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Re-assessing the Impact of the Grandparent's Income on the Infant Mortality Rate: An Evaluation of the Old Age Allowance Program in Nepal

YUNRONG LI [a] and RICARDO MORA [b,*]

[a] *Southwestern University of Finance and Economics, Chengdu, China*
[b] *Universidad Carlos III, Madrid, Spain*

Summary. — Most studies find that the presence of grandmothers is associated with higher child survival rates while the presence of a grandfather has no effect. In this paper we argue that the use of incomplete retrospective information on household composition may lead to substantial downward biases in the estimates of the grandfather's effect. To illustrate our argument, we study the effects of the introduction of a non-contributory universal pension scheme on infant mortality in Nepal. We use cross-sectional data from the 1996 and 2001 Nepal Demographic and Health Surveys and implement a flexible difference-in-differences approach using as treatment indicator the presence in the household of an elderly person eligible for the pension benefits. Our results confirm the importance of the income of the elderly for infant welfare. In households that include an eligible elderly person, the pension scheme resulted in survival benefits of approximately 7–8 percentage points 12 months after birth from a baseline probability of approximately 89%. Importantly, these results do not depend on the gender of the elderly person. Moreover, we show that ignoring the lack of retrospective information on household composition leads to underestimates of the true effects when the elderly person is a male. These results are qualitatively similar across alternative definitions of the control group and do not depend on the gender of the infant. In addition, we explore potential channels through which these survival benefits are produced, and our results suggest that the pension scheme benefited infants only after their birth and mostly during the first month of life.

Key words — infant mortality, difference-in-differences, intra-household transfers

1. INTRODUCTION

In their recent review, Sear and Mace (2008) report that most cross-sectional studies conducted by evolutionary scientists and demographers find that the presence of maternal grandmothers is statistically associated with higher child survival rates (Sear, Mace, & McGregor, 2000; Sear, Steele, McGregor, & Mace, 2002; Ragsdale, 2004; Leonetti, Nath, Hemam, & Neill, 2004; Beise, 2004; Leonetti, Nath, Hemam, & Neill, 2005). The evidence on the role of paternal grandmothers shows more variation (Jamison, Cornell, Jamison, & Nakazato, 2002; Beise & Voland, 2002; Beise, 2004 Kemkes-Grottenthaler, 2005; Mulder, 2007), while the statistical association between grandfather presence and child survival is much weaker (Hill & Hurtado, 1996; Gibson & Mace, 2005; Sear, 2006; Mulder, 2007).

The estimation of the effect of the presence of elderly people in the household on children survival probabilities is not straightforward. If households with elderly people have different characteristics from households without elderly people, then a direct comparison of child mortality rates confounds the true effect with the effects brought about by differentials in household characteristics (Duflo, 2000, 2003; Sear & Mace, 2008). For example, if households with elderly people are poorer, the comparisons of survival probabilities using cross-sectional data have a negative bias. Adding controls and using linear regression techniques will not reduce the problem significantly if determinants of three-generation households are unobservable to the researcher. One interesting methodological strategy focuses on exogenous income differentials associated with some elderly people. Duflo (2000, 2003) explores the effects on children's nutritional status of the expansion of a pension program in South Africa. As pension eligibility is based on age, subject to a means test, comparisons between households with a pension beneficiary and households with a non-eligible elderly person likely minimize the bias brought about by the endogenous formation of three-generation households.

In this paper, we also exploit an exogenous income differential among the elderly. Using the Nepal Demographic and Health Survey, NDHS, from 1996 and 2001, we focus on the effects on infant mortality of the introduction in 1995 of a non-contributory universal pension scheme in Nepal known as the Old Age Allowance Program, OAAP. Under the OAAP, all Nepalese aged 75 and above were eligible for a universal flat rate pension of 100 rupees per month, approximately 2 dollars or 12% of the country's income per capita. Crucial for our purposes, the data contain birth information on all children born alive to all women between 15 and 49 years of age, regardless of whether the children are alive or dead at the time of the interview. Therefore, we can reconstruct monthly survival histories for all children born before and after the introduction of the program. The NDHS also provides a very rich set of socio-economic indicators, including parents' education and household wealth indicators. As in all cross-sectional studies, our data have incomplete retrospective information regarding the composition of the household and, in particular,we have no information on those

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elderly who were in the household when the infant was born but were not present at the time of the interview. We explicitly address incomplete retrospective information of the household composition with a flexible difference-in-differences approach.

We find a significant effect of the presence of an eligible elderly individual in the household on the survival probability of the infant. Quantitatively, this effect is important: between 7 and 8 percentage points 12 months after birth (the average survival probability for households with eligible elderly people before the OAAP is approximately 89%). Importantly, these results do not depend on the gender of the elderly person or of the infant. We show that ignoring the lack of retrospective information on household composition leads to underestimates of the true effects when the elderly person is a male. In addition, we find no evidence that the reported survival benefits for born-alive children may reflect changes in fertility decisions brought about by the OAAP. We also find that the OAAP is not associated with any improvement in pre-natal and delivery assistance, infant size at birth, or desire for the child during pregnancy. These results suggest that the OAAP benefited infants only after their birth. We find that while the effects were small and not significant three days after birth, most of the survival benefits were already present during the first month after birth.

The rest of this paper is structured as follows. We first describe the institutional settings in Section 2 and then present the data and estimation strategy in Section 3. In Section 4, we report and discuss the main results of the paper. Section 5 discusses alternative channels through which the effects can take place. Finally, Section 6 summarizes the most important findings of the paper and Section 7 concludes.

2. POLICY BACKGROUND

Nepal has consistently ranked as one of the least-developed countries in the world. In 1995, the year the OAAP was introduced, GDP per capita was 200 US dollars in real terms, ranking Nepal 211th in the world. Living conditions for children were also among the worst in the world. The infant mortality rate in Nepal at the time was 7.6%, a higher rate than the average among developing Asian countries (5.4%). The incidence of malnutrition among children under 5 years old was also higher than in the other developing Asian countries. Using height for age and weight for age as malnutrition indicators, 64.5% and 44.1% of children under 5 years old, respectively, suffered from malnutrition in Nepal in 1995, while the averages in other Asian developing countries were 42.9% and 28.8%. [1]

Before the introduction of the OAAP, the only pension scheme available in Nepal—the Provident Fund—affected less than 7% of the older adults (mainly Army personnel and civil servants). The OAAP scheme was announced on December 1994. All Nepalese citizens aged 75 and above became eligible for a universal flat rate pension, regardless of individual characteristics such as past working histories or wealth. The pension, which at the time pays 100 rupees per month, represents approximately 2 dollars or 12% of the country's real GDP per capita. Payments started in July 1995 (see Rajan, 2003, Dahal, 2007, and Willmore & Kidd, 2008, for a more detailed description of the OAAP policies).

In 1999 the pension increased from 100 to 150 rupees per month (or, equivalently, from 8% to 12.5% of nominal GDP per capita). In 2005, the pension increased from 150 to 200 rupees (from 8.3% to 11.1% of nominal GDP per capita). In 2008 the government increased the pension from 200 to 500 rupees, resulting in a real increase—in terms of nominal GDP per capita—from 8.5% to 21.3%, and it reduced the eligibility age threshold from 75 to 70 years old.

Since its inception the OAAP has been financed via taxes (or public debt), and it implies the redistribution of resources from taxpayers and future generations to the elderly. Unfortunately, there are no direct measures of the actual coverage of the program for the first years of implementation. Rajan (2003) reports that some legitimate beneficiaries may have initially encountered difficulties in proving their citizenship and dates of birth. This is consistent with the evolution in the official number of OAAP recipients, which remained relatively stable (between 170,000 and 175,000) from its inception until 2001, and then increased by approximately 10%. [2] Based on census information, Rajan (2003) estimates coverage of the OAAP to range from 83% to 86% in 2001. Hence, if the observed increase in the number of recipients in 2001 reflects only coverage improvements, then average coverage during the first years of the implementation of the OAAP may have ranged from 75% to 78%, possibly with lower coverage in poor and isolated areas.

Other social policies were also implemented during the period studied in our paper. First, since the end of the 1950s, the government has made an effort to gradually extend the provision of health care services. By the end of the 20th century, the majority of people lived within one or two hours walk of a health service provider (Rai, Rai, Hirai, Abe, & Ohno, 2001). Moreover, since 2000 there has been a significant increase in the number and importance of newborn survival policies implemented by the Nepalese government (Pradhan *et al.*, 2012). Hence, we should expect infant mortality rates to decline regardless of the introduction of the OAAP. Finally, in 1996, the Nepalese government introduced two social programs targeted at very narrow groups: the Helpless Widows Allowance and the Disabled Pension. The Helpless Widows Allowance is targeted at elderly widows who obtain neither care from family members nor a widow pension. Thus, by definition, the beneficiaries of this program are not part of our study. The Disabled Pension program, which provides 100 rupees per month to disabled adult citizens, affects a very small proportion of both the adult and the elderly populations (see, Rajan, 2003, for a more detailed description of these policies). To conclude, even though other social policies were introduced during the sample period, the OAAP is the only program introduced at the time affecting the elderly who were living with infants.

3. DATA AND METHODS

(a) *The Nepal Demographic and Health Survey*

We use data from the NDHS whose standard version has been conducted every five years since 1996. [3] The surveys are always conducted between January and June. Each annual survey provides demographic characteristics for every member of the household—such as current age, sex, education, and relation to the household head—and basic information on the characteristics of the household—such as its regional location and whether it is located in a rural or urban area.

An important feature of the NDHS is that, for all women aged between 15 and 49, it contains birth information—such as the birth date, sex, birth order, and whether the child was a twin—for all of their children, regardless of whether the children are alive at the time of the interview. For children who are dead, the dataset also contains their death date. Therefore,

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