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# GEOGRAPHIC INFLUENCES ON QUALITY OF EMPLOYMENT

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## Abstract

This paper explores the effects of geographic context on the quality of the jobs people get, specifically the impact of postcode socio-economic status (SES) on their occupational status. Although less used in economics, occupational status -- perhaps sociology's most widely used variable -- provides a robust and reliable measure of job quality which some economists regard as good measure of permanent income. There are several complications in estimating the impact of postcode SES. (1) People living in poor postcodes tend to be from disadvantaged families themselves, so individual-level data are needed to control for that. Our analysis controls for family background using a comprehensive model combining both class and status elements. (2) People can choose for themselves where to live, so living in a high SES postcode is in part a consequence of occupational success, rather than a cause of it. Hence we need to know where people grew up, not just where they currently live. (3) There is appreciable random measurement error in postcode SES, which leads to biased and inconsistent estimates. Our analysis is based on data are from several large, representative national samples from the International Social Science Survey/Australia (ISSS) and uses structural equation (LISREL) models to correct for measurement error. The results suggest that, other things being equal, growing up in a low SES postcode is only a slight occupational disadvantage. The disadvantage comes about entirely because children in low SES postcodes get less education than comparable children in high SES postcodes.

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This paper explores the effects of geographic context on the quality of the jobs people get, specifically the impact of postcode socio-economic status (SES) – a comprehensive and reliable measure of locational advantage – on their occupational status.<sup>1</sup> Occupational status provides a robust and reliable measure of job quality, ranging from farm workers (mostly unskilled, ill-educated, and poor) at the bottom of the hierarchy to professional occupations at the top (mostly highly skilled, well educated, and prosperous). Although less used in economics, occupational status is one of sociology’s most widely used variables and some economists regard as good measure of permanent income (Blau and Duncan 1967; Featherman and Hauser 1978; Ganzeboom, Luijkx and Treiman 1989; Haller and Portes 1973; Kelley and Evans 1995).

At first glance it would seem that growing up in a community full of well-educated, prosperous people in high status occupations would confer a great advantage. Certainly, the fate of children who grew up in, for example, Sydney’s salubrious harbour-side suburbs differs from the fate of children who grew up in unappealing inner suburbs surrounded by poor, ill-educated, low-skilled workers. So the image in the mind of many politicians and social commentators is stark. Moreover, perusal of ABS postcode data confirms sharp differences between postcodes. So it is easy to make a seemingly persuasive case about geographical disadvantage (for example, by the Deputy Leader of the Labor Party: “we see very clearly that success in education and the labour market are highly polarised depending on where you live” [Macklin 2002]). But is geography really an advantage to some and a disadvantage to others?

There are several complications in estimating the impact of postcode socioeconomic status. (1) People living in poor postcodes tend to be from disadvantaged families themselves, so individual-level data are needed to control for family background to ensure that postcode effects are not confounded with socio-demographic disadvantage (e.g. Mirowsky and Ross 1986; Jencks and Mayer 1990). Our analysis controls for family background using a comprehensive model combining both class and status elements. (2) People can choose for themselves where to live, so living in a high SES postcode is in part a consequence of occupational success, rather than a cause of it. Hence we need to know where people grew up, not just where they currently live. Our analysis, based on data are from several large, representative national samples from the International Social Science Survey/Australia (ISSS), has such data. (3) There is appreciable random measurement error in postcode SES, which leads to biased and inconsistent estimates. Our analysis uses structural equation (LISREL) models to correct for measurement error in postcode SES.

Plan of the paper. Section 1 gives our theory. Section 2 describes the key outcome, occupational status. Section 3 describes the data and presents our baseline model of family background and demographic effects. Section 4

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<sup>1</sup> This paper is taken from a larger report to the Department of Family and Community Services (FaCS), Commonwealth of Australia. FaCS is not responsible for the views presented here.

describes the measure of postcode socioeconomic status, and addresses some of the difficulties involved in estimating its impact. Section 5 presents our main results on the impact of postcode socioeconomic status. Section 6 concludes with a brief discussion.

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## 1. Theory

There are many ways in which growing up in a high SES area could be an advantage, recreating within a single country an echo of the manifold differences evident in comparisons between richer and poorer nations (World Bank 2001). One important possibility is that schools and other infrastructure in high SES areas is better than in low SES areas. Another is that the industrial and occupational structure in high SES areas is more favourable, so that getting high status jobs is easier, *ceteris paribus*. Another possibility is that levels of social capital will be greater in high SES areas, conferring an educational advantage on children growing up there (e.g. Putnam 2000).

Empirical evidence generally suggests that educational and occupational success depends not only on parental characteristics but also on the composition of the local neighbourhood (e.g. Piketty 2000; Kremer 1997).

Additive model:

$$Status = \sum FamilyBackground_i + \sum DemographicVariables_i + PostcodeSES + e \quad [Eq. 1]$$

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## 2. Occupational status

The measure of occupational status we use Kelley's Worldwide Status Scores (Kelley 1990: 344-346; Kelley and Evans 2002), which are conceptually similar to Duncan's SEI scores and, in the United States, interchangeable with them. It is based on Treiman's (1977: 203-208) 14 category classification, in turn based on the major groups of the International Labour Office's International Standard Classification of Occupations (ILO, 1968) with further distinctions within major groups based on Treiman's prestige scores. Occupational status refers to present occupation for those currently employed, or to past occupation for those not now employed, or to spouse's occupation if no other information is available.<sup>2</sup> Occupations were initially coded into the 4-digit Australian Standard Classification of Occupations; and thence recoded into Worldwide Status Scores. These scores range from 0 to 100.

In constructing the status scores, we assume that the true status of an occupation is intimately related to the education of incumbents (well educated people get the

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<sup>2</sup> This procedure typically leaves under 10 percent of respondents with missing data on occupational status. We have regularly found that including a "no occupation" dummy variable in an analysis makes little difference to the substantive results and so, for simplicity, we omit it.

best jobs), to their income (high status jobs command larger rewards), and to the success of their children in the next generation (high status jobs provide resources that can be used to give children a head start in life). If so, and if Treiman's 14 categories give groups of occupations with similar status, then it follows that a scoring scheme (applied to the 14 categories) that maximizes the correlation between them and education, or income, or occupation in another generation would reflect the true status of occupations in each group. This scoring scheme can be found from a canonical (or, equivalently, discriminant) analysis -- for example, Klatzky and Hodge's (1972) procedure using only occupation in two generations. Rather than relying on a single pair of variables, we prefer a variant of Duncan-Jones' (1972) procedure predicting respondent's occupation (treated as a set of dummy variables without assumptions about rank) from education, income, and father's occupation (also scored as a set of dummy variables without assumptions about rank). We applied this procedure to individual level data from 16 countries, obtaining entirely independent scores for each. As the resulting scores are invariant under a linear transformation, there is no natural unit nor zero point; we have therefore (arbitrarily but conveniently) normed them from a low of zero to a high of 100.

These results suggest that occupational status hierarchies are much the same throughout the world. Table A1 shows the (product-moment) correlations between hierarchies in 16 societies. The correlations are high, averaging 0.84. Indeed, this is slightly higher than the correlation Treiman found among prestige scores around the world. Furthermore, the similarity holds not just for western industrial societies but is equally apparent for the developing societies of Latin America, Africa, and Asia; correlations between industrial and developing societies average 0.82. Poland, though communist, is little different from the rest of the world. By far the lowest correlations involve Finland but since the other three Scandinavian countries are in no way unusual and the Finnish sample is the smallest analyzed (N=345), we attribute this to sampling error.

Since occupational status is essentially the same throughout the world, it is reasonable to construct a single scale for use throughout the world. We did this simply by averaging the scores for each country and norming the result to range again from zero to 100. These worldwide status scores are given in the text below.

Higher professionals -- the traditional free professions -- are clearly at the top of the hierarchy. Administrators are well behind, closely followed by technical employees, with higher clerical and higher sales employees coming next. Then there is a distinct gap; below that, the bottom of the white collar hierarchy overlaps with skilled manual workers. Ordinary semi-skilled workers follow next, then unskilled, followed by farmers and farm labourers at the bottom.

**Table A1. Correlations among socioeconomic status scores for 16 societies; decimals omitted.[1]**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Industrial Nations</b>															
1. USA															
2. Australia	82														
3. Denmark	86	91													
4. Finland	63	28	73												
5. Germany	90	89	91	63											
6. Britain	92	91	93	43	99										
7. Netherlands	93	84	96	61	84	91									
8. N. Ireland	79	53	81	60	75	92	87								
9. Norway	88	82	90	67	87	89	92	78							
10. Poland	84	87	91	89	89	86	89	99	98						
11. Sweden	91	91	97	69	99	99	95	79	99	94					
<b>Developing nations</b>															
12. Bolivia	94	87	94	84	91	96	99	87	94	92	95				
13. Kenya	92	90	84	44	83	79	88	97	96	94	94	99			
14. Malaysia	79	63	72	70	62	77	80	93	84	93	78	84	96		
15. Philippines	89	70	81	57	73	84	92	94	93	93	93	98	97	89	
16. Taiwan	82	69	69	78	51	65	84	88	82	78	76	98	93	82	92

[1] Computed over occupational groups, not individual respondents.

Table xx. Occupational status scores

<i>Status</i>	<i>Group (Definition: ISCO major group; Treiman prestige)</i>
<b>100</b>	<b><i>Higher professionals</i></b> (ISCO 0 or 1; prestige 58 or more) -- lawyers, doctors, dentists, pilots, engineers, accountants, academics, secondary school teachers, economists, etc.
<b>75</b>	<b><i>Administrators and managers</i></b> (ISCO 2; any prestige) -- managing directors of companies, sales managers, bank managers, parliamentarians, high ranking bureaucrats, etc.
<b>70</b>	<b><i>Technical employees</i></b> (ISCO 0 or 1; prestige under 58) -- computer programmers, nurses, primary school teachers, librarians, artists, social workers, etc.
<b>60</b>	<b><i>Higher clerical employees</i></b> (ISCO 3; prestige 41 or more) -- clerks, secretaries, bookkeepers, bank tellers, etc.
<b>51</b>	<b><i>Higher sales employees</i></b> (ISCO 4; prestige 40 or more) -- owners of retail stores, sales representatives, insurance agents, wholesale managers, etc.
<b>38</b>	<b><i>Routine clerical workers</i></b> (ISCO 3; prestige under 41) -- filing clerks, postal clerks, telephone operators, etc.
<b>37</b>	<b><i>Skilled manual workers</i></b> (ISCO 7, 8 or 9; prestige 38 or more) -- mechanics, machinists, master craftsmen, foremen, television repairmen, locomotive drivers, etc.
<b>33</b>	<b><i>Skilled service workers</i></b> (ISCO 5; prestige 27 or more) -- restaurant managers, policemen, cooks, hairdressers, etc.
<b>32</b>	<b><i>Routine sales workers</i></b> (ISCO 4; prestige under 40) -- shop assistants, sales clerks, etc.
<b>24</b>	<b><i>Ordinary semi-skilled workers</i></b> (ISCO 7, 8 or 9; prestige 26 to 37) -- carpenters, plumbers, sheet metal workers, drivers, painters and decorators, bricklayers, etc.
<b>18</b>	<b><i>Unskilled service workers</i></b> (ISCO 5; prestige under 27) -- waiters, bartenders, cleaners, etc.
<b>14</b>	<b><i>Unskilled manual workers</i></b> (ISCO 7, 8 or 9; prestige under 26) -- labourers, porters, garbage collectors, etc.
<b>10</b>	<b><i>Farmers</i></b> (ISCO 6; prestige 34 or more) -- farm owners, farm foremen, etc.
<b>0</b>	<b><i>Farm labourers</i></b> (ISCO 6; prestige under 34) -- farm workers, tractor drivers, fishermen, etc.

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### 3. Data, methods and baseline model

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#### Data

The IsssA surveys are from simple random samples of Australian citizens drawn by the Electoral Commission from the compulsory electoral roll. They are conducted by mail using a modification of Dillman's (1993) Total Response Method. First, a personally addressed preliminary letter announces the survey, then the survey itself arrives in the post some weeks later. For non-respondents, this is typically followed by four follow-up mailings, two with fresh copies of the questionnaire, over a six to 12 month period. Completion rates (defined as completions as a percentage of the sum of completions and refusals) run around

60 to 65 per cent, which compares favourably with recent experience in Australia, the USA, and many other industrial nations -- for example, the well-regarded International Crime Victim Survey averaged 41 per cent in 14 nations (van Dijk, Mayhew and Killias,1990).

Benchmarking information comparing the IsssA surveys to the Census (on the limited range of variables available in the Census) shows that the survey closely resembles the population as a whole but with under representations of very young adults whose frequent movements elude the electoral rolls and of the very old, some of whom are troubled by dementia and other conditions that make survey completion difficult (Sikora 1997; Evans and Kelley, 2002: Ch. 28). Further details are in Kelley and Evans (1999).

This analysis uses all cases with the relevant data from the IsssA Pooled File, 1984-2001. For the family background analysis, N=17,875. Questions on postcode when respondent was young were asked only in recent surveys, with N= 3,348; the structural equation analysis is based on 2,835 cases with complete information on all variables in the model.

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## Methods

Estimates for the baseline model are by ordinary least squares regression. For the analysis of postcode effects where data on geographic context are attached to the individual-level records, standard errors for contextual variables are biased, usually downwards (DiPrete and Forrestal 1994), which can be corrected using a variance-components multilevel model (e.g. Hox 1995). However, preliminary analysis showed the bias to be negligible for the problem at hand (there are over 2000 postcodes in Australia), so we have not used these methods. We correct for random measurement error in postcode SES using structural equation (LISREL) models (Joreskog and Sorbom1989) using Arbuckle and Wothke's (1999) AMOS program.

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## Baseline model: Effect of family background on occupational status

One complication in estimating the effect of postcode SES on occupational status is that people living in poor postcodes tend to be poor themselves: less educated, in worse jobs, and with lower incomes. So to compare like with like, you need to take that into account. Specifically, you need to have individual level data (not just aggregate data for the postcode as a whole). For the issues at hand, in addition to the postcode these data would need to include father's occupational status, parents' education and other variables characterizing the family respondent grew up in.

The impact of family background on occupational status has of course been widely studied, most notably in the vast tradition of sociological research stemming from the Blau-Duncan paradigm (Blau and Duncan 1967; Featherman

and Hauser 1978).<sup>3</sup> Subsequent developments included class models (e.g. Erickson and Goldthorpe 1992; Wright 1985), models incorporating both class and status elements (e.g. Robinson and Kelley 1979), and many others. Our model is in the comprehensive tradition, incorporating both class and status aspects of family background and a variety of ascriptive factors (sex, age, ethnicity, immigration, religion, marriage, divorce):

$$\begin{aligned} \text{Status} = & b_0 + b_1\text{Male} + b_2\text{Mig1Gen} + b_3\text{Mig2nd} + b_4\text{LnUrbanAtAge14} + b_5\text{Siblings} \\ & + b_6\text{ParentsEducation} + b_7\text{BooksInParentalHome} + b_8\text{FathersOccupationalStatus} \\ & + b_9\text{FatherSupervisor} + b_{10}\text{FatherSelfEmployed} + b_{11}\text{ParentsIncome} \\ & + b_{12}\text{ParentsAge} + b_{13}\text{ParentsDivorced} + b_{14}\text{MotherWorked} + b_{15}\text{PrivateSchooling} + e_2 \quad [\text{Eq. 2}] \end{aligned}$$

We also extended the model to include life-cycle variables and education:

$$\begin{aligned} \text{Status} = & [\text{Eq. 2}] \\ & + b_{16}\text{Married} + b_{17}\text{SpouseInLF} + b_{18}\text{ChildrenAge0_5} + b_{19}\text{ChildrenAge6_16} \\ & + b_{20}\text{LnChurchAttendance} + b_{21}\text{YearOfSurvey} \\ & + b_{22}\text{CompletedSecondarySchool} + b_{23}\text{CompletedUniversity} \\ & + b_{24}\text{Age25_34} + b_{25}\text{Age45_54} + b_{26}\text{Age55_64} + e_3 \quad [\text{Eq. 3}] \end{aligned}$$

All these variables are measured conventionally; details are in Evans and Kelley (2002: Ch. 28).

### *Effects of family background*

Family background has a major impact on occupational success: children from high ranking families do well themselves in the occupational world (Table 3.1). This is well known for Australia (e.g. Broom, Jones, McDonnell and Williams 1980) and throughout the world (Ganzeboom, Luijkx, and Treiman 1989; Kelley 1978). Less well known are the relative importance of various aspects of family background – it is not just father’s occupational status that matters, or parents’ education, or parents’ income. Rather many things about the family one grows up in matter, some more than others. Specifically :

- o The most important single thing is **father’s occupational status**, with a standardised effect of .13. If two children grew up in families with similar education, income, ethnicity and so forth, differing only in that the father was an unskilled labourer (status=0) in one and a professional in the other (status=100), the child from the professional home could expect to get a job 13 status points higher. For example, he might be a skilled manual worker rather than a semi-skilled worker; or an administrator rather than a higher clerical employee. That is a real advantage, although not an overwhelming one.

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<sup>3</sup> The Blau-Duncan paradigm led to a flowering of research unprecedented in sociology. Robust findings about stratification emerged first for the US (Blau and Duncan 1967; Duncan, Featherman and Duncan 1972) and soon afterward for many other countries, including Britain and Australia in the western industrial world (Broom and Jones 1969); Poland and Hungary in Eastern Europe (Zagorski 1984); and developing and even tribal societies (Kelley 1978). A Kuhnian (1962) "normal science" of social stratification was the outcome.

- o **Parents' education** is also important, with a standardised effect of .09. For example, the child of university educated parents (16 years of education) could expect to get a job 6 points higher than the child of parents who both left school at year 9, all else equal.<sup>4</sup>
- o Fathers who are **supervisors** also get their children jobs 5 points higher, on average and other things being equal.
- o **Self-employed** fathers, in contrast, are hardly able to give their children any advantage – only about 1 status point.
- o Families that are inclined toward the **literary culture** and have many books around the house also provide a small advantage to their children, other things being equal.
- o Surprisingly, **family income** does not seem to confer any discernable advantage on their children. While there is some uncertainty in this estimate for technical reasons,<sup>5</sup> we feel reasonably confident in claiming that family income is, at most, only a minor influence. In political discussions, “rich families” are a potent symbol of privilege. But in reality it is more their advanced education and high status jobs that confer an advantage on their children.

[Table 3.1 about here]

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<sup>4</sup> Viz  $.87 * 16 - .87 * 9 = 5$ .

<sup>5</sup> We have no direct measure of family income because survey respondents are not generally able to provide reliable information on their parents's income. They do, however, provide reliable information on their parents' education, occupation, supervision, labour force participation and the like. We estimated parents' income from those known facts in the following way. (1) First, we estimated the impact of education, occupation, supervision, labour force participation and the like on the (log of) family income of contemporary families by OLS regression. (2) Next, we assumed that this relationship held equally in the past, and so predicted their parents' income on the basis of their *parents'* education, occupation, labour force participation, and the like. The resulting estimate is provides a plausible but by no means perfect proxy for family income, and we used this proxy in the analysis. An alternative would be to use a measure based on the possessions (house, car, VCR etc) which we have in several of our surveys. We did not do that because, other things being equal, older families are much less likely to have these possessions than younger families (cars, for example, were rare in the past and VCRs non-existent). Since age is linked to education and other key variables, that produces a serious bias.

**Table 3.1:** Effects of family background on occupational status: OLS regression estimates. Men and women, aged 25 and over. N=17,875.[1]

Variable	b	s.e.	Standardized	t
Male	0.77	0.47	n.s.	1.62
Migrant: 1st generation	0.68	0.58	n.s.	1.18
Migrant: 2nd generation	2.13	1.01	0.02	2.12
Urban at 14 (ln)	0.78	0.07	0.11	11.48
Number of siblings	-0.25	0.03	-0.07	-8.20
Parent's education	0.87	0.10	0.09	8.39
Books in parents' home	0.01	0.00	0.06	6.73
Father's status	0.13	0.01	0.13	11.72
Father supervises	5.00	0.68	0.07	7.32
Parents income	-0.85	0.68	n.s.	-1.24
Father self-employed	1.35	0.57	0.02	2.36
Parents' age	0.16	0.04	0.04	4.03
Parents divorced	-2.46	0.81	-0.03	-3.05
Mother worked	0.71	0.74	n.s.	0.97
Private school	7.18	1.45	0.04	4.94
(constant)	32.26	7.17		

[1] Adjusted R<sup>2</sup> = .11.

Other aspects of the family matter only a little. Once again, the baleful consequences of **parental divorce** appear: The children of divorced parents get jobs about 2.5 points lower, on average, than their peers from intact families. **Older parents** do a little better by their children, as has been found in a number of other studies. **Mothers who work** confer no occupational advantage on their children, but neither do they impose a disadvantage.<sup>6</sup>

Perhaps surprisingly, ascriptive factors matter little. **Men** get no better jobs, and no worse jobs, than women. If there is sex-based discrimination, it comes not in hiring and firing (nor in education), but in income.

**First generation migrants** do neither better nor worse than native-born Australians – a counter-intuitive but long established finding (Evans and Kelley 1991). Migrants in the **second generation** may even do fractionally better than the native-born, other things equal.

Parents who send their children to **private school** provide them with a substantial 7 point advantage in occupational status. This is consistent with much other evidence that private schooling provides a substantial educational advantage (e.g. Evans and Kelley 2002: Ch. 6). As a consequence, it indirectly provides an occupational advantage (compare private schooling's effect in Table 3.1 with its effect controlling education in Table 3.2 below).

Coming from a family with a large **number of siblings** is a small but real educational disadvantage, as is well known.

<sup>6</sup> There is, however, a small effect on education with the children of highly educated working mothers suffering a disadvantage (Evans and Kelley 2002: Ch. 4).

### *Effect of family structure, education, and religion*

Family structure has no appreciable effect on occupational status (Table 3.2). The **married** and the single have equally good (or bad) jobs. People with **children** get no better and no worse jobs than the childless. Nor does it matter whether one's **spouse is in the labour force** or not. **Age** matters little. People in their late 20s and early 30s have slightly lower status jobs than those further along in their careers. But by the late 30s, people are settled into jobs as good -- or as bad-- as they will have later in life: there is, on average, neither an occupational premium to older workers, nor an occupational cost to them.

[Table 3.2 about here]

**Table 3.2:** Effects of family structure, education and religion on occupational status:OLS regression estimates. Men and women, aged 25 and over. N=17,875.[1]

Variable	b	s.e.	Standardized	t
Male	-0.59	0.45	n.s.	-1.31
Migrant: 1st generation	-1.87	0.54	-0.03	-3.48
Migrant: 2nd generation	1.23	0.93	n.s.	1.33
Urban at 14 (ln)	0.57	0.06	0.08	9.22
Number of siblings	-0.13	0.03	-0.04	-4.68
Parent's education	0.28	0.10	0.03	2.93
Books in parents' home	0.00	0.00	n.s.	0.40
Father's status	0.07	0.01	0.07	6.63
Fathr supervises	2.50	0.63	0.04	3.97
Parents income	-0.78	0.62	n.s.	-1.25
Father self-employed	-0.54	0.52	n.s.	-1.03
Parents' age	0.02	0.04	n.s.	0.59
Parents divorced	-1.14	0.74	n.s.	-1.55
Mother worked	0.97	0.69	n.s.	1.40
Private school	0.60	1.36	n.s.	0.44
Married	0.74	0.60	n.s.	1.22
Spouse in labor force	0.22	0.52	n.s.	0.43
Children: Pre-school	0.07	0.68	n.s.	0.11
Children: School age	-0.44	0.51	n.s.	-0.86
Church attendance (ln)	0.71	0.13	0.05	5.42
Catholic	-1.20	0.54	-0.02	-2.22
Year of survey	-0.04	0.04	n.s.	-0.93
School: Complted year 12	14.44	0.57	0.27	25.46
University graduate	19.17	0.67	0.29	28.68
Age 25-34	-4.85	0.60	-0.08	-8.08
Age 35-44 (reference)				
Age 45-54	0.66	0.61	n.s.	1.08
Age 55-64	-0.40	0.71	n.s.	-0.56
(constant)	39.51	6.60		

[1] Adjusted R<sup>2</sup> = .32.

Success in **school** and **university** pays enormous occupational benefits, as is true in all known societies, rich and poor, modern and ancient. Other things being equal, someone who completes year 12 at school gets a job 14 status points higher than an early school leaver. A university graduate gets jobs 19 points above an early school leaver's job.

Most of the occupational advantage that stems from family background comes about indirectly through its impact on education. For example, the children of well **educated parents** had an advantage of .09 in standardised terms compared to children with otherwise similar family background (Panel 1). But compared to others with similar family background **and** education (Panel 2), their advantage drops by two-thirds, to .03. All the advantages of growing up in a cultured family with many **books** comes about in this indirect way. But only half of the advantage of having a **high status father** comes about in this way (.13 to .07) – high status fathers can help you directly into a good job, as well as helping you through school.

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#### 4. Measuring postcode socio-economic status

Using postcode level data from the census (Australian Bureau of Statistics 1996), we developed objective measures of neighbourhood quality. To this end, we winnowed the wide variety of affluence measures that are available in the ABS postcode data to find those that best discriminate among neighbourhoods. We also examined the other traditional elements of socioeconomic status measures – placement in the occupational hierarchy, educational level, engagement in work. To evaluate the various possible measures, we assessed descriptive statistics and listings of cases to check data quality, and examined data structures to see whether items that we hoped to combine into multiple-item indices (because they are theoretically linked and because combining into multiple-item indices reduces random measurement error) have the kinds of relationships that permit us to do this. For these purposes, we used exploratory factor analysis: Combining items into a multiple item index or scale is only justified if they are really multiple measures of the same thing. In addition to conceptual similarity, this means that they should all be highly correlated with each other, that exploratory factor analysis should find that they all belong on a single “factor” or “dimension”, and that their correlations with criterion variables should be proportional to their factor loadings. The multiple-item indices constructed in this way are our objective socioeconomic measures of neighbourhood quality.

ABS data include a variety of possible indicators of the socioeconomic status of postcodes, from which we have harvested a set that cover important dimensions of socioeconomic status – the percentage of postcode residents who hold university degrees, the percentage who left school at 14, the percentage who work in professional occupations, the percentage who work as labourers, and the earnings of prime age men. These variables are shown by factor analysis to cohere well, substantiating our expectation that the various indicators are all measures of a single, uni-dimensional underlying construct [see Appendix table A]. The resulting scale is very similar to ABS socio-economic status indicators (ABS 1998; Martin 1994: 129-136, 183-229).

[Appendix table A about here]

**Appendix Table A.** Factor analysis of postcode socio-economic characteristics, 1996. N= 2,364 postcodes.[1]

<b>Panel A: Variables</b>			Mean	s.d.
1. % left school at age 14			8.4	6.3
2. % university educated			17.6	6.3
3. % labourers			14.2	7.5
4. % professional			10.8	5.4
5. Earnings, prime age men			\$595 week	199

  

<b>Panel B: Correlations</b>				
	(1)	(2)	(3)	(4)
1. % left school at age 14	1.00			
2. % university educated	-0.58	1.00		
3. % labourers	0.50	-0.56	1.00	
4. % professional	-0.53	0.92	-0.58	1.00
5. Earnings, prime age men	-0.66	0.70	-0.54	0.65

  

<b>Panel C: Maximum likelihood factor analysis (preferred) [2]</b>		
	Factor loading	Factor scores
1. % left school at age 14	-0.60	-0.03
2. % university educated	0.97	0.62
3. % labourers	-0.60	-0.03
4. % professional	0.94	0.30
5. Earnings, prime age men	0.72	0.05

  

<b>Panel D: Principal axis factor analysis (alternative)</b>		
	Factor loading	Factor scores
1. % left school at age 14	-0.69	-0.13
2. % university educated	0.92	0.46
3. % labourers	-0.66	-0.12
4. % professional	0.88	0.19
5. Earnings, prime age men	0.80	0.21

  

<b>Panel E: Correlations among alternative factor scores</b>		
	Maximum likelihood	Principal axis
Maximum likelihood	--	0.977
1. % left school at age 14	-0.686	-0.680
2. % university educated	0.867	0.747
3. % labourers	-0.604	-0.566
4. % professional	0.823	0.697
5. Earnings, prime age men	0.959	0.997

[1] Postcode socio-economic characteristics are from the 1996 Census: Australian Bureau of Statistics, *1996 Census of Population and Housing: Basic Community Profile*. Canberra: Commonwealth of Australia 2000.

[2] Scale reliability: standardized item alpha = .89.

## Difficulties in measuring the effect of postcode SES

A fundamental complication in estimating the effect of postcode SES on occupational status is that people can choose for themselves where to live. Someone who starts life in a poor area but does well in school, gets a high status professional job, and earns a lot of money can then buy a house in the most

salubrious of suburbs. Conversely, someone else born into a rich area who does poorly in school and gets a modest job may find he can no longer afford to live in the good suburb and must perforce move to a cheaper one. In short, living in a good suburb is in part a *consequence* of success, not a cause of it. The implication is that we need to know where people grew up, not just where they live now. But finding data to deal with this complication is not so easy, as few surveys ask for postcode in childhood. Fortunately, the IsssA surveys began to include this question in the mid-1990s, so we do have some data of the sort required, albeit for only a moderate number of cases (about 3,000).

An alternative possibility would be to use current postcode as a surrogate for childhood postcode. This might well work in times and places where migration is rare – as it was in many countries in earlier centuries, or as it is in nations like China and Russia today which control restrict migration. However Australia is not such a nation, as can be seen by comparing postcode now with postcode in childhood (Table 3.3).

[Table 3.3 about here]

**Table 3.3.** Correlations: SES of postcode of curent residence, SES of postcode at age 14, and selected variables. N=3,348 men and women with complete data on both postcode questions.

	SES of postcode now	SES of postcode at age 14
SES of postcode now	1.00	0.33
SES of postcode at age 14	0.33	1.00
Education (years)	0.26	0.14
Occupational status	0.27	0.17
Supervisor	0.09	0.01
Family income (ln)	0.22	0.11

In Australia, current postcode SES is a poor proxy for childhood postcode SES (column 1). The product-moment correlation is only .33. Moreover, there is clearly selective migration, as the correlation between current postcode SES and education is noticeably higher than the correlation between education and childhood postcode (.26 versus .14). Similarly, occupational status is much more highly correlated with postcode now than with childhood postcode (.27 versus .17). The same is true of income (.22 and .11).

### *Some misleading estimates of the effect of postcode SES*

These complications make it easy to be misled about the effect of postcode SES.

(A) It is instructive to begin with an analysis that ignores all the complications and just compares people in rich and poor postcodes (as many social commentators and politicians do). This is done in the Panel A of Table 3.4. It seems to show that postcode SES has a huge impact on occupational status, with a standardised effect of fully .28. This effect is clearly statistically significant ( $t=31.2$ ,  $p<.001$ ).

[Table 3.4 about here]

**Table 3.4:** Alternate estimates of the effect of postcode SES on occupational status: OLS regression estimates. Men and women, aged 25 and over. [1]

Variable	b	s.e.	Standardized	t
<b>Panel A. Postcode now, no controls</b>				
SES of postcode	0.28	0.01	0.28	31.32
<b>Panel B. Postcode now, controlling for family background [2]</b>				
SES of postcode	0.21	0.01	0.20	19.95
<b>Panel C. Postcode at age 14, controlling for family background [2]</b>				
SES of postcode	0.04	0.02	0.05	2.32

[1] N=11,716 for Panels A and B. Postcode at age 14 was asked only in recent surveys and has substantial missing data, so for Panel C N= 3,348.

[2] Controlling for Migrant: 1st generation; Migrant: 2nd generation; Urban at 14 (ln); Number of siblings; Parent's education; Books in parents' home; Father's status; Father supervises; Parents income; Father self-employed; Parents' age; Parents divorced; Mother worked; and Private school.

(B) Next, consider an analysis that (correctly) adjusts for differences in the kind of people who live in high and low SES postcodes, drawing on individual level data with an extensive battery of questions on family background (Panel B of Table 3.4). This also suggests that postcode SES has a major impact on occupational status, with a standardised effect of fully .20. That effect is also clearly significant statistically ( $t=19.95$ ,  $p<.001$ ).

(C) Third, consider an analysis that (correctly) adjusts for differences in the kind of people who live in different postcodes and (also correctly) measures SES for the postcode they lived in childhood (Panel C of Table 3.4). This suggests a much smaller postcode effect, around .05 in standardised terms. It seems statistically significant ( $t=2.32$ ,  $p<.05$ ), although uncertainties in model specification and limits on the range of control variables leave one with some unease. A Scottish verdict of “suspicious but not proven” would be indicated. But there is a further complication: measurement error.

## 5. Effects of postcode SES

In estimating the effect of postcode socio-economic status, random measurement error poses a serious difficulty. We have measured postcode SES using five seemingly sensible indicators, but they (or any other set of indicators) can not completely characterise a postcode's SES. Even if we assume (optimistically) that demographic and family background measurements have little measurement error, measurement error in postcode SES can entirely vitiate our analysis.

It has long been known that measurement error leads to biased and inconsistent results – errors that are often large, usually unpredictable in direction, and cannot be cured simply by getting larger samples (Arbuckle and Wothke. 1999; Joreskog and Sorbom 1989; for a striking example, see Kelley 1973). Without some attempt to deal with this fundamental difficulty, we cannot know whether or not postcode SES has any effect at all. Correcting for attenuation due to random measurement error using a structural equation (LISREL) model provides our preferred estimate of the effect of childhood postcode SES on occupational status (Table 3.5, Model 1).

*Results: Postcode SES and occupational success*

These results suggest that the socio-economic status of the postcode one grows up in has a real, albeit modest, effect on occupational success, with those growing up in more advantaged areas getting slightly better jobs. These estimates are net of a wide range of controls for family background characteristics and are statistically significant.

[Table 3.5 about here]

**Table 3.5.** Structural equation (LISREL) models of the effects of family background and postcode SES, correcting for attenuation due to random measurement error in postcode SES at age 14. Models 1: effects on occupational status; Model 2: same, also controlling for education; Model 3: effects on education. Full information maximum likelihood estimates. N= 2,835 [1]

	Model 1:		Model 2:		Model 3:	
	Occupational status		Occupational status		Education (years)	
	Standardized	t	Standardized	t	Standardized	t
<b>Structural model:</b>						
SES of postcode at 14	0.10	4.51	n.s.	1.89	0.11	5.28
Parent's education	0.07	3.53	n.s.	-0.76	0.15	7.51
Father's status	0.13	5.80	0.05	2.41	0.14	6.82
Father supervises	0.04	2.05	0.01	0.61	0.05	2.78
Parents' income	n.s.	-0.76	-0.01	-0.77	n.s.	-0.21
Father self-employed	n.s.	0.63	-0.03	-2.03	0.07	4.17
Parent divorced	-0.05	-2.59	n.s.	-0.87	-0.06	-3.36
Mother worked	n.s.	-0.25	n.s.	-1.33	n.s.	1.53
Migrant: 1st generation	0.04	2.03	n.s.	1.46	n.s.	1.47
Male	n.s.	1.94	n.s.	-1.13	0.09	5.18
Married	n.s.	-1.54	n.s.	1.83	-0.11	-5.53
Spouse in labor force	0.05	2.43	n.s.	-0.95	0.12	5.81
Children: Pre-school	n.s.	-0.61	n.s.	-1.75	n.s.	1.53
Children: School age	n.s.	-1.63	-0.04	-2.11	n.s.	0.22
Church attendance (ln)	0.08	4.34	n.s.	1.94	0.09	4.90
Age 25-34	n.s.	-1.66	-0.08	-4.17	0.07	3.27
Age 45-54	n.s.	-0.33	n.s.	0.04	n.s.	-0.66
Age 55-64	n.s.	-1.54	n.s.	1.90	-0.11	-5.63
Year of survey	0.05	2.54	0.03	2.03	n.s.	1.52
Urban at 14 (ln)	0.08	3.74	0.08	4.33	n.s.	0.25
Education (years)	--	--	0.58	35.52	--	--
<b>Measurement model (postcode characteristics)</b>						
% university educated	0.95	--	0.95	--	0.95	--
% left school at age 14	-0.75	-55.08	-0.75	-55.08	-0.75	-55.10
% professional	0.97	115.17	0.97	115.18	0.97	115.15
% labourers	-0.84	-71.46	-0.84	-71.46	-0.84	-71.46
Earnings, prime age men	0.83	69.56	0.83	69.57	0.83	69.58
Chi-square	2326.6		2330.0		2317.1	
Degrees of freedom	85		89		85	
Adj goodness of fit	0.77		0.77		0.77	

[1] All surveys for which the relevant data are available.

What matters about a postcode appears to be its effect on the educational attainment of children living in it (Table 3.5, Model 2). Once education is taken into account, the postcode SES effect dwindles into statistical insignificance (t=1.89, n.s.).<sup>7</sup>

## 6. Discussion

So the story is simple. In prosperous postcodes, children go a little longer to school, other things being equal (Table 3.4, Model 3). The reason they get more schooling is not clear from this analysis. It is probably not some unmeasured characteristics of their family background, as our model includes an unusually

<sup>7</sup> It is possible that there is some residual effect that would be found in a sample larger than ours, but even if so, it is certainly small.

comprehensive range of background controls. It might be that schools in rich postcodes are better. It might also, or additionally, be that postcode SES is reflecting the nature of the reference group among which children live. Educational research suggests that having academically inclined peers leads some children to emulate their friends and do well in school. It may also mean there is less disruption by disgruntled lower-class students in the schools, and hence less hindrances to academically inclined students performance.

But whatever the reason, educational success however achieved in turn leads to much better jobs. For that reason, and probably for that reason alone, the SES of the postcode one grows up in matters to one's occupational career.

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