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Grandparental child care, child allowances, and fertility

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ABSTRACT

Recent research on grandparenting reveals that it has a positive impact not only on parental child care but also on the grandparent's welfare. In this study, we examine the effect of child allowances on fertility by assuming that fertility is a joint product of both parental and grandparental child care and that providing grandparental child care improves welfare. In doing so, we aim to establish a theoretical framework that more accurately predicts the impacts of child care policies than that which is currently utilized in the literature (empirical evidence for which has been inconclusive at best). We find that the fertility effect of child allowances critically depends on individual preferences and household production technology. In some cases, the fertility rate is monotonically decreasing or shaped like an inverted U with respect to the size of child allowances. We therefore conclude that small child allowances can increase fertility in situations where there is little initial parental child care. However, in situations where the initial rate of parental child care is relatively large, or where grandparental child care features as a key factor in household fertility production, child allowances can effectively reduce the fertility rate.

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1. Introduction

Among the OECD countries, several, such as Japan, Korea, Germany, and Italy, share a common concern regarding their total fertility rate as it is below the replacement rate (2.07). Although low fertility itself may not be a problem (Lee and Mason, 2014), it is generally argued among politicians and mass media that effective and prompt public policies are needed to resolve this problem. One such potential policy, which standard endogenous fertility models predict should be effective, is a child allowance as it directly lowers child care costs.[1] Empirically, however, the efficacy of this policy has proven doubtful. Using the German Socio-Economic Panel (SOEP), Haan and Wrohlich (2011) simulate women's behavioral responses to changes in child care policies; they show that an increase in subsidized child care, conditional on

employment, has a positive impact on labor force participation, but its over-all effect on fertility is ambiguous.[2,3]

The purpose of this study is to bridge the gap between what theory would predict and what the empirical evidence has shown. To do this, we introduce an additional form of child care, which is provided by grandparents, into a standard endogenous fertility model.[4] This seems to be a particularly appropriate extension in that

[2] Positive fertility effects are observed only in two subgroups, that is, highly educated women and women having their first child.

[3] Some papers, however, do find empirical evidence that child care policies increase fertility. Milligan (2005) examines the fertility effect of the Allowance for Newborn Children (ANC), which was instituted in Quebec from 1988 to 1997; he shows that the fertility rate in Quebec increased with the number of existing children and even rose by 12.0% in 1996. Brewer et al. (2012) examine the fertility effect of the Working Families' Tax Credit (WFTC), which was introduced in the UK in 1999. They show: (1) among all women, the fertility effect is positive but insignificant. (2) Among women with a partner, the effect is significantly positive. (3) Controlling for the couples' education levels, the reform increased the birth rate among women with partners by 0.013, which implies that the fertility rate was increased by approximately 15%. Cohen et al. (2013) examine how the probability of pregnancy among married women with two or more children is associated with child subsidies and income. They show a NIS 150 (approximately USD 34) monthly increase in the child subsidy leads to a 0.99% increase in the probability of pregnancy.

[4] Coall and Hertwig (2011) insist that grandmothers may have been the most productive, experienced, and motivated helpers for reproducing mothers throughout human history. This grandmother hypothesis is currently the most influential theory in explaining why human female longevity extends beyond menopause.

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[1] Using an endogenous fertility model with pay-as-you-go public pensions, van Groezen et al. (2003) show that a generous child allowance has a positive impact on the fertility rate if the government collects a lump-sum tax. Yasuoka and Goto (2011) arrive at the same conclusion, though they recommend a consumption tax.

the importance of grandparenting has increased in developed countries in line with the increase in healthy life expectancy (WHO, 2010), and that the existence of informal child care providers has a significant impact on not only labor force participation, but also on the demand for professional child care (Blau and Robins, 1988; Hank and Kreyenfeld, 2003; and Kaptijn et al., 2010).

Recent research on grandparenting reveals its economic implications. Powdthavee (2011) shows a positive correlation between having grandchildren and self-rated life satisfaction. Arpino and Bordone (2014) find that providing child care improves cognitive function, such as verbal fluency, both for grandmothers and grandfathers. These findings suggest that grandparenting improves grandparents' welfare; furthermore, similar results were found in studies conducted in the US (Silverstein and Marenco, 2001) and Europe (Del Boca, 2002; Hank and Buber, 2009; Aassve et al., 2012).

In this study, we use an overlapping generations model in which grandparents' help lowers the cost of child rearing. In our model, there are markets for both child and grandchild care; parents buy one, and grandparents buy the other. The life of each individual features two periods; that in which he/she is a parent and that in which he/she is a grandparent. In the first period, the individual provides parental child care, taking as given the grandparental child care provided by their own parents. In the second period, the individual provides grandparental child care and takes their children's parental child care as given. In this setting, an intergenerational, strategic interaction arises. For example, a young adult would decrease their parental child care if they expected their parent to increase grandparental child care. This mechanism plays an important role in examining a policy's effect on fertility. We assume that the child care policy entails a subsidy for the purchase of parental child care, that grandparental child care is not covered by the policy, and that the revenue for its enactment is collected by wage taxation.

In this model economy, we show that the equilibrium fertility rate may have an inverted U-shape with respect to the tax rate. The child care policy would encourage parental child care, which would, in turn, have a positive impact on fertility. However, assuming that grandparents take total expenditure on child care into account, they would provide less child care per child in response to increases in family size. This decrease in grandparental child care would have a negative impact on fertility. Furthermore, the child care policy would increase the price of child care. This price effect would reduce the demand for grandparental child care and thereby also negatively impact fertility. If grandparenting is important in household production, then expanding the child care policy could decrease fertility.

In terms of theory, this paper is related to the work of Hirazawa and Yakita (2009), Fanti and Gori (2009) and Cardia and Ng (2003). Assuming that children are a product of parents' time and that there is a market for child care, Hirazawa and Yakita (2009) analyze the fertility effect of pay-as-you-go public pensions in a small open economy. They show that an increase in the contribution rate increases the amount of time parents spend on child care and that the demand for professional child care decreases if the elasticity of parental child care time with respect to the contribution rate is small. They consequently conclude that public pensions decrease the fertility rate when the negative impact on professional child care outweighs the positive impact on the time that parents dedicate toward child rearing. Although these results are similar to our own, the mechanisms behind the models are different in several respects. First, our central concern is the introduction of an intergenerational interaction, which Hirazawa and Yakita (2009) do not include. Our model demonstrates a negative correlation between parental child care and grandparental child care, a relationship that significantly impacts the effectiveness of child care

policies. Second, as we focus on policy in particular, we are able to draw more direct implications. Third, because our model is constructed using a general equilibrium framework, variations in pricing play an important role in our policy evaluation. Specifically, we show that a child care allowance serves to increase the wage rate and the price of child care. Hirazawa and Yakita (2009) do not consider any such price effects in their study.

Using a simple overlapping generations model with endogenous fertility, Fanti and Gori (2009) show that a child tax may increase fertility. They argue that, on one hand, the child tax decreases fertility because it directly increases the cost of child rearing, but on the other hand, it has an income effect which serves to increase fertility. In the short run, disposable income increases because the tax is paid back in a lump-sum transfer, while in the long run, the wage rate increases because the tax-transfer policy stimulates private saving. Fanti and Gori (2009) conclude that child taxes increase fertility when there is a strong preference regarding the number of children, the share of capital income is large, and when the rate of time preference is large. In our model, unlike in Fanti and Gori (2009), the wage rate is increased by a subsidy for child care; this reduces grandparental child care and thus generates a negative fertility effect.

By introducing intergenerational time transfers into home good production functions, Cardia and Ng (2003) examine what kind of child care policies effectively increase long-run per capita income. In a calibrated economy, they show that subsidizing grandparental time spent on child care is the most effective policy when time transfers are operative; otherwise, subsidizing parents' purchases of professional child care is the most effective. Our model is similar to that of Cardia and Ng (2003), but the motivations are quite different. Cardia and Ng (2003) assume that the fertility rate is constant and that monetary transfers come in the form of a lump-sum bequest. In our model, the fertility rate is endogenous and grandparental monetary transfers are targeted toward child care.

The rest of our study is organized as follows: In Section 2, we introduce a basic model and derive equilibrium conditions. In Section 3, we present an explicit solution by specifying household production technology. In Section 4, we examine the effects of child allowances on fertility, child care costs, growth, and welfare. Section 5 concludes the paper.

2. Model

We use a two-period overlapping generations model with two sectors of production.[5] The model is a single-sex model such that the replacement rate of fertility is 1. We do not consider intra-household bargaining and the related effect on fertility.

We denote the number of individuals who enter the economy in period t as N_t (we say they belong to "generation t"). The law of motion for N_t is given by

$$\frac{N_{t+1}}{N_t} = n_t \tag{1}$$

where n_t stands for the fertility rate of generation t.

Two generations coexist in each period. In period t, the population of the younger generation is represented by N_t, and the population of the older generation is N_{t-1}.

We assume the following household production function of fertility,

$$n_t = n(e_t^t, g_t^{t-1}) \tag{2}$$

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[5] Logically, we have to use a three-period OLG model because three generations coexist in each period: children, parents, and grandparents. In this study, however, a two-period model is sufficient for analyzing a link between parents and grandparents because children do not make any decisions.