Income and Occupational Intergenerational Mobility in New Zealand

Matthew Gibbons

NEW ZEALAND TREASURY

WORKING PAPER 10/06

NOVEMBER 2010

THE TREASURY
Kaitohutohu Kaupapa Rawa

NZ TREASURY WORKING PAPER 10/06

Income and Occupational Intergenerational Mobility in New Zealand

MONTH/YEAR

November 2010

AUTHOR

Matthew Gibbons
The Treasury
PO Box 3724
Wellington 6140
New Zealand

Email matthew.gibbons@treasury.govt.nz
Telephone 04-917 6248
Fax 04-473 1151

ACKNOWLEDGEMENTS

Thanks to Professor Richie Poulton (University of Otago) and Professor Jack Vowles (University of Exeter) for providing data and for their comments on the paper. At the Treasury, Tony Burton initiated the project. Claire Douglas, Gerald Minnee, Katy Henderson, Norman Gemmell, Paul Rodway, Minoo Meimand, David Law, Grant Scobie and Oliver Valins reviewed the paper and made useful comments. Dean Hyslop (Victoria University of Wellington) provided an insightful external review on an early draft. Professor Markus Jantti (University of Stockholm), Professor John Ermisch (Essex) and Professor Andrew Leigh (ANU) provided advice on methodological details and on international comparisons. Anna D'Addio (OECD) and Professor Jacques Poot (Waikato) provided valuable encouragement and comments. In addition, Dr Philip Meguire (Canterbury), Dr Peter Leowen (UBC) and Dr Eric Belanger (McGill) provided useful suggestions about Section 8.1.2.

NZ TREASURY

New Zealand Treasury
PO Box 3724
Wellington 6140
NEW ZEALAND

Email information@treasury.govt.nz
Telephone 64-4-472 2733
Website www.treasury.govt.nz

Abstract

Intergenerational mobility research quantifies the relationship between the circumstances of parents and the circumstances of their children as adults. This paper tentatively quantifies intergenerational economic mobility in New Zealand using the best available datasets. These datasets are: longitudinal income data from the Dunedin Study of the population of people born in Dunedin in 1972-73; and occupation data from the 1996 Election Study's post-election nationwide survey. The occupation data determines the Socio-Economic Status (SES) of respondents and their parents. The results show that only a small proportion of variance in income or SES was explained by the economic situation of people's parents, indicating that other explanatory variables are more important.

The Dunedin Study results suggest that rates of intergenerational income mobility for men and women from Dunedin are probably within a similar range to rates of intergenerational income mobility in most other developed countries. Our results provide weak evidence that New Zealand has higher intergenerational occupational mobility than Britain, and stronger evidence that New Zealand men have higher intergenerational occupational mobility than men in Germany. Unfortunately, insufficient data is available to make intergenerational occupational mobility comparisons with other countries.

We have to be cautious when interpreting our results because both datasets we used contain proportionately fewer Māori and Pacific peoples than New Zealand's population. The Dunedin Study was founded in a single city, and while the study has a very high participation rate its participants may not be fully representative of New Zealand's population. In addition, participants have not reached their peak earning years, and this may have affected the results. The nationwide Election Study is under-representative of people from groups less likely to be on the electoral roll and the data is now over 14 years old.

JEL CLASSIFICATION J62 – Occupational and Intergenerational Mobility
F22 – International Migration

KEYWORDS Social mobility; Emigration.

Table of Contents

List of Tables

List of Figures

Income and Occupational Intergenerational Mobility in New Zealand

Executive Summary

Intergenerational mobility and why it is important

Intergenerational economic mobility research tests the relationship between the situation of parents and the situation of their children as adults. In other words, intergenerational mobility is about the extent to which parents' circumstances predict the circumstances of their children in adult life.

Researchers are interested in intergenerational economic mobility because of its implications for equality of opportunity and because barriers to people developing and making full use of their abilities could potentially hinder skills development, productivity growth and the achievement of improved living standards. However, some policies that facilitate skills development, productivity and the introduction of new technology could potentially lower intergenerational mobility, at least in the short term.

Data sources used to measure intergenerational mobility in New Zealand

Intergenerational mobility in New Zealand was tentatively calculated using two datasets: income data from the Dunedin Study of people born in Dunedin in 1972-73; and occupation data from the 1996 New Zealand Election Study's voluntary post-election survey.

Results and international comparison

The intergenerational income elasticity for people from Dunedin was 0.26. This implies that a 1% increase in the income of a person's father is associated with, on average, a 0.26% increase in their own income when they are an adult. Using the nation-wide Election Study dataset the average effect of the Socio-Economic Status (SES) of fathers on the subsequent adult SES of their children was 0.20 for those aged 25 or over, and this effect applied to the full range of fathers' SES.

However, only a small proportion of variance in logged income or socio-economic status was explained by the economic situation of people's parents. Furthermore, the standard errors for the Dunedin Study results were large, indicating uncertainty about our results. Differences in mobility between men and women and between Māori and New Zealand's entire population were not statistically significant.

Our results suggest that rates of intergenerational income mobility for people from Dunedin are probably within a similar range to rates for people from most other developed countries. Results based on data from the New Zealand Election Study provide weak evidence that New Zealand has higher intergenerational occupational mobility than Britain, and stronger evidence that New Zealand men have higher intergenerational occupational mobility than German men. Insufficient data is available to make intergenerational occupational mobility comparisons with other countries, although the results do not give cause for concern.

The international literature suggests that a country's rate of intergenerational mobility is affected by the effectiveness of the education system, the rate of economic growth, the physical and emotional environment children experience and the opportunity people have to improve and to use their capabilities. We were unable to test whether most of these theories applied to New Zealand. However, the Dunedin Study results suggest that children's educational qualifications are an important explanatory variable for their income as adults.

Introduction

Intergenerational mobility is about the degree to which one generation affects the next. Researchers have frequently quantified intergenerational mobility by calculating the extent to which parents' circumstances predict the circumstances of their children in adult life.[1] Intergenerational mobility has been tested using data on economic outcomes, educational qualifications, health status and behavioural and personality traits (Black and Devereux, 2010, pp. 58-67). This paper tentatively tests the relationship in New Zealand between parents' economic situation and the subsequent economic situation of their grownup children.

Researchers are frequently interested in intergenerational economic mobility because of its implications for equality of opportunity. Barriers to people developing and making full use of their abilities could potentially hinder skills development, productivity growth, and the achievement of improved living standards (Atkinson, Maynard and Trinder, 1983, pp. 13-17; Causa and Johansson, 2009, pp. 5, 23; OECD, 2008b, p. 3). However, as the next section notes, some policies that promote intergenerational mobility could also hinder the achievement of these goals.

Researchers have found that the effect of family background on a person's adult outcomes varies between countries. Factors that influence the rate of intergenerational economic mobility include the effectiveness of a country's education system, the rate of economic growth, the physical environment children experience and the freedom and opportunity people have to use their capabilities (Blanden, 2008, pp. 19-25; Cabinet Office Strategy Unit, 2008a, pp. 4, 63). Intergenerational income mobility is a relatively new research area, and there are still no estimates available for more than half the OECD countries (Blanden, 2008, p. 2; OECD, 2008b, p. 5).

Section 1 outlines why researchers are interested in intergenerational mobility. More technical sections are then included on the methods used to calculate intergenerational mobility and the obstacles to accurately doing so. In contrast, Sections 2.2 and 2.3 on comparing and explaining rates of mobility in different countries are likely to be of interest to many readers. Income and occupational intergenerational mobility rates are then tentatively quantified using income data from the population of people born in the New Zealand city of Dunedin in 1972-73 and nationwide survey data on people's occupations and the occupations of their parents. Readers who skim these sections should still be able to understand Section 6, which cautiously compares the rates of intergenerational mobility for people in developed countries, and Section 7, which concludes the paper. Although the detailed Appendix is intended for other researchers, the unique information in Section 8.1.4 on people from Dunedin living in different countries will be of interest to migration researchers.

[1] Another way of measuring intergenerational mobility is to examine differences in the incomes or occupations of those born in each time-period. For instance, researchers in Britain have found that the proportion and number of unskilled manual workers has fallen over the 20th century, whereas the proportion and number of people working in professional and management positions has grown. This has reflected structural changes in Britain's economy (Cabinet Office Strategy Unit, 2008a, pp. 11-23).

1 Why researchers are interested in intergenerational mobility

Researchers are interested in understanding how intergenerational mobility affects equality of opportunity, skills development, economic efficiency, productivity and living standards. Low intergenerational mobility can imply that, because of their backgrounds, people are unable to fully develop and use their skills and abilities.[2] As well as signalling low equality of opportunity, this would constitute an inefficient use of a country's human capital (Harding, Jencks, Lopoo and Mayer, 2003, p. 30; OECD, 2008b, p. 3).

Conversely, some policies that facilitate skill development and productivity could feasibly lower observed rates of intergenerational mobility and vice versa (Breen, 1997, p. 442). For instance, increased government expenditure on secondary education and universities in many countries during the 1950s and 1960s increased average educational levels and levels of human capital. However, in some countries this increase in educational expenditure disproportionately benefited children from better-off families. This was because they were most likely to take advantage of these improved educational opportunities (Blanden and Machin, 2004, p. 247; Corak, 2006, pp. 15, 16). Similarly, a country's economy benefits when parents invest time, emotional commitment and money in their children. Many parents are also supportive if their children aspire to have a similar career to themselves, or if their children want to work in a family business (d'Addio, 2007, p. 11; Roemer, 2004, p. 55).

Nevertheless, policies that aim to improve the aspirations, preferences and skills of those from disadvantaged home environments can sometimes enhance intergenerational mobility and arguably economic growth (d'Addio, 2007, p. 11). In addition, reducing barriers to entering the workforce and particular occupations and to starting a business and employment could promote both economic growth and intergenerational mobility (Cabinet Office Strategy Unit, 2008a, p. 49).

Studying intergenerational economic mobility in New Zealand can shed light on the opportunity New Zealanders have to advance themselves, relative to the economic position of their parents, compared to people in other developed countries. The level of intergenerational mobility is an important measure of the economic openness of a society and of the level of opportunity. However, generational mobility is by no means the only measure of these goals (Corak, 2006, p. 12; d'Addio, 2007, p. 12). Policies to increase intergenerational mobility may sometimes also adversely affect the achievement of other policy objectives, such as individual freedom, making specifying an ideal level difficult (Roemer, 2004, p. 51).

While the number of overseas studies of intergenerational income and occupational mobility has grown (Corak, 2006), the literature on this topic for New Zealand is limited. Although a recent comparative study of intergenerational income mobility briefly included New Zealand men, because the authors did not have information on the incomes of fathers, they imputed their incomes using occupation data (Andrews and Leigh, 2008, p. 7). Similarly, while an unpublished comparative study of intergenerational occupational mobility included New Zealand, the sample size was small and few technical details are available (Blanden, 2008, p. 32). Factors limiting intergenerational mobility and whether mobility varies between New Zealand population groups have also not been explored. The

[2] Implicit in our analysis is that we are primarily concerned about the intergenerational mobility of those who grew up in low-income or low socio-economic status families. Where possible, we therefore test how mobility differs for those from different types of backgrounds.

extent to which obstacles to intergenerational mobility identified in other countries, such as Britain and the United States, apply to New Zealand is therefore not clear.

This paper seeks to remedy some of these gaps in our knowledge by applying methods used widely overseas to two different New Zealand datasets. Because our research is preliminary, and in some respects experimental, we also identify areas for future research.

2 Calculating and comparing intergenerational mobility

Researchers have often studied intergenerational mobility by examining the extent to which a person's childhood economic circumstances predict their adult economic circumstances. For economists, the aim of this research has often been to identify obstacles to people improving their economic position (Blanden, Gregg and Macmillan, 2007). This model is often used to calculate intergenerational income mobility:

$$ln(Y_{i,t}) = \alpha + \beta ln(Y_{i,t-1}) + \gamma Z_i + \varepsilon_{i,t} \quad (1)$$

where:

$\ln(Y_{i,t})$ = a natural log of an individual's permanent income[3] (or a proxy) when they have grown up

i = the family to which children and parents belong

t = an index of generations

α = the constant

β = the generational income elasticity (the marginal effect of a 1% relative difference in parental income on a person's own income as an adult)

$\ln(Y_{i,t-1})$ = a natural log of parents' permanent income (usually just of fathers, and usually a proxy) when their children were growing up

Z_i = control variables (usually just ages of parents and their ages squared, but sometimes also age variables for their children)

$\varepsilon_{i,t}$ = a random error term.

In this equation, the natural log of a person's income $(\ln(Y_{i,t}))$ is a function of the intercept (α), plus a fraction (β) of the natural log of their parents' incomes $(\ln(Y_{i,t-1}))$ plus a variety of other factors (Z_i). The intergenerational income elasticity (β value) quantifies intergenerational mobility by estimating the average percentage effect that a small relative difference in the income of a person's parents has on their own income as an adult.[4] Assuming that everything else is constant, a high intergenerational income elasticity implies parents' incomes have a large effect on the incomes of their children, and that there is low intergenerational mobility. A positive intergenerational income elasticity

[3] Permanent income is the average income an individual expects to receive over their life-time. In other words, permanent income is the average of a person's life-time income. Often permanent income is estimated by averaging income data for several different years (Corak, 2006, pp. 3-4, 9, 11-12).

[4] The percentage change interpretation is approximately scalable for small relative changes in parental income. The effect of larger changes in parental income should be calculated by raising the relative change in parental income to the power of the elasticity.

implies that children from higher income families on average grow up to earn more than children from lower income families.[5]

To control for life-cycle income effects, variables for parents' ages are "standard" in intergenerational mobility equations, while age controls for their children are usually included when there is significant variation in this variable (Blanden, 2007, p. 5; Couch and Lillard, 2004, p. 196; Grawe, 2006, p. 551). The best and most internationally comparable estimates of total intergenerational economic mobility for a country usually omit other variables, such as children's educational qualifications, that are associated with or influenced by parental income (Bowles and Gintis, 2002, pp. 5-10, 22). When researchers do include such controls they are usually testing the extent to which these variables mediate the effects of parental income (Blanden, Goodman, Gregg and Machin, 2004, p. 139; Ng, 2007, p. 17).

2.1 Methodological obstacles to accurately measuring intergenerational mobility

Demanding data requirements make accurately calculating intergenerational income mobility difficult. Ideally researchers would have comprehensive data on both the incomes of children's parents and on the incomes of these children when they are adults. Very large datasets containing intergenerational individual-level income data have been developed from taxation and census data in the Nordic countries and in Canada. However, in most countries such data is not available (Corak, 2006, p. 7; Jäntti, Bratsberg, et al., 2006, pp. 28-30). In Germany and the United States, intergenerational income mobility research has usually used panel data on the incomes of parents and on the incomes of their children when they are grown up and left home. However, relatively few studies have collected data on people's economic circumstances for prolonged periods (Corak, 2006, p. 6).

Since relying on people's recollection of their parents' incomes is fraught with difficulties, sometimes survey data on the occupations, qualifications and housing tenure of respondents' parents has been used to predict their incomes.[6] Income mobility estimates for France, Italy, Spain, Switzerland, and Japan are only available using this method. However, calculating incomes using these instrumental variables seems to inflate estimates compared to using actual income data, especially when only one or two years of data on the actual incomes of parents is available (Grawe, 2006, pp. 551, 555). This is partly because the characteristics used to predict income, such as parents' educational levels, have an independent effect on children's outcomes (Blanden, 2008, p. 6; Blanden and Machin, 2007, p. 4; Grawe, 2004, p. 69). Just using finely grained occupation data to predict income (Andrews and Leigh, 2008, 2009) has produced estimates that are often considerably different from results based on detailed national income datasets (Blanden, 2008, p. 14). Using socio-economic status (SES) data, based on the average economic return for different occupations, often seems to generate similar intergenerational mobility results to self-reported income (Blanden, 2008, p. 16; Ermisch, Francesconi and Siedler, 2006), although sometimes estimates are lower (Ermisch and Francesconi, 2004, p. 182). For some people SES may better capture their long-term economic position than their current income. However, there are obvious limitations to imputing a person's economic situation on the basis of their occupation (Corak, 2004, p. 23; Zimmerman, 1992, p. 419).

Even when income data is available, life-cycle effects on people's incomes make accurately measuring their economic situation difficult. This is because some types of

5 The effect of parents' incomes on the incomes of their children is also greater in countries with higher income inequality.

6 These are referred to as two-stage instrumental variable estimates, or sometimes two-sample or two-stage least squares (b2SLS) estimates (Blanden and Machin, 2007, p. 4).

workers, and particularly those with high life-time earnings, tend to reach their peak earning years later than other workers (Bohlmark and Lindquist, 2006, pp. 882, 885; Grawe, 2006, p. 552). While the entry of highly educated workers into the labour force is often delayed by the time they spend training, on average they usually subsequently enjoy higher earnings growth than those who have fewer educational qualifications (Vogel, 2006, pp. 9, 29). Measuring incomes when people are in their fifties and sixties is also likely to inaccurately measure their permanent income because people's real wages are often declining at this age (Corak, 2006, p. 10). As a result of life-cycle bias, estimates of intergenerational mobility in some countries are "highly sensitive" to the age at which earnings are observed (Jäntti, et al., 2006, p. 3; Vogel, 2006, p. 14). The incomes of parents and of their children should ideally normally be measured between their thirties and mid-forties, when their income is more likely to accurately reflect their permanent income and their life-time earnings (Haider and Solon, 2006, pp. 1316-1319).

In addition, because people's incomes often vary from year to year in response to transitory short-term factors, measures of incomes from just a few time points tend to produce "snapshots" that poorly capture people's life-time or permanent income (Jenkins, 1987, p. 1149). In other words, while researchers would like long-term data on the incomes of families, usually only a few measurements are available (Corak, 2006, p. 6). This "errors in variables" bias depresses measures of intergenerational mobility because each income observation contains a random component, and only having a small number of income observations can mask the relationship between parental income and the income of their children (Solon, 1992, pp. 396, 401). Higher and more accurate intergenerational mobility results occur in most countries when a large number of income measurements from peak-earning years are available. However, in Norway additional years of income data had very little effect (Corak, 2006, pp. 9, 52; Corak and Heisz, 1999, p. 512; Haider and Solon, 2006, p. 1309; Jäntti, et al., 2006, p. 20; Mazumder, 2005, pp. 248-249).

Sample selection rules and the accuracy of the dataset are also important. For instance, intergenerational mobility results are affected by the inclusion or exclusion of unemployed and part-time workers (Couch and Lillard, 1998, p. 328; Minicozzi, 2003, p. 291). Using total income slightly inflates estimates of immobility in the United States and Canada compared to using just labour market earnings, but data on this effect is unavailable for most countries (Corak and Heisz, 1999, pp. 504, 512-513; Mazumder, 2005, p. 250; Peters, 1992, p. 466). Sometimes datasets on incomes omit those who were dependent on benefits. Intergenerational income mobility results using these datasets may not apply to those who grew up with unemployed parents. For instance, estimates of intergenerational earnings mobility in Canada effectively exclude families from the lowest decile of family income because this group contains few workers who are included in Canadian tax return data (Fortin and Lefebvre, 1998, p. 17; Gorard, 2008, p. 320). There are also obvious incentives for people to under-report their taxable income (Corak and Heisz, 1999, p. 515). Furthermore, using self-reported income can result in errors resulting from inaccurate recall, while using bands to collect income data results in further imprecision (Atkinson, 1980, p. 207). What people earn is also a very private matter, and non-response rates to survey questions about income tend to be relatively high (Dearden, Machin and Reed, 1997, p. 53). Rates of intergenerational mobility in a country can also gradually change over time (Blanden and Machin, 2008, p. 106; Fortin and Lefebvre, 1998, pp. 20, 26).

In addition, research into intergenerational mobility has often covered just men and their fathers, when to be representative and comprehensive, research should include both men and women (Chadwick and Solon, 2002, p. 335). Although fathers' incomes are likely to be more stable, with women frequently leaving the paid workforce or reducing their

working hours to have and look after children, ideally researchers should test the effect of total family income as well as the incomes of fathers (Corak, 2006, pp. 6, 9). For similar reasons, using total family income as a dependent variable is sometimes desirable (Chadwick and Solon, 2002, pp. 335, 342-343; Raaum, Bratsberg, et al., 2007, pp. 3, 31). In some countries the number of children in a family also seems to affect the results (Björklund, Eriksson, et al., 2004).

Researchers using large datasets have also shown that the rate of intergenerational mobility sometimes varies across the income distribution, and mobility is usually lowest near the extremes of the income distribution (Bratsberg, Roed, et al., 2007). As a result, modelling intergenerational mobility as a linear relationship may sometimes produce imprecise results (Corak and Heisz, 1999). The causal mechanisms by which the long-run economic conditions of families affect the subsequent incomes of their children are also unclear (Raaum, et al., 2007, p. 6). In addition, sometimes only a very small proportion of variation in people's incomes is explained by what their parents earned, suggesting that other variables are more important (Gorard, 2008, p. 319).

Indeed, New Zealand research shows that individual specific factors, such as child poverty and coming from a dysfunctional home environment, tend to have a modest effect on subsequent outcomes for people (Ferguson and Horwood, 2003, p. 22; Melchior, Moffitt, et al., 2007, p. 972). Multiple disadvantages are associated more strongly with negative outcomes, but many people are still able to overcome them (Ferguson and Horwood, 2003, p. 130; Welch and Wilson, 2009a). Protective factors include individual characteristics, family cohesion and warmth, good parenting and external support systems (Mackay, 2003, p. 118; Ward, 2008, pp. 31-32).

2.2 Comparing rates of intergenerational mobility

The rate of intergenerational income mobility in some countries is uncertain and widely debated, and there are still no estimates available for many developed countries (OECD, 2008b, p. 4). Figure 1, however, shows the intergenerational income elasticity point estimates for men in different countries made by Canadian economist Miles Corak, together with results that have since become available for Australia, France, Italy, Japan, Spain and Switzerland (Bauer, 2006; Cervini, 2008; Corak, 2006; d'Addio, 2007; Hugalde, 2004; Lefranc, Ojima and Yoshida, 2008; Mocetti, 2007; Piraino, 2007). Corak drew his point estimates from studies using similar methodologies, and scaled them so that they were comparable to the result for the United States (Corak, 2006; OECD, 2008b, p. 6).[7] Corak's results for men are similar to the preferred estimates selected by British economist Jo Blanden (Blanden, 2008, pp. 13, 30). The results for a recent comparative study of the Nordic countries, Britain and the United States (Figure 2), which applied the same methodology and assumptions to large and comparable datasets for the same period, also produced a similar ordering to Corak. There were often statistically significant differences between countries' intergenerational income mobility rates (Jäntti, et al., 2006,

[7] The United States intergenerational income elasticity point estimate Corak preferred (which is shown in Figure 1) was produced by ordinary least squares regression of data from a long-running panel study using a sample where fathers' earnings were measured five times in a 10-year period, and in which the average age of fathers was 40.2. Having a high number of measures of parents' incomes results in a more accurate measurement of their permanent income and tends to increase the intergenerational income elasticity. So does measuring the incomes of parents and their sons when they are in their peak earning years. Corak applied the sample selection rules (father age range and number of years of income data) used in the best study for each country to United States panel data to determine the comparable elasticity for the United States. He then multiplied the results for each country by the ratio of his preferred United States intergenerational income elasticity point estimate divided by the United States estimate using that country's sample methods (Corak, 2006, p. 50). This made the results for countries more comparable, and produced most of the estimates in Figure 1. The results in Figure 1 for France, Italy, Japan, Spain and Switzerland have not been scaled, either because of data limitations or because the research is more recent than Corak's. Leigh (2007) scaled his results for Australia using Corak's methodology.

p. 13). For instance, Figure 2 shows that men in the United States were less intergenerationally mobile than men living in the five other countries graphed. Using total family income as the explanatory variable, rather than just the incomes of fathers, seemed to usually only have a small effect on the results. However, the magnitude and direction of this change varied between countries (Jäntti, et al., 2006, pp. 24-25). In most countries women seem to be more intergenerationally mobile than men (Cervini, 2008; Lefranc, 2004, p. 18; Raaum, et al., 2007, p. 22).[8]

Figure 1 shows that in three Nordic countries (Denmark, Norway and Finland) and in Canada the intergenerational income point elasticity for men is less than 0.2. This means that a 1% relative difference in the income of a man's father is associated with, on average, less than a 0.2% difference in his own adult income. In contrast, in Britain, Italy and the United States a 1% relative difference in the income of a man's father is associated with, on average, a 0.4% difference in his own adult income (Corak, 2004, pp. 9,11; d'Addio, 2007, p. 32). Continental European countries (coloured blue), such as Germany and France, appear to have lower intergenerational income mobility than the Nordic countries (coloured yellow). Spread throughout the distribution are the English speaking countries (coloured red), while Japan (coloured green) is in the middle of the range. However, we have to be cautious as the results for men in Australia, France, Italy, Japan and Switzerland are each based on a single dataset, and further research could change their positions (OECD, 2008b, p. 5). The confidence intervals for some estimates are also wide, with the result that there is considerable uncertainty about the exact position of some countries (Björklund and Jäntti, 2009, p. 503).

Studies of intergenerational mobility based on occupation data usually tend to generate similar results to studies based on income data, with measures of SES "capturing something similar to measures of income". Indeed, the correlation between Blanden's preferred intergenerational income elasticity results and estimates based on SES is 0.9 for the nine countries both measures are available for (Blanden, 2008, pp. 16, 40).

While the number of overseas studies of intergenerational income and occupational mobility has grown (Corak, 2006), the literature on this topic for New Zealand is limited. A recent comparative study by Andrews and Leigh has estimated the intergenerational income elasticity for men living in New Zealand at 0.25. However, the standard error for the estimate was large (Andrews and Leigh, 2008, pp. ii, 13). In addition, that study calculated fathers' incomes using finely grained data on respondents' recall of their father's occupation. Andrews and Leigh's estimates for other countries are often lower than estimates from the best available national datasets, and are also relatively poorly correlated with both these estimates and with other estimates using occupation data (Blanden, 2008, pp. 14, 40).[9] Similarly, while the results of an unpublished comparative study suggested New Zealand had relatively high intergenerational occupational mobility, the sample size was small and few technical details are available (Blanden, 2008, p. 32). Earlier research suggested that in the 1970s intergenerational mobility between different occupational groups was fractionally higher in New Zealand than in Australia or in the United States (Davis, 1979, pp. 52, 55; Jones and Davis, 1988, p. 282).

However, research using New Zealand data has made an important contribution to the literature on intergenerational welfare dependency. Christchurch Health and Development

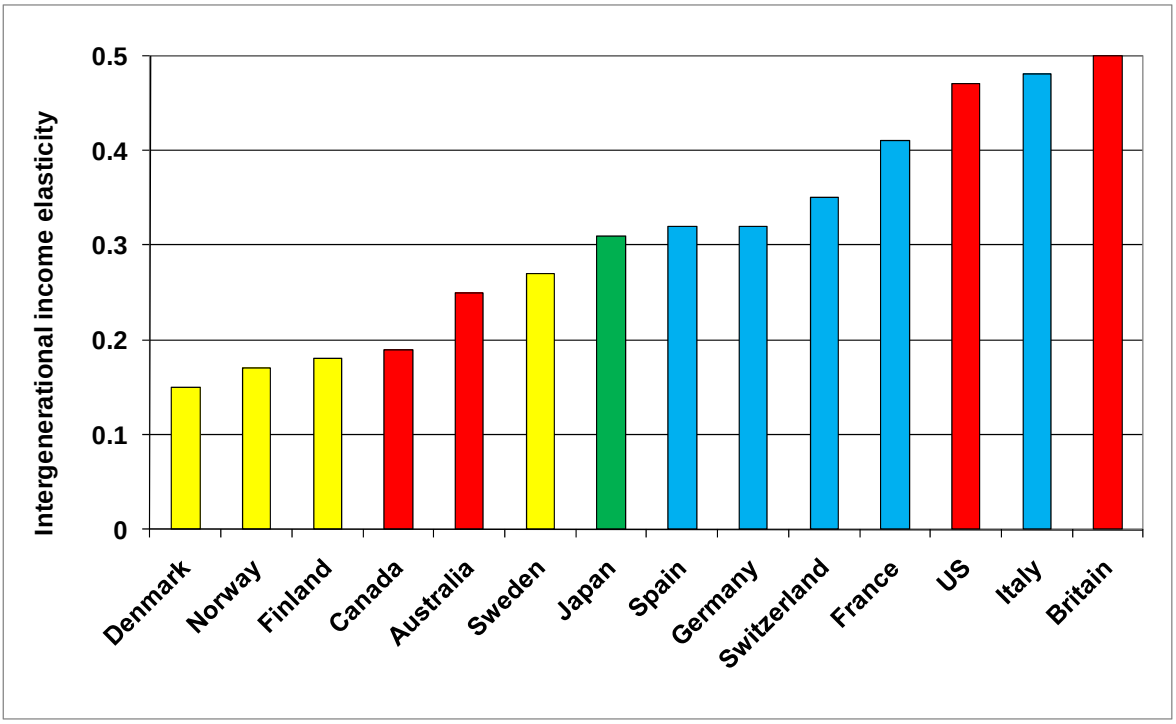
[8] The difference is statistically significant at a 5% level in Canada, Denmark, Finland, France (for some time-periods), Norway (for some income percentiles), Sweden and the United States. The difference is statistically significant at a 10% level in Germany. In contrast to other countries, the point estimate is sometimes higher for women than for men in Britain. Estimates for Australia, Italy, Japan and Switzerland are only available for men. The results for Spain vary.

[9] Andrews and Leigh just used detailed occupation data to calculate the income of fathers. Other studies using instrumental variables have tended to use the SES or social standing of occupations together with data on the educational qualifications of parents and their housing tenure (Blanden, 2008, p. 14).

Study panel data indicates that, between the ages of 16 and 21, the correlation coefficient in benefit dependency (in terms of the unemployment and domestic purposes benefits) between parents and their children was at least one-third. The effects seemed to be more than twice as high for women as for men (Maloney, Maanin and Pacheco, 2003; Pacheco and Maloney, 2003).

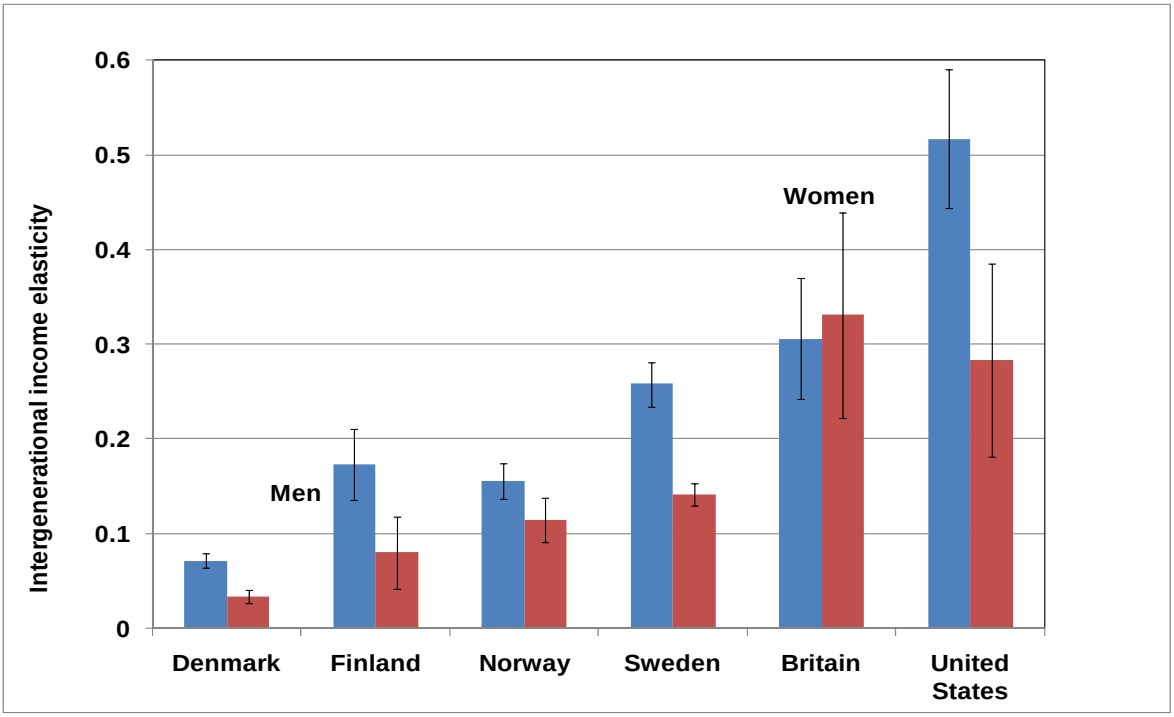
One of the aims of this working paper is to investigate how high intergenerational income and occupational mobility is for people in New Zealand compared to people in other countries. Intergenerational mobility is quantified using self-reported income data and a large and internationally comparable occupation dataset. This paper also breaks new ground by investigating whether income and occupational mobility varies between New Zealand population groups.

Figure 1 - Intergenerational income elasticity point estimates for men in developed countries



Source: (Bauer, 2006; Corak, 2006, p. 42; d'Addio, 2007, p. 33; Lefranc, et al., 2008, p. 24; Leigh, 2007, p. 22; Mocetti, 2007, pp. 9-10). Nordic countries are coloured yellow, English-speaking countries are coloured red, continental European countries are coloured blue, Japan is coloured green. The dependent variable is sons' log incomes; the independent variable is fathers' log incomes. Results for France, Italy, Japan, Spain and Switzerland have not been scaled and are therefore less comparable than the results for the other countries.

Figure 2 - Intergenerational income elasticities in four Nordic countries, Britain and the United States (with 95% confidence intervals) that have been calculated using the same methods and similar datasets



Source: (Jäntti, et al., 2006, p. 13). The results for men are in blue and for women are in red. The black lines show 95% confidence intervals. Children's earnings were measured twice for this comparison (at about age 33 and 41) and fathers' earnings (family earnings for the United States) were measured once (when children were about age 16). The children included were born between 1957 and 1964.

2.3 Explaining variations in intergenerational mobility

Explanations of why intergenerational mobility varies between countries are often nationally focused, or about a relatively small number of countries, and sometimes do not hold when applied to a larger group of countries. Figure 1 shows differences in rates of intergenerational income mobility between the Nordic and continental European countries, suggesting that public policy differences between these countries may be important. However, the scattered distribution of the point estimates for English-speaking countries indicates that a wide range of factors may influence intergenerational mobility in developed countries. These are likely to include: the quality of a country's education and training system; the rate of economic growth and of job creation; the physical and emotional environment children experience; and the opportunities people have to improve and to use their capabilities (Blanden, 2008, pp. 19-25; Cabinet Office Strategy Unit, 2008a, pp. 4, 63; Grawe, 2004, pp. 73-75). Genetic inheritance of ability also affects the level of intergenerational mobility, but this effect is not likely to systematically vary between countries (Causa and Johansson, 2009, p. 9).

Research into factors affecting rates of intergenerational mobility has often focused on cross-national variations in educational achievement, cognitive skills, and workforce training (OECD, 2008a). Some researchers, for example, have suggested that a key reason why intergenerational mobility in the Nordic countries is high is the widespread availability of high-quality childcare and after-school care. These policies have contributed to levels of academic achievement and cognitive and non-cognitive skills being comparatively high, particularly among those at the bottom of the ability range. The provision of childcare has also improved people's economic circumstances by making it

easier for women to work (Bratsberg, et al., 2007, p. C91; Esping-Andersen, 2004b, p. 133; OECD, 2000, pp. 14-15; 2008b, p. 13). However, France also has higher early childhood education expenditure than most countries. While France's investment in early childhood education seems to have boosted student achievement (Esping-Andersen, 2007, p. 20; OECD, 2006, p. 105), other barriers appear to limit intergenerational mobility.

While some researchers have found that early investments in people's skills are most effective (Carneiro and Heckman, 2003, pp. 90, 129, 194; Esping-Andersen, 2004a), there is also evidence that retraining unemployed and low-income workers can increase people's skills and incomes (Krueger, 2003, pp. 23, 48). Furthermore, high participation rates in upper secondary school education and being able to borrow to fund tertiary education both seem to increase intergenerational mobility (Corak, Gustafsson and Osterberg, 2004, p. 284; OECD, 2010, p. 193). In contrast, early streaming of children into different educational paths seems to limit intergenerational mobility in some continental European countries (Grawe, 2004, p. 73; Pekkarinen, Uusitalo and Pekkala, 2006, pp. 10-11). Parental income is often a key determinant of educational choice in these countries, and children who do not pursue an academic stream frequently find their later educational options are limited (Mocetti, 2007, p. 13). The quality of a country's teachers also affects student performance and intergenerational mobility (Causa and Johansson, 2009, pp. 28-30; OECD, 2010, p. 190).

For education expenditure to promote intergenerational mobility these outlays have to benefit people from lower income families relatively more than those from higher income families. This has not always happened (OECD, 2007b, pp. 12, 21). For instance, cohort study data clearly shows that increased expenditure on secondary schools and universities in Britain during the 1960s and 1970s disproportionately benefited children from better-off families. However, since the mid-1980s the greatest growth in student numbers in Britain has been among those from less well-off families (Blanden, Gregg and Machin, 2005, p. 11; Blanden and Machin, 2004, p. 238, 2007, pp. 15, 19).

Although factors relating to educational achievement have some explanatory power, they often poorly explain rates of intergenerational income mobility. In Italy, for instance, differences in educational achievement by children seem to account for only about one-third of the effects of parents' incomes on the incomes of their children. While education is an important channel for intergenerational mobility in Italy, two-thirds of the effects of parents' income on the incomes of their children occur through channels other than the education system. Italian researchers have suggested that entry barriers into a wide range of occupations and the strong role played by social and family ties in gaining employment may be constraining intergenerational mobility (Mocetti, 2007, pp. 15-18; Piraino, 2007, pp. 18-22). Researchers have raised similar concerns about France. Intergenerational income effects in Canada also appear to be partly attributable to labour market contacts gained through a person's father, with 40% of young men having been employed by an employer for whom their father has also worked (Corak and Piraino, 2010, pp. 26-28). In addition, having parents who received a benefit seems to have a negative effect on a person's labour market outcomes and income as an adult (d'Addio, 2007, pp. 34-36). In Britain, there has been growing interest in how policies that make establishing a business and employing people easier may promote intergenerational mobility, particularly for groups with high rates of unemployment (Cabinet Office Strategy Unit, 2008b, p. 49).

Some researchers have found that black people in the United States have lower intergenerational income mobility than white people (Hertz, 2005, p. 165). However, this seems to explain only a small part of the difference in intergenerational mobility rates between the United States and other countries (Jäntti, et al., 2006, pp. 2, 25). Explanations for low intergenerational income mobility in the United States have tended to focus on high returns from education, together with poor average educational

performance by students from low-income families (Raaum, et al., 2007, p. 27) and the negative effects of exposure to violence. A high rate of absolute child poverty together with parental characteristics, such as a higher teenage birth-rate than in other developed countries, may also be important (Corak, 2001, p. 7; Corak, Curtis and Phipps, 2010, pp. 19-24). However, exceptionally able children in the United States seem to be more upwardly mobile than similar children in other countries (Grawe, 2004, p. 79).

Researchers have theorised that women are more mobile than men in most countries because married women with children have often reduced their labour market participation. Parental income has affected the educational qualifications of both men and women (Raaum, et al., 2007, p. 30) but has not had the expected effect on the incomes of women (Chadwick and Solon, 2002; Ermisch, et al., 2006, p. 674). Indeed, rates of intergenerational income mobility for married women born between the late 1950s and early 1960s in the Nordic countries, Britain and the United States, when based on their own earnings, are approximately uniform (Raaum, et al., 2007, pp. 21-22). High intergenerational income mobility for married women in the United States and in Britain, relative to single women and to single and married men, seems to reflect low labour market participation by married women with children. This may have occurred because in these two countries the tax system, childcare costs and social expectations have encouraged more married women with children to completely leave the labour market than in Scandinavia. As a result, some married women have either not been using or have only partly been using their labour market earnings potential compared to other adults. In the United States and Britain this effect seems to have been biggest among women from affluent backgrounds with high-income husbands (Raaum, et al., 2007, pp. 23, 30, 35-37).

Recent research in Sweden, using a dataset that includes a large number of adopted children, suggests that pre-birth factors are more important than post-birth factors for educational achievement. In contrast, for long-run earnings and income, adopted father's earnings seemed to be more important than birth father's earnings (Björklund, Jäntti and Solon, 2007, pp. 1015, 1026). There was also evidence for interactive effects between pre-birth environment and genetic effects (Björklund, et al., 2007, p. 999) suggesting that disaggregating these effects is very complex.

3 The New Zealand data

No representative nationwide New Zealand datasets on the incomes of children's parents and on the incomes of these children when they are adults are currently available to researchers. However, we are able to test intergenerational economic mobility using two datasets. These datasets are income data from the Dunedin Multidisciplinary Health and Development Study of people born in Dunedin in 1972-73; and occupation data from the nationwide 1996 New Zealand Election Study (NZES).[10] This section describes these datasets.

3.1 The Dunedin Study data

The Dunedin Study is a cohort study of the population of children born between April 1972 and March 1973 in Dunedin who were still living there at age three. Almost all eligible children have participated in the study. When the participants were growing up Dunedin had the fourth biggest population of any New Zealand metropolitan centre. The study included 1,037 children from a full range of economic backgrounds (Silva and McCann, 1996, pp. 11-13).

Data from similar cohort studies, including a study of people from one city, has also been the main source for intergenerational income mobility estimates in Britain (Atkinson, 1980, p. 205; Blanden, et al., 2007, p. C46). New Zealand household economic surveys only capture the incomes of parents and their children if they are living at the same address. They therefore do not produce a random sample of adult children and of their parents. New Zealand also does not have large intergenerational administrative datasets on people's incomes that are available for research purposes (Lane and Maloney, 2002; Wilson, 2002). This makes the Dunedin Study income data extremely valuable.

Although the Dunedin Study sample is most representative of children born in Dunedin at the time the participants were born, in many respects Dunedin is also a microcosm of New Zealand. Indeed, when the participants were born the occupational structure of Dunedin closely resembled New Zealand as a whole (Silva and McCann, 1996, pp. 2, 10, 14). Health outcomes for the participants at ages 21 and 26 were usually not statistically different from those of other New Zealanders of the same age, but the study is under-representative of Māori and Pacific peoples compared to New Zealand's entire population (Poulton, Hancox, et al., 2006, pp. 1, 9). Irrespective of where they live in New Zealand, people have the same entitlements to welfare payments and to public education and health services, while the central government also sets employment laws. By the time they were 21, a third of the participants were living outside Dunedin (Silva and McCann, 1996, pp. 14-15). At age 32 only 38% were living in Dunedin, 76.7% were living in New Zealand and 23.7% were living overseas. The Dunedin Study considers its participants to be "broadly representative" of New Zealand children born in 1972-73 (Poulton, et al., 2006, p. 9).

This paper treats the Dunedin Study data as if it were a random sample of people born in Dunedin in the early 1970s, rather than as a sample of all New Zealanders born during this period. However, because Dunedin is reasonably similar to other parts of

[10] The Dunedin Study has occupation and therefore SES data for both participants and their parents. However, the occupation data for parents was coded using the Elley-Irving index, which has values between 1 and 6, whereas the data on participants' age-32 occupations was coded using the newer New Zealand Socio-Economic Index, which has values between 10 and 90. If the occupation data for parents was recoded using the system that was later used for participants, this data could be used by future researchers to calculate occupational mobility. The Election Study asked about the incomes of respondents, but not about their parents' incomes.

New Zealand, and because the participants have been geographically mobile, the results from the Dunedin Study are useful for understanding intergenerational income mobility by New Zealanders. Intergenerational income mobility studies in other countries that have used regional datasets have tended to generate similar results to later studies that have used larger national datasets, and that apart from using a national dataset have been similar in other methodological respects. Although there is some evidence of regional differences in intergenerational income mobility in the United States and in Finland (Mayer and Lopoo, 2008, pp. 149, 151, 154-155; Pekkarinen, et al., 2006, pp. 5, 10), New Zealand has much fewer regional differences in public policy than these two countries (OECD, 2009, pp. 56-57). Further discussion of this topic is in Section 8.1.1.

Existing Dunedin Study results show high rates of intra-generational mobility, with only 41% of participants remaining in the same three-group SES category between the ages of 0, 5 and 9 (Parnicky, Williams and Silva, 1987, p. 121). The Pearson's correlation between childhood SES and adult SES was 0.32 (Melchior, et al., 2007, p. 969).[11]

We used data on parents' incomes when the participants were aged 13 and 15, together with data on the incomes of participants from their most recent assessment at age 32. When data on the incomes of participants' parents was collected the average age of mothers was 40 and the average age of fathers was 42.[12] In our dataset, parents are therefore more likely than their children to be in their peak earning years. Overseas researchers have found a decrease in intergenerational mobility when people are in their peak earning years, compared to when they were younger. This is because early-career data understates the long-term economic situation of better educated workers who tend to have higher life-time earnings growth rates (Jäntti, et al., 2006, p. 3). Admittedly, 32 is similar to the age of children used in some overseas studies (Blanden, 2008, pp. 5, 42-44; Corak, 2006, pp. 10, 61). However, increases in educational attainment and the increased tendency of many young people to travel and to move between jobs means that the age-earnings profile of people has been changing (Grawe, 2006, p. 565). Indeed, historically many New Zealand men have only reached their peak earning years in their mid-thirties, and the peak earning years for women have traditionally been in their forties. The age-earnings profiles for both New Zealand men and women have also changed over time, and the median earnings profile for women born in the early 1970s was considerably higher at 30 than for women born just five years earlier (Coleman, 2006, pp. 14-15, 29-30). This makes it difficult to assess whether we are measuring participants' incomes at an appropriate age.

We considered also seeking income data from the Christchurch Health and Development Study of 1,265 children born in Christchurch in mid-1977. However, because the most recent assessment of Christchurch Study participants was when they were 30, the Christchurch data would currently appear to be less suitable than the Dunedin data.

At age 32, 94% of those assessed by the Dunedin Study at age three were still participating. We lose some additional cases, mainly because of non-reporting of fathers' incomes when the participants were 13 and 15. This reflects the intensely personal nature of information about people's income, with the pattern of results suggesting some mothers of participants felt unable to accurately state their partner's income.[13] The missing income

---

11 The Pearson's correlation shows the strength of linear dependence between two variables and gives a value between -1 and 1.

12 The questions used asked about the incomes of the participant's "mother and father figure". These would not necessarily be biological parents.

13 The directors of both the Dunedin Study and the Election Study agree that income is the topic people are most reluctant to answer questions about. Indeed, the director of the Dunedin Study commented that whereas participants are willing to talk about a wide range of health problems and personal behaviours, they tend to be less forthcoming about their financial position. Because of a historically low response rate to questions about personal income, this was the second to last question in the NZES's 1996 questionnaire.

data does not seem to affect the characteristics of our sample. Indeed, the incomes of those whose father's income data is missing are not statistically different, using 95% confidence intervals, from those whose father's income is available. We also lose a small number of cases when female participants (and occasionally participants' parents) reported zero income. Our analysis excludes these cases because the log of zero income is undefined. When female participants declared zero income all but one declared an income for a partner, suggesting that they had zero income because they were homemakers. Our sample size for men is similar to that of samples used in early intergenerational income mobility studies of men in the United States, Britain, Norway and Sweden (Atkinson, 1980, p. 210; Becker and Tomes, 1986, p. S26; Gustafsson, 1994, p. 82; Solon, 1992, p. 401).

The Dunedin Study asked people which category best represented their income, and we used midpoints except at the extremes. This masks some of the variation in income, particularly for those in the top income category. Although the Dunedin Study's income categories were based on the census categories, the second half of the 1980s was a period of high inflation in New Zealand. As a result, 14.1% of parents (27% of fathers and 2.4% of mothers) are in the top income category. We set the top income category for parents at the equivalent of $47,000 in 1987 values, which was just over $80,600 in 2008 values. A much lower proportion of participants reported incomes in the top category at age 32. The incomes of participants who had declared in an overseas currency were converted into New Zealand dollars using purchasing power conversion rates. For participants who were in the top income category we used the $135,000 income Statistics New Zealand allocated to this group after the 2001 and 2006 censuses. Increasing the income imputed for parents and participants in the top income bands had very little effect on the results. However, skews in the data affect our results and reduce their precision in ways that we are unable to quantify (Gujarati, 1995, pp. 325-336, 343; Miles and Shevlin, 2001, pp. 78-80). Overseas studies have encountered similar problems (Atkinson, 1980, pp. 205, 207; Haider and Solon, 2006, p. 1313; Mazumder, 2005, p. 243). Fuller details on the income data are in the Appendix.

If additional years of income data were available this would give us a more accurate picture of people's economic circumstances (Haider and Solon, 2006; Mazumder, 2005, pp. 249, 253). Nevertheless, the Dunedin Study data is very useful because it includes longitudinal information on the actual incomes of both parents and their grownup children, includes New Zealanders who have moved overseas and has a very high participation rate.

3.2 The New Zealand Election Study data

Intergenerational mobility was also measured using occupation data from the large nationwide 1996 New Zealand Election Study (NZES) dataset.[14] In 1996, the NZES's post-election survey asked respondents what their occupation was and what their parents' occupations had been when the respondent was aged about 14. It was not until 2008 that the Election Study again asked respondents about their parents' occupations, and the 2008 data is not yet available. Researchers in other countries have also used election study data to study intergenerational mobility (Heath and Payne, 1999, p. 4), and similar questions from household economic surveys (Ermisch, et al., 2006, p. 663).

The NZES's sample frame was people on the electoral roll. In 1996, 91.6% of eligible voters were enrolled and 88% of enrolled electors voted (New Zealand Post, 1997, section 80). The Election Study's postal response rate was 55.7% (4,118 respondents),

[14] http://www.nzes.org/exec/show/1996

which is high by international standards. Groups that are less likely to be on the electoral roll, vote and answer surveys include those who move frequently, young people, people who are travelling overseas, Māori and some ethnic groups (Electoral Enrolment Centre, [2008], p. 10; Electoral Law Committee, 1998, pp. 26-33; Jackson, 1996, p. 14; Vowles, 2002b, pp. 99-103). The Election Study weight ensures that the data matches voting behaviour, but the data does not always perfectly mirror the characteristics of New Zealand's population. As a result, caution is necessary when interpreting the results.

The Election Study had a large sample size and deliberately sampled a higher proportion of people who had chosen to be on the Māori electoral roll than on the general electoral roll. Nevertheless, only 13.5% of the Election Study's weighted sample of mail respondents identified as Māori (solely or in part), compared to 14.5% of New Zealanders in the 1996 census (Statistics New Zealand, 1998a). Because there are 374 cases where we have both the respondent's occupation and that of their father[15] we are able to cautiously study intergenerational mobility by Māori. With only 31 such cases for Pacific peoples we are unable to calculate intergenerational mobility by them. In total, 15.7% of the Election Study's mail respondents were born outside New Zealand compared to 17.5% of New Zealand's population (Statistics New Zealand, 1998c). Apart from sampling a higher proportion of voters on the Māori roll, the Election Study sample is a simple random sample.

Of the Election Study mail sample, we were able to include 79.8% of total cases in our regressions (3,256 cases) and 67.7% of Māori respondents (374 cases). The single biggest reason why we lose cases is because respondents were economically inactive. A detailed analysis of why we lose cases is included in Section 8.2.

People's occupation determined their Socio-Economic Status (SES) score on the 10 to 90 scale. The average income of people in different occupations in the 1996 census, together with data on their educational qualifications and survey data on the value of goods they consumed, calculated the SES of occupations (Davis, Jenkin and Coope, 2003, pp. 12-16). On average, people in higher SES occupations, such as corporate managers and general practitioners, have higher incomes and educational qualifications than people in lower SES occupations, such as labourers and textile workers. Since occupation is an excellent indicator of permanent income (the average income that an individual expects to receive over their life-time), intergenerational mobility has frequently been calculated using SES data (Blanden, 2008, pp. 6, 16; Corak, 2006, p. 8; Ermisch, et al., 2006, pp. 674, 677). While people's SES is not the same as their income, the SES scores are correlated with health and economic outcomes (Davis, et al., 2003, p. 11).[16]

Our data on people's SES has a number of limitations. Some of the SES groups, and farming in particular, contain people from a wide range of economic circumstances. This variation is only partly caused by life-cycle effects (Davis, et al., 2003, pp. 12, 27). Farming is an important part of the New Zealand economy and 16.7% of Election Study respondents listed their father's occupation as being a farm or animal producer or farm worker. The inability of our data to measure the different economic circumstances of people from a farming background is therefore an important limitation. Another limitation is that the SES of occupations can gradually change over time as relative pay rates and educational requirements change. In addition, we are relying on people's recall of their father's occupation. This recall may be inaccurate, particularly when their father had a number of jobs. Indeed, people may sometimes "uplift" their occupational status and that

[15] This falls to 371 cases once we exclude those for whom age data is missing.

[16] The correlation between NZES income results and SES is only 0.32, although the eight income bands the NZES uses are not ideally designed for the comparison. In contrast, for the Dunedin Study participants the relationship between SES and income is 0.45.

of their parents to present themselves and their parents in the best possible light (Atkinson and Harr, 1978, pp. 62-64; Galt, 1985, pp. 89, 124). The Election Study data is now over 14 years old, and there have been changes to New Zealand's workforce since 1996. Because the occupational careers of women are sometimes quite complex, since they frequently spend time outside the workforce looking after children, we have followed overseas studies in only using data on the occupation of people's fathers (Ermisch, et al., 2006, p. 664; Ganzeboom and Treiman, 2007, p. 17).

4 The Dunedin Study results

The results in this section are based on the Dunedin Study data described in Section 3.1. Table 1 shows intergenerational income elasticity rates for nine models of intergenerational mobility. The first model used fathers' incomes to explain the incomes of males from Dunedin who were living in New Zealand at age 32, and included the standard intergenerational income mobility controls of fathers' ages and fathers' ages squared (Couch and Lillard, 2004, p. 198; Solon, 1992, p. 399). The intergenerational income elasticity for model one was 0.253, although the large standard error suggests considerable variability (95% confidence interval: 0.081 to 0.424).[17] The elasticity implies that if an average man's father earned 1% more than the father of another man, he himself would earn 0.253% more annually at age 32. The age controls are not statistically significant for any model, and have been included simply to ensure that the equations for men and for women are the same as those used in overseas studies.[18]

The elasticity for model one is identical to Andrews and Leigh's intergenerational income elasticity of 0.25 for New Zealand men aged between 25 and 54 (95% confidence interval: .03 to .46). They used 1999 national survey data on respondents' recall of their fathers' occupations to impute incomes (Andrews and Leigh, 2008, p. 13).

The Dunedin results are easier to understand by considering an example. When the participants were in their teens, the average income of fathers in the Dunedin Study was about $48,000 in 2008 values, while the level of income imputed for fathers in the top income group was approximately $80,600. Suppose a man from Dunedin had grown up with a father who was in the top income group and who was the average age of 41.4 when they were 13. The intergenerational income elasticity for model one of 0.253 implies that this man would, on average, earn almost $7,000 more annually at age 32 than another man whose father had been the same age but had been in the average income group.[19] Because of the large standard error for the parameter and because of measurement errors, however, we have to be very cautious. Model one explained only 2.5% of the variance in the incomes of men (see the adjusted R^2 line in Table 1). This indicates that a wide range of other factors influence participants' incomes.

---

17 In a random sample or a repeatable experiment, the true parameter value has a 95% likelihood of being contained within a 95% confidence interval. The confidence intervals in this section apply to people from Dunedin who were born in the early 1970s, rather than to all New Zealanders.

18 Father's age has been included in overseas studies because income often changes over a person's lifecycle. The effects of father's age seem to vary between country, and appear to be larger in the United States than in Britain (Zimmerman, 1992, p. 418). Researchers using a very large dataset of Canadian men found that including controls for the ages of fathers did not change the elasticities (Corak and Heisz, 1999, p. 514).

19 The elasticity is for the effect of the log of fathers' incomes on the log of sons' incomes. To calculate an estimated income multiply the log of father's income by the elasticity, multiply the father's age and age squared by the coefficients for these variables, add the intercept, then take an anti-log. Note that in this model the only requirement is that these men have the same-aged father. The model does not control for the effect of any other characteristic on income. This example also assumes the relationship between the logs of incomes is linear, when there is some evidence from overseas that immobility is highest at the extremes of the income distribution.

The estimated intergenerational income elasticity for women from Dunedin living in New Zealand was just 0.167 (see model two), but was not statistically significant even at a 10% level. Model two also explained just 0.09% of the variance in women's incomes. Measuring intergenerational mobility for women is difficult because the labour force participation of some women was limited by the time they were spending looking after children. At age 32, 15.4% of women and 1.4% of men in the Dunedin Study who were living in New Zealand were out of the workforce because they were homemakers or beneficiaries. The difference between the intergenerational income elasticities for men and women is not statistically significant.

For the third model we included all Dunedin Study participants living in New Zealand but added a gender control. We also dropped the statistically insignificant variables for the age of fathers. Since age details are missing for some fathers this slightly improves our sample size, although the results were very similar with the age controls included (not shown here). Model three implies an intergenerational income elasticity of 0.212 for males and females. Although the proportion of variance explained is higher than for the first two models, this has occurred because we have pooled men and women. Model three quantifies the "between gender" variation by including a control for the tendency for men to earn more than women. Tests of whether the effect of father's income differed for men and women indicated no statistically significant difference, so no interaction term is included in the model. The pooled model without the gender control (not shown here) explained only 1.4% of the variance in incomes. This implies that the gender control explains more of the variance in incomes than fathers' income alone.

Table 1 - Intergenerational income elasticity results using data on Dunedin Study participants

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	Income of males in New Zealand	**Income of females in New Zealand**	**Income of those in New Zealand**	**Income of all males irrespective of country**	**Income of all females irrespective of country**	**Income of everyone, irrespective of country**	**Income of everyone, with parents' income as explanatory variable**	**Income of everyone with controls for education**	**Income of everyone with controls for education and country**
Constant	6.585 (1.62)***	8.198 (2.41)***	7.838 (.709)***	6.067 (1.54)***	7.813 (2.12)***	7.418 (.666)***	7.246 (.714)***	8.226 (.697)***	8.002 (.676)***
Income effects									
Father's income	.253 (.087)***	.167 (.102)	.212 (.066)***	.290 (.08)***	.215 (.096)**	.264 (.062)***			
Parents' income							.272 (.064)***	.144 (.064)**	.162 (.062)***
95% CI	.081, .424	-.034, .368	.083, .341	.127, .454	.027, .403	.143, .385	.146, .398	.019, .269	.041, .283
Parental age control									
Father's age	.065 (.064)	.005 (.103)	-	.075 (.063)	.002 (.090)	-	-	-	-
Father's age squared	-.00071(.0007)	-.00005(.0012)	-	-.00083(.0007)	.00003 (.0010)	-	-	-	-
Gender control									
Male	-	-	.631 (.067)***	-	-	.584 (.060)***	.596 (.061)***	.644 (.059)***	.621 (.057)***
Educational qualifications (base=no school qualification)									
School Certificate	-	-	-	-	-	-	-	.166 (.107)	.158 (.104)
Finished high school	-	-	-	-	-	-	-	.428 (.090)***	.373 (.088)***
Bachelor's degree	-	-	-	-	-	-	-	.641 (.103)***	.565 (.101)***
Higher degree	-	-	-	-	-	-	-	.994 (.143)***	.853 (.141)***
County (base=New Zealand)									
Australia									.402 (.081)***
Britain									.705 (.126)***
Rest of world									-.165 (.153)
Adjusted R^2	2.5%	0.09%	14%	3.3%	0.7%	13%	13%	20%	25%
Probability > F	.018	.437	0	0	.144	0	0	0	0
Number of cases	289	291	592	393	372	780	764	763	763

Column entries are unstandardised linear regression coefficients. Values are for log income. Standard errors are in brackets. *=p<.10, **=p<.05, ***=p<.01. Those whose income is missing or declared zero income (eg homemakers) have been excluded. Income is an extremely sensitive topic and missing values, usually for the fathers of participants, have reduced the number of cases.

4.1 Including those living overseas

Most overseas studies of intergenerational mobility have included only those living in their home country with data not being collected on those who have emigrated (Jäntti, et al., 2006, pp. 28-31). In contrast, the Dunedin data allows us to explore what has happened to all people, irrespective of the country they are living in. Compared to other developed countries, New Zealand has proportionately high emigration (Bedford, 2001, p. 52). Excluding the 24% of the cohort who were living overseas at age 32 could therefore risk inaccurately measuring intergenerational mobility for New Zealanders. Many New Zealanders who live overseas in their twenties and early thirties also consider themselves to be only temporarily away, undertaking what they call their "overseas experience", and plan to return to New Zealand (Conradson and Latham, 2005, p. 167; Lidgard, 2001; Milne, Poulton, Caspi and Moffitt, 2001). Although about 60% of those who were overseas at age 32 were in Australia, where New Zealand has a large and relatively settled expatriate population, the remainder were in countries that migration and census data shows most New Zealanders return home from during their late twenties or their thirties. Because New Zealand has such high emigration, the results for the entire group are probably more comparable to the population of similar overseas studies than the results for just those who were living in New Zealand.

Model four therefore shows the effect of fathers' log incomes on the log incomes of males. This model generates an intergenerational income elasticity estimate of 0.290. Although this point estimate is slightly higher than for model one, because the confidence intervals overlap we cannot say the results are different. The equivalent elasticity for females is 0.215 (model five). Unlike the results for women living in New Zealand (model two), the model five results for all women are statistically significant at a 5% level. However, the proportion of variance explained is extremely low at only 0.7%. Indeed, the probability (p value) of 0.14 associated with the F statistic indicates that the explanatory variables (father's income and father's age) do not reliably predict the dependent variable.[20]

To maximise the sample size, the model six results include male and female participants, irrespective of the country they were living in, and without the statistically insignificant controls for the ages of participants' fathers. This model generated an intergenerational income elasticity of 0.264 (95% confidence interval: 0.143 to 0.385).

People who were born in Dunedin and who were living overseas at age 32 tended, on average, to have higher incomes (and to work in higher status occupations) than those living in New Zealand. Further details on these differences are in Section 8.1.4 of the Appendix. The data for women included in model five did not show a statistically significant difference in the proportion of women in New Zealand and overseas who were not participating in the labour force. However, if we include cases where father's income data was missing we can be confident at a 10% level that women in New Zealand were more likely to be homemakers than women living overseas. Further research might uncover more subtle differences in labour market participation between these groups.

Because of limited data and because the incomes of children's fathers have tended to be higher and more stable than those of their mother, most overseas studies of intergenerational income mobility have used the income of fathers as the main explanatory variable. However, studying the combined effect of both parents' incomes arguably produces a richer picture of intergenerational mobility and in some countries increases the magnitude of estimates (Corak, 2006, pp. 9, 11). Many participants had

[20] Note that when the age variables for fathers are excluded, the father's income effect and its significance are largely unchanged. However, the model just crosses the threshold for being statistically significant, with the F statistic being consistent with the T value on the father's income coefficient.

mothers who were working (Silva, 1996, pp. 49-50), and this affected their standard of living when they were growing up. In model seven, the relationship between parents' combined income and the income of their child or children, irrespective of the country they were living in, was therefore tested. The intergenerational income elasticity estimate for model seven of 0.272 is very similar to the 0.264 result for model six, showing that changing the explanatory variable had very little effect. Changing the explanatory variable for the other models to parents' combined income (not shown) also had little effect on the results. This is not entirely surprising: when participants were 13 and 15 on average fathers received 75% of the total income of Dunedin Study families. There was also a 0.20 correlation between the unlogged incomes of mothers and of fathers, indicating assortative coupling. In other words, the data suggests that high income men and high income women tended to be living together.

To better understand the effects of changes in different variables, we will look at two further examples. In 2008 values, the average family income in the Dunedin Study when the participants were 13 and 15 was about $70,000 while the highest reported family income was imputed at $161,000. Suppose a man from Dunedin had parents who were in the top income bracket when he was aged about 14. In model seven, assuming linearity, this would result in that man's income at age 32 (on average) being about $13,000 higher than if he had been brought up in an average income family. For a woman, the equivalent income difference would be $7,000, on average. This difference between men and women occurs because the model controls for the tendency for men to earn more than women.

In model eight we added variables for people's educational qualifications, while in model nine we added variables for the country they lived in. These changes increased the proportion of variance explained to 25%. The effects of educational qualifications on income are discussed in the next section of this paper. In model nine, the effect on a person's income of living overseas, and in particular the effect of living in Britain, are affected by the value we impute to the top income category. We are therefore reluctant to calculate the apparent economic benefits of living overseas. Previous research has also found that participants who had lived overseas had better physical and mental health than those who had remained in New Zealand (Milne, et al., 2001, p. 450). This suggests that some of the income effects our model has linked to country of residence may be caused by other variables. When we ran separate regressions for people in New Zealand, Australia, Britain and all other countries combined, the overlapping confidence intervals suggested there was no statistically significant difference between intergenerational income mobility rates for people in different countries. Median incomes and mean SES for people living in different countries are listed in Section 8.1.4.

Models six and seven contain our preferred estimates of the intergenerational income elasticity for all people from Dunedin. Earlier models give estimates for particular groups of individuals. For instance, models four and five are respectively the best estimates for all men and women. Although models eight and nine explain substantially more of the variation in incomes, adding controls for education reduces the size of the intergenerational income elasticity. This is because individuals from better-off families tend to have higher levels of educational attainment. The estimates of the intergenerational income elasticity in models eight and nine will therefore not capture the full parental income effect. Education will also have a direct effect on an individual's income, but disentangling these effects is difficult. Section 4.2 discusses this in more detail.

4.2 Mediation of parental income effects through education

Some of the effects of parents' incomes on the incomes of their children occur because children from better-off families tend to spend more time in the education system. In model eight of Table 1, we followed overseas studies by adding variables for people's educational qualifications (Blanden, et al., 2004, p. 139; Ng, 2007, p. 18). This resulted in a lower intergenerational income elasticity point estimate, with the results indicating that in our model on average about 47% of the effects of family background on income were mediated through educational qualifications, and about 53% occurred because of other influences. Whereas having School Certificate in one or more subjects did not result in a statistically significant increase in a person's income compared to having no qualifications, finishing secondary school, having a degree or having a higher degree all resulted in progressively larger increases in a person's income. For instance, the results imply that a man from an average income family with a higher degree would earn approximately $41,000 more per year at age 32 than a man from an average income family who had only finished secondary school. A woman from the same background with a higher degree would earn $22,000 more than a woman who had only completed secondary school.[21] Adding variables for other important factors that influence income might diminish the effect of parental income and of a person's educational qualifications and gender.

Model eight has the advantage of providing an estimate of the effect of each qualification on a person's income. Because of collinearity between variables,[22] however, we have also used other methods to calculate the extent to which educational achievement mediates parental income effects. Table 2 shows how we calculated the magnitude of this effect using a series of regression equations. Equation one shows the total effect of parents' incomes on the incomes of people from Dunedin. Equation two shows the effect of people's years of education on their incomes, while equation three shows the effect of parents' incomes on children's years of education. In the next (fourth) column, the effect of years of education on the incomes of people from Dunedin was multiplied by the effects of parents' incomes on children's years of education. The final column shows the level of income persistence not explained by the previous column. Our point estimates suggest that about half the intergenerational income effect may occur because children from better-off families tend to continue their education for longer than children from less well-off families, and that about half is attributable to other factors. This is similar to our result for model eight in Table 1. A similar effect for persistence through factors other than education occurred when calculating this effect directly.[23]

Comparable results for men in Britain and Italy suggest that about one-third of the intergenerational income elasticity in these countries is attributable to children from better-off families continuing their education for longer than other children (Blanden, et al., 2005, p. 11; Piraino, 2007, p. 16). Although those estimates were lower than our point estimate for people from Dunedin, because of our large standard errors and the imprecise methods

---

21 The parental income effect is the same for men as for women. As with model seven, model eight includes a control for the tendency for males to have higher incomes than females, which is why the parental income effect appears higher for males than for females.

22 There is a 0.24 correlation between parents' incomes and participants' years of education. The variance inflation factor, which shows how the variance of an estimate is inflated by the presence of multicollinearity, had a mean of 1.62 and no values above 2.33. This level of collinearity would not usually give cause for concern.

23 The residuals when using education and gender to explain participants' incomes were calculated. The covariance of these residuals with parents' incomes was then divided by the variance in parents' incomes. See Blanden and Machin (2008, pp. 102-103) and equations one and six in particular.

used we cannot say that the effects of educational qualifications on intergenerational income persistence are higher in New Zealand than in Britain or Italy.

We have to be cautious when trying to quantify the effects of education because years of education are an imperfect proxy for the quality of a person's education. Relying on this imperfect proxy may cause the effects of educational achievement to be underestimated.[24] However, adding additional control variables, such as physical and mental health, might diminish the apparent effects of education (Bowles and Gintis, 2002, p. 5).

Table 2 - Education and its effects on intergenerational income mobility

	Effect of parents' income on the income of children (equation one)	Effect of years of education on income (equation two)	Effect of parents' income on their children's years of education (equation three)	Income persistence through education (equation two education effect times equation three income effect)	Income persistence not through education (equation one income effect less effect in previous column)
Main explanatory variables					
Parents' income	.272 (.064)***	-	1.161 (.172)***		
Years of education	-	.116 (.013)***	-		
Equation results				.13 (.02)	.14 (.07)
Gender control (male)	.595 (.061)***	.651 (.059)***	-.50 (.16)***		
Adjusted R^2	13%	20%	6.8%		
Probability > F	0	0	0		
Number of cases	763	763	763		
Column entries are unstandardised linear regression coefficients. Values are for log income. Standard errors are in brackets. *=p<.10, **=p<.05, ***=p<.01.					

We also cannot tell if coming from a high income family in itself results in people spending longer in the education system. Further research might show that other variables, such as parental education levels and a supportive home environment, are more important (Piraino, 2007, p. 17). Researchers have suggested that parental income effects that are not mediated through educational qualifications probably result from family dynamics and parenting, the formation of preferences and aspirations, labour market connections, investment in other aspects of their children's lives, and genetic factors (Björklund, et al., 2007, p. 13; Roemer, 2004, p. 51).

4.3 Results excluding extreme outliers and after adding a quadratic

Our analysis so far has included all Dunedin Study participants for whom we have positive incomes for themselves and for their parents. However, overseas studies have sometimes excluded cases with extremely low incomes, often with the aim of testing the robustness of the results (Couch and Lillard, 1998, pp. 314, 328; Raaum, et al., 2007, pp. 15, 17; Solon, 1992, pp. 401-402). Our dataset also contains a small number of very low incomes for parents that analysis suggested could have a disproportionately large effect on the results. In three cases, currency conversions also resulted in participants' incomes being much lower than could be expected on the basis of other data.

[24] In addition, we only have data on five stages of educational achievement, rather than the exact number of years participants spent in the education system. However, rerunning the models using a variable for self-reported months of education between 15 and 21 had only a slight effect on the results.

Table 3 shows the results after excluding cases with extremely low parental incomes and participants' incomes that seem distorted by currency conversions. Excluding these cases tends to increase the intergenerational income elasticity point estimates, particularly for women.[25] For models two and five, the p value for the F statistic fell to 0.035 and 0.030 respectively, indicating that the explanatory variables now have a statistically significant effect on the incomes of women. If we probed further into people's circumstances we could probably justify excluding additional cases, such as those who were temporarily out of the workforce looking after children.

While our Table 1 results would seem to be more internationally comparable than the Table 3 results, comparing these two tables shows our intergenerational income elasticity results are sensitive to small changes in the data used. This point has also been made by overseas economists researching intergenerational income mobility (Couch and Lillard, 1998, p. 328; Minicozzi, 2003, p. 309).

We also experimented with adding a polynomial term to see if the relationship between parental income and the income of their children was non-linear. However, this term was not statistically significant, and we therefore cannot reject the null hypothesis that the relationship is linear. This topic is discussed further in Section 8.1.5.

[25] Two participants with fathers with incomes below $7,000 were excluded from the regressions for men, while three participants with fathers with similarly low incomes were excluded from the regressions for women. In three of these cases the participant's mother had an above average income. For models seven and eight, three participants whose parents' combined income was under $6,000 were excluded. In these models the lowest incomes for fathers are over $9,000 in 2008 values, and for both parents are over $13,000. For models four onwards, two men and one woman living overseas were excluded because of the effects of currency conversions.

Table 3 - Intergenerational income elasticity results using data on Dunedin Study participants with extremely low income cases excluded

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	Income of males in New Zealand	**Income of females in New Zealand**	**Income of those in New Zealand**	**Income of all males irrespective of country**	**Income of all females irrespective of country**	**Income of everyone, irrespective of country**	**Income of everyone, with parents' income as explanatory variable**	**Income of everyone with controls for education**	**Income of everyone with controls for education and country**
Constant	6.11 (1.63)***	7.38 (2.48)***	6.84 (.814)***	5.57 (1.47)***	6.66 (2.15)***	6.63 (.724)***	6.82 (.767)***	8.07 (.747)***	7.949 (.725)***
Income effects									
Father's income	.323 (.093)***	.272 (.125)***	.304 (.075)***	.312 (.082)***	.323 (.111)***	.337 (.067)***			
Parents' income							.311 (.069)***	.158 (.068)**	.166 (.066)
95% CI	.140, .506	.027, .518	.156, .452	.149, .474	.104, .542	.205, .469	.175, .446	.024, .292	.036, .286
Parental age control									
Father's age	.052 (.064)	-.010 (.104)	-	.088 (.059)	-.000 (.001)	-	-	-	-
Father's age squared	-.00057(.0007)	.00011 (.0012)	-	-.00098 (.0007)	.00008 (.0010)	-	-	-	-
Gender control									
Male	-	-	.634 (.067)***	-	-	.593 (.059)***	.604 (.059)***	.655 (.057)***	.623 (.056)
Educational qualifications (base=no school qualification									
School Certificate	-	-	-	-	-	-	-	.160 (.104)	.148 (.101)
Finished high school	-	-	-	-	-	-	-	.447 (.088)***	.378 (.086)***
Bachelor's degree	-	-	-	-	-	-	-	.660 (.100)***	.56 (.10)***
Higher degree	-	-	-	-	-	-	-	.989 (.139)***	.827 (.137)***
Country (base=NZ)									
Australia									.400 (.079)***
Britain									.709 (.121)***
Rest of world									.205 (.156)
Adjusted R^2	4.6%	0.6%	15%	4.6%	1.6%	14%	14%	22%	25%
Probability > F	.004	.035	0	.046	.030	0	0	0	0
Number of cases	287	288	587	389	368	772	758	757	757

Column entries are unstandardised linear regression coefficients. Values are for log income. Standard errors are in brackets. *=p<.10, **=p<.05, ***=p<.01. Those whose income is missing or declared zero income (eg homemakers) have been excluded. Income is an extremely sensitive topic and missing values, usually for the fathers of participants, have reduced the number of cases.

This section has investigated intergenerational income mobility using unique Dunedin Study data. Although our confidence intervals are narrower than for the only other study of intergenerational income mobility in New Zealand, they are still quite wide. Parents' incomes also explained only a very small proportion of the variance in the incomes of men and women who were born in Dunedin, confirming that other factors have a large effect on their incomes.

Our research has a number of limitations. For instance, we used two years of self-reported income data for parents and one year of data for their children to model people's long-term economic situations. Because people's incomes tend to vary from year to year, the data imperfectly measures the economic circumstances of some participants and their parents (Corak, 2006, p. 6). The results are also affected by measurement error, resulting from the use of income bands rather than exact amounts. In addition, at age 32 many of the participants in the Dunedin Study probably had not yet reached their peak earning years. People in jobs with high life-time earnings tend to reach their peak earning years later in life than people in jobs with low life-time earnings, and using data from early in people's careers may result in their economic situation being inaccurately measured (Haider and Solon, 2006, p. 1310). Data from the age 38 Dunedin Study assessments (which are taking place in 2010-11) and from other future assessments may therefore produce different results, particularly for women (Bohlmark and Lindquist, 2006).

5 New Zealand Election Study results

Although the Dunedin Study dataset is very comprehensive, includes income data for both participants and for their parents, and includes people now living outside New Zealand, the study is restricted to people born within a 12-month period in a single centre. Testing intergenerational occupational mobility using a national dataset that includes immigrants and people born in all regions of New Zealand provides another source from which to estimate intergenerational economic mobility. As discussed in Section 3.2, Election Study data on the SES of respondents and of their fathers was therefore used to measure intergenerational occupational mobility. The average income of people in different occupations in the 1996 census, together with data on their educational qualifications and the value of goods they consumed, determined the SES of occupations (Davis, et al., 2003, pp. 12-16).

Because the distribution of the SES data did not appear overly skewed, we were able to use it unlogged in our regression equations.[26] The results should therefore be interpreted differently than for the Dunedin Study. In the models using Election Study data the effect of father's SES is linear, and a person's SES reflects the coefficient for father's SES times the full value of their father's SES.[27] Because of the different model specifications and different units of measurement, readers should only cautiously compare the Election Study and Dunedin Study results. Our data suggests only a weak relationship between logged income and SES.

Table 3 shows that, in 1996, the estimated effect of the SES of fathers on the SES of their children was 0.18 (model one). This implies, on average, that growing up with a father who had an SES 10 units higher than another man's father, on the 10 to 90 SES scale, is associated with having an adult SES that is 1.8 units higher than the other man. For men

[26] Unlogged SES has also been used by another study of occupational mobility (Ermisch, et al., 2006) although sometimes SES has been logged by researchers (Ermisch and Nicoletti, 2005, p. 149). When we experimented with using logged SES this had very little effect on the results.

[27] In contrast, the regression equations for the Dunedin Study used logged income data and produced an intergenerational income elasticity. The elasticity showed the effect of small percentage changes in father's unlogged income on a person's adult income. For large percentage changes, however, income should be logged and then substituted into the Dunedin Study equations.

the coefficient for the effect of father's SES was 0.20 (model two) and for women was very similar at 0.17 (model three). Because of the large size of the dataset, the confidence intervals are smaller than for the Dunedin data.

Although these regressions use our full sample, many people experiment with different jobs when entering the workforce (Atkinson, 1980, p. 203), while students usually do not have a permanent job until after they graduate. Many young New Zealanders also travel after they finish their education, and this can further delay both entry into the workforce and seeking a permanent job (Conradson and Latham, 2005, pp. 166-167). We therefore followed an overseas study by also running separate regressions for all men and women who were 25 years or older (Ermisch, et al., 2006).[28]

The coefficient for everyone aged 25 years or older increased only modestly to 0.20 (model four). This implies that having a father who is a lawyer (SES of 83) rather than a labourer (SES of 20) is, on average, associated with a 12.6 unit difference in a person's adult SES. This is approximately the difference between being an insurance underwriter (SES of 48), and being a builder (SES of 36) or of being a nursing or midwifery professional (SES of 45) and being a secretary or keyboard operator (SES of 33) (Galbraith, Jenkin, Davis and Coope, 2003, pp. 26-28). However, model four explains only 5% of the variance in people's SES. This indicates that other variables, which have not been included in the model, had a larger effect than father's SES on a person's own SES. As Table 5 indicates, many people from low SES backgrounds also later become adults with a high SES, and vice versa.

For men aged 25 years or older the estimated effect of father's SES was 0.23 (model five), and for women was 0.18 (model six). The confidence intervals for men and women still overlapped, indicating that the relatively small differences between the intergenerational occupational mobility estimates for men and women were not statistically significant. Restricting the analysis to those aged over 30 left the point estimates unchanged, while further restricting the analysis to those aged over 35 slightly diminished the point estimates (results not shown).

Although the average incomes of people in different occupations at the 2006 census largely determined the SES scores, the average educational qualifications of people in each occupation were also used in the calculation of the SES scores. As a result, we have not used people's years of education to explain their SES.

Using the 1993 New Zealand Election Study dataset generated almost exactly the same intergenerational mobility point estimates, despite differences in the occupational coding schemes used. These results are also similar to a recent unpublished estimate of occupational intergenerational mobility for New Zealand men (using 1995 data and a small sample) by Ganzeboom and Treiman (Blanden, 2008, p. 32; Ganzeboom and Treiman, 2007, p. 45).

The intergenerational occupational mobility point estimates for men and women (25 years or older) using Election Study data are about 80% of the size of the intergenerational income mobility point estimates for men and women using Dunedin Study data. A study of intergenerational mobility in Britain has also found that intergenerational occupational mobility seems to be higher than intergenerational income mobility (Ermisch and Francesconi, 2004, p. 182).[29]

[28] We decided to use those 25 or over after John Ermisch confirmed that this was the age range used in his 2006 publication. Another study restricts most analysis to those aged 31 or over (Ermisch and Nicoletti, 2005, pp. 9, 19).

[29] As noted on the previous page, the estimates using these two datasets should only be cautiously compared.

Table 4 - Intergenerational occupational mobility results using New Zealand Election Study survey data

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	SES of all those on the electoral roll	**SES of men on the electoral roll**	**SES of women on the electoral roll**	**SES of all those 25 years or older**	**SES of men 25 years or older**	**SES of women 25 years or older**
Constant	17.91 (2.50)***	10.81 (3.45)***	21.75 (3.59)***	27.74 (3.50)***	20.60 (4.87)***	30.16 (4.96)***
Father's SES	.18 (.02)***	.20 (.03)***	.17 (.03)***	.20 (.02)***	.23 (.03)***	.18 (.03)***
95% CI	.15, .21	.15, .25	.12, .21	.16, .24	.17, .29	.12, .23
Gender						
Male	3.29 (.58)***	-	-	3.91 (.62)***	-	-
Age						
Person's age	.73 (.10)***	.93 (.15)***	.52 (.16)***	.33 (.15)**	.51 (.19)**	.17 (.20)
Age squared	-.007 (.001)***	-.008(.002)***	-.006 (.002)***	-.003 (.001)***	-.005 (.002)**	-.003 (.002)
Adjusted R^2	5.0%	6.3%	3.5%	5.0%	4.8%	3.8%
Probability > F	0	0	0	0	0	0
Number of cases	3268	1606	1661	2939	1431	1508
Column entries are unstandardised linear regression coefficients. We have not used the log of SES in the regressions. Standard errors are in brackets. *=p<.10, **=p<.05, ***=p<.01						

5.1 Inter-group movement

Although the estimate for the effect of father's SES is a valuable summary statistic, we lose considerable detail about how mobility varies between occupational groups (Blanden, et al., 2004, p. 140). We will now therefore examine intergenerational movement between four broad occupational groups.[30] The estimates in Table 5 indicate that people from lower New Zealand Socio-Economic Index (NZSEI) occupational groups tended, on average, to be more intergenerationally mobile than people from higher income occupational groups. The diagonal (in bold) shows estimates of the proportion of those on the electoral roll (aged 25 years or older) who were in the same NZSEI occupational group as their father. The results imply a relatively high degree of intergenerational mobility for those whose fathers were in the lowest two NZSEI occupational groups: only 31.7% and 27.5% respectively of people from these groups were in the same occupational group as their father. In contrast, the percentages that were in the same occupational group as their father were 35.6% and 41.6% for the second-highest and highest groups respectively. Those born into families in the top two quartiles seem less likely to be downwardly mobile than those in the bottom two quartiles seem likely to be upwardly mobile. A Chi-test confirms differences in patterns of inter-quartile movement between those who grew up in families in the top two quartiles and those who grew up in families in the bottom two quartiles.

These estimates are similar to those found using 1993 Election Study data, and suggest that the relationship between the occupation of people and that of their father is not perfectly linear. We also tested whether the relationship between father's SES and the SES of their children was a polynomial. For men, the term for the square of father's SES was not statistically significant even at a 10% level. For women, the square was statistically significant, but negative. There is therefore some evidence that the relationship between father's SES and the SES of their daughters is not consistent across the distribution of SES. However, adding a locally weighted regression line to a scatter plot of the SES data (see Section 8.2.4) indicated that this is a relatively small deviation. Similarly, although the point estimates for quartile regressions differed, the confidence intervals for these estimates overlapped.

The average SES for fathers in Table 5 was 39.9 and the average SES for their children was 40.8. This suggests only slight upward occupational mobility by New Zealand's entire population over time. As the results have already indicated, there is a statistically significant gender difference between the SES of children, with males 25 years or over having an average SES of 42.7 and females in this age group having an average SES of 39. The biggest difference between the occupations of fathers and of their children is that considerably fewer children work in agriculture and farming. In total, 19.3% of the fathers of people aged 25 or older worked in agriculture and farming. In contrast, 7.9% of their children aged 25 years or older (10% of males and 5.9% of females) worked in agriculture and farming. Although in the NZSEI framework different types of farmers have different scores, most farmers receive the lowest SES score in the second highest occupational group (Galbraith, et al., 2003).

[30] Similar analysis using the Dunedin Study data is not feasible because the categories used to collect data on income mean that participants and their parents cannot be divided into a small number of approximately even-sized groups.

Table 5 - Occupational transition matrices for people (25 years or older)

Occupational group of fathers	Occupational group of their sons and daughters			
	Lowest	2nd lowest	2nd highest	Highest
Lowest	**31.7**	22.6	23.0	22.8
2nd lowest	18.7	**27.5**	26.0	27.8
2nd highest	17.4	20.3	**35.6**	26.7
Highest	13.5	18.2	26.8	**41.6**

Source: Author's calculations based on 1996 NZES and quartile boundaries used in the New Zealand Socio-Economic Index Users' Guide. Because the distribution of SES implied by the Election Study data differs from the distribution used to construct the quartiles, there are more sons, daughters and fathers in some of these groups than in other groups.

5.2 Intergenerational mobility with variables for being Māori, for ethnicity and for region

We can tentatively measure intergenerational occupational mobility for Māori using 1996 Election Study data because the Election Study had a large sample size and collected data on a similar proportion of Māori to the proportion of Māori in New Zealand's population. Nevertheless, there are still only 371 cases where people identified as Māori and for whom we have data on their age, their occupation and their father's occupation. This makes accurately calculating intergenerational mobility for Māori difficult.

To measure intergenerational occupational mobility for Māori we reran the regressions with a binary variable for Māori ethnicity and an interactive term for Māori ethnicity by father's SES. The binary variable measures the difference in SES between all people and Māori. The interactive term measures whether father's SES has a statistically significant additional effect on the SES of Māori. We also included a binary variable for those who had not identified as New Zealand European, Pākehā or Māori, and an interactive variable for this group by father's SES. To maximise the sample size and lower the sampling error, we included all people aged over 18 in our regressions, although including only those aged 25 or over produced similar results. Because of the small number surveyed, we were unable to calculate intergenerational mobility for ethnic groups such as Pacific peoples.

Our results (Table 6, model one) indicated that Māori, on average, had lower SES than New Zealand's population as a whole, and that this effect was statistically significant at a 5% level. The model's estimate suggests that Māori tended to have SES scores that were 6.86 points lower on the 10 to 90 scale than for New Zealand's population as a whole (95% confidence interval: 1.62 to 12.10). However, the interactive term for Māori ethnicity by father's SES was not statistically significant, even at a 10% level. This suggests that there is insufficient evidence that father's SES had a different effect on Māori intergenerational mobility than for New Zealand's entire population.[31] The binary and interactive variables for having an ethnic identity that was not Māori or Pākehā/New Zealand European were not significant in any of the models.

In model one, the variables for Māori include those who identified just as Māori and those who identified themselves as being Māori and as belonging to one other ethnic group as well. The results were very similar when these variables included only those who identified just as Māori (results not shown).

[31] The results were sensitive to changes in the age range, with the interactive effect becoming significant at a 10% level (and almost at a 5% level) when we arbitrarily restricted the analysis to those 20 years and older. Increasing the age range to those over 24 eliminated this effect. However, there would not seem to be a sound theoretical rationale for restricting the age range in this way.

Language is a key component of Māori and of ethnic identity. We therefore tried dropping the Māori ethnicity and other ethnicity variables and replacing them with variables for speaking Māori or another language at home (model two). However, neither the binary variable for Māori language skills nor the interactive variable for speaking Māori at home by father's SES was significant. The binary variable for speaking a language other than English or Māori at home was positive, but was also not statistically significant. In addition, the interactive variable for speaking a language other than Māori or English by father's SES was not significant. Within our sample, speaking a language other than English at home does not seem to have had a statistically significant effect on people's SES or their intergenerational occupational mobility. However, the 1996 NZES questionnaire was only available in English. This may have discouraged responses by some Māori and by other potential respondents.

Our third model returned to using ethnicity controls and added controls for people's geographic location. Adding geographic location only slightly diminished the effects of Māori ethnicity on a person's SES. However, the results showed that people living in provincial cities, provincial towns and rural areas on average had lower SES than those living in New Zealand's three main urban centres.

We also followed an overseas study by experimenting with other ways of quantifying intergenerational mobility for different groups (Hertz, 2005, pp. 167-168, 175-178). Running separate regressions for the Māori and non-Māori population or for Māori and for New Zealand European/Pākehā (results not shown) produced a similar pattern of results.

Table 6 - Intergenerational occupational mobility results using New Zealand Election Study survey data and including ethnicity, language and region

	Model 1	Model 2	Model 3
	SES of all those on the electoral roll	**SES of all those on the electoral roll**	**SES of all those on the electoral roll**
Constant	19.42 (2.53)***	17.87 (2.51)***	20.62 (2.56)***
Father's SES	.16 (.018)***	.18 (.018)***	.15 (.018)***
95% confidence interval	.12, .20	.15, .22	.11, .18
Age			
Respondent's age	.73 (.10)***	.73 (.10)***	.79 (.10)***
Respondent's age squared	-.0071 (.001)***	-.007 (.001)***	-.0076 (.001)***
Gender			
Male	3.26 (.58)***	3.32 (.58)***	3.29 (.59)***
Ethnicity other than NZ European/Pākehā			
Māori ethnicity	-6.86 (2.67)**		-5.87 (2.68)**
Māori ethnicity by father's SES	.11 (.07)		.10 (.07)
Other ethnicity	-4.85 (3.34)		-5.07 (3.37)
Other ethnicity by father's SES	.087 (.08)		.057 (.08)
Speak language other than English at home			
Māori spoken at home	-	-4.06 (3.62)	-
Māori language by father's SES	-	.11 (.10)	-
Language other than English or Māori at home	-	3.67 (3.67)	-
Other language by father's SES	-	-.13 (.08)	-
Location (base=3 main centres)			
Provincial city			-3.29 (.59)***
Provincial town			-5.27 (.80)***
Rural			-4.06 (.94)***
Overseas			8.52 (6.10)
Adjusted R^2	5.3%	5.0%	6.75%
Probability > F	0	0	0
Number of cases	3256	3268	3203
Column entries are unstandardised linear regression coefficients. We have not used the log of SES in the regressions. Standard errors are in brackets. *=p<.10, **=p<.05, ***=p<.01.			

The lower SES for Māori than for New Zealand European/Pākehā is likely to reflect historical factors. Until the 1940s New Zealand Māori largely lived in rural areas, with the largest numbers in the north and north-east of the North Island. Between the early 1940s and late 1960s Māori rapidly become urbanised (Pool, 1991, p. 105). Since the 1940s, median outcomes for Māori in areas such as educational achievement, health status, income levels and family size have become more similar to median outcomes for non-Māori New Zealanders. In the 1990s, there was "considerable overlap" in outcomes for Māori and non-Māori (Gould, 2008, p. 260; Treasury, 2001, pp. 6-8). However, the median position of Māori often continued to differ from the median for non-Māori in areas such as occupation, educational qualifications, geographic location, age structure, family size, the age at which women had children, the language they spoke at home and health status (Pool, 1991, pp. 136, 167, 181, 183, 201). These differences help explain why the data suggests that in 1996 Māori continued to have a lower average SES than New Zealand European/Pākehā.

The data precedes the massive expansion of the non-degree part of the tertiary sector from the late 1990s, and the associated development of tertiary education providers that have concentrated on the needs of Māori (Ministry of Education, 2007, section 12). For instance, between 1996 and 2004 the number of effective full-time Māori tertiary students more than doubled, with Māori participation rates becoming higher than for New Zealand's total population (Ministry of Education, 2005). This may have changed the position of Māori and the rate of intergenerational mobility by Māori. However, increases in higher education expenditure in other countries have not always increased intergenerational mobility (Blanden, et al., 2005, p. 14; Blanden and Machin, 2004, p. 230). Generational replacement is also continually changing the characteristics and experiences of the Māori population. More recent data might therefore produce different results.

Important limitations to our research include that we are dependent on a single measure of people's SES, when many people change jobs over time, and that we are also reliant on respondents' recall of their father's occupation (Björklund and Jäntti, 2000, p. 23; Ermisch, et al., 2006, p. 665).[32] In addition, the SES of occupations can change over time, while some SES categories, such as farming, contain people with a wide variety of economic circumstances (Davis, et al., 2003, p. 86; Galbraith, et al., 2003, p. 23). As noted in Section 3.2, our sample also imperfectly mirrors some characteristics of New Zealand's population. Furthermore, the data we are using is now over 14 years old and we might not necessarily get the same results using more up-to-date data.

6 Comparing our results with those for other countries

Now that we have tentatively estimated rates of income mobility for people from Dunedin and occupational mobility in New Zealand, we can very cautiously compare our results to results from the most similar overseas studies. Considerable caution is necessary when making comparisons because of sampling and methodological differences between studies (Causa and Johansson, 2009, p. 12). Comparisons by other researchers have sometimes been criticised on the basis that differences may reflect methodological differences rather than real differences in intergenerational economic mobility (Gorard, 2008, pp. 320, 322).

6.1 Comparing the Dunedin Study income results with similar overseas studies

Table 7 compares our intergenerational income elasticity results for New Zealand men and women from Dunedin to those of the most similar overseas studies. For all these results the models used included just the incomes or earnings of fathers or parents, the adult earnings or incomes of their children, and a varying range of age controls (Blanden and Machin, 2008, p. 106; Corak and Heisz, 1999, p. 510; Ermisch, et al., 2006, p. 673; Jäntti, et al., 2006, p. 5; Solon, 1992, p. 399).[33] To maximise comparability with the Dunedin data, we tried to find studies that measured children's incomes once in their early thirties, and fathers' incomes twice when their children were in their teens.[34]

[32] Occupational mobility by people across time is a poorly researched area in New Zealand. The Election Study includes a panel of respondents with some respondents filling out questionnaires for several successive elections. Movement by individuals between occupations could be estimated using this data. Section 3.1 noted research on occupational mobility using Dunedin Study data.

[33] We also contacted Markus Jäntti, John Ermisch and Andrew Leigh for further information about their research.

[34] There are two sets of results for men in Canada and in the United States because the most comparable studies of intergenerational income mobility for men in these two countries did not include women.

We identified reasonably similar studies to the Dunedin Study for men and women in Britain, and for men in Canada and in the United States. However, the studies for most countries measured children's incomes during their late thirties, and have more income measurements, either for fathers or for their children, than the Dunedin Study. This may result in estimates for these countries being higher than if incomes were measured at the same ages and the same number of times as in the Dunedin Study (Jäntti, et al., 2006, p. 20; Solon, 1999, p. 1785, 2002, pp. 61-63). For instance, the high estimates for men in Germany in Table 7 probably partly reflect the much higher number of measures of father's income than for the other countries.

However, our data may include people from a wider range of income groups than overseas studies. Most of the studies in Table 7 exclude people whose father was not working, and this may reduce the magnitude of estimates in these countries (Fortin and Lefebvre, 1998, p. 17; Gorard, 2008, p. 320; Jäntti, et al., 2006, pp. 28-30). When the participants were aged 13, the Dunedin Study asked parents not to report benefit income. But when the participants were aged 15 their parents were asked to report income from all sources, including benefit income. When participants were aged 32 they were prompted about different sources of income and then asked to report the total income they had received (Poulton, [2003], pp. Fin1-2). In addition, some of the studies in Table 7 are just for labour market earnings. Studies of the United States and Canada have found that using total income tends to slightly inflate estimates compared to using just labour market earnings (Corak and Heisz, 1999, p. 512; Mazumder, 2005, p. 250; Peters, 1992, p. 466).

Differences in sample selection methods, definitions of income or earnings, the time-period covered, the number of income measurements and the ages at which incomes were measured all reduce the comparability of the Table 7 estimates and make international comparisons tricky (Jäntti, et al., 2006, p. 5; Solon, 2002, pp. 61-63). Because of the methodological differences between studies, we have not summarised the results in a graph. A more detailed version of Table 7 appears in the Appendix as Table A11.

Our preferred point estimate of the intergenerational income elasticity for New Zealand men from Dunedin (the result in Table 1, model four) is 0.29. Our preferred point estimate for New Zealand women from Dunedin is 0.215 (Table 1, model five). The latter result suggests that, on average, a 1% relative difference in the income of a woman's father is associated with about a 0.22% relative difference in that woman's own adult income. However, the wide confidence intervals indicate that our parameter estimates might change if we had additional cases, or took a different draw from the population of people born in Dunedin. Table 7 shows that the confidence intervals for the New Zealand results for people from Dunedin are much wider than for many countries. This reflects our relatively small sample size. For several of the countries included in Table 7 data is available for the entire birth cohort for one or more years, provided people had positive earnings as an adult and were still living in their home country. For instance, for Denmark the sample contains all people born between 1958 and 1960 and includes over 150,000 people. However, our sample size and confidence intervals are similar in size to Solon's for men in the United States, and those for a study of men from York in England and of men living in Sarpsborg in Norway (Atkinson, 1980; Solon, 1992, p. 401; Soltow, 1965, pp. 107-110).[35] The confidence intervals for people from Dunedin are also large because there is a weak relationship (compared to other variables not controlled for) between parental income and a person's own income.

[35] The sample size is also similar to that for a study of men from Stockholm in Sweden, but data on standard errors for that study is not available (Gustafsson, 1994, pp. 82-84).

The results in Table 7 show that the 95% confidence intervals for the preferred intergenerational income mobility estimates using Dunedin Study data overlap with those for people living in most developed countries.[36] At a 5% level, only men in Denmark are more mobile than men from Dunedin. Men from Dunedin are more mobile than United States men at a 5% level using the alternative United States results shown in the last row of Table 7. However, the alternative United States results measure the incomes of men twice and at an older age than the Dunedin Study results.[37] This would increase the size of the elasticity and the level of the lower and upper confidence intervals (Corak, 2006, p. 10). Solon's results for the United States are a more valid comparison, and his confidence intervals for the United States overlap with those from the Dunedin Study.

[36] In a random sample or repeatable experiment the true population parameter value has a 95% likelihood of being contained within a 95% confidence interval. The confidence interval gives an estimated range expected to contain the true population parameter value in repeated random sampling or repeatable draws, of the same size, from a population. Table 7 shows that the intergenerational income elasticity point estimates for men and women born in Dunedin in 1972-73 are lower than the respective point estimates for British Cohort Study men and women who were born in Britain during a particular week in April 1970. Our confidence intervals suggest, however, that if we had equivalent income data for people born in Dunedin during other years in the early 1970s, our point estimates for intergenerational mobility would vary within a large range. This is because the results indicate that a sample drawn from a different year might yield different results simply because of random variation between people born in Dunedin during different years in the early 1970s. Similarly, the confidence intervals for Britain suggest that if we had equivalent income data for people born in Britain during other weeks during the early 1970s, the point estimates for Britain would also considerably vary. In other words, the results indicate that if the sample sizes were larger the point estimates for people from Dunedin and from Britain might change. Because the 90% and 95% confidence intervals for men and for women in these two countries overlap, we are therefore unable to conclude that intergenerational income mobility for men and women born in Dunedin during the early 1970s was higher than for men and women born in Britain during the early 1970s.

[37] This difference also holds at a 10% level when we replace father's income with parents' income as the explanatory variable (and retain variables for the age and age squared of parents) to ensure comparability with the United States results.

Table 7 - Rates of intergenerational income mobility for people from Dunedin compared to those in the most similar studies of developed countries

Country	Source	Sample	Age(s) and years when income or earnings measured	Income or earnings measure for fathers or parents	β and 95% confidence intervals for men	β and 95% confidence intervals for women
Australia	(Leigh, 2007, pp. 7, 14-15)	Survey data	25-54 (1965-2004)	Predicted from detailed occupational data	.22 (.13, .31) (not scaled)	Not available
Britain	(Blanden, 2008, p. 106)	British Cohort Study	34 (2004)	Parental income 1986	.33 (.27, .39)	.43 (.33, .53)
Canada-men only	(Corak and Heisz, 1999, pp. 509, 512)	Statistics Canada	29-32 (1995)	Fathers' income averaged over two years between 1978 and 1982	.155 (.149, .161) to .172 (.166, .178)	Not available
Alternate Canada results	(Corak, 2001, p. 17)	Statistics Canada	32-35 (1998)	Fathers' earnings averaged over five years between 1978 and 1982	.262 (.254, .270)	.227 (.219, .235)
Denmark	(Jäntti, et al., 2006, p. 7) Table 2	Tax returns	38-40 (1998) and 40-42 (2000)	Fathers' incomes in 1980	.071 (.064, .079)	.034 (.027, .041)
Finland	(Jäntti, et al., 2006, p. 13) Table 5	Census and tax records	33-35 (1993) and 40-42 (2000)	Fathers' earnings, 1970 and 1975	.213 (.172, .253)	.099 (.061, .137)
Germany	(Ermisch, et al., 2006, pp. 666-668, 673)	German Socio-Economic Panel	32.8 (sons) and 29.5 (daughters); 1990s on	Ten-year averages fathers' earnings over the 1984-1993 period	.396 (.24, .552)	.152 (.044, .26)
New Zealand	**This study**	**Dunedin Study**	**31-32 (2003-2005)**	**Fathers' incomes 1985-1986 and 1987-1988**	**.290 (.127, .454)**	**.215 (.027, .403)**
Norway	(Jäntti, et al., 2006, p. 20) Table 5	Tax returns	34 (1992) and 41 (1999)	Fathers' earnings 1974 and other years	.150 (.132, .168)	.121 (.099, .143)
Sweden	(Jäntti, et al., 2006, p. 7) Table 5	Tax returns	34 (1996) and 37 (1999)	Fathers' incomes, 1970 and 1975	.267 (.241, .293)	.204 (.179, .229)
United States men	(Solon, 1992, p. 401)	Panel Study Income Dynamics	25-33 (1984)	Fathers' earnings 1967-1971 (two years average)	.290 (.126, .454) to .425 (.245, .605)	Not available.
Alternate US results	(Jäntti, et al., 2006, p. 20) Table 5	National Survey of Youth	31-38 (1995) and 37-44 (2001)	Family earnings in 1978 and 1979	.531 (.456, .606)	.307 (.200, .415)

All these results were generated using Ordinary Least Squares regression. Studies using two-stage least squares methods (France, Italy, Japan, Spain and Switzerland) were excluded because this method tends to yield different results from only using one or two measurements of actual income. The results for Australia should be treated with caution because incomes for fathers were predicted on the basis of finely grained occupational data.

Comparing the results for different countries using 90% confidence intervals (not shown here) does not result in any additional differences emerging between rates of intergenerational mobility for men from Dunedin and men in other countries. Even using 90% confidence intervals, differences between rates of intergenerational income mobility for New Zealand women from Dunedin and women in other countries were not statistically significant. Our results suggest that rates of intergenerational income mobility for New Zealand men and women are probably within a similar range to rates of intergenerational income mobility in most other developed countries.

Other researchers comparing rates of intergenerational income mobility between countries have often initially reported similarly inconclusive findings (Björklund and Jäntti, 1997, pp. 1016-1017; Solon, 1999, p. 1787). Greater certainty about the relative position of countries has usually resulted from parallel analysis, which involves applying the same methods and methodological assumptions to datasets from different countries, and by increasing the number of cases included in regressions (Grawe, 2004, pp. 65-66, 70; Jäntti, et al., 2006, p. 1).

Future researchers could slightly increase the number of cases by imputing missing income data for parents of Dunedin Study participants from information on parents' occupation, education, age and employment status. This would reduce comparability with the results shown in Table 7, although some comparisons with results for other countries would be possible. Deriving the income of each parent in the top income group from other data, such as their occupation and education, could potentially produce a richer picture of the economic circumstances of some families. Imputing income from benefits when the participants were 13 could also improve the dataset. It would also be desirable to test the relationship between the income data and other measures of wellbeing, such as SES and self-assessed standard of living. The comprehensiveness of the Dunedin dataset would also make it possible to test how variables such as physical and mental health and childhood intelligence influence adult income.

The results from the Dunedin Study data could potentially be cross-validated using income data from the Christchurch Study of 1,265 children born in mid-1977. This cohort was last assessed at age 30. Although the Christchurch data would provide results for people who had grown up in a different geographic region, the results would be from a similar point in time and for a slightly younger age group. In the future, it might be possible to develop large national datasets containing the incomes of New Zealanders from government statistical records. This might make it possible to calculate intergenerational income mobility estimates with smaller standard errors, and to calculate estimates for people born in different time-periods. Despite potential privacy and data protection concerns (Lane and Maloney, 2002; Sinnott, 2000; Wilson, 2002), longitudinal analysis of detailed individual-level New Zealand benefit and employment data collected by the government has occurred (Dixon and Crichton, 2007; Wilson and Soughtton, 2009). However, researchers using administrative data to study intergenerational mobility would need to match individual-level historical data on parents with subsequent data on their grown-up children. This could be difficult (Corak and Heisz, 1999, p. 509). A new longitudinal study was launched in New Zealand in 2008-09, and if participants are tracked into their thirties and forties this study could also eventually be used to study intergenerational income mobility (Growing up in New Zealand, 2010).

6.2 Comparing the Election Study occupation results with similar overseas studies

Table 8 compares intergenerational occupational mobility in New Zealand using Election Study data to the results for a similar study of Britain and Germany (Ermisch, et al., 2006, pp. 666-669). Figure 3 summarises the results in a graph, with the solid bars showing the effect of a one unit change in father's SES.[38] The thin black lines show the 90% confidence intervals.[39] Additional information on the data for each country is available in Table A12 in the Appendix.

Figure 3 suggests that men and women in New Zealand aged 25 years or over had slightly higher intergenerational occupational mobility than people 25 years or older in Britain. The evidence is weak, however, as this difference was barely significant at a 10% level. Men in New Zealand also had higher occupational mobility than men 25 years or older in Germany. This difference was statistically significant at a 5% level, which provides reasonably strong evidence of a difference in occupational mobility. Although our point estimate for New Zealand women is lower than the point estimate for German women, the 90% confidence intervals overlapped indicating the difference is insignificant even at a 10% level.

In Britain and Germany, however, the standard deviations for respondents' ages suggest respondents were born within a narrower time-period than in New Zealand (Ermisch, et al., 2006, p. 668). There may be other methodological differences we are unaware of. We should therefore be cautious when comparing the results for New Zealand in Figure 3 with those for Britain and Germany.

Our point estimate for New Zealand men is very similar to an unpublished intergenerational occupational mobility point estimate for New Zealand men in an overseas study (Blanden, 2008, p. 34). That study suggested that New Zealand had high intergenerational occupational mobility compared to other countries, with New Zealand placed third out of 32 countries. Confidence intervals were not included, so we cannot ascertain whether differences were statistically significant (Blanden, 2008, p. 34). There is therefore still considerable uncertainty about how New Zealand compares to other countries in terms of intergenerational occupational mobility.

[38] Since we have used SES directly in the regression, rather than the log of values as in the income section, we can discuss the effects in this way.

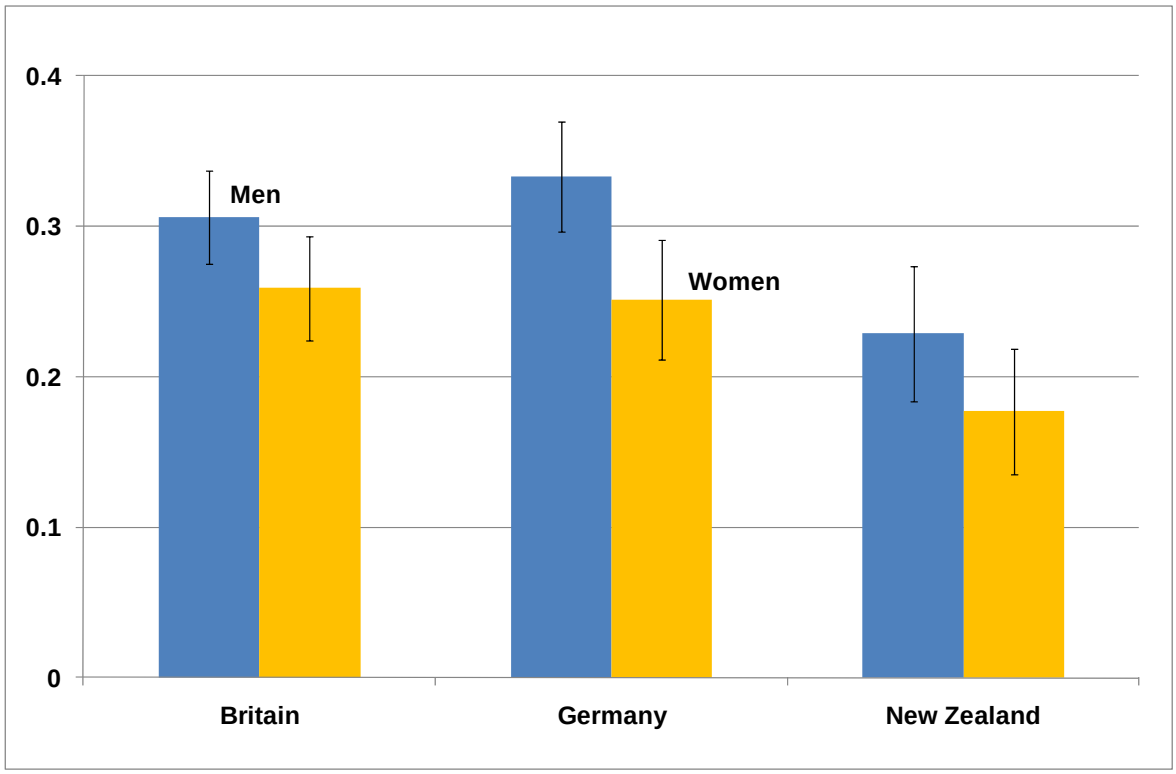
[39] If a sufficient number of random samples were drawn from the electoral roll and the same model was specified in each of them, 90% of the 90% confidence intervals for a parameter would be expected to contain the true population parameter value.

Table 8 - Rates of intergenerational occupational mobility for people in New Zealand compared to those in Britain and in Germany

Country	Source	Sample	Age(s) at which occupation of children was measured	How occupation of fathers was measured	β and 95% confidence intervals for men 25 and over	β and 95% confidence intervals for women 25 and over
Britain	(Ermisch, et al., 2006, pp. 663-665)	Household Panel Survey	Average 40.3 for men and 38.9 for women	Recollection of father's occupation when respondent 14	.306 (.268, .344)	.259 (.217, .301)
Germany	(Ermisch, et al., 2006, pp. 663-665, 668, 673)	Socio-Economic Panel	Average 39.8 for men and 37.9 for women	Recollection of father's occupation when respondent 15	.333 (.289, .377)	.251 (.203, .299)
New Zealand	**This study**	**New Zealand Election Study**	**Average 47.6 for men and 46.7 for women**	**Recollection of father's occupation when respondent 14**	**.229 (.175, .282)**	**.177 (.127, .227)**

A low coefficient indicates that father's SES has a low effect on the SES of their adult children, and indicates high intergenerational occupational mobility. Whereas this table lists 95% confidence intervals, Figure 3 shows 90% confidence intervals.

Figure 3 - Intergenerational occupational mobility estimates for those 25 years and over in Britain, Germany and New Zealand (with 90% confidence intervals)



A low coefficient indicates that father's SES has a low effect on the SES of their adult children, and indicates high intergenerational occupational mobility. The parameter estimates for men are in blue, and for women are in orange. The thin black lines show the 90% confidence intervals. As 90% confidence intervals are narrower in range than 95% confidence intervals they are less likely to include the true population parameter.

7 Conclusion

This paper has researched intergenerational economic mobility in New Zealand using income data from the Dunedin Multidisciplinary Health and Development Study and occupation data from the New Zealand Election Study. We have used this data to calculate the relationship between parents' economic situation and the subsequent economic situation of their grownup children. This has been the most detailed research since the 1980s into intergenerational economic mobility by New Zealanders. Nevertheless, our research has been exploratory and our findings are very tentative.

Using data from the Dunedin Study, our preferred model for men and women produced an estimate of the intergenerational income elasticity of 0.26 (95% confidence interval: 0.14 to 0.39). This implies that, on average, having a father who earned 1% more than another person is associated with the person with the higher income father earning 0.26% more at age 32, all else being equal. Using combined parents' income, rather than father's income, as the main explanatory variable had very little effect on the results. Our estimates for men are very similar to a recent estimate for New Zealand men in a comparative study, which used national survey data on respondents' recall of their fathers' occupations to impute income (Andrews and Leigh, 2008, p. 13). Our results indicated that, on average, the childhood income of people's parents explains a modest proportion of the variance in their adult income compared to other possible explanatory variables.

The results suggested that some of the effect of parents' income on the income of their children occurs because children from better-off families tend to spend longer in the education system. Our estimate using Dunedin Study data was that just under half of intergenerational income persistence was attributable to the length of time spent in the education system. This is a very approximate proportion, however, and adding additional variables could alter this estimate (Bowles and Gintis, 2002, p. 22).

We have to be cautious because many of the Dunedin Study participants are unlikely to have reached their peak earning years at age 32 (Coleman, 2006, pp. 14-15, 29-30; Corak, 2006, pp. 10-11). Indeed, the data indicates that some participants were not participating in paid work or had reduced their participation because they were having or looking after children. In addition, if we had additional years of income data we would have a clearer picture of people's long-term economic circumstances. This would probably alter the results (Jäntti, et al., 2006, p. 20). We were unable to reach firm conclusions about the rate of intergenerational income mobility for people from Dunedin compared to those who were born in most other developed countries. However, our results suggested that rates of intergenerational income mobility for New Zealand men and women are probably within a similar range to rates in most other developed countries.

We also used occupation data from the nationwide 1996 Election Study to see what effect the SES of a person's father had on their own SES when they were grown up. When the Election Study analysis was restricted to people aged 25 or over the intergenerational occupational effect for New Zealanders on the electoral roll was 0.20 in 1996 (95% confidence interval: 0.16 to 0.24). This implies that, on average, each one unit relative difference in the SES of a person's father is associated with a 0.20 unit relative difference in their own adult SES. As with the income data, a family's economic circumstances when a person is growing up had only a modest effect on that person's subsequent economic outcomes. People who identified as Māori had lower SES on average than New Zealand's population as a whole. However, intergenerational occupational mobility for Māori was not statistically significantly different from the level for all New Zealanders.

When we compared our intergenerational occupational mobility results to those from a similar overseas study, there was weak evidence that New Zealanders were more mobile

than people in Britain, and stronger evidence that New Zealand men were more mobile than German men. Important limitations to our intergenerational occupational mobility results include that they are based on a single measure in time of people's economic circumstances, rely on people being able to accurately recall their father's occupation and that the data is now over 14 years old. Insufficient data is available to reach conclusions about intergenerational occupational mobility in New Zealand compared to other countries, although the occupational mobility results give no reason for concern.

It should be emphasised that our findings are very preliminary. When Dunedin Study participants are in their late thirties and forties they are more likely to be in their peak earning years. Using data from the 2010-11 assessments should result in more accurate, but still imperfect, estimates of intergenerational income mobility (Haider and Solon, 2006, p. 1317). The results could potentially be cross-validated using data from the Christchurch Study of children born in 1977 and even possibly using government statistical records for a national sample. In 2008 the New Zealand Election Study asked about the occupations of respondents' parents for the first time since 1996 and the data could be used to update our research into intergenerational occupational mobility.

8 Appendix

The Appendix contains material on the methodology and data covered only in passing or omitted entirely from the main text. Additional analysis and tables showing the full results from the regression analysis are also included. The unique information in Section 8.1.4 on the incomes and educational qualifications of Dunedin Study participants who were living in different countries at age 32 is of particular significance. Many of the other sections are more technical and are less likely to be of interest to most readers.

Section 8.1 discusses the Dunedin Multidisciplinary Health and Development Study dataset. The opening paragraphs discuss the rationale for using the Dunedin Study to investigate intergenerational income mobility. Section 8.1.1 discusses the extent to which Dunedin is representative of New Zealand, while Section 8.1.2 is a theoretical section about what inferences we can make from population study data. Section 8.1.3 outlines the collection of data on the incomes of participants' parents and on the participants themselves. Section 8.1.4 compares the characteristics of study members who were living in New Zealand at age 32 to the characteristics of those study members who were living in Australia, Britain and in other countries. This section contains new and significant information on the median incomes and educational qualifications of participants who were living outside New Zealand. Section 8.1.5 contains scatter graphs of the incomes of Dunedin Study members and their parents, together with best-fit lines from regression. Section 8.1.6 is a technical section on the dataset.

Section 8.2 describes the 1996 New Zealand Election Study data. Section 8.2.1 outlines the sampling of the electoral roll and the extent to which the sample mirrors New Zealand's population. Data on Māori is discussed in Section 8.2.2. Section 8.2.3 describes the calculation of the SES scores. Section 8.2.4 shows scatter graphs from the Election Study regressions, while Section 8.2.5 is a technical section on the dataset.

Section 8.3 contains detailed tables comparing rates of intergenerational mobility in New Zealand to rates of intergenerational mobility for other developed countries.

8.1 New Zealand income datasets and the Dunedin Study

Currently no comprehensive nationwide New Zealand datasets on the incomes of children's parents and of the incomes of these children when they are adults are available for research purposes. Surveys such as the Household Economic Survey (HES) record the incomes of children and their parents only when they are living at the same address and, at most, interview people for only a few years. Since relatively few adult New Zealanders live with their parents, using this data for our research would mean using a skewed sample of New Zealanders. Only limited use of individual-level Inland Revenue data for research purposes has been possible in New Zealand (Dixon, 2002; Hyslop, 2000). The longest-running national study of income in New Zealand is the Survey of Family, Income and Employment (SoFIE), which began in 2002 and will run for eight years (Statistics New Zealand, 2010). However, even when all the SoFIE data is available, most of the children living with their parents in 2002 will not be in their peak earning years. We therefore tested intergenerational income mobility using data from the longitudinal Dunedin Study.

As noted in the main paper, the Dunedin Study is a cohort study of 1,037 people born between 1 April 1972 and 31 March 1973 in Dunedin who were still living there at age three. Data on the physical and mental health and wellbeing of participants has been collected at regular intervals. There were a small number of children not included, either because of parental refusal or because children could not be found in time. Those not

followed up tended to come from the extremes of the group in terms of SES, and were about 9% of the potential sample. However, those enrolled did not differ in terms of perinatal characteristics, mode of delivery at birth, birth weight or the prevalence of neonatal problems from those who have not taken part in the study (Silva, 1990, p. 80). The Dunedin Study participation rate has remained very high. About 94% of those who were in the study at age three participated in the age 32 assessments that took place between November 2003 and mid-2005.[40] This implies an extremely low attrition rate for a longitudinal study. The study pays participants' travel costs, even if they have emigrated. Section 8.1.1 now discusses how representative Dunedin is of New Zealand, and how intergenerational mobility in other countries has been studied using regional datasets.

8.1.1 Extrapolating the Dunedin Study results

The Dunedin Study covers people born in Dunedin during 1972-73, which is narrower than the population of interest (all people born in New Zealand at about that time). Nevertheless, in the 1970s, Dunedin had the fourth biggest population of any New Zealand metropolitan area, included children from a full range of backgrounds and had a similar socio-economic character to the rest of New Zealand (Ferguson, Poulton, et al., 2003, p. 3; Silva and McCann, 1996, pp. 10-11). Welfare payments, entitlements to public education and health services, and the minimum wage are the same throughout New Zealand. Health outcomes for Dunedin Study participants at ages 21 and 32 were usually not statistically different from those of other New Zealanders of the same age (Poulton, Hancox, et al., 2006, p. 9). Similarly, when participants were at intermediate school their test results were not statistically different (at a .05 level) from children of the same age who had been born in other parts of New Zealand but were living in Dunedin, and were also usually similar to those of other New Zealand children (Silva, 1984, p. 7). At age 32, the participants had similar benefit receipt histories to those of all New Zealanders born in 1972-73 (Welch and Wilson, 2009b, p. 3). However, the Dunedin Study is under-representative of Māori and Pacific peoples compared to New Zealand's entire population, with 7.5% and 1.5% of its participants respectively identifying with these groups at age 26 (Poulton, et al., 2006, pp. 1, 9).[41] While the Dunedin Study participants were all born in Dunedin, by the time they were 21 a third were living elsewhere (Silva and McCann, 1996, pp. 14-15). By the time they were 32 only 38% of participants were living in Dunedin.

Because the Dunedin Study participants are not perfectly representative of people born in New Zealand in the early 1970s (Silva, 1990, p. 81), the Dunedin Study results cannot be extrapolated to all New Zealanders born during that period. Nevertheless, the Dunedin Study results are useful for understanding intergenerational income mobility in New Zealand. This is because Dunedin is a major city with many similar policy settings and characteristics to the rest of New Zealand. The Dunedin Study researchers consider its study members to be "broadly representative" of New Zealand children born in the early 1970s (Poulton, et al., 2006, p. 9).

Estimates of intergenerational mobility in other countries using the best available regional datasets have been similar to estimates using equivalent samples from large national datasets. For example, the first estimate of intergenerational income mobility for Britain was based on men born in York. Although York was unrepresentative of Britain in some respects, the point estimate of 0.358 for men from York is within the 95% confidence interval for a subsequent point estimate of 0.306 calculated using a national cohort study of British men (Atkinson, 1980, p. 210; Atkinson, et al., 1983, pp. 41, 178; Jäntti, et al.,

[40] http://dunedinstudy.otago.ac.nz/study.html#studymap. Assessments are now spread over a longer period than when the participants were children.

[41] Statistics New Zealand figures show that at the 1996 census approximately 16% of 25-29 year-olds identified as Māori, and 5.8% of this age group identified as Pacific Islanders.

2006, pp. 13, 15). The most widely-used regional dataset for studying intergenerational mobility in the United States has been a sample of Wisconsin high school students. Intergenerational income elasticity results using the Wisconsin dataset are also similar to estimates calculated using one or two observations of father's income from a national dataset of men of broadly similar ages (Becker and Tomes, 1986, pp. S24-S27; Solon, 1992, pp. 394, 401). Estimates of intergenerational income mobility in Norway and Sweden using small regional datasets have also produced similar estimates to later studies using large national datasets (Corak, 2006, pp. 61-63; Gustafsson, 1994, pp. 82-85; Soltow, 1965, pp. 107-110). These results support our judgement that using the Dunedin Study data is a valid way of investigating intergenerational income mobility in New Zealand.

We are aware of two studies that have directly tested whether the rate of intergenerational income mobility varies within a country. In the United States, Mayer and Lopoo found statistically significant differences in intergenerational income mobility between some groups of states. These differences appeared to be most strongly associated with the level of expenditure on compulsory education (Mayer and Lopoo, 2008, pp. 149, 151, 154-155). A study of Finland also found small regional differences in intergenerational income mobility. However, the boundaries of the "regions" used reflected when local municipalities adopted educational reforms, and imperfectly reflected geographic regions (Pekkarinen, et al., 2006, pp. 5, 10). In terms of government expenditure, New Zealand is the most centralised of OECD countries (OECD, 2009, pp. 56-57). Because local and regional government does not fund or have any influence over the running of schools in New Zealand, the inter-regional variations found in these studies may not apply to New Zealand.

A few other national studies of intergenerational mobility have also included dummy variables for the region in the United States, France or Italy in which people were born or lived when they were growing up (Hertz, 2006, p. 12; Lefranc, 2004, pp. 12,17; Piraino, 2007, p. 11). However, these dummy variables have controlled for large regional differences in the incomes of parents, rather than for the effect of region on intergenerational income mobility in the sense in which we have measured this concept.[42]

8.1.2 Statistical inference from a population study

Longitudinal studies, such as the Dunedin Study, often include all children born in a particular geographic region within a specified period. This sometimes raises questions about which statistical tests can be used to analyse the data.[43]

Arguments for treating data from a population study as if it were a random sample of a much larger population are often based on the assumption that data from other years, or time-periods, or even places, "would be a reasonable replicate of the original sample" (Bollen, 1995, p. 464; Plewis, Calderwood, Hawkes and Nathan, 2004, p. 7). Researchers using data from population studies who have implicitly taken this approach have included statistics designed to measure uncertainty about estimates of population parameters, such as standard errors, and confidence intervals, when reporting regression results (Melchior, et al., 2007, p. 969; Poulton, Caspi, et al., 2002, p. 1643).[44] Some researchers

[42] The dummy variables are significant for some regions in the United States. The results were not reported for France or for Italy.

[43] I am deeply indebted to Katy Henderson for her helpful discussions on this topic.

[44] In regression analysis, the standard error of an estimate measures the amount of dispersion of the observed data points around the estimated regression line. A confidence interval shows the range of values that in the long-run will contain (in a stated percentage of cases) the true population value with repeated random sampling of a population, or if an experiment is repeated under identical conditions. In significance tests the p-value measures the probability of getting a particular value or a more extreme value by chance if the null hypothesis is true (Gujarati, 1995, pp. 70-71; Moore and McCabe, 1993, pp. 433-435, 464-465).

have argued that standard errors and significance tests are valuable for regression results of a population as they show the level of uncertainty that the same results would occur if the research methods used were applied to an effectively similar situation (Hoover, 2008, pp. 20-21; Winch and Campbell, 1970 (1969), p. 204). Sometimes this alternative situation or population has been hypothetical (Deming and Stephan, 1941, pp. 45, 48; Gray, Knoke, et al., 1998, p. 328). An analogy has sometimes also been drawn with physical or biological science experiments where researchers tacitly assume that the experimental units are representative of a wider population (Moore and McCabe, 1993, p. 266). Indeed, in the article in which the term "confidence interval" was coined, Neyman argued that "the statistician may be concerned with certain experiments which, if repeated under apparently identical conditions, yield varying results" (Neyman, 1937, p. 333).

Other researchers have argued that significance tests and standard errors have "no meaning in terms of classical statistical inference" for a non-random sample (Henkel, 1976, p. 76), and are not appropriate when all cases for a time-period are being used (Haley, 1998, p. 335; McCloskey and Ziliak, 1996, p. 100; Morrison and Henkel, 1970, p. 305; Ziliak and McCloskey, 2008, p. 69). This is because statistical models designed for researchers using random sampling are being applied to all cases that exist (Western and Jackman, 1994, p. 412), such as government expenditure in developed democratic countries during the entire post-war period. Analysing such data as if it were a random sample of a larger population is therefore inappropriate (Klingemann, Hofferbert and Budge, 1994, p. 285). Since 2002, the *Journal of Socio-Economics* has had a policy that significance tests are inappropriate for population studies (Altman, 2004, p. 662). However, the *Journal of Socio-Economics* still publishes standard errors for regression results of population data.

This paper takes the view that the "repeatable experiment" justification for tacitly treating data as if it were a random sample often has considerable logic. In addition, this paper assumes that the Dunedin Study can be viewed as a repeatable experiment that has drawn a sample from a regional population at a particular point in time. This is because researchers could easily have studied another cohort of children born in Dunedin during the early 1970s. We therefore treat the Dunedin Study data as if it were a sample of people born in Dunedin in the early 1970s, and use this assumption to justify reporting standard errors, confidence intervals and significance test statistics. This paper assumes that the confidence intervals for the results show the range within which we would expect the point estimates to be if the research methods used were applied to those born in Dunedin in adjacent years to the people actually included in the Dunedin Study (Bollen, 1995, p. 464). Our justification is that those born in Dunedin in the early 1970s would, by the time they were 32, have effectively experienced the same relevant family background effects and educational, health care, economic and labour market opportunities as those actually included in the Dunedin Study. It should be noted that we are not claiming that there has been no change in these variables. Instead we are assuming that none of the observable changes are likely to have affected intergenerational income mobility outcomes (Hoover, 2008, p. 22). Data to begin testing these assumptions is unfortunately unavailable within our research timeframe. However, when the Dunedin Study participants were aged nine, researchers found that their spelling scores were almost identical to the results obtained from Dunedin children tested in 1963 (Silva, Smith and Pearce, 1984, pp. 29-31).[45]

Similar assumptions are made when analysing the income mobility results for countries where all people born within a particular time-period have been included. In some ways this is an extension of our assumption, which is common in panel studies, that even

[45] Data was collected on all births in Dunedin and this data has been analysed for 1 August 1967 to 31 July 1973. However, no changes in the characteristics of births over time were noted (Buckfield, 1978, pp. 244-246).

though participants have been surveyed at different times during the year this will not have affected the results (Wooldridge, 2006, p. 6).

Changes in New Zealand's economy, domestic policy-settings, family dynamics and the like would obviously, over time, gradually change the childhood and adult experiences of those born in Dunedin. Some readers may therefore prefer to see the Dunedin Study as a population study of people born between 1 April 1972 and 30 April 1973, and to view the significance tests and standard errors as summarising the relative goodness of fit of a relationship for these people (Castles, 1998, p. 18; Klingemann, et al., 1994, p. 285). This is because the standard error of the estimate in regression analysis is the standard deviation of the sampling distribution of the estimator (Gujarati, 1995, p. 70). This interpretation of the results also seems logical.

8.1.3 The Dunedin Study income data

The Dunedin Study included questions on the incomes of participants' parents when the participants were growing up. In more recent years, the study has included questions on the adult income of participants. As a result, we have historical data on the incomes of the participants' parents and more recent data on the adult income of participants. Income questions were based on questions used in New Zealand's five-yearly national censuses.

The income data for participants' parents comes from data provided by a parent of each participant at the assessments when the participants were 13 and 15 years old. Parents were asked which category best represented the income of their child's father and mother figures. When the participants were 13 the income question for parents specifically excluded social security benefits and war pensions. However, when the participants were 15 the income question for parents specifically included social welfare benefits and superannuation. There were 10 income categories at age 13, and 14 income categories at age 15. We converted income data for each parent when the participant was 13 and 15 years old into March 2008 values using the Consumers Price Index (CPI), summed their answers and then averaged by the number of time points available. Usually income data was available from both assessments, but sometimes income was available only from one assessment. We used the midpoint of each income band, except at the extremes.[46] The top income band when participants were 15 was $35,000 plus. On the basis of 1986 census data (Department of Statistics, 1988, pp. 12-13) and Household Economic Survey data we set this amount at $47,000 in 1987 values, which is about $81,000 in 2008 values. We set the top income band when participants were 13 at the same real value as for the age 15 assessment. We experimented with increasing and decreasing the real value of the top income band and found that this had very little effect on the results.[47]

The income data from the participants at age 32 comes from similar income questions on their own income. The interviewer showed participants a list of 12 different sources of income, and asked them whether they had received income from any of these sources during the previous 12 months. The interviewer then asked participants which of 13 categories best represented their income (from all sources) during the previous 12 months (Poulton, [2003], pp. Finances 1-2). Income data collected when the participants were 26 was not used because people's income in their mid-twenties is unlikely to be an accurate indicator of permanent income (Haider and Solon, 2006, p. 1317). The top income band when participants were 32 was $100,000 plus. We set incomes in this open-ended category at $135,000. This is the income Statistics New Zealand set for this category after

[46] Midpoints have also been used by overseas researchers (Blanden and Machin, 2008, p. 114; Dearden, et al., 1997, p. 56).

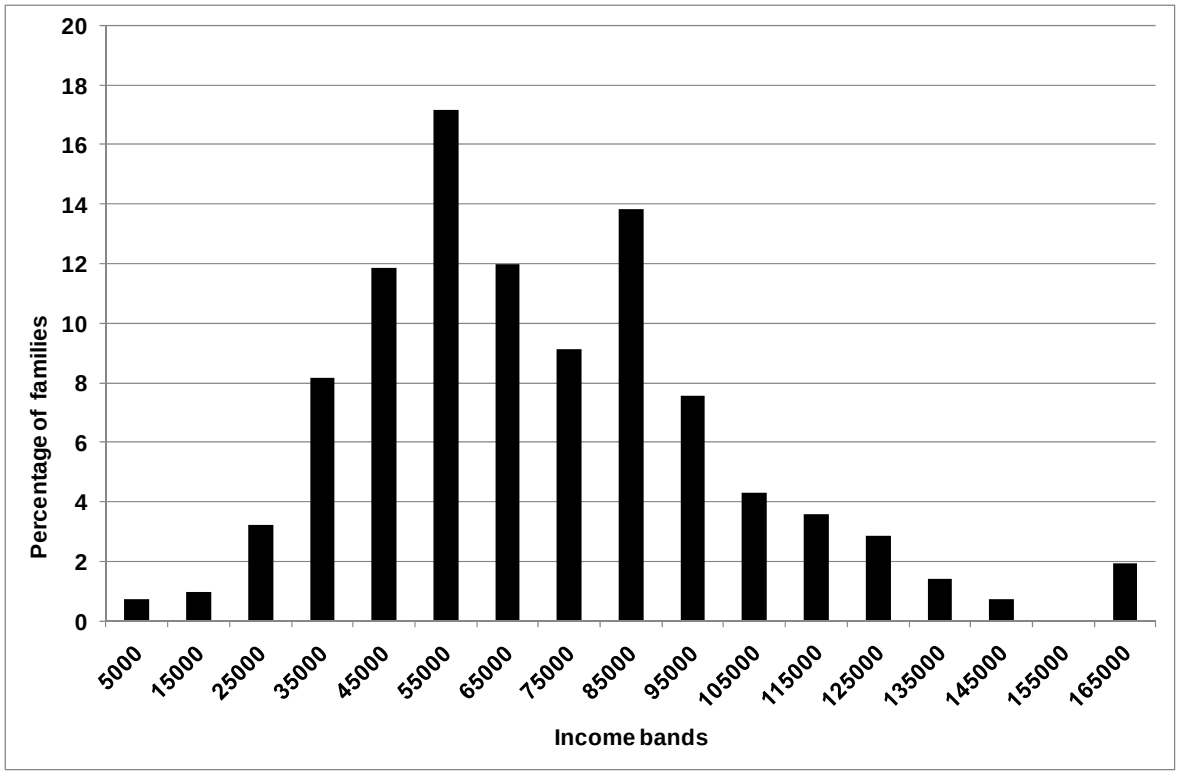
[47] At age 15, 30 participants were interviewed in Australia and four in North America (Silva, 1990, p. 82), but we do not know how the income conversions were done for their parents.

the 2001 and 2006 censuses. We also experimented with decreasing this amount to $100,000 and increasing it to $150,000.

8.1.4 Incomes of people in the Dunedin Study

Figure A1 shows the distribution of the incomes of parents when participants were aged 13 and 15. When the participants were 14, the average age of their fathers was 42 and the average age of their mothers was 40. This is within the usual age range for measuring parents' income as most men are near their peak earning years during their forties (Grawe, 2004, p. 66). Unfortunately the Dunedin Study truncated the census income classifications its questions were based on, while there had been substantial wage inflation since the censuses. As a result, 14.1% of parents (27.0% of fathers and 2.4% of mothers) were in the highest income category. Imputing incomes for a high proportion of participants' parents is therefore difficult. There was a 0.77 correlation between incomes of fathers over the two time-periods, and a 0.75 correlation for the incomes of mothers.

Figure A1 - The combined incomes of the parents of participants (2008 values) when the participants were aged 13 and 15



Incomes have been put into $10,000 bands for the purpose of this graph. The x axis shows the midpoint of each band. We have included all cases where we have data for both parents, but have excluded cases where we only have income data for one parent. Combined income is the average income of the participant's mother and father figures added together.

Most of the participants were living outside Dunedin by the time they were 32 years old. When they were 32 years old, 23.7% of the sample was living overseas, with 14.5% in Australia and 5.2% in Britain (Table A1). The next biggest group of 1.2% (12 people) was in the United States. The other participants who were living overseas were in a number of different countries.

Table A1 - Location of participants in the Dunedin cohort study at age 32

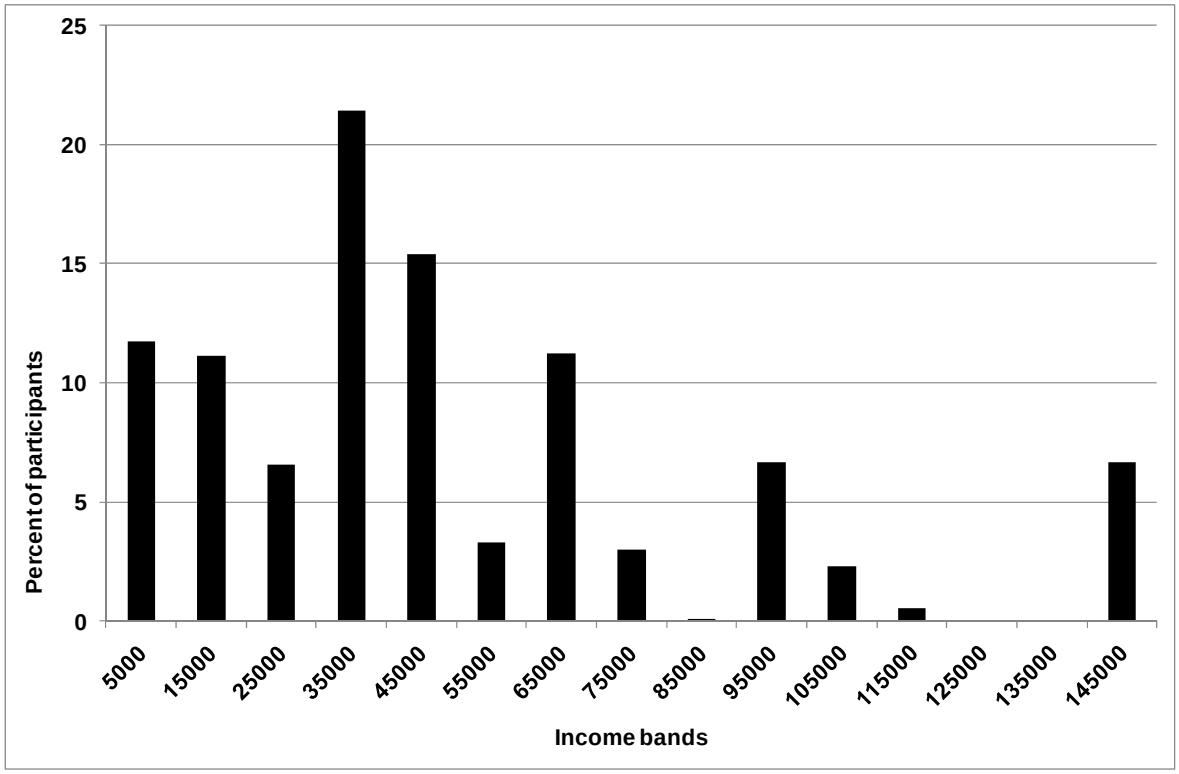
Location	Number	Percentage
New Zealand	742	76.3
Australia	141	14.5
Britain	51	5.2
USA	12	1.2
Asia	11	1.1
Europe	8	0.8
Canada	3	0.3
Pacific	2	0.2
Middle East	2	0.2
Total	972	100.0

There is relatively high labour mobility between New Zealand and Australia (Byrant and Law, 2004, p. 3; OECD, 2007a, p. 231). Young New Zealanders have considerable freedom to work in Britain, although they have to show that they have sufficient funds to support themselves while they search for a job (Foreign and Commonwealth Office, 2009). Many New Zealanders who are too old for a working holiday visa are able to work in Britain, either because they qualify through their ancestry or because they qualify for a skilled workers permit (Inkson and Myers, 2003, p. 171; Sell, 2004, pp. 26-27).

The incomes of participants at age 32 (in March 2008 values) are shown in Figure A2. The incomes of those who were overseas were converted into New Zealand dollars using purchasing power parity (PPP) conversion rates (World Bank, 2008, pp. 10-11), and then adjusted for changes in the CPI since the time of the interview. PPP conversion rates control for differences in the buying power of currencies in different countries, and usually reduced the value of overseas salaries compared to direct conversions using exchange rates. Nevertheless, the questions asked imply that those overseas could have a much higher maximum salary than those who were in New Zealand. For instance, five people living in Britain reported that they earned 100,000+ and indicated that they were reporting their income in pounds. At the PPP conversion rate this became $236,000. This was $101,000 higher than the $135,000 attributed to those reporting in New Zealand dollars who placed themselves in the $100,000+ income category. The same maximum salary of $135,000 was therefore imputed for people in every country. The reverse problem occurred for the three study members living in Japan and Taiwan. There, even the highest salary declared in the local currency became relatively low when converted to New Zealand dollars.

Because of the possible effects of the currency conversions, intergenerational income mobility was initially calculated just for those living in New Zealand. In subsequent models those who were living overseas were included. As Table 1 has shown, including those who were living overseas increased the magnitude of the intergenerational income elasticity point estimates by a modest amount.

Figure A2 - The incomes of participants at age 32 (in 2008 values)



Incomes have been put into $10,000 bands for the purpose of this graph. The x axis shows the midpoint of each band. We have included all participants we have data for.

Table A2 shows that the median income for participants living in New Zealand at age 32 was $38,800, compared to $55,300 for participants living in Australia, $92,000 for participants living in Britain and $50,000 for participants living in other countries. In fact, the incomes of participants living in Britain started at about the median income for participants living in New Zealand.

Table A2 - Median income and qualifications of people from Dunedin at age 32

Location	Median income (2008 values)	Mean SES	Finished high school	Have degree	Have higher degree
New Zealand	$38,800	39.8	61.6%	22.8%	4.5%
Australia	$55,300	44.7	76.2%	24.5%	5.6%
Britain	$92,000	51.7	94.1%	56.9%	17.5%
Other countries	$50,000	47.2	91.9%	48.7%	10.8%
All countries	$38,800	41.5	66.6%	25.8%	5.6%

Median income is after incomes have been converted into March 2008 values. Mean SES is just for those who are participating in the labour force. We have included all participants we have data for.

Other research has shown that New Zealanders who have recently arrived in Britain (those who have been there for less than 15 years) are one of the highest income groups in Britain (BBC News., 2004). Of course some costs such as transport and housing, are typically much higher than in New Zealand. Many of these New Zealanders were living in and around London, which has higher costs (housing and transport) and in some ways a

lower quality of life (poorer state schools, greater congestion and pollution, longer working hours) than other parts of Britain. Wages for British-born people in and around London tend to be higher than the British average. Data was not collected at age 32 on where participants planned to live in the future. However, at age 26 those who had migrated to Britain had invariably either returned to New Zealand to live or intended to do so (Milne, et al., 2001, p. 451). The total number of New Zealanders living in Britain has also been increasing only gradually, while British census data indicates that during their thirties many New Zealanders in Britain do return home.

Because of the problems inherent in making currency conversions, the SES of participants working in different countries is valuable. The New Zealand Socio-Economic Index (1996) scale runs from 10 to 90. Table A2 shows that people from Dunedin who were working in New Zealand had a mean SES of 39.8 compared to 44.7 for those in Australia, 51.7 for those in Britain and 47.2 for those in all other countries. At a 5% level, the mean SES for those in New Zealand is lower than the mean SES for those working in Australia, Britain and in other countries. At a 10% level, the mean for those in Britain is higher than the mean for those in Australia. This indicates that people from Dunedin who were living in different countries were tending to work in different types of jobs.

Participants living in Britain usually came from higher income families than participants still living in New Zealand, but the difference was only slight. However, Table A2 shows that 56.9% of those living in Britain had completed a degree compared to only 22.8% of those living in New Zealand and 24.5% of those in Australia. In addition, 17.5% of participants living in Britain had a masters, PhD, medical or law degree, compared to only 4.5% of those living in New Zealand, and 5.6% of those living in Australia. Participants living in Australia were considerably more likely to have completed high school than participants who were living in New Zealand. The small number of participants living outside New Zealand, Australia and Britain also tended to be highly qualified.

On average, female participants had lower incomes than male participants. For those living in New Zealand the average income for female participants was $31,649 compared to $51,806 for male participants. An obvious problem when making the comparisons at age 32 is that 14.1% of female participants were out of the workforce, whereas just 1.1% of men were.

8.1.5 Scatter graphs of the incomes of parents and of Dunedin Study participants

Figures A3 and A4 show the relationship between the incomes of parents and the incomes of their grown-up children. Each green circle plots the combined income of a participant's parents (x axis) and of their child (y axis). The wide distribution of dots reveals a weak relationship between parents' incomes and the incomes of their children, particularly for female participants. The grey bands show the confidence intervals for the straight regression lines. The curved orange lines show a best-fit line for a locally weighted regression. These results might seem to suggest that for the first part of the parental income range the relationship between parental income and participants' incomes is not linear. However, adding a quadratic polynomial term to the regression did not allow rejection of the hypothesis that the relationship was linear. If we had a much larger number of cases we would be in a better position to test for a non-linear relationship.

Figure A3 - The real incomes of parents and of their sons

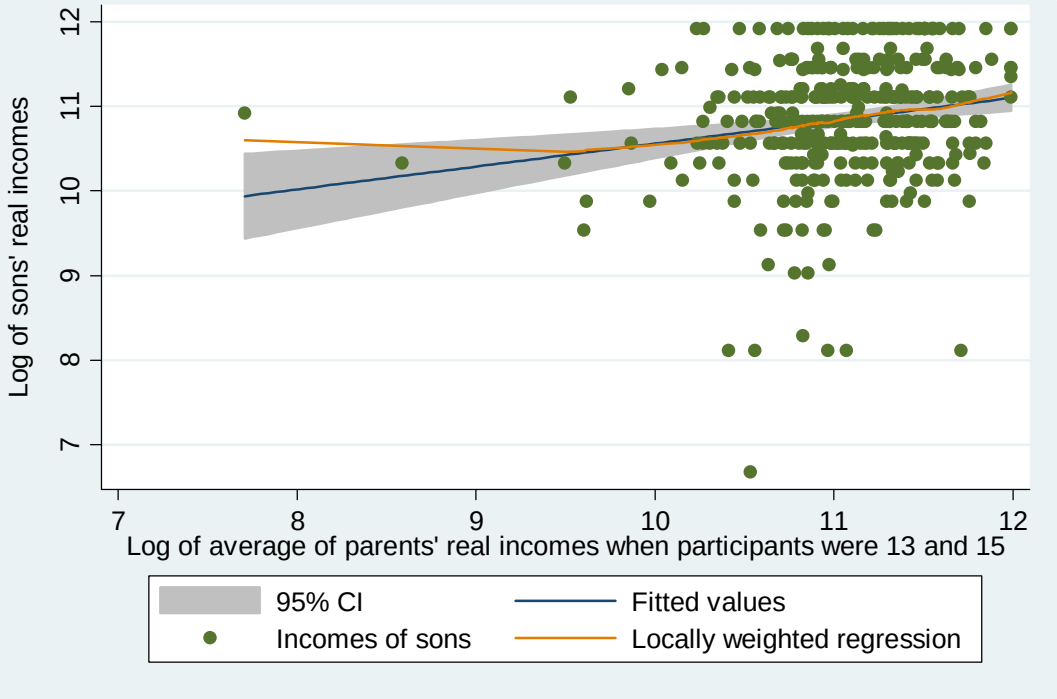
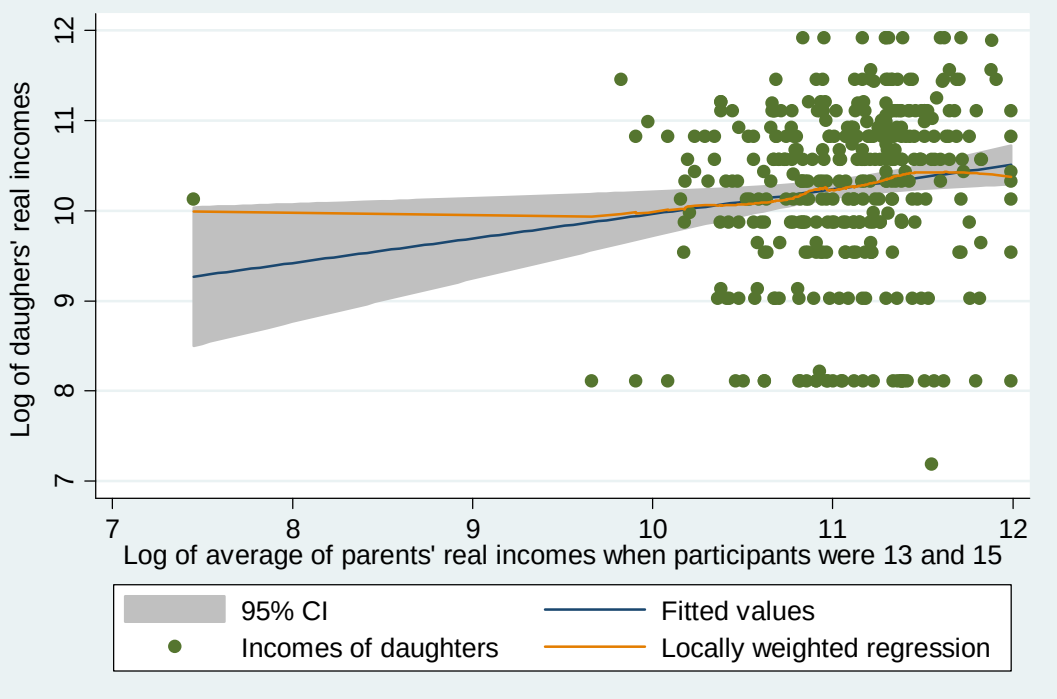


Figure A4 - The real incomes of parents and of their daughters



8.1.6 Dunedin Study cases available for analysis

Although most Dunedin Study participants have remained with the study, we have lost some cases. This section shows that we most frequently lose cases from the Dunedin Study because of missing income data (particularly for the fathers of participants), although we also lose some cases because some people's incomes (such as homemakers) are zero, and because a small number of participants had died before they

turned 32. Because one parent supplied information on both parents' incomes, perhaps not surprising data is sometimes unavailable for both parents. Income is an extremely sensitive topic, and collecting accurate information on this topic from people is difficult. We will firstly look at why we lose cases when using the incomes of fathers to explain the incomes of participants (Table 1, model six). We will then look at why we lose cases when using the combined incomes of both parents to explain the incomes of participants (Table 1, model seven).

Losing cases when using fathers' incomes as the explanatory variable (Table 1, model 6)

Twenty-two participants had died before they turned 32 (Table A3). Of the remaining 1,015 cases, there are 23 cases where there is no income data for both fathers and for the total income of participants. This includes those who had opted out of the study, who were unable to be contacted or who declined to provide information on their income. In 30 cases we have income data for fathers, but are missing this information for participants at age 32. In seven of these cases an SES measure, but not their total income from all sources, is available for participants at age 32.

In 155 cases income data is missing for fathers, but we have income data for participants at age 32. A further 20 participants (all female) are excluded because their income was zero at age 32. This is because we use log income in the regression and the log of zero is undefined. All but one of these cases declared an income for a partner, suggesting that their zero incomes were because they were homemakers rather than because they were unwilling to answer the question. A further seven cases are excluded because although the income of the participant was positive their father's income was zero. So we are losing only a small number of cases owing to fathers having zero income.

We will now look at the 178 cases where participants were alive at age 32 but income data for fathers is missing. Of these, we have: 23 cases where income data is missing for both participants and their fathers; and 155 cases where we have income data for participants but not for their fathers. In only 25 of the 178 cases of missing data on father's income was the father absent or was father's residency information missing from both assessments. This suggests that the most important reason why fathers' income data is missing is because of non-reporting of income. In 102 (57.3%) of the cases where the father's income data is missing, including 86 (56.2%) where the data indicates that the father was resident, we have the mother's income but not the father's. This could have occurred when mothers providing the information did not feel they knew the income of the participant's father accurately enough to answer this question. Of the 76 cases where both parents' income is missing, the data indicates that one parent was resident for at least 69 of these participants.

This raises the question of whether the characteristics of those whose father's income is missing differ from those whose father's income is not missing. In terms of the incomes of participants' mothers (when the participants were teenagers) and of the incomes of participants (at age 32) there is very little difference, with the confidence intervals for the mean salaries overlapping when using 95% confidence intervals. If we confine the analysis to those who were living in New Zealand at age 32, we reach the same conclusion. We are unable to test whether our estimates of intergenerational income mobility are affected by the exclusion of these cases.

Table A3 - Why we lose cases from the Dunedin Health and Multidisciplinary Study Dataset when studying the effects of fathers' incomes

	Number of cases	Percentage of participants alive at 32
Original cases in the Dunedin Study	1,037	
Participant was dead by age 32	22	
Cases where participant was alive at age 32	1,015	100
Income data is missing for both participants and for their fathers	23	2.3
Have income for fathers, but missing income for participants	30	3.0
Have income data for participants, but missing for fathers	155	15.3
Zero income for participants (all female), father's income +ve	20	2.0
Participants' incomes positive, but their fathers' incomes were zero	7	0.7
Total remaining sample	780	76.8

Losing cases when using parents' incomes as the explanatory variable (Table 1, model 7)

We also used joint family income to explain the incomes of participants. We excluded the 22 cases where the participant was dead before the age 32 assessments. In the remaining dataset, there are 76 cases where the incomes of both the participant's parents were missing when the participant was 13 and 15 years old. The inclusion of cases where the father's **or** mother's income is missing is problematic, particularly when the residency data indicates that a participant's father or mother was living with them. This is because there is a danger of underestimating the incomes of households where the parent answering the questionnaire was unable or unwilling to reveal their partner's income.

Most of the cases where father's income is missing occur because of non-reporting of income rather than because the father has been absent. Because of the risk of potentially underestimating parental income, we therefore restricted the analysis to cases where both parents' incomes were available.

Table A4 repeats the Table A3 analysis, but for the joint income of both parents. The results are similar. Because the calculation requires the income details of **both** parents (rather than just of fathers) there are more cases (177 in total) where we lack income data and fewer in the subsequent categories. There are 764 cases when we can use parents' combined income to explain the incomes of participants.

Table A4 - Why we lose cases from the Dunedin Health and Multidisciplinary Study Dataset when studying the effects of combined parental income

	Number of cases	Percentage of participants alive at 32
Original cases	1,037	
Participant was dead by age 32	22	
Cases where participant was alive at age 32	1,015	100
Cases where no income data for both participants and for their parents	23	2.2
Have income for parents but missing income for participants	30	3.0
Have income data for participants, but missing for parents	177	17.4
Zero income for participants (all female), parental income +ve	19	1.9
Participants' incomes positive, but parents' income was zero	2	0.2
Total remaining sample	764	75.3

8.2 New Zealand occupation datasets and the New Zealand Election Study data

Just as with income data, no official representative datasets are available at an individual level on the occupations of children's parents and of occupations of these children when they are adults. We have therefore used data from the New Zealand Election Study (NZES), which has been carrying out a voluntary nationally representative post-election survey of voters at all elections since 1990 (www.nzes.org/). These studies have resulted in the publication of five books on voting behaviour and in the publication of articles in international journals. Researchers have used the data for a variety of purposes. Although this is the first use of NZES data to study intergenerational mobility, intergenerational mobility in Britain has been studied using data from the British election study (Heath and Payne, 1999, p. 4).

Between 1990 and 1996, the NZES's post-election postal survey asked respondents what their occupation was, and what their parents' occupations had been when the respondent was aged about 14. Fourteen is the age used in similar overseas surveys and is a good age for establishing parents' usual occupation (Ermisch, et al., 2006, pp. 14-15; Leigh, 2007, p. 4). We use this data to study intergenerational mobility by using occupation to determine people's SES, and then testing the relationship between respondents' and their fathers' SES.

Unfortunately, after 1996 the NZES did not ask about parents' occupation again until 2008, and the 2008 occupation data is not yet available. This limits the relevance of the results. Since the NZES dataset approximates a simple random sample, the concerns about inference from a population study discussed in Section 8.1.2 do not apply. However, the response rate of 55.7% for the mail survey, which was the only surveying method that asked about parents' occupations, may have affected the results. Although the response rate is high for a voluntary post-election survey, the response rate is also considerably lower than for the income questions in the Dunedin Study. Some researchers would criticise the use of significance tests and confidence intervals because of the Election Study's response rate (Henkel, 1976, p. 80). Section 3.2 discussed limitations of the SES data, such as how some of the SES groups contain people from a wide range of economic backgrounds. The following sections discuss in more detail how the 1996 Election Study dataset imperfectly mirrored New Zealand's 1996 population and how this may have affected the results.

8.2.1 Sampling design and the representativeness of the sample

In 1996, the NZES post-election sample had three main components: the new sample; the panel study; and the campaign wave. The total number of responses was 5,012 (Table A5). Those interviewed over the telephone were not asked about their parents' jobs. The total sample available for our study is therefore the 4,118 mail responses.

Table A5 - The 1996 New Zealand Election Study components, their size and their response rates

		Mail		Phone		Total	
Number and name of study component	Sample size	Responses	Rate	Additional responses	Increase in rate	Responses	Rate
1. New sample	2,650	**1,285**	**48.5**	261	9.9	1,546	58.3
2. Panel study	1,648	**1,173**	**71.2**	132	8.0	1,305	79.2
3. Campaign wave	3,090	**1,660**	**53.7**	501	16.2	2,161	69.9
Total	7,388	**4,118**	**55.7**	894	12.1	5,012	67.8

The **new sample** was a random sample of voters drawn from the 1996 general and Māori electoral rolls. People are usually qualified to enrol to vote in New Zealand if they are 18 years or older, are New Zealand citizens or permanent residents and have lived in New Zealand for one year or more without leaving the country. New Zealand is unusual because it allows non-citizens to vote if they are permanent residents (Nagel, 1988, pp. 17-18). Enrolment usually lapses only if a citizen has been out of New Zealand continuously for three years or more (with some exemptions), or if a person is in prison for a term of three or more years (New Zealand Government, 1993, section 80). No data is available for 1996, but in the late 1980s less than one percent of people over 18 living in New Zealand were unable to vote because of the eligibility rules (Nagel, 1988, pp. 17-18).

About 91.6% of eligible voters (those who were legally entitled to vote) were on the electoral roll in 1996 (New Zealand Post, 1997, p. 29). Eligible voters are legally required to enrol in New Zealand, although efforts to increase enrolment concentrate on publicity and on education campaigns (Elections New Zealand, 2009; Electoral Enrolment Centre, [2008], pp. 8-11). Groups that are less likely to be on the roll include those who move frequently, young people, people who are travelling overseas, new citizens, Māori and Pacific and Asian peoples. Some people are also reluctant to enrol because the electoral roll is publicly available (apart from an unpublished roll for people who can prove that publication of their name and address would place their safety at risk). The electoral roll can therefore be used by people, such as debt collectors, to find addresses (Electoral Enrolment Centre, [2008], p. 10; Electoral Law Committee, 1998, pp. 26-33; Jackson, 1996, p. 14).

People of Māori descent enrolling for the first time can choose the Māori **or** general roll. Thereafter they can only decide during the Māori Electoral Option that follows each five-yearly census. The NZES's new random sample included a deliberate oversample of voters on the Māori electoral roll to improve knowledge of Māori electoral behaviour. Following the 1994 Māori Electoral Option, about 52% of people of Māori descent were on the Māori electoral roll. Coverage was lower in the South Island where only 39% of people of Māori descent were on the Māori electoral roll (Statistics New Zealand, 2006). In addition to the deliberate oversample of voters from the Māori electorates, the NZES also surveyed people of Māori ancestry and identity through the other study samples.

The **second component** of the 1996 post-election sample was a panel study of people who had been part of the 1990 and/or 1993 Election Study and who had agreed to also be part of the 1996 Election Study. Originally this sample had been drawn from the 1990 and 1993 electoral rolls.

The **third component** of the 1996 post-election sample was the campaign wave of people who had been surveyed by telephone before the election and who had agreed to give their address so that they could be sent a post-election survey. This part of the sample captured an unknown number of adults who were not on the electoral roll. The number of respondents in this category is thought to be very small (Vowles, 2002a, p. 600). In 1996, 95.1% of New Zealand households had a telephone, with ownership being lowest among low-income groups, among Māori and among Pacific peoples (Statistics New Zealand, 1998b, pp. 16-17). Less than 5% of households who may have contained eligible voters were therefore outside the scope of the telephone survey.

The 1996 post-election survey was predominantly a mail survey. However, sample members who had failed to reply after two postal reminders were contacted by telephone (when their telephone number could be found) and asked to complete a shortened version of the survey over the telephone (Vowles, Aimer, Banducci and Karp, 1998, p. xiii). Unfortunately the post-election telephone survey did not include questions on parents' occupations.

The mail respondents formed the basis of our sample for analysis. Although the mail response rate of 55.7% was high by international standards, there is considerable scope for non-response bias to affect analysis based on this data. We used the mail survey weight (mmqwt) provided with the data, which ensures the data matched voting behaviour. However, the data imperfectly matches some characteristics of New Zealand's population.

8.2.2 Data on Māori and the representativeness of this data

Intergenerational mobility of Māori is of interest to this study because Māori are New Zealand's indigenous people and are the largest component of the population after New Zealand European/Pākehā. The 1996 Election Study was New Zealand's first systematic survey-based study of Māori based on a national sample drawn from the electoral roll (Vowles, et al., 1998, p. xiii).

Whereas official statistics now use cultural self-identity to define who is Māori, most statutes use ancestry. Māori communities often consider Māori to be those who both have Māori ancestry and who self-identify as Māori. Other variables sometimes used to measure Māori identity include participation in Māori cultural activities, knowledge of Māori ancestry and use of the Māori language (Kukutai, 2004, pp. 90, 91, 94-95; Statistics New Zealand, 2005, p. 2).

We used the NZES's ethnic identity question to identify Māori. We included those who identified solely as Māori and also those who identified as Māori and another group. In total, 695 respondents identified as Māori, and this group comprised 13.5% of the NZES's weighted sample who responded by mail. This compares to 14.5% of New Zealand's population who identified as Māori in the 1996 census. However, the NZES asked for the ethnic group people mainly identified with, whereas the census asked people to "Tick as many circles as you need to show the ethnic group(s) you belong to" (Statistics New Zealand, 1996, 1998a). Most Māori in the NZES's dataset circled only that they were Māori. Nevertheless, 54 respondents indicated that they identified as both European and Māori, and eight identified as both Māori and Pacific Islanders.

Almost all respondents who had indicated that they identified as Māori were of Māori ancestry, with 95.5% circling that they had some New Zealand Māori ancestry and another 2.8% indicating that they were unsure. The remaining 1.7% (11 respondents) circled that they had no Māori ancestry. However, three of these 11 respondents were on the Māori electoral roll, showing that they had ticked that they were "a descendant of a New Zealand Māori" when they had enrolled (Electoral Enrolment Centre, 2009). Of the 18 respondents who identified as Māori but were unsure if they had Māori ancestry, 16 were also on the Māori electoral roll. People's answers to survey research rarely generate completely compatible answers, with people often answering questions quickly and changing their answers over time, in response to question wording and according to the context. But our data indicates that almost everyone who identified as Māori had indicated that either they had Māori ancestry in the survey, or were unsure of whether they had Māori ancestry, or had indicated that they were of Māori descent when they had enrolled to vote.

Of those who had Māori ancestry, 66.6% identified themselves as New Zealand Māori. The next most common ethnic identifications among those with some Māori ancestry were New Zealand European (21.0%) and Pākehā (5.3%). The Election Study ethnicity question discouraged multiple answers, which may have affected the results.

Among respondents who identified themselves as Māori, 544 were on the Māori electoral roll while 151 were on the general electoral roll. In the NZES's 1996 weighted sample 59.2% of those of Māori ancestry were on the Māori roll compared to Statistics New

Zealand's calculation of 52% of those of Māori descent in 1994 (Statistics New Zealand, 2006, p. 26). This suggests a slight bias in the NZES data towards Māori on the Māori roll, although Māori enrolling for the first time may have disproportionately chosen the Māori roll. At the time of the 1994 Māori enrolment option, some Māori organisations were actively encouraging Māori to choose the Māori roll by claiming that this would increase Māori political representation and power (Kia Hiwa Ra, 1994, p. 5). Different question wording may have also affected the results. The NZES's researchers admitted that the age distribution of the study's Māori respondents differed from that of the electoral roll, with the sample under-representing 18-29 year-olds and over-representing 30-39 year-olds (Sullivan and Vowles, 1998, pp. 190-191).

Māori language use is a key aspect of Māori ethnic identification (Kukutai, 2004, p. 91). In the Election Study dataset, 48.3% of those who identified as Māori wrote that they spoke Māori at home, compared to just 1.1% of the rest of New Zealand's population. 63.7% of Māori on the Māori electoral roll wrote that they spoke Māori at home compared to 16.4% of Māori on the general electoral roll.

8.2.3 Calculation and distribution of SES

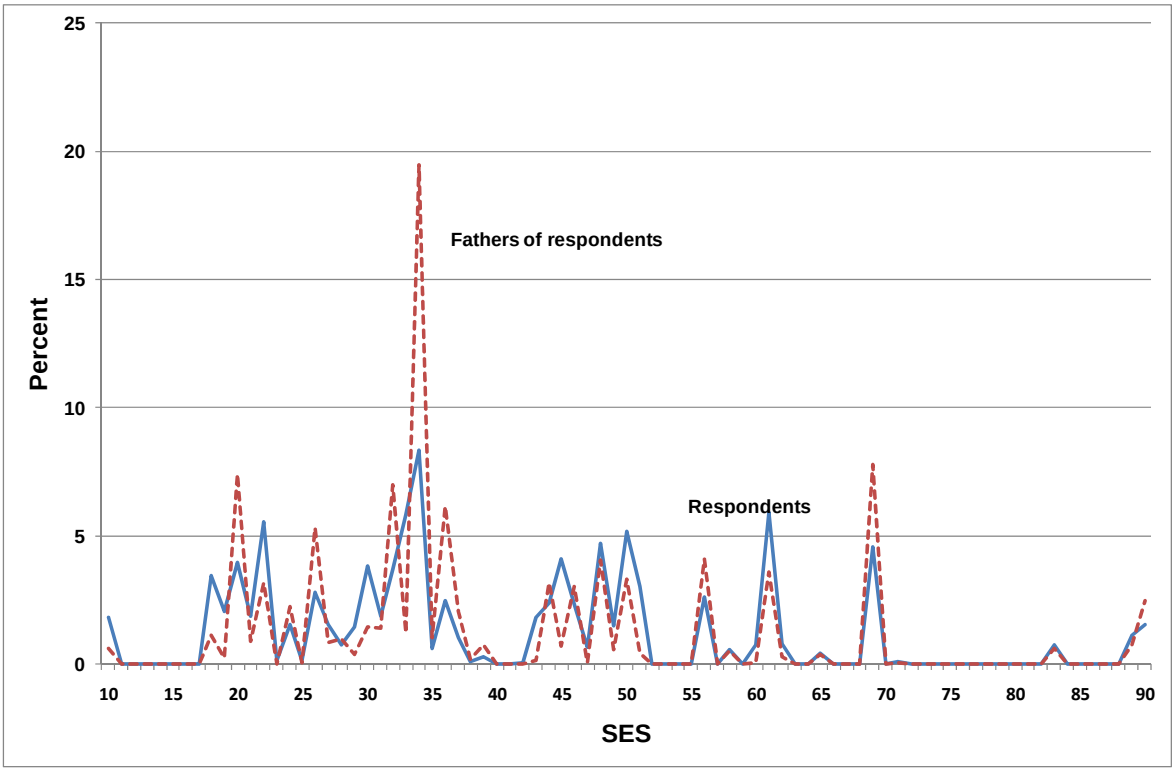
In the NZES dataset, people's occupation determined their SES. The NZES had coded answers about the occupation of respondents and of their fathers using the International Labour Organization's International Standard Classification of Occupations (ISCO). This is very similar to the New Zealand Standard Classification of Occupations (NZSCO).

The SES scores for different occupations were available in the *New Zealand Socio-economic Index 1996* (NZSEI). The average income and educational level of people in each occupation at the time of the 1996 census is used to calculate a base SES for each occupation in the NZSEI. The statistical algorithm used maximised the direct effects of income on SES. The SES scores were then adjusted, using data from in-depth surveys on people's actual purchases. These adjustments controlled for the tendency of self-employed people, such as farmers and builders, to under-report their incomes. Health professionals, such as doctors, are almost at the top of the NZSEI scale (89 out of 90). Labourers and textile workers are near the bottom (Davis, et al., 2003, pp. 13-17; Galbraith, et al., 2003). The author of the present study recoded ISCO occupation data in the Election Study dataset into NZSCO occupation categories and linked the NZSCO codes with NZSEI scores. Another Treasury analyst checked the program.

Figure A5 graphs the SES of Election Study respondents and the SES of their fathers. Although there are several different categories and SES scores for different types of agriculture and fisheries workers, 16.7% of Election Study respondents listed their father's occupation as being a farm or animal producer or farm worker. These occupations have an SES of 34 in the NZSEI framework, (Galbraith, et al., 2003, p. 27). Once other people in the same SES category were included, 19.5% of fathers in the NZES sample had an SES of 34. In contrast, just 8.3% of NZES respondents were in this category.

There were considerably more respondents' fathers than respondents with an SES of 69, mostly because many respondents gave their father's occupation as being a general manager. This indicates that people may not have been able to describe their father's occupation as accurately as we would like. There were more respondents than fathers with an SES of 61 because more respondents reported their own occupation as being a secondary school teacher or a business professional. There were also more respondents than fathers with an SES of 50 (department and production managers) and 22 (sales supervisors and market gardeners).

Figure A5 - SES of respondents and of the fathers of respondents



Only respondents who provided their father's occupation and their own occupation are included in this graph.

Table A6 places Election Study respondents into the same SES quartiles as the NZSEI. The Election Study had more people than the NZSEI in high SES quartiles, indicating that respondents were better off than New Zealand's entire population. This is not altogether surprising: people who enrol to vote and who answer voluntary surveys tend to be better off than average (Vowles, 2002b, p. 100). There were more respondents than fathers in the highest income occupational group. Because of the contraction of New Zealand's farming sector, however, there were fewer respondents than parents in the second highest income occupational group. The high proportion of farmers makes generating more accurate quartiles very difficult. It also seems unlikely that the NZSEI results perfectly broke down into quartiles. However, the good spread of responses makes the results suitable for use in regression models.

Table A6 - SES groups based on quartiles used in the New Zealand Socio-economic Index Users' Guide

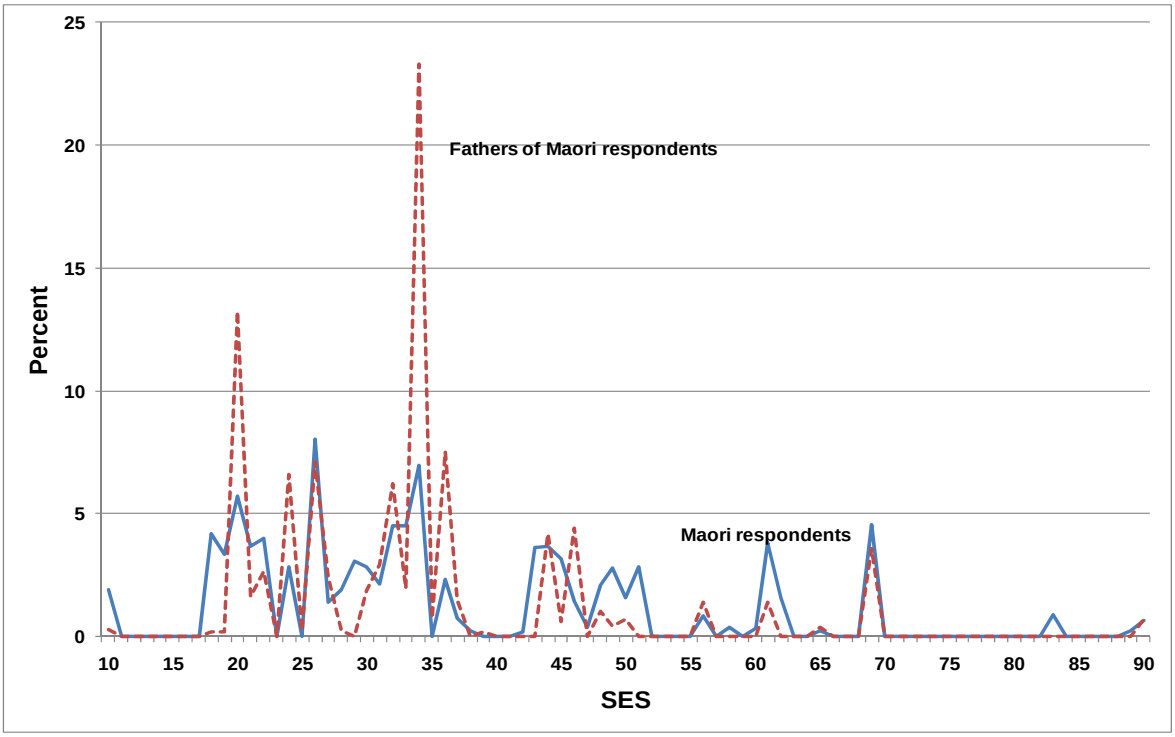
SES groups	Quartile	All respondents		Male respondents		Male respondents 25 or over		Fathers of respondents	
		%	C%	%	C%	%	C%	%	C%
10-24	4 (lowest)	20.4	20.4	16.9	16.9	14.7	14.7	15.7	15.7
25-33	3 (2nd lowest)	21.9	42.3	17.8	34.6	17.2	31.9	18.7	34.4
34-48	2 (2nd highest)	28.9	71.2	33.6	68.2	34.8	66.6	40.8	75.2
49-90	1 (highest)	28.8	100	31.8	100	33.4	100	24.8	100

Here % is the percentage in a quartile, and C% is the cumulative percentage. Only respondents who provided their occupation and their father's occupation are included in this table.

Figure A6 shows the SES of Māori respondents and of their fathers. The graphs for the entire weighted sample and for Māori show some similarities. Māori, however, were more concentrated in lower SES groups. Indeed, the average SES for all respondents was 40.1, compared to 36.3 for Māori. The average SES for the fathers of all respondents was 40.4,

compared to 33.7 for the fathers of Māori. Compared to non-Māori, Māori were more likely to be labourers, although not to the same extent as their fathers were. They were also more likely to be drivers, food workers and machine operators.

Figure A6 - SES of Māori respondents and of the fathers of Māori respondents



Only Māori respondents who provided their occupation and their father's occupation are included in this graph.

8.2.4 Scatter graphs of the relationship between the SES of fathers and of Election Study respondents

Figure A7 shows the SES of fathers and of their sons in the 1996 Election Study dataset. Each blue circle plots the SES of a father (x axis) and of his son (y axis). Equivalent results for fathers and for their daughters are in Figure A8. The grey bands in the graphs show the confidence interval for the straight regression line. The slightly curved orange line in each graph shows a best-fit line for a locally weighted regression. These graphs provide visual confirmation that the relationship between the SES of Election Study respondents and of their fathers was weak in 1996.

Figure A7 - The SES of fathers and sons in the 1996 NZES

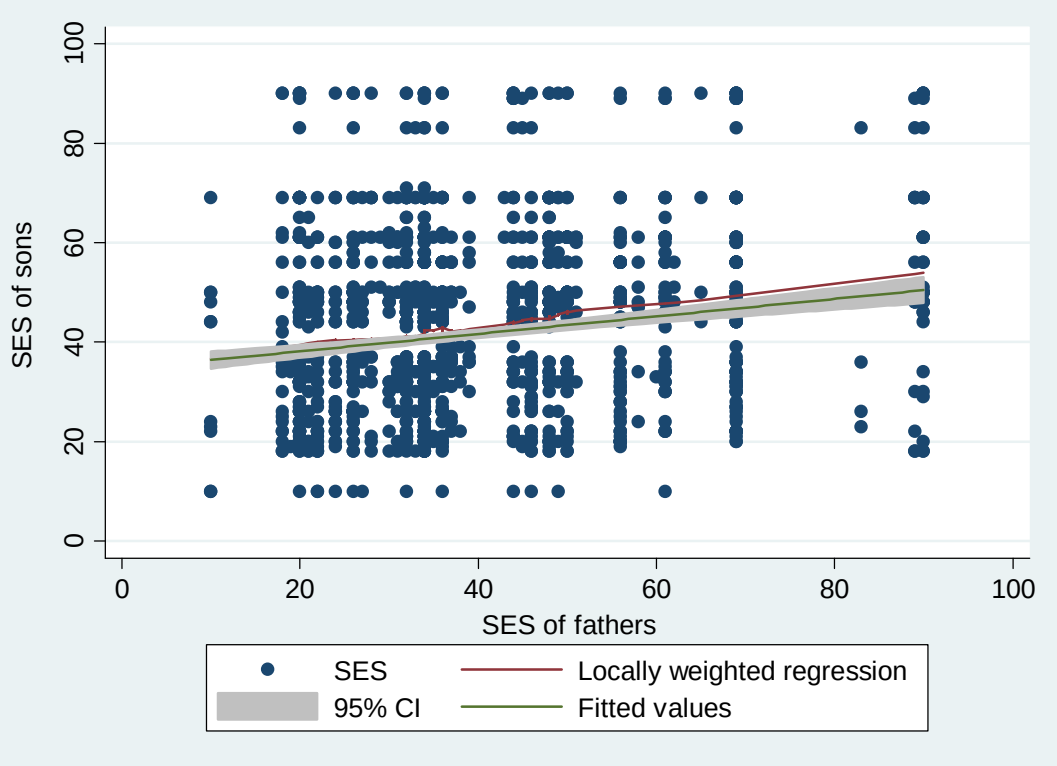
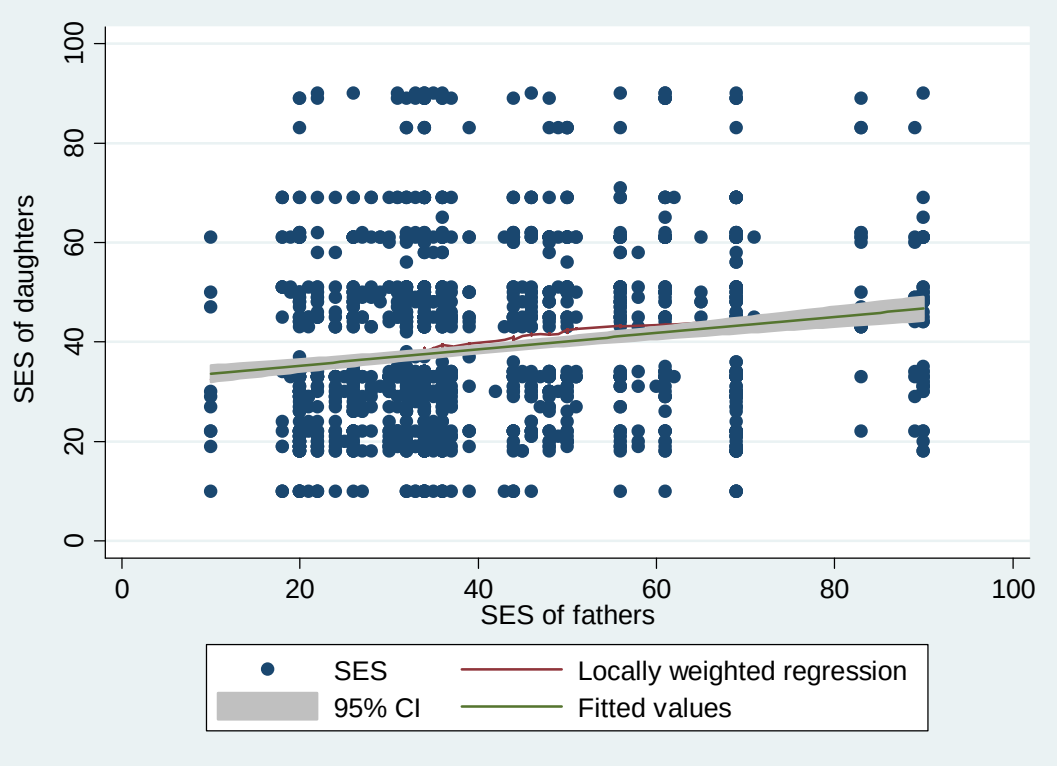


Figure A8 - The SES of fathers and daughters in the 1996 NZES



8.2.5 Election Study cases available for analysis

Table A7 shows why we lose cases from the Election Study dataset. The original dataset contained 5,013 cases, although we excluded a case that contained no information apart from voter validation and method of interview. The main reason we lose cases is that the Election Study did not ask the 894 telephone respondents about their parents' jobs.

Table A7 - Why we lose cases from the 1996 Election Study dataset

	Number of cases	Percentage of original sample	Percentage of mail sample
Original number of cases=	5,012	100	-
Mail survey respondents	4,118	82.2	100
+ Phone respondents (not asked father's job)	894	17.9	-
Less mail survey cases where:			
No job specified by respondent (see Table A8)	370	7.4	9.0
Have respondent's job but not father's job	238	4.8	5.8
Have respondent's job but father was dead	145	2.9	3.5
Have respondent's job but father unemployed	66	1.3	1.6
Have respondent's job, father was homemaker	3	0.1	0.1
Have job data but not respondent's age	9	0.2	0.2
Have job and age data but missing respondent's sex	2	0	0.1
Number of cases left	3,285	66.5	79.8
Number of cases in weighted dataset using iweight	3,268		

Of more concern is why information requested of respondents is missing. Of those respondents who could have provided information on their father's job, the biggest reason why we lose cases is because 370 mail respondents failed to specify their own job or "**their last regular paid job**" (original emphasis in questionnaire). Table A8 shows that 37.0% of those who did not state their job had previously circled that their work status was retired. Here the length of the occupation questions (five lines followed by boxes for the job and industry of the respondent and of their partner) seem to have resulted in some inaccurate answers. Although the loss of these cases is unfortunate, 86.8% of those who were retired still listed their last regular paid job with 92.0% of retired men and 82.8% of retired women doing so. Another 11.4% of those who failed to specify their job gave their work status as keeping house. A further 7.0% gave their occupation as being a student.

Table A8 shows that 73 respondents indicated that they were working, but did not write their job name. However, non-responses to open-ended questions are common in long surveys. These 73 respondents constitute only 2.4% of those who indicated that they were working. Forty-six respondents failed to answer both the question about their work status and about their job. In total, 65.4% of those who did not answer the occupation question were retired, unemployed, keeping house, a student or unable to work. These results indicate that the main reason why people failed to answer the occupation question was that they were out of the workforce, and either had not fully read the question or had not previously had a job.

Table A7 indicates that of the cases where we have the respondent's job, 238 cases were lost because respondents did not specify their father's job. A further 145 cases were lost because their father was dead when the respondent was aged 14, while 66 cases were lost because their father was economically inactive. Only three cases were lost because respondents said their father was a homemaker, while nine cases were lost because

respondents had not provided their age. The number of cases left was 3,285, which fell to 3,268 once an iweight was applied (see model one, Table 4). This was 79.8% of mail responses. Missing or unusable data resulted in the exclusion of fractionally over 20% of mail responses.

The 11% of respondents who did not specify their father's job or wrote that their father was dead, unemployed or a homemaker had an average SES of 37.2 compared to 40.1 for those who specified their father's occupation. This difference was significant even at a 1% level. All these individual groups had a lower average SES than respondents whose father was working, although only by combining groups was the difference statistically significant. Nevertheless, growing up without a father in the workforce seems to usually have only a modest negative effect on a person's adult SES.

Table A8 - Work status of respondents who did not specify their job or last paid job

Work status	Number	Percentage
Retired	137	37.0
Working	73	19.7
Work status is missing	46	12.4
Keeping house	42	11.4
Unemployed	25	6.8
Student	26	7.0
Unable to work	12	3.2
Unpaid work	9	2.4
Total	370	100%

Māori cases available for analysis

Although 695 respondents identified as Māori, Table A9 shows that 147 cases were lost because respondents interviewed over the telephone were not asked their father's occupation. Among those who were asked about both their occupation and their father's occupation, the main reason why we lose cases is because 98 Māori respondents failed to specify their own job or "**their last regular paid job**" (original emphasis in questionnaire). Table A10 shows that the biggest single reason for this is that 23 Māori respondents who had indicated they were working failed to write down their job. However, this still accounts for only 23.5% of those who did not specify their job, compared to 67.3% who were retired, unemployed, keeping house, a student or unable to work. In total, 92.5% of Māori who circled their work status as working wrote down the name of their job.

The 14% of Māori mail respondents who did not specify their father's job or wrote that their father was dead, unemployed or a homemaker had an average SES of 29.3 compared to 36.3 for those who specified their father's occupation. This difference was significant, even at a 1% level.

Table A9 - Why we lose respondents who identify as Māori from the 1996 Election Study dataset

	Number of cases	Percentage of original sample	Percentage of mail sample
Original number of Māori cases=	695	100	-
Māori mail survey respondents	548	78.8	100
+ Phone respondents (not asked father's job)	147	21.2	-
Less Māori mail survey cases where:			
No job specified by respondent (see A10)	98	14.1	17.9
Have respondent's job but not father's job	48	6.9	8.8
Have respondent's job but father was dead	19	2.7	3.5
Have respondent's job but father unemployed	8	1.2	1.5
Have respondent's job, father was homemaker	1	0.1	0.2
Have job data but not respondent's age	3	0.4	0.6
Number of cases left	374	53.4	67.7
Number of cases in weighted dataset using iweight	369		

Table A10 - Work status of respondents who identified as Māori and who did not specify their job or last paid job

	Number	Percentage
Working	23	23.5
Retired	20	20.4
Unemployed	17	17.3
Keeping house	16	16.3
Student	8	8.2
Work status is missing	6	6.1
Unable to work	5	5.1
Unpaid work	3	3.1
Total	98	100.0

8.3 Detailed tables of the data used in the cross-national comparisons of results

This section contains detailed tables comparing rates of intergenerational mobility in New Zealand to rates in similar overseas studies. These tables are more detailed versions of Table 7 (intergenerational income mobility) and Table 8 (intergenerational occupational mobility) than appeared in Section 6 of this working paper. Additional details are included on the ages of children and their parents, groups (such as beneficiaries) who were excluded from analysis in some countries, and the time-periods covered.

Table A11 - Rates of intergenerational income mobility in New Zealand compared to those in the most similar studies of developed countries

Country	Source	Sample and size (where available)	Age(s) and years in which income or earnings was measured	Income or earnings measure and age range (where available) for fathers or parents	β and 95% confidence intervals for men	β and 95% confidence intervals for women
Australia	(Leigh, 2007, pp. 7, 14-15) Table 4, panel B	Survey data from 1965, 1973, 1987 and 2001-04	Employed men 25-54 with non-missing earnings	Fathers' earnings were predicted on the basis of detailed occupational data	.22 (.13, .31) – not scaled to match US results	Not available
Britain	(Blanden, 2008, p. 106)	Survey data from British Cohort Study of all children born during a week in 1970	34 when income measured in 2004	Parental income data from 1986 when participants were 16	.33 (.27 to .39)	.43 (.33 to .53)
Canada – men.	(Corak and Heisz, 1999, pp. 509, 512)	Statistics Canada administrative data. Samples of 397,000 to 404,000 men born 1963-66, who filed a tax return between 1982 and 1986 when they were 16-19, still at home, and living with their father	29-32, when income measured in 1995	Fathers' total market income averaged over two consecutive years between 1978 and 1982. Fathers were aged between 43 and 87	.155 (.149 to .161) to .172 (.166 to .178) depending on which two years were averaged	Not available
Alternative Canada results	(Corak, 2001, p. 17)	Statistics Canada administrative data. Samples of 230,000 to 400,000 children born 63-1966	32-35, when income measured 1998	Fathers' earnings averaged over five years between 1978 and 1982	.262 (.254 to .270)	.227 (.219 to .235)
Denmark	(Jäntti, et al., 2006, pp. 7, 13, 28) Table 2	Tax data. All people resident in Denmark who were born between 1958 and 1960. Samples of 78,131 (men) and 73,803 (women)	38 to 40 when income measured in 1998 and 40 to 42 when measured again in 2000	Wages, salaries and self-employment income in 1980 for fathers aged 35-64	.071 (.064 to .079)	.034 (.027 to .041)
Finland	(Jäntti, et al., 2006, pp. 13, 21) Table 5	Census data and tax records. Children were born between 1958 and 1960. Samples of 5,797 (men) and 5,450 (women)	33 to 35 when income measured in 1993 and 40-42 when income was measured again in 2000	Fathers' earnings were measured in 1970 and 1975, when their children were respectively aged 10-12 and 15-17. Fathers were aged 36 to 64 with a mean age of 47 in 1975	.213 (.172 to .253)	.099 (.061 to .137)
Germany	(Ermisch, et al., 2006, pp. 666-668, 673)	Survey data from German Socio-Economic Panel. Children were born between 1962 and 1977. Samples of 537 (men) and 242 (women)	Income used last time surveyed when over 25. Average age of 32.8 for sons and 29.5 for daughters	Ten-year averages over the 1984-93 period. Average age of 49.7 for fathers of sons and 48 for fathers of daughters	.396 (.24 to .552)	.152 (.044 to .26)

New Zealand	This study	Survey data from the Dunedin Multidisciplinary Health and Development Study. Children were born between April 1972 and March 1973. 393 (men) and 372 (women) in regressions	Incomes measured between November 2003 and mid-2005. Participants had to be at least 31 and were usually 32	Incomes of mothers and fathers were collected when participants were 13 (1985-86) and 15 (1987-88). On average fathers were aged 42 and mothers were aged 40	.290 (.127 to .454)	.215 (.027 to .403)
Norway	(Jäntti, et al., 2006, pp. 4, 13, 20-21) Table 5	Tax returns that exclude transfers. All children born in Norway in 1958. Samples of 27, 254 (men) and 25,574 (women)	Incomes measured in 1992 and 1999, when children were respectively 34 and 41	Fathers' earnings were measured in 1974, when the children were 16, although adding additional years had little effect on the results	.150 (.132 to .168)	.121 (.099 to .143)
Sweden	(Jäntti, et al., 2006, pp. 7, 20-21) Table 5	Statistics data from tax returns. 20% of children born in Sweden in 1962 and of children who migrated to Sweden before they were 17. Samples of 32,564 (men) and 30,901 (women)	Earnings were measured in 1996 and 1999, when children were 34 and 37 respectively	Fathers' incomes in 1970 and in 1975, when their children were 8 and 13 respectively	.267 (.241 to .293)	.204 (.179 to .229)
United States men	(Solon, 1992, p. 401)	Survey data from nationwide Panel Study of Income Dynamics. Children born between 1951 and 1959. 303 to 313 cases	25-33, average 29.6, when earnings measured 1984	Fathers' earnings 1967-1971, with income measures from two consecutive years used. The average age of fathers was 42 in 1967	.290 (.126 to .454) to .425 (.245 to .605) depending on which two years were averaged	Not available
Alternative United States results.	(Jäntti, et al., 2006, pp. 4, 7, 21, 30) Table 5	Survey data from the National Longitudinal Survey of Youth. Children born 1957-64. Samples of 1,805 (men) and 1,614 (women)	Earnings were measured in 1995 and 2001, when children were 31-38 and 37-44 respectively	Family earnings in 1978 and in 1979. Fathers had an average age of 46 in 1978	.531 (.456, .606)	.307 (.200, .415)

All results in this table were generated using Ordinary Least Squares regression. This table excludes studies using two-stage least squares methods for parents because this method tends to yield different results from using only one or two measurements of actual income. There are therefore no estimates included for France, Italy, Japan, Spain and Switzerland. The results for Australia should be treated with caution because incomes for fathers were predicted on the basis of finely grained occupational data. The 95% confidence intervals for Australia, Britain, the United States, Canada and Germany were calculated by multiplying the standard error by two. These confidence intervals are therefore less precise than those for the Nordic countries, where the authors published the confidence intervals. Markus Jantti provided valuable help in identifying the most comparable results and for clarifying what his Table 5 showed. Similarly, Andrew Leigh advised on the most appropriate result for Australia.

Table A12 - Rates of intergenerational occupational mobility for people in New Zealand compared to those in Britain and in Germany

Country	Source	Sample and size (where available)	Age(s) and years in which occupation of children was measured	Occupation measure and age range (where available) for fathers or parents	β and 95% confidence intervals for men 25 or over	β and 95% confidence intervals for women 25 or over
Britain	(Ermisch, et al., 2006, pp. 663-665)	Survey data from the British Household Panel Survey. Samples of 2,151 men and 2,046 women	Data was collected between 1991 and 1999 when men were on average 40.3 (standard deviation 9.6) and women were on average 38.9 (standard deviation 9.7). Those under 25 were excluded	Occupational status score coded according to recollection of father's occupation when respondent was 14. Age data is not available	.306 (.268, .344)	.259 (.217, .301)
Germany	(Ermisch, et al., 2006, pp. 663-665, 668, 673)	Survey data from German Socio-Economic Panel. Samples of 2,670 men and 2,213 women	Data was collected between 1984 and 2002 when men were on average 39.8 (standard deviation 10.7) and women were on average 37.9 (standard deviation 10.7). Those under 25 were excluded	Socio-economic status score coded according to recollection of father's occupation when respondent was 15. Average age of 49.7 for fathers of sons and 48 for fathers of daughter	.333 (.289, .377)	.251 (.203, .299)
New Zealand	This study	Survey data from the New Zealand Election Study. 1,500 men and 1,596 women 25 years or older	Data was collected in late 1996. Men were on average 47.6 (standard deviation 15.0) and women were on average 46.7 (standard deviation 14.5). Respondents were born between 1903 and 1971 - those under 25 were excluded from this section	Socio-economic status score coded according to recollection of father's occupation when respondent was 14. Age data is not available	.229 (.175, .282)	.177 (.127, .227)

All results in this table were generated using Ordinary Least Squares regression. The 95% confidence intervals for Britain and Germany were calculated by multiplying the standard error by two. These confidence intervals are therefore less precise than those for New Zealand. Whereas this table lists 95% confidence intervals, Figure 3 showed 90% confidence intervals.

9 References

Altman, M. (2004). Statistical significance, path dependency, and the culture of journal publication. *Journal of Socio-Economics, 33*(5), 651-663.

Andrews, D., & Leigh, A. (2008). *More inequality, less social mobility (Discussion paper)*. Canberra: ANU.

Andrews, D., & Leigh, A. (2009). More inequality, less social mobility. *Applied Economic Letters, 16*, 1489-1492.

Atkinson, A. B. (1980). On intergenerational income mobility in Britain. *Journal of Post Keynesian Economics, 3*(2), 194-218.

Atkinson, A. B., & Harr, A. J. (1978). *Distribution of personal wealth in Britain* Cambridge: Cambridge University Press.

Atkinson, A. B., Maynard, A. K., & Trinder, C. G. (1983). *Parents and children: Incomes in two generations*. London: Heinemann.

Bauer, P. (2006). The intergenerational transmission of income in Switzerland: A comparison between natives and immigrants. *SSRN eLibrary*.

BBC News. (2004). Born abroad: Economics. Retrieved 5 April 2008, from http://news.bbc.co.uk/2/shared/spl/hi/uk/05/born_abroad/economics/html/overview.stm

Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics, 4*(3), S1-S39.

Bedford, R. (2001). Reflections on the spatial Odysseys of New Zealanders. *New Zealand Geographer, 57*(1), 49-54.

Björklund, A., Eriksson, T., Jäntti, M., Rauum, O., & Österbacka, E. (2004). Family structure and labour market success: The influence of siblings and birth order on the earnings of young adults in Norway, Finland and Sweden. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 207-225). Cambridge: Cambridge University Press.

Björklund, A., & Jäntti, M. (1997). Intergenerational income mobility in Sweden compared to the United States. *The American Economic Review, 87*(5), 1009-1018.

Björklund, A., & Jäntti, M. (2000). Intergenerational mobility of socio-economic status in comparative perspective. *Nordic Journal of Political Economy, 26*(3), 3-32.

Björklund, A., & Jäntti, M. (2009). Intergenerational economic inequality. In W. Salverda, B. Nolan & T. Smeeding (Eds.), *The Oxford handbook of economic inequality* (pp. 491-521). Oxford: Oxford University Press.

Björklund, A., Jäntti, M., & Solon, G. (2007). Nature and nurture in the intergenerational transmission of socioeconomic status: Evidence from Swedish children and their biological and rearing parents. *The B.E. Journal of Economic Analysis & Policy, 7*(2), Article 4.

Black, S. E., & Devereux, P. J. (2010). Recent developments in intergenerational mobility. *National Bureau of Economic Research Working Paper Series, No. 15889*.

Blanden, J. (2007). *Intergenerational income mobility in a comparative perspective*. London: Department of Economics, University of Surrey.

Blanden, J. (2008). *How much can we learn from international comparisons of social mobility?* Department of Economics, University of Surrey.

Blanden, J., Goodman, A., Gregg, P., & Machin, S. (2004). Changes in intergenerational mobility in Britain. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 122-146). Cambridge: Cambridge University Press.

Blanden, J., Gregg, P., & Machin, S. (2005). *Intergenerational mobility in Europe and North America*. London: Centre for Economic Performance.

Blanden, J., Gregg, P., & Macmillan, L. (2007). Accounting for intergenerational income persistence: Noncognitive skills, ability and education. *Economic Journal, 117*, C43-C60.

Blanden, J., & Machin, S. (2004). Educational inequality and the expansion of UK higher education. *Scottish Journal of Political Economy, 51*(2), 230-248.

Blanden, J., & Machin, S. (2007). *Recent changes in intergenerational mobility in Britain.* (Report for Sutton Trust). London.

Blanden, J., & Machin, S. (2008). Up and down the generational income ladder in Britain: Past changes and future prospects. *National Institute Economic Review, 205*(1), 101-116.

Bohlmark, A., & Lindquist, M. J. (2006). Life-cycle variations in the association between current and lifetime income: Replication and extension for Sweden. *Journal of Labor Economics, 24*(4), 879-896.

Bollen, K. A. (1995). Apparent and nonapparent significance tests. *Sociological Methodology, 25*, 459-468.

Bowles, S., & Gintis, H. (2002). The inheritance of inequality. *The Journal of Economic Perspectives, 16*(3), 3-30.

Bratsberg, B., Roed, K., Raaum, O., Naylor, R., Jantti, M., Eriksson, T., et al (2007). Nonlinearities in intergenerational earnings mobility: Consequences for cross-country comparisons, *The Economic Journal* (Vol. 117, pp. C72-C92): Blackwell Publishing Limited.

Breen, R. (1997). Inequality, economic growth and social mobility. *The British Journal of Sociology, 48*(3), 429-449.

Buckfield, P. (1978). Perinatal events in the Dunedin City population 1967-1973. *New Zealand Medical Journal, 88*, 244-246.

Byrant, J., & Law, D. (2004). *New Zealand's diaspora and overseas-born population*. Wellington: New Zealand Treasury.

Cabinet Office Strategy Unit (2008a). *Getting on, getting ahead. A discussion paper: Analysing the trends and drivers of social mobility*. London: Strategy Unit, Cabinet Office.

Cabinet Office Strategy Unit (2008b). *Realising Britain's potential: Future strategic challenges for Britain*. London: Strategy Unit, Cabinet Office.

Carneiro, P., & Heckman, J. J. (2003). Human capital policy. In J. J. Heckman & A. B. Krueger (Eds.), *Inequality in America: What role for human capital policies* (pp. 77-240). Cambridge, Massachusetts: MIT Press.

Castles, F. G. (1998). *Comparative public policy: Patterns of post-war transformation*. Cheltenham: Edward Eager.

Causa, O., & Johansson, A. (2009). *Intergenerational social mobility*. Paris: OECD.

Cervini, M. (2008). Intergenerational earnings mobility in Spain. Retrieved 13 February 2009, from https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=simposio2008&paper_id=261&file_type=slides

Chadwick, L., & Solon, G. (2002). Intergenerational income mobility among daughters. *The American Economic Review, 92*(1), 335-344.

Coleman, A. (2006). *The life-cycle model, savings and growth*. Wellington: Reserve Bank.

Conradson, D., & Latham, A. (2005). Escalator London? A case study of New Zealand tertiary educated migrants in a global city. *Journal of Contemporary European Studies, 13*(2), 159-172.

Corak, M. (2001). *Are the kids all right? Intergenerational mobility and child well-being in Canada*. Ottawa: Statistics Canada, Analytical Studies Branch.

Corak, M. (2004). Generational income mobility in North America and Europe: An introduction. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 1-37). Cambridge: Cambridge University Press.

Corak, M. (2006). *Do poor children become poor adults? Lessons from a cross country comparison of generational earnings mobility*. Bonn, Germany: IZA.

Corak, M., Curtis, L., & Phipps, S. (2010). *Economic mobility, family background, and the well-being of children in the United States and Canada*. Bonn, Germany: IZA.

Corak, M., Gustafsson, B., & Osterberg, T. (2004). Generational influences on unemployment insurance. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 245-288). Cambridge: Cambridge University Press.

Corak, M., & Heisz, A. (1999). The intergenerational earnings and income mobility of Canadian men: Evidence from longitudinal income tax data. *The Journal of Human Resources, 34*(3), 504-533.

Corak, M., & Piraino, P. (2010). *The intergenerational transmission of employers*. Bonn, Germany: IZA.

Couch, K., & Lillard, D. (1998). Sample selection rules and the intergenerational correlation of earnings. *Labour Economics, 5*(3), 313-329.

Couch, K., & Lillard, D. (2004). Non-linear patterns of intergenerational mobility in Germany and the United States. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 190-206). Cambridge: Cambridge University Press.

d'Addio, A. C. (2007). *Intergenerational transmission of disadvantage: Mobility or immobility across generations? A review of the evidence for OECD countries*. Paris: OECD.

Davis, P. (1979). Social mobility in New Zealand: Preliminary results from a national survey. *Australian and New Zealand Journal of Sociology, 15*(1), 50-56.

Davis, P., Jenkin, G., & Coope, P. (2003). *New Zealand socio-economic index 1996: An update and revision of the New Zealand socio-economic index of occupational status*. Wellington: Statistics New Zealand.

Dearden, L., Machin, S., & Reed, H. (1997). Intergenerational mobility in Britain. *The Economic Journal, 107*(440), 47-66.

Deming, W., & Stephan, F. (1941). On the interpretation of censuses as samples. *Journal of the American Statistical Association, 36 (Supplement)*, 45-49.

Department of Statistics (1988). *1986 New Zealand census of population and dwellings: Incomes and social welfare payments*. Wellington: Department of Statistics.

Dixon, S. (2002). Using administrative data sources in labour market research: An introduction. *Labour Market Bulletin 2000-02*, 26-30.

Dixon, S., & Crichton, S. (2007). The longer-term employment outcomes of people who move from a benefit to work. *Social Policy Journal of New Zealand, 31*(July 2007), 137-157.

Elections New Zealand (2009). Enrolling. Retrieved 5 April 2009, from http://www.elections.org.nz/enrolment/enrol-faqs/enrolling-detailed-faq.html#gen1

Electoral Enrolment Centre (2009). Enrolling to vote: Application. Wellington: Electoral Enrolment Centre.

Electoral Enrolment Centre ([2008]). *Getting ready to vote: Inside New Zealand's electoral system*. Wellington: New Zealand Post.

Electoral Law Committee (1998). Interim report on the inquiry into the 1996 General Election. *Appendices to the Journals of the House of Representatives*. Wellington: House of Representatives.

Ermisch, J., & Francesconi, M. (2004). Evidence from the British household panel survey. In M. Corak (Ed.), *Generational Income Mobility in North America and Europe* (pp. 147-189). Cambridge: Cambridge University Press.

Ermisch, J., Francesconi, M., & Siedler, T. (2006). Intergenerational mobility and marital sorting. *The Economic Journal, 116*(513), 659-679.

Ermisch, J., & Nicoletti, C. (2005). *Intergenerational earnings mobility: Changes across cohorts in Britain*. Essex: ISER.

Esping-Andersen, G. (2004a). Unequal opportunities and the mechanisms of social inheritance. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 245-288). Cambridge: Cambridge University Press.

Esping-Andersen, G. (2004b). Untying the Gordian Knot of social inheritance. *Research in Social Stratification and Mobility, 21*, 115-138.

Esping-Andersen, G. (2007). *Investing in children and their life chances*. Madrid: Fundacion Carolina International Workshop.

Ferguson, D., & Horwood, L. J. (2003). Resilience to childhood adversity: Results of a 21 year study. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaption in the context of childhood adversities* (pp. 130-155). Cambridge: Cambridge University Press.

Ferguson, D., Poulton, R., Horwood, J., Milne, B., & Swain-Campbell, N. (2003). *Comorbidity and coincidence in the Christchurch and Dunedin longitudinal studies*. Christchurch: Christchurch Health and Development Study and Dunedin Multidisciplinary Health and Development Research Unit.

Foreign and Commonwealth Office (2009). Important information for all visa applicants. Retrieved 5 March 2009, from http://ukinnewzealand.fco.gov.uk/en/visas/important-information/

Fortin, N. B., & Lefebvre, S. (1998). Intergenerational income mobility in Canada. In M. Corak (Ed.), *Labour markets, social institutions and the future of Canada's children*. Ottawa: Statistics Canada.

Galbraith, C., Jenkin, G., Davis, P., & Coope, P. (2003). *New Zealand socio-economic index 1996: Users' guide*. Wellington: Statistics New Zealand.

Galt, M. (1985). *Wealth and income in New Zealand c. 1870 to c. 1939*: PhD thesis, Victoria University of Wellington, Wellington.

Ganzeboom, H., & Treiman, D. (2007). *Ascription and achievement in occupational attainment in comparative perspective*. Amsterdam: Free University of Amsterdam.

Gorard, S. (2008). A re-consideration of rates of 'social mobility' in Britain: Or why research impact is not always a good thing. *British Journal of Sociology of Education, 29*(3), 317-324.

Gould, J. (2008). The distribution of personal incomes 1951 to 2006: Maori and non-Maori compared. *New Zealand Population Review, 33/34*, 249-260.

Grawe, N. D. (2004). Intergenerational mobility for whom? The experience of high- and low-earning sons in international perspective. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 58-89). Cambridge: Cambridge University Press.

Grawe, N. D. (2006). Life cycle bias in estimates of intergenerational earnings persistence. *Labour Economics, 13*(5), 551-570.

Gray, G. C., Knoke, J. D., Berg, S. W., Wignall, F. S., & Barrett-Connor, E. (1998). Counterpoint: Responding to suppositions and misunderstandings. *American Journal of Epidemiology, 148*(4), 328-333.

Growing up in New Zealand (2010). Growing up in New Zealand: Home. Retrieved 25 February 2010, from http://www.growingup.co.nz/

Gujarati, D. (1995). *Basic econometrics* (3rd ed.). New York: McGraw-Hill.

Gustafsson, B. (1994). The degree and pattern of income immobility in Sweden. *Review of Income & Wealth, 40*(1), 67-86.

Haider, S., & Solon, G. (2006). Life-cycle variation in the association between current and lifetime earnings. *American Economic Review, 96*, 1308-1320.

Haley, R. W. (1998). Countercounterpoint: Haley replies. *American Journal of Epidemiology, 148*(4), 334-338.

Harding, D. J., Jencks, C., Lopoo, L. M., & Mayer, S. E. (2003). *The changing effect of family background on the incomes of American adults*. Boston: SSRN.

Heath, A., & Payne, C. (1999). *Twentieth century trend in social mobility in Britain*. Oxford: Centre for Research into Elections and Social Trends.

Henkel, R. E. (1976). *Tests of significance*. Beverly Hills: Sage.

Hertz, T. (2005). Rags, riches, and race: The intergenerational economic mobility of black and white families in the United States. In S. Bowles, H. Gintis & M. Osborne Groves (Eds.), *Unequal chances: Family background and economic success* (pp. 161-191). New York: Princeton University Press.

Hertz, T. (2006). *Understanding mobility in America*. Washington: Centre for American Progress.

Hoover, K. D. S., Mark V. (2008). Sound and fury: McCloskey and significance testing in economics. *Journal of Economic Methodology, 15*(1), 1-37.

Hugalde, A. S. (2004). *Movilidad intergeneracional de ingresos y educativa en España (1980-90).* Barcelona.

Hyslop, D. (2000). *A preliminary analysis of the dynamics of individual market and disposable incomes*. Wellington: New Zealand Treasury.

Inkson, K., & Myers, B. (2003). The big O.E.: Self-directed travel and career development. *Career Development International, 8*(4), 170-181.

Jackson, G. (1996). Low young-voter enrolments cause concern. *Press*, 14.

Jäntti, M., Bratsberg, B., Røed, K., Rauum, O., Naylor, R., Österbacka, E., et al (2006). *American exceptionalism in a new light: A comparison of intergenerational earnings mobility in the Nordic Countries, the United Kingdom and the United States*. Bonn: IZA.

Jenkins, S. (1987). Snapshots versus movies: 'Lifecycle biases' and the estimation of intergenerational earnings inheritance. *European Economic Review, 31*(5), 1149-1158.

Jones, F. L., & Davis, P. (1988). Class structuration and patterns of social choice in Australia and New Zealand. *Sociology, 22*(2), 271-291.

Kia Hiwa Ra (January/February 1994). Maori on a roll campaign. *Kia Hiwa Ra: Maori National Newspaper*, 5.

Klingemann, H.-D., Hofferbert, R. I., & Budge, I. (1994). *Parties, policies, and democracy*. Boulder: Westview Press.

Krueger, A. B. (2003). Inequality: Too much of a good thing. In J. J. Heckman & A. B. Krueger (Eds.), *Inequality in America: What role for human capital policies* (pp. 1-76). Cambridge, Massachusetts: MIT Press.

Kukutai, T. (2004). The problem of defining an ethnic group for public policy: Who is Maori and why does it matter? *Social Policy Journal of New Zealand, 23*, 86-108.

Lane, J., & Maloney, T. (2002). Overview: The New Zealand conference on database integration and linked employer-employee data. *New Zealand Economic Papers, 36*(1), 3-7.

Lefranc, A. (2004). *Intergenerational earnings mobility in France: Is France more mobile than the US?* Marseille, France: Institut d'economie publique (IDEP).

Lefranc, A., Ojima, F., & Yoshida, T. (2008). *The intergenerational transmission of income and education: A comparison of Japan and France*. Florence: European University Institute.

Leigh, A. (2007). Intergenerational mobility in Australia. *B.E. Journal of Economic Analysis & Policy, 7*(2), Article 6.

Lidgard, J. (2001). Return migration of New Zealanders: A profile of returnees in 2000. *New Zealand Journal of Geography, 112*(1), 10-17.

Mackay, R. (2003). Family resilience and good child outcomes: An overview of the research literature. *Social Policy Journal of New Zealand*(20), 98-118.

Maloney, T., Maanin, S., & Pacheco, G. (2003). Intergenerational welfare participation in New Zealand. *Australian Economic Papers, 42*(3), 346-360.

Mayer, S. E., & Lopoo, L. M. (2008). Government spending and intergenerational mobility. *Journal of Public Economics, 92*(1-2), 139-158.

Mazumder, B. (2005). Fortunate sons: New estimates of intergenerational mobility in the United States using Social Security earnings data. *Review of Economics and Statistics, 87*(2), 235-255.

McCloskey, D. N., & Ziliak, S. T. (1996). The standard error of regressions. *Journal of Economic Literature, 34*(1), 97-114.

Melchior, M., Moffitt, T. E., Milne, B. J., Poulton, R., & Caspi, A. (2007). Why do children from socioeconomically disadvantaged families suffer from poor health when they reach adulthood? A life-course study. *American Journal of Epidemiology, 166*(8), 966-974.

Miles, J., & Shevlin, M. (2001). *Applying regression and correlation*. London: Sage.

Milne, B., Poulton, R., Caspi, A., & Moffitt, T. E. (2001). Brain drain or OE? Characteristics of New Zealanders who leave. *New Zealand Medical Journal, 114*, 450-453.

Minicozzi, A. L. (2003). Estimation of sons' intergenerational earnings mobility in the presence of censoring. *Journal of Applied Econometrics, 18*(3), 291-314.

Ministry of Education (2005). Maori in Tertiary Education. Retrieved 2 June 2009, from http://www.educationcounts.govt.nz/publications/maori_education/maori_in_tertiary_education

Ministry of Education (2007). *State of education in New Zealand 2007*. Wellington: Ministry of Education.

Mocetti, S. (2007). Intergenerational earnings mobility in Italy. *The B.E. Journal of Economic Analysis & Policy 7*(2), Article 5.

Moore, D. S., & McCabe, G. P. (1993). *Introduction to the practice of statistics*. New York: W.H. Freeman.

Morrison, D. E., & Henkel, R. E. (1970). Significance tests in behavioural research: Skeptical conclusions and beyond. In D. E. Morrison & R. E. Henkel (Eds.), *The significance test controversy - a reader* (pp. 182-198). Chicago: Aldine.

Nagel, J. (1988). Voter turnout in New Zealand general elections, 1928-1988. *Political Science, 40*(2), 16-38.

New Zealand Government (1993). *Electoral Act 1993*. Wellington: New Zealand Government

New Zealand Post (1997). *New Zealand Post annual report*. Wellington: New Zealand Post.

Neyman, J. (1937). X-outline of a theory of statistical estimation based on the classical theory of probability. *Philosophical Transactions of the Royal Society of London. Series A, Mathematical and Physical Sciences, 236*(767), 333-380.

Ng, I. (2007). Intergenerational income mobility in Singapore. *B.E. Journal of Economic Analysis & Policy, 7*(2), Article 2.

OECD (2000). *Literacy in the information age*. Ottawa: OECD.

OECD (2006). *Starting strong: Early childhood education and care*. Paris: OECD.

OECD (2007a). *International migration outlook annual report 2007*. Paris: OECD.

OECD (2007b). *No more failures: Ten steps to equity in education*. Paris: OECD.

OECD (2008a). *Growing unequal? Income distribution and poverty in OECD countries*. Paris: OECD.

OECD (2008b). *Working Party No. 1 on macroeconomic and structural policy analysis*. Paris: OECD.

OECD (2009). *Government at a glance 2009*. Paris: OECD.

OECD (2010). *A family affair: Intergenerational social mobility across OECD countries*. Paris: OECD.

Pacheco, G., & Maloney, T. (2003). Are the determinants of intergenerational welfare dependency gender-specific? *Australian Journal of Labour Economics, 6*(3), 371-382.

Parnicky, J. J., Williams, S. M., & Silva, P. A. (1987). Mothers' characteristics, perceptions of family environments and sustained socio-economic status. *New Zealand Journal of Educational Studies, 22*(1), 121-124.

Pekkarinen, T., Uusitalo, R., & Pekkala, S. (2006). *Education policy and intergenerational income mobility: Evidence from the Finnish comprehensive school reform*. Berlin: Institute for the Study of Labor (IZA).

Peters, H. E. (1992). Patterns of intergenerational mobility in income and earnings. *The Review of Economics and Statistics, 74*(3), 456-466.

Piraino, P. (2007). Comparable estimates of intergenerational income mobility in Italy. *Berkeley Electronic Press 7*(2), Article 1.

Plewis, I., Calderwood, L., Hawkes, D., & Nathan, G. (2004). *National Child Development Study and 1970 British Cohort Study: Technical Report*. London.

Pool, I. (1991). *Te iwi Maori: The New Zealand population past, present and projected*. Auckland: Auckland University Press.

Poulton, R. ([2003]). *Work & finances, religion & spirituality*. Dunedin: University of Otago.

Poulton, R., Caspi, A., Milne, B. J., Thomson, W. M., Taylor, A., Sears, M. R., et al (2002). Association between children's experience of socioeconomic disadvantage and adult health: A life-course study. *Lancet, 360*(9346), 1640-1645.

Poulton, R., Hancox, R., Milne, B., Baxter, J., Scott, K., & Wilson, N. (2006). The Dunedin Multidisciplinary Health and Development Study: Are its findings consistent with the overall New Zealand population? *The New Zealand Medical Journal, 119*(1235), 1-11.

Raaum, O., Bratsberg, B., Røed, K., Österbacka, E., Eriksson, T., Jäntti, M., et al (2007). Marital sorting, household labor supply, and intergenerational earnings mobility across countries. *The B.E. Journal of Economic Analysis & Policy, 7*(2), Article 7.

Roemer, J. E. (2004). Equal opportunity and intergenerational mobility: Going beyond intergenerational income transition matrices. In M. Corak (Ed.), *Generational income mobility in North America and Europe* (pp. 48-57). Cambridge: Cambridge University Press.

Sell, B. (2004). *The big OE: A guide for New Zealanders in the UK*. Auckland: Random House.

Silva, P. A. (1984). *The educational attainment of 2,600 Dunedin children: A report on the Dunedin intermediate schools' collaborative testing project 1984: The NZCER tests*. Dunedin: Dunedin Multidisciplinary Health and Development Study.

Silva, P. A. (1990). *The Dunedin Multidisciplinary Health and Development Study: A fifteen year longitudinal study*. Dunedin: Dunedin Multidisciplinary Health and Development Study.

Silva, P. A. (1996). Health and development in the early years. In P. A. Silva & W. R. Stanton (Eds.), *From child to adult: The Dunedin Multidisciplinary Health and Development Study* (pp. 24-58). Auckland: Oxford University Press.

Silva, P. A., & McCann, M. (1996). Introduction to the Dunedin Study. In P. A. Silva & W. R. Stanton (Eds.), *From child to adult: The Dunedin Multidisciplinary Health and Development Study* (pp. 1-23). Auckland: Oxford University Press.

Silva, P. A., Smith, C. T. W., & Pearce, D. W. (1984). *The Dunedin spelling tests: A report from the Dunedin Multidisciplinary Health and Development Study*. Dunedin: University of Otago.

Sinnott, R. (2000). The census and privacy in New Zealand: Do privacy concerns justify destruction of name-identified census forms? *Archifacts*, 25-49.

Solon, G. (1992). Intergenerational income mobility in the United States. *American Economic Review, 82*(3), 393-408.

Solon, G. (1999). Intergenerational mobility in the labor market. In O. C. Ashenfelter & D. Card (Eds.), *Handbook of Labor Economics* (Vol. 3, Part 1, pp. 1761-1800): Elsevier.

Solon, G. (2002). Cross-country differences in intergenerational earnings mobility. *Journal of Economic Perspectives, 16*(3), 59-66.

Soltow, L. (1965). *Towards income equality in Norway*. Madison: University of Wisconsin Press.

Statistics New Zealand (1996). *1996 Individual form*. Wellington: Statistics New Zealand.

Statistics New Zealand (1998a). *Ethnic groups (Census 96) (1996) - Reference reports.* Wellington: Statistics New Zealand

Statistics New Zealand (1998b). *New Zealand now: Housing (Census 96).* Wellington: Statistics New Zealand.

Statistics New Zealand (1998c). *People born overseas (Census 1996).* Wellington: Statistics New Zealand.

Statistics New Zealand (2005). *Statistical standard for ethnicity 2005.* Wellington: Statistics New Zealand.

Statistics New Zealand (2006). *The mathematics of electoral district allocation in New Zealand.* Wellington: Statistics New Zealand.

Statistics New Zealand (2010). Survey of Family, Income and Employment. Retrieved 14 January 2010, 2010, from http://www.stats.govt.nz/methods_and_services/completing-a-survey/individual-and-household-surveys/survey-of-family-income-and-imployment.aspx

Sullivan, A., & Vowles, J. (1998). Realignment? Maori and the 1996 election. In J. Vowles, P. Aimer, S. Banducci & J. Karp (Eds.), *Voters' victory? New Zealand's first*

election under proportional representation (pp. 171-191). Auckland: Auckland University Press.

Treasury (2001). *Reducing Māori and Pacific inequalities*. Wellington: The Treasury.

Vogel, T. (2006). *Reassessing intergenerational mobility in Germany and the United States: The impact of differences in lifecycle earnings patterns.* . Berlin: Humboldt University.

Vowles, J. (2002a). Offsetting the PR effect? Party mobilization and turnout decline in New Zealand, 1996-99. *Party Politics, 8*(5), 587-605.

Vowles, J. (2002b). The puzzle of turnout. In J. Vowles, P. Aimer, S. Banducci, R. Miller & A. Sullivan (Eds.), *Proportional representation on trial: The 1999 General Election and the fate of MMP* (pp. 99-113). Auckland: Auckland University Press.

Vowles, J., Aimer, P., Banducci, S., & Karp, J. (1998). Preface. In J. Vowles, P. Aimer, S. Banducci & J. Karp (Eds.), *Voters' victory: New Zealand's first election under proportional representation* (pp. xi-xiv). Auckland: Auckland University Press.

Ward, J. (2008). *Social mobility: Evidence paper*. Wellington: The Treasury.

Welch, D., & Wilson, M. (2009a). *Lifecourse factors associated with time spent receiving benefit in young adulthood: A note on early findings*. Wellington: Ministry of Social Development.

Welch, D., & Wilson, M. (2009b). *Lifecourse factors associated with time spent receiving main benefits in young adulthood: Full report on early findings*. Wellington: Ministry of Social Development.

Western, B., & Jackman, S. (1994). Bayesian inference for comparative research. *American Political Science Review, 88*(2), 412-423.

Wilson, M. (2002). Understanding New Zealand children's experiences of low family income: What could data integration add? *New Zealand Economic Papers, 36*(1), 89-91.

Wilson, M., & Soughtton, D. (2009). Children in families supported by main benefits: An update. *Social Policy Journal of New Zealand, 36*, 142-152.

Winch, R. F., & Campbell, D. (1970 (1969)). Proof? No. Evidence? Yes. The significance of significance. In D. E. Morrison & R. E. Henkel (Eds.), *The significance test controversy - a reader* (pp. 199-206). Chicago: Aldine.

Wooldridge, J. M. (2006). *Introductory econometrics: A modern approach*. Mason: Thomson.

World Bank (2008). *2005 International comparison program: Tables of final results.* Washington DC: World Bank.

Ziliak, S. T., & McCloskey, D. N. (2008). *The cult of statistical significance: How the standard error costs us jobs, justice, and lives*. Ann Arbor: University of Michigan Press.

Zimmerman, D. J. (1992). Regression toward mediocrity in economic stature. *The American Economic Review, 82*(3), 409-429.