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The value of children: Inter-generational support, fertility, and human capital☆

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ABSTRACT

This paper offers robust empirical evidence of a Darwinian pro-natalist mechanism: parents can improve their old-age support with an additional child. Using the incidence of first-born twins as an instrument for fertility outcomes, I find that Chinese senior parents with more children receive more financial transfers and are more likely to co-reside with an adult child. They are also less likely to work past retirement age. The estimated effects are large, despite the evidence that adult children from larger families are less educated and earn significantly less. Interestingly, the effect of an increase in the number of children on old-age support does not depend on the child's gender.

1. Introduction

In many societies, inter-generational support running from children to senior parents is commonplace. Regardless of the underlying motives for these transfers, they give fertility choices and children's human capital investment a life-cycle perspective — children potentially become a source of income for old age. This is especially true in developing countries, where social security systems are ill-functioning and financial markets are underdeveloped. In the economics literature, the studies that consider the old-age security motive for childbearing have argued that the choices of fertility and life-cycle consumption are closely related. Implicit in this argument is the idea that children serve a function as a reliable support mechanism and, in particular, that this support is increasing in offspring number.[1] However, the link between fertility and old-age support has not been corroborated by a rigorous empirical analysis. This paper addresses this gap, while attempting to identify the channels connecting number of children to senior parents' material standard of living.

To shed light on the mechanisms by which fertility choices impact inter-generational support, I set up a framework where young parents make fertility, savings, and human capital investment decisions while accounting for children's role as providers of income during parents' old age. In the comparative statics analysis of an exogenous shock to the number of children during parents' childbearing years, I show that higher fertility has an ambiguous effect on the old-age support received from children during retirement. On the one hand, holding per-child quality and savings constant, the increase in the number of children increases total transfers. On the other hand, the exogenous shock to fertility changes parents' optimal investment in children's quality and parental savings and alters the relative incomes of parents and children during parents' old age, so transfers could potentially be lower. Intuitively, because younger parents face a

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[1] In a seminal article, Caldwell (1976) advances the idea that the demographic transition was created by a decline in the inter-generational transfers running from children to parents. The macroeconomics literature has extensively relied on the idea that old-age security is a motive for having children. For models that study the relationship between fertility and capital accumulation, see Modigliani and Cao (2004), Boldrin and Jones (2002), Chakrabarti (1999), Becker and Barro (1988), Cisno and Rosati (1992), and Raut and Srinivasan (1994). In the applied microeconomics literature, Banerjee et al. (2010) and Choukhmane et al. (2013) study the role of fertility in explaining the rise in the savings rate in China.

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trade-off between the quantity and the quality of children, it is not clear whether higher fertility leads to more old-age support if children from larger families have lower human capital and income.[2] Additionally, the poorer quality of children in larger families could offset the initial incentive to save less for old-age, so one might not observe an inverse relationship between fertility and savings.

In the empirical analysis, I deal with the challenges in inferring causality between the number of children and inter-generational support by exploiting the incidence of twins in the first birth as a source of exogenous variation in fertility.[3] The logic behind this instrument is clear. If one assumes that all couples desire at least one child — which is a reasonable assumption in most developing countries — then the increase in fertility due to twins *in the first birth* is orthogonal to unobserved parental preferences and constraints. Twins at any other parity would be systematically correlated with fertility, as the probability of experiencing a multiple birth in a given pregnancy increases with birth order and "extra" pregnancies are choices (Rosenzweig and Wolpin, 1980a, 1980b).

The data come from the 2011 wave of the China Health and Retirement Longitudinal Study (CHARLS). The survey provides detailed information on senior mother's fertility outcomes — allowing me to locate first-born twins — coupled with detailed data on inter-generational support and other outcomes of senior parents such as income, asset holdings, and work status. Besides data availability, China also provides a suitable context to study the fertility–transfer relationship. Until recently, the vast majority of Chinese residents did not have access to formal old-age security.[4] Over the past five years, old-age pension coverage has expanded.[5] Nonetheless, according to a report from the International Labor Organization (ILO), benefit levels are still low and constituted less than 11% of the average income per capita among rural residents in 2012. As a consequence, there is heavy reliance on child-provided financial support during old age. Among CHARLS 2011 respondents, rural and urban combined, 68.2% relied on children for old-age support.

First-stage estimates reveal that senior mothers who gave birth to first-born twins have on average 0.81 more children relative to non-twin mothers.[6] Furthermore, when checking for differences in observable maternal traits such as marital status, education, income, and health status, I do not find significant differences between first-born twin and non-twin samples, which supports the validity of the instrument.

The main IV estimates indicate a positive and significant effect of increasing the number of children on total net financial transfers received by senior parents. In particular, an additional child results in an increase in financial transfers equivalent to 13% of the mean household per capita income. There is also evidence of a 8 percentage-points increase in the likelihood of receiving some financial assistance and a 10 percentage-points increase in the probability of co-residing with at least one married adult child following an increase in the number of children. In addition, senior parents in retirement age are 7 percentage-points less likely to work when the number of children increases, suggesting a positive effect on leisure. The estimated fertility–transfer relationship does not seem to be explained by lower parental savings for old-age consumption, as I do not find conclusive evidence that the a larger number of children decreases senior parents' financial asset holdings or the likelihood of owning a house. Consistent with previous studies which use Chinese data, I find evidence of the quantity–quality trade-off — an increase in the number of children lowers average children's education by 0.64 years. The latter suggests that my estimates of the impact of the number of children on financial support are likely to be a lower bound.

Additional estimates shed light on whether and how the fertility–transfer relationship differs by offspring gender and senior mother's hukou status. First, I use information on the gender of first-born twins to provide separate IV estimates of the effects of the number of daughters and the number of sons on inter-generational support and test whether there is a significant gender differential in the "returns" to number of children. The tests do not allow me to reject the hypothesis that an increase in the number of daughters has the same effect on transfers and co-residence as an increase in the number of sons. Finally, I find that an increase in the number of children leads to a larger percent increase in financial transfers among urban senior parents, which is consistent with the evidence of a stronger quantity–quality trade-off among rural Chinese households found in previous studies. Nonetheless, the estimated increase in financial support represents a larger proportion of the per capita income for senior parents with rural hukou (15%) compared to parents with urban hukou (8%).

This paper complements the empirical literature on the quantity–quality trade-off (Angrist et al., 2010; Black et al., 2010; Rosenzweig and Zhang, 2009; Qian, 2009; Li et al., 2008; Caceres-Delpiano, 2006; Black et al., 2005; Roy and Foster, 1996; Hanushek, 1992; Rosenzweig and Paul Schultz, 1987; Rosenzweig and Wolpin, 1980b). However, it departs from previous studies in that it utilizes a framework more aligned with the specificities of developing economies, where children play an important role regarding parents' old-age consumption. This paper is related to the study by Choukhmane et al. (2013) which uses twins as an exogenous fertility shock to quantify the effect of the One-child policy on aggregate savings behavior in China. However, their framework focuses on explaining the behavior of aggregate fertility and savings. More importantly, the empirical characterization of the fertility–transfer relationship is descriptive, not causal. In addition, Rosenzweig and Zhang (2014) use the first-born twins strategy to investigate the effects of the number of siblings on co-residence, transfers to parents, and savings of adult children in urban China. They do not study the relationship between fertility, old-age support, and savings of senior parents.

The paper is organized as follows. Section 2 presents the conceptual framework developed to shed light on the channels by which fertility affects inter-generational support. Section 3 discusses the use of first-born twins as instrument for fertility, addresses the threats to internal and external validity of the empirical strategy, and describes the estimating sample. Section 4 presents the main results concerning the effects of the number of children on inter-generational support, parental savings, and children's quality. Section 5 lays out a test for gender differences in the provision of old-age support. Section 6 discusses rural/urban disparities in access to formal old-age pension and estimates the fertility–transfer relationship by hukou status. Section 7 presents further tests for alternative channels and assesses the robustness of my main estimates. Section 8 concludes.

[2] For a comprehensive summary of empirical studies on the effects of fertility on children's outcomes, including children's educational attainment and health status, see Schultz (1993) and Schultz (2008). Empirical evidence of the quantity-quality trade-off is mixed. Existing studies have examined this relationship using a variety of empirical strategies, including variations in family planning policy and access to contraceptives (see Qian (2009), Miller (2005), Sinha (2003), Roy and Foster (1996), and Rosenzweig and Paul Schultz (1987)) and birth of twins (see Angrist et al. (2010), Black et al. (2010), Rosenzweig and Zhang (2009), Li et al. (2008), Caceres-Delpiano (2006), Black et al. (2005), and Rosenzweig and Wolpin (1980b)). Hanushek (1992) finds evidence of the quantity-quality trade-off when looking at the effects of birth order on children's achievement, as measured by test score performance.

[3] This identification strategy was introduced by Rosenzweig and Wolpin (1980a) to estimate the effects of fertility on the labor supply of young mothers in the U.S. Other studies have used twins to study the effects of fertility on children's human capital and female labor supply. See Angrist et al. (2010), Black et al. (2010), Rosenzweig and Zhang (2009), Li et al. (2008), Caceres-Delpiano (2006), Black et al. (2005), and Rosenzweig and Wolpin (1980b) for the effects of family size on children's human capital and Caceres-Delpiano (2012), Cruces and Galianz (2007), Jacobsen et al. (1999), Angrist and Evans (1998), and Bronars and Grogger (1994) for the effects on women's labor supply.

[4] The 2000 Chinese Census revealed that only 8.2% of the non-working rural population aged 60 and older had pension benefits and 82.6% depended on family support Wang (2006).

[5] The number of people covered by the old-age pension system has tripled during the 2009–2013 period. By 2012, about 57% of Chinese residents had access to pension insurance (National Bureau of Statistics of China, 2012).

[6] It is worth noting that the majority of first births in my sample occurred before the One-child policy imposed a cap on the number of children in 1979. Therefore, I do not expect the incidence of first-born twins to be systematically altered by the policy.