FINANCIAL TRANSFERS FROM PARENTS TO ADULT CHILDREN

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Abstract

This paper uses 1996-2014 longitudinal HRS data to establish the relative importance of intervivos transfers, bequests and coresidency in the United States. We find that when computing the relative importance of intervivos transfers versus bequests, the aggregate perspective that pools all data into a single cross-section is very different than the parent-level longitudinal perspective, highlighting the special value of panel data. This difference reflects the fact that large bequests are highly concentrated and play an influential role at the aggregate level, while at the micro parent-level, intervivos transfers constitute the main form of financial support for most parents. Regarding coresidency, we find that although older children and parents tend to coreside when the child is helping the parent, coresidency tends to be more prevalent among poorer, younger parents and their children. Children who ever coreside with parents also receive larger total intervivos transfers.

Key words: intervivos transfers, bequests, coresidency, parental altruism
JEL Codes: D15, J12

1 Introduction

Financial transfers from parents to adult children occur in the form of intervivos transfers (IVT), bequests and coresidency. Understanding the patterns of these transfers is important as they play an insurance role and also constitute a source of wealth accumulation. These roles may vary across families, with IVT and coresidency occurring across the income distribution, and bequests being highly concentrated at the top end of the wealth distribution.

This paper uses the best available longitudinal data to establish the relative importance of IVT, bequests and coresidency in the United States. We use RAND biennial 1996-2014 panel data from the Health and Retirement Study (HRS), a nationally representative panel survey of individuals age 50+ and spouses. HRS data includes information on IVT, bequests, and coresidency, as well as economic and demographic data on parents and their children.

We conduct our analysis in three parts. In the first part, we examine the parent as a giver of financial support. For this purpose, we take the parent as unit of observation to examine total IVT given over a 20-year period and bequests. We create a longitudinal sample of parents in the HRS initial cohort, who were born between 1931 and 1941 and constitute the largest HRS cohort. This sample is used to compare the relative importance of total IVT and bequests from two perspectives: *(i)* an aggregated view of the data, where we pool all waves into a single cross-section and compute

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the fraction of all dollars given in IVT and bequests by parental age bracket; and *(ii)* a parent-level longitudinal view of the data, where we follow each parent over the 20-year period to compute the share of dollars given in transfers and bequests by wave. These two perspectives provide a distinct understanding of the aggregate importance of financial transfers to adult children, and the underlying heterogeneity in parent-level behavior. Our aggregate analysis revisits Gale and Scholz (1994), but the use of panel HRS data allows us to add novel insights into the relative importance of IVT.

In the second part of this paper, we examine the adult child as a receiver of financial support. In this case we take the parent-kid pair as unit of observation to examine total IVT received by specific adult children, distinguishing whether the child coresides with the parent during any of the HRS waves, or if the child is never a coresident. For this purpose, we continue using our longitudinal sample of parents in the HRS initial cohort, but transform the data into parent-kid pairs. We use this parent-kid pair sample to revisit Altonji *et al.* (1997), who examine the behavior of IVT across parental permanent income distribution, but the novelty in our case is that using panel data we can compute total transfers over a 20-year period. We also correlate total IVT with observable economic and demographic characteristics, and use family-fixed effect regressions to examine transfer inequality among siblings. Finally, we examine coresidency by comparing the total IVT of those who never coreside with the parent during the sample period, and those who do. This comparison of total IVT among coresidents and non-coresidents is distinct relative to other papers in the coresidency literature (Kaplan, 2012; Barczyk and Kredrel, 2018; Albanesi *et al.*, 2022; Barczyk *et al.*, 2022).

The third part of the paper, a by-product of using longitudinal transfers data, focuses on an aspect that has received little attention in the literature, namely the patterns of positive IVT. A major feature of the parent-kid pair transfers data is that transfers are discontinuous over time, with many zeros occurring and with heterogeneous patterns when positive transfers occur. As a result, there is no age profile for positive IVT, a fact we document. What is interesting about this fact, is that it uncovers underlying differences in parental transferring strategies and the extent to which some adult children receive more consistent and generous financial support from parents over time. We explore these underlying differences in the data and interpret them using insights from models of parental altruism.

Our analysis yields the following main four findings. First, when computing the relative importance of IVT versus bequests, the aggregate cross-sectional perspective is very different than the parent-level longitudinal perspective, which highlights the special value of longitudinal data. The aggregate perspective that pools all HRS waves into a single cross-section of giving parents implies that IVT represent 63% of total gifts, with bequests accounting for the remaining 37%. In contrast, the parent-level longitudinal perspective, which follows each parent over time and calculates the fraction of dollars given as IVT or bequest implies that on average 93% of gifts are given in the form of IVT, with the remaining 7% being bequests. The difference between the aggregate and the parent-level perspectives reflects the fact that large bequests are highly concentrated and play an influential role at the aggregate level, while at the micro parent-level, IVT constitute the main form of financial support for most parents. In addition, while at the aggregate level, total giving is overall increasing with parental age, giving at the longitudinal parent-level has a U-shaped pattern. At the aggregate level, giving before age 65 represents about 16% of total giving, it is 45% after age 75. In contrast, the U-shape at the parent-level implies that the fraction of total gifts given are the highest in the first two HRS waves (4 years) and the last two waves: 27% of total gifts over a 20-year period are given in the first two waves, and 20% in the last two waves.

Second, using parent-kid pairs as the unit of observation, we find that over a 20-year period, 48% of adult children receive at least once, with a total average amount of $9,593, and an average amount conditional on receiving of $19,931. Total intervivos transfer amounts exhibit high dispersion, making inequality a prevalent feature of parental IVT data. For example, while 28% of children with parents in the first permanent income quartile receive positive total transfers, 65% do when parents are in the fourth quartile. But interestingly, among children who receive, total transfers are proportionally higher relative to parental permanent income for the poorer parents. We also find quantitatively high correlations between total transfers received, schooling and number of siblings: every additional year of parental schooling results in additional $1,014 in total transfers, with an extra year of the child's schooling adding $870, and every extra sibling reducing total transfers among those who receive in $2,605. Last, we find that within a family transfers are compensatory, with parents giving more total transfers to children with lower income, but these effects are small.

Third, regarding coresidency, we find that both the parent and the child who coreside at least once during the 20-year sample period have significantly lower income and wealth relative to non-coresidents. Interestingly, ever coresiding with a parent raises the probability of receiving any transfers by 12 percentage points, increases average total transfer by $4,338, and conditional on receiving, it raises the total transfer amount by $4,231. Children who coreside with parents tend to be younger in our sample: 30% of adult children are ages 25-35 when they coreside with parents, while among those who do not coreside, 17% are in this age bracket. Parents also tend to be younger: 35% of parents are ages 55-65 when they coreside with adult children, while among those who do not coreside, 22% are in this age bracket. These statistics suggest that if anything, coresidency tends to be a way in which younger parents support young adult children while they get established as independent adults, a mechanism that has been studied in the literature (Kaplan, 2012; Albanesi *et al.*, 2022). Finally, we also look at the group of children and parents who coreside when the child is providing help to the parent: for this group children tend to be older (ages 45-55), as well as parents (ages 75-85), which echoes what others have found regarding the care of parents in older age (Barczyk and Kredrel, 2018; and Barczyk *et al.*, 2022).

Our last finding concerns the patterns of positive IVT. We find that when looking only at positive IVT over time, there is no age profile. This contrasts with the decreasing age profile of all IVT (zero and positive) documented in the literature (McGarry, 2016). Underlying the absence of an age profile for positive IVT are composition effects of different types of transfers patterns, with some parents delaying transfers, others front-loading transfers, and others giving both early and late (Chu, 2020). Following a relatively narrow cohort of children ages 25-34 in 1996, we find that 18% receive only early (first five HRS waves), 10% receive only late (last five HRS waves), and 23% receive both early and late. The higher the parent's permanent income, the more likely is the adult child to receive both early and late. But the most interesting finding is that regardless of parental permanent income, adult children who receive both early and late also receive more generously in both periods. This observation lends support to the notion that beyond parental income, differences in parental altruism also play a role.

Our work relates to the few empirical papers using longitudinal parental transfer data (Hurd *et al.*, 2011; Scholz *et al.*, 2014; and McGarry, 2016). Hurd *et al.* (2011) use HRS data for the period 1992-2006 to characterize IVT from the perspective of parents, who are the givers. Different from them, our analysis is not limited to IVT but also includes bequests. We also use parent-kid pairs to examine adult children as receivers of financial support, which allows us to include coresidency in our analysis. McGarry (2016) uses parent-kid pairs from HRS data to conduct an empirical analysis of transfers by wave. Her focus is to determine how transfers are correlated with events in the life of the adult child, specifically a new divorce, a job loss, losing a home, graduating, marrying, purchasing a new home, or having new child. In contrast to her work, we use parent-kid pairs to analyze total IVT over a 20-year period. We also include data with the parent as a unit of observation, which allows us to provide an aggregate perspective on the importance of IVT and bequests. Finally, Scholz *et al.* (2014) use data from the Wisconsin Longitudinal Study to analyze the long-run determinants of intergenerational transfers. A limitation of this data is that information is available only from few waves far apart in time, so the reporting of transfers is based on recalling over a long period of time. Like Scholz *et al.* (2014), our work also takes a more long-run perspective by aggregating transfers to children over time. Since the HRS has more frequent information over time, we are able to examine whether parents give transfers early or tend to postpone for later. Our work complements all these papers.

This paper is also related to two classic papers in the literature of IVT: Gale and Scholz (1994) and Altonji *et al.* (1997). Gale and Scholz (1994) use a single 1986 cross-section of the SCF and steady state assumptions to explore the aggregate importance of IVT and bequests. We revisit this aggregate perspective using longitudinal HRS data. HRS data has the advantage that it includes transfers above \$500, while the SCF only reported transfers above \$3,000. In addition, our analysis does not rely on steady state assumptions. Altonji *et al.* (1997) use a single 1988 cross-section of the PSID to study IVT. We revisit their analysis using HRS data, which allows us to aggregate transfers over time and to explore how parental permanent income correlates with the probability that adult children receive, as well as the amount.

The remainder of the paper is organized as follows. Section 2 presents our analysis of the parent as a giver of financial support, which uses parents from the HRS initial cohort as units of observation and focuses on total IVT and bequests given. Section 3 corresponds to our analysis of the adult child as a receiver of financial support, which uses parent-kid pairs as units of observation and analyzes total IVT and cohabitation with specific children in the family. Section 4 presents our findings regarding the patterns of positive IVT and the lack of age profile for conditional IVT. Section 5 concludes.

2 Parents as givers of financial support

This section focuses on parents as givers of IVT and bequests in the United States. We study the relative importance of these two by computing the total IVT and bequests parents give to their adult children during the 20-year period we observe them. In studying this relative importance, we make a point to compare a purely aggregated perspective from a pooled cross-section of the data versus a longitudinal perspective. This comparison provides novel insights into the heterogeneity underlying aggregate data. This section does not include coresidency as a form of financial support because coresidency refers to a specific adult child in a family. This requires having parent-kid pairs as units of observation, which is what we do in Section 3 of the paper.

We organize the analysis in two parts: first, we pool all HRS waves into a single cross-section and use sample weights to aggregate and compare the relative importance of all IVT and bequests given over the sample period. This aggregate perspective revisits the analysis in Gale and Scholz (1994), with the difference that they used a single cross-section from the SCF to examine the relative size of IVT and bequests. Our analysis also echoes Barczyk *et al.* (2022), who use HRS data to compare IVT and bequests, but since they focus on parents ages 65+, they miss many of the IVT parents give to their adult children before then. The second part of our analysis uses HRS data to compute the relative importance of IVT and bequest in a longitudinal sense, by following parents overtime and computing the parent-level shares of these gifts. This analysis sheds light into what the average parent gives and how it differs from parents at the top of the distribution.

2.1 Sample and summary statistics

Our main data source is the RAND biennial 1996-2014 HRS data (10 waves). We use the longitudinal file, the family data files, and the exit/post-exit interview files. The HRS is a nationally representative panel survey of individuals age 50+ and spouses. Both the individual and the spouse are respondents to the survey. This is the ideal longitudinal data for our purpose as it contains demographic and economic information for both parents and each of their children, as well as transfers and bequests.

We use HRS data starting in 1996 because the parental transfer question in the HRS was different in the 1992 and 1994 waves. Starting in 1996 the transfer question asks whether or not the respondent gave financial help to the child totaling $500 or more since the last wave (two years). If financial help was provided, then the total amount given to each child is asked.[1] We stop our analysis in 2014 which is the last year for which family data files from RAND are available.[2] As transfers are reported since the last wave, the 1996-2014 data gives information about transfers over a 20-year period. Regarding bequests, we use the RAND HRS exit/post-exit data and only impute missing observations as zero bequests when the question regarding the value of assets left is answered as nothing of value.

We use data for the HRS initial cohort, which corresponds to parents born 1931-1941. This cohort is the largest of the HRS, and the one for which we can observe parents giving IVT to their adult children since they are young adults and for the whole 20-year period. A potential limitation of the HRS initial cohort is that most of the bequests we observe are side bequests, namely the bequest given when one of the parents in the couple dies, as opposed to final bequests, which are given by a single or a widowed parent (Di Nardi *et al.*, 2020). Although a potential limitation, the HRS initial cohort is the best data we can use for our purpose and it is a good compromise to obtain enough IVT data and bequests.[3] In addition, our analysis provides some insights into side bequests, which have been much less studied than final bequests (Di Nardi *et al.*, 2020).

The unit of observation for this section is the parent. Therefore, when we measure IVT and bequests, they correspond to the total given to all children. We construct our sample in two steps. First, we take all available parents in the HRS initial cohort and retain those who report having zero or one spouse. This restriction facilitates the analysis of IVT and bequests. Specifically, when analyzing transfers it is cleaner to have either single parents or stable couples. The same applies for the case of bequests, as we can measure both final bequests (single parents or widowed) and side bequests (a parent in a stable couple dies). We call this sample the "full sample." As shown in Table 1, the full sample has 6,260 parents, where parent couples are represented in a single record.

Second, starting from the full sample, we introduce additional criteria to select our "longitudinal sample," which is the baseline sample we use in this paper. For this purpose, we add the restriction that total IVT to all children are observed in all 10 waves. This restriction is needed because, as mentioned, one of the points we make here is to compare the aggregate view from a pooled cross-section of the data with a longitudinal perspective, where we follow a parent over time and compare the relative size of IVT and bequest. This can only be done if transfers (zero or positive) are reported in all waves. Despite this restriction, Table 1 shows that our longitudinal sample represents the full sample well along relevant observable dimensions. The longitudinal sample has 2,795 parents, who are very similar in average age in 1996 (61), years of schooling (12.7), income ($76,437), and wealth ($641,399) as those in the full sample. The two samples are also very similar on the incidence and amount of IVT by wave: 38% of parents give to their adult children a total average of $4,504, with an average conditional on giving of $11,896. Side bequests are also similar in the full and longitudinal samples, with an incidence of 5%, an average of $15,724 and a conditional average of $284,572.

[1] The issue with the transfer questions in 1992 and 1994 is that they ask about the amount given in the previous year only. In addition, the 1992 question included transfers totaling $100 or more.

[2] Family data files are important for our analysis because they include information on intervivos transfers given to each child separately. We use this information in Sections 3 and 4 of this paper.

[3] Older HRS cohorts such as the AHEAD cohort, which consists of parents born before 1924, has more information on final bequests, but all the information on intervivos transfers to young adult children is lost, since these parents are at least 72 years old in 1996 when our sample period starts.

As seen in Table 1, the only dimension in which there are some differences between the full and longitudinal samples is in all bequests (final plus side), where the incidence (5%) and average ($19,812) are lower in the longitudinal sample. However, despite these differences, the average conditional bequest is similar in both samples ($240,751), which is what matters for the aggregate computations we perform here. In sum, the longitudinal sample we use in this paper is overall representative of the full sample for the HRS initial parent cohort.

2.2 Aggregate cross-sectional perspective

The first perspective we take on the transfers and bequests data is an aggregate one, similar in spirit to Gale and Scholz (1994) and to Barczyk *et al.* (2002, their Figure 5). For this purpose, we pool all HRS waves 1996-2014 of our longitudinal sample into a single cross section. We then use HRS sample weights to compute the weighted sum of all IVT and bequests given and report them by parent age bracket as a fraction of all dollars given in Figure 1. As seen in the figure, giving overall grows as parents age: total gifts (transfers plus bequests) given at ages < 60 represent 6% of gifts in the pooled cross-section, while this number increases to 24% for ages 70-74, and 27% for ages 80+.[4] In addition, looking within each age bracket, the relative importance of IVT decreases with parental age, representing almost 100% of all gifts for ages < 60, going down to 62% for ages 70-74, and 30% for ages 80+. On the flip side, the relative importance of bequests within age bracket increases with age.[5]

Aggregating across all age brackets in Figure 1, IVT represent 63% of total gifts, with bequests accounting for 37%. These measures contrast with Gale and Scholz (1994), who use a single 1986 cross-section of the SCF. Using steady state assumptions they estimate that IVT account for 33% of total gifts. However, since the only transfers recorded in the SCF are those above $3,000, Gale and Scholz argue that a correction to account for smaller amounts implies that IVT account for 43% of total gifts. In principle, our computations might underestimate the aggregate importance of bequests: since our sample consists of parents in the HRS initial cohort, some of whom are still alive, most of the bequests we measure are "side bequests", which represent the bequests left when the first parent in a couple dies (Di Nardi *et al.*, 2020). What alleviates this concern is that although average side bequests are smaller than all bequests, average positive side bequests are as large as average bequests (Table 1). In addition, our findings align well with earlier studies suggesting that IVT account for 60 to 67% of total gifts (Cox, 1987; Cox and Raines, 1985). In any case, given the inherent limitations of the data used by different papers in the literature, including ours, the focus of our analysis is on difference between the aggregate cross-sectional perspective in Figure 1 and the parent-level longitudinal perspective we present in the next subsection (Figure 2).

Table 2 reports additional aggregate statistics regarding the distribution of total IVT and bequests. We use our longitudinal sample to compute total transfers given by a parent to all his children during the 20-year period we observe them. Column (1) in Table 2 reports the distribution of total transfers, where the mean is $45,399 and the probability of given any transfer is 83%. This suggests that the incidence of intervivos giving among parents over a 20-year period is quite high.

[4] The bar of parental age bracket 75-79 is somewhat atypical relative to the increasing pattern of the graph. We checked this carefully and this is not due to under-representation of this age bracket in the sample. It is also not due to the imputation of zero bequests when the HRS exit interview indicates that nothing of value was left. Positive bequests recorded for this age bracket tend to be smaller.

[5] The qualitative patterns in our Figure 1 are comparable to those in Figure 5 of Barczyk *et al.* (2022), but they are quantitatively different. The reason is that they only consider single parents ages 65+. This allows them to focus on final bequests only, and to impute some of the missing bequest data from the HRS. The issue with their sample is that they miss all intervivos transfers given before age 65, which in our sample account for roughly 15% of all gifts given, a non-trivial fraction. In addition, by excluding all couples from the sample, they are leaving out the bulk of parents in the HRS.

This contrast with the 8% incidence of bequests, as reported in column (2). The distribution of total transfers given is skewed to the right, with the median at $15,454 and a mean at $45,399. But as seen in column (2) a distinct feature of bequests is that they are zero up to the 90th percentile of the distribution, and only $34,541 at the 95th percentile. Notably, average total IVT are higher than the 95th percentile of bequests. In sum, when it comes to distributions, while the average parent transfer $45,399 over a 20-year period, the average parent leaves $19,812 in bequests. Finally, columns (3) and (5) report average ratios. As seen in column (3), the ratio of average bequests to average total IVT is 0.44, while the ratio of average total IVT to total gifts (transfers + bequests) is 0.7. These two numbers confirm the importance of IVT as the prime form of financial support the average parent gives to his adult children.

2.3 Longitudinal perspective

We now go from the aggregate to the micro-level perspective of transfers and bequests. For this purpose we take a parent-level longitudinal view of the data. We take each parent in the sample and follow them over time to compute the total transfers and bequests given over the 20-year period. We then calculate the fraction of total dollars given by the parent as transfers or bequest every two waves. Figure 2 displays the weighted average across all parent-level fractions for each 2-wave period. The shape displayed in Figure 2 is interesting: the longitudinal view of parent-level gifts results in a U-shape, with the fraction of total gifts being the highest in the first two waves and the last two waves. The peak in the first two waves is purely due to IVT and corresponds to 27% of total gifts given over the 20-year period. The peak in the last two waves corresponds to 20% of total gifts, with IVT accounting for 14% and bequests the remaining 6%.

Aggregating parent-level fractions over time results in IVT accounting on average for 93% of gifts and bequests the remaining 7%. This micro-level longitudinal proportions are quite different from the corresponding aggregate percentages presented in the previous section. These differences speak to the importance of IVT as the main form of financial support across all parents, with large bequests being highly concentrated but playing an influential role at the aggregate level.

Table 2 provides additional information on the distribution of parent-level giving. Column (4) reports the distribution of the parent-level ratio of bequests to total IVT: the distribution is highly skewed, with an average of 1.35, a 90th percentile of zero, a 95th percentile of 1.7, and a 99th percentile of 47.9. As a complementary statistic, column (5) reports the distribution of the parent-level total IVT to total gifts: while the average is 0.93, the 50th, 90th, 95th and 99th percentile are all one. These figures confirm once more the importance of IVT for the majority of parents over time.

3 Adult children as receivers of financial support

Section 2 provided a characterization of the total financial support given by parents to all (the sum) of their adult children. This section takes a complementary perspective, this time examining each of the receiving children separately. This perspective allows us to study total IVT individual adult children receive as well as the inequality in financial support among siblings. It also allows us to examine coresidency, as after all coresidency pertains to a specific adult child in a family living with the parents. Since the unit of observation needed for this analysis is a parent-kid pair, in this section we transform our HRS longitudinal sample into a sample of parent-kid pairs. While the parent-kid pair sample has the advantage that it allows us to study coresidency, we do not include an analysis of bequests in this section because there are few observations on bequests at the parent-kid pair level in the HRS.[6]

Although some other papers have analyzed the patterns of IVT in the data (Hurd *et al.*, 2011; Scholz *et al.*, 2014; and McGarry, 2016), as well as some aspects of coresidency (Kaplan, 2012; Barczyk and Kredrel, 2018; Albanesi *et al.*, 2022; Barczyk *et al.*, 2022), our focus here is different in that we exploit longitudinal data to analyze total IVT. We organize this analysis in two parts: first, we characterize total IVT. Specifically, we revisit Altonji *et al.* (1997) to examine the distribution of total transfers according to parental permanent income. The innovation is that while Altonji *et al.* (1997) use a 1988 cross-section of PSID data and can only analyze a one-time transfer, here we have longitudinal data and can aggregate transfers over a 20-year period. We also examine how total transfers correlate with other observables and use family fixed effects to look at the differences in total transfers among children in the same family. Second, we examine the interaction between total transfers and coresidency, which is another form of financial transfer to the adult child, either when the parent is insuring the young adult child from labor market risk (Kaplan, 2012; and Albanesi *et al.*, 2022), or when the elder parent is receiving care from the child (Barczyk and Kredrel, 2018; and Barczyk *et al.*, 2022). Relatively to this literature, the distinct angle we take here is to examine how total IVT differ according to coresidency status.

3.1 Sample and summary statistics

As mentioned, the unit of observation for this section is a parent-kid pair. For this purpose we transform our longitudinal HRS sample into parent-kid pairs, which requires us to introduce the following additional sample selection criteria: that there is a valid parent-kid link, that parents never divorce, split or separate during the period, that children are age 18 or older in the first wave they are observed, that the child is alive in every wave, and that transfers to the adult child (zero or positive) are reported every wave.[7] Our baseline analysis of total transfers only includes children who never coreside with their parents. We consider coresidency in Section 3.3. We collapse records from both parents (respondents) so that there is a single longitudinal record for every kid, which we call the parent-kid pair. When both parents are present, we assign the male parent as head, but retain all information concerning the spouse as part of our panel record for the every parent-kid pair.

Table 3 summarizes some economic and demographic features of our sample with parent-kid pairs. With the additional sample selection criteria we now have 2,348 parents, and total of 6,463 parent-kid pairs (64,630 panel observations over all 10 waves). Parent heads of household are on average 61 years old when they are first observed in 1996, have 2.74 matched children in the sample and 12.7 years of schooling. The mean parental household income in our sample is $76,379 while mean family wealth is $654,138. Notice how the statistics for parents in Table 3 are very similar to those in Table 1. Although we lose some parents with the additional selection criteria for parent-kid pairs, the sample is still representative of our longitudinal HRS sample.

Adult children are on average 34 years old when first observed in 1996, have 13.8 years of schooling, and household average income of $78,840. The latter value is imputed, as HRS child's income is reported in brackets rather than in continuous values.[8] A salient feature of the data is

[6] For parents in the HRS initial cohort we have information on total bequests given for 899 parents (Table 1), while information on bequest given to each separate adult child is only available for 267 parents.

[7] Our sample selection criteria is similar to McGarry (2016). Different from her, we require transfers to be reported in every wave, as our objective here is to compute total transfers over a 20-year period. As we show below, when we compare Tables 3 and 1 our parent-kid pair sample is still representative of our full HRS sample.

[8] We impute the child's income following a procedure similar to McGarry and constructing continuous measures using Current Population Survey (CPS) data. McGarry (2016) imputes the child's income in the HRS by using the median family income within the given income bracket for individuals in the CPS by year. In addition to family income bracket and year, we also take into account the following criteria in imputing income from the CPS: gender,

that on average only 14% of children receive transfers in any given HRS wave, but that when we follow children over a 20-year period, 48% receive at least once. The average transfer amount by wave is $974, but conditional on receiving it is $6,932 (in a 2-year period). In contrast, the average total amount over 20 years is $9,593, and conditional on receiving it is $19,931. Both transfers by wave and total transfers exhibit high dispersion, making inequality a prevalent feature of parental IVT data. On the other hand, despite of this inequality, IVT occur across the income distribution as opposed to bequests, which tend to be highly concentrated.

3.2 Total intervivos transfers

In this section we focus on the patterns of total IVT to individual children over the 20-year period. We first look at the distribution of total transfers by parental permanent income, and we then correlate total transfers with other observables. To describe the distribution of transfers across the parental income distribution, we revisit Altonji *et al.* (1997), who performed a similar exercise but only in a cross-section of the PSID. For this purpose we construct a measure of parental permanent income following their methodology, which runs the following regression

$$\log(Y_{it}) = \mathbf{X}_{it}\beta + e_{it},$$

where Y_{it} is the age of parent i at time t; $\mathbf{X}_{it}$ contains an age polynomial, marital status dummies, year dummies, and number of children; and error term e_{it} is given by $e_{it} = \nu_i + u_{it}$.As in Altonji *et al.* (1997) we assume that the serial correlation of u_{it} very weak, so that ν_i is the mean residual of the regression for each person. Permanent income is measured by ν_i normalized to a person age 50, married and with no children in 2014 (taking antilog).[9]

Table 4 reports the probability, mean total transfer and average positive total transfer by quartile of parental permanent income (columns). As seen in the table, higher parental permanent income increases the probability, total amount and total positive amount. For example, while 28% of children with parents in the first income quartile receive positive total transfers, 65% do when parents are in the fourth quartile. But interestingly, the average positive total transfer is $11,034 in the first quartile, where parent's permanent income is $53,415, and it is about three times bigger, $29,508 for the fourth quartile, even if permanent income is about five times higher ($280,518). In other words, among children who receive, total transfers are proportionally higher relative to parental permanent income for the poorer parents. In fact, Table 4 also reports the average ratio of transfers to permanent income in each quartile, as well as the corresponding average ratio for positive transfers. The average ratio of transfers to permanent income is not very different across income quartiles: it is 5.5% for the lowest and 6.8% for the highest. However, the average ratio of positive transfers to permanent income is decreasing across income quartiles: it is 19.5% for the lowest and 10.5% for the highest. Perhaps richer parents give proportionally less IVT relative to income, and provide other forms of financial transfers. In sum, children of poorer parents who receive transfers appear to receive generous amounts relative to parental income.

Table 4 is our total-transfer version of the one-time cross-sectional transfers reported by Altonji *et al.* (1997) using 1988 PSID data (see their Table 3, p. 1140). While in their table the frequency and amount of one-time transfers is increasing with income quartile, what is distinct about our

5-year age brackets, marital status (married or non-married), education (college and non-college), and work status (unemployed, part time or full time). We use properly weighted CPS data for anyone who is a head (males for couples, and either gender for singles) or a spouse.

[9] We interpret our measures of permanent income for parents with caution, since in the HRS parent's income is mostly observed after age 50, around the time income starts falling. In fact, the only statistically significant age coefficient is the linear one (negative). Despite this limitation, the measures of parental permanent income are overall reasonable and the distribution is comparable to that in Altonji *et al.* (1997), who uses PSID data.

results, which can only be obtained from longitudinal data, is that when observed over a 20-year period, poorer parents give transfers to their children at a share of income even larger than that of richer parents.

A question of interest here is how parental transfers compare with public transfers, which are mostly directed to adult children in the lowest quartile. It turns out that even if poorer parents transfer a larger share of their permanent income relative to rich parents, parental transfers are small relative to public transfers. For instance, in 2013 a household with an income of $53,000, which is the average income of our lowest quartile, received net public transfers of $7,800 (CBO, 2016). According to Table 4, children in the lowest quartile who receive positive parental transfers get $11,034, but over a 20-year period.

Table 4 does not control for the income of the child, nor for unobservable parental characteristics such as degree of altruism. We control for this and other observable variables in Table 5, where we regress the probability and the total transfer amount on parental permanent income, parental initial wealth, child's average income and other observables including years of schooling of parent and child, number of siblings, child's gender, child's cohort, parent race and initial age. We report both OLS regressions and family fixed effects. All reported coefficients are significant and with the expected signs. For example, among those who receive positive total transfers, every extra dollar of parental permanent income translates into additional $0.03 of total transfers. On the other hand, every extra dollar of child's average income translates into a reduction in total transfers of $0.09. The quantitative effects are large for schooling and number of siblings: every additional year of parental schooling results in additional $1,014 in total transfers, with an extra year of the child's schooling adding $870. Every extra sibling reduces total transfers among those who receive in $2,605, a sizable quantitative effect.

The family fixed effect regressions in Table 5 provide insights into the distribution of total transfers among siblings. The effects here echo the early results from McGarry and Shoeni (1995), but in our case it is for total transfers over a 20-year period. As shown in the table, parents do give more to children with lower income, although the point estimates are small: on average, a sibling $1 richer receives $0.18 less total transfers. In this respect transfers are compensatory.

3.3 Coresidency

Our baseline analysis of total transfers in Section 3.2 included only children who never coresided with the parents. Since coresidency with parents is another form of financial transfer, in this section we include children who coreside with parents at least during one wave. Since imputing an amount to this type of transfer is difficult, here we focus on comparing total IVT received by adult children who never coreside, with the transfers received by children who coreside with parents at some point during the sample period. There are 1,606 parent-kid pairs who reported coresiding in at least one of the HRS waves, with about 33% of them reporting it once, 20% twice, 13% three times, 8% four times, and the rest more than four times. Table 6 compares some statistics of our baseline sample of adult children who never coreside (6,463 parent-kid pairs) with the sample of those who report coresiding at least once (1,606 parent-kid pairs). As seen in the table, both the parent and the child who coreside have significantly lower income and wealth relative to non-coresidents. But more interestingly, 67% of coresident adult children receive transfers over the 20-year period, relative to 48% of non-coresidents. Coresidents also receive more, with the average total transfer of $16,706 relative to $9,593 for non-coresidents. Last, conditional on receiving, the average total transfer is $24,785 for coresidents, versus $19,931 for non-coresidents. In sum, if an adult child ever coresides with the parent, we observe on average larger total transfers to that child, even without accounting for the financial implicit transfer of living under the same roof.

Table 6 does not control for any observables in comparing coresident with non-coresident children. We do this in Table 7, where the main variable of interest is a dummy for whether the child ever coresides with the parent. Once we control for observables, ever coresiding with a parent raises the probability of receiving any transfers by 12%, the average total transfer by $4,338, and conditional on receiving, it raises the total transfer amount by $4,231, largely confirming the results from Table 6.

A final aspect of the coresidency data we analyze is the age distribution of parents and children when they coreside. We also look into the age distribution for the group that coresides and reports that the parent is receiving help from the child. It might be that the coresident child receives the larger transfers we document in Tables 6 and 7 as a form of payment from an elder parent who needs home care, an exchange motive. Table 8 examines the age distribution of adult children and parents who coreside. Since for the majority of adult children in our sample coresidency is a short-term occurrence, we compute the age distributions only for the periods in which coresidency occurs versus those in which it does not. As seen in the table, coresidency occurs in all brackets of the child and parent age distributions. However, in our sample children who coreside tend to be younger: 30% of adult children are ages 25-35 when they coreside with parents, while among those who do not coreside, 17% are in this age bracket. Parents also tend to be younger: 35% of parents are ages 55-65 when they coreside with adult children, while among those who do not coreside, 22% are in this age bracket. These statistics suggest that if anything, coresidency tends to be a way in which younger parents support young adult children while they get established as independent adults. In sum, Table 8 suggests that relative to adult non-coresident children, those who coreside tend to be younger and receive more total transfers from their parents.

Finally, although in our sample children and parents who coreside tend to be younger, we examine the age distribution of children and parents for those who coreside and where the child is providing help to the parent. These distributions are shown on the last column of Table 8. We find that it is older children ages 45-55, the ones who tend to coreside and provide help to older parents ages 75-85. While this result echoes what others have found regarding the care of parents in older age (Barczyk and Kredrel, 2018; and Barczyk *et al.*, 2022), coresidency in our sample is relatively more prevalent among younger children and parents, which is consistent with the hypothesis that parents provide insurance to their children during labor market shocks (Kaplan, 2012; and Albanesi *et al.*, 2022).

4 The patterns of positive intervivos transfers

Sections 2 and 3 used longitudinal HRS data to provide new insights into three major forms of financial support parents provide to children, namely total IVT, coresidency and bequests. As a by-product of this analysis, we also learned from longitudinal data that positive IVT are discontinuous. When we follow individuals over time, many periods of zero transfers are sometime alternated with periods of positive transfers. In addition, these patterns vary widely among parent-kid pairs.

This section of the paper exploits the longitudinal nature of HRS data to document and analyze an additional fact that has received little attention, namely the fact that positive IVT exhibit no age profile. The literature has documented that the age profile of IVT is decreasing for both parents (Hurd *et al.*, 2011) and children (McGarry, 2016). This decreasing age profile is mostly driven by the probability of IVT decreasing with age. In contrast, less is know about the profile of positive IVT. As we document here, there is no specific age profile for positive transfers, and this fact turns out to be informative about the patterns of giving among parents. One of the novel insights from this analysis is that there are parents who give more consistently to children, both when they are young adults and when they are older, and who also give much more generously in both periods. More interestingly, this consistent and generous behavior occurs across the whole income distribution, lending additional support to the notion that unlike bequests, IVT matter for both poorer and richer families.

In this section we first verify in our sample that the age profile of IVT is decreasing, as documented elsewhere (McGarry, 2016), and then we document and analyze the age profile of positive transfers. Finally, we interpret our findings in light of available theoretical models.

4.1 Revisiting the age profile of transfers

Table 9 replicates the result from the literature that the age profile of transfers is decreasing. For this purpose we consider transfers by wave and report the age profile of the probability of receiving, the transfer amount, and positive transfers. Both OLS estimations and parent-kid fixed effects are reported.[10] The main message of Table 9 is that while there is a significant age profile for both the probability of receiving and the amount, there is no age profile for positive amounts. In fact, the decreasing age profile of amount received is mostly driven by the decreasing age profile of the probability, as more zero transfers are observed as the child ages. These findings are robust to controlling for parent-kid fixed effects.

Instead of regressing transfers by wave on age as in McGarry (2016), here we consider age brackets, which we find more informative. The most interesting findings in Table 9 concern the regressions for transfer amounts. According to OLS estimates, those in the 25-35 age bracket receive on average \$919 more than the 55-65 age bracket (omitted), while those ages 35-45 receive \$536 more. This pattern is consistent with the notion that younger adults on average have less income than their parents and are more likely to face borrowing constraints, a well-known result. When parent-kid fixed effects are introduced, only the 25-35 age bracket is statistically significant, with children in this bracket receiving \$368 more. However, looking only at those who receive positive amounts, age plays no role, suggesting that when we follow children over time, positive transfers are received at all ages, and on average on similar amounts. This pattern is consistent with the insight that while over time some children receive early transfers, other receive later transfers, and others both early and late. This could be due to borrowing constraints binding at different ages, or to strategic considerations where parents delay transfers.

4.2 Positive intervivos transfers in the data

In this section we look deeper into the lack of an age profile for positive transfers by characterizing different transfer types observed in the data. These different types describe a heterogeneity at the parent-kid pair level consistent with average positive transfers that do not change with age, as documented in Table 9. For this purpose, we follow a relatively narrow cohort of children ages 25-34 in 1996 and construct measures of aggregate transfers for each parent-kid pair over the first five waves (early transfers) and the last five (late transfers).[11] The properties of early versus late transfers give us a way to characterize different types of parent-kid pairs.

Table 10 examines the relative size of total early versus total late transfers. Consistent with the message of Table 9, Table 10 shows how children who were 25-34 in 1996 received on average \$1,226 total more in the early than in the late period, suggesting than on average parents tend to front-load transfers. As seen from the probability regressions, this early-transfers pattern is explained in part by the decreasing probability of receiving over time. Introducing parent-kid fixed effects we estimate that total early transfers are on average \$1,217 larger than late transfers. But

[10] OLS estimates control for year effects. Results are robust to logit regressions for probabilities and Tobit regressions for amounts. For a simpler interpretation, here we report OLS estimates.

[11] We follow a relatively narrow cohort of children ages 25-34 in 1996, so that the term "early" more closely reflects younger adults. This cohort accounts for about 50% of the parent-kid pairs. All results in this section are robust to wider cohorts and are available upon request.

the most interesting result in Table 10 is that conditional on receiving, on average total transfer amounts are no different between the earlier and later periods, a novel result.

We now explore the potential composition effects of different transfer types across children, as well as the role of parental income. Theoretically, parents with different resources have different optimal transfer timings, with some delaying transfers, others front-loading transfers, and others giving both early and late (Chu, 2020). Table 11 reports the distribution of children who receive early transfers, late transfers, or both. As shown in the top panel, 49% of children never receive transfers, 18% receive only early, 10% receive only late, and 23% receive both early and late. When looking at the distribution by parental permanent income, 70% of children with parents in the first income quartile ($53,415) never receive. In contrast, 34% of children with parents in the fourth income quartile ($280,518) never receive and 37% receive both early and late. Finally, Table 11 also indicates that the fraction of children who only receive late transfers is not only the smallest, but it does not vary much across income quartiles.

While Table 11 summarizes the distribution of transfer types (early, late or both periods) by parental income quartile, Table 12 presents the estimation of a multinomial logit introducing other controls, notably child's income, dummies for child age in 1996, parental wealth, parental and child schooling, and number of siblings (early transfer only omitted).[12] Table 12 includes the sample of children who receive positive transfers either only early, only late or both. As seen in the table, relative risk ratios are only significant for children who receive in both periods. For example, relative to children with parents in the first income quartile, children with parents in the second quartile are 2.4 times more likely to receive in both periods when compared with the corresponding income quartiles among those who only receive early. The corresponding relative risk ratios are 3.2 for children with parents in the third quartile, and 4.1 for those in the fourth quartile. Table 12 also indicates that relative to children with parents in the first income quartile, children with parents in higher income quartiles are no more likely to receive late transfers only compared with those who receive early transfers only. In sum, Table 12 suggests that parents with higher permanent income are more likely to give both early and late, so that they can both support the children when they more likely face borrowing constraints, but also postponing transfers to perhaps avoid that the child overconsumes. This observation is consistent with two-period models of strategic interaction between parent and child (Chu, 2020). In this respect, children with high income parents receive more consistent support over the lifecycle than children with poorer parents.

The bottom half of Table 11 explores transfer amounts by transfer type and by parental permanent income. Overall, and regardless of type, average transfers are increasing in parental permanent income. Notably, regardless of parental income, those receiving both early and late receive more in the early period than those who only receive early, and receive more in the late period than those who only receive late. For example, even among children whose parents are in the first income quartile, those who only receive early get on average $5,134, while those who receive both early and late get on average $15,330 just on the early period (and $25,501 total). This suggests that even controlling for parental income, parents who give both in the early and late periods also give more generously, suggesting the importance of additional behavioral aspects of parental giving.

Table 13 tests for the statistical significance of these differences among those who receive positive transfers. We run separate regressions for total early transfers and total late transfers, control for a number of observables, and we introduce a dummy for receiving transfers in both periods. As seen in the Table, this dummy is significant: children who receive in both periods get $8,132 more in the early period relative to those who only receive in the early period. In addition, those who

[12] In the HRS child's income is reported less frequently than parental income. Due to limited number of observations we compute the child's average income for the sample period, rather computing permanent income using the methodology of Altonji *et al.* (1997). In addition, we are not able to control for child's wealth, as this is not reported in HRS data.

receive in both periods get $5,670 more in the late period relative to those who only receive in the late period. This suggests that even controlling for relevant observables, there is still a difference in transfer amount between those who receive in both periods and those who receive only early or only late.

4.3 Insights from altruistic theoretical models

Our findings regarding the lack of an age profile for positive transfers and the different transfer types (early, late, or both) can be rationalized by two types of altruistic models: dynastic models of parental altruism with commitment (Altig and Davis, 1989, 1992; Cordoba and Ripoll, 2019), and models of strategic interactions between a parent and a child (Bruce and Waldman, 1990; Altonji *et al.*, 1997; Boar, 2020, 2021; Chu, 2020; and Barczyk and Kredler, 2021). In dynastic models with commitment, parental transfers primarily occur early in the life cycle, since transfers are linked to binding borrowing constraints for the child. In models of strategic interaction, where children face borrowing constraints early in life and income is uncertain in later periods, the timing of parental transfers is also linked to binding borrowing constraints, but strategic considerations introduce the possibility that even an unconstrained child receives a transfer earlier in adult life (Chu, 2020).

We now briefly discuss these two types of models and illustrate how models of parental altruism deliver a rich set of predictions on the patterns of parental IVT. We show that both types of models qualitatively predict that transfers may occur early in the lifecycle, late, or both, although the mechanisms differ. We hope the facts we documented here might generate research on the ability of models to quantitatively generate them.

Dynastic models with commitment The main insight from dynastic altruistic models with commitment is that if parental transfers are positive, they will occur in the period in which the child is most constrained over the lifecycle. In addition, family size reduces both the probability that parental transfers will occur, as well as the amount (Cordoba and Ripoll, 2019). To understand the intuition of this class of models, consider the case of an altruistic adult parent in an overlapping generations setting. Adult life lasts for four periods indexed by t. For simplicity assume that all children are born at the same time and that there is a gap of one period between each kid and the parent, so that parent and adult children overlap three periods. This is the simplest model in which we can examine the timing of parental transfers in the presence of a realistic hump-shaped income profile, credit constraints and multiple children.

The parent head of dynasty solves the following problem[13]

$$V = \max_{[c_t, a_{t+1}, b_t^k]} \sum\nolimits_{t=1}^{4} \beta^{t-1} u(c_t) + \beta\gamma n V^k,$$

subject to

$$c_t + a_{t+1} = b_t + y_t + Ra_t \text{ for } t = 1,$$

$$c_t + a_{t+1} + nb_{t-1}^k = b_t + y_t + Ra_t \text{ for } 2 \leq t \leq 4,$$

$$a_{t+1} \geqslant 0 \text{ for } 1 \leq t < 4, \tag{2}$$

$$b_{t-1}^k \geqslant 0 \text{ for } 2 \leq t \leq 4, \tag{3}$$

where V is the lifetime utility of the parent, V^k is the lifetime utility of each child, β is the discount factor, c_t is consumption, n is the exogenous number of children, $\gamma < 1$ represents the altruistic

[13] The online appendix provides all the details of the model solution, as well as a numerical illustration of the transfer types predicted by the model (early transfers, late transfers, and both early and late transfers).

weight per child, b_t is the transfer received by the parent from his own parents, b^k_{t-1} is the transfer the parent gives to each child age $t-1$, a_t are the assets in period t, y_t is the income, and R is the gross interest rate.[14] For simplicity in (2) we assume a zero borrowing limit. Constraint (3) implies that parental transfers cannot be non-negative.

The Euler equations of this model are given by

$$u'(c_t) = \beta R_{t+1} u'(c_{t+1}) \geqslant \beta R u'(c_{t+1}) \text{ for } t < 4, \tag{4}$$

where $R_{t+1} \geqslant R$ is the shadow borrowing interest rate. Notice that if the borrowing constraint does not bind in period t, then $R_{t+1} = R$. Similarly, the optimality conditions for parental transfers to the child are given by

$$u'(c_t) \geqslant \gamma u'(c^k_{t-1}) \text{ for } 2 \leq t \leq 4, \tag{5}$$

where c^k_{t-1} is the consumption of the child and the inequality holds strictly when the parental transfer is zero, or $b^k_{t-1} = 0$. In the equation above $u'(c_t)$ is the marginal cost to the parent of transferring to the child, while $\gamma u'(c^k_{t-1})$ is the marginal benefit. In this sense, the parent in this model acts as a family planner who discounts the child's utility at rate γ.

The Euler equation and the optimality condition for transfers imply that the parent in this model is both trying to smooth his own consumption over time as in (4), and to equalize his current marginal utility with the one of each of his children, properly weighted by the altruistic term as in (5). What makes this problem interesting is that if the child faces a binding borrowing constraint, then his marginal utility will be high, which would create incentives for the parent to transfer to the child. However, even if the child is constrained, the parent might not transfer if the parental marginal cost of the transfer is larger than the marginal benefit. In other words, being constrained is a necessary condition for a transfer to occur, but it is not sufficient.

Assume that borrowing constraints are not binding after $t = 3$ ($R_4 = R$), which is a reasonable assumption for the later periods in adult life, and that utility is $u(c) = \log(c)$. As we show in the appendix, in the steady state, conditions (4) and (5) imply that the timing of parental transfers is determined by,[15]

$$1 \geqslant \gamma\beta \max\{R_2, R_3\} \geqslant \gamma\beta R_4 = \gamma\beta R, \tag{6}$$

where the following three cases with positive transfers may occur: *(i)* $b^k_1 > 0$, or early transfer, which occurs if $1 = \gamma\beta R_2$; *(ii)* $b^k_2 > 0$, or late transfer, which occurs if $1 = \gamma\beta R_3$; and *(iii)* $b^k_1, b^k_2 > 0$, or transfer in both periods, which holds if $1 = \gamma\beta R_2 = \gamma\beta R_3$. These conditions imply that parental transfers occur in the periods in which the child is most constrained: this happens in period $t = 1$ in case *(i)*, and period $t = 2$ in case *(ii)*. These predictions are consistent with the patterns documented in Table 11, where transfers occur early, late or in both periods. The interpretation of this model is that if we observe positive transfers, either early or late, then the borrowing constraint must have been binding for the child. However, when we observe zero transfers, the child might have been constrained, but the marginal cost to the parent of transferring might have been high. In addition, if a child is constrained, higher levels of altruism γ would result in higher probability of IVT as seen in equation (5). Higher levels of altruism could provide an interpretation of why children who receive both in the early and late period receive more generously regardless of parental income (Table 11). Finally, this model is also consistent with the a larger number of siblings n reducing transfers, as documented in Table 5, an effect that works through n diluting parental resources in the budget constraint.

[14] Notice that this model is dynastic: iterating forward from one generation to the next, the model becomes infinite horizon. We solve for the stationary equilibrium with $V = V^k$. Due to the infinite horizon nature of this model, restriction $\beta\gamma n < 1$ is required for utility to be bounded.

[15] As in Altig and Davis (1989, 1992), since the model is dynastic, deterministic, and there is no income growth, we focus on the steady state solution.

Strategic games in dynamic models of parental altruism Models of strategic interactions between parents and children also link parental transfers with instances when the child is credit constrained, but they also include alternative mechanisms to explain the timing of positive transfers. To explore these insights and the cases where the child receives transfers early, late or in both periods, consider the following two-period model, which summarizes Altonji *et al.* (1997) and Chu (2020). Parental utility is given by

$$V = u(c_1) + \gamma u(c_1^k) + \beta E_1[u(c_2) + \gamma u(c_2^k)],$$

and parental constraints are[16]

$$\begin{aligned} c_1 + a_2 + b_1^k &= y_1 + Ra_1, \\ c_2 + b_2^k &= y_2 + Ra_2, \\ b_1^k \geq 0, \text{ and } b_2^k &\geq 0. \end{aligned}$$

While parents face non-negative transfer constraints, they do not face borrowing constraints. The child's utility is given by

$$V^k = u(c_1^k) + \beta E_1[u(c_2^k)],$$

the child faces a borrowing constraint in the first period of the form,

$$a_2^k \geq 0,$$

and the child's income in the second period y_2^k is uncertain. The game occurs in three stages: in the first stage the parent decides savings a_2 and the first-period transfer to the child b_1^k (Stackelberg leader). In the second stage, the child decides his savings a_2^k. In the third stage, which occurs in the second period, the parent chooses the second-period transfer b_2^k. The timing of the game guarantees a unique solution.

Solving the model by backwards induction, the optimal second-period transfer b_2^k satisfies

$$u'(c_2) \geq \gamma u'(c_2^k),$$

which holds with equality if $b_2^k > 0$ and is similar to (5). Optimal function $b_2^k(a_2, a_2^k, y_2^k)$ depends on the assets of parent and child, as well as the realized child's income y_2^k. In this strategic game, the parent chooses $b_2^k(a_2, a_2^k, y_2^k)$ to induce allocations of consumption for himself and the child.

In the second stage of the game, the solution of the optimal child savings $a_2^k(b_1^k, y_2^k, a_2)$ depends on whether $b_2^k > 0$ or $b_2^k = 0$, and takes as given the first-period transfer b_1^k. If the child anticipates a positive second-period transfer in a low-income state, then the child's optimal saving will be inefficiently low. But if the child expects no second-period transfers, then it is optimal to save more.

In the first stage of the game, the parent takes the child's saving function $a_2^k(b_1^k, y_2^k, a_2)$ as given and chooses savings a_2 and the first-period transfer to the child b_1^k. In deciding the first-period transfer the parent takes into account that the borrowing constraint of the child may bind, which prevents the child from smoothing consumption across the two periods. But there is a trade-off since the parent also considers that in response to a large first-period transfer, the child may undersave and expect to receive a larger second-period transfer (Samaritan's dilemma). Chu's (2020) characterization of these trade-offs results in the insight that rich parents can act as family dictators, achieving what they think is the first-best allocation. They do so by making a first-period

[16] In contrast with the dynastic model with commitment, the model here is not dynastic: parents do not receive transfers from their own parents, and children do not give transfers to their own children. The parent is not the head of a dynasty solving an infinite horizon problem.

transfer that still keeps the child constrained, so that there is no undersaving, and then giving a second-period transfer that dictates the consumption of the child. Rich parents give in both periods, giving less in the first period, and delaying transfers to the second period. This prediction of the model is consistent with the results reported in Table 12, where the probability of receiving in both the early and the late period was much larger for higher-income parents.[17]

In sum, relative to dynastic models with commitment, models with strategic interaction introduce additional behavioral considerations into the patterns of positive transfers in the data, giving rise to a rich set of predictions. There is no paper we know of that has quantitatively tested a model against the fact that there is no age profile of positive transfers. This is an area where future research may provide insights into the behavioral ingredients of models that would be necessary to replicate the data.

5 Concluding comments

All across the income distribution, parents provide financial support to their adult children. Our analysis underscores the prevalence and importance of IVT for parents at all income levels, as opposed to bequests, which tend to be highly concentrated. Both at the aggregate cross-sectional level and at the parent-level over time, IVT represent a significant fraction of financial support. We also find that coresidency tends to be more prevalent among poorer, younger parents and children, although older children and parents also coreside when the child is helping the parent. Interestingly, children who ever coreside receive more total IVT that those who do not, even without accounting for the rent value of living with the parent.

The facts we document in this paper provide insights into the extent of parental financial support to adult children in the United States. A question remains on whether these patterns hold in countries with different institutional settings, including public transfers and estate taxation.[18] We leave this question for future research.

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[17] Chu (2020) also concludes that for middle-wealth parents it is optimal to give a large first-period transfer (front-loading) and a zero second-period transfer: these parents make the second-period transfer inoperative, eliminating the child's undersaving problem. Children of middle-wealth parents save in the first period in anticipation of a zero second-period transfer. Finally, poor parents find it optimal to delay transfers and only give in the second period.

[18] Scervini and Trucchi (2022) explore intergenerational insurance (precautionary savings) in Europe in a spirit similar to what Boar (2021) does for the United States. However, they do not directly use intervivos transfers data.

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TABLE 1

Summary statistics for parents in the initial HRS cohort

	Full sample		Longitudinal sample	
	Mean	Standard deviation	Mean	Standard deviation
Variables for parent:				
Number of parents	6,260		2,795	
Age in 1996	61.14	5.24	60.88	5.17
Years of schooling	12.39	3.29	12.65	3.20
Family income	$71,013	$101,744	$76,437	$100,076
Family wealth	$594,698	$1,611,704	$641,399	$1,487,195
Transfer to children per-wave:				
Gave a transfer	36%		38%	
Amount	$4,331	$16,867	$4,504	$15,855
Amount > 0	$11,953	$26,347	$11,896	$24,000
Bequests:				
Number of parents	2,102		899	
Probability	13%		8%	
Mean amount	$31,239	$205,419	$19,812	$182,359
99th percentile	$672,461		$419,429	
Amount>0	$247,856	$531,335	$240,751	$596,818
Side bequests:				
Number of parents	1,283		818	
Probability	6%		5%	
Mean amount	$16,343	$198,135	$15,724	$183,978
99th percentile	$300,000		$300,000	
Amount>0	$291,380	$793,749	$284,572	$740,951

Notes: Data corresponds to 10 biennial waves during the 1996-2014 period. Full sample corresponds to available data from all parents in the HRS initial cohort, who are those born 1931-1941, and who have zero (single) or one spouse (stable couple). Longitudinal sample corresponds to parents in the full sample who are also observed in all 10 waves. Side bequests correspond to inheritances given from a parent couple when one parent is deceased. Bequests include both final bequests (from single parents or widowed parents) and side bequests. All statistics are weighted using HRS sample weights. Dollar amounts are expressed in 2014 US$.

TABLE 2

Distribution of total intervivos transfers and bequests by parents

Longitudinal sample for parents in HRS cohort

	Total intervivos transfers (1)	Bequests (Side and Final) (2)	Ratio of mean bequests to mean total intervivos transfers (3)	Parent-level bequests to total intervivos transfers (4)	Ratio of mean total intervivos transfers to mean total gifts (5)	Parent-level total intervivos transfers to total gifts (6)
Number of parents	2,795	899		899		899
Probability	0.83	0.08				
Mean amount	$45,399	$19,812	0.44	1.35	0.70	0.93
50th percentile	$15,454	0		0		1
90th percentile	$114,749	0		0		1
95th percentile	$190,509	$34,541		1.70		1
99th percentile	$431,712	$419,429		47.91		1

Notes: Longitudinal sample corresponds to parents in the full sample who are also observed in all 10 waves. Side bequests correspond to inheritances given from a parent couple when one parent is deceased. Bequests include both final bequests (from single parents or widowed parents) and side bequests. Total gifts refer to the sum of total intervivos transfers plus bequests. Columns (3) and (5) are computed using the means of intervivos transfers and bequests reported on columns (1) and (2). Columns (4) and (6) report statistics on the parent-level ratios. Dollar amounts are expressed in 2014 US$.

TABLE 3

Summary statistics for parent-kid pairs

Longitudinal sample for parents in HRS cohort

	Mean	Standard deviation
Variables for parent:		
Number of parents	2,348	
Age in 1996	61.13	5.07
Number of matched children	2.74	1.57
Years of schooling	12.68	3.11
Family income	$76,379	$99,856
Family wealth	$654,138	$1,483,878
Variables for child:		
Age in 1996	33.76	5.71
Years of schooling	13.84	2.21
Family income (imputed)	$78,840	$44,385
Transfer per-wave:		
Received a transfer	14%	
Amount	$974	$4,485
Amount > 0	$6,936	$10,094
Total transfers:		
Received a transfer	48%	
Amount	$9,593	$24,848
Amount > 0	$19,931	$32,816
Sample size:		
Unique parent-kid pairs	6,463	
Total panel observations	64,630	

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample. HRS data on child's family income is reported in brackets. A continuous child's family income is imputed using CPS data for those with the same income bracket, gender, age bracket, marital status, education, work status and year. Transfer per wave corresponds to transfers over a 2-year period. Total transfers are aggregated over a 20-year period (1996-2014). All statistics are weighted using HRS sample weights. Dollar amounts are expressed in 2014 US$.

TABLE 4

Total 20-year intervivos transfers across the parental income distribution

	Permanent income quartile of the parent				
	Lowest ($53,415)	Second ($93,643)	Third ($136,014)	Highest ($280,518)	Total ($140,845)
Probability	0.28	0.47	0.51	0.65	0.48
Mean amount	$3,122	$6,640	$8,972	$19,186	$9,657
Conditional amount	$11,034	$14,238	$17,499	$29,508	$20,013
Mean share of parental income	5.5%	7.0%	6.5%	6.8%	6.5%
Conditional share of parental income	19.6%	15.0%	12.6%	10.5%	13.4%

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample. A measure of parental permanent income is constructed following Altonji, Hayashi, and Kotlikoff (1997). Total transfers are computed as aggregated transfers over all 10 waves (20-year period). All statistics are weighted using HRS sample weights. Dollar amounts are expressed in 2014 US$.

TABLE 5

Probability and total amount received by adult children

	OLS models			*Family fixed effects*		
Dependent variable →	Probability	Transfer amount	Positive amount	Probability	Transfer amount	Positive amount
Parental permanent income	0.00466^{***}	317.9^{***}	307.6^{**}			
($10,000s)	(0.001)	(120.9)	(149.1)			
Parental initial wealth	0.000618^{***}	91.24^{***}	91.84^{***}			
($10,000s)	(0.000)	(17.8)	(19.5)			
Parental years of schooling	0.0271^{***}	555.6^{***}	1013.9^{***}			
	(0.004)	(187.8)	(358.2)			
Child average income	-0.0246^{***}	-931.8^{***}	-862.9^{***}	-0.0388^{***}	-1227.4^{***}	-1875.8^{***}
($10,000s)	(0.003)	(157.9)	(274.7)	(0.004)	(186.2)	(505.5)
Child years of schooling	0.0165^{***}	682.3^{***}	869.6^{**}	0.00809	248.6	872.4
	(0.005)	(227.6)	(395.8)	(0.007)	(250.7)	(694.4)
Number of siblings	-0.0446^{***}	-1556.0^{***}	-2604.9^{***}			
	(0.006)	(248.8)	(478.6)			
N	4,679	4,670	2,326	4,670	4,670	2,326
R^2	0.14	0.22	0.21	0.49	0.63	0.52

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample. Total intervivos transfers are computed aggregating transfers at the parent-kid level over 20 years of data (1996-2014). Additional control variables include parental race, and initial age; child's gender, and cohort dummies (age brackets in 1996). Standard errors clustered at the family level. Start superscripts: * $p < 0.10$, ** $p < .05$, *** $p < 0.01$.

TABLE 6

Coresident versus non-coresident adult children

Summary statistics for income, wealth, total transfers, and bequests

Variables	*Adult child never coresides with parent*	*Adult child coresides with parent at least one wave*
Income and wealth		
Parent permanent income	$136,037	$118,244
Parent wealth in 1996	$520,204	$352,393
Child average income	$76,132	$46,663
Transfers and bequests		
Any transfer during 1996-2014	48%	67%
Total transfer amount	$9,593	$16,706
Conditional total transfer amount	$19,931	$24,785
Ever provide help to parents	8%	22%
Number of parent-kid pairs	6,463	1,606

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample. Adult children who never coreside with parents do so for all 10 waves during 1996-2014. Differences between children who never coreside with parents and those who do at least one wave are all statistically significant at the 1% level. All statistics are weighted using HRS sample weights. Dollar amounts are expressed in 2014 US$.

TABLE 7

Probability and total amount received by coresident and non-coresident children

	OLS models		
Dependent variable →	Probability	Transfer amount	Positive amount
Ever coresident with parent	0.124***	4337.6***	4231.4***
	(0.020)	(1046.4)	(1520.5)
N	5,564	5,564	2,890
R^2	0.14	0.22	0.20

Notes: All regressions are OLS. The "ever coresident" dummy takes a value of one if the child coresides with the parent at least in one HRS wave over the 1996-2014 period. Total amount is computed aggregating transfers at the parent-kid level over 20 years of data (1996-2014). Additional control variables include parental permanent income, initial wealth, years of schooling, race, and initial age; child's average income, gender, number of siblings, and cohort dummies (age brackets in 1996). Standard errors clustered at the family level. Start superscripts: * $p < 0.10$, ** $p < .05$, *** $p < 0.01$.

TABLE 8

Age distribution of parent and child during coresidency and non-coresidency periods

	During non-coresidency periods	During periods of coresidency	During periods of coresidency and help to parent
Kid age distribution			
25-35	17%	30%	12%
35-45	42%	39%	35%
45-55	34%	27%	42%
55-65	7%	4%	11%
Parent age distribution			
55-65	22%	35%	16%
65-75	49%	43%	36%
75-85	29%	22%	48%
Number of observations	75,239	5,451	520

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample. Age distributions are computed over all the waves in which a parent-kid pair coresides as well as when they do not. Differences between the age distributions for both parents and children are all statistically significant at the 1% level. Among those periods in which there is coresidency, we also report on the last column the age distribution of parents who report receiving help from child.

TABLE 9

Age profile of intervivos transfers by wave

	OLS models			*Parent-kid pair fixed effects*		
Dependent variable →	Probability	Transfer amount	Positive amount	Probability	Transfer amount	Positive amount
25-35 dummy	0.129***	918.5***	454.5	0.0806***	368.4***	-1268.7
	(0.015)	(179.1)	(1035.7)	(0.010)	(123.5)	(1231.7)
35-45 dummy	0.0649***	535.8***	727.4	0.0318***	135.1	-951.4
	(0.010)	(130.9)	(914.4)	(0.008)	(94.4)	(1155.3)
45-55 dummy	0.0366***	297.3***	445.2	0.0192***	66.04	-985.9
	(0.007)	(98.1)	(792.2)	(0.007)	(78.5)	(1052.1)
Constant	0.0847***	629.9***	7241.2***	0.107***	827.2***	7907.0***
	(0.007)	(96.8)	(797.5)	(0.007)	(78.9)	(1037.4)
R^2	0.01	0.01	0.01	0.29	0.25	0.21
N	63,634	63,634	8,364	63,634	63,634	8,364

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample. Omitted age bracket is 55-65 years old. Transfer amount includes zero and positive amounts. Year dummies are included for OLS models. Standard errors are clustered at parent-kid level. Start superscripts: * $p < 0.10$, ** $p < .05$, *** $p < 0.01$.

TABLE 10

Timing of intervivos transfers – Aggregated early versus late transfers

Adult children who are ages 25-34 in 1996

	OLS models			*Parent-kid pair fixed effects*		
Dependent variable →	Probability	Transfer amount	Positive amount	Probability	Transfer amount	Positive amount
Early transfers dummy	0.074***	1226.1***	373.9	0.074***	1217.0***	2773.2
(First five waves)	(0.011)	(324.5)	(865.8)	(0.016)	(457.0)	(2101.5)
Constant	0.376***	4785.2***	12844.0***	0.334***	4800.3***	13075.2***
	(0.033)	(945.4)	(2019.4)	(0.008)	(221.8)	(1124.9)
N	6,460	6,460	2,298	6,460	6,460	2,298
R^2	0.01	0.01	0.01	0.43	0.54	0.34

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample and for children who were ages 25-34 in 1996. Each parent-kid pair has two observations: one for the early transfers (first five waves) and one for the late transfers (second five waves). Transfer amount refers to the total received in the early and the late periods (over 10 years each). Dummies for child's age in 1996 are included. Start superscripts: * p < 0.10, ** p < .05, *** p < 0.01.

TABLE 11

Distribution of transfer types by timing of transfers and parental permanent income
Adult children who are ages 25-34 in 1996

	No transfers	*Early transfer only*	*Late transfer only*	*Both periods*		
				Total	*Early transfers*	*Late transfers*
Distribution of transfer types (%)	49%	18%	10%	23%		
Distribution of transfer types by parental permanent income (%)						
First quartile ($53,415)	70%	14%	8%	8%		
Second quartile ($93,643)	51%	20%	10%	19%		
Third quartile ($136,014)	47%	18%	11%	24%		
Fourth quartile ($280,518)	34%	18%	11%	37%		
Total transfer received ($)	0	$7,813	$7,868	$37,054	$19,940	$17,113
Total transfer received by parental permanent income ($)						
First quartile ($53,415)	0	$5,134	$9,292	$25,501	$15,330	$10,171
Second quartile ($93,643)	0	$7,492	$4,828	$23,700	$11,428	$12,271
Third quartile ($136,014)	0	$8,955	$5,961	$33,328	$18,636	$14,692
Fourth quartile ($280,518)	0	$8,335	$11,029	$47,398	$25,526	$21,872

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample and for children who were ages 25-34 in 1996. “Early transfers only” refers to receiving only in the first five waves (10 years). “Late transfers only” refers to receiving only in the second five waves (10 years). Total transfers are aggregated over the 10-year period (five waves). Average permanent income is shown in parenthesis for every income quartile. Dollar amounts are expressed in 2014 US$.

TABLE 12

Multinomial logit for transfer types
Adult children who are ages 25-34 in 1996

	Relative risk ratio	*Robust standard error*
Late transfer only		
Second quartile ($93,643)	0.940	0.271
Third quartile ($136,014)	1.090	0.312
Fourth quartile ($280,518)	1.233	0.389
Constant	0.706	0.981
Both periods transfer		
Second quartile ($93,643)	2.407^{***}	0.658
Third quartile ($136,014)	3.193^{***}	0.907
Fourth quartile ($280,518)	4.061^{***}	1.209
Constant	1.659	2.107
Likelihood ratio chi-square = 120.43		
Prob > chi-square = 0.000		
N = 1,385		

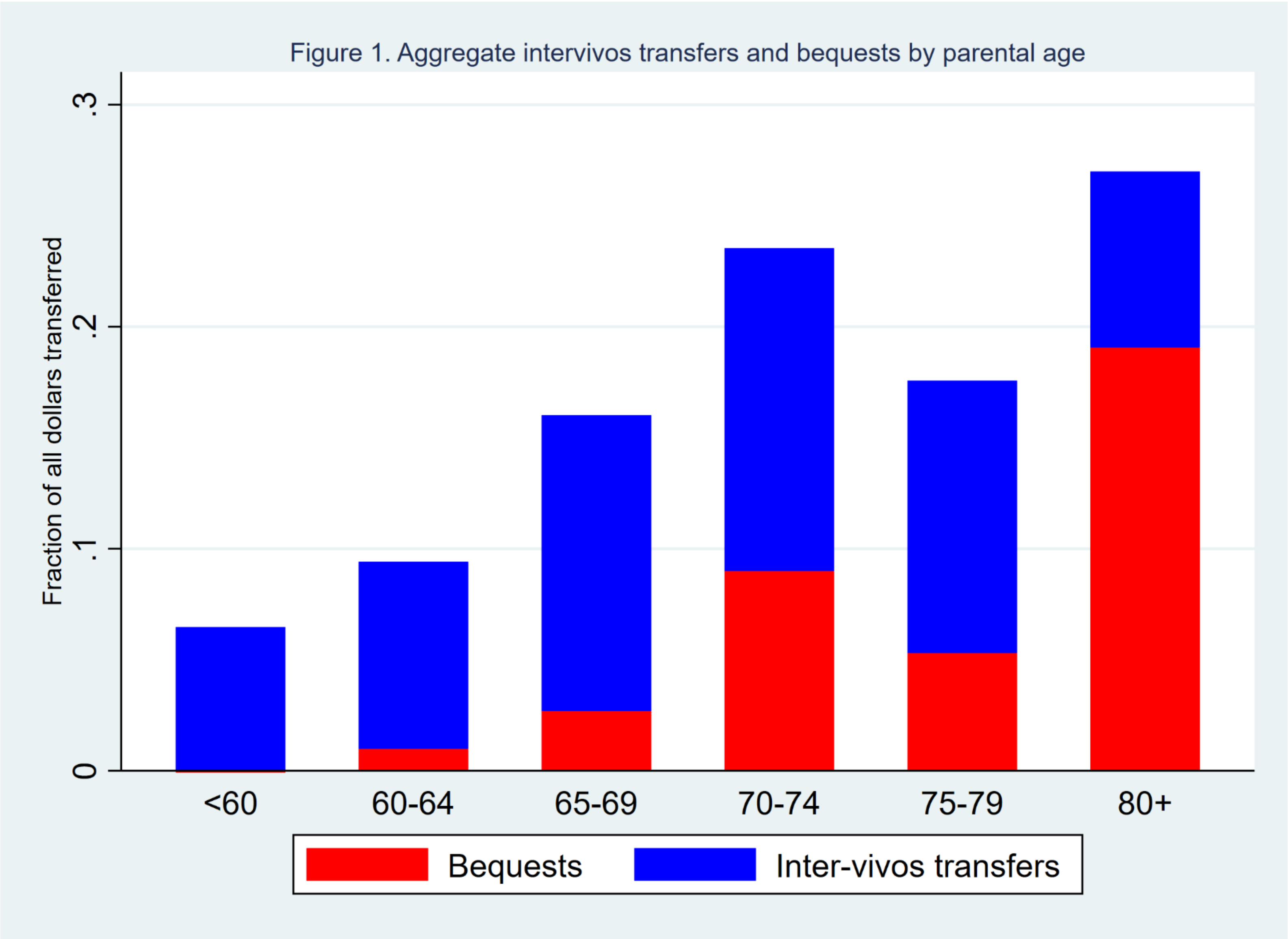
Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample and for children who were ages 25-34 in 1996. Base outcome for multinomial logit is "Early transfers only," which refers to the category of those receiving only in the first five waves (10 years). "Late transfers only" refers to the category of those receiving only in the second five waves (10 years). Additional control variables include parental years of schooling, race, initial age, and wealth; child's average income, schooling, number of siblings, gender, and dummies for child's age in 1996. Average permanent income is shown in parenthesis for every income quartile. First quartile of parental permanent income ($53,028) is omitted. Standard errors clustered at the family level. Start superscripts: * $p < 0.10$, ** $p < .05$, *** $p < 0.01$.

TABLE 13

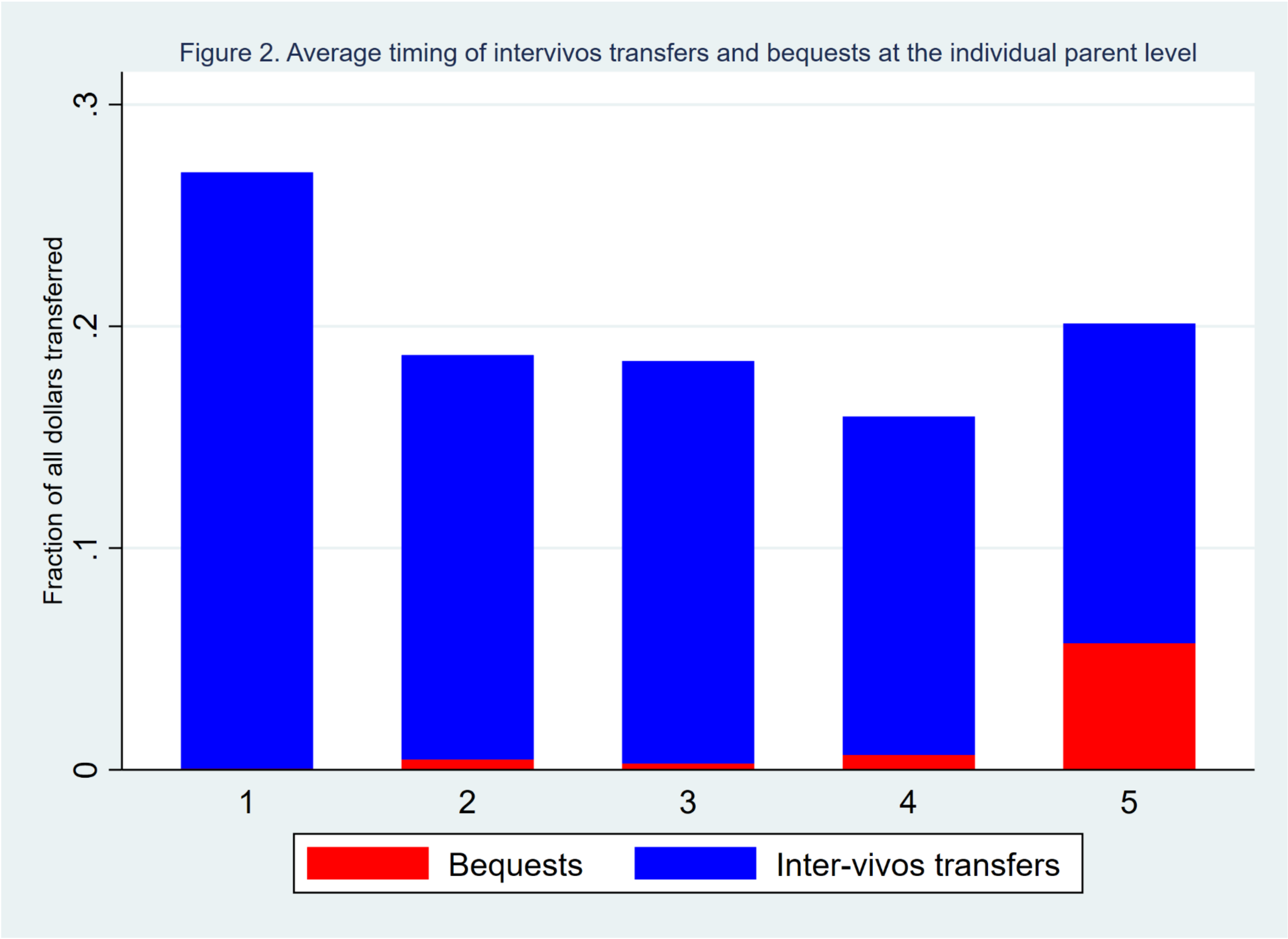
Early and late conditional total transfer amounts received by children
Adult children who are ages 25-34 in 1996

	OLS models	
Dependent variable →	Early total transfer amounts	Late total transfer amount
Parental permanent income ($10,000s)	23.76 (88.5)	142.7 (117.6)
Both periods dummy	8132.6*** (1215.9)	5670.2*** (1449.0)
Parental initial wealth ($10,000s)	71.23*** (15.8)	29.63* (15.4)
Child average income ($10,000s)	-372.7 (271.9)	-135.0 (326.3)
N	1,101	923
R^2	0.27	0.15

Notes: The units of observation are parent-kid pairs for parents in the HRS initial cohort in the longitudinal sample and for children who were ages 25-34 in 1996. Regressions exclude those who never receive. Early and late total transfer amounts include both zero and positive. Both periods dummy is one if child receives positive transfers both in the early and late periods. Additional control variables include parental year of schooling, race, and age in 1996; and child's schooling, number of siblings, gender, and age in 1996. Standard errors clustered at the family level. Start superscripts: * $p < 0.10$, ** $p < .05$, *** $p < 0.01$.



Notes: Data includes parents in the HRS initial cohort who are observed in all 10 biennial HRS waves during the 1996-2014 period (longitudinal sample). All data are pooled into a single cross-section. We compute the weighted sum of all intervivos transfers and bequests given and report them by age bracket as a fraction of all dollars transferred. HRS sample weights are used. All dollar amounts are converted to 2014 US$.



Notes: Data includes parents in the HRS initial cohort who are observed in all 10 biennial HRS waves during the 1996-2014 period (longitudinal sample). The numbers 1 to 5 on the x-axis refer to 2-wave groups, where 1 corresponds to 1996 and 1998, 2 corresponds to 2000 and 2002 and so on, up to 5 which is 2012 and 2014. For each parent in the sample we compute the total transfers and bequests given over the whole period, and then calculate the fraction of total dollars given as transfers or bequest in each of the 2-wave periods. The figure shows the corresponding weighted average across all parent-level fractions for each 2-wave period. HRS sample weights are used. All dollar amounts are converted to 2014 US$.

FINANCIAL TRANSFERS FROM PARENTS TO ADULT CHILDREN

APPENDIX
Supplementary materials for online publication

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1 Solution of dynastic model with commitment

Consider the following dynastic model, which is a simplification of Cordoba and Ripoll (2019). This is the simplest model in which we can examine the timing of parental transfers in the presence of a realistic hump-shaped income profile, credit constraints and multiple children. Consider the case of an altruistic adult parent in an overlapping generations setting. Adult life lasts for four periods indexed by t. For simplicity assume that all children are born at the same time and that there is a gap of one period between each kid and the parent, so that parent and adult children overlap three periods. As we show, this is the simplest model in which parental transfers may occur earlier in the lifecycle, later, or both.

1.1 Dynastic problem

The parent head of dynasty solves the following problem

$$V = \max_{[c_t, a_{t+1}, b_t^k]} \sum\nolimits_{t=1}^{4} \beta^{t-1} u(c_t) + \beta\gamma n V^k,$$

subject to

$$c_t + a_{t+1} = b_t + y_t + Ra_t \text{ for } t = 1,$$

$$c_t + a_{t+1} + nb_{t-1}^k = b_t + y_t + Ra_t \text{ for } 2 \leq t \leq 4,$$

$$a_{t+1} \geqslant 0 \text{ for } 1 \leq t < 4, \tag{2}$$

$$b_{t-1}^k \geqslant 0 \text{ for } 2 \leq t \leq 4, \tag{3}$$

where V is the lifetime utility of the parent, V^k is the lifetime utility of each child, β is the discount factor, c_t is consumption, n is the exogenous number of children, $\gamma < 1$ represents the altruistic weight per child, b_t is the transfer received by the parent from his own parents, b_{t-1}^k is the transfer the parent gives to each child age $t-1$, a_t are the assets in period t, y_t is the income, and R is the gross interest rate. For simplicity in (2) we assume a zero borrowing limit. Constraint (3) implies that parental transfers cannot be non-negative.

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Notice that this model is dynastic: iterating forward from one generation to the next, the model becomes infinite horizon. We solve for the stationary equilibrium with $V = V^k$. Due to the infinite horizon nature of this model, restriction $\beta\gamma n < 1$ is required for utility to be bounded.

The Euler equations of this model are given by

$$u'(c_t) = \beta R_{t+1} u'(c_{t+1}) \geqslant \beta R u'(c_{t+1}) \text{ for } t < 4 \tag{4}$$

where $R_{t+1} \geqslant R$ is the shadow borrowing interest rate. Notice that if the borrowing constraint does not bind in period t, then $R_{t+1} = R$. Similarly, the optimality conditions for parental transfers to the child are given by

$$u'(c_t) \geqslant \gamma u'(c_{t-1}^k) \text{ for } 2 \leq t \leq 4, \tag{5}$$

where c_{t-1}^k is the consumption of the child and the inequality holds strictly when the parental transfer is zero, or $b_{t-1}^k = 0$. In the equation above $u'(c_t)$ is the marginal cost to the parent of transferring to the child, while $\gamma u'(c_{t-1}^k)$ is the marginal benefit. Although these equations are similar to the ones obtained in Altig and Davis (1989, 1992), in what follows we focus the analysis on how for given preference parameters β and γ, different shapes of the income profile can generate a different timing of parental transfers. This analysis is relevant to interpret the data, since the age difference between the parent and the child naturally introduces a life-cycle income gap between them.

1.2 Timing of transfers

The following proposition summarizes the predictions of the model regarding the timing of parental transfers.

Proposition 1. *In a steady state where $c_t = c_t^k$ and $b_t = b_t^k$ for all t, the timing of parental transfers to the child is determined by the following conditions*

$$1 \geqslant \gamma\beta \max\{R_2, R_3\} \geqslant \gamma\beta R_4 = \gamma\beta R, \tag{6}$$

where $b_1 > 0$ if $1 = \gamma\beta R_2$; $b_2 > 0$ if $1 = \gamma\beta R_3$; and $b_1, b_2 > 0$ if $1 = \gamma\beta R_2 = \gamma\beta R_3$.

Proof. *The conditions in (6) follow directly from equations (4) and (5) in a steady state with $c_t = c_t'$ and $b_t = b_t'$ for all t. Specifically, using (4) into (5) we have*

$$u'(c_t) \geqslant \gamma u'(c_{t-1}^k) = \gamma\beta R_t u'(c_t^k) \geqslant \gamma\beta R u'(c_t^k) \text{ for } 2 \leq t < T, \tag{7}$$

and

$$u'(c_4) \geqslant \gamma u'(c_3^k) = \gamma\beta R_4 u'(c_4^k) = \gamma\beta R u'(c_4^k), \tag{8}$$

which in a steady state with $c_t = c_t^k$ can be combined into a single expression as in (6).

1.3 Transfer types

The following proposition characterizes the transfer patterns predicted by the model.

Proposition 2. *In a steady state where $c_t = c_t^k$ and $b_t = b_t^k$ for all t, the following types of parental transfers may occur:*
No transfers *- the adult child never receives a positive transfer or*

$$b_1 = b_2 = b_3 = 0,$$

which occurs when either of the following conditions hold

$$1 > \gamma\beta R_2 = \gamma\beta R_3 = \gamma\beta R_4 = \gamma\beta R, \tag{9}$$

$$1 > \gamma\beta R_2 > \gamma\beta R_3 = \gamma\beta R_4 = \gamma\beta R, \tag{10}$$

$$1 > \gamma\beta R_3 > \gamma\beta R_2 = \gamma\beta R_4 = \gamma\beta R, \tag{11}$$

$$1 > \gamma\beta R_2, \gamma\beta R_3 > \gamma\beta R_4 = \gamma\beta R. \tag{12}$$

Early transfers only - *the child receives positive transfers only in period $t = 1$ or*

$$b_1 > 0, \text{ and } b_2 = b_3 = 0,$$

which occurs when either of the following conditions hold

$$1 = \gamma\beta R_2 > \gamma\beta R_3 = \gamma\beta R_4 = \gamma\beta R, \tag{13}$$

$$1 = \gamma\beta R_2 > \gamma\beta R_3 > \gamma\beta R_4 = \gamma\beta R. \tag{14}$$

Late transfers only - *the child receives positive transfers only in period $t = 2$ or*

$$b_2 > 0, \text{ and } b_1 = b_3 = 0,$$

which occurs when either of the following conditions hold

$$1 = \gamma\beta R_3 > \gamma\beta R_2 = \gamma\beta R_4 = \gamma\beta R, \tag{15}$$

$$1 = \gamma\beta R_3 > \gamma\beta R_2 > \gamma\beta R_4 = \gamma\beta R. \tag{16}$$

Transfer in both periods - *the child receives positive transfers in periods $t = 1, 2$ or*

$$b_1 > 0, \ b_2 > 0, \text{ and } b_3 = 0,$$

which occurs when either of the following condition holds

$$1 = \gamma\beta R_2 = \gamma\beta R_3 > \gamma\beta R_4 = \gamma\beta R. \tag{17}$$

Proof. *All conditions follow from the inequalities in (6).*

Notice that the shadow interest rate R_t is endogenous and it is given by the marginal rate of substitution or

$$R_{t+1} = \frac{u'(c_t)}{\beta u'(c_{t+1})}, \tag{18}$$

which in turn depends on the income profile $\{y_t\}_{t=1}^{4}$. Therefore, which of the transfer types in Proposition 2 occurs depends on the income profile.

1.4 Comparative statics

In this section we exploit the closed-form solutions of the model to provide insights into the main mechanisms of the model, namely the income profile and number of siblings. Proposition 3 summarizes some comparative statics for the case in which utility function is $u(c) = \log(c)$.

Proposition 3. *Assume $u(c) = \log(c)$. Then in a steady state where $c_t = c_t^k$ and $b_t = b_t^k$ for all t, the following comparative static results hold:*
Income profile *- for early transfers and transfers in both periods,*

$$\frac{\partial b_1}{\partial y_1} < 0,\ \frac{\partial b_1}{\partial y_2} > 0,\ \frac{\partial b_1}{\partial y_3} \gtrless 0,\ \frac{\partial b_1}{\partial y_4} \gtrless 0,$$

and for late transfers and transfers in both periods,

$$\frac{\partial b_2}{\partial y_1} \lessgtr 0,\ \frac{\partial b_2}{\partial y_2} < 0,\ \frac{\partial b_2}{\partial y_3} > 0,\ \text{and}\ \frac{\partial b_2}{\partial y_4} > 0.$$

Number of children *- for early transfers and late transfers,*

$$\frac{\partial b_1}{\partial n} < 0 \text{ and } \frac{\partial b_2}{\partial n} < 0.$$

Proof. See proof below.

1.5 Steady state solution

The proof of Proposition 3 requires solving the steady state of the model for the case of log utility, $u(c) = \log(c)$, and analyzing separately all the transfer types with positive transfers from Proposition 2.

1.5.1 Early transfer only under condition (13)

In this case the borrowing constraint binds in period 1 only and transfers are only received in period 1, or

$$b_1 > 0, b_2 = b_3 = 0,$$

$$R_2 > R_3 = R_4 = R,$$

$$a_2 = 0,\ a_3 > 0,\ \text{and}\ a_4 > 0.$$

Equations (4) and (5) together with the budget constraints imply the following steady state solution,

$$c_1 = \frac{n\gamma}{1 + n\gamma + \beta + \beta^2}\left[y_1 + \frac{1}{n}\left(y_2 + \frac{y_3}{R} + \frac{y_4}{R^2}\right)\right],$$

$$c_2 = \frac{1}{\gamma}c_1,$$

$$c_3 = \beta R c_2 = \frac{\beta R}{\gamma}c_1,$$

$$c_4 = (\beta R)^2 c_2 = \frac{(\beta R)^2}{\gamma}c_1,$$

$$b_1 = \frac{\gamma}{1+n\gamma+\beta+\beta^2}\left[y_2 + \frac{y_3}{R} + \frac{y_4}{R^2}\right] - \frac{1+\beta+\beta^2}{1+n\gamma+\beta+\beta^2}y_1,$$
$$a_3 = \frac{\beta+\beta^2}{1+\beta+\beta^2}\left[y_2 - nb_1\right] - \frac{1}{1+\beta+\beta^2}\left[\frac{y_3}{R} + \frac{y_4}{R^2}\right],$$
$$a_4 = \frac{c_4 - y_4}{R}.$$

The comparative statics for income ratios in Proposition 1 are then given by

$$\frac{\partial b_1}{\partial y_1} = -\frac{1+\beta+\beta^2}{1+n\gamma+\beta+\beta^2} < 0$$
$$\frac{\partial b_1}{\partial y_2} = \frac{\gamma}{1+n\gamma+\beta+\beta^2} > 0,$$
$$\frac{\partial b_1}{\partial y_3} = \frac{n\gamma}{1+n\gamma+\beta+\beta^2}\frac{1}{n}\frac{1}{R} > 0,$$

and

$$\frac{\partial b_1}{\partial y_4} = \frac{n\gamma}{1+n\gamma+\beta+\beta^2}\frac{1}{n}\frac{1}{R^2} > 0.$$

Finally, for number of kids the comparative statics are given by

$$\frac{\partial b_1}{\partial n} = \frac{-\gamma^2}{(1+n\gamma+\beta+\beta^2)^2}\left[y_2 + \frac{y_3}{R} + \frac{y_4}{R^2}\right] + \frac{(1+\beta+\beta^2)\gamma}{(1+n\gamma+\beta+\beta^2)^2}y_1 < 0,$$

where it can be shown that the expression above is negative because $b_1 > 0$.

1.5.2 Early transfer only under condition (14)

In this case the borrowing constraint binds in periods 1 and 2, but transfers to the child only occur in period 1, or

$$b_1 > 0, b_2 = b_3 = 0,$$
$$R_2 > R_3 > R_4 = R,$$
$$a_2 = 0,\ a_3 = 0,\ \text{and}\ a_4 > 0.$$

Equations (4) and (5) together with the budget constraints imply the following steady state solution,

$$c_1 = \frac{n\gamma}{1+n\gamma}\left[y_1 + \frac{1}{n}y_2\right],$$
$$c_2 = \frac{1}{\gamma}c_1,$$
$$c_3 = y_3 - a_4 = \frac{1}{1+\beta}\left[y_3 + \frac{y_4}{R}\right],$$
$$c_4 = \beta R c_3,$$
$$b_1 = \frac{n\gamma}{1+n\gamma}\frac{1}{n}y_2 - \frac{1}{1+n\gamma}y_1,$$
$$a_4 = \frac{\beta}{1+\beta}y_3 - \frac{1}{1+\beta}\frac{y_4}{R}.$$

The comparative statics for income ratios are given by

$$\frac{\partial b_1}{\partial y_1} = -\frac{1}{1+n\gamma} < 0$$

$$\frac{\partial b_1}{\partial y_2} = \frac{\gamma}{1+n\gamma} > 0,$$

and

$$\frac{\partial b_1}{\partial y_3} = \frac{\partial b_1}{\partial y_4} = 0.$$

Finally, for number of kids the comparative statics are given by

$$\frac{\partial b_1}{\partial n} = \frac{-\gamma^2}{(1+n\gamma)^2} y_2 + \frac{\gamma}{(1+n\gamma)^2} y_1 < 0,$$

where it can be shown that the expression above is negative because $b_1 > 0$.

1.5.3 Late transfer only under condition (15)

In this case, the borrowing constraint binds in period 2 only and transfers are only received in period 2, or

$$b_2 > 0, b_1 = b_3 = 0,$$

$$R_3 > R_2 = R_4 = R,$$

$$a_3 = 0,\ a_2 > 0,\ \text{and } a_4 > 0.$$

Equations (4) and (5) together with the budget constraints imply the following steady state solution,

$$c_1 = y_1 - a_2 = \frac{n\gamma}{n\gamma + \beta + n\gamma\beta + \beta^2}\left[y_1 + \frac{y_2}{R}0 + \frac{1}{n}\left[\frac{y_3}{R} + \frac{y_4}{R^2}\right]\right],$$

$$c_2 = \beta R c_1,$$

$$c_3 = \frac{1}{\gamma} c_2,$$

$$c_4 = \beta R c_3,$$

$$b_2 = \frac{n\gamma}{n\gamma+\beta}\frac{1}{n}\left[y_3 + \frac{y_4}{R}\right] - \frac{\beta}{n\gamma+\beta}\left[R y_1 + y_2\right],$$

$$a_2 = \frac{\beta}{1+\beta} y_1 - \frac{1}{1+\beta}\left[\frac{y_2}{R} + \frac{b_2}{R}\right],$$

$$a_4 = \frac{\beta}{1+\beta}(y_3 - n b_2) - \frac{1}{1+\beta}\frac{y_4}{R}.$$

The comparative statics for income ratios in Proposition 3 are given by

$$\frac{\partial b_2}{\partial y_1} = -\frac{\beta R}{n\gamma+\beta} < 0$$

$$\frac{\partial b_2}{\partial y_2} = -\frac{\beta}{n\gamma+\beta} < 0,$$

$$\frac{\partial b_2}{\partial y_3} = \frac{\gamma}{n\gamma+\beta} > 0,$$

and

$$\frac{\partial b_2}{\partial y_4} = \frac{\gamma}{n\gamma + \beta} \frac{1}{R} > 0.$$

Finally, for number of kids the comparative statics are given by

$$\frac{\partial b_2}{\partial n} = \frac{-\gamma^2}{(n\gamma + \beta)^2} \left[y_3 + \frac{y_4}{R} \right] + \frac{\beta\gamma}{(n\gamma + \beta)^2} [Ry_1 + y_2] < 0,$$

where it can be shown that the expression above is negative because $b_2 > 0$.

1.5.4 Late transfer only under condition (16)

In this case the borrowing constraint binds in periods 1 and 2, but transfers to the child only occur in period 2, or

$$b_2 > 0, b_1 = b_3 = 0,$$

$$R_3 > R_2 > R_4 = R,$$

$$a_3 = 0, \ a_2 = 0, \ \text{and } a_4 \geqslant 0.$$

Equations (4) and (5) together with the budget constraints imply the following steady state solution,

$$c_1 = y_1,$$

$$c_2 = y_2 + b_2 = \frac{n\gamma}{1 + n\gamma + \beta} \left[y_2 + \frac{1}{n} \left(y_3 + \frac{y_4}{R} \right) \right],$$

$$c_3 = \frac{1}{\gamma} c_2,$$

$$c_4 = \beta R c_3,$$

$$b_2 = \frac{n\gamma}{1 + n\gamma + \beta} \frac{1}{n} \left[y_3 + \frac{y_4}{R} \right] - \frac{1 + \beta}{1 + n\gamma + \beta} y_2,$$

$$a_4 = \frac{\beta}{1 + \beta} [y_3 - nb_2] - \frac{1}{1 + \beta} \frac{y_4}{R}.$$

The comparative statics for income ratios in Proposition 3 are given by

$$\frac{\partial b_2}{\partial y_1} = 0$$

$$\frac{\partial b_2}{\partial y_2} = -\frac{1 + \beta}{1 + n\gamma + \beta} < 0,$$

$$\frac{\partial b_2}{\partial y_3} = \frac{\gamma}{1 + n\gamma + \beta} > 0,$$

and

$$\frac{\partial b_2}{\partial y_4} = \frac{\gamma}{1 + n\gamma + \beta} \frac{1}{R} > 0.$$

Finally, for number of kids the comparative statics are given by

$$\frac{\partial b_2}{\partial n} = \frac{-\gamma^2}{(1 + n\gamma + \beta)^2} \left[y_3 + \frac{y_4}{R} \right] + \frac{\gamma(1 + \beta)}{(1 + n\gamma + \beta)^2} y_2 < 0,$$

where it can be shown that the expression above is negative because $b_2 > 0$.

1.5.5 Transfers in both periods

In this case the borrowing constraint binds in periods 1 and 2, and transfers to the child only in periods 1 and 2, or

$$b_1, b_2 > 0, b_3 = 0,$$

$$R_2 = R_3 > R_4 = R,$$

$$a_2 = 0,\ a_3 = 0,\ \text{and } a_4 > 0$$

Equations (4) and (5) together with the budget constraints imply the following steady state solution,

$$c_1 = \frac{(n\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta}\left[y_1 + \frac{1}{n}y_2 + \frac{1}{n^2}\left(y_3 + \frac{y_4}{R}\right)\right],$$

$$c_2 = \frac{1}{\gamma}c_1,$$

$$c_3 = \frac{1}{\gamma}c_2,$$

$$c_4 = \beta R c_3,$$

$$b_1 = \frac{(n\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta}\left[\frac{1}{n}y_2 + \frac{1}{n^2}\left(y_3 + \frac{y_4}{R}\right)\right] - \frac{1 + n\gamma + \beta}{1 + n\gamma + (n\gamma)^2 + \beta}y_1,$$

$$b_2 = \frac{n\gamma + (n\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta}\frac{1}{n}\left[y_3 + \frac{y_4}{R}\right] - \frac{1 + \beta}{1 + n\gamma + (n\gamma)^2 + \beta}\left[ny_1 + y_2\right],$$

$$a_4 = \frac{\beta}{1 + \beta}\left[y_3 - nb_2\right] - \frac{1}{1 + \beta}\frac{y_4}{R}.$$

The comparative statics for income ratios in Proposition 3 are given by

$$\frac{\partial b_1}{\partial y_1} = -\frac{1 + n\gamma + \beta}{1 + n\gamma + (n\gamma)^2 + \beta} < 0$$

$$\frac{\partial b_1}{\partial y_2} = \frac{n(\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta} > 0,$$

$$\frac{\partial b_1}{\partial y_3} = \frac{(\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta} > 0,$$

$$\frac{\partial b_1}{\partial y_4} = \frac{(\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta}\frac{1}{R} > 0,$$

$$\frac{\partial b_2}{\partial y_1} = -\frac{1 + \beta}{1 + n\gamma + (n\gamma)^2 + \beta}n < 0$$

$$\frac{\partial b_2}{\partial y_2} = -\frac{1 + \beta}{1 + n\gamma + (n\gamma)^2 + \beta} < 0,$$

$$\frac{\partial b_2}{\partial y_3} = \frac{n\gamma + (n\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta}\frac{1}{n} > 0,$$

and

$$\frac{\partial b_2}{\partial y_4} = \frac{n\gamma + (n\gamma)^2}{1 + n\gamma + (n\gamma)^2 + \beta}\frac{1}{nR} > 0.$$

2 Numerical illustration of dynastic model with commitment

A numerical illustration of the effects of different realistic income profiles on the timing of transfers is shown in the attached figure.[1] Income profile (top panel) and transfer amounts (bottom panel) are displayed relative to y_1, which is the total income during the first period of adult life. The income profile corresponding to case *(iii)*, where transfers are given both early and late, is the steepest, with the peak occurring in period $t = 3$. As shown in the bottom panel of the figure, this increasing income profile allows parents to transfer to their adult children in both periods ($b_1 > 0$ and $b_2 > 0$). These parents not only give to their adult children in both periods, but they also give them larger amounts (bottom panel). The importance of the income profile can be again seen by noticing the case when the child never receives transfers. As seen in the top panel of the figure, when the income profile is almost flat between periods $t = 1$ and $t = 2$, which is typical among those with less than a college degree, parents do not transfer at all. In this case, the income of the child is similar to that of the parent and the marginal cost of transferring is higher than the marginal benefit to the parent. Finally, the income profile corresponding to the early transfer case ($b_1 > 0$) is not as steep as in the case when transfers occur in both periods, while that corresponding to the late transfer case ($b_2 > 0$) displays a ratio y_2/y_1 slightly lower than one, case in which the borrowing constraint is most binding in period $t = 2$.

[1] The figure assumes a period lenght of 20 years, $n = 2$, an annual interest rate of 3%, $\beta = 0.442$ and $\gamma = 0.7$. We used data from the Panel Study of Income Dynamics to verify that the examples of income profiles displayed in the figure are observed in US data.

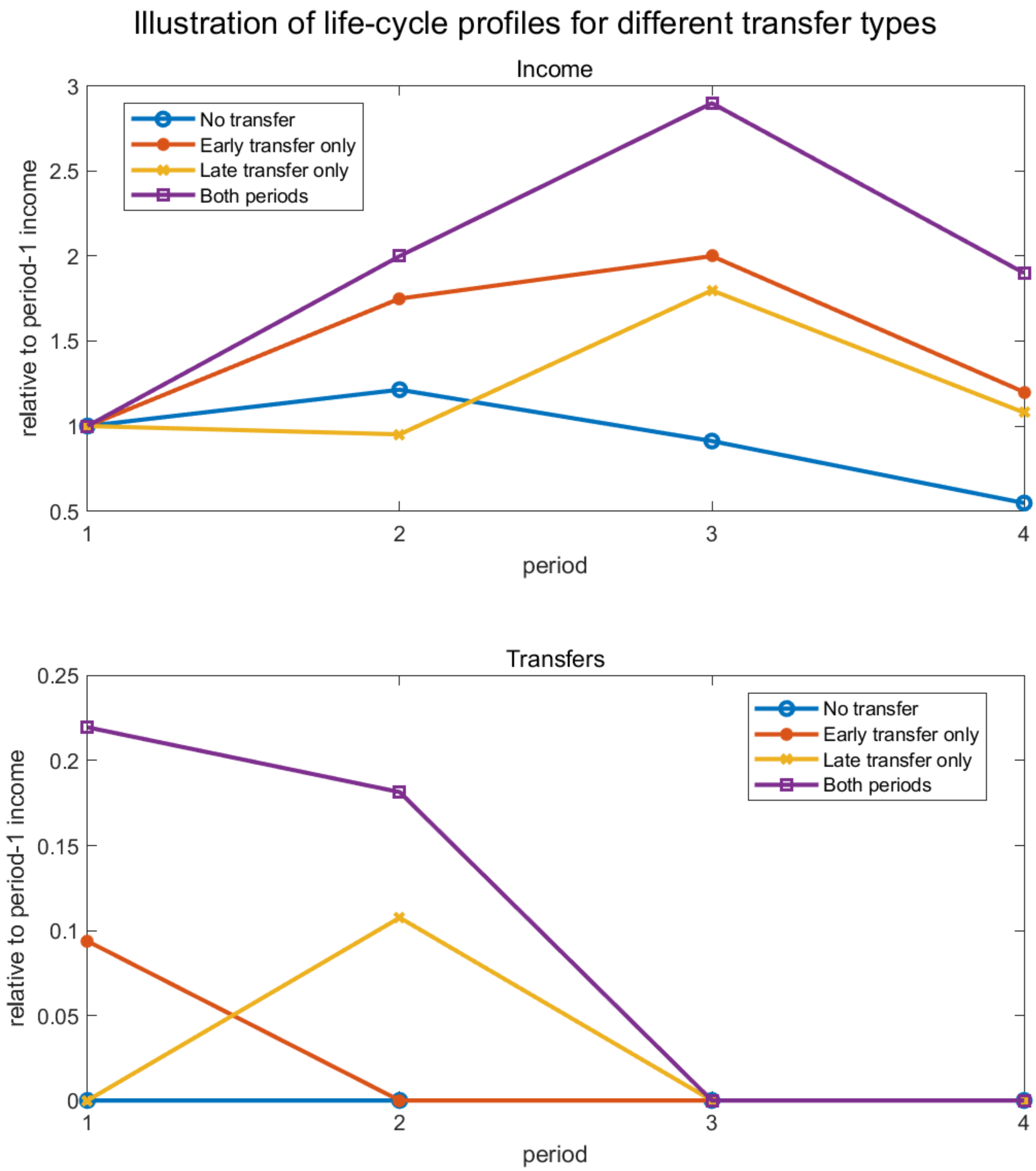
Illustration of life-cycle profiles for different transfer types
Income
relative to period-1 income
period
No transfer
Early transfer only
Late transfer only
Both periods
3
2.5
2
1.5
1
0.5
1
2
3
4
Transfers
relative to period-1 income
period
No transfer
Early transfer only
Late transfer only
Both periods
0.25
0.2
0.15
0.1
0.05
0
1
2
3
4