).

6.8.7 Unemployment Status Variables

From our analysis it seems beyond doubt that education is an important factor that affects the probability of unemployment of both NESB and Australian-born women. Having a degree or a diploma significantly decreased the probability of unemployment, however the effects were greater for Australian-born women [-0.307 and -0.148 (Australian-born) versus -0.186 and -0.127 (NESB)]. The results of the univariate probit model suggested that for having a degree, the effect was slightly greater for Australian women than NESB women (-0.378 versus -0.336), but the reverse was true for NESB women when they had diplomas (-0.244 versus -0.232).

The probability of unemployment decreased with experience for both groups of women, however, the effect was greater for Australian-born women than NESB women (-0.025 versus -0.006).

6.8.8 Participation Status Variables

For both groups, being aged 18-24 and 54-64 decreased the probability of participation in the labour market, however the effects were greater for NESB women than Australian-born women (-0.488 and -0.539 versus -0.196 and -0.286). The univariate probit model showed a different result for "mature" aged women. In that case, the effect was greater for Australian-born women (-1.047) than NESB women (-0.778).

Being married did not yield consistent results. For NESB women, being married decreased the probability of participation in the labour market, but the effect was not significant. For Australian-born women, being married increased the probability of participation and the effect was significant. When we used a univariate probit model we observed that being married increased the probability of participation for both group of women in the labour market, however the effect was greater for NESB women (0.420) than Australian-born women (0.246).

The coefficient of the dummy variable for the presence of children were negative and significant for both groups of women, however the effect was greater for Australian-born women then NESB women (-0.726 versus -0.263), which were also achieved by the univariate probit model.

The coefficient of the place of residence dummy did not yield consistent results. For Australian-born women it was positive and significant, indicated that for Australian-born women living in a metropolitan area increased the probability of participation. For NESB women it was negative and insignificant, suggested that for NESB women living in a metropolitan area did not affect the probability of participation.

In this analysis, all signs of coefficients of various independent variables are the same for Australian and NESB women, except marital status and place of residence.

6.9 Conclusion

6.9.1 Participation and Primary Sector Employment

This chapter uses a bivariate probit model to determine the probability of having primary sector employment based on two simultaneous decisions, participation decisions and selection into primary sector employment. We have shown that selection into primary sector employment is significantly correlated with participation. We did attempt to estimate bivariate probit models using pooled data, however LIMDEP was unable to converge with a useful number of independent variables.

This bivariate probit analysis provides four main conclusions. First, Australian-born women were more likely to benefit from having a degree if their aim is to obtain primary sector employment, however NESB women also benefit but to a lesser extent. The reverse was true for diploma holders. Second, whilst greater labour market experience increases the probability of having primary sector employment, Australian-born women appear to benefit more than NESB women. These two results generally conform to the predictions of human capital theory. Third, "mature" aged NESB women were less likely to participate in the labour market compared to Australian-born women. Fourth, Australian-born women with children were less likely to participate compared to NESB women.

The results of this bivariate probit model were also compared with the results of the univariate probit model for participation status and primary sector employment, which were presented earlier Chapter 3 and Chapter 4 respectively. There were no large differences between the results of bivariate probit and univariate probit models for NESB and Australian-born women. The main point of interest for those two models are that the signs of all coefficients of various independent variables agree for both NESB and Australian-born women, except young women and women living in metropolitan areas.

We have observed from our estimated bivariate probit model that ρ was positive and significant for both groups of women, which indicated that unobserved factors that influenced participation also affected primary sector employment and participation. The estimated parameters of the bivariate probit model and univariate probit model did not show any large differences, but in some cases it showed that some of our expected results can be achieved by the bivariate probit model, which could not be achieved by the univariate probit analysis. However, the results of the bivariate probit model reconfirmed our earlier results, which were obtained by the univariate probit models for participation in Chapter 3, and primary sector employment status in Chapter 4.

6.9.2 Participation and Unemployment

This section used a bivariate probit model to estimate the probability of unemployment based on two simultaneous decisions, the participation decisions of individuals and decisions of employers to hire or not hire. This analysis provides five main conclusions. First, Australian-born women with degrees or diplomas were less likely to be unemployed compared to NESB women. Second, with experience Australian-born women were less likely to be unemployed. These results generally conform to the predictions of human capital theory. Third, "young" and "mature" aged NESB women were less likely to participate in the labour market compared to Australian-born women. Fourth, Australia-born women with children were less likely to participate in the labour market compared to NESB women. Fifth, Australian-born married women were less likely to be unemployed compared to NESB women.

The results of this bivariate probit model were compared with the results of the univariate probit model for unemployment status and participation in the labour market, which were presented in Chapter 3 and Chapter 5. There were only small differences between the results of bivariate probit and univariate probit models for NESB and Australian-born women. The main point of interest for these two models are that the signs of all coefficients of the independent variables agree for both NESB and Australian-born women, except married women and living in a metropolitan area in participation.

In the estimated models, ρ was positive and insignificant, providing at most weak evidence that unobserved factors influenced the decision to participate and the failure of employers to hire individuals simultaneously. The estimated parameters of the bivariate probit model and univariate probit model did not show any large differences, but in some cases it showed that some of our expected results can be achieved by bivariate probit model, which could not be achieved by univariate probit analysis. However, the results of the bivariate probit model reconfirmed our earlier results, which were obtained by the univariate probit models for participation in Chapter 3 and unemployment status in Chapter 5.

Table 6.1: NESB Women's Participation & Primary Sector Status

Variables	Bivariate Probit Model		Univariate Probit Models	
(1) Primary Sector Employment *PRIM**	***Parameter Estimates***	***P-value***	***Parameter Estimates***	***P-value***
Constant	-1.034	0.000	-0.390	0.000
ENGVW	-0.003	0.911	-0.053	0.283
ENGW	-0.394	0.000	-0.607	0.000
ENGNW	-0.840	0.000	-1.112	0.000
DEGREE	0.614	0.000	0.893	0.000
DIPLOMA	0.475	0.000	0.642	0.000
SKILL	-0.068	0.387	-0.225	0.048
EXPERIENCE	0.002	0.256	0.016	0.000
RIA	0.023	0.000	0.031	0.000
YOUNG			0.251	.002
MATURE			-0.167	0.000
MARRIED			0.133	0.008
CHILD			-0.241	0.000
*YOUNG*MARRIED*CHILD*			-0.488	0.174
(2) Participation *PART**				
Constant	0.167	0.000	-3.314	0.000
ENGW			-0.288	0.000
ENGNW			-0.465	0.000
DEGREE			0.522	0.000
DIPLOMA			0.282	0.000
SKILL			0.167	0.000
EXPERIENCE			0.017	0.000
RIA	0.017	0.000	0.022	0.000
YOUNG	-0.288	0.000	-0.635	0.002
MATURE	-0.328	0.000	-0.778	0.000
MARRIED	-0.062	0.022	0.420	0.001
CHILD	-0.109	0.001	-0.800	0.000
*MATURE*MARRIED*			-0.814	0.000
*MATURE*CHILD*			0.698	0.000
*MIDDLE*MARRIED*			-0.550	0.000
*MIDDLE*CHILD*			-0.211	0.115
*MIDDLE*MARRIED*CHILD*			0.299	0.000
*MARRIED*CHILD*			0.383	0.000
CITY	-0.024	0.355	0.066	0.047
RHO	0.963	0.000		
Log-L	-8354.1			

Table 6.2: Australian-born Women's Participation & Primary Sector Status

Variables	Bivariate Probit Model		Univariate Probit Models	
(1) Primary Sector Employment *PRIM**	***Parameter Estimates***	***P-value***	***Parameter Estimates***	***P-value***
Constant	0.392	0.000	0.081	0.000
DEGREE	0.655	0.000	1.026	0.000
DIPLOMA	0.376	0.000	0.527	0.000
SKILL	-0.166	0.000	-0.374	0.000
EXPERIENCE	0.005	0.000	0.021	0.000
YOUNG			-0.570	0.000
MARRIED			0.539	0.000
CHILD			-0.344	0.000
*MATURE*MARRIED*			-0.498	0.000
*MATURE*CHILD*			0.182	0.000
*MARRIED*CHILD*			0.059	0.187
*MIDDLE*MARRIED*			-0.283	0.000
CITY			0.217	0.000
(2) Participation *PART**				
Constant	0.784	0.000	0.922	0.000
DEGREE			0.587	0.000
DIPLOMA			0.465	0.000
SKILL			0.103	0.013
EXPERIENCE			0.010	0.000
YOUNG	0.071	0.000	-0.099	0.000
MATURE	-0.172	0.000	-1.047	0.000
MARRIED	-0.015	0.194	0.246	0.000
CHILD	-0.416	0.00	-1.370	0.000
*MATURE*MARRIED*			-0.299	0.000
*MATURE*CHILD*			1.418	0.000
*MIDDLE*MARRIED*			-0.256	0.000
*MIDDLE*CHILD*			0.530	0.000
*MARRIED*CHILD*			0.088	0.025
CITY	0.011	0.284	0.085	0.000
RHO	0.974	0.000		
Log-L	-39474.4			

Table 6.3: NESB Women's Bivariate and Univariate Probit Models

Variables	Bivariate Probit Model		Univariate Probit Models	
(1) Unemployment *UNE**	***Parameter Estimates***	***P-value***	***Parameter Estimates***	***P-value***
Constant	-1.197	0.000	-0.646	0.000
ENGVW	-0.036	0.528		
ENGW	0.167	0.004	0.264	0.000
ENGNW	0.398	0.000	0.608	0.000
DEGREE	-0.186	0.004	-0.336	0.000
DIPLOMA	-0.127	0.145	-0.244	0.000
SKILL	-0.004	0.739		
EXPERIENCE	-0.006	0.042	-0.004	0.335
RIA	- 0.027	0.000	-0.040	0.000
MATURE			0.334	0.000
*MATURE*MARRIED*			-0.458	0.000
*MIDDLE*MARRIED*CHILD*			-0.257	0.000
(2) Participation *PART**				
Constant	0.260	0.000	-3.314	0.000
ENGW			-0.288	0.000
ENGNW			-0.465	0.000
DEGREE			0.522	0.000
DIPLOMA			0.282	0.000
SKILL			0.167	0.000
EXPERIENCE			0.017	0.000
RIA	0.023	0.000	0.022	0.000
YOUNG	-0.488	0.000	-0.635	0.002
MATURE	-0.539	0.000	-0.778	0.000
MARRIED	-0.003	0.925	0.420	0.001
CHILD	-0.263	0.000	-0.800	0.000
*MATURE*MARRIED*			-0.814	0.000
*MATURE*CHILD*			0.698	0.000
*MIDDLE*MARRIED*			-0.550	0.000
*MIDDLE*CHILD*			0.299	0.000
*MIDDLE*MARRIED*CHILD*			-0.211	0.115
*MARRIED*CHILD*			0.383	0.000
CITY	-0.013	0.659	0.066	0.047
RHO	0.997	0.872		
Log-L	-7209.3			

Table 6.4: Australian-born Women's Bivariate and Univariate Probit Models

Variables	Bivariate Probit Model		Univariate Probit Models	
(1) Unemployment *UNE**	***Parameter Estimates***	***P-value***	***Parameter Estimates***	***P-value***
Constant	-1.498	0.000	-1.161	0.000
DEGREE	-0.307	0.000	-0.378	0.000
DIPLOMA	-0.148	0.001	-0.232	0.000
SKILL	0.037	0.567		
EXPERIENCE	-0.025	0.000	-0.014	0.000
YOUNG			0.199	0.000
MARRIED			-0.621	0.000
CHILD			0.650	0.000
*MATURE*CHILD*			-0.630	0.000
*MIDDLE*CHILD*			-0.369	0.000
CITY			-0.147	0.000
(2) Participation *PART**				
Constant	0.926	0.000	0.922	0.000
DEGREE			0.587	0.000
DIPLOMA			0.465	0.000
SKILL			0.103	0.013
EXPERIENCE			0.010	0.000
YOUNG	-0.196	0.000	-0.099	0.000
MATURE	-0.286	0.000	-1.047	0.000
MARRIED	0.136	0.000	0.246	0.000
CHILD	-0.726	0.000	-1.370	0.000
*MATURE*MARRIED*			-0.299	0.000
*MATURE*CHILD*			1.418	0.000
*MIDDLE*MARRIED*			-0.256	0.000
*MIDDLE*CHILD*			0.530	0.000
*MARRIED*CHILD*			0.530	0.000
CITY	0.131	0.000	0.085	0.000
RHO	0.954	0.999		
Log-L	-29994.6			

7.0 Conclusion

The aim of the thesis is to investigate the labour market status of NESB migrant and Australian-born women. NESB women are often, considered to be a disadvantaged group in the sense of being under represented in "good" jobs and over represented in the unemployment pool. We estimated that the labour market participation rates of NESB and Australian-born women were 52.7 percent and 66.8 percent respectively. Only 47.7 percent of NESB women had primary sector jobs compared with 61.1 percent of Australian-born women, and the unemployment rate for NESB women was 12.7 percent, compared with 7.6 percent for Australian-born women. We considered the role of education for both groups, and the effect of English skills and length of residence in Australia for NESB women.

We began this thesis with a review of the literature that is relevant to the labour market status of NESB women in Australia and overseas, based on both econometric and non-econometric approaches. A common theme in the econometric literature is that human capital variables including education, labour market experience and English skills have large effects on the participation, unemployment and occupational attainment of individuals. Non-econometric studies generally support the view that NESB women have not only lower labour market participation, but also occupy lower status positions, and suffer higher unemployment. Some studies also suggest that NESB women also face indirect discrimination in jobs and in employment opportunities. It is a common theme that this disadvantage is due to at least in part to NESB women having lesser human capital attributes.

Amongst the literature, the use of wage equations is common. As a rule, they attempt to measure the relationships between wages and a variety of human capital and demographic variables. Another approach is to use dummy variables to represent particular aspects of labour market status and use human capital and demographic variables to estimate the probabilities of different states of the dummy variables. In this thesis we have used the second of these.

In Chapter 3 we developed a probit model to investigate the labour market participation of NESB and Australian-born women. We were principally interested in examining the effects of different levels of skills in English, length of residency and educational qualifications. The variables that we used were limited to what was available from 1996 Census, however they were ones commonly found in the literature in studies of this type. Although our results concussed with those of other researchers, we found that the use of several interaction variables improved the performance of the models. For example, the combined effects (via an interaction variable) of being married and having children appear to be more important than these variables added separately to the models.

On the whole, our investigation suggested that the probability of NESB women's participation was greatest for those with "excellent" skills in English, and this suggested that if they were offered opportunities to improve their English, they would be more likely to participate. We also found a positive relationship between the length of residence and the probability of participation and this suggested that as migrant women live longer in Australia they feel less reticent about seeking employment after becoming more acclimatized to their Australian environment.

Australian-born women with degrees or diplomas were more likely to participate in the labour market than NESB women with those qualifications. This might be because the potential employers in Australia do not recognize some degrees or diplomas obtained overseas and this might discourage some potential participants. Other authors have written on the non-recognition of overseas qualifications of NESB women and concluded that it could be an obstacle to labour market participation. When foreign qualifications are equivalent to Australian qualifications, policy ought to be directed to appropriate recognition. Determination of equivalence is sometimes problematic and it is unclear how effective any policy measure might be in changing the preferences of private sector employers.

In Chapter 4 we presented models of the probability of primary sector employment. We believe that these models offered some useful insights to matters that might limit NESB women's access to primary sector employment.

We allocated individuals to the primary sector or the secondary sector employment, using the list of occupations provided in the 1996 Census and a modified version of the ANU2 occupational prestige scale developed by Broom *et al.* (1977a). Our division was based on the ANU2 median (492) along with an income criterion ($400 a week) where Census occupational levels overlapped the two sectors. Categorising employees to the primary or secondary sector of the labour market has not been previously attempted in Australia. Although the range of variables available from the Census is restrictive, we believe that this categorisation could be useful in the formulation of social policies directed towards the labour market status of migrants.

The aim was to estimate the probability of employment of NESB women and Australian-born women in the primary sector employment. Having done this we were able to identify significant explanatory variables and drew comparisons between the two groups. The estimated models suggested that education was an important determinant of whether women were better placed to enter primary sector employment. Those without more than basic education qualifications appeared to be disadvantaged in this respect. In addition, NESB women were further disadvantaged if their English skills were poor. The results of our analysis generally supported the previous findings of other researchers that human capital attributes increased the probability of employment in general, and more specifically in the primary sector.

Our analysis found other interesting results. These were: (i) "young" NESB women were more likely to have primary sector employment than Australian-born women, (ii) for both groups of women, being married increased the probability of having a primary sector occupation, (iii) NESB women with children were more likely to have primary sector jobs than Australian-born women, and (iv) Australian-born women who lived in a

metropolitan area were more likely to obtain primary sector employment than their NESB counterparts.

In Chapter 5 we developed probit models of unemployment for both NESB migrant and Australian-born women. This model investigated which factors made women more likely to be unemployed. We investigated the effects of some specific migratory variables: the period of residence and English language proficiency, along with different levels of education. The estimated probit model is consistent with the predictions of theory.

The model strongly supported the claims of those who have maintained that English training programs and recognition of overseas qualifications have had a profound effect on unemployment for NESB women in Australia. The models supported the proposition that when individuals have more than basic educational qualifications they are less likely to be unemployed. In addition, NESB with poor English skills were more likely to be unemployed. This supported the predictions of human capital theory that the opportunity cost of unemployment increased with greater levels of human capital, suggesting that better-endowed women were therefore less likely to become unemployed.

There seemed strong *a priori* grounds for persisting with using dummies for being married and having children in our models, when they performed poorly. Their use was strongly supported by theory and we created several interaction variables to investigate the effects further. It turned out that being middle/mature aged, married and having children appeared to affect the unemployment status for both groups of women. The probability of unemployment for Australian-born women was greater if they had children, but it had little effect for NESB women.

In Chapter 6, we presented an alternative approach by developing bivariate probit models to estimate the probability of having primary sector employment based on two simultaneous decisions: labour market participation decisions and selection into primary

sector employment. We also used bivariate probit models to estimate the probability of unemployment based on two simultaneous decisions: labour market participation decisions of individuals and decision of employers' not to hire. It was expected that the bivariate probit model would provide more accurate estimates of the probabilities of various labour market outcomes, because it takes into account the simultaneous decisions of women to participate in the labour market and the decisions of employers to hire them for primary sector jobs or not to employ them at all. The bivariate probit model has not been used before to analyse labour market outcomes in Australia and hence this thesis is a new contribution to estimating the relationships between these outcomes and human capital and demographic variables.

Although there were some econometric grounds for performing a bivariate approach, getting the estimation process to converge was problematic. We were forced to partition our variables to make primary sector employment and unemployment a function of human capital variables, and participation a function of the demographic variables. Although we made a case for this partitioning, it limited our ability to make direct comparisons between our bivariate and univariate probit models. Despite these problems with the bivariate probit model, we still believe that this approach provides more accurate estimates of the probabilities of labour market outcomes and this is borne out by greater rates of successful predictions compared with those of the corresponding univariate probit models.

On the whole, results obtained from our bivariate probit models re-confirmed the predictions of human capital theory. The results from the bivariate probit models were compared with the results of the univariate probit models and, in general, the same variables were found to be significant. The signs of the coefficients for the most part were the same and consistent with *a priori* considerations, however there were some differences in the magnitudes of the coefficients and hence on the estimated impacts of the independent variables.

One limitation of this study was that it aggregated NESB migrant women from all countries into one group, and it is possible that there were marked differences between different migrant groups.

The 1996 Census 1-percent sample provided us with useful information regarding labour market status and a range of human capital and demographic variables. Although the sample is very large and as close to random as one is likely to get, many of the variables are not exactly what is needed to settle the questions. In particular, the English language variables are not well defined in the Census, and the responses are individuals' assessments of their own abilities. Although the education variables are better defined and we can be reasonably sure that the responses are objective the categories are very broad and surely mask much variation.

Similarly, the Census only tells us whether women have had at least one child and we are unable to ascertain whether they have several children and what their ages are. This information could be very important in modelling exercises of this type.

Although we might have had some misgivings about the broadness of the variables, what seemed clear was that having more education and having good English skills were important assets for women to take into the labour market. This position is strongly supported by the results of the univariate probit models and is reinforced by the results of our bivariate probit models, which we have argued is a new and superior modelling approach.

The 1996 Census is old data and it would be interesting to discover whether later Censuses would produce similar findings. We believe, however, that more useful information might be generated from a smaller longitudinal sample of NESB and Australian-born women, in which the survey questions could be designed specifically to investigate labour market status and to measure human capital attributes. This would be an expensive enterprise, however it might shed further light on the causes of the apparent labour market disparities that we observed in our own analysis.

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