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The role of maternal education in child health: Evidence from a compulsory schooling law

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ABSTRACT

This paper explores the effect of maternal education on child health and the channels in which education operates by exploiting a change in the compulsory schooling law (CSL) in Turkey. In order to account for the endogeneity of education, variation across cohorts induced by the timing of the CSL and variation across provinces by the intensity of additional classrooms constructed in the mother's birth provinces is used as an instrumental variable. The results indicate that mother's primary school completion improves infant health, as measured by very low birth weight, and child health, as measured by height-for-age and weight-for-age *z*-scores, even after controlling for many potential confounding factors. This paper also demonstrates that maternal education leads to earlier preventive care initiation, reduces smoking, reduces fertility, and increases age at first birth.

1. Introduction

Education, especially maternal education, influences child health, which is an important factor predicting the wellbeing and productivity in adult life.[1] While significant attention has been given to the correlation between maternal education and child health, only recently have studies attempted to establish causality in the context of developing countries.[2] This paper uses a nationwide reform of the compulsory education system (CSL) in Turkey in 1997, which extended compulsory schooling from five to eight years, as an instrument to identify the causal effect of maternal education on infant and child health. The change in the educational policy provides an ideal natural experiment since, among women for whom this policy was binding, it encouraged more education than would have otherwise been obtained. Exploiting the policy reform, this paper shows that maternal education improves infant and child health.

This paper contributes to the literature in two ways. First, this paper explores the causal relationship between maternal education and anthropometric measures of child health in the context of a developing country. Anthropometric measures, such as height-for-age and weight-for-age *z*-scores, are ideal measures of child health as they are objective and apply to large numbers of children. Second, this paper explores numerous mechanisms in which education influences child health, including health care utilization, fertility, age at first

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[1] For a survey of the literature, see Strauss and Thomas (1995). Moreover, there is a large literature investigating the effects of education on adult health and health behaviors in developed countries (Amin, Behrman, & Spector, 2013; Eide & Showalter, 2011; Jürges, Reinhold, & Salm, 2011; Silles, 2009).

[2] Overcoming the problem of endogeneity is crucial as unobservable confounding factors, such as ability (Griliches, 1977) and discount rates (Fuchs, 1982), could influence both education and health in the same direction, resulting in spurious relationships.

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birth, smoking behavior, labor force participation, type of occupation, and spouse's education, labor force participation, and occupation.

One explanation of the observed correlation between parental education and child health is that greater maternal education translates into greater health care utilization, including formal prenatal visits. The relationship between maternal education and health care utilization, particularly in developing countries, holds even after controlling for factors that affect both maternal schooling and health care utilization, such as childhood place of residence, ethnicity, and husband's education.[3] Besides health care utilization, maternal education can affect child health through several other mechanisms. For example, better educated women have higher income and may "match" with better educated, and higher income, husbands (Behrman & Rosenzweig, 2002). Educated women also have greater knowledge of modern health care services and ability to communicate with healthcare providers (Caldwell, 1979; Barrera, 1990). Moreover, education may affect smoking and other health behaviors during pregnancy (Currie & Moretti, 2003). Another channel is through greater female autonomy, which in turn influences health-related decisions and the allocation of resources within the household (Caldwell, 1979; Caldwell, Reddy, & Caldwell, 1983). Other possible explanations include greater knowledge about diseases and increased adoption of modern medical practices (Caldwell, 1979; Barrera, 1990).[4]

In order to identify causal effects of maternal education, this paper employs instrumental variables estimation (IV) using variation across cohorts induced by the timing of the CSL and variation across provinces by the intensity of additional classrooms constructed in the mother's birth provinces as an instrumental variable. The main objective of the CSL was to increase the education level to universal standards in order to enter the European Union. In order to accommodate the increased number of primary school students, additional classrooms and schools were constructed, new teachers were recruited, and transportation was arranged for children living in rural areas, who are often far away from existing schools. More than 58,000 classrooms were constructed within the first year of the change in the law (between the 1997/1998 and the 1996/1997 Academic Year), which corresponds to approximately a 30% increase in the number of classrooms from the 1996/1997 Academic Year and an average of approximately 10 additional classrooms per 1000 primary school aged children in 1995.[5] This paper explores the causal impact of maternal primary school completion (8+ years) on infant health at birth (very low birth weight), child health (height-for-age and weight-for-age *z*-scores—HAZ and WAZ), and maternal health (length of health facility stay after delivery, which indicates delivery complications). I control for many confounding factors by including individual- and community-level characteristics, and mother's year-of-birth and province of birth fixed effects.[6]

In the context of a developed country, a few studies have investigated the causal relationship between parental education and infant and child health using various approaches and find mixed results.[7] The literature exploring the causal effect of maternal education on infant health in developing countries is limited. Breierova and Duflo (2004) investigate the impact of parental education on a measure of child mortality (the total number of child deaths before various ages of the mother) using a primary school construction program in Indonesia as exogenous variation in schooling. Chou, Liu, Grossman, & Joyce (2010) explore the impact of parental education on infant health, as measured by the probability of low-weight (less than 2500 g) birth, neonatal death, postneonatal death, and infant death, using a middle school expansion in Taiwan, as exogenous variation. The former paper finds that parental education reduces child mortality, whereas the latter paper finds that parental education reduces the probability of low-weight birth and infant mortality. In a recent working paper, Dinçer, Kaushal, and Grossman (2013) do not find a significant effect of education on child mortality using a change in the compulsory schooling law in Turkey as an instrument.[8] To date, no studies have investigated the impact of maternal education on child health anthropometric measures, which is the primary contribution of this paper.

[3] In India Navaneetham and Dharmalingam (2002); in Bangladesh Paul and Rumsey (2002); in Ethiopia Mekonnen and Mekonnen (2003); in Peru Elo (1992); in Turkey Celik and Hotchkiss (2000); in Thailand Raghupathy (1996); in Uganda Tann et al. (2007); in rural Guetemala Glei, Goldman, and Rodríguez (2003); in South America Jewell (2009); among others.

[4] Barrera (1990) and Caldwell (1979) show that educated mothers benefited more from health care services, regardless of access to health services. Altindag, Cannonier, and Mocan (2011) find weak evidence that education increases health knowledge in the US.

[5] Detailed educational data (the number of classrooms) and the primary school aged population at the province level are provided by the Turkish Statistics Institute (TurkStat).

[6] For example, Behrman and Wolfe (1987) argue that the effect of female education on health outcomes may be overstated in studies that do not control for women's childhood environment during which health related skills and habits are acquired.

[7] Lindeboom, Llena-Nozal, and Van der Klaauw (2009) use a policy influencing time of school exit in the UK, and find little evidence of a causal relationship between parental education and child and infant health as well as parental health and smoking behavior. McCrary and Royer (2011) use age-at-school-entry policies in California and Texas, and find that education has small effects on infant health (as measured by birth weight, prematurity, and rate of infant mortality), and does not affect prenatal behaviors (as measured by smoking rates and prenatal care). Currie and Moretti (2003) use availability of colleges by county when the mother is aged 17 as an instrument for education. They find that higher maternal education improves infant health, and assess the importance of various channels through which education may improve birth outcomes in the United States. The CSL provides a more ideal instrument compared to college openings as a source of identification. Currie and Moretti (2003) addressed concerns regarding the validity of their instrumental variables: (1) the location of college openings may not be random and (2) the endogenous mobility of women who move to attend college.

[8] The working paper by Dinçer et al. (2013) was published after the circulation of an earlier working paper of the present paper. While both use the CSL in Turkey as a natural experiment, the empirical approach, outcomes, and findings are dissimilar. Dinçer et al. (2013) use the number of teachers in 12 region and 20 sub-region as the intensity of the CSL, while I use the number of additional classrooms in 80 provinces. They investigate the impact on child mortality, as measured by the number of children who died before the age of 1 or 5. One potential explanation why the authors do not find a significant effect of education on child health, as measured by infant and child mortality, is that avoidable infant and child deaths are rare events in Turkey during the survey years. On the other hand, stunting from malnutrition and infections starting at birth affects 1 in 10 children (2008 Turkey Demographic and Health Survey Main Report, http://www.hips.hacettepe.edu.tr).