INTERNATIONAL REVIEW OF ECONOMICS AND MANAGEMENT
ISSN: 2148-3493 IREM
DOI: 10.18825/irem.79053 Volum 4, Number 1, 2016, 1-13.

INTERGENERATIONAL TRANSMISSION OF HEALTH IN TURKEY

Murat Anil Mercan*

Hande Barlin**

Abstract

Intergenerational transmission of health is a relatively new area of study for economists. Its persistence points to health inequalities. It also suggests that some part of the population does not have the capacity or opportunity to neither participate in nor benefit from economic and social life to the fullest extent. This study examines the relationship between parental income and offspring health as well as the relationship between health of parents and children. It uses 2008-2011 Income and Living Conditions Survey conducted in Turkey. The results establish a strong relationship both between parental income and offspring health as well as health of fathers and sons. The study suggests that while richer parents have healthier children, healthier parents have healthier children.

Key Words: Intergenerational mobility, health status, intergenerational transmission, self-assessed-health (SAH)

JEL Classification: J62, I12, I14

I. INTRODUCTION

Intergenerational transmission of different characteristics, in other words intergenerational mobility, is one of the most thought-provoking topics that has been studied by scientists since Sir Francis Galton's (1886) seminal work, where the relation between height of children and that of the

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

** Faculty of Business Administration, Department of Economics, Gebze Technical University, Kocaeli, Turkey. Corresponding author: Gebze Teknik Üniversitesi Rektörlüğü, İşletme Fakültesi Dekanlığı, P.K. 141 4140 Gebze/Kocaeli TÜRKİYE hbarlin@gtu.edu.tr.

Date of submission: 22.02.2016

Date of acceptance: 13.04.2016

parents' is investigated. Social scientists, especially economists were fascinated with persistence of economic outcomes between generations as it pinpoints to inequality in opportunity and trends in income inequality (Corak, 2013).While they have especially dealt with income, socioeconomic status and education, other family characteristics such as health have not been widely studied (Black & Devereux, 2011). Despite its modest coverage in intergenerational mobility literature until now, health transmission between generations is an increasingly relevant, yet understudied area.

Health, in general, is a critical area of study of economics not because it constitutes a component in human capital besides education (Ahlburg, 1998; Kim, Sikoki, Strauss &Witoelar, 2015) but it also is a determinant in labor market outcomes such as wages, employment and working hours (Currie & Madrian, 1999) and its lack is associated with higher public and private spending (Thorpe, 2013; Paez, Zhao & Hwang, 2009). Studies in this area are essential, because it is a fundamental determinant for quality of life.

In this scope, intergenerational health transmission, especially its persistence is also an important area as it is a socioeconomic outcome (Thompson, 2014) and most importantly it signifies health inequalities. Persistence suggests that while certain part of the present and future population is inherently healthy, some other is inherently unhealthy. This means that some part of the population does not have the capacity or opportunity to neither participate in, nor benefit from economic and social life to the fullest extent. Moreover, as health is closely associated with income and education, it is thought to play a role in the intergenerational mobility concerning income and education (Thompson, 2014). Accordingly, it is crucial to identify if health status is transmitted to future generations. In addition, mechanisms should be identified so that in the case of ill-health transmission, it can be prevented. (Erikson, Pan & Qin, 2014)

Various dimensions of parent-child relations are central to intergenerational transmission. First dimension pertains to genetic transmission (Lidhal, Lundberg, Palme & Simenova, 2016), such that sensitivity towards various diseases are inherited. (Case, Lubotsky & Paxson, 2002). Another dimension relates to the significant role played by parents in the upbringing of their children. Based on their financial resources and knowledge base, they take everyday decisions for their children on many issues ranging from education they receive and healthcare they take, to the environment they live in and the diet they have (Case & Paxson, 2002). Furthermore, parents' lifestyle choices and behaviors constitute reference for their children (Trannoy, Tubeuf, Jusot, & Devaux, 2010). In addition, generally parents and their children live in the same environment and engage in family activities (Thompson, 2014), at least during the offspring's childhood, so that they are affected by the same environmental factors (Coneus & Spiess, 2012). Consequently, all these

genetic features, choices and decisions with their financial and cognitive resources affect health of their offspring, starting from the womb.

Accordingly, the study attempts to investigate intergenerational transmission of self-assessed health in Turkey for the first time. Most specifically the relationship between income of parents and children's health, as well as the relationship between health of parents and that of their offspring in Turkey are examined. The study finds *strong* relationship between income of fathers and health of sons as well as strong relationship between health of fathers and sons. The results suggest that wealthier fathers have healthier sons. Moreover, healthy fathers have healthy sons.

This paper is structured in the following way. After a literature review, data is introduced and methodology is explained. Following the presentation of results, results are discussed. Finally, the paper concludes with research findings, future research areas and policy implications.

II. LITERATURE REVIEW

As Ahlburg (1998) put forth, intergenerational health mobility have been predominantly studied by genetic epidemiologists until the end of the *1990s*. With the beginning of the new millennia studies concerning health relations between generations, which used large data sets, started to be conducted by economists with a view to explain mechanisms lying behind intergenerational income mobility. Nevertheless, in time, health transmission became an interest in its own right.

Through many channels, parental socioeconomic status, especially income plays an important role in health outcome of the children at various stages of their lives. As supply of goods and services by the community decreases, the role of income increases (Marmot, 2002). Even during the prenatal period income affects health of offspring. Financially disadvantaged mothers give birth to babies with poor health (Aizer & Currie, 2014), so do the low educated mothers (Doyle, Harmon, Heckman & Tremblay, 2009). Furthermore, lower socioeconomic status of the parents is associated with poorer overall health of the children (Chen, Martin & Matthews, 2006). In addition, chronic and acute conditions (Currie & Lin, 2007) as well as cognitive development and emotional health problems (Najman et al., 2004) are more prevalent among low-income children. Moreover, due to health problems their educational attainments are likely to be lower (Case, Fertig & Paxson, 2005). Negative health effects accumulate over time and poorer children start their adulthood at a disadvantaged state, with possible health problems compared to their wealthier counterparts. In adulthood their labor market performance falls short of healthier adults and earn less (Case & Paxson, 2002; Case, Lubotsky & Paxson, 2002; Eriksson, Bratsber & Raaum, 2005) and they

accede in lower social class positions (Palloni, 2006). In this sense, socioeconomic status of parents affects health of their children and their prospects at adulthood (Currie, 2009). Furthermore higher parental income during childhood, buffers them from negative health problems (Case & Paxson, 2002), decreases the risk of mortality of the individual later on (Palme & Sandgren, 2008).

In addition to relations between parent's socioeconomic status and offspring health, health of the parents seems to affect their children's health. In economic literature, different health measures and characteristics were used to analyze intergenerational health transmission. For instance, looking at self-assessed health (SAH), Pascual and Cantarero (2009) finds what they call "parents health effect", where a strong relationship between health of fathers and sons exists. Similarly, Erikson, Pan and Qin (2014) unravel positive correlation between health of parents and their children in China. Comparably, Kim, Sikoki, Strauss and Witoelar (2015) identify intergenerational transmission of health in Indonesia. Nevertheless, they also put forth that associations are lower in developed regions.

Furthermore intergenerational health transmission was identified, for many other health measures and behaviors such as longevity (Trannoy et al., 2010), BMI (Dolton & Xiao, 2015; Classen & Hokayem, 2005; Classen, 2010), birth weight (Emanuel, Filakti, Alberman, & Evans, 1992; Currie & Moretti, 2007; Royer, 2009), anthropometric measures, health disorders and SAH (Coneus & Spiess, 2012), mental health (Hancock, Mitrou, Shipley, Lawrence & Zubrick, 2013; Johnston, Schurer & Shields, 2013), aggression (Margolin, Ramos, Timmons, Miller & Han, 2016), smoking (Göhlmann, Schmidt & Tauchmann, 2010; Loureiro, Sanz-de-Galdean & Vuri, 2010) and alcohol consumption (Schmidt & Tauchmann, 2011).

Intergenerational transmission of health has not been studied widely in Turkey. The only study in this area, which focuses only on Turkey, falls in the scope of medicine. In their study Özdemir et al. (2015) finds intergenerational transmission of psychiatric disorders in Turkey. Besides this study, Turkey is among the countries, which Bhalotra and Rawlings (2011) analyze in the first cross-country study. The authors, looking at relation between height, body mass index and anemia of the mother and mortality risk as well as stunting of children, puts forth that health of the mother in childhood and in present affects health of their children. The study mostly focuses on early life of children. On the other hand, present study looks relation of self-assessed health of father-son pairs as well as the relation between fathers' income and health of sons, in which son's health status is not limited to early life.

III. DATA & METHODOLOGY

The study makes use of Income and Living Conditions Survey (ILCS) from 2008-2011 conducted by The Turkish Statistical Institute (TUIK). ILCS is a longitudinal nationally representative data set and the data comes from probability sample, which avoids homogeneity. For the sample, TUIK contacted 11,043 households from urban areas and 5,522 households from settlements other than urban areas (16,565 households in total). Answering rate was around nine percent. The data set includes self-assessed-health (SAH) as well as income of fathers and sons, which provides the possibility to conduct intergenerational health transmission analysis. It classifies SAH into five categories, ranging from very bad to very good health. While 1 refers to very good health, 5 refers to very bad.

Against these advantages, ILCS harbors a limitation which may cause estimation error. As all father-son pairs surveyed in ILCS live in the same house, fathers and sons living in separate houses cannot be observed. Furthermore, variables of education and age are in intervals. Nevertheless, this data set is the only nationally representative data set for Turkey, which contains income and health status of fathers and sons.

There are 1892 father-son pairs in the samples. Son sample constitute from children reporting health status for 2011. Fathers are male head of households, to which sons belong in 2011.

Table I: Summary Statistics

	Mean	s.d.	Min	Max
Father's lnwage	9.32	0.79	5.56	12.46
Father's age	44.97	10.41	24	86
Son's health dummy	0.40	0.49	0.00	1.00
Son's age	14.39	9.17	1	55
N		1892		

Summary statistics relating to earnings, age and health dummy for 2011 are presented in Table I. Sample size is 1892. Average income and age of fathers are 9.32 and 44.9, respectively.

Health dummy is a dummy variable, where value of 1 represents good or very good health. Average of health status dummy of sons is 0.40. Sons' average is 14.3[*].

Intergenerational health transmission between fathers and sons were estimated using following probit regression:

$$D^{Son} = \alpha + \beta\, Y^{Father} + \psi\, A + \varepsilon \qquad (1)$$

where D^{Son} is a dummy variable, in which value of 1 represents good or very good health. Y^{Father} denotes father's income. Vector A represents control variables namely,ages and square ages of fathers and sons.

IV. RESULTS

Table II: Marginal Probit Results

	Coefficent	s.e.	N
ln wage	0.03**	0.01	1892
son's age	0.13***	0.01	
square of son's age	-0.00***	0.00	
father's age	0.01	0.01	
1square of father's age	-0.00	0.00	

*** p<0.01

** p<0.05

* p<0.1

β estimates from equation (1) are represented in Table II. D^{Son} is a dummy variable that is 1, if SAH of son is good or very good in 2011. In addition, following Solon (1992), to minimize transitory earning shocks, Y^{Father} is the natural logarithm of average of fathers' income data for the years 2008 through 2011. β is 0.03[†]. It means that an increase in income of father is accompanied by an increase in the probability of son's health status becoming good or very good. This result conveys that sons of wealthier fathers have better self-assessed health.

[*]In an additional analysis, son sample included cohort born before 1994, to ensure that the youngest son was 17 years old in 2011. The results are similar and available upon request.

[†]In a separate analysis earnings from one year was used, instead of averaging. The results are similar and available upon request.

Additionally, relationship between fathers' health status and sons' health status was examined. Marginal probit estimate for fathers' health status coefficient is 0.05 (S.E.:0.01). This result suggest that healthier fathers are more likely to have healthier sons. When the divorce status of fathers is controlled results do not change.

Table III: IV Results

	Coefficent	s.e.	N
ln wage	0.06***	0.02	1892
son's age	0.08***	0.00	
square of son's age	-0.00***	0.00	
father's age	0.01	0.01	
1square of father's age	-0.00	0.00	
*** p<0.01			
** p<0.05			
* p<0.1			

Furthermore, following Pascual and Cantarero (2009) in order to dismiss possibility of endogenity, fathers' education level[‡]was used as an instrument. Table III shows the results for the IV method 2SLS estimates give the coefficient as 0.06 (SE:0.02). Hence, in the case that father's self-assessed health is very good or good, son's probability of reporting the same is higher.

Moreover probit results are at means. In addition$\bar{R}^2$ equals to 0.64, which suggests that regression explains 64% of health status.

V. DISCUSSION

The results of the study establish that in Turkey, fathers who self-assess themselves healthy have sons who also self-assess themselves healthy. This results is in line with the findings of researches which used SAH as a unit of measurement for different countries, namely Pascual and Cantarero (2009), Kim, Sikoki, Strauss and Witoelar (2015) as well as Coneus and Spiess (2012).

The study also finds a relation between parental income and offspring's health, most specifically higher income fathers have healthier sons. This result lends support to discussions and

[‡]It has seven categories: illiterate, literate but not a graduate, primary school, secondary, vocational secondary or primary education school, high school, vocational or technical high school, and faculty/university, college or higher education level.

results put forth by Chen, Martin and Matthews (2006), Case and Paxson (2002), Case, Lubotsky and Paxson, (2002) as well as Currie (2009) among many others.

As discussed in the literature (Thompson, 2014), the results of the study may help to explain income mobility in Turkey. In a recent study, Mercan and Barlin (2016) estimated intergenerational income elasticity to be 0.6, which depicts Turkey as a highly rigid country and suggests that while high income parents have high income sons, low income parents have low income sons. Even though causality cannot be established directly, it is possible to contemplate that intergenerational health transmission play a role in this rigidity. For as much as low income parents have children of ill-health, those children cannot perform as well in the labor market and remain poor.

VI. CONCLUSION

The study estimates intergenerational health transmission in Turkey. Results of the study convey that higher income parents are likely to have healthier children and healthy parents are likely to have healthy children. The situation is exactly the opposite for low income parents. Accordingly, policies need to be developed for improving health of low income parent's children. In accordance with the results of the study, amelioration of father's income and health status would lead to healthier offspring. Nevertheless, to prescribe effective policies, more has to be studies regarding the mechanism at play. Thus, further research should concentrate on establishing casual links and identifying mechanism behind the results of the study.

REFERENCES

Ahlburg, D. (1998). Intergenerational transmission of health. *The American Economic Review, 88*(2), 265-270.

Aizer, A. & Currie, J. (2014). The intergenerational transmission of inequality: Maternal disadvantage and health at birth. *Science, 344*(6186), 856-861.

Bhalotra, S. & Rawlings, S. B. (2011). Intergenerational persistence in health in developing countries: The penalty of gender inequality? *Journal of Public Economics, 95*(3), 286-299. doi:10.1016/j.jpubeco.2010.10.016

Black, S. E. & Devereux, P. J. (2011). Chapter 16 - Recent developments in intergenerational mobility. In D. Card & O. C. Ashenfelter (Eds), *Handbook of labor economics: Volume 4B.* (pp.1487-1541). Amsterdam: North Holland.

Classen, T. J. (2010). Measures of the intergenerational transmission of body mass index between mothers and their children in the United States, 1981–2004. *Economics & Human Biology, 8*(1), 30-43. doi:10.1016/j.ehb.2009.11.002

Classen, T. & Hokayem, C. (2005). Childhood influences on youth obesity. *Economics & Human Biology, 3*(2), 165-187. doi:10.1016/j.ehb.2005.05.008

Case, A., Fertig, A., & Paxson, C. (2005). The lasting impact of childhood health and circumstance. *Journal of Health Economics, 24*(2), 365-389. doi:10.1016/j.jhealeco.2004.09.008

Case, A., Lubotsky, D., & Paxson, C. (2002). Economic status and health in childhood: The origins of the gradient. *American Economic Review, 92*(5), 1308-1334. doi: 10.1257/000282802762024520

Case, A., & Paxson, C. (2002). Parental behavior and child health. *Health Affairs, 21*(2), 164-178. doi:10.1377/hlthaff.21.2.164

Chen, E., Martin, A. D., & Matthews, K. A. (2006). Socioeconomic status and health: do gradients differ within childhood and adolescence? *Social Science & Medicine, 62*(9), 2161-2170. doi:10.1016/j.socscimed.2005.08.054

Coneus, K. & Spiess, C. K. (2012).The intergenerational transmission of health in early childhood—Evidence from the German Socio-Economic Panel Study. *Economics & Human Biology, 10*(1), 89-97. doi: 10.1016/j.ehb.2011.03.002

Corak, M. (2013). Income inequality, equality of opportunity, and intergenerational mobility. *The Journal of Economic Perspectives,* 27(3), 79–102. doi: 10.1257/jep.27.3.79

Currie, J. (2009). Healthy, wealthy, and wise: Socioeconomic status, poor health in childhood, and human capital development. *Journal of Economic Literature, 47* (1), 87-122. doi: 10.1257/jel.47.1.87

Currie, J. & Lin, W. (2007). Chipping away at health: more on the relationship between income and child health. *Health Affairs, 26*(2), 331-344. doi: 10.1377/hlthaff.26.2.331

Currie, J. & Madrian, B. C. (1999). Chapter 50 - Health, health insurance and the labor market. In O. C. Ashenfelter & D. Card (Eds), *Handbook of Labor Economics: Volume 3C*. (pp. 3309-3416). Amsterdam: North Holland. doi:10.1016/S1573-4463(99)30041-9.

Currie, J. & Moretti, E. (2007). Biology as Destiny? Short- and Long-Run Determinants of Intergenerational Transmission of Birth Weight. *Journal of Labor Economics, 25*(2), 231-264. doi: 10.1086/511377

Dolton, P. & Xiao, M. (2015). The intergenerational transmission of BMI in China. *Economics & Human Biology, 19*, 90-113. doi:10.1016/j.ehb.2015.06.002

Doyle, O., Harmon, C. P., Heckman, J. J. & Tremblay, R. E. (2009). Investing in early human development: timing and economic efficiency. *Economics & Human Biology, 7*(1), 1-6. doi: 10.1016/j.ehb.2009.01.002

Eriksson, T., Bratsberg, B., & Raaum, O. (2005). Earnings persistence across generations: Transmission through health? University of Oslo Department of Economics &The Frisch Centre For Economic Research, Memorandum No: 35/2005. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.395.6882&rep=rep1&type=pdf

Eriksson, T., Pan, J. & Qin, X. (2014) The intergenerational inequality of health in China. *China Economic Review, 31,* 392-409. doi: 10.1016/j.chieco.2014.06.005.

Emanuel, I., Filakti, H., Alberman, E. & Evans, S. J. (1992). Intergenerational studies of human birthweight from the 1958 birth cohort: 1. Evidence for a multigenerational effect. *BJOG:*

An International Journal of Obstetrics & Gynaecology, *99*(1), 67-74. doi: 10.1111/j.1471-0528.1992.tb14396.

Galton, F. (1886). Regression Towards Mediocrity in Hereditary Stature. *The Journal of the Anthropological Institute of Great Britain and Ireland, 15*, pp. 246- 263.

Göhlmann, S., Schmidt, C. M. & Tauchmann, H. (2010). Smoking initiation in Germany: the role of intergenerational transmission. *Health Economics, 19*(2), 227-242. doi: 10.1002/hec.1470

Hancock, K. J., Mitrou, F., Shipley, M., Lawrence, D. & Zubrick, S. R. (2013). A three generation study of the mental health relationships between grandparents, parents and children. *BMC Psychiatry*, 13(299). doi:10.1186/1471-244X-13-299

Johnston, D. W., Schurer, S. & Shields, M. A. (2013). Exploring the intergenerational persistence of mental health: Evidence from three generations. *Journal of Health Economics*, *32*(6), 1077-1089. doi:10.1016/j.jhealeco.2013.09.001

Kim, Y., Sikoki, B., Strauss, J. & Witoelar, F. (2015) Intergenerational correlations of health among older adults: Empirical evidence from Indonesia. *The Journal of the Economics of Ageing, 6*, 44-56. doi: 10.1016/j.jeoa.2014.08.004.

Lindahl, M., Lundberg, E., Palme, M. & Simeonova, E. (2016). Parental Influences on Health and Longevity: Lessons from a Large Sample of Adoptees. NBER Working Papers, (No. w21946). http://www.nber.org/papers/w21946.pdf

Loureiro, M. L., Sanz-de-Galdeano, A & Vuri, D. (2010). Smoking Habits: Like Father, Like Son, Like Mother, Like Daughter?*. *Oxford Bulletin of Economics and Statistics*, *72*(6), 717-743. doi: 10.1111/j.1468-0084.2010.00603.x

Margolin, G., Ramos, M. C., Timmons, A. C., Miller, K. F. & Han, S. C. (2016). Intergenerational Transmission of Aggression: Physiological Regulatory Processes. *Child Development Perspectives, 10*(1), 15-21.doi: 10.1111/cdep.12156

Marmot, M. (2002). The influence of income on health: views of an epidemiologist. *Health Affairs, 21*(2), 31-46. doi: 10.1377/hlthaff.21.2.31

Mercan, M. A. & Barlin, H. (2016). Intergenerational Income Elasticity in Turkey: A New Estimate. *Journal of Research in Business and Social Science*,*5*(3), 30-37. doi: 10.20525/ijrbs.v5i3.297

Najman, J. M., Aird, R., Bor, W., O'Callaghan, M., Williams, G. M. & Shuttlewood, G. J. (2004). The generational transmission of socioeconomic inequalities in child cognitive development and emotional health. *Social Science & Medicine, 58*(6), 1147-1158. doi: 10.1016/S0277-9536(03)00286-7

Özdemir, O., Boysan, M., Özdemir, P. G., Coşkun, S., Özcan, H., Yılmaz, E. & Atilla, E. (2015). Family patterns of psychopathology in psychiatric disorders. *Comprehensive Psychiatry, 56*, 161-174. doi: 10.1016/j.comppsych.2014.09.014

Paez, K. A., Zhao, L. & Hwang, W. (2009). Rising out-of-pocket spending for chronic conditions: a ten-year trend. *Health Affairs*, *28*(1), 15-25. doi: 10.1377/hlthaff.28.1.15

Palme, M. & Sandgren, S. (2008). Parental income, lifetime income, and mortality. *Journal of the European Economic Association, 6*(4), 890-911. doi:10.1162/JEEA.2008.6.4.890

Palloni, A. (2006). Reproducing inequalities: Luck, wallets, and the enduring effects of childhood health. *Demography, 43*(4), 587-615. doi: 10.1353/dem.2006.0036

Pascual, M. & Cantarero, D. (2009). Intergenerational health mobility: an empirical approach based on the ECHP. *Applied Economics, 41*(4), 451-458. doi: 10.1080/00036840701367523

Royer, H. (2009). Separated at birth: US twin estimates of the effects of birth weight. *American Economic Journal: Applied Economics, 1*(1), 49-85. doi: 10.1257/app.1.1.4

Schmidt, C. M. & Tauchmann, H. (2011). Heterogeneity in the intergenerational transmission of alcohol consumption: A quantile regression approach. *Journal of Health Economics, 30*(1), 33-42. doi:10.1016/j.jhealeco.2010.09.005

Solon, G. (1992). Intergenerational income mobility in the United States. *American Economic Review*,*82*(3), 393-408. doi: 10.2307/1928066

Thompson, O. (2014). Genetic mechanisms in the intergenerational transmission of health. *Journal of Health Economics, 35*, 132-146. doi:10.1016/j.jhealeco.2014.02.003

Thorpe, K. E. (2013). Treated disease prevalence and spending per treated case drove most of the growth in health care spending in 1987-2009. *Health Affairs*, *32*(5), 851-8. doi: 10.1377/hlthaff.2012.0391

Trannoy, A., Tubeuf, S., Jusot, F. & Devaux, M. (2010). Inequality of opportunities in health in France: a first pass. *Health Economics, 19*(8), 921-938. doi: 10.1002/hec.1528