The World Economy

The World Economy (2013)
doi: 10.1111/twec.12043

The Trend and Mechanism of Intergenerational Income Mobility in China: An Analysis from the Perspective of Human Capital, Social Capital and Wealth

Yuan Zhigang[1] *and Chen Lin*[2]

[1]*School of Economics, Fudan University, Shanghai, China and* [2]*Department of Social Sciences, Fudan University, Shanghai, China*

1. INTRODUCTION

INTERGENERATIONAL income mobility is the extent to which children's income depends on their parents. The increasing of intergenerational income mobility can relieve the social pressure caused by the income gap and provide the incentive for hardworking and human capital investment. As is shown by some studies, while the income inequality caused by differences in individual talent and effort is generally tolerable by the public, the income inequality caused by uncontrollable factors such as family background will bring about strong redistributive preference (Piketty, 1995; Benabou and Ok, 2001).

Recently, the widening of income gap has become an important issue perplexing Chinese economic and social development. The central government also emphasises the significance of income equality relative to economic growth in many circumstances. At the same time, the success of the Chinese economy in overcoming the middle-income trap, realising industrial upgrading and sustained growth in the global competition also hinges on the accumulation of high-qualified human capital. All these make the research on intergenerational income mobility necessary and significant for current Chinese society.

However, relevant research in China is still in its infancy. First, there is no consensus on the trend of the intergenerational income mobility in recent years in China. On the one hand, the phenomenon of inheritance of wealth and position has become a hot issue in both the public press and academic fields (Hongbin, 2011). On the other hand, classic sociological social mobility research suggests that a society will tend to be more mobile during the process of industrialisation and marketisation (Blau and Duncan, 1967).

Second, current empirical analysis also gets different results, with the estimated intergenerational elasticity varying from 0.2 to 0.8 (Haigang, 2005; Xianguo and Liqiu, 2006; Ying, 2009; Gong et al., 2010). This broad range of estimation mainly stems from different ways of constructing income variables and different sample selection processes. We try to base our research in this paper on a more clearly defined income variable and a more careful data management process, which we believe will lead to a more precise estimate of the mobility trend. The details will be described in Section 3.

Third, there is very few analysis on the mechanism of the intergenerational income mobility in China, which is quite important for the understanding of a given mobility level and relevant

public policy designing. Ruilong (2010) proves the importance of father's political resources by finding a significant impact of father's Communist Party of China (CPC) membership on children's income before father's retirement. Congbin and Weifang (2009) point out the important role of education. Xianguo and Liqiu (2006) calculate the contribution of education, health and occupation, with the total explanation power reaching only 19 per cent.

What is the trend and mechanism of the intergenerational income mobility in China? This paper seeks to answer these questions by using the microdata from CHIPS (1988–2002) and Chinese General Social Survey (CGSS) (2006). The remaining paper is constructed as follows: Section 2 will briefly review relevant research, Section 3 will introduce the data and the empirical methods, Section 4 will report the main empirical results, Section 5 will give more discussion on the role of wealth, and Section 6 concludes.

2. RELEVANT LITERATURE

The empirical estimation on intergenerational income mobility is generally based on the following 'Galton-Becker-Solon equation':

$$y_i^{child} = \tilde{\alpha} + \tilde{\beta} y_i^{father} + \tilde{\varepsilon}_i. \quad (1)$$

y_i^{child} is the log of child's lifetime income of family i. y_i^{father} is the log of father's lifetime income of family i. All incomes are the demeaned value after controlling for both father's and child's age and square of age, as well as children's gender. $\tilde{\beta}$ is the intergenerational income elasticity (IGE) measuring the income mobility. The higher the IGE is, the lower the income mobility is.

As $\tilde{\varepsilon}_i$ includes many factors that relate to y_i^{father}, such as the ability and health of the father, the estimated $\tilde{\beta}$ can only be interpreted as the general correlation between father's and children's income, instead of being explained causally. Although it is pointed out by relevant theoretical analysis that genetic inheritance and human capital investment is the key to the intergenerational income correlation (Becker and Tomes, 1979; Solon, 2004), the complex endogeneity makes it very difficult to get the causality conclusion (Solon, 1999; Sandra and Devereux, 2011).

Various attempts have been made trying to get the causal coefficient during the past decade, the methods of which can be classified into three categories. The first one is to distinguish the genetic factors from the environmental factors by using the income data of various kinds of siblings, such as twins and adoptees (Bjorklund et al., 2005, 2006). The second one is to identify the impact of income by using exogenous income shocks such as the tax reduction and subsidy programme (Morris et al., 2004; Dahl and Lochner, 2005). The third one is to identify the importance of different intermediate variables by using statistical and empirical decomposition (Bowles and Gintis, 2002; Blanden et al., 2007).

As data availability restricts the application of the first two methods in China, this paper uses the third one to study the mechanism of the intergenerational income mobility in China. More exactly, we follow the general method of Blanden et al. (2007) and choose human capital, social capital and wealth as the main intermediate variables because our understanding of the Chinese society suggests they should be very important in the intergenerational income transmission in China. The following results prove this hypothesis, which we believe is a quite interesting and important finding that should be given special attention in the current economic and social development of China.

Meanwhile, although the impact of these intermediate variables cannot be interpreted causally, their direct relationship with various public policies may make this category of analysis more meaningful in practice than the pure differentiation between genetic, environmental and material factors.

3. MODEL AND DATA

a. The Model

First, we estimate IGE by using a regression based on equation (1),

$$y_{i,t}^{child} = \alpha_i + \beta y_{i,t}^{father} + \varepsilon_i. \tag{2}$$

The only difference between equations (1) and (2) is the income used here is yearly income of both father and children, instead of the permanent income.[1] Then, we use the following two regressions to obtain the impact of father's income on various intermediate variables, as well as the impact of these intermediate variables on children's income.

$$\mathrm{IN}_{j,i} = \phi_{j,i} + \lambda_j y_i^{father} + \mu_i, \tag{3}$$

$$y_{t,i}^{child} = \omega_i + \sum_{j=1}^{3} \theta_j \mathrm{IN}_{j,i} + \upsilon_i. \tag{4}$$

$\mathrm{IN}_{j,i}$ refer to the intermediate variables, with $j = 1, 2, 3$ representing human capital, social capital and wealth, respectively. We call regressions (3) and (4) the investment equation and the return equation, respectively, as they represent the process of investing father's income in different capitals and then get the return through children's income. λ_j and θ_j are thus called the investment ratio and rate of return, respectively, which satisfy the following equation:[2]

$$\beta = \sum_{j=1}^{3} \lambda_j \theta_j + \frac{Cov\left(\upsilon_i,\ y_i^{father}\right)}{Var\left(y_i^{father}\right)}. \tag{5}$$

The contribution of an individual intermediate variable τ_j and their total contribution τ satisfy

$$\tau_j = \frac{\lambda_j \theta_j}{\beta}, \tag{6}$$

$$\tau = \sum_{j=1}^{3} \tau_j. \tag{7}$$

[1] Generally, this will lead to a downward estimation bias as annual income is not a good proxy for lifetime income. However, as the focus of this paper is the trend and mechanism of the intergenerational income transmission, if the structure of the bias is similar among different years, then we believe this bias will not fundamentally change our main conclusion. In fact, we also used the average income in the urban sample when retrospective five- and six-year income is available in year 1995 and 2002 CHIPS urban sample to do the similar estimation, the main conclusion stays. More details can be provided if required.

[2] The detailed proof is listed in Appendix A. It should be noted that the confidents in equations (3) and (4) are not meant to be given causal explanations.

b. Data and Variables

There are now three public data sets in China which have information on individual income and can be matched between parents and children, including the 2006 CGSS, the three waves of Chinese Household Income Project Series from 1988 to 2002 (CHIPS), as well as the eight waves of Chinese Health and Nutrition Survey from 1989 to 2009 (CHNS).[3]

It should be noted that the income variable in these above three data sets is reported in very different ways. CGSS has a single question asking the individual's total income in 2005. CHIPS record more detailed income from various sources, but the exact income composition differs among different waves, as well as between urban and rural areas. Different waves of CHNS have a more coherent income record from various sources, although many of them are recorded at the family level, such as business and agricultural revenues.

Various data processing problems exist in current studies, and they partly explain the broad range of current estimations. First, the exact composition of income needs to be more carefully defined. Haigang (2005) uses CHIPS (1988 and 1995, the urban sample), but did not clearly report the exact meaning of income in their research. Ying (2009), as well as Xianguo and Liqiu (2006), uses CHNS, but both use the average family income from various sources as a component of individual income, which will definitely bias the intergenerational income correlation estimation.

Second, sample should be more precisely selected. Haigang (2005) includes parents who are retired and above 70 years old, which will also bias their estimation. Ying (2009) uses the annual data of CHNS (1989–2004), with the annual number of observations ranging from 149 to 319 in the full sample and 33–274 in the subsample. Limited number of observations lowers the representativeness of the result and may be one of the reasons for the large fluctuations in this research.

Third, some of the research uses annual income (Haigang, 2005; Ying, 2009), while others use average income from different years as a way to overcome the estimation bias caused by inability to measure lifetime income (Xianguo and Liqiu, 2006; Gong et al., 2010). Finally, Gong et al. (2010) use the administrative data set that is not publicly available.

Thus, this study tries to explore all the above three public data sets, so as to have a more clear and precise understanding of the trend of income mobility in China. We use CHIPS as the main data source and CGSS and CHNS as the supplementary ones.[4]

At the same time, in this study, we clearly restrict the 'income' variable to the individual wage income, including cash and item subsidies, as this is the most consistent and detailed data we can get from CHIPS and CHNS.[5] We use educational years to measure children's

[3] Detailed information on data sources and definitions of variables are provided in Appendix C.

[4] This is mainly because CHIPS have the most detailed record of income, but the most recent round is 2002, so we use the other two data sets to find more recent trend. In addition, there is no record of family wealth in CHNS, which is a core variable in studying the mechanism in the second part of the paper, so we cannot use CHNS as the main data sources.

[5] We recognise there are some differences between CHIPS and CGSS which may impede our exact comparison in them. However, we believe this will not impact our main conclusion as we only use 2006 CGSS as a supplementary data to check the results drawn from CHIPS. The result from CHNS reported later testifies our belief.

TABLE 1
Descriptive Statistics

Mean (SD)	*Urban Area*				*Rural Area*			
	1988	*1995*	*2002*	*2005*	*1988*	*1995*	*2002*	*2005*
Father								
Income	8.63	8.94	9.29	8.89	7.84	8.10	7.42	8.06
	(0.35)	(0.63)	(0.64)	(0.86)	(1.40)	(1.25)	(1.40)	(0.86)
Age	52.59	52.69	53.07	58.17	49.17	50.04	51.46	58.10
	(4.21)	(4.21)	(3.69)	(4.48)	(5.11)	(4.49)	(4.94)	(5.28)
Children								
Gender (= 1 son)	0.53	0.57	0.55	0.48	0.52	0.57	0.68	0.43
	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)	(0.47)	(0.50)
Income	7.96	8.29	8.83	9.50	7.52	8.38	7.99	9.05
	(0.52)	(0.72)	(0.74)	(0.62)	(1.19)	(0.94)	(1.00)	(0.68)
Age	23.40	23.29	24.78	32.46	22.67	22.91	24.13	31.64
	(2.91)	(2.54)	(3.05)	(11.96)	(3.14)	(2.54)	(3.78)	(5.80)
Educational year	11.48	11.63	12.78	11.97	9.08	8.60	8.91	8.55
	(2.15)	(2.41)	(2.42)	(3.02)	(2.44)	(2.49)	(2.18)	(2.59)
Social capital	0.08	−0.13	0.85	0.26	−0.17	−0.18	−0.52	−0.41
	(1.04)	(1.02)	(1.34)	(1.28)	(0.87)	(1.30)	(1.03)	(1.16)
Family								
Housing assets	–	10.41	11.49	11.41	10.27	9.74	10.00	10.21
		(1.49)	(0.97)	(1.09)	(2.59)	(1.00)	(1.00)	(1.46)
Financial assets	–	9.27	10.30	–	10.28	8.67	8.27	–
		(1.19)	(1.20)		(5.02)	(1.19)	(1.58)	
Land area	–	–	–	–	2.30	1.42	1.69	–
					(1.85)	(0.71)	(0.93)	
Observations	1,764	781	585	371	127	163	898	199

Notes:
(i) All variables except age have been taken logs. (ii) Income, housing assets and financial assets are adjusted to 2002 value according to the regional CPI. (iii) Social capital is the fitted value by principal component analysis. (iv) As this paper focuses on the rural and urban splitting, we only list the main statistics for these two subsamples here. (v) More details for other samples used in the paper can be provided if required.

human capital. Social capital is generated by the principal component analysis on children's CPC membership, occupation, industry and the ownership of the working unit. Wealth includes the market value of the families' self-owned houses, the financial assets and the land area (for rural families only).

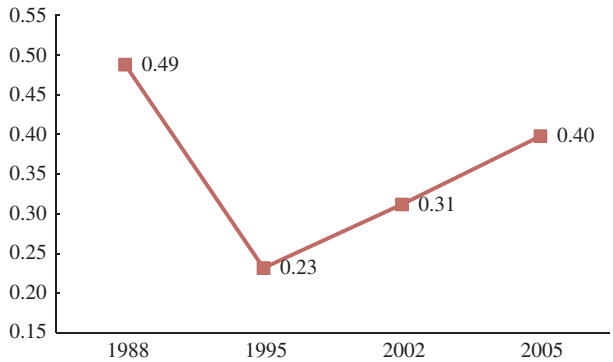
We select those individuals with the complete above information and restrict to those aged 20–65, and the age difference between father and child no smaller than 10 years. The statistical description of the final sample is shown in Table 1.

4. RESULTS

a. The Time Trend

Figure 1 shows the overall trend of IGE from 1988 to 2005 by using CHIPS and CGSS. There is a very clear trend of decreasing before 1995 and then an increasing trend after 1995.

FIGURE 1
Time Trend of Intergenerational Income Elasticity in China (1988–2005, Overall Trend)



The differences between different years are significant in the test.[6] We also do some more robust checks concerning the income variables, including using total income instead of labour income, separating sons and daughters. The overall time trend stays in all these robust checks.[7]

This is not quite surprising considering the reform history in China in the past decades. During the last two decades of the twentieth century, the market-oriented reform advanced greatly, bringing the prosperity of private sector and manufacturing industry, which provides abundant opportunities for the children from low-income families to enhance their income. The implementation of compulsory education and the resumption of college entrance examinations also make it possible for the poor children to have a better education which will later bring income return in the labour market. All these lead to the improvement of intergenerational income mobility for the low-income group in the early period of the reform and opening up in China. However, with the reform in the factor markets stagnating in recent years, income advantage is now transmitted more easily through rent seeking and nepotism, which lead to the increasing of IGE after 1995.

Considering the distinctive urban and rural dual economy structure in China, we further break the total sample to look at the differences between these two sectors.[8] Figure 2 shows the IGE estimated by equation (2) for urban and rural residents, respectively.[9] First, the IGE

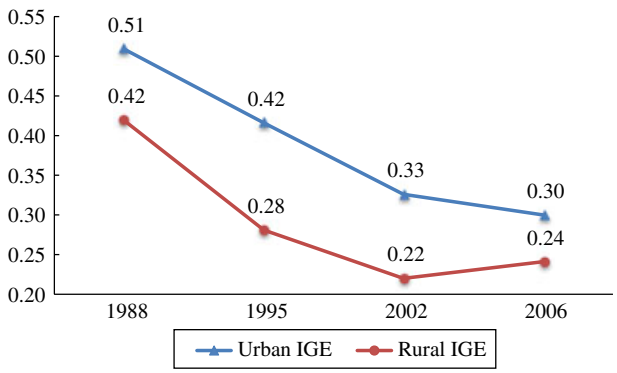
[6] We use the 'suest' code in STATA (StataCorp, College Station, TX) to check the significance of difference between the coefficients of different yearly samples. The *p*-values of these tests are 0.0733 for 1988 and 1995, 0.0327 for 1988 and 2002, 0.0026 for 1995 and 2002. All are significant at the 10 per cent level. We also use the widest income statistic to run the regression. The IGE estimation is 0.48, 0.28, 0.32 and 0.40, respectively, for the four year, which is quite similar to the results in Figure 1. It should be noted that the exact meaning of this total income is different among different subsamples, so we do not use this total income as our main result.

[7] Details can be provided if required.

[8] Another reason for this sample splitting is that, in CHIPS, the detailed income composition, as well as the assets used in the mechanism decomposition, is different in urban and rural areas. Thus, splitting also makes the variables more coherent between different years.

[9] Urban and rural areas are defined based on the accommodation place of the household head, which is the parental generation in our study. This definition follows CHIPS, which draw their sample from the State Statistical Bureau's urban and rural samples, respectively (The State Statistical Bureau has two different departments responsible for the urban and rural areas, respectively, and each has its own sample pools).

FIGURE 2
Time Trend of Intergenerational Income Elasticity in China (1988–2005, Rural and Urban Area)



in urban areas is larger than that in the rural areas. This is not quite unexpected, as there are more opportunities for rent seeking and nepotism in the urban area, and rural labour's migration into manufacturing explains the relatively low level of IGE in rural areas. Second, while the IGE in rural areas shows a clear upward trend in 2005, the IGE in urban areas shows a downward trend until 2005, although the decreasing rate is becoming smaller and smaller.

Robust checks are made to further confirm this trend. First, we pool every two yearly successive subsamples together for urban and rural areas, respectively, which generate six new samples. A new regression is carried out, adding a year dummy representing the later year and its interaction with father's income in equation (2). For the urban areas, the coefficients of the interaction term are −0.128 for 1995 compared to 1988, −0.057 for 2002 compared to 1995, and −0.027 for 2005 compared to 2002. For the rural areas, the coefficients of the interaction term are −0.073, −0.084 and 0.074. Although not all of them are significant at the 10 per cent level, their signs confirm the time trend in Figure 2. The urban IGE keeps decreasing, but at a lower speed, while the rural IGE decreases before 2002 and then increases in 2005.

Second, as the above result is drawn from two different samples, the time trend may come from the differences in the two samples. A single data set (CHNS) is then used to further check the time trend. As is noted before, the annual sample in CHNS is too small to run an effective regression, so we pool the eight waves into four periods.[10] The estimation of IGE is 0.447, 0.360, 0.207 and 0.045 for urban areas and 0.338, 0.258, 0.274 and 0.330 for the rural areas. Except the 2009 urban estimation, all the coefficients are significant at the 1 per cent level. This result further confirms the time trend in Figure 2.[11]

b. The Mechanism

Table 2 reports the main results calculated by equations (3–7). First, educational year has an explanatory power of more than 10 per cent for all the sub-samples except the 1988 rural

[10] The first period includes years 1989, 1991 and 1993. The second period includes years 1997 and 2000. The third period includes years 2004 and 2006. The fourth period includes year 2009. The number of observations is 1,442, 639, 358 and 251 for urban areas and 1,516, 890, 285 and 274 for rural areas.
[11] We cannot use CHNS in the mechanism decomposition because it has no information on family wealth.

sample. This is in accordance with the theoretical analysis which suggests that low-income families cannot reach the optimal human capital investment level for their smart children as a result of credit constraint and insufficient supply of public education (Becker and Tomes, 1979; Solon, 2004).

Second, social capital also has a parallel contribution. Although the explanatory power of social capital is a little smaller than that of human capital, it keeps increasing and reaches nearly 10 per cent in 2005. Social capital has always been taken as an important factor influencing one's income. For example, as is shown by Jianzhi and Luming (2009), social network contributes 12.1 to 13.4 per cent to the income gap in rural China. As parents can invest in children's social capital by ways such as helping them to get acquainted with specific groups of people who can help the children in their career, or to enter advantageous industries and occupations, etc., it is no surprise that social capital plays such an important role in the intergenerational income transmission.

Finally, family wealth shows a significant contribution which is larger than both human and social capital in almost all the subsamples. The explanatory power of housing assets reaches 37.85 and 15.47 per cent for urban and rural China in 2005, while the explanation power of financial assets reaches 31.18 and 26.51 per cent in 2002 when the most recent data are available. A further investigation into the investment ratio and rate of return sug-

TABLE 2
Decomposition of Intergenerational Income Elasticity in China (Major Results)

Urban		*Education Year*	*Social Capital*	*Housing Assets*	*Financial Assets*	*Land Area*
1995	Investment ratio	2.33	0.20	0.70	0.81	–
	Rate of return	0.02	0.10	0.11	0.22	
	Contribution (%)	11.20	4.73	17.73	43.37	
2002	Investment ratio	1.00	0.42	0.35	0.74	–
	Rate of return	0.03	0.07	0.12	0.14	
	Contribution (%)	10.16	8.56	12.99	31.18	
2005	Investment ratio	0.82	0.45	0.45	–	–
	Rate of return	0.05	0.06	0.25		
	Contribution (%)	14.16	9.00	37.85		
Rural						
1988	Investment ratio	0.44	0.09	0.34	0.13	0.01
	Rate of return	0.01	0.30	0.00	−0.01	0.05
	Contribution (%)	0.84	6.17	0.33	−0.35	0.11
1995	Investment ratio	1.16	0.24	0.35	0.37	−0.14
	Rate of return	0.03	0.10	0.31	0.17	0.13
	Contribution (%)	11.92	8.60	39.22	22.34	−6.15
2002	Investment ratio	0.47	0.23	0.32	0.39	−0.26
	Rate of return	0.05	0.09	0.12	0.15	−0.12
	Contribution (%)	11.06	9.41	17.38	26.51	14.26
2005	Investment ratio	0.48	0.26	0.34	–	
	Rate of return	0.06	0.09	0.11		
	Contribution (%)	11.95	9.71	15.47		

Notes:
(i) Detailed information for the regression coefficient is listed in Appendix B.

gests that this result is mainly caused by the high rate of return of family wealth on children's income. For example, in 2005, the rate of return for housing reaches 0.25, which is much larger than the contemporary rate of return for human capital and social capital, which are 0.05 and 0.06, respectively. The only exception is the small and even negative contribution of land assets in the rural area. The result suggests that not only the relationship between father's income and families' land area is negative since 1995, but also the relationship between families' land area and children's income becomes negative since 2002.

5. MORE DISCUSSIONS ON FAMILY ASSETS

An interesting discover of Table 2 is the large contribution of family wealth, which is quite interesting and will be given more discussion in this part.

a. Urban Area

In the urban area, the contribution of financial assets stays high until it drops a little in 2005. The contribution of housing assets increases significantly from 17.73 to 37.85 per cent during the period of 1995–2005.[12]

During the reform of the housing system and emergence of the real estate market, with the increasing housing price and the special significance that traditional Chinese culture puts on immovables, housing assets has become the most important part of family wealth in the past decades, which will definitely play a significant role in the family life, including those affecting the children.

Housing will certainly impact children's education, as children should go to schools near their home. As places with high housing property value in the urban area always enjoy better education facilities and favourable environment for the children (Ting and Zhigang, 2010), it is no surprise that housing price contributes such a great proportion to the intergenerational income transmission in the urban area. As overseas studies are becoming more and more popular, the purchasing power provided by the housing mortgage is becoming more important for supporting offspring's educational attainment. What is more, considering the loss of the education rights of the rural immigrants' offsprings[13] and the increasing housing price after 2005, the impact of housing price may become larger in recent years.

Housing will also impact children's social capital through peer effects and role modelling in the living neighbourhood. However, as education and social capital are already included as explanatory variables in equation (4), the contribution of housing assets to children's income should be interpreted by other channels. We guess this may relate to the traditional emphasis that Chinese families put on the housing assets, and also the credit constraints when children

[12] The explanatory power of housing drops in 2002. This is mainly caused by the declining of investment ratio, which is related to the housing system reform in China in 1990s. The privatisation reform first benefits the high-income families in the first years and then involves middle- and low-income families (Shi et al. 2005). This leads to the decreasing of investment ratio from 1995 to 2002. Then, the marketisation of the housing market later leads to the rise of this investment ratio in 2005.

[13] The central government has already tried to solve this problem in recent years, with the responsibility of providing education to rural immigrants' offsprings assumed by local government. The situation of those children is becoming better, although problems still stay challenging.

start their business careers. Yet, we admit that the finding needs to be more carefully tested and explained in future.

b. Rural Area

In rural areas, although the contribution of housing assets is obviously larger than human capital and social capital, it decreases from 39.22 to 15.47 per cent during 1995–2005. This may be caused by the illiquidity of rural housing assets in rural areas, which is in strong contrast with the prosperous development of the real estate market in urban areas.

The contribution of financial assets remains increasing. Indeed, with the fast development of the manufacturing sector in the east coastal area, rural families are becoming more dependent on the working income earned by the immigrant family members (Shi and Renwei, 1999).

Finally, land assets are having a negative impact on children's income in rural areas. It will be no surprise if we take into consideration the low agriculture income in the past decades and the illiquid nature of the land assets. In fact, although the income gap and wealth gap are all growing in China, land assets still remain fairly equally distributed. Rural families cannot enjoy the capitalisation benefit of land assets brought by the rapid Chinese economics growth, and could only rely on the immigrants' working payments, which lead to the negative impact of land assets on offsprings' income.

6. CONCLUSION

Using microdata and statistical and empirical technique, this study analyses the time trend and structural mechanism of China's intergenerational income mobility in 1988–2005. The results suggest the intergenerational income mobility improves in the early period, then becomes stable and even shows a deteriorating sign recently. Human capital, social capital and wealth explain more than 60 per cent of the intergenerational income mobility in China, with wealth contributing the largest proportion.

Promoting education equality, eliminating the labour market segmentation and deepening the market-oriented reform are suggested to help improve intergenerational income mobility in China. In addition, the importance of housing assets and financial assets on offsprings' success also helps in explaining rising housing prices and household savings, which is plaguing Chinese social and economic development. The policies suggested above will also solve many of these problems.

It is worth noting that while policies aiming at reducing absolute income gap may face the trade-off between income equality and efficient incentive, the above-mentioned policies suggested to improve the dynamic intergenerational income inequality are beneficial to the economy in both ways. They can provide incentive for human capital investment and at the same time alleviating the social pressure of increasing housing prices and the income gap.

In the meantime, although most of the traditional social mobility research considers the intergenerational income transmission as the most unforgivable source of income inequality, we stress in this paper that the construction of a sound system which can guide people healthily investing in their children's welfare is more important. After all, it is human nature to care about the welfare of offspring, and this is also one of the most powerful strengths driving human development. It is also in this sense that this problem is of great importance to China's

development as traditional Chinese culture gives extraordinary attention to children's success. If the high return of social capital and wealth continues, this may lead to the overinvestment in these assets and at the same time crowding out human capital investment, which is quite harmful to the sound development of the Chinese economy.

Finally, although this paper gives some pioneering observations on the trend and mechanism of the intergenerational income mobility in China, data restrict us from more broad exploration beyond the scope of labour income as is shown in the above analysis. Meanwhile, with the measurement errors in the intermediate variables, as well as the model designing of the decomposition, it should be noted that our main decomposition results should be given statistical instead of causal interpretations. Further research is also needed to find out the exact channels how housing will affect children's income other than through affecting their human and social capital. We believe much more work is needed in future to solve this puzzling problem and help the relevant public policy design.

APPENDIX A: PROOF FOR THE EMPIRICAL MODEL

This section is aimed at proving equation (5).

For simplicity, we omit subscript indicating family i and use C and F to represent children's and father's income, respectively. Thus, we have

$$C = \alpha + \beta F + \varepsilon. \tag{A1}$$

The basic nature of ordinary least squares gives

$$EC = E(\alpha + \beta F + \varepsilon) = \alpha + \beta EF. \tag{A2}$$

Deducting (A2) from (A1), we have

$$C - EC = \beta(F - EF) + \varepsilon. \tag{A3}$$

Suppose the correlation between father's and children's income is r,

$$r \equiv Corr(C, F) \equiv \frac{E[(C - EC) * (F - EF)]}{\sqrt{E(C - EC)^2 * E(F - EF)^2}}. \tag{A4}$$

Substitute (A3) into (A4)

$$\begin{aligned} E[(C - EC) * (F - EF)] &= E[(\beta(F - EF) + \varepsilon) * (F - EF)] \\ &= \beta E(F - EF)^2 + E[(F - EF)(\varepsilon - E\varepsilon)], \\ &= \beta E(F - EF)^2 + 0 \end{aligned} \tag{A5}$$

so,

$$Corr(C, F) = \beta \frac{\sqrt{E(F - EF)^2}}{\sqrt{E(C - EC)^2}}. \tag{A6}$$

Similarly, if we let D to represent the educational year of children, then,

$$D = \phi_1 + \lambda_1 F + \mu_1, \tag{A7}$$

$$C = \varpi + \theta_1 S + \upsilon. \tag{A8}$$

Substitute (A1) and (A7) into (A8),

$$\upsilon = (\alpha - \varpi - \theta_1\phi_1) + (\beta - \lambda_1\theta_1)F + (\varepsilon - \theta_1\mu_1). \tag{A9}$$

According to the logic of (A6), we have

$$Corr(\upsilon, F) = (\beta - \lambda_1\theta_1)\frac{\sqrt{E(F - EF)^2}}{\sqrt{E(\upsilon - E\upsilon)^2}}, \tag{A10}$$

which can be reorganised into

$$\beta - \lambda_1\theta_1 = Corr(\upsilon, F)\frac{\sqrt{E(\upsilon - E\upsilon)^2}}{\sqrt{E(F - EF)^2}} = \frac{Cov(\upsilon, F)}{Var(F)}, \tag{A11}$$

which is $\beta = \lambda_1\theta_1 + \frac{Cov(\upsilon,F)}{Var(F)}$.

This result can be extended similarly when we have more than one intermediate variable. Let S and *A* represent social capital and family wealth, respectively, then similar to (A7) and (A8),

$$S = \phi_2 + \lambda_2 F + \mu_2, \tag{A12}$$

$$A = \phi_3 + \lambda_3 F + \mu_3, \tag{A13}$$

$$C = \varpi + \theta_1 D + \theta_2 S + \theta_3 A + \upsilon. \tag{A14}$$

Substitute (A1), (A6), (A12) and (A13) into (A14),

$$\upsilon = (\alpha - \varpi - \theta_1\phi_1 - \theta_2\phi_2 - \theta_3\phi_3) + (\beta - \lambda_1\theta_1 - \lambda_2\theta_2 - \lambda_3\theta_3)F + (\varepsilon - \theta_1\mu_1 - \theta_2\mu_2 - \theta_3\mu_3). \tag{A15}$$

According to the logic of (A6), we have

$$Corr(\upsilon, F) = (\beta - \lambda_1\theta_1 - \lambda_2\theta_2 - \lambda_3\theta_3)\frac{\sqrt{E(F - EF)^2}}{\sqrt{E(\upsilon - E\upsilon)^2}}. \tag{A16}$$

We can reorganise this into $\beta = \lambda_1\theta_1 + \lambda_2\theta_2 + \lambda_3\theta_3 + \frac{Cov(\upsilon,F)}{Var(F)}$.

APPENDIX B: DETAILED REGRESSION RESULTS

TABLE B1
Table Time Trend of Intergenerational Income Elasticity in China (1988–2005, Overall Trend)

Co-efficient (standard error)	*1988*	*1995*	*2002*	*2005*
Father's income	0.488***	0.232***	0.312***	0.398***
	(0.031)	(0.030)	(0.016)	(0.033)
Children's gender	0.068***	0.124***	0.007	0.322***
(= 1, if male)	(0.022)	(0.047)	(0.046)	(0.038)
Children's age	0.091**	0.101	0.249***	0.044
	(0.039)	(0.096)	(0.071)	(0.040)
Children's age square	−0.001*	−0.002	−0.004***	−0.001
	(0.001)	(0.002)	(0.001)	(0.001)
Father's age	−0.014	−0.17*	−0.066	0.137
	(0.044)	(0.097)	(0.090)	(0.092)
Father's age square	0.000	0.002*	0.001	−0.001
	(0.000)	(0.001)	(0.001)	(0.001)
Constant	2.596**	9.136***	3.611*	1.253
	(1.154)	(2.444)	(2.172)	(2.361)
R^2_adj	0.150	0.067	0.258	0.288
PRO>F	0.000	0.000	0.000	0.000
Number of observations	1,891	944	1,483	570

Notes:
(i) The dependent variable is the log of children's income.
(ii) ***Significant at the level of 1%, **significant at the level of 5%, *significant at the level of 10%.

TABLE B2
Time Trend of Intergenerational Income Elasticity in China (1988–2005, Rural and Urban Areas)

Coefficient (SD)	*Urban Area*				*Rural Area*			
	1988	*1995*	*2002*	*2005*	*1988*	*1995*	*2002*	*2005*
Father's income	0.509***	0.416***	0.326***	0.300***	0.419***	0.281***	0.220***	0.241***
	(0.041)	(0.058)	(0.045)	(0.046)	(0.132)	(0.088)	(0.028)	(0.078)
Children's gender	0.057***	0.089*	0.078	0.204***	0.122	0.325**	0.003	0.703***
	(0.020)	(0.047)	(0.051)	(0.039)	(0.176)	(0.137)	(0.066)	(0.123)
Children's age	0.048	0.125	0.486***	−0.038	0.182	−0.074	0.122	0.096
	(0.031)	(0.082)	(0.134)	(0.043)	(0.255)	(0.311)	(0.083)	(0.109)
Children's age square	−0.001	−0.002	−0.009***	0.000	−0.004	0.001	−0.002	−0.001
	(0.001)	(0.002)	(0.003)	(0.001)	(0.005)	(0.006)	(0.002)	−(0.002)
Father's age	−0.022	−0.254**	0.102	0.128	0.030	0.427	−0.155	0.263
	(0.042)	(0.099)	(0.148)	(0.086)	(0.134)	(0.420)	(0.109)	(0.255)
Father's age square	0.000	0.002**	−0.001	−0.001	0.000	−0.004	0.002	0.002
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)
Constant	3.193***	9.300***	−3.819	3.740	0.855	−4.424	8.402***	−2.137
	(1.118)	(2.512)	(3.738)	(2.283)	(4.499)	(9.378)	(2.558)	(7.096)
Adj. R^2	0.141	0.104	0.168	0.158	0.236	0.156	0.107	0.176
Pro.>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	1,764	781	585	371	127	163	898	199

Notes:
(i) The dependent variable is the log of children's income.
(ii) ***Significant at the level of 1%, **significant at the level of 5%, *significant at the level of 10%.

TABLE B3
The Decomposition of Intergenerational Income Elasticity in China (Investment Equation, Urban Areas)

Dependent Var.		*Educational Year*	*Social Capital*	*Housing Assets*	*Financial Assets*
1995	Father's income	2.331***	0.203**	0.696***	0.809***
		(0.169)	(0.079)	(0.165)	(0.107)
	Constant	4.766**	−1.946**	4.143**	2.021*
		(1.521)	(0.712)	(1.466)	(0.962)
	Adj. R^2	0.024	0.009	0.056	0.115
	Pro.>F	0.000	0.011	0.000	0.000
	Observations	781	781	781	781
2002	Father's income	1.004***	0.423***	0.353***	0.742***
		(0.170)	(0.097)	(0.073)	(0.093)
	Constant	3.438*	−3.085***	8.194***	3.389***
		(1.581)	(0.902)	(0.685)	(0.877)
	Adj. R^2	0.057	0.033	0.045	0.126
	Pro.>F	0.000	0.000	0.000	0.000
	Observations	585	585	585	585
2005	Father's income	0.817***	0.450***	0.447***	–
		(0.190)	(0.185)	(0.067)	
	Constant	4.782**	−0.517	7.428***	
		(1.701)	(0.764)	(0.601)	
	Adj. R^2	0.048	0.000	0.109	
	Pro.>F	0.000	0.313	0.000	
	Observations	371	371	371	

Notes:
(i) ***Significant at the level of 1%, **significant at the level of 5%, *significant at the level of 10%.

TABLE B4
The Decomposition of Intergenerational Income Elasticity in China (Investment Equation, Rural Areas)

Dependent Var.		*Education Year*	*Social Capital*	*Housing Assets*	*Financial Assets*	*Land Area*
1988	Father's income	0.440**	0.087	0.343**	0.134	0.01
		(0.214)	(0.045)	(0.132)	(0.297)	(0.075)
	Constant	5.637***	−0.851**	7.580***	9.233***	2.221***
		(1.716)	(0.360)	(1.017)	(2.398)	(0.557)
	Adj. R^2	0.053	0.011	0.025	−0.007	−0.008
	Pro.>F	0.042	0.057	0.010	0.653	0.894
	Observations	127	127	127	127	127
1995	Father's income	1.155***	0.244***	0.351***	0.365***	−0.135**
		(0.147)	(0.080)	(0.067)	(0.090)	(0.052)
	Constant	7.350***	−2.159***	6.893***	5.705***	2.512***
		(1.090)	(0.635)	(0.550)	(0.748)	(0.415)
	Adj. R^2	−0.001	0.039	0.147	0.111	0.04
	Pro.>F	0.000	0.003	0.000	0.000	0.011
	Observations	163	163	163	163	163
2002	Father's income	0.468***	0.230***	0.316***	0.394***	−0.255***
		(0.057)	(0.031)	(0.025)	(0.044)	(0.024)

TABLE B4 *Continued*

Dependent Var.		*Education Year*	*Social Capital*	*Housing Assets*	*Financial Assets*	*Land Area*
Constant		5.429***	−1.948***	7.650***	5.387***	3.581***
		(0.436)	(0.228)	(0.190)	(0.330)	(0.175)
Adj. R^2		0.078	0.037	0.177	0.105	0.131
Pro.>F		0.000	0.000	0.000	0.000	0.000
Obser-vations		898	898	898	898	898
2005	Father's income	0.481**	0.260***	0.341***	–	
		(0.230)	(0.092)	(0.160)		
	Constant	5.656**	−0.187	6.806***		
		(1.906)	(0.760)	(1.282)		
	Adj. R^2	0.011	0.005	0.050		
	Pro.>F	0.108	0.733	0.007		
	Observations	199	199	199		

Notes:
***Significant at the level of 1% and **significant at the level of 5% levels.

TABLE B5
The Decomposition of Intergenerational Income Elasticity in China (Return Equation)

	Urban Area			*Rural Area*			
	1995	*2002*	*2005*	*1988*	*1995*	*2002*	*2005*
Educational year	0.021*	0.033**	0.052***	0.008	0.029	0.052***	0.062***
	(0.015)	(0.015)	(0.012)	(0.044)	(0.022)	(0.014)	(0.012)
Social capital	0.097***	0.066***	0.060	0.297**	0.099*	0.090***	0.091***
	(0.034)	(0.018)	(0.025)	(0.140)	(0.058)	(0.032)	(0.025)
Housing assets	0.106***	0.120***	0.254***	0.004	0.314***	0.121***	0.114***
	(0.038)	(0.027)	(0.030)	(0.043)	(0.059)	(0.034)	(0.020)
Financial assets	0.223***	0.137***	–	−0.011	0.172***	0.148***	–
	(0.033)	(0.025)		(0.017)	(0.054)	(0.020)	
Land area	–	–		0.048	0.128	−0.123***	
				(0.032)	(0.102)	(0.038)	
Children's gender	0.127	0.101*	0.361***	0.281	0.398***	0.063	0.361***
	(0.074)	(0.054)	(0.057)	(0.235)	(0.133)	(0.069)	(0.057)
Children's age	0.424***	0.425***	−0.005	0.036	−0.045	0.047	−0.005
	(0.132)	(0.125)	(0.049)	(0.283)	(0.300)	(0.076)	(0.049)
Children's age square	−0.008***	−0.008***	0	−0.001	0.001	−0.001	0
	(0.003)	(0.002)	(0.001)	(0.005)	(0.006)	(0.001)	(0.001)
Constant	−0.197	−0.195	5.675***	7.241*	3.902	4.409***	5.675***
	(1.671)	(1.602)	(0.942)	(3.726)	(3.812)	(1.047)	(0.942)
Adj. R^2	0.240	0.266	0.290	0.026	0.290	0.171	0.290
Pro.>F	0.000	0.000	0.000	0.063	0.000	0.000	0.000
Observations	781	585	371	127	163	898	199

Notes:
(i) The dependent variable is the log of children's income.
(ii) ***Significant at the level of 1%, **significant at the level of 5%, *significant at the level of 10%.

APPENDIX C: DATA APPENDIX

a. Brief information of the data sources used in this paper

CHIPS are organised by the State Statistical Bureau and Chinese Academy of Social Sciences, with the purpose of measuring and estimating the distribution of income in both rural and urban areas of China. The data collection every year consists of two distinct samples of the urban and rural population which were selected from significantly larger samples drawn by the State Statistical Bureau. It is generally considered as the most comprehensive and strict micro-data on Chinese income which is publically available. The survey has now been carried out for four rounds, including 1988, 1995, 2002 and 2007, with the data for the first three rounds being public and also the main data we used in this paper.

Chinese General Social Survey is organised by Renmin University of China and Hong Kong University of Science and Technology, with the sample drawn from the fifth national population census in 2000 using stratified sampling method. The survey has been carried out for three rounds, including 2003, 2005 and 2006, with each round collecting data for the previous year of the survey. We use the last round as a complement to CHIPS, as it is the latest publically available micro income data in China and also the only one having information on both generation's income in the three rounds of CGSS.

Chinese Health and Nutrition Survey is an international collaborative project between the Carolina Population Center at the University of North Carolina at Chapel Hill and the National Institute of Nutrition and Food Safety at the Chinese Center for Disease Control and Prevention. It was designed to examine the effects of the health, nutrition and family planning policies and programmes implemented by national and local governments and to see how the social and economic transformation of Chinese society is affecting the health and nutritional status of its population.

b. Definition of key variables

(i) Income

In CHIPS, labour income is defined as the cash and item income received by the individuals in the labour market, being based on the most accurate narrowest questions in the questionnaire. All the incomes that cannot be clearly included as labour income are excluded. In comparison, total income is calculated by using all the incomes that can be specified to a specific individual, including asset income, although the exact items are not the same in different years and in urban/rural areas. In CGSS, income is defined as the total income including wages, bonus and interests. In CHNS, income is defined as wages and bonuses.

(ii) Intermediate Variables

Human capital is defined as the finished educational years. Social capital is generated by the principal component analysis on children's CPC membership, occupation, industry and the ownership of the working unit. The factor loading on these four variables is 0.28, 0.46, 0.58, 0.61 (CHIPS) and 0.45, 0.23, 0.64, 0.59 (CGSS), respectively.

More exactly, CPC membership is defined by a dummy variable equal to 1 when the child is a CPC member. Occupation is a discrete variable with the values 1–7 representing managers, technicians, private undertaking owners, clerks, service personnel and agriculture workers, respectively. Industry is a discrete variable with the values 1–4 representing agriculture, man-

ufacturing, service industries and public sectors, respectively. Ownership of the working unit is a dummy variable equal to 1 when an individual works in a publically owned unit.

Housing value is defined as the market value of the families' self-owned houses. The financial asset is defined as the savings and assets in the capital market, including bond and stocks. Land asset is defined as land areas (for rural families only).

REFERENCES

Becker, G. S. and N. Tomes (1979), 'An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility', *The Journal of Political Economy*, **87**, 6, 1153–189.

Benabou, R. and E. Ok (2001), 'Social Mobility and the Demand for Redistribution: the POUM Hypothesis [J]', *Quarterly Journal of Economics*, **116**, 2, 447–87.

Bjorklund, A., M. Jantti and G. Solon (2005), 'Influences of Nature and Nurture on Earnings Variation: A Report on a Study of Various Sibling Types in Sweden', in S. Bowles, H. Gintis and M. Osborne Groves (eds.), *Unequal Chances: Family Background and Economic Success* (Princeton, NJ: Princeton University Press), 145–64.

Bjorklund, A., M. Lindahl and E. Plug (2006), 'The Origins of Intergenerational Associations: Lessons from Swedish Adoption Data', *Quarterly Journal of Economics*, **121**, 3, 999–1028.

Black, S. E. and J. Devereux (2011) Recent Developments in Intergenerational Mobility (M), in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, Volume 4B (Amsterdam: North Holland), 721–75.

Blanden, J., P. Gregg and L. Macmillan (2007), 'Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education', *The Economic Journal*, **117**, 1, C43–C60.

Blau, P. M. and O. D. Duncan (1967), *The American Occupational Structure* (New York: Wiley).

Bowles, S. and H. Gintis (2002), 'The Inheritance of Inequality', *The Journal of Economic Perspectives*, **7, 16**, 3, 3–30.

Congbin, G. and M. Weifang (2009), 'Education: Establishing Rational and Intergenerational Mobility Mechanism – The Application of Structural Equation Model in the Research on the Relationship between Education and Intergenerational Mobility', *Educational Research*, **10**, October, 5–12. (Chinese).

Dahl, G. B. and L. Lochner (2005), 'The Impact of Family Income on Child Achievement', NBER Working Paper 11279 (Cambridge, MA: NBER).

Gong, C. H., A. Leigh and X. Meng (2010), 'Intergenerational Income Mobility in Urban China', The institute for the Study of Labor (IZA) Discussion Paper No. 4811 (Bonn: The Institute for the Study of Labor).

Haigang, W. (2005), 'The Intergenerational Mobility in Chinese Income Distribution', *Economic Science*, **2**, February, 18–25. (Chinese).

Hongbin, C. (2011), 'Maintain High Social Mobility', *The New Century*, **13**, April, 2–10. (Chinese).

Jianzhi, Z. and Ming L. (2009), 'The Contribution of Guanxi to Income Inequality in Rural China and a Cross-regional Comparison: A Regression-Based Decomposition', *China Economic Quarterly*, **10**, October, 363–90. (Chinese).

Morris, P., G. J. Duncan and C. Rodrigues (2004), 'Does Money Really Matter? Estimating Impacts of Family Income on Children's Achievement with Data from Random-Assignment Experiments', Working Paper (Evanston, IL: Northwestern University).

Piketty, T. (1995), 'Social Mobility and Redistributive Politics', *Quarterly Journal of Economics*, **110**, 3, 551–84.

Ruilong, Y. (2010), 'Father's Political Status, Political Connection and Children's Income', *China Economic Quarterly*, **3**, March, 871–90. (Chinese).

Shi, L. and Z. Renwei (1999), 'On the Income Distribution of Chinese Residents', *Economic Research Journal*, **4**, 1, 3–17. (Chinese).

Shi, L., W. Zhong and D. Sai (2005), 'Empirical Analysis on the Inequality and the Reason of China Residents' Property Distribution', *Economic Research*, **6**, June, 6–15.

Solon, G. (1999), 'Intergenerational Mobility in the Labor Market', in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, Vol. III (Amsterdam: North-Holland), 1761–800.

Solon, G. (2004), 'A Model of Intergenerational Mobility Variation Over Time and Place', in M. Corak (ed.), *Generational Income Mobility in North America and Europe* (Cambridge: Cambridge University Press), 38–47.

Ting, S. and Y. Zhigang (2010), 'Land Supply, Supply of Local Public Goods and Housing Price', *Nankai Economics Studies*, **3**, March, 3–19 (Chinese).

Xianguo, Y. and Z., Liqiu (2006), 'Intergenerational Income mobility and the Channels of Intergenerational Transmission in China: 1989–2000', Working Paper (Hangzhou: School of Economics, Zhejiang University).

Ying, W. (2009), *Research on Intergenerational Income Mobility and Income Inequality in China* (Beijing: China Financial and Economic Publishing House).