Working paper on Intergenerational mobility in Nepal: Does land ownership really matter?*

Ashesh Shrestha & Arpita Nepal

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Abstract

Due to lack of longitudinal data in Nepal, a proper study of inter-generational mobility has to rely either on survey data or on repeated cross-sectional analysis. This paper uses two methods to study inter-generational mobility in Nepal. Firstly, we look at repeated cross sections to analyze which factors most influence inter-generational mobility. Secondly, we rely on building cohorts such as the one used by Borjas (1985) based on similarities of households and births to create a panel to study inter-generational mobility. We find that agrarian land ownership is not necessarily conducive to upwards mobility. Ownership of agriculture land contributes positively towards relative occupational mobility however, the effect of agriculture land depends on occupational rank of parents in relation to average occupational rank of the individuals of the district they were born in. Additionally, Agrarian land ownership has no significant effect on absolute inter-generational occupational mobility.

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1 Introduction

Nepal undertook land reform between 1951 and 1964. During this time, the practice of gifting land for political purposes by the elites and rulers in the form of *'Birta', 'Jagir', 'Rakam'and 'Jimidari'* (all non - taxed gifts) were abolished especially with the introduction of *'Birta Abolition Act'* in 1959. Early reports undertaken by the Government of Nepal on land reform repeatedly identify this history of feudalistic practices in land management as a major problem that perpetuated the advantages of the elites since land was the only source of capital formation and wealth in modern Nepal during that time (Khatri Chhetri 1986). This kind of narrative has continuously influenced popular opinion in Nepal. Land reform, therefore, has been a major political agenda in every election with all the major political parties election manifestos promising land redistribution as well as other kinds of agrarian reforms tied to land [1].

Based on this narrative, if the advantages of owning large tracts of land persists then this should have a positive effect on inter-generational mobility of children of land owners. Piketty (2000) highlighted the persistence of inequality based on wealth over inter-generational mobility and created an interesting debate in the academic and development world regarding wealth accumulation and distribution. Black and Devereux (2010) summarizes lessons learned from academic research in this area specifically focused on research in the developed world where the transmission of upward mobility

[1]For example, Nepali Congress (NC) in it's election manifesto of 2013 general elections talk about effective implementation of *'Land Use Act'* as well as introducing a law that establish the rights of local farming communities in the commercial use of genetic resources. Similarly, Communist Party of Nepal, Unified Marxists Leninist (CPN - UML) as well as Communist Party of Nepal, Maoists (CPN-M) in their joint election manifesto of 2017 general elections promised *'Scientific Management of Land'* which introduces classification of land based on land use policies as well as encouraging non-conversion of agricultural land into any other category. This manifesto also promises to encourage cooperative farming through subsidies in agriculture mechanization, fertilizers, seeds, technology and processing and storage.

happens through education or investment in human capital. Although, theories based on developed world data and research are extensive, the same claim cannot be made for developing world. It is a challenge to study intergenerational mobility in the developing world owing to the paucity of quality data that can be used to establish any kind of causations. Therefore, studies of intergenerational mobility in the developing world suffer from biases and measurement errors as extensively reported in the review by Emran and F. J. Shilpi (2019) .

2 Theoretical Model

For an individual i, nature determines the endowment of wealth $Wi \in [0, \infty)$. Given Wi, she optimally chooses occupation $Oi \in \{1, 2, 3, 4\}$ ranked in ascending order. We assume that the probability of success in higher ranked occupation increases with an increase in wealth[2]. Moreover, she is endowed with an innate ability $\alpha_i \in [0, 1]$ which determines her success in any occupation. It is highly likely that it is correlated with those of her parents through genetic transmission.[3] The innate ability is not observed but she can form an estimate of the innate ability utilizing the observed information (Emran and F. Shilpi 2011). The information set Ω_i includes educational attainment, place of birth, ethnicity, parent's occupation among others. The relative

[2]This assumption in an extension of the assumption made by Emran and F. Shilpi (2011) . They have considered farm and non-farm occupation and assumed that with higher endowment of capital stock, the probability of success in non-farm activities is higher

[3]Genetic transmission is believed to play an important role in inter-generational association of socioeconomic outcomes. Conley et al. (2015) suggest inter-generational correlation in education is influenced by genetic inheritance. In their raw child-parent education correlation, they found that one-sixth of the effect is through genetic transmission. Fagereng, Mogstad, and Rønning (2021) study difference in the inter-generational transmission of wealth between and within the families with and without biological children (adopted children). In both case, they find stronger transmission in biological children in compared to adopted children.

success in any occupation is determined by earnings from that particular occupation in comparison to earnings from other occupation. Our agent forms an expectation of income Yi from choice of her occupation given her wealth endowment and observed information set. Given the wealth endowment and the observed information set, agent's choice of occupation

$$= 1 \text{ if } E(Y_i|O_i = 1; W_i, \alpha_i; \Omega_i) \geq E(Y_i|O_i \neq 1; W_i, \alpha_i; \Omega_i)$$

$$= 2 \text{ if } E(Y_i|O_i = 2; W_i, \alpha_i; \Omega_i) \geq E(Y_i|O_i \neq 2; W_i, \alpha_i; \Omega_i)$$

$$= 3 \text{ if } E(Y_i|O_i = 3; W_i, \alpha_i; \Omega_i) \geq E(Y_i|O_i \neq 3; W_i, \alpha_i; \Omega_i)$$

$$= 4 \text{ if } E(Y_i|O_i = 4; W_i, \alpha_i; \Omega_i) \geq E(Y_i|O_i \neq 4; W_i, \alpha_i; \Omega_i)$$

But, parental occupation choice is a critical element of the information set. Parent's choice of occupation forms the primary basis for estimation of the one's own innate ability (genetic endowment). As innate ability is not directly observed, an expectation of the ability is formed conditioned on parent's occupational choice. [4] The ability parameter based choice can be summarized as follows.

$$= 1 \text{ if } E(\alpha_i|O_i = 1; ParentO_i = 1) \geq E(\alpha_i|O_i \neq 1; ParentO_i = 1)$$

$$= 2 \text{ if } E(\alpha_i|O_i = 2; ParentO_i = 2) \geq E(\alpha_i|O_i \neq 2; ParentO_i = 2)$$

$$= 3 \text{ if } E(\alpha_i|O_i = 3; ParentO_i = 3) \geq E(\alpha_i|O_i \neq 3; ParentO_i = 3)$$

$$= 4 \text{ if } E(\alpha_i|O_i = 4; ParentO_i = 4) \geq E(\alpha_i|O_i \neq 4; ParentO_i = 4)$$

[4]She will choose the same occupation as her parent only if the expected value of the ability parameter given her parent's choice exceeds the expected value of the ability parameter in all other occupation.

3 Data Description and Methodology

This research exploits Nepal living Standard Survey (NLSS) data to identify the effects of parental wealth on intergenerational socio-economic mobility proxied by occupational mobility. Living Standards surveys are primarily cross-sectional household surveys conducted across Nepal by the Central Bureau of Statistics (CBS) Nepal. So far CBS has conducted three rounds of living standard surveys using Living Standards Measurement Study (LSMS) developed by the World Bank; the first living standard survey was conducted in the year 1995/96, the second survey was conducted in 2003/4 and the third survey was conducted in the year 2010/2011. The total sample size of the household in the first NLSS is 3,388, the sample size in the second NLSS is 4008 and the sample size in the third NLSS is 7,200[5]. The main reason behind using NLSS survey data is that it is the only survey which collects information on the household characteristics and its members comprehensively. Much research conducted on the empirical analysis of the households have been conducted using the NLSS data (see (Emran and F. Shilpi 2011),Salike, Wang, and Regis (2022),Acharya and Roberto (2013), Tiwari, Shidiq, and Balcázar Salazar (2016)). Moreover, the research conducted by Emran and F. Shilpi (2011) studies inter-generational persistence of occupation in Nepal using NLSS data. Therefore, the use of NLSS data to study inter-generational mobility is warranted.

In order to identify how ownership of private property effect intergenerational socio-economic mobility, we have used two kinds of measurement of mobility, namely relative and absolute mobility. The strand of literature devoted to intergenerational mobility (see for instance Gregg, Macmillan, and Vittori (2017),Chen et al. (2015),Chen et al. (ibid.),Chetty et al. (2014), Blanden (2013),Dearden, Machin, and Reed (1997)) defines relative inter-generational mobility as the change in a child's ranking in

[5]Details on sampling methods and techniques are provided in NLSS reports.

comparison to their parent's ranking in the income distribution. If a child is born into bottom quartile of the distribution and moves into the second quartile, we can say that he/she has experienced relative mobility. Since we are attempting to investigate factors that influence occupational mobility, we define relative mobility differently. First, we calculate the average occupation of the individuals in a particular district measured by the highest number of individuals following a particular occupation. Any deviation from the average occupation is considered to be relative mobility. If an individual has a better job in comparison to the average jobs held by people in a particular district, then we say that the individual has experienced relative mobility.

While relative mobility considers distributional change in inter-generational income, absolute mobility measures actual change in inter-generational income. For relative mobility, absolute change in income is not a necessity. It depends upon the relative performance of other individuals who are considered within the same distribution. One can move up in the distribution even when other individuals in the distribution become worse-off. However, absolute inter-generational mobility requires increase in children's income in comparison to their parent's income in absolute terms. Therefore, absolute mobility is of greater interest to the economists. In our measure of absolute mobility, we measure change in occupational ranking of children in relation to their parent's occupational ranking.

Firstly, we look at repeated cross sections to analyze which factors most influence inter-generational mobility. In the cross-sectional analysis, we considered all the household with first-born children (hereafter children) above the age of 18. After taking a sub-sample of the household with first born child above the age of 18, we were left with 883 household in NLSS 1995/96. Likewise, repeating the same process in NLSS 2003/04 and 2010/11, we were left with the sub-samples of 1,267 households and 1,614 households respectively. As many observations had missing data on occupation and many reported

their occupation as "student" and "not working", they were excluded from our analysis.

Secondly, we build cohorts such as the one used by Borjas (1985) based on similarities of household and births to create a panel to study intergenerational mobility. We use NLSS data from 1995/96 to create a cohort of parent's generation. The average age marriage in the year 1995/96 was 19 years. We assumed that the first child is born within 1 year of marriage and therefore considered all the household heads (hereon heads or parents) above the age of 20. Additionally, the life expectancy at birth during the same year was 58 and all the household heads above the age of 58 are excluded. Thus, we have a parent's cohort which included all the household heads between that age of 20 and 58 inclusive. Based on the parental characteristics, we match each household from our parent's cohort to the households from 2010/11 NLSS. We use parent's age, educational attainment, district, and region (urban/rural) born in to create such a match. By doing so, we were able to match 1,149 households. Since, we only considered the children above the age of 15 in our children's cohort, all the households without children and with children below the age of 15 were excluded, which left us with 726 households in our cohort analysis. The missing observations and those who reported "student" and "not working" in occupation section were excluded from our analysis.

Our main variable of interest is occupation. NLSS records the occupation of every individual from each household. We classify them into 4 categories. The first category pertains to all agriculture and farming related occupations, the second category contains all manual labor jobs, the third category is white- collared office works and the fourth category is public-sector jobs. We rely on average income and prestige of the type of jobs in each of these categories as the primary basis of categorization. We rank public sector/government jobs as the highest-ranked jobs which is followed by

white-collared office works. Blue-collared manual labor works stand third in the ranking, and agriculture and farming job are at the bottom.

Value of property: We are interested to diagnose if family property has any influence on inter-generational occupational change. NLSS records the value of different kinds of property owned by each individual household. The survey asks questions related to value of agriculture land, value of dwelling and the land area occupied by dwelling, value of other land and property, and value of assets owned by household. We analyze the effect of each kind of property on mobility.

Controls: In our analysis, we control for various factors which might influence occupational choice of the individuals. We control for demographic characteristics such as sex, ethnicity, region born (urban/rural), education and migration status. Sex is a binary variable indicating whether an individual is a male or a female. There is a broad set of ethnicity/caste which differs in each NLSS. In order to account for the differences between different ethnic groups in Nepal of we classify ethnic groups into three main categories: Upper Caste, Indigenous and lower caste. NLSS records education in terms of the grade up to which an individual has studied or is studying. We reclassify educational attainment into three major categories: never attended school, attended school up to School Leaving Certificate (SLC) level and above SLC (higher education). Migration status pertains to whether household head has ever migrated or not. We also control for financial characteristics of the household like gross household income, whether they have borrowed money from financial institutions or not, whether they have used collateral for borrowing or not, whether the property they own is inherited or not.

We apply the same strategy to relative mobility. We measure district wise average of all our primary independent variables and several of the con-

trols. We categorize the values as "Average", "Above average" and "Below average". We further categorize the values based on the deviation from the average value. For instance, in case of continuous variable, say value of agriculture land, we make a percentile distribution of agricultural land value by district. Any household with agricultural land value between 30th and 70th percentile is considered to be average. The households with agricultural land value below 30th percentile is below average and the households with land value above 70th percentile is above average. Likewise, in the case of ordered categorical variables, the category with the highest frequency is the average. An individual/household one step above that category holds a position one step higher than the average and so on. For example, in the case of occupational categories, if most of the people in a district are involved in white collared jobs, individuals holding government jobs are one step above average, individuals holding blue collared jobs are one step below average, and the individuals in farming occupation are two steps below average.

As stated previously, absolute mobility measures difference in the occupational ranking between the children's occupation and parent's occupation. Since we are not interested in the relative position of an individual/household with respect to district average, all the variables are either simple categories or are continuous.

We use ordered Probit Maximum Likelihood Estimator (MLE) to estimate what drives occupational mobility in Nepal. As our dependent variable, in the case of both relative and absolute mobility are ranked categorical variables, we have used logistic regression approach similar to the approach used by Karagiannaki (2017) and Emran and F. Shilpi (2011)instead of an Ordinary Least Square (OLS) regression[6] Moreover, due to the presence of

[6]Emran and F. Shilpi (2011)also measure occupation in categorical terms. They have categorized occupation as farm and non-farm jobs. They also use Probit regression as a primary tool for analysis.

homoskedasticity in error terms, we reckon that result from MLE would be more reliable. However, we do report results from OLS estimation.

3.1 Econometric Specification

$$y_i = \beta_0+\beta_L X_{Li}+\beta_D X_{Di}+\beta_O X_{Oi}+\beta_{PR} X_{PRi}+\beta_A X_{Ai}+\beta_{PRL} X_{Li} X_{PRi}+\gamma C_i+\epsilon_i \tag{1}$$

where in the case relative mobility y_i is the deviation of the occupational rank from the average district occupational rank of individual i from children's generation, X_{Li} is the deviation of land value of household i from the district average, X_{Di} is the deviation of value of dwelling area of household i from the district average, X_{oi} is the deviation of value of other property of household i from the district average, X_{PRi} is the deviation of parental occupational ranking from average district-wise occupational rank, X_{Ai} is the deviation of assets value of household i from the district average, $X_{Li}X_{PRi}$ is the interaction between X_{Li} and X_{PRi} , C_i are controls form various household, parental and children characteristics. Theories of franchise expansion and the resulting devolution of power by the elites seem to be centered around two schools of thought, not necessarily distinct from each other.

In case of absolute mobility[7] , y_i measures the difference between occupational rank of children and occupational rank of parents from household i, X_{Li} is the value of land owned by household i, X_{Di} is value of dwelling owned by household i, X_{oi} is the of value of other property of household i, X_{PRi} is the parent's occupational rank from household i, X_{Ai} is the assets value of household i, $X_{Li}X_{PRi}$ is the interaction between X_{Li} and X_{PRi} , C_i

[7]Absolute mobility only considers upward mobility in our case. It is obtained as a difference of parent's occupational rank from children's occupational rank. We have changed any negative value of occupational mobility (downward mobility) to be zero.

are controls form various household, parental and children characteristics.

4 Empirical Results

We have included results from cohort based analysis as our main findings. The results from repeated cross sections are presented in the appendix.

Table 1: Ordered probit estimates of effect of property endowment and parental occupation on children's relative occupational mobility

	Relative occupational mobility	
	Without Controls	With Controls
Avg Land Value	1.065*	1.986**
	(1.93)	(2.51)
Above Avg Land Value	1.198**	1.346**
	(2.18)	(2.24)
Avg Dwelling Value	0.194	0.253*
	(1.50)	(1.86)
Above Avg Dwelling Value	-0.0234	-0.0442
	(-0.12)	(-0.24)
Above Avg Property value	0.0224	-0.166
	(0.11)	(-0.78)
Avg total assets value	-0.316*	-0.189
	(-1.66)	(-0.90)

Above Avg Total Assets value	0.0463	-0.116
	(0.27)	(-0.60)
Parent Rank one step below Avg	4.669***	5.051***
	(7.26)	(6.71)
Avg Parent Rank	3.724***	4.716***
	(5.92)	(6.11)
Parent Rank one step higher than Avg	3.717***	4.619***
	(5.36)	(5.72)
Parent Rank two steps higher than Avg	3.270***	4.090***
	(6.07)	(5.56)
Parent Rank one step below Avg#Above Avg Land Value	-9.636***	-8.288***
	(-11.53)	(-8.38)
Avg Parent Rank#Avg Land Value	-1.269**	-2.009**
	(-2.16)	(-2.48)
Avg Parent Rank#Above Avg Land Value	-1.204**	-1.114*
	(-2.22)	(-1.92)

Parent Rank one step higher than Avg#Avg Land Value	-0.831	-1.662*
	(-1.20)	(-1.77)
Parent Rank one step higher than Avg#Above Avg Land Value	-2.167***	-2.127***
	(-3.39)	(-3.12)
Parent Rank two steps higher than Avg#Avg Land Value	-1.299*	-2.430**
	(-1.94)	(-2.30)
/		
cut1	0.732	2.516***
	(1.27)	(2.93)
cut2	1.400**	3.214***
	(2.43)	(3.90)
cut3	4.262***	6.436***
	(6.78)	(6.75)
cut4	4.825***	7.085***
	(7.53)	(7.26)
N	619	614
Pseudo R2	0.0582	0.1575

t statistics in parentheses, *p<0.1, **<p0.05, ***<p0.01

Table 1 presents the effect of endowment of household property and assets

on relative inter-generational change in occupation. Moreover, parent's occupational choice also impacts children's choice of occupation, therefore we also evaluate the effect of parent's occupation on relative mobility of children's occupation. Column 1 presents the results without any controls, whereas in column 2 we control for various household, parental and children characteristics. Among various kind of properties, our results show that agricultural land has highest impact on relative occupational rank of children, both with and without controls. With an increase in land value within a district, there is a within district upward occupational mobility. Likewise, parental occupational rank in district wise distribution of occupation has positive impact on children's occupational rank in the distribution. However, the coefficient of interactions between land value and parent's occupational rank is negative and statistically significant at at least 10 percent level. Thus, letting the effect of land value on occupational choice of children to be dependent of parent's occupational choice, we see that effect of endowment of land does not have linear effect of occupational ranks of children.

Children who are endowed with higher land value than the average land endowment in a district but whose parent's occupational rank is below average occupational rank in the same district, seem to have experienced downward mobility in occupation. Whereas when children who are endowed with average land value and whose parents' occupational ranks are higher than the average occupational rank, tend to have positive impact on their occupation. Likewise, for those children who are endowed with above average land value and whose parents' occupational ranks are average also experience upward relative mobility. From our analysis, we can conclude that higher endowment of agricultural land holds you back in terms of upward occupational mobility if your parents are employed in low ranked occupation. People with higher endowment of agriculture land cannot move up the occupational ladder relative to the people in their neighborhood if their parents are involved in low ranked jobs. Individuals whose parents are involved in agriculture which is

the lowest ranked occupation have low chances of moving towards higher ranked occupation even though they are endowed with higher agriculture land value.

Table 2: Ordered probit estimates of effect of property endowment and parental occupation on children's absolute occupational mobility

	absolute occupational mobility	
	Without Controls	With Controls
Land Value	-1.89e-09	-4.91e-09
	(-0.05)	(-0.14)
Dwelling Value	0.000000124	7.73e-09
	(0.70)	(0.05)
Other Property Value	3.58e-08	-7.25e-08
	(0.59)	(-0.46)
Total Assets Value	0.00000225	-0.00000248
	(0.44)	(-0.56)
Parent rank two steps below avg rank	-0.457**	-0.960***
	(-2.24)	(-3.69)
Parent rank one step below avg	-5.378***	-12.99
	(-12.77)	(-1.59)
Parent rank two steps below avg rank#Land Value	-0.000000684	-0.000000501

	(-1.17)	(-0.64)
Parent rank one step below avg#Land Value	-0.000000195	-0.00000509*
	(-0.27)	(-1.69)
cut1	0.492***	0.286
	(4.42)	(0.68)
cut2	1.145***	1.064***
	(9.90)	(2.60)
N	602	593
Pseudo R2	0.049	0.1856

t statistics in parentheses, *p<0.1, **<p0.05, ***<p0.01

Table 2 presents effect of property endowment and parental occupational rank on absolute occupational mobility of children. The endowment of any kind of property seems to have no significant effect on absolute occupational mobility of children. In probabilistic sense, property has no effect on children's probability of moving towards a higher ranked occupation that the parent's occupation. Whereas parental occupational choice seems to have significant effect on absolute mobility of children. Children whose parents are in high ranked jobs would find it difficult to a find a job ranked above their parents' occupation.

5 Conclusion

There has been a dominant narrative that wealth should have a positive effect on inter-generational mobility of children of wealth owners. Such studies conducted in developed countries have found significant evidence to support this claim. Yet, such studies in case of developing world is rare. Therefore, in this paper we attempt to investigate if ownership of land as a proxy to wealth has any effect on inter-generational mobility of the children of land owners.

Through cohort based analysis and repeated cross-sectional analysis, we find that land ownership contributes positively towards relative occupational mobility however, the effect of land depend on occupational rank of parents. Moreover, land ownership seems to have no significant effect on absolute occupational mobility.

However, at this stage, we cannot establish causal link between occupational mobility of children and land ownership as occupational choices are affected by unobservable factors such as genetics (Emran and F. Shilpi 2011). Therefore, as a part of our further analysis we will be conducting sensitivity analysis, a strategy previously adpoted by Altonji, Elder, and Taber (2005)

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6 Appendix

Table 3: 1995 Absolute Mobility

	occ_mobility	
	Without Controls	With Controls
Land Value	0.000000107***	-9.54e-09
	(3.10)	(-0.18)
Dwelling Value	0.000000644**	0.000000904***
	(2.20)	(3.22)
Other Property Value	0.000000280***	0.000000252**

	(5.13)	(2.45)
Total Assets Value	0.00000320**	0.00000114
	(2.26)	(0.66)
Parent rank two steps below avg rank	0.0198	-0.979**
	(0.10)	(-2.36)
Parent rank one step below avg	-10.47***	-27.59**
	(-3.62)	(-2.09)
Avg Parent rank	-9.930***	-14.69***
	(-4.88)	(-6.86)
Parent rank two steps below avg rank#c.Land Value	-0.0000756	-0.0000307
	(-1.64)	(-1.43)
Parent rank one step below avg#c.Land Value	0.000000643	0.00000422*
	(0.86)	(1.68)
Avg Parent rank#c.Land Value	0.00000963**	0.0000193***
	(2.35)	(4.22)
cut1	1.030***	0.962*
	(11.97)	(1.84)
cut2	1.605***	1.601***

	(16.35)	(2.87)
N	759	727
Pseudo R2	0.1042	0.1907

t statistics in parentheses, * p<0.1, **p<0.05, ***p<0.01

Table 4: 1995 Relative Mobility

	Relative occupational mobility	
	Without Controls	With Controls
Avg Land Value	-0.702*	-0.612
	(-1.89)	(-1.63)
Above Avg Land Value	1.078***	1.133***
	(12.95)	(7.47)
Avg dwelling value	-0.0769	-0.111
	(-0.56)	(-0.73)
Above Avg Dwelling value	0.307**	0.154
	(2.37)	(0.99)
Avg other property value	0.571	0.818**
	(1.54)	(2.57)
Above Avg other property value	0.309**	0.0926
	(2.11)	(0.59)
Avg asset value	0.333*	0.419***

	(1.78)	(2.61)
Above Avg asset value	0.433***	0.228*
	(3.36)	(1.81)
Parent rank one step below avg	1.765***	1.401***
	(7.80)	(5.71)
Avg Parent rank	4.686***	5.283***
	(11.57)	(9.37)
Parent rank one rank higher than avg	5.367***	5.787***
	(7.90)	(7.76)
Parent rank two ranks higher than avg	6.005***	6.263***
	(12.64)	(11.74)
Parent rank three ranks higher than avg	2.998***	2.149***
	(13.73)	(4.07)
Parent rank one step below avg#Above Avg Land Value	-0.176	-0.230
	(-0.12)	(-0.14)
Avg Parent rank#Avg Land Value	0.652*	0.600
	(1.71)	(1.51)

Avg Parent rank#Above Avg Land Value	-1.170***	-1.187***
	(-6.69)	(-5.83)
Parent rank one rank higher than avg#Avg Land Value	0.713*	0.584
	(1.66)	(1.36)
Parent rank one rank higher than avg#Above Avg Land Value	-1.353***	-1.502***
	(-3.13)	(-2.97)
Parent rank two ranks higher than avg#Above Avg Land Value	-0.767*	-0.894*
	(-1.75)	(-1.93)
Parent rank three ranks higher than avg#Above Avg Land Value	-0.695***	0.924
	(-4.78)	(1.19)
cut1	0.684***	0.856*
	(3.68)	(1.78)
cut2	2.315***	2.869***
	(12.75)	(5.38)
cut3	5.778***	6.619***
	(15.49)	(11.81)
cut4	6.357***	7.274***
	(16.24)	(12.32)

N	759	755
Pseudo R2	0.2344	0.2998

t statistics in parentheses, * p<0.1, **p<0.05, ***p<0.01

Table 5: 2003 Relative Mobility

	Relative occupational mobility	
	Without Controls	With Controls
Avg Land Value	-4.372***	-3.672***
	(-15.08)	(-6.26)
Above Avg Land Value	0.670*	0.799
	(1.80)	(1.27)
Avg dwelling value	-0.0230	-0.234**
	(-0.20)	(-2.10)
Above Avg Dwelling value	0.225	-0.130
	(1.57)	(-1.08)
Avg other property value	-0.00316	-0.174
	(-0.01)	(-0.77)
Above Avg other property value	0.161	0.00626
	(1.51)	(0.06)
Avg asset value	-1.217***	-1.276***
	(-2.90)	(-3.51)

Above Avg asset value	0.00880	-0.202
	(0.03)	(-0.67)
Parent rank one step below avg	0.610***	-0.124
	(8.58)	(-0.67)
Avg Parent rank	2.838***	3.302***
	(8.06)	(4.99)
Parent rank one rank higher than avg	3.431***	3.859***
	(6.90)	(5.47)
Parent rank two ranks higher than avg	4.271***	4.262***
	(5.92)	(4.60)
Parent rank three ranks higher than avg	4.424***	5.133***
	(11.70)	(11.03)
Parent rank one step below avg#Avg Land Value	4.746***	4.796***
	(7.37)	(8.18)
Parent rank one step below avg#Above Avg Land Value	0.624	1.402**
	(1.18)	(2.02)

Avg Parent rank#Avg Land Value	4.397***	3.948***
	(11.65)	(5.82)
Avg Parent rank#Above Avg Land Value	-0.572	-0.589
	(-1.22)	(-0.76)
Parent rank one rank higher than avg#Avg Land Value	4.583***	3.648***
	(8.93)	(4.89)
Parent rank one rank higher than avg#Above Avg Land Value	-0.393	-0.476
	(-0.67)	(-0.60)
Parent rank two ranks higher than avg#Avg Land Value	3.969***	3.331***
	(5.26)	(3.05)
Parent rank two ranks higher than avg#Above Avg Land Value	-1.132	-1.062
	(-1.45)	(-1.02)
cut1	0.110	0.917**
	(0.95)	(2.13)
cut2	0.784***	1.605***
	(6.00)	(3.95)

cut3	3.553***	4.742***
	(10.48)	(6.27)
cut4	4.305***	5.629***
	(11.66)	(6.74)
cut5	6.671***	8.197***
	(10.16)	(7.53)
N	791	782
Pseudo R2	0.1354	0.2346

t statistics in parentheses, * p<0.1, **p<0.05, ***p<0.01

Table 6: 2010 Relative Mobility

	Relative occupational mobility	
	Without Controls	With Controls
Avg Land Value	-0.668	-1.209***
	(-0.59)	(-3.89)
Above Avg Land Value	-0.121	0.196
	(-0.19)	(0.72)
Avg dwelling value	-0.0606	-0.0653
	(-0.69)	(-0.70)
Above Avg Dwelling value	0.187**	0.0766
	(2.02)	(0.89)

Avg other property value	-0.0456	-0.216
	(-0.13)	(-0.49)
Above Avg other property value	0.263***	0.203**
	(3.25)	(2.38)
Avg asset value	0.0613	0.0363
	(0.74)	(0.26)
Above Avg asset value	0.0817	-0.0329
	(1.01)	(-0.38)
rank_dist_deviation_parent	0.844***	1.048***
	(2.89)	(6.84)
Parent rank one step below avg#0.land_value_dist_deviation	0.154	-0.191
	(0.29)	(-0.37)
Parent rank one step below avg#Above Avg Land Value	0.0184	-0.418
	(0.02)	(-0.36)
Avg Parent rank#0.land_value_dist_deviation	0.168	0.188
	(0.27)	(0.37)
Avg Parent rank#Avg Land Value	0.536	1.223***
	(0.88)	(4.39)

Avg Parent rank#Above Avg Land Value	0.176	-0.147
	(0.23)	(-0.70)
Parent rank one rank higher than avg#0.land_value_dist_deviation	0.128	-0.181
	(0.15)	(-0.81)
Parent rank one rank higher than avg#Avg Land Value	0.434	0.808***
	(1.18)	(3.66)
Parent rank one rank higher than avg#Above Avg Land Value	-0.207	-0.819***
	(-0.20)	(-3.16)
Parent rank two ranks higher than avg#0.land_value_dist_deviation	-0.498	-1.155***
	(-0.44)	(-3.23)
Parent rank two ranks higher than avg#Above Avg Land Value	-0.312	-1.122***
	(-0.25)	(-3.09)
cut1	0.801	2.055***
	(1.03)	(3.71)
cut2	1.269	2.520***
	(1.64)	(5.28)

cut3	4.174***	5.583***
	(5.33)	(6.43)
cut4	4.717***	6.168***
	(6.02)	(6.73)
cut5	7.466***	9.067***
	(8.68)	(7.81)
N	1484	1457
Pseudo R2	0.1202	0.1640

t statistics in parentheses, * p<0.1, **p<0.05, ***p<0.01

Table 7: Cohort Absolute Mobility 2003

	occ_mobility	
	Without Controls	With Controls
Land Value	8.99e-08*	1.79e-08
	(1.70)	(0.32)
Avg dwelling area value	0.000000435***	0.000000284**
	(4.69)	(1.97)
Other Property Value	1.35e-08	1.78e-08
	(0.27)	(0.39)
V13C_08	-0.0000274*	-0.0000379**
	(-1.76)	(-1.98)

Parent rank two steps below avg rank	-0.636***	-0.824***
	(-3.66)	(-3.52)
Parent rank one step below avg	-6.781	-6.696***
	(-0.04)	(-8.21)
Avg Parent rank	-5.085	-3.745***
	(-0.00)	(-3.82)
Parent rank two steps below avg rank#c.Land Value	0.000000328	0.000000450
	(1.18)	(1.39)
Parent rank one step below avg#c.Land Value	-0.000000435	-0.00000214
	(-0.00)	(-0.37)
Avg Parent rank#c.Land Value	-0.000000137	-0.000000427**
	(-0.00)	(-2.14)
cut1	0.712***	0.452
	(11.07)	(0.88)
cut2	1.428***	1.258**
	(18.04)	(2.48)
N	791	782
Pseudo R2	0.0961	0.1759

t statistics in parentheses, * p<0.1, **p<0.05, ***p<0.01

Table 8: Cohort Absolute Mobility 2010

	occ_mobility	
	Without Controls	With Controls
Land Value	3.36e-09	1.04e-09
	(0.71)	(0.23)
dwelling_area_value	0.000000115***	6.71e-08***
	(6.67)	(3.18)
v15_27	4.19e-08***	3.08e-08***
	(3.12)	(3.18)
other_assets_value	0.000000300	5.48e-08
	(0.60)	(0.08)
Parent rank two steps below avg rank	-0.237**	-0.708***
	(-2.11)	(-5.44)
Parent rank one step below avg	-21.12	-14.73***
	(-0.19)	(-5.36)
Avg Parent rank	-5.968	-5.483***
	(-0.00)	(-17.06)
Parent rank two steps below avg rank#c.Land Value	4.74e-08	4.94e-08*
	(1.11)	(1.78)

Parent rank one step below avg#c.Land Value	0.000000769	0.000000435***
	(0.04)	(3.06)
Avg Parent rank#c.Land Value	-4.60e-08	-6.74e-08**
	(-0.00)	(-2.38)
cut1	0.780***	0.536*
	(16.84)	(1.73)
cut2	1.383***	1.208***
	(24.74)	(3.97)
cut3	3.752***	3.786***
	(9.03)	(5.38)
N	1484	1457
Pseudo R2	0.1197	0.1957

t statistics in parentheses, * p<0.1, **p<0.05, ***p<0.01