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Intergenerational transfer, human capital and long-term growth in China under the one child policy ☆

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ABSTRACT

We suggest that the demographic changes caused by the one child policy (OCP) may not harm China's long-term growth. This is because of the higher human capital accumulation induced by the intergenerational transfer arrangements under China's poor-functioning formal social security system. Parents raise their children and depend on them for support when they reach an advanced age. A decrease in the number of children prompted by the OCP results in parents investing more in their children's education to ensure retirement consumption. In addition, decreased childcare costs strengthen educational investment through an income effect. Using a calibrated model, a benchmark with the OCP is compared to three counterfactual experiments without the OCP. Output in 2025 without OCP decreases about 4% under moderate estimates. The output gain comes from a greatly increased educational investment driven by fewer children (11.4 years of schooling rather than 8.1). Our model sheds new light on the prospects of China's long-term growth by emphasizing the OCP's growth enhancing role through human capital formation under intergenerational transfer arrangements.

1. Introduction

China's government introduced the one child policy (OCP) in 1979 with the aim of controlling rapid population growth. As a result, China experienced a great demographic transition from high to low rates of fertility and mortality in the late twentieth century (McElroy and Yang, 2000). According to UN world population prospects, there will be an increase in the population of young adults (and its share of the total population) before the 2020s, a decrease in the childhood population after the 1990s and a continuous increase in the elderly population after 1979. In the demographic transition, the elderly population is expected to exceed the working-age population by 2025 (see Fig. 1).[1]

How the OCP would affect China's future growth has become one of the most widely debated questions regarding China's future growth. We first analyze the relationship between population and economic growth. There have been debates on this topic for hundreds of years. Malthus (1798) asserts that given limited resources, population growth hampers economic growth. Boserup (1981) is more optimistic. He argues that population may have a scale effect that is beneficial to economic growth. The Malthusian model treats technological progress as exogenous, and this has also been challenged in more recent studies. Romer (1986, 1990) and Jones (1999) emphasize the role of population in economic growth as becoming neutral or even positive when allowing technological progress to be endogenous. Thus, these theories offer no consensus about the OCP's impact.

Other economists have tried to conduct empirical investigations on this issue. Li and Zhang (2007) show that the birth rate has had a negative influence on economic growth, also suggesting that the OCP is growth enhancing. Bloom and Williamson (1998) highlight the role of the working-age population. According to their studies on East Asia, the OCP would first enhance economic growth through a fast increase in the working-age population, which they call a demographic gift. However, this demographic gift would dissipate with the rising volume of elderly individuals in the future, as depicted in Fig. 1. The idea of a disappearing demographic gift in China has become increasingly popular in the past several years, particularly in light of the labor shortages experienced in some coastal provinces. Cai (2010) and Zhang et al. (2011) view it as a sign that the Lewis Turning Point has been reached and express concern over the challenges to China's future growth.

We argue that the demographic changes caused by the OCP may not harm China's long-term growth as conventionally believed, given parents' behavioral response as reflected in their children's educational

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[1] In our calibrated model, we define the generational groups as childhood (0–24 years), young adulthood (25–49 years) and elderly (50 or more years). Typical definitions place childhood from 0 to 14 years, youth at 15 to 64 years and old age at 65 or more years, but the trend of China's demographic transition is robust to different definitions.

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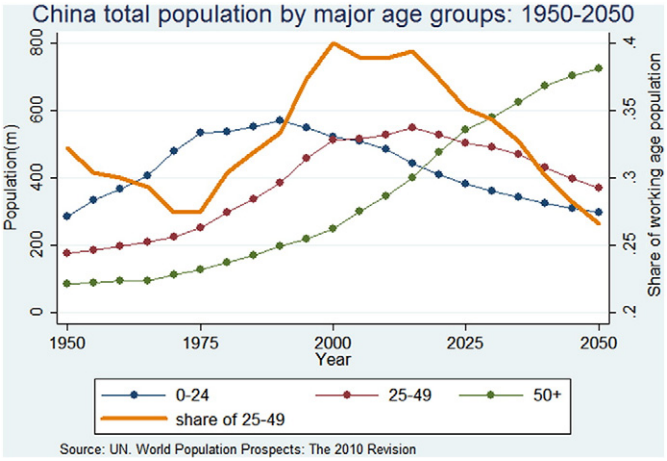

Fig. 1. China's population by age group: 1950–2050.

investment given the OCP and China's intergenerational transfer arrangements. Because of a poorly functioning formal social security system, Chinese parents raise their children and depend on them for support once they have reached an advanced age. Thus, the decrease in the number of children prompted by the OCP results in parents investing more in their children's education to ensure retirement consumption. In addition, the decreased childcare costs strengthen the educational investment through an income effect.

Using a calibrated model, we compare a benchmark with the OCP to counterfactual experiments without the OCP. The model sheds new light on the prospects for China's long-term growth. The framework is a three-period overlapping generation economy under the OCP. In the model, only parents work for wage income and they take care of the children and the elderly. The children depend on their parents for support. As a reward, the parents then depend on their children upon reaching an elderly state. We assume that the parents receive a share of their children's future wage income in the family internal transfer agreement. The parents make decisions and supply labor to the production sector. Childcare costs are fixed, so they choose their own consumption and the level of the children's education. The parents have an incentive to invest in their children's education because it can increase their children's future wage income, which will be shared by parents who have retired in that period.

By plugging China's demographic structure as shaped by the OCP into the model, we can calibrate the main parameters of the model using data from 1975 to 2000.[2] We then conduct three counterfactual experiments without the OCP. Under moderate estimates, we find that the output in 2025 would decrease by 4.1% without the OCP despite an increase in the working population of 28.2% without the policy. The qualitative effect of OCP is robust to alternative parameterizations.

Our model contributes to the literature in several respects. First and most importantly, it shows that the OCP can be growth enhancing in the long term under family intergenerational transfer arrangements. It is well-known that Chinese parents depend on their children for retirement consumption under a poorly functioning social security system (Banerjee et al., 2010). However, there has been little attention paid to the implication for China's human capital and growth. Unlike other studies, our model treats children's education as an investment rather than a consumption good. This implies that the intergenerational transfer arrangements would cause parents to invest more in their children's education with the OCP in effect, which could by and large offset the adverse effects of the disappearing demographic gift. Our results are consistent with those of Li and Zhang (2007), which support the neo-Malthusian school of thought.

Second, we provide an explanation of Chinese parents' stronger preference for more educated children compared to other countries. Li et al. (2008) and Rosenzweig and Zhang (2009) find that family size has a negative effect for average child quality (education). This is usually interpreted as a quantity–quality tradeoff originated by Becker and Lewis (1973), which assumes that both the number and education of children can increase parents' utility. Yet it does not explain why Chinese parents prefer education to a greater degree than parents from many other countries. We suggest that under the intergenerational transfer arrangements, parents share in the return of educational investment in children, thus they have a stronger investment incentive to maintain their retirement consumption when fertility is constrained by the OCP. It also partly explains the great increase in the education of the Chinese working-age population since the 1990s.

Three recent papers are most closely related to our study, and our study supplements them. Liao (2012) uses a calibrated general equilibrium model and finds that the OCP promotes human capital and increase per capita output. In her model, the incentives for investing in children's education come from the price effect (general equilibrium) and parents' preference (quantity–quality tradeoff). Wei and Zhang (2011) study the competitive saving motive (for a son's relative attractiveness in the marriage market) created by the rising sex ratio caused by the OCP. They show that the competitive saving motive explains much of China's high savings rate. Neither of these studies takes the intergenerational transfer into account. Banerjee et al. (2010) note the popularity of parents' dependence on their children and introduce it into a life cycle model to explain Chinese households' savings behavior. Their focus is on the OCP's impact on savings. However, they do not consider its influence on education or the long-term growth effects.

The remainder of this paper is organized as follows. In Section 2 we provide some background. We summarize the OCP and its impact on demographic structure and provide evidence of parents' dependence on their children. In Section 3 we describe the model. In Section 4 we discuss the calibration. The experiments and results are provided in Section 5. Section 6 offers robustness tests and Section 8 concludes the paper.

2. Background

2.1. The one child policy and China's demographic structure

China's OCP was formally introduced as a family planning policy that was introduced in 1978 and initially applied to first-born children beginning in 1979. It officially restricted married urban couples to having only one child, while allowing exemptions in several cases including twins, ethnic minorities, rural couples and parents without any siblings themselves. It was created by the government to alleviate economic, social and environmental problems in China.

The policy has been strongly enforced mainly through fines that are imposed based on family income and other factors,[3] but implementation varies from location to location. As mentioned above, the majority of provinces now permit two parents who were only children themselves to have two children. All non-Han ethnic groups are usually allowed to have two or more children. Han Chinese living in rural areas are also permitted to have two children if their first child is female.

After the introduction of the OCP, the fertility rate in China fell from 2.63 births per woman in 1980 to 1.61 in 2009. According to authorities' claims, the policy has prevented about 400 million births in 30 years,[4] which showed the policy to be remarkably effective. There has been some debate regarding whether there had already been a sharp reduction in the fertility rate in the early 1970s (five births per woman) in

[2] The time period in the model is 25 years.

[3] There are also some benefits and financial rewards for single-child families including a small amount of child allowance that continues until the child reaches age 14 and priority access to schools and health care.

[4] 400 million births prevented by one-child policy, October 28, 2011, People's Daily.