LABOUR FORCE PARTICIPATION AND EARNINGS IN QUEENSLAND: A STATE AND SUBSTATE ANALYSIS[1]

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ABSTRACT   Queensland is the most decentralised of the Australian States. The geographical size and spatial disparities of this State raise the possibility of regional differences in labour market behaviour. In this paper, unit record data from the 1991 Australian Census of Population and Housing were used to estimate participation and earnings functions for Queensland at the State and Substate level. The results from the estimation of these models will cast light upon those factors that are influential on supply decisions within the Queensland labour market and determine the extent of regional variation in the relative importance of these factors. In a broader context, the results will have generalised value to the study of participation and earnings as well as providing insight into the workings of regional labour markets.

1. INTRODUCTION

Employment in Queensland grew more rapidly, in both an absolute and relative sense, than in any of the other Australian States over the intercensal period 1981-1991. This employment growth coincided with significant increases in the all-persons and female participation rates. However, female participation rates in Queensland remained well below those of males and displayed variation across the regions of Queensland. In this paper, unit record data from the 1991 Australian Census of Population and Housing were used to estimate participation and earnings functions for Queensland at the State and Substate level. The unit record data provide a particularly useful data set for these purposes. Not only does the series provide a large number of observations (over 18,000 for Queensland as a whole) but data contained within the census, such as family-type and the presence of non-dependent family offspring, allow specific attention to be focused upon important questions concerning the role of the family and the type of household structure upon participation decisions. The results from the estimation of these models will, in the first instance, cast light upon which factors are influential on supply decisions within the Queensland labour market and how these factors differ in relative importance across regions. In a broader context, the results will have generalised value to the

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study of participation and earnings as well as providing insight into the workings of regional labour markets.

2. PARTICIPATION IN QUEENSLAND AND ITS REGIONS

Four regions have been identified from the census data within Queensland. These are: the Brisbane Statistical Division; the Moreton Statistical Division; Northern Queensland (comprising the Northern, Far North, North West and Mackay Statistical Divisions); and the Remainder of Queensland (comprising the Darling Downs, Fitzroy, Central West, South West and Wide-Bay Burnett Statistical Divisions). An advantage of this regional aggregation is that the metropolitan region of Brisbane, which is traditionally the highest participation area of the State, is compared with an outer region of the South-East (Moreton), Central Queensland (the Rest of Queensland) and the North of the State which is currently a high growth area. One disadvantage of this level of disaggregation is that it does not adequately allow for disaggregation between coastal and inland areas where it might be expected that some differences in participation decisions may exist. Inspection of the relevant data indicates that there are considerable differences among the four regions in an absolute sense and at least one region, the Remainder of Queensland, has shown considerable variation in participation levels over short periods of time.

3. THE PARTICIPATION AND EARNINGS MODELS

It is assumed that the decision to participate in the workforce is the result of utility maximising behaviour, which involves the choice between participation in the market (paid work) or job search and recognises the role of social security payments and non-market activities such as leisure and/or domestic activities. The main factors that are expected to influence a person's decision to participate in the labour market are: potential earnings, which are a positive function of the market wage for each level of qualification and a negative function of job-search costs; and the value of time in non-market activities, which is the reservation wage and will be a function of various factors such as the earnings of the spouse or partner, sources of non-wage income and family composition and responsibilities. The procedure used to explain participation decisions and the earnings function is a Heckman two-step procedure in which a probit regression is used to explain the participation decision and OLS analysis is used to estimate the earnings function. In the latter case the Mills inverse ratio, obtained as an output from the probit estimation, is added as a correction factor to allow for the selectivity bias that appears because of the fact that earnings are observed only for those employed.

Labour force participation is presented as a binary variable Y, taking the value of one if the person is participating and zero if they are not. That is:

$$Y = 1 \text{ if } Y^* = Z\alpha + \varepsilon > 0 \tag{1}$$
$$Y = 0 \text{ otherwise}$$

where Y^* is an unobservable variable reflecting the gap between market wages and reservation wages. It is assumed that participation occurs if this gap is positive. In addition, it is assumed that Y^* depends linearly on a vector of Z factors that influence the participation decision. The income function takes the form:

$$\ln W = X'\beta + \mu \qquad (2)$$

where $\ln W$ is observed if $Y^* > 0$, W stands for income and X is a vector of factors that determine income. α and β are vectors of parameters and ε and μ symbolise error terms with zero means. Under a probit specification:

$$\Pr(Y=1) = \Pr(\varepsilon > -Z'\alpha) = F(Z'\alpha) \qquad (3)$$

where F is the cumulative normal distribution. The coefficient vector is estimated through maximum likelihood methods. However, as Heckman (1974), Lee (1976) and Kottis and Dimelis (1992) have shown, that due to selectivity bias the estimation of the earnings function requires the addition of a term reflecting the Mills inverse ratio of the standard normal density function. This term is obtained as an output from the probit estimation. The earnings function then becomes:

$$\ln W = X'\beta + \delta\lambda + \mu \qquad (4)$$

where λ is the Mills inverse ratio of the standard normal density function.

4. DATA SOURCES AND VARIABLES USED

Data were gathered from the 1991 Census of Population and Housing, Household Sample file. This is a one per cent sample of private households and associated persons and a one per cent sample of persons in non-private dwellings. A number of the variables used, as detailed below, were recoded to aggregate classification ranges while 'not stated' classifications were excluded from the analysis. The sample file was further truncated to exclude all persons under 15 years of age. The economic variables that enter into the labour force participation and/or the income equations may be broadly grouped as *financial* (personal income, other family income), *family structure* (dependent offspring, non-dependent offspring, marital status), *human capital* (highest qualification, proficiency in English) and *demographic* (age, sex, and birthplace). Specifically, the variables chosen were as follows:

- **Labour force participation:** The dependent variable, recoded to a binary choice variable by combining the Census *employed* and *unemployed* classifications as '1' and the *not in the labour force* classifications as '0'.
- **Personal income:** Represents the gross earnings per annum of the individual. This variable was recoded to numerical values by taking the midpoint of each income bracket. Participation is assumed to be positively related to the level of earnings.

- **Other family income**: A derived variable using *family income* less *personal income,* and includes income of spouse and non-dependent children. It may be that the higher the amount of other income coming into the household the smaller will be the contribution of the individual's wage and the less likely they are to participate for financial reasons. On the other hand, presence of substantial other family income may indicate a strong work ethic within the whole family and be positively related to participation. This variable is in keeping with that area of inquiry starting with Bowen and Finegan (1969) and Ashenfelter and Heckman (1974) that emphasises the individual participation decision as being made in relation to the family or household conditions.

- **Dependent offspring**: Represents the number of school age children (up to 14 years of age) and older children (aged 15 to 24) studying full-time that are dependent, fully or in part, upon the individual. Included are dependent offspring present on Census night and those temporarily absent. On the basis of previous studies (Killingsworth and Heckman, 1986) this variable is expected to vary inversely with female participation but directly with male participation.

- **Non-dependent offspring**: The number of non-financially dependent offspring that are normally resident in the household and includes those present on Census night and those temporarily absent. The impact of this variable needs to be empirically determined as there appears to have been little research done into the impact of this component of family structure on participation. In one sense, the presence of older children may stimulate participation by assisting parents in caring for younger children. On the other hand, if these older children are working and paying rent it will reduce the financial need for both parents to participate.

- **Marital status**: Classified as never married, married, separated, divorced or widowed. Bowen and Finegan (1969) in their pioneering study of 1960 US census data found that marital status was the most important factor in determining the labour force status of males. This result reflected the normal social and family responsibilities associated with being a married male at this period in time (Sapsford and Tzannatos, 1993). However, even in the different social setting of the 1990s, being married should still be positively related to participation for males. For females the issue is less clear cut with the need for a two income family exerting a positive influence and family responsibilities exerting influence in the opposite direction.

- **Age**: Age in years, persons aged 15 years and over. This variable is likely to be of importance in the income equation. Most earnings and human capital studies have found the existence of a significant age-earnings profile (Pscaharopoulos and Layard, 1979; Sapsford and Tzannatos, 1993) up until middle age.

- **Sex:** Male = '0'; Female = '1'

- **Place of birth:** Country of birth of the individual. This variable is designed to test for differences in participation between Australian and overseas born. Differences in participation behaviour, particularly for females, by country of origin and ethnic group have been found in numerous studies including; Bowen and Finegan (1969), Greenhalgh (1977), Kottis and Dimelis (1992).

- **Highest qualification**: A variable designed to test for the impact of human capital on participation. This variable records the highest level of qualification obtained by a person since leaving school. Ordered from '1' = higher degree to '10' = not applicable.
- **Proficiency in English:** A variable designed to test the relationship between ability in the dominant language and participation decisions.
- **Hours worked:** Represents the number of hours worked in the main job held by employed persons during the week before Census night.
- **Industry:** This variable describes the industries in which employed people aged 15 years and over work. Classifications relate to two digit ASIC codes.
- **Age left school:** Age in years.

The model was run using data for Queensland and the four substate regional groupings described above. These four regions represent the lowest geographical classification available from the Census sample file. The analysis was also undertaken by sex within each region.

Table 1. Probit Results, Participation in Queensland, 1991

Equation Variable	Persons Coeff	Partial	Males Coeff	Partial	Females Coeff	Partial
Constant	1.483**		1.32**		1.402**	
	(56.60)		(41.00)		(38.00)	
Personal income	0.015**	0.024	0.013**	0.017	0.019**	0.027
	(64.00)		(47.24)		(45.30)	
Other family income	-0.001**	-0.001	-0.003**	-0.002	0.001	0.001
	(-4.04)		(-10.33)		(2.42)	
Dependent offspring	0.008	0.020	0.020**	0.015	-0.013**	-0.020
	(0.336)		(5.57)		(-3.28)	
Non-dependent offspring	0.06**	0.081	0.093**	0.080	0.057**	0.078
	(13.12)		(13.36)		(7.30)	
Marital status	-0.022**	-0.025	0.006	0.006	-0.030**	-0.047
	(-6.40)		(1.15)		(-6.69)	
Age	-0.030**	-0.032	-0.028**	-0.022	-0.032**	-0.039
	(-40.62)		(-29.32)		(-29.35)	
Sex	-0.065**	-0.066	-	-	-	-
	(-10.40)					
Birthplace	-0.001*	-0.001	-0.001	-0.001	-0.002*	-0.003
	(-2.30)		(-1.32)		(-2.20)	
Highest qualification	-0.011**	-0.018	-0.007**	-0.009	-0.013**	-0.025
	(-8.71)		(-4.35)		(-6.40)	
Proficiency in English	-0.035**	-0.039	-0.017	-0.011	-0.050**	-0.074
	(-3.50)		(-1.28)		(-3.40)	
N	18,688		9,418		9,270	
ZM R^2 #	0.65		0.65		0.60	

* Significant at 5 per cent level
** Significant at 1 per cent level
# For details of calculation see Zavoina and McElvey, 1975

The results for Queensland (refer Table 1), though in keeping with results obtained elsewhere, reveal significant differences in the determinants of participation between males and females and highlight the role played by family variables. All probit equations had reasonable fits, with the Zavoina-McElvey R^2 statistic ranging from 0.65 for the equations covering all-persons and males to 0.60 for females. Most of the explanatory variables were significant at the 5 per cent or 1 per cent level which is, perhaps, not surprising given the large number of observations and the theoretical foundations of most of these variables. However, in judging the nature of the results, care must be taken with the way in which census data is presented. For example, the qualification variable was ordered in such a way that the lowest value on the qualification scale coincided with the highest level of qualification. In this case a negative sign on the qualification variable implies a positive relationship between participation and educational qualifications. Differences emerged between males and females in terms of variable significance and their marginal contributions to the participation decisions. For the *financial variables,* both male and female participation are positively related to personal income levels although the marginal importance of a unit increase in personal income for females (2.7 per cent) is larger than that for males (1.7 per cent). The presence of other family income reduces the probability of male participation but has an insignificant impact upon the probability of female participation. A number of factors may contribute to this sex difference. For males, the earnings of other family members may remove some of the financial need to participate in the labour force. This might also be true for females. However, other factors relating to a multi-income family seem to be working in the opposite direction with the net result that the other family income variable is a positive factor in female participation decisions.

All of the variables designated as *family structure* exerted some influence on participation decisions, especially for females. The likelihood of female participation is significantly and inversely related to the number of dependent children, with each additional child decreasing the probability of participating by 2 per cent. This result is in line with most other studies (Kottis and Dimelis, 1992) and of much the same level of marginal contribution. The presence of non-dependent children exerts a significant and positive impact on participation for both males and females. There are several likely reasons for this. Non-dependent children are able to supervise dependent children and in this way may enable adults with dependent children to participate in the workforce. As well the presence of non-dependent children in the home points to that stage in the life-cycle where those who may have temporarily withdrawn from the workforce are returning. For both these reasons it is not surprising that the presence of non-dependent children is closely correlated with increased participation.

The performance of the marital status variable again highlights the differing impact that family structure variables still exert upon the respective participation decisions of males and females. The variable is insignificant for males but highly significant and inversely related to participation for females. The results suggest that females, by becoming married, decrease their probability of participating by almost 5 per cent.

The sex variable is significant for the persons equation and its negative sign reflects the fact that there are still some differences between the male and female participation patterns.

The high significance of the qualification variable for both males and females again displays the strong positive influence that formal educational qualifications exert upon participation decisions. This is particularly true for females where the probability of participating increases by approximately 7 per cent as females gain greater formal qualifications.

Proficiency in English was selected as a human capital variable as it is often the lack of fluency in English that reduces the real value of human capital. For males this does not appear to be a problem and the proficiency in English variable is insignificant. For females however and, via their influence, persons, the variable is significant and negatively related to participation.

In terms of the earnings equation, the two variables that dominate for both males and females are the age variable and the selectivity variable (refer Table 2). Income is shown to have a strong age profile. The significance of the selectivity variable is a normal feature of these types of equations and reflects the necessity of recognising the censored nature of the data. Important sex differences also occur within the income equation. Age left school, highest qualification and hours worked all make positive contributions to male earnings. However, for females highest qualification

Table 2. The Earnings Equations, Queensland, 1991

Equation Variable	Persons	Males	Females
Dependent offspring	0.453*	-0.191	0.610*
	(2.48)	(-0.73)	(2.41)
Hours worked	0.179*	0.279*	0.241**
	(2.36)	(2.34)	(2.62)
Industry	-0.180	-0.094	-0.409*
	(-1.04)	(-0.38)	(-1.78)
Age	1.845**	1.758**	1.765**
	(32.19)	(22.04)	(21.83)
Sex	1.715**	-	-
	(3.62)		
Highest qualification	-0.066	-0.418**	0.236
	(-0.73)	(-3.32)	(1.87)
Age left school	0.368**	0.595**	0.166
	(3.38)	(3.86)	(1.14)
Proficiency in English	1.433	0.258	2.751*
	(1.88)	(0.24)	(2.56)
Selectivity correction	-34.040**	-39.018**	-28.412**
	(-46.91)	(-34.59)	(-30.74)
Constant	-20.004**	-12.164**	-20.071**
	(-8.60)	(-4.06)	(-6.83)
N	12,092	7,088	5,004

* Significant at 5 per cent level
** Significant at 1 per cent level

and age left school are insignificant. The chief determinants of female earnings, other than age and selectivity, are hours worked, type of industry and proficiency in English. Overall these results may indicate that females are subject to more structural and institutional influences within the labour market than males.

5.   REGIONAL DIFFERENCES

Queensland is the most decentralised, in terms of population distribution, of all the Australian States. In addition, given the States' absolute size and diversity in regional economic activity it would not be surprising if spatial differences emerged in participation and earnings behaviour. An inspection of the regional participation equations listed in Appendix 1 shows little difference in the determinants of male participation across the State. However, some interesting differences occur across the regions for the determinants of female participation.

Northern Queensland is distinguished from the results obtained from the other areas because neither the highest qualification variable nor the proficiency in English variable is significant for females in this area. North Queensland has a history of immigration of persons from Non-English Speaking backgrounds (NESBs) dating back to the influx of Italian migrants in the 1920s. The fact that proficiency in English does not appear a barrier to female participation in this area may indicate that the local labour market may have evolved mechanisms for handling linguistic problems based on this lengthy exposure to NESBs. The proficiency in English variable is also non-significant for the Moreton region. This area has only a small number of NESBs but inspection of the data indicates that females in this group do not appear to have participation patterns different from the rest of the population. A surprising result obtained from the equations is the non-significance of the number of dependent children on female participation in Moreton and the Remainder of Queensland regions. This variable was highly significant and negative for Queensland as a whole and the Brisbane and Northern Queensland Regions and is routinely found to be a major factor in female participation in most studies. The Moreton region is one with a high proportion of two-income families. Dependent children may be having the traditional effect of reducing female labour supply in this region but through the mechanism of reduced hours, for example, from full-time to part-time work. As such this trend would not show up in the aggregate participation data.

To test for this effect the sample was subdivided to examine the choices between full-time participation and part-time participation and to examine the impact of dependent children upon each of these choices. Specifically, the binary choices were between participating in a full-time sense or not participation and participating in a part time sense or not participating. Results reported below in Table 3 relate only to the marginal impacts of the number of dependent children. The results indicate that dependent children exert opposite effects on the probability of females participating in a full or part time sense. In all cases participation in a full-time sense is inversely and significantly related to the number of dependent children. Conversely, having dependent children increases the likelihood of females participating but choosing

Table 3. Partial impacts of dependent children on female participation

Region	Full-time	Part-time
Queensland	-0.033**	0.021**
Brisbane	-0.047**	0.026**
Moreton	-0.021**	0.046**
Northern Queensland	-0.029**	0.01*
Remainder of Queensland	-0.017**	0.03

* Significant at the 5 per cent level
** Significant at the 1 per cent level.

part-time employment. All coefficients in the part-time equations had positive signs but the results for Northern Queensland were significant only at the 5 per cent level and the results for the Remainder of Queensland were not statistically significant at the normally accepted levels. These results are in line with those reported by Miller (1993) who used a multinominal logit model on United States panel data to explain the labour market states of females. She found that having dependent children increased the probability of participating in a part-time sense as compared to a full-time sense.

In terms of the earnings equation, the age, hours worked and selectivity variables are important for all regions and for both males and females (see Appendix 2). However, there are some interesting differences in the sign and significance of some of the other variables across the regions. The qualifications variable, normally a strong performer in participation equations, is significant for males only in Brisbane and the Rest of Queensland and for females it is only significant in the Moreton region. The school leaving age is insignificant for female earnings in all the regional equations. The poor performance of human capital variables in explaining female incomes is a further example of the segmented labour market that women still appear to work in.

Overall, though some regional differences exist in participation decisions by both males and females, differences by sex are more pronounced than differences by region. The study has confirmed, at least in the case of males, the importance of the traditional participation variables in the participation decision and earnings. Family structure variables were shown to be important for females but there are now major differences in the impact of these variables between full time and part-time participation. It was unfortunate that the data did not allow testing for differences in labour force behaviour between coastal and inland residents.

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APPENDIX 1. Regional Probit Results

Table 1a. Probit results, Participation in the Brisbane Region, 1991

Equation Variable	Persons Coeff	Partial	Males Coeff	Partial	Females Coeff	Partial
Constant	1.394**		1.250**		1.370**	
	(37.45)		(26.92)		(26.88)	
Personal income	0.003**	0.025	0.013**	0.016	0.019**	0.029
	(47.41)		(34.90)		(34.10)	
Other family income	-0.001**	-0.001	-0.003**	-0.001	-0.002	0.000
	(-3.68)		(-8.53)		(0.96)	
Dependent offspring	-0.005	-0.003	0.011	0.008	-0.016**	-0.021
	(-1.32)		(2.21)		(-2.83)	
Non-dependent offspring	0.068**	0.077	0.092**	0.056	0.051**	0.090
	(9.35)		(9.26)		(5.55)	
Marital status	-0.022**	-0.024	0.008	0.008	-0.029**	-0.046
	(-4.62)		(0.96)		(-4.46)	
Age	-0.030**	-0.030	-0.027**	-0.019	-0.033**	-0.039
	(-27.27)		(-18.41)		(-20.75)	
Sex	-0.035**	-0.034	-	-	-	-
	(-3.91)					
Birthplace	-0.001*	-0.001	0.000	0.000	-0.002	-0.003
	(-0.90)		(0.26)		(-1.80)	
Highest qualification	-0.009**	-0.016	-0.048*	-0.006	-0.009**	-0.024
	(-4.70)		(-2.04)		(-3.48)	
Proficiency in English	-0.034**	-0.038	-0.025	-0.020	-0.039**	-0.059
	(-2.71)		(-1.51)		(-2.14)	
N	8,438		4,123		4,315	
ZM R² #	0.68		0.70		0.62	

* Significant at 5 per cent level
** Significant at 1 per cent level
# For details of calculation see Zavoina and McElvey, 1975

Table 1b. Probit results, Participation in the Moreton Region, 1991

Equation Variable	Persons Coeff	Partial	Males Coeff	Partial	Females Coeff	Partial
Constant	1.707**		1.616**		1.550**	
	(25.27)		(18.73)		(16.08)	
Personal income	0.013**	0.021	0.012**	0.017	0.017**	0.024
	(22.41)		(16.79)		(15.65)	
Other family income	0.001**	0.001	-0.002**	-0.002	0.002**	0.003
	(0.69)		(-2.74)		(2.61)	
Dependent offspring	0.251**	0.029	0.037**	0.042	0.017	0.017
	(3.44)		(3.85)		(1.56)	
Non-dependent offspring	0.074**	0.010	0.101**	0.126	0.062**	0.079
	(5.10)		(5.21)		(2.84)	
Marital status	-0.008**	-0.013	0.020	0.019	-0.023*	-0.040
	(-1.04)		(1.60)		(-2.15)	
Age	-0.037**	-0.043	-0.038**	-0.037	-0.036**	-0.043
	(-20.26)		(-16.04)		(-13.02)	
Sex	-0.081**	-0.096	-	-	-	-
	(-5.24)					
Birthplace	-0.001*	-0.001	-0.001	0.000	-0.002	-0.003
	(-0.79)		(-0.35)		(-0.93)	
Highest qualification	-0.018**	-0.025	-0.013**	-0.016	-0.023**	-0.034
	(-5.58)		(-3.23)		(-4.55)	
Proficiency in English	-0.035**	-0.047	-0.029	-0.038	-0.044	-0.058
	(-1.22)		(-0.76)		(-1.05)	
N	3,213		1,647		1,566	
ZM R^2 #	0.61		0.60		0.59	

 * Significant at 5 per cent level

** Significant at 1 per cent level

For details of calculation see Zavoina and McElvey, 1975

Table 1c. Probit results, Participation in Northern Queensland, 1991

Equation Variable	Persons Coeff	Partial	Males Coeff	Partial	Females Coeff	Partial
Constant	1.498**		1.268**		1.355**	
	(24.47)		(17.72)		(14.94)	
Personal income	0.013**	0.022	0.010**	0.010	0.021**	0.028
	(25.60)		(18.10)		(19.79)	
Other family income	-0.0003	0.001	-0.001	0.000	0.001*	0.002
	(-0.67)		(-1.85)		(2.52)	
Dependent offspring	-0.011	-0.013	0.011	0.004	-0.027**	-0.037
	(-1.84)		(1.52)		(-3.03)	
Non-dependent offspring	0.045**	0.043	0.060**	0.038	0.034	0.047
	(3.52)		(3.50)		(1.76)	
Marital status	-0.022**	-0.020	-0.011	-0.007	-0.023*	-0.030
	(-2.77)		(-0.97)		(-2.05)	
Age	-0.028**	-0.030	-0.023**	-0.016	-0.034**	-0.041
	(-15.63)		(-10.00)		(-12.36)	
Sex	-0.100**	-0.096	-	-	-	-
	(-6.67)					
Birthplace	-0.003*	-0.004	-0.003	-0.003	-0.003	-0.004
	(-2.31)		(-1.70)		(-1.24)	
Highest qualification	-0.012**	-0.017	-0.012**	-0.015	-0.005	-0.012
	(-3.53)		(-3.16)		(-0.092)	
Proficiency in English	-0.015	-0.040	0.023	0.039	-0.059	-0.078
	(-0.61)		(0.80)		(-1.65)	
N	3,305		9,418		9,270	
ZM R^2 #	0.66		0.65		0.60	

* Significant at 5 per cent level
** Significant at 1 per cent level
# For details of calculation see Zavoina and McElvey, 1975

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Table 1d. Probit results, Participation in Remainder of Queensland, 1991

Equation Variable	Persons		Males		Females	
	Coeff	Partial	Coeff	Partial	Coeff	Partial
Constant	1.496**		1.29**		1.38**	
	(21.65)		(14.52)		(14.23)	
Personal income	0.015**	0.024	0.014**	0.02	0.018**	0.025
	(26.73)		(21.52)		(16.92)	
Other family income	-0.002**	0.002	-0.004**	-0.003	0.000	0.000
	(-4.48)		(-6.82)		(-0.81)	
Dependent offspring	0.009	0.011	0.027**	0.025	-0.007	-0.010
	(1.51)		(3.37)		(-0.85)	
Non-dependent offspring	0.081**	0.096	0.107**	0.107	0.067**	0.073
	(6.74)		(7.06)		(3.52)	
Marital status	-0.036**	-0.044	0.003	0.000	-0.053**	-0.076
	(-4.43)		(0.26)		(-4.67)	
Age	-0.025**	-0.028	-0.026**	-0.021	-0.025**	-0.029
	(-15.21)		(-12.57)		(-9.77)	
Sex	-0.087**	-0.087	-	-	-	-
	(-6.04)					
Birthplace	-0.002	-0.001	-0.004	-0.003	-0.000	0.000
	(-0.85)		(-1.41)		(-0.12)	
Highest qualification	-0.011**	-0.017	-0.002	-0.001	-0.019**	-0.031
	(-3.53)		(-0.48)		(-3.69)	
Proficiency in English	-0.110**	-0.151	-0.082	-0.083	-0.111*	-0.165
	(-2.82)		(-1.43)		(-2.07)	
N	18,688		9,418		9,270	
ZM R^2 #	0.65		0.65		0.60	

 * Significant at 5 per cent level
** Significant at 1 per cent level
 # For details of calculation see Zavoina and McElvey, 1975

APPENDIX 2. Regional Earnings Equations

Table 2a. The Earnings Equations, Brisbane Region, 1991

Variable	Persons	Males	Females
Dependent offspring	0.827**	0.463	0.817*
	(3.38)	(1.36)	(2.31)
Hours worked	0.258*	0.422**	0.270*
	(2.49)	(2.64)	(2.06)
Industry	-0.187	-0.110	-0.433
	(-0.82)	(-0.34)	(-1.39)
Age	1.672**	1.494**	1.705**
	(22.50)	(14.63)	(15.69)
Sex	-0.059	-	-
	(-0.10)		
Highest qualification	-0.304**	-0.702**	0.062
	(-2.70)	(-4.59)	(0.39)
Age left school	0.413**	0.713**	0.134
	(2.82)	(3.50)	(0.66)
Proficiency in English	0.570	-0.268	1.826
	(0.64)	(-0.22)	(1.43)
Selectivity correction	-30.951**	-34.220**	-27.411**
	(-33.62)	(-24.44)	(-22.16)
Constant	-12.593**	-5.723	-17.058**
	(-4.26)	(-1.52)	(-4.39)
N	5,599	3,148	2,451

* Significant at 5 per cent level
** Significant at 1 per cent level

Table 2b. The Earnings Equations, Moreton Region, 1991

Equation Variable	Persons	Males	Females
Dependent offspring	-1.035	-1.620	-1.051
	(-1.78)	(-1.85)	(-1.51)
Hours worked	0.060	-0.066	0.294
	(0.03)	(-0.19)	(1.25)
Industry	0.063	-0.014	-0.419
	(0.11)	(-0.02)	(-0.61)
Age	2.452**	2.527**	1.962**
	(13.08)	(9.63)	(8.50)
Sex	3.113*	-	-
	(2.21)		
Highest qualification	0.569*	0.232	0.715*
	(2.00)	(0.59)	(2.03)
Age left school	0.535	0.583	0.426
	(1.67)	(1.28)	(1.09)
Proficiency in English	2.408	0.876	3.551
	(1.02)	(0.27)	(1.16)
Selectivity correction	-39.055**	-45.219**	-28.649**
	(-16.719)	(-12.58)	(-11.26)
Constant	-41.415**	-32.502**	-30.030**
	(-5.54)	(-3.35)	(-3.56)
N	1,914	1,143	771

  * Significant at 5 per cent level
** Significant at 1 per cent level

Table 2c. The Earnings Equations, Northern Queensland, 1991

Equation Variable	Persons	Males	Females
Dependent offspring	0.608	-0.429	0.997
	(1.36)	(-0.63)	(1.68)
Hours worked	0.170	0.371	0.202
	(0.92)	(1.21)	(0.95)
Industry	-0.048	0.223	-0.299
	(-0.12)	(0.35)	(-0.59)
Age	1.887**	1.892**	1.741**
	(12.83)	(8.43)	(9.19)
Sex	2.906*	-	-
	(2.32)		
Highest qualification	-0.083	-0.038	-0.138
	(-0.35)	(-0.11)	(-0.45)
Age left school	0.283	0.467	0.140
	(1.04)	(1.12)	(0.41)
Proficiency in English	1.546	-0.424	3.965
	(0.86)	(-0.16)	(1.61)
Selectivity correction	-37.339**	-47.877**	-27.960**
	(-19.35)	(-13.71)	(-13.13)
Constant	-21.958**	-17.778**	-18.326**
	(-3.68)	(-2.15)	(-2.63)
N	2,238	1,368	870

* Significant at 5 per cent level
** Significant at 1 per cent level

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Table 2d. The Earnings Equations, Remainder of Queensland, 1991

Equation Variable	Persons	Males	Females
Dependent offspring	0.329	-0.203	0.704
	(0.84)	(-0.41)	(1.18)
Hours worked	0.117	0.307	0.096
	(0.68)	(1.23)	(0.42)
Industry	-0.589	-0.765	-0.469
	(-1.47)	(-1.48)	(-0.80)
Age	1.648**	1.523**	1.634**
	(13.25)	(9.91)	(8.27)
Sex	3.347**	-	-
	(2.97)		
Highest qualification	-0.036	-0.734**	0.582
	(-0.16)	(-2.72)	(1.66)
Age left school	0.331	0.569*	0.275
	(1.35)	(1.81)	(0.75)
Proficiency in English	5.792	3.355	7.389
	(1.61)	(0.73)	(1.38)
Selectivity correction	-33.340**	-34.153**	-30.341**
	(-20.23)	(-16.02)	(-12.23)
Constant	-20.105**	-6.378	-22.263*
	(-3.24)	(-0.88)	(-2.56)
N	2,341	1,429	912

  * Significant at 5 per cent level

** Significant at 1 per cent level