Intergenerational Income Elasticity in Turkey: A New Estimate

Murat Anil Mercan
Faculty of Business Administration, Department of Economics, Gebze Technical University, Kocaeli, Turkey

Hande Barlin
Faculty of Business Administration, Department of Economics, Gebze Technical University, Kocaeli, Turkey

Abstract
Social scientists have been intrigued by the relationship between generations based on different characteristics. Economists, has been especially interested in measuring intergenerational income elasticity, which looks at the relationship of parents and that of their children when they become adults and gives clue on trends of income inequality. Most of the literature concentrates on the experiences of developed countries and measurement issues. Nevertheless, new studies concerning intergenerational income elasticity is being undertaken in developing countries as the data become increasingly available for these countries. In this vein, there is only one previous study that investigates intergenerational income elasticity for Turkey. Mercan (2012) finds that intergenerational income elasticity is around 0.1 in Turkey, which depicts Turkey as a highly mobile country meaning that children of poor parents have a higher likelihood to have a better income status. However, his study does not depend on a longitudinal dataset, which might make Mercan’s (2012) estimate biased. Following Solon (1992) in using OLS for lower bound and instrumental variable (IV) for upper bound, this study puts forth a new estimate, which relies on a nationally representative and longitudinal dataset for Turkey. The study’s estimate for intergenerational income elasticity varies between 0.3 and 0.6, which is much higher than the result of Mercan (2012), indicating that Turkey is a less mobile country than previously foreseen.

Key words: Intergenerational mobility, income, earnings

JEL classification: J62
Introduction

Since early efforts of Sir Francis Galton in measuring regressions to obtain different characteristics of generations, social scientists have attempted to measure the relationship between generations. Nevertheless it was Becker and Tomes (1976; 1998), who spurred interest concerning income relationships between generations, which are known as intergenerational income elasticity.

Intergenerational income elasticity looks at the relationship between income of parents and that of their offspring when they become adults. In the words of Mazumder (2015: 2), intergenerational income elasticity tells us how many generations (on average) it would take the descendants of a low income family to rise to the mean level of log income."

While low elasticities depict societies that are mobile, high elasticities characterize societies that are rigid. Likelihood of poor parent's children to have a better income status is higher in low elasticity countries compared to their counterparts in high elasticity countries (Blanden, 2013). Accordingly, intergenerational income elasticities give clues on the trends in income inequality. In this trait, there is a positive association between Gini coefficient and intergenerational income elasticity (Corak, 2013a). Furthermore, there is positive relation between inequality in income and opportunity (Lefranc, Pistolesi and Trannoy 2008).

Unfortunately economic inequalities are transmitted from an older generation to a younger one (Lefranc, Ojima and Yoshida, 2014). Not only the family, but also labor market and the state (Solon, 2004) as well as the social context play role in this transmission. Accordingly, to prescribe policies improving life chances for the poorer segments of the society, it is important to understand the extent of this transmission.

Against this background, it is mostly the developing countries experiencing inequalities in income distribution, which need analysis on this transmission, namely estimation of intergenerational income elasticity. Thanks to newer availability of data, it is only recently these types of analysis started to be conducted in developing countries.

In Turkey, first analysis in this manner was carried out by Ozdural (1993), who found that increase in mother's education and father's education by one year, increases daughter's income by 6% and decreases daughter's income by 4% respectively. Nevertheless, it was Mercan (2012), which estimated income elasticity for Turkey. Using yearly earnings, he calculated intergenerational income elasticity at approximately 0.1 in Turkey and described Turkey as a highly mobile country. However, as his study does not depend on a longitudinal dataset, Mercan's (2012) estimate might have been biased.

With the availability of nationally representative and longitudinal data, the present study investigates intergenerational income elasticity in Turkey. Following Solon (1992) in using OLS for lower bound and instrumental variable (IV) for upper bound, the study estimates generational income elasticity around 0.6, which is much higher than the result of Mercan (2012).

Following the literature review, the paper introduces the data, explains the methodology, presents the results and finally concludes with research findings.

Literature Review

The literature on international income elasticity is overwhelmed with discussions regarding measurement issues. Causes and consequences of values obtained is shadowed by these discussions. The discussions focus on problems regarding measurement of lifetime earnings/income, life cycle bias and international comparability of intergenerational elasticities and go hand-in-hand with improvement of data quality and quantity and estimation techniques over time.

The literature calculates the intergenerational income elasticity by a simple regression, as follows:

\[ Y^{Son} = \alpha + \beta Y^{Father} + \psi A + \varepsilon \]  

(1)

where \( Y^{Son} \) and \( Y^{Father} \) denote log of lifetime incomes of sons and fathers respectively. Vector A in the equation represents control variables, like son’s age. Control variables diminish life-cycle bias effect.
Regression coefficient of intergenerational income elasticity is represented with $\beta$. While lower $\beta$ indicates higher income mobility between fathers and sons, higher $\beta$ represents lower income mobility between the two generations.

Theoretical models assume lifetime earnings must be used both for fathers and sons. This necessitates data at least covering whole working life of two generations. However, due to lack of quality data, early studies used single earnings/income for lifetime income of fathers and estimated intergenerational mobility coefficient to be around 0.2 for the US (Mazumder, 2005a). Solon (1989) criticizing earlier works in 1970s and 1980s put forth that results of these studies underestimated intergenerational income elasticity due to transitory earning shocks and problems regarding sample homogeneity. With a view to correct this problem Solon (1992) and Zimmerman (1992) averaged father's earnings for five and four years respectively. Both studies estimated intergenerational income elasticity as approximately 0.4. On the other hand, Mazumder (2005b) used up to 16 years for averaging and found intergenerational earnings elasticity of 0.6 for the US. As Mazlumder (2005a) put it, difference of 0.2 between intergenerational income elasticity of 0.6 and 0.4 represents two more generations for a family with an income of 50% of the national average to reach average. In a more recent study, Mazumder (2015) used 15 years averages of parental income, which centered around age of 40, and established an elasticity higher than 0.6.

Another source of discussions has been life cycle bias. As lifetime earnings follow inverted U shape pattern, age intervals used for earnings observations affect results. For instance, when observations for father's earnings are taken near the peak, results give lower estimates. Accordingly Grawe (2006) indentified that variations in estimates for the same country, even using the same data, partly arise from the age of father at observation. Similarly, Haider and Solon (2006) establish that son's earnings observed at younger ages influence the results to a great extent. It generates downward bias (Chun-In and Solon, 2009). In addition, using Swedish example Böhlmark and Mathew (2006) found that using current income as a proxy creates inconsistencies.

Until the mid 2000s much of the literature on intergenerational income elasticity concentrated on developed countries, especially the United States. Nevertheless, with the increase in availability of data, studies started to be conducted for the developing countries including, Brazil (Dunn, 2007), Chile (Nunez and Leslie, 2010), China (Gong, Leigh and Meng 2012; Hau, Zhou, Jiang and Sun 2014), South Korea (Ueda, 2013), Singapore (Ng, 2007) Philippines (Bevis and Barrett, 2015), Taiwan (Kan, Li and Wang, 2015; Sun and Ueda, 2015) and Turkey (Mercan, 2012).

Recently, there have been several attempts to compare intergenerational income elasticity of countries. Some of the studies, which make cross-country comparisons include Solon (2002), Corak (2006) and Blanden (2013). Nevertheless, it is not an easy endeavor as comparability necessitates similar information for generations and comparable sample selection (Piraino, 2007). These comparisons highlight that while Scandinavian countries are mobile, United States is a comparatively a rigid country.

**Research and Methodology**

**Data**

The study uses nationally representative Income and Living Conditions Survey (ILCS) collected by Turkish Statistical Institute (TSI). TSI collects data from around 12,800 household members annually for this longitudinal data set. ILCS is convenient for intergenerational analysis as it includes earnings of both fathers and sons. Due to its longitudinal character, average earnings can be obtained from multiannual data, decreasing the vulnerability of the analysis against transitory earnings shocks.

On the other hand ILCS has two disadvantages, which may lead to estimation errors. First disadvantage pertains to selection bias, as all father-son pairs in the survey live in the same house. Accordingly, father-son pairs living in separate houses remains outside of the scope of the study. Second disadvantage is related to recording of education variables. These variables are in intervals, not in actual values. Nonetheless, ILCS is the only data set in Turkey, with which intergenerational income elasticity can be estimated.
The study uses four years data collected in 2009, 2010, 2011 and 2012. Still, below section portraying main characteristics focus on a one-by-one averaging regression sample from 2009 dataset, which is the largest dataset in ILCS. This means yearly average incomes were used for both fathers and sons. There are 441 father son pairs in the primary sample, of which the size is conformity with literature - for instance Solon (1992) uses 332 father - son pairs in his analysis. Son sample includes male children born before 1994, who also reported annual earnings for 2009. Father sample includes male head of families of the sons.

Table 1: Summary Statistics

|                  | Mean | Std. Dev. | Min | Max |
|------------------|------|-----------|-----|-----|
| Son's log wage   | 8.67 | 1.01      | 5.01| 11.47|
| Father's log wage| 9.19 | 0.78      | 5.14| 11.33|
| Father's age     | 54.50| 9.29      | 35  | 86  |
| Son's age        | 25.46| 6.69      | 15  | 51  |
| Father's education| 5.85 | 4.00      | 0   | 16  |
| Son's education  | 9.59 | 4.20      | 0   | 16  |
| N                | 441  |           |     |     |

Table 1 presents summary statistics for the year 2009. Average income and fathers’ mean income are higher compared to that of their sons. Standard deviation of natural logarithm of son's earnings is slightly higher. Average age is approximately 54 years for fathers. Son's average age is around 25. While average level of school completed is elementary school for fathers (5.85 in Table 1 indicating 2nd education interval), average level of school completed is middle school for sons (9.59 in Table 1 indicating 3rd education interval).

Methodology

The model estimated in this study extends the model under the literature review section. Averaging income was used in order to overcome transitory earnings shock bias. Therefore, Equation 1 becomes

$$ Y^\text{Son} = \alpha + \beta Y^\text{Father} + \psi A + \epsilon $$

(2)

where $Y^\text{Son}$ and $Y^\text{Father}$ are average of their respective incomes. Vector A represents control variables, like son's age, square and cube of son's age, father's age and square and cube of father's age. $\beta$ denotes regression coefficient of intergenerational income elasticity. Lower $\beta$ indicates higher income mobility.
### Findings

**Table 2: OLS Results**

| Father | 1       | 2       | 3       | 4       |
|--------|---------|---------|---------|---------|
|        | 0.05    |         |         |         |
|        | (0.05)  |         |         |         |
|        | [441]   |         |         |         |
| 2      | 0.14**  | 0.20*** |         |         |
|        | (0.06)  | (0.07)  |         |         |
|        | [443]   | [200]   |         |         |
| 3      | 0.17*** | 0.25*** | 0.30*** |         |
|        | (0.06)  | (0.08)  | (0.09)  |         |
|        | [428]   | [191]   | [167]   |         |
| 4      | 0.15**  | 0.26*** | 0.31*** | 0.31*** |
|        | (0.07)  | (0.09)  | (0.09)  | (0.09)  |
|        | [420]   | [188]   | [164]   | [157]   |

Standard errors are in parentheses. Sample sizes are in square brackets.

* p<0.10  ** p<0.05  *** p<0.01

β estimates from the OLS analysis for different averaging options are provided in Table-2. First cell (1 by 1) shows that the result for $Y_{Son}$ is the natural logarithm of the son’s annual earnings in 2009 and $Y_{Father}$ is the natural logarithm of the father’s annual earnings in 2009. The sample size is 441 father–son pairs. Without any averaging, β becomes 0.05, which is very low and close to the results of Mercan (2012). However, these results suffer from transitory earnings shock bias.

Other cells show β values for different averaging. For instance, father 2 and son 1 pertain to 2-year averaging for father’s earnings and 1-year averaging for son’s earnings. In that case, β becomes 0.14. This is almost three times larger than no averaging result, which suggests that averaging is important for the estimates.

Best estimate in the study is a four-by-four averaging regression, which refers to 4 years for the average of both fathers’ earnings and sons’ earnings. In this estimate, β becomes 0.31. It is noteworthy that a higher β indicates lower income mobility. In addition, fathers’ education was used as an instrument in the four-by-four averaging regression. Solon (1992) highlighted that the instrumental variable approach gives the upper bound for the estimates. The result of the study shows that β becomes 0.64 (standard error: 0.26), which demonstrates that Turkey is a less mobile society than the previous literature suggests.
Conclusion

The study investigated intergenerational income mobility and tried to explore relation between father's and son's income. The estimates vary with 0.3 (OLS) and 0.6 (IV), indicating that Turkey is a comparatively rigid society in terms of income mobility.

As the data set used is longitudinal, the study's vulnerability against transitory earning shocks is diminished. This feature presents advantage over Mercan (2012). On the other hand as the data set do not include father-son pairs living in separate houses, a sample selection problem is inherent. Nonetheless, the study is the first endeavor to estimate intergenerational income mobility in Turkey with a longitudinal dataset.

The results suggest that Turkey is a less mobile society than considered previously. This implies that policies should be developed which target the children of the poorer segments of the society, so that their life chances are improved. Accordingly, future research should concentrate on identifying factors, which make the Turkish society rigid in terms of income mobility, so that effective policies can be prescribed.

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