5 Results

This chapter presents estimates of the marginal effects of educational attainment (section 5.1) and health status (section 5.2) and the potential wages of people not currently working compared with people who are currently working (section 5.3). The results are discussed, including some caveats on their use for policy formulation. The approach to estimating the marginal effects of education and health status is set out in appendix A. Estimation results for the wage model are set out in greater detail in appendix C.

5.1 Marginal effects of education

The results of this study are consistent with the human capital literature and previous estimates showing that increased educational attainment has a significant positive effect on wages (table 5.1).

Table 5.1 **Average marginal effects of education on hourly wages**

Per cent increase in hourly wages compared with year 11 or below (standard errors in brackets)

Highest level of education	*Marginal effect of each level of education*	
	Men	Women
	per cent	per cent
Degree or higher	38.4 (1.90)	36.7 (1.57)
Diploma or certificate	13.8 (1.50)	11.4 (1.44)
Year 12	12.8 (2.11)	10.1 (1.63)

Source: Productivity Commission estimates based on HILDA release 5.1, waves 1–5.

Obtaining a university education has the largest effect on wages — a 38 per cent increase in men's wages and a 37 per cent increase in women's wages. The implication is that people with a degree have a higher level of productivity than people with lower levels of education. Laplagne et al. (2007) found that university education also has the largest effect on workforce participation — increasing the probability of participation by 15–20 per cent (men) and 8–10 per cent (women).

The marginal effect of completing year 12 is close to that of completing a diploma or certificate. Again, this is consistent with Laplagne et al. (2007), who found the

participation effects of these qualifications to be of a similar magnitude. These results suggest that the labour market effects of high school completion and vocational education and training (VET) are similar.

The positive effects of education are between 1.8 and 2.8 percentage points larger for men than the effects for women.

In interpreting these results, it should be noted that endogeneity bias and unobserved heterogeneity (such as due to ability bias) may lead to positive bias in the results. This would overstate the positive effects of education on wages, and by implication labour productivity.

It should also be noted that these estimates represent the average marginal effects of increasing levels of education. The actual marginal effects of additional education would be expected to vary according to individual characteristics. For example, Lattimore (2007) reported results from the literature that suggest that for some people additional education is associated with lower wages and labour market participation:

> … students with traits that imply a low ex ante probability of completing school who nevertheless go onto complete the maximum 12 years have lower real weekly full-time earnings and hourly earnings and higher [unemployment] rates than similar students who left earlier. For the group of children with the lowest 50 per cent predicted likelihood of completing school, two additional years of schooling past year 10 actually increases unemployment by around 3 percentage points. For this group of children, each additional year of schooling reduces real hourly earnings by about 1.1 per cent and real weekly fulltime earnings by 2.4 per cent. The best (on average) that students with such traits can do is to leave school earlier. (Lattimore 2007, p. 210)

This result suggests that programs to increase levels of education will deliver the greatest benefits when targeted toward people who are most likely to benefit from additional education.

5.2 Marginal effects of health status

The wage model was used to estimate the marginal effects of health status. The marginal effects reported are not conditional on employment. The target conditions were found to have a small negative effect on wages (wage reductions of between 1.6 per cent and 5.4 per cent for men and between 1.0 per cent and 3.5 per cent for women) (table 5.2). Of the six health conditions, the most significant effects on wages were associated with mental health conditions and major injury. This is consistent with Laplagne et al. (2007), who found that these conditions had the largest effects on workforce participation.

Table 5.2 **Marginal effects of target health conditions on hourly wages**

Target condition	*Percentage hourly wage reduction attributable to presence of target condition* [a]	
	Men	Women
Cardiovascular disease	-1.9	-1.3
Diabetes	-1.8	-1.2
Cancer	-1.6	-1.0
Arthritis	-2.3	-1.5
Poor mental health	-4.7	-3.1
Major injury	-5.4	-3.5

[a] Percentage wage reduction attributable to a target condition is calculated by multiplying the average marginal effect of a change in the PCS and MCS on wages by the expected reduction in PCS and MCS associated with each target condition (see Appendix B).

Source: Productivity Commission estimates based on HILDA release 5.1, waves 1–5.

These results, combined with the results presented by Laplagne et al. (2007), suggest that the most significant labour market effects of chronic illness relate to the effects of the conditions on workforce participation. People who contract the target conditions but remain at work tend not to experience large reductions in their wage rates.

The results also suggest that the target conditions have larger effects on men's wages than on women's — for all conditions the reduction in men's wages is around 50 per cent larger compared to women's wages. Again, this is consistent with Laplagne et al. (2007), who found that the negative effects of the target conditions on labour force participation were generally larger for men than for women.

In interpreting these results, there are several factors that should be taken into account:

- Using individual's wages as an indicator of productivity leads to results that are likely to understate the effects of health status on productivity. It is likely that individuals' wages do not adjust fully to changes in their health status, and that some of the reduction in labour productivity caused by illness is borne by firms and co-workers, or collectively by society. The full effects of illness on productivity would therefore not come through in individual wages data, although illness could have a real effect on aggregate productivity and national income. This would suggest that the reductions in productivity arising from health conditions are understated.

- Unobserved heterogeneity and endogeneity may lead to positive bias in the results. This would serve to overstate the positive effects on wages (and labour productivity) of improved health status.
- There are issues associated with using the indirect approach (relating changes in PCS and MCS scores to specific chronic illnesses) to estimating the effects of the target conditions on wages. However, the direction of any potential bias relating to the use of this approach is not clear.

These concerns suggest that the positive effects on labour productivity of reducing the prevalence of the target conditions may be larger or smaller than the effects estimated using this model. It is not possible to determine which of the potential sources of bias is likely to have the largest effect, and therefore whether the results will tend to under- or overstate the negative effects of ill health on wages.

It is worth noting that the results of this study and those found in Laplagne et al. (2007) suggest that the more significant effects of chronic health conditions relate to their effect on labour force participation, and that the effects on the wages of people who remain in the labour force are generally of a smaller magnitude.

5.3 Estimated wages of people not currently working

As a group, people who are unemployed or not in the labour force have systematically different characteristics from employed people. On average, they have less education, are in worse health, have less work experience, more experience of unemployment, and demographic characteristics that are associated with lower wages (such as poor language skills and living outside of major cities). These characteristics mean that they are more likely to be unemployed or not in the labour force, and if they were working, they would be more likely to earn lower wages.

The estimates in table 5.3 are derived based on the human capital, labour market and demographic characteristics of people who are unemployed and not in the labour force. The estimates are based on taking the average of these characteristics for men and women of different age groups. The wage model was used to estimate the wages that a hypothetical person with these characteristics would be likely to receive if they were working. These 'offer wages' are divided by the average wage that is earned by employed persons of the same age and gender to derive an estimate of the potential wages of people who are unemployed or not in the labour force relative to employed persons.

The technique used to estimate the wages of people who are not currently employed relative to the wages of people who are currently employed is described in Appendix A.

The potential wages of people who are unemployed or not in the labour force relative to employed persons are estimated separately for men and women. Binary variables are used to distinguish people in four different age groups and recipients of the Disability Support Pension (DSP).

The estimates of the potential wages of people not currently working show that, on average, people with their labour market and demographic characteristics would be expected to earn around 70–75 per cent of the wages of people who are currently working. These figures are consistent with the assumptions that the Commission used in its reports on the economic implications of an ageing population (PC 2005) and the impact of the NRA (PC 2006).[1]

The results also show that the estimated potential wages of people receiving the DSP are lower than the estimated potential wages of the general non-working population. However, the gap between the estimated wages is not large — between 3 and 6 per cent for men and 4 and 10 per cent for women.

A significant result is that the estimated potential wages for male DSP recipients in the 25–44 and 45–64 age groups (that is, working-age men) are only 3–3.3 per cent lower than the general population of non-working men. This suggests that many male DSP recipients have similar human capital and labour market characteristics to other men who are not working (and not receiving the DSP). The gap for working-age women is much larger, particularly in the 25–44 age group, where the estimated potential wage for female DSP recipients is around 9.7 per cent lower than for other non-working women who are not receiving the DSP.

[1] The relevant comparison with the NRA report is the estimate of the 'productivity ratio of 75 per cent [that] was adopted for additional workers as a result of changed work incentives' (PC 2006, p. 299).

Table 5.3 **Predicted potential relative wages for NRA target groups**

Demographic group	*Estimated potential wages of people not currently employed relative to employed people (per cent)*		
	Men	Women	Men and women
15–24 years	75.4	76.6	76.1
25–44 years	67.3	74.8	71.3
45–64 years	72.2	73.7	73.0
55–64 years	72.8	75.2	73.9
Weighted average[a]	70.5	74.7	72.7
Disability Support Pension recipients			
15–24 years	69.7	72.5	71.1
25–44 years	64.0	65.1	64.5
45–64 years	69.1	68.7	68.9
Weighted average[a]	66.6	67.6	67.1

[a] Weighted to reflect sample proportions.

Source: Productivity Commission estimates based on HILDA release 5.1, waves 1–5.