# Intergenerational Income Mobility In Singapore

## Executive Summary



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# EXECUTIVE SUMMARY

The measurement of intergenerational income mobility is a subject of great interest among social scientists and policymakers. High intergenerational mobility suggests that society offers similar chances of achieving economic success regardless of one's background whereas low mobility implies that children from low-income families are more likely to remain poor, and thus presents a case for more active government intervention to "level the playing field".

Solon (1992) introduced a simple methodology to measure intergenerational income mobility. Specifically, he estimated the correlation between measures of fathers' incomes and that of their sons' incomes. The correlation coefficient, $\rho$, is typically a value between 0 and 1, where a higher value implies lower intergenerational mobility, meaning a son is more likely to have an income status similar to his father's.[2]

For the United States (US), Solon (1992) found an estimate of $\rho$ = 0.4 and concluded that intergenerational mobility was relatively low. This value of $\rho$ = 0.4 has since served as a benchmark for international comparison of intergenerational mobility.

Ensuring high intergenerational mobility has been a key national aspiration for Singapore. However, there have been few studies measuring intergenerational mobility in Singapore. To our knowledge, the only other studies are two papers by Ng (2007) and Ng et. al. (2009). Both papers used data from the 2002 Singapore National Youth Survey, which surveyed youths aged 15-29 in 2002. Both papers estimated Singapore's intergenerational correlation to be in the range of 0.23 to 0.28. However, after using various ways to correct for data constraints, they found relatively large values for Singapore's intergeneration correlation. Ng (2007) found correlations ranging from 0.135 to 1.2, a very wide range which suggests extremely high and low mobility. Ng et. al. (2009) found a value of 0.45 in Singapore, similar to the US.

The two studies faced significant data constraints. The sample sizes were small, with only a single cross section of data available. Further, the incomes were recorded in intervals and not in exact dollar values; youths' own reports in the survey on their parent's incomes could also have contained recall error. In addition, the study had to focus on incomes of youth below 30, which is generally regarded as too early to draw conclusions on life-time mobility. To overcome these problems, they had to introduce several debatable assumptions and adjustment factors in their analysis. Their results are hence less than conclusive, and cannot be interpreted with confidence. In our view, the data issues they faced required a larger sample size and longitudinal data in order to be convincingly addressed.

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[2] The Table below illustrates what various values of $\rho$, imply for father-son income mobility. Assuming a father is in the lowest income quintile, in a society where $\rho$ is 0.2, the son has a 72 percent (59 + 13) chance of moving to the 2nd or higher income quintiles. This probability decreases to 62 percent when $\rho$ is 0.4, and further to 50 percent when $\rho$ is 0.6.

Intergenerational Income Status Transition Probabilities for Different Values of $\boldsymbol{\rho}$
(Given Father in the 1st Quintile)

| Father: 1st quintile | Son: Probability of Reaching Various Quintiles | | |
|---|---|---|---|
| | 1st quintile | 2nd-4th quintile | 5th quintile |
| $\rho$ = 0.2 | 0.28 | 0.59 | 0.13 |
| $\rho$ = 0.4 | 0.38 | 0.55 | 0.07 |
| $\rho$ = 0.6 | 0.50 | 0.48 | 0.02 |

In this paper, we present measures of intergenerational income mobility in Singapore, following the methodology of Solon (1992). We used previously unused data - high precision longitudinal data of large sample sizes of nearly 40,000 father-son pairs - to overcome the challenges faced by the two earlier studies mentioned.[3]

We applied the methodology to income records of some 39,500 father-son pairs using data from the Singapore Department of Statistics.  Several technical issues can affect the result, such as (i) the optimal point to measure the incomes of the father-son pair is at the middle of the life cycle; and (ii) obtaining good measures of permanent income.  In addition, income data was only available from 1996 to 2008.  Working within these constraints, we focused on sons from the 1969 to 1978 birth cohorts so as to measure both fathers' and sons' incomes as close to the middle of the life cycle as data allows.  Specifically we measure sons aged 30 to 39 in 2008, and their fathers averaging 51 to 56 years at least 8 years earlier in 1996 to 2000.  We also pay close attention to employment status, and use average incomes to approximate long-run incomes.

Our results indicate that Singapore's father-son intergenerational correlation was **0.22 to 0.3.** Singapore's intergenerational income mobility was therefore moderately high, and higher than as found in similar studies for the US - rather than being similar to the US as suggested by Ng et el. (2009).[4]

To illustrate what our estimates mean, Table 1 simulates an income transition matrix corresponding to a correlation of 0.3.  Given a father in the 1st quintile, a son's odds of reaching the second or higher quintiles are 66%; his odds of reaching the top quintile are 10 percent. Given a father at the median (3rd quintile), the son has fairly even odds of reaching every quintile.

TABLE 1: TRANSITION PROBABILITY MATRIX IF $\rho$ =0.30, ASSUMING A BIVARIATE NORMAL DISTRIBUTION

| $\rho$ = 0.30 | | Son's Quintile | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | 1st | 2nd | 3rd | 4th | 5th |
| | 1st | 0.33 | 0.24 | 0.19 | 0.15 | 0.10 |
| | 2nd | 0.24 | 0.22 | 0.21 | 0.19 | 0.15 |
| **Father's Quintile** | 3rd | 0.19 | 0.21 | 0.21 | 0.21 | 0.19 |
| | 4th | 0.15 | 0.19 | 0.21 | 0.22 | 0.24 |
| | 5th | 0.10 | 0.15 | 0.19 | 0.24 | 0.33 |

We also find that our estimates do not differ greatly across different ways of measuring incomes, and across different percentiles of the income distribution.  For example, at the 10th percentile, the father-son correlation in the US was found to be very high, at 0.67, indicating mobility is much lower among poor sons than the son with average income.  In Singapore we estimate it to be 0.27 to 0.36.  Hence while mobility of the poor in Singapore is lower than the person with average income, it does not differ as greatly as compared to the US.

The relatively high level of mobility in Singapore may be due to the significant expansion in education opportunities during the 1960s to 1980s, which coincided with three decades of rapid economic transition.  A simple cross-tabulation of father-child educational attainment for the children born in 1972-1978 suggests a fairly large increase in the child's educational attainment over their fathers.

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[3] Analysis was performed by the Department of Statistics .
[4] Compared to a selection of OECD countries in Corak (2006), our estimates appear to be moderate – below that of the US and UK which exceed 0.4, similar to that of Germany at around 0.3, and higher that of Canada and some Nordic countries (0.2 or less).  However, due to the wide variation in data quality and context, these should be taken as indicative comparisons only.

While this paper finds moderate to high intergenerational mobility in Singapore, the findings are only representative of the cohorts born between 1969 and 1978. Nonetheless, we believe these results to be robust given the large sample sizes and high data quality. Insofar as the cohorts somewhat overlap with the 2002 Youth Survey (the latter would have been aged 24 to 33 in 2002), they suggest distinctly higher mobility than previous work had estimated. The intergenerational mobility of younger cohorts can only be addressed in the future with data with a longer horizon and as younger cohorts reach maturity.

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