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The Demand for Grandchildren:

Children as Family Public Goods

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Abstract

The title says it all. Well, almost all. The situation suggests bargaining between parents and grandparents, where the grandparents can "bribe" the parents to have more children or to have children sooner than they otherwise would. Bribes are more likely to take the form of down payments on houses or promises of childcare because cash payments seem inappropriate. To economists, however, Coasian bargaining with its promise of Pareto efficiency, offers a readily accessible off-the-shelf model. Family complexity resulting, for example, from divorce and repartnering by the parents' generation or the grandparents' generation, are likely to threaten the Coasian assumption of low transaction costs and, hence, the Coasian conclusion: Pareto efficiency.

1. Introduction

Economists assume that prospective parents choose their fertility either by maximizing a household utility function subject to relevant constraints or by bargaining. Becker (1960); Doepke and Kindermann (2019). By focusing exclusively on prospective parents, economists as well as sociologists and demographers ignore the role of prospective grandparents and, more generally, of the family beyond the household. Popular culture has long recognized that grandparents often want their married adult children to provide grandchildren and to provide grandchildren sooner rather than later. Prospective grandparents pressure their unmarried daughters to marry perhaps motivated in part by their desire for grandchildren.

We expand the standard model of fertility by assuming that children enter the utility functions not only of prospective parents (hereafter, "parents") but also of prospective grandparents (hereafter, "grandparents"). Our title signals this expansion by characterizing grandchildren as "family public goods," a characterization that suggests the term "family bargaining" as opposed to "household bargaining." In this context, unless parents and grandparents live in the same household, the familiar phrases "household public goods" and "household bargaining" would be misleading.

The economics of the family often relies on cooperative Nash bargaining models which, like all cooperative models, assumes that outcomes are Pareto efficient. Symmetric Nash bargaining, the workhorse of the literature on bargaining in marriage, also assumes that spouses have equal weight in the bargaining process. This "symmetry" (or "anonymity") assumption, which is theoretically attractive for bargaining between spouses, is unattractive for bargaining between parents and grandparents. Asymmetric Nash bargaining models avoid this assumption but require specifying the degree of asymmetry. Economists sometimes finesse specifying a

particular bargaining model by asserting that "transaction costs" within families are low and appealing to the Coase Theorem. Coase (1960).

Economic and specifically Coasian reasoning implies that when the fertility preferences of parents and grandparents conflict, fertility will depend on family bargaining. Because transaction costs within families are low, Coasian reasoning is arguably appropriate within families. Pollak (1986a,b). Coasian reasoning implies that in some cases family bargaining will lead to grandparents making transfers ("side-payments") to parents to incentivize them to have more children or to have children sooner than the parents would otherwise choose.

The "no transaction costs" assumption needs to be unpacked because it does most of the analytical work required to reach the Coasian conclusion that bargaining will lead to a Pareto efficient outcome. The argument rests of three assumptions: family bargaining involves few players, relatively good information, and family ties that, under most circumstances, are strong enough to support the enforcement of informal agreements. Enforceability of agreements, whether formal or informal, is usually less than perfect -- "good enough" is as much as can realistically be expected.

We propose and analyze a model in which grandparents sometimes make transfers to the parents to incentivize them to have children, for example, by offering to provide childcare or the down payment on a house. Incentives may be explicit or implicit. The distinguishing feature of these transfers is the grandparents' intent. Not all offers of transfers from grandparents to parents are intended to incentivize fertility; some may reflect grandparents desire to have contact with their grandchild or altruism toward the parents.

Coasian reasoning suggests that the resources of grandparents as well as those of parents may affect fertility: wealthy parents may spurn grandparents' offers, while less wealthy parents may choose to have more children or have children sooner than they otherwise would.

Grandparents may provide the down payment on a first house or more childcare than they would have provided because of their desire for contact with their grandchildren -- that is, on the basis of the utility they expect to derive from caring for their grandchildren or on the basis of altruism. Although Zelizer (1994, 2005) does not analyze fertility decisions, she does discuss why naked cash transfers are often regarded as inappropriate and why side-payments within families often take the form of "special currencies" rather than straightforward cash transfers.

We have shamelessly appropriated our title, "The Demand for Grandchildren" from Cox and Stark (2005). Their subtitle, "Tied Transfers and the Demonstration Effect," signals a different direction from that signaled by our subtitle, "Children as Family Public Goods." We do, however, follow a direction suggested by Cox and Stark, that the literature has neglected, specifically, grandparents providing their adult children with down payments on houses. We return to Cox and Stark when we review the literature.

We say virtually nothing about why grandparents want grandchildren. Indeed, neither we nor the literature has much to say about why parents in high income countries in the 21st century want children; see Morgan and King (2001). Some may want contact with their children or grandchildren. Those bound by Anglo-American conventions regarding family names may want male children who will produce male grandchildren who will carry the family name (e.g., in a family business). Others may want to their genes to be expressed in future generations. Demographers have been concerned about low or below replacement fertility at least since 1986

when *Population and Development Review* published a special supplement on "Below-Replacement Fertility in Industrial Societies: Causes, Consequences, Policies."

We conclude this introduction with a road map. Section 2 briefly discusses the paradigmatic Coasian case of the farmer and the rancher and describes the application of the Coasian analysis to divorce. Section 3 applies Coasian analysis to the conflict between parents and grandparents over grandchildren. A complication is that cash transfers are not an appropriate currency in bargaining between parents and grandparents, so grandparents may instead provide "help" with childcare or with the down payment on a first house. Almost all of section 3 assumes that only one pair of grandparents, for definiteness, the maternal grandparents, interact with the parents. The concluding paragraph of section 3 relaxes this assumption and instead assumes that Coasian bargaining includes both pairs of grandparents. This expansion has the potential of increasing the resources available to the parents, but it is also likely to increase transaction costs, threatening the Coasian conclusion of Pareto efficiency. Section 4 expands the discussion of transaction costs, arguing that proximity is less of an obstacle than many readers imagine, but that family complexity resulting, for example, from divorce and repartnering in the parents' generation or the grandparents' generation, are likely to substantially increase transactions costs. Section 5 provides a preliminary empirical analysis. Using data from the National Survey of Family and Households, we estimate correlations between fertility and intergenerational transfers of time (childcare) and money (help in home purchases). We show that when adult children's fertility decisions are heavily influenced by their concerns about money or the desire to provide grandchildren for their parents, there is a positive correlation between transfers and fertility. The relationship between childcare and fertility is less obvious. Section 6 is a brief conclusion.

2. Coasian Bargaining

2.1 The Farmer and the Rancher

Recall Coase's familiar parable of the farmer and the neighboring "cattle raiser" -- the "rancher" in American English. The issues are whether to build a fence to prevent straying cows from eating the farmer's "corn" "wheat" in American English -- and, if they agree to build a fence, how much each will contribute to its cost.

The "Coase Theorem" famously asserts that if there are no transaction costs and if property rights are assigned and transferrable, then the farmer and the rancher will agree to build a fence if and only if doing so is Pareto efficient. In Coase's parable, the relevant property right is responsibility for the damage cows inflect on crops. Although the initial assignment of property rights has distributional consequences, in the absence of transaction costs, it has no efficiency consequences. Whether it is Pareto efficient to build a fence is independent of the initial assignment of property rights. The Coase theorem concludes that whether the farmer and the rancher will agree to build a fence is independent of the initial assignment of property rights. If property rights are assigned to farmers then, in the absence of transaction costs, ranchers must fully compensate farmers for the damage caused by their straying cattle; but if the property rights are assigned to ranchers, then farmers are not entitled to any compensation.

Social norms play two minor background roles in Coasian analysis. First, norms may underlie the assignment of legally enforceable property rights. Second, the assignment of legal enforceable property rights may affect the evolution of social norms. Norms sometimes override legally assigned property rights. Ellickson (1991) found that in those parts of Shasta County (California) in which ranchers have no legal liability for damage their straying cattle do to crops, ranchers nevertheless compensated farmers, following the norm that ranchers are responsible for

the damage their straying cattle do to crops. The Coasian parable generalizes. If there are no transaction costs and if property rights are assigned and transferrable, then two or more profit maximizing firms will agree to undertake a joint project if and only if doing so is Pareto efficient. Furthermore, whether it is Pareto efficient for profit maximizing firms to undertake a joint project such as building a fence is independent of the initial assignment of property rights.

2.2 Divorce

Thus far the only application of the Coase theorem to family economics has been spouses bargaining over divorce. Becker, Landes, and Michael (1977) and Becker (1981, p. 227; 1991, p. 331-2) famously applied the Coase Theorem to divorce and concluded that spouses will divorce if and only if divorce is Pareto efficient. They go a step further, claiming that the decision to divorce will be independent of the assignment of property rights -- that is, spouses will divorce under a unilateral divorce regime if and only if they will divorce under a mutual consent divorce regime. ftn: ((Becker (1981, p. 227; 1991, p. 332) uses the word "bribe" in discussing the side payments; Becker-Landes-Michael do not. The scare quotes are Becker's.))

Their independence claim is incorrect. It fails to recognize a crucial difference between bargaining by profit maximizing firms and bargaining by utility maximizing individuals unless the individuals' preferences exhibit transferable utility. Stevenson and Wolfers (2007 p. 46), after summarizing the Becker-Landes-Michael and Becker analyses of divorce in a concise paragraph, write: "Yet the assumptions required for Coasian bargaining, including symmetric information, transferable utility, and the absence of important transaction costs, may be unrealistic for the marginal divorce."

Coasian reasoning implies that in the absence of transaction costs, bargaining between utility maximizing individuals will lead to Pareto efficient decisions, but does not imply that the resulting decisions will be independence of the initial assignment of property rights. The difficulty arises because of income/ wealth/ utility effects corresponding to different assignments of property rights. Transferable utility banishes these effects. With transferable utility assumption, the conclusion of the Coase Theorem for utility maximizing households is identical to its conclusion for profit maximizing firms.

The Coasian efficiency claim, although not the independence claim, is likely to hold in the economics of the family if there are few players, information is good, and family ties are strong -- strong enough to support the enforcement of informal agreements; see Pollak (1986). These restrictions ensure Pareto efficiency, but independence requires more -- specifically, it also requires transferrable utility to ensure the absence of income/ wealth/ utility effects associated with reassignments of property rights. These effects can alter bargaining outcomes (e.g., divorce/ no divorce). Although the independence conclusion can be salvaged by assuming transferrable utility, this unrealistic assumption is too a price to pay.

3. Grandchildren

3.1 Introduction

We next apply Coasian reasoning to parents and grandparents bargaining over fertility. The simplest model involves two players, one parent and one grandparent. We consider a more general model with two "teams," the parents and one pair of grandparents, for definiteness, the maternal grandparents. We assume that the parents are a married couple, that the grandparents are a married couple, and that each team has well-behaved preferences. Readers uncomfortable

with the team assumption can reinterpret our model in terms of individuals: an adult daughter and her mother. We assume that the grandparents have only one child, an assumption we revisit in Section 4 when we discuss this and other complications.

We assume children are discrete so the choice is between the parents' initial number of children, N = No, and having one additional child, N = No + 1; we ignore the possibility of twins.

The crucial property right for fertility is the right to choose whether to have (another) child. American and European readers may assume that this property right "naturally" belongs to parents and thus differs from Coasian property rights that courts or legislatures might assign to parents or to grandparents. According to Lee and Feng (1999) in Imperial China paternal grandfathers had the right not only to control the resources of their adult sons and daughters-in-law but also the right to determine their fertility. This traditional legal structure of Imperial China, they argue, set the stage for the acceptance of the Chinese government's "One Child Policy" which in the 1980s transferred the authority to control fertility from paternal grandfathers to the Chinese government.

We begin by showing that, in the absence of transaction costs, Coasian reasoning implies a Pareto efficient solution, where the outcome of bargaining depends on the resources of the parents, the resources of the grandparents, and property rights analogous to the farmer's right to compensation for damage to crops done by straying cattle.

Suppose the grandparents want the parents to have another child, and that, absent coercion or side payments, the parents would choose not to have another child. Given the American and European assignment of property rights to the parents, the Coasian outcome depends on whether the grandparents are willing and able to incentivize ("bribe") the parents to

have another child. The application of Coasian reasoning to fertility is analogous to its application to divorce. If the grandparents have sufficient resources, then incentivizing the parents to have another child is a straightforward Coasian transaction. Thus, the outcome of bargaining depends on the resources of the parents and the grandparents and on their preferences.

Whether bargaining will lead to a Pareto efficient outcome depends on what we assume about the family bargaining. If we assume that family bargaining is cooperative, then Pareto efficiency is guaranteed by the axioms. If we assume zero transaction costs in the family and that zero transactions costs implies Pareto efficient outcomes, then Pareto efficiency is guaranteed.

A difficulty, as Cox and Stark (2005) implicitly recognize by focusing on grandparents providing childcare or down payments on houses rather than cash transfers to their adult children, is that everyone knows that grandparents paying their adult children to provide grandchildren is "inappropriate." The sociologist Viviana Zelizer (1994) introduced the notion of "multiple currencies." Although Zelizer discusses transfers between spouses, she does not discuss transfers from grandparents to parents. Roth (2007) discusses what he calls "repugnant markets" which governments discourage by criminalizing them (i.e., using their police power to punish those who engage in the behavior). Although Roth does not discuss the distinction between "inappropriate" behavior and "repugnant" behavior, in the case of fertility it is useful to distinguish between behavior that individuals regard as "inappropriate" (i.e., behavior they would avoid but not behavior they favor criminalizing) and "repugnant" behavior that (i.e., behavior they favor criminalizing.) Fertility is an especially sensitive application. Grandparents offering cash to their adult children to provide grandchildren is inappropriate but not repugnant, while offering them childcare or the down payment on a house is neither repugnant nor inappropriate.

Grandparents may make voluntary transfers to parents that are great enough to induce the parents to have more children than they would choose to have in the absence of transfers. Altruistic transfers provide an alternative to bargaining or, if altruistic transfers alone are not sufficient to induce a Pareto efficient outcome, they may at least to change the initial resource distribution from which bargaining begins.

3.2 Childcare

With minor linguistic modifications, the claim that bargaining leads to Pareto efficient fertility outcomes generalizes to situations in which grandparents are unwilling to make direct transfers to incentivize parents to have children but instead to provide indirect transfers such as childcare or the down payment on a house. The grandparents want to provide childcare not to incentivize the parents but because it allows the grandparents to spend more time with their grandchildren. If the grandparents' voluntary provision of childcare leads to a Pareto efficient outcome, then attributing that outcome to Coasian bargaining would be a mistake. If, however, the voluntary provision of childcare is insufficient to induce the parents to have another child, then the grandparents may be willing to provide even more childcare to induce the parents to have another child.

Our analysis assumes that the grandparents prefer to provide some level of childcare. Given this assumption, we relax our implicit assumption that the parents will accept as much childcare as the grandparents are willing to provide and allow the parents to costless decline what from their perspective is "excess" grandparental childcare.

3.3 Coasian Analysis

We denote the parents' utility function by

$Up(C, Ni|Xp, Xg)$ $i = \{o,+\}$

where Ni is the number of children, $Ni = \{No, N+\}$, $N+ = No + 1$, and C childcare hours provided by the grandparents. Notice that C is NOT total childcare hours, but only the childcare hours provided by the grandparents. The vectors Xp and Xg represent the socio-economic and demographic characteristics of the parents and the grandparents.

We denote the minimum childcare hours the parents require to have another child, their "reservation" child care requirement, by C*p. That is, C*p is the level of childcare that equates the parent's utility with N+ children with the parents' utility with No children and the grandparents providing no childcare (i.e., C = 0):

$Up(0, No|Xp, Xg) = Up(C*p, N+|Xp, Xg)$.

We denote the grandparents' utility function by

$Ug(C, Ni|Xp, Xg)$ $i = \{o,+\}$

We denote the maximum level of childcare that the grandparents are willing to provide in order to induce the parents to have another child by C**g. That is, C**g is the level of childcare that equates the grandparents' utility with N+ children with their utility when they have No grandchildren and provide 0 childcare.

$Ug(0, No| Xp, Xg) = Ug(C**g, N+| Xp, Xg)$.

We think of grandparents as facing a time-budget constraint, $\bar{C}$, and allocating their time between C and all other activities. The grandparents' preferences determine which of three intervals contains C:

If $C < C*p$, then the parents respond by choosing N = No.

If C satisfies the inequality C*p < C < C**g, then it is Pareto efficient for the parents to have another child; in this interval, Coasian bargaining determines C.

We now relax our assumption that the grandparents provide childcare only to induce the parents to provide another grandchild and assume instead that the grandparents choose to provide some level of childcare because they want additional contact with their grandchildren. (Alternatively, grandparents may provide some level of childcare because they are altruistic.)

We denote the grandparents' utility function by

Ug(C,Ni|Xp,Xg) i = {o,+}

We assume that the grandparents' utility function for childcare is an inverted U. This "single-peaked" preference specification is often used in voting models. In voting models the preferred point -- peak of the inverted U -- is called the "bliss point." We denote the bliss points by Cgi, i = {o,+}.

Cgi = fg(Ni, Xp, Xg) i = {o,+}

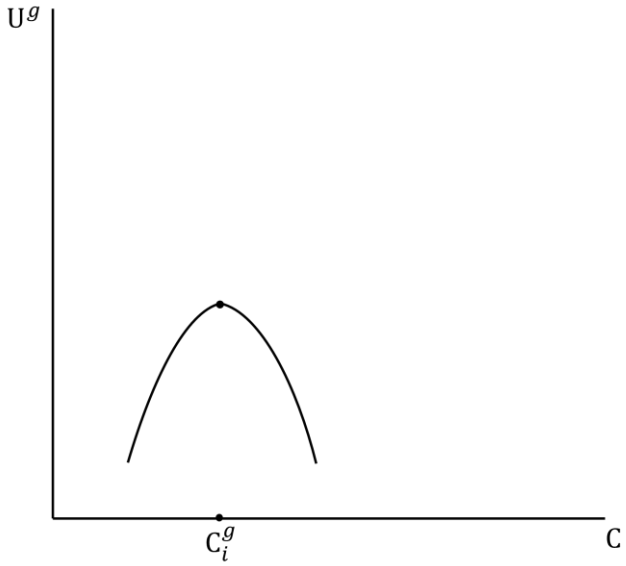


Figure 1: $N = N_i$

Because of the grandparents' altruism or because of their desire for contact with their grandchildren, the bliss point, Cgi, may equal or exceed the parents' reservation childcare requirement, Cp*. If it does, then bargaining is unnecessary. Even if the bliss point is less than the parents' reservation childcare requirement, however, the additional child care (i.e., the child care beyond the grandparents' bliss point) required to satisfy the parents' reservation requirement may be small.

Now consider the case in which both pairs of grandparents are willing and able to provide childcare and suppose that the sum of the maximum amounts they are willing to provide exceeds the parents' reservation requirement. In this case it is Pareto efficient for the parents to have another child but the involvement of both pairs of grandparents increases transaction costs. First, and most obviously, bargaining now involves three parties rather than two. Second, the assumption that the preferences of all parties is common knowledge, which was likely to be approximately valid when only one pair of grandparents was involved, is substantially less likely to be valid when both pairs are grandparents are involved. Third, the strong family ties which make informal agreements within families self-enforcing are less strong when both pairs of grandparents are involved. The low transaction costs assumption is much more plausible when the analysis is limited to one pair of grandparents.

4. Willing and Able: Proximity, Competing Caregiving Obligations, and Family Complexity

Childcare requires proximity but Americans and their parents live closer to each other than you thought. Using 1992-1994 data from wave 2 of the National Survey of Families and Households (NSFH), Compton and Pollak (2014, 2015) find that "the median distance between

married women and their mothers is 20 miles." They report a strong education gradient: for couples in which neither spouse is a college graduate, 46% live within 25 miles of both sets of parents; for couples in which both spouses are college graduates, only 17% live within 25 miles of both his parents and her parents. Using 2013 data from the Panel Study of Income Dynamics (PSID), Choi et al. (2020) report that 75% of adults with one or more living parents or adult children "had their nearest parent or adult child within 30 miles" and 36% "had all parents and adult children living that close." Molloy, Smith, and Wozniak (2011) and Jia, et al. (2023) document the decline in internal migration in the United States. As a result of this decline, American adults today probably live even closer to their parents than they did a generation earlier.

The willingness and ability of grandparents to provide childcare depends not only on proximity but also on competing caregiving obligations, on the relationship of the grandparents with the parents, and on the parents' relationship with each other. Thus far we have tacitly assumed that the grandparents have only one child and, hence, only one potential source of grandchildren. But suppose the grandparents have two or more children. Then each of these children or, more precisely, all of these children's children, compete for grandparental childcare; indeed, the grandparents may have previously made commitments to provide care for some of these children.

Grandchildren may be subject to diminishing marginal utility. which would reduce the grandparents' bliss point contributions and their maximum contributions to childcare. If one grandparent is disabled, then that grandparent competes with the grandchildren for scarce family caregiving resources. The phrase "sandwich generation" refers to a family with caregiving responsibilities for a disabled elderly parent as well as for young children, but grandparents may

have caregiving responsibilities for family members in more than one generation. Alburez-Gutierrez et al. (2021) propose that the "grandsandwiched generation" for grandparents facing the analogous predicament.

Family complexity increases transactions costs and complicates caregiving. Thus far we have focused on the maternal grandparents and tacitly assumed that they are the biological grandparents and that they are both alive and remain a couple. We distinguish between the death of a biological grandparent, the separation or divorce of the biological grandparents, and their repartnering following a death or a divorce.

The death of a biological grandparent, considered by itself, simplifies the analysis by replacing a "team" by an individual. Complications arise when and if the surviving spouse repartners. Divorce, considered by itself, fractures the "team" and requires us to analyze the parents' relationship with two distinct individuals in place of a (perhaps) previously unified "team." (The underlying "team" may itself be the problem.) Repartnering after death or divorce is likely to be more complex because it introduces a new individual into the family.

Once upon a time the biological grandparents were young and had a relationship that resulted in the birth of a child. The biological grandparents may never have lived together and, even if they were married to each other when their child was born, they may have divorced when she was a toddler. The biological grandparents may have repartnered and each may have had additional children with the new partner. Indeed, they may have repartnered more than once. Their new partners may have had children from one or more previous relationships and, if they did, they may have obligations to those children and grandchildren. As a result, the new partners may have interests different from those that biological grandparents would be expected to share if they had remained together. ftn: ((Older grandparents also divorce. Brown and Lin (2012) find

that "gray divorce" has increased rapidly from a low base.)) These possibilities challenge our assumption that the grandparents act as a "team" devoted to their biological children and grandchildren. The new partner may have a tenuous relationship with the mother and little or no commitment to the grandchildren. Indeed, if the biological grandparents divorce and repartner, it is possible than one of them -- most likely the biological grandfather -- will have had little contact with and attachment to the daughter who becomes the mother of (some of) his biological grandchildren. Replacing biological grandparents with "social grandparents" may result in replacing an individual with a strong relationship to the mother with someone with a weak relationship with her and little or no interest in her children. The common knowledge and low transaction costs assumptions more plausible for simple families than for complex families.

Regardless of whether the parental couple were married, their breakup complicates and reduces the probability of continuing contact between grandchildren and the parents of the noncustodial parent. Assume, as is likely, that the mother becomes the custodial parent. If the mother repartners, then her new partner becomes the child's "social father" and making his parents “social grandparents” or “step grandparents.” Cherlin and Furstenberg (1995). One may argue about whether the result is a child with two pairs of paternal grandparents or with none. In any case, neither has a well-defined role. If the new couple has additional children, then the mother's new partner is presumably the biological father of the additional children and, hence, his biological parents are the biological grandparents of these additional children. If the mother's new partner has children from a previous relationship, this further complicates the situation, especially if her new partner brings children from a previous relationship into the household.

Family complexity resulting from breakups, repartnering, and multiple partner fertility increase transactions costs. Cherlin (1978) famously describes remarriage as an "incomplete

institution." With 40% of US births nonmarital, we might update Cherlin and describe "repartnering" as an "incomplete institution." The low transaction costs assumption and the assumption that informal family agreements are self-enforcing presuppose strong underlying family relationships, and these relationships are likely to be stronger and more stable in nuclear families than in complex families.

5. Empirical Results

We investigate the relationship between fertility and intergenerational bargaining using longitudinal data from the National Survey of Family and Households. Although the data are not current, they are uniquely suited to this analysis as they contain a wealth of information about fertility, planned fertility, family structure and intergenerational transfers. The data consists of three waves, with interviews in 1987-88 (W1), 1992-94 (W2), and 2001-2003 (W3).

Our work builds on the analysis of Cox and Stark (2005) who show that housing transfers to adult children is more likely when the child intends to have a(nother) child but is concerned about finances. They find that the transfers are more likely for sons than daughters and more likely for adult children in close proximity than those living farther away, and therefore the most plausible explanation for the observed transfers is the 'demonstration effect.' That is, grandparents will seek to remove barriers that their own children face in their fertility decisions (e.g., financial barriers) in the belief that adult children will treat their elderly parents better if they are demonstrating caring behavior. Cox and Stark (2005) note that the demonstration effect is one of many motivations that grandparents may have for desiring more grandchildren. We posit that the framework of the Coase model allows us to broaden the analysis to include other motivations.

While Coase and Stark (2005) estimate the impact of fertility intentions and constraints on the probability of housing transfers, we consider the other half of the Coase bargaining and estimate the impact of housing transfers (and childcare transfers) on fertility. However, in this preliminary work, we do not claim to provide causal of definitive empirical evidence.

Our sample includes all women aged 18-40 in W1. [1] In Tables 1a and 1b, we estimate the probability of having a child between W1 and W2, separately for the women who indicated in W1 that they did not wish to have more children (1a) and those who did wish to have more children (1b).[2] All regressions include controls for the woman's demographic characteristics (age, education, marital status, number of children in W1, and strength of fertility intentions).[3] Our variables of interest include descriptions of the availability of her mother for childcare, her reasons for her stated fertility intentions, and intergenerational transfers of time and money received. We focus on transfers between women and her parents, in order to simplify the analysis.

We expect that a woman may be more likely to have a child if her mother is available to provide grandchild care. Since bargaining involving childcare spans multiple time periods, the expected ability of one's mother to provide childcare following a birth will be an important parameter in fertility decisions. We include 5 indicator variables: mother is alive, mother is in

[1] Although an increasing proportion of births are born to women over the age of 40, questions pertaining to fertility plans were only asked of women under 40.

[2] Women are asked in wave 1, "Do you intend to have (a/another) child sometime?" (Yes/No) followed by "How sure are you that you will (or will not) have (more) children?" (Very, Moderately, Not at All). Of the women who stated that the do not intend to have a(nother) child, 17% did have a child before the second wave. Of the women who stated that they did intend to have a(nother) child, 48% had a child before the second wave interview.

[3] There is strong evidence of a two-child preference on average. Compared to women with zero children in W1, women who desire more children are more likely to have another if they have one child. Women who do not desire more children are more likely to have another child if they already have two or three, suggesting perhaps that women with multiple children may be more likely to have unplanned pregnancies and/or be more likely that these pregnancies are brought to term

good health, mother is aged between 55-75, the daughter has a good relationship with her mother, and the mother is in close proximity (within 20 miles). We also include an indicator for receipt of childcare from mother in W1. In cols (4-6) we limit the sample to those in close proximity.

The second group of variables of interest are indicators that the woman had higher-than-average concerns about money, time and grandparents when answering fertility intentions.[4] Finally, we add indicators that the woman received childcare from her parents in wave 2, received financial help from her parents to purchase a home between waves, and received an inheritance between waves.

Focusing first on the sample of women who did not intend to have a(nother) child, columns (1)-(3) in Table 1a indicate that the probability of having a child before the second wave was higher if her mother was alive and in good health. However, the women are less likely to have another child if they have a good relationship with their mother and if they live in close proximity to their mother. Overall, this suggests that mothers' availability for childcare may influence the fertility decision, but this result is not clear cut. We expected that the receipt of grandmother childcare in wave1 would be most predictive of childcare receipt in wave 2, and those likely to positively influence fertility, however, the coefficient on W1 childcare receipt is consistently insignificant.

[4] The question reads as follows: "Below is a list of things that some people consider when thinking about having a child or another child. Please circle how important you feel each is to you at present time." The responses are on the scale of 1 (Not at all important) to 7 (Very Important). For *Time Concerns*, we sum responses to "time for leisure and social activities", and "time and energy for my career." For *Money Concerns*, we sum responses to "able to support a child," "able to make major purchases", and "buy a home or a better home." Other factors included in the list of potential factors influencing fertility decisions include mothers' age, someone to love, someone to care for me when I'm old, needing something to do, stress and worry about raising children, giving child a brother or sister, uncertainty about whether marriage or relationship will hold, disagreement with spouse about whether to have child. These are not included in our analysis as such reasons are unlikely to be part of any bargaining with grandparents.

We anticipated negative correlations between fertility and higher-than-average concerns about money and time, and a positive correlation between fertility and higher-than-average concern about giving grandparents grandchildren. However, these are insignificant for this sample. Finally, we see a positive correlation between receiving childcare in W2 and fertility (as one would expect) and a negative impact of receiving an inheritance between waves.

Moving next to the sample of women who stated an intention for more children (Table 1b), there is a notable lack of correlation between mother's characteristics and fertility between waves. An interesting pattern emerges with respect to childcare receipt: in columns 3 and 6, we estimate a negative correlation between wave 1 childcare receipt and fertility, but a positive correlation between wave 2 childcare receipt and fertility. This may suggest that grandmothers are more likely to provide childcare for the first grandchild, but less for the second and that this may be internalized into the fertility decision.

Note that these regressions do not show a relationship between housing transfers and fertility. In Tables 2a and 2b we extend the regressions to include interaction terms, to identify any subgroups for whom the transfers may have an impact.

In Table 2a we again focus on women who did not intend on having another child. Columns (1)-(3) include the full sample, columns (4)-(6) restrict to those in close proximity. In these sets of regressions, we include interactions between intergenerational transfers and indicators for higher-than-average concerns about money, time, and grandparents when making fertility planning decisions. We hypothesize that bargaining with grandparents will be most likely when the adult children's decisions are heavily influenced by factors that can be mitigated (time, money) and when the adult children are specifically concerned with providing grandchildren for their parents.

The results show glimpses of relationships that are consistent with intergenerational Coase bargaining on fertility. Among women not desiring children, who live in close proximity to their parents and have higher than average concerns about money are more likely to have a child if they receive financial help with a home purchase. For those women not in close proximity, this result is positive but insignificant. We also see a positive correlation between fertility and receiving financial help to purchase a home for those who are concerned with providing grandchildren to their parents. The relationship between childcare and concerns about time and grandparents will require further refinement, as there is no clear pattern with this sample.

Table 2b repeats these regressions for the sample of women who did intend to have more children. Columns (7) and (10) present regressions that are similar to the analysis of Cox and Stark (2005) who find that transfers of financial help for the purpose of home purchases are most likely to occur for adult children who desire more children, have financial concerns, and live in close proximity. Here we are estimating the inverse question – is financial help to purchase a home positively related to fertility for those who desire more children? We find that the fertility of adult children is *not* more responsive to housing transfers when there is high money concerns but is more responsive to housing transfers when there are concerns about providing grandchildren for parents. We also find that childcare provision is more strongly connected to fertility for women concerned about time and those concerned about grandparents, relative to those without these concerns.

Overall, the regression results are generally consistent with the a Coase theory of intergenerational bargaining over fertility, but the results are sporadic. The lack of a clear result may be due to small samples and the coarse measurement of financial and childcare transfers.

We also suspect that the salience of housing affordability and of low fertility were lower during W1 (1987-88) and W2 (1992-94) of the NSFH survey than they are today. Figure 1 shows indices of fertility and housing prices in the US from 1991. We expect that bargaining over fertility and housing transfers is more likely in times when housing prices are increasing rapidly, while fertility is falling, as we have seen in the US over the past decade.

6. Conclusion

Where does this leave us? If prospective grandparents want their adult children to have more children or to have children sooner than they otherwise would, economists will want to treat the interactions between grandparents and parents as a bargaining game. Coasian bargaining provides an tractable model but, like all bargaining models, it requires assumptions. The key assumptions are a clear assignment of property rights and low transaction costs. At least in American and European law, the right to make fertility decisions belongs to the parents. Low transaction costs present difficulties.

If we focus on the parents and the maternal grandparents and if we assume that each "team" is a married couple, and if there are no other family members whose interests need to be recognized, then we can model the fertility decision as the outcome of a two player bargaining game. If other family members are also players (e.g., the paternal grandparents), or if there has been divorce and repartnering in the family by the parents' generation or by the grandparents' generation, then the model is more difficult. Furthermore, the difficulties go beyond Coasian bargaining. consider a general cooperative bargaining game. Pareto efficient is a fundamental axiom of cooperative game theory, but the underlying rationale for Pareto efficiency involves assumptions about transaction costs -- few players, good information, and inexpensive

enforcement of agreements -- and these assumptions play an implicit role in justifying the Pareto efficiency axiom of cooperative game theory.

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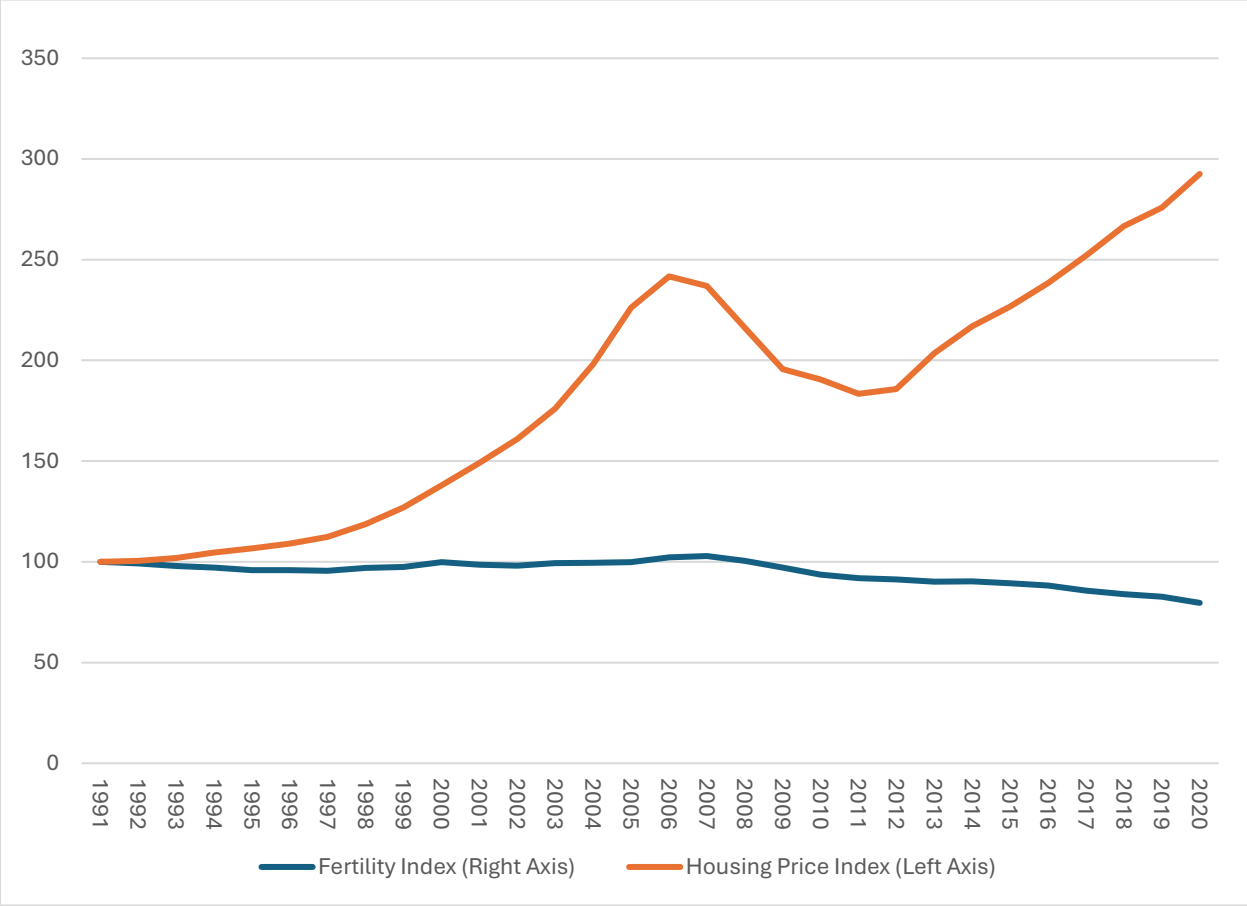
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Figure 1: US Fertility Index and Regional Housing Price Indices.



Fertility data from www.macrotrends.net.[5] Housing Index is the S&P CoreLogic Case-Shiller U.S. National Home Price Index, Annual, Seasonally Adjusted. Federal Reserve Economic Data, Federal Reserve Bank of St. Louis.[6]

[5] https://www.macrotrends.net/global-metrics/countries/usa/united-states/birth-rate'%3EU.S.%20Birth%20Rate%201950-2025#google_vignette

[6] https://fred.stlouisfed.org

Table 1a: Probability of Having a(nother) child between Wave1 and Wave2
Sample: Those not intending to have another child

	All			Lives Close to Mother		
	(1)	(2)	(3)	(4)	(5)	(6)
Mother is Alive	0.170***	0.173***	0.144**			
	(0.0628)	(0.0628)	(0.0638)			
Mother is in Good Health	0.0620*	0.0624*	0.0519	0.0582	0.0603	0.0572
	(0.0337)	(0.0338)	(0.0339)	(0.0484)	(0.0486)	(0.0492)
Has good relationship with mother	-0.148***	-0.148***	-0.137***	-0.169**	-0.174***	-0.165**
	(0.0445)	(0.0446)	(0.0445)	(0.0661)	(0.0665)	(0.0674)
Lives close to mother	-0.0542	-0.0580*	-0.0595*			
	(0.0338)	(0.0339)	(0.0337)			
Mother is between 55-75 years	-0.00129	-0.000433	-0.00822	0.0279	0.0267	0.0251
	(0.0354)	(0.0355)	(0.0353)	(0.0532)	(0.0537)	(0.0540)
Received Childcare in Wave 1	0.0180	0.0221	-0.00203	-0.0157	-0.0114	-0.0179
	(0.0396)	(0.0398)	(0.0403)	(0.0531)	(0.0536)	(0.0551)
Above average concerns about money		-0.0107			0.0495	
		(0.0335)			(0.0540)	
Above average concerns about time		0.0200			0.0177	
		(0.0335)			(0.0534)	
Above average concerns about GPs		0.0502			-0.00879	
		(0.0359)			(0.0551)	
Receives CC in Wave 2			0.0828**			0.0214
			(0.0406)			(0.0578)
Receives Financial Aid to purchase home			0.0778			0.00293
			(0.0633)			(0.109)
Receives Inheritance between waves			-0.132*			-0.0950
			(0.0711)			(0.178)
Observations	606	606	606	269	269	269
R-squared	0.127	0.130	0.141	0.121	0.126	0.122

Sample: All women aged 18-40 in Wave 1 who indicated they did not intend on having more children. Dependent variable = 1 if the woman had a child before wave 2 interview. All regressions include controls for age, education, marital status, number of children in wave 1, and intensity of desire to not have more children. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1b: Probability of Having a(nother) child between Wave1 and Wave2
Sample: Those intending to have another child

	All			Lives Close to Mother		
	(7)	(8)	(9)	(10)	(11)	(12)
Mother is Alive	-0.0848	-0.0803	-0.105	-0.637	-0.576	-0.389
	(0.0752)	(0.0755)	(0.0713)	(0.445)	(0.445)	(0.417)
Mother is in Good Health	0.00707	0.00538	0.000758	-0.0107	-0.0194	-0.0110
	(0.0330)	(0.0330)	(0.0310)	(0.0477)	(0.0479)	(0.0447)
Has good relationship with mother	0.0217	0.0139	-0.0101	0.0321	0.0267	-0.00825
	(0.0442)	(0.0444)	(0.0415)	(0.0663)	(0.0665)	(0.0623)
Lives close to mother	-0.0139	-0.0129	-0.0732**			
	(0.0312)	(0.0312)	(0.0297)			
Mother is between 55-75 years	0.0453	0.0457	0.0543	0.0876	0.0844	0.0918*
	(0.0388)	(0.0388)	(0.0364)	(0.0590)	(0.0590)	(0.0552)
Received Childcare in Wave 1	-0.00940	-0.0102	-0.0977**	-0.0501	-0.0562	-0.117**
	(0.0415)	(0.0415)	(0.0397)	(0.0575)	(0.0582)	(0.0548)
Above average concerns about money		-0.0367			0.0250	
		(0.0321)			(0.0486)	
Above average concerns about time		-0.0206			-0.0949*	
		(0.0316)			(0.0494)	
Above average concerns about GPs		0.0436			0.0620	
		(0.0306)			(0.0472)	
Receives CC in Wave 2			0.351***			0.333***
			(0.0308)			(0.0441)
Receives Financial Aid to purchase home			0.0181			-0.0124
			(0.0485)			(0.0746)
Receives Inheritance			-0.162*			-0.161
			(0.0973)			(0.206)
Observations	963	963	963	409	409	409
R-squared	0.234	0.237	0.330	0.279	0.287	0.374

Sample: All women aged 18-40 in Wave 1 who indicated they did intend on having more children. Dependent variable = 1 if the woman had a child before wave 2 interview. All regressions include controls for age, education, marital status, number of children in wave 1, and intensity of desire to have more children. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2a: Probability of Having a(nother) child between Wave1 and Wave2
Sample: Those not intending to have another child

	All			Lives Close to Mother		
	(1)	(2)	(3)	(4)	(5)	(6)
Received Childcare in Wave 1	-0.00105	-0.00300	-0.00319	-0.0138	-0.0208	-0.0217
	(0.0406)	(0.0406)	(0.0405)	(0.0555)	(0.0564)	(0.0551)
Above average concerns about money	-0.0172			0.0546		
	(0.0357)			(0.0588)		
Above average concerns about time		0.0102			0.0703	
		(0.0359)			(0.0585)	
Above average concerns about GPs			0.0527			0.0869
			(0.0410)			(0.0669)
Receives CC in Wave 2	0.0721	0.0765	0.0983**	0.0520	0.109	0.0985
	(0.0554)	(0.0630)	(0.0467)	(0.0807)	(0.0931)	(0.0670)
Receives Financial Aid to purchase home	0.0137	0.120	0.0189	-0.203	-0.0316	-0.00631
	(0.0896)	(0.126)	(0.0700)	(0.150)	(0.186)	(0.130)
Receives Inheritance between waves	-0.132	-0.179*	-0.109	-0.00416	-0.0848	-0.117
	(0.0827)	(0.102)	(0.0745)	(0.229)	(0.234)	(0.180)
X Above average concerns about money						
Receives CC in Wave 2	0.0197			-0.0638		
	(0.0752)			(0.106)		
Receives Financial Aid to purchase home	0.127			0.441**		
	(0.126)			(0.217)		
Receives Inheritance between waves	0.00447			-0.258		
	(0.155)			(0.363)		
X Above average concerns about time						
Receives CC in Wave 2		0.0108			-0.138	
		(0.0776)			(0.112)	
Receives Financial Aid to purchase home		-0.0617			0.0481	
		(0.145)			(0.233)	
Receives Inheritance between waves		0.0919			-0.0558	
		(0.138)			(0.369)	
X Above average concerns about GPs						
Receives CC in Wave 2			-0.118			-0.266**
			(0.0862)			(0.116)
Receives Financial Aid to purchase home			0.335**			0.0371
			(0.158)			(0.240)
Receives Inheritance between waves			-0.150			
			(0.229)			
Observations	606	606	606	269	269	269
R-squared	0.143	0.143	0.151	0.142	0.130	0.141

Sample: All women aged 18-40 in Wave 1 who indicated they did not intend on having more children. Dependent variable = 1 if the woman had a child before wave 2 interview. All regressions include controls for age, education, marital status, number of children in wave 1, intensity of desire to not have more children, and mother availability characteristics (see Table 1a). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 2b: Probability of Having a(nother) child between Wave1 and Wave2
Sample: Those intending to have another child

	All			Lives Close to Mother		
	(7)	(8)	(9)	(10)	(11)	(12)
Received Childcare in Wave 1	-0.0972**	-0.0931**	-0.0949**	-0.117**	-0.125**	-0.106*
	(0.0398)	(0.0400)	(0.0398)	(0.0549)	(0.0555)	(0.0551)
Above average concerns about money	-0.0573			-0.00273		
	(0.0366)			(0.0602)		
Above average concerns about time		-0.0590			-0.104*	
		(0.0360)			(0.0600)	
Above average concerns about GPs			-0.0179			0.0348
			(0.0366)			(0.0611)
Receives CC in Wave 2	0.318***	0.297***	0.306***	0.315***	0.299***	0.333***
	(0.0413)	(0.0437)	(0.0399)	(0.0607)	(0.0608)	(0.0553)
Receives Financial Aid to purchase home	0.0636	0.0492	0.0100	0.120	-0.0377	-0.0861
	(0.0703)	(0.0727)	(0.0616)	(0.119)	(0.116)	(0.0876)
Receives Inheritance between waves	-0.137	-0.200	-0.0609	0.00289	0.0986	0.344
	(0.136)	(0.162)	(0.136)	(0.241)	(0.294)	(0.411)
X Above average concerns about money						
Receives CC in Wave 2	0.0676			0.0337		
	(0.0561)			(0.0819)		
Receives Financial Aid to purchase home	-0.0803			-0.215		
	(0.0945)			(0.150)		
Receives Inheritance between waves	-0.0470			-0.641		
	(0.192)			(0.483)		
X Above average concerns about time						
Receives CC in Wave 2		0.0974*			0.0653	
		(0.0566)			(0.0837)	
Receives Financial Aid to purchase home		-0.0525			0.0553	
		(0.0949)			(0.147)	
Receives Inheritance between waves		0.0653			-0.495	
		(0.199)			(0.423)	
X Above average concerns about GPs						
Receives CC in Wave 2			0.0959*			-0.0225
			(0.0566)			(0.0831)
Receives Financial Aid to purchase home			0.0160			0.279*
			(0.0963)			(0.160)
Receives Inheritance between waves			-0.195			-0.688
			(0.189)			(0.476)
Observations	963	963	963	409	409	409
R-squared	0.333	0.333	0.333	0.380	0.382	0.384

Sample: All women aged 18-40 in Wave 1 who indicated they did intend on having more children. Dependent variable = 1 if the woman had a child before wave 2 interview. All regressions include controls for age, education, marital status, number of children in wave 1, intensity of desire to have more children, and mother availability characteristics (see Table 1a). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1