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Inter-vivos Transfers in Taiwan: Evidence and Theory

Daniel Barczyk and Tzu-Yu Lin*

We study inter-vivos transfers between elderly parents and their children in Taiwan. We find that transfers from children to parents are almost 10 times more common in Taiwan than in the U.S. Our data suggests that this stark discrepancy is due to *filial piety*. The mere fact that children are employed is the most substantial predictor of transfers from children to parents. Similar to the U.S., however, wealthier parents are less likely to receive transfers and more likely to give. Based on these two key features we propose a first step towards a theory of the family in Taiwan. Children are obliged to transfer a fraction of their labor income to parents. Parents have altruistic preferences which can override this social norm. As a result, transfers from children to parents are common but do not occur in wealthier families.

Keywords: inter-vivos transfers, social norm, altruism
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1 Introduction

Intergenerational transfers play an important role in economic theory and in public policy. For example, they have been argued to constitute an important source of consumption insurance, to support investments in human

*The authors are Associate Professor of Department of Economics, McGill University and CIREQ, Assistant Professor of Department of Economics, National Cheng Kung University, Correspondence: Daniel Barczyk, email: daniel.barczyk@mcgill.ca. We would like to thank two anonymous referees for comments and suggestions on an earlier version of this paper. Any remaining errors are our own.

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capital, but also to distort risk-taking and effort-making behavior of potential and actual recipients. In macroeconomics, transfers motivated by altruism in the spirit of Becker (1974) and Barro (1974) are particularly relevant as these can in principle extend the planning horizon of individuals leading to an irrelevancy between taxation and deficit financing, i.e., Ricardian equivalence.[1] However, the vast majority of empirical and theoretical research has focused on the United States (US) which may not be readily applicable to East Asian countries: Family culture and norms differ from those found in western societies in ways that likely matter for economic outcomes. For example, *filial piety* is an important virtue in East Asian countries. It emphasizes the importance of children to respect, care, and support their parents which can manifest itself in providing co-residency, care-giving, and financial support.

Our goal in this paper is to provide a better understanding of how intergenerational transfer behavior in East Asian countries differs from those in western countries. We do this by empirically studying inter-vivos transfers within the family in Taiwan in contrast to those found in the US.[2] Our empirical findings suggest that the key difference is a cultural component in Taiwan of what children are expected to do. We find that in contrast to the US, sons are significantly more likely to be donors and that the employment status of children is the most important predictor of transfers from children to parents. Still, wealthier parents are less frequently transfer recipients and more likely to give which is in line with transfer behavior in the US. Based on our empirical findings we propose a simple two-period non-cooperative model which can serve as a potential building block towards a more complete theory of the family in Taiwan. Our contribution here is to show that a social norm obliging children to support parents financially together with altruistic preferences by parents can in principle generate sufficient transfers from children to parents while simultaneously generating the feature that relatively wealthy parents do not receive transfers.

[1] For a theoretical and computational analysis of the role of altruistically-motivated transfers when the government engages in deficit-financed tax cuts in the U.S. see Barczyk (2016). Cheng, Lin, and Tanaka (2019) is a recent paper studying pension policy reform in Taiwan with a warm-glow bequest motive.

[2] Of course, other types of transfers among family members are also important – bequests, cohabitation, caregiving, transfer of home-ownership – financial transfers are, however, a useful beginning.

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Our empirical analysis makes use of the Taiwan Longitudinal Study on Aging (TLSA) and the Health and Retirement Study (HRS) for the US.[3] The most crucial stylized facts are the following. First, in Taiwan transfers flow primarily from children to parents: 56% of all parent households receive a transfer over a one-year period from at least one child whereas in the US this is the case for only 6% of parent households.[4] Furthermore, these transfers are economically substantial: The unconditional average amount (including parent households with zero transfers) is almost 15% of per capita GDP in Taiwan. Second, in Taiwan there is a statistically significant gender bias: Almost two-thirds of children donors are sons. In the US this fraction corresponds to one-half which is exactly in line with the population representation. Third, controlling for many other factors, the association between the employment status of children and the probability of transfers from children to parents is much greater in Taiwan than the US (19% compared to 1.5%). Fourth, transfers from children to parents in Taiwan appear to be less need-based than we find is the case in the US. Finally, increasingly better-off parents are increasingly less likely to receive transfers.

Our empirical findings suggest that the key difference in explaining transfer behavior in Taiwan is a social norm. Specifically, children – typically sons – face a societal obligation to financially support parents conditional on employment. However, such a norm alone is an inadequate explanation. Otherwise, we should observe transfers from children to parents in all families with working children which is clearly not the case. A potential explanation is that parents are altruistic towards their children and so will override this obligation. The intuition is that altruistic parents take into account the well-being of their children. Thus, even if children work and are culturally obliged to financially support their parents, parents may refuse this transfer, or pay it back in some manner, if their children are not sufficiently well-off relative to themselves.

In order to formalize our empirical findings we propose a non-cooperative two-period model in which children face a social obligation and parents are altruistic. We model the transfer obligation as a proportional "tax" on the

[3]These data sets are well-suited for our research question as they are comparable and focus on the elderly population who tend to have working-age children.

[4]Nonetheless, transfers within the family are also important in the US. However, the directionality is reversed as they occur typically from parents to children (36%). In Taiwan 16% of children receive transfers from parents.

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child household's labor income. The parent household is altruistic towards the child household and cares about its well-being.[5] Parents and children overlap only in the second period. For the second period, we adopt the following timing protocol. First, the child decides on leisure and consumption. Second, the parent chooses consumption and altruistically-motivated transfers (*gifts*) to children. In the first period only the parent exists. The parent faces a consumption-savings trade-off given an endowment; parents have no endowment in the second period.[6] The model successfully generates the feature that less well-off parents obtain transfers from children whereas sufficiently well-off parents do not and in fact provide transfers. The key tension in the model is that the child household conditions its leisure choice on the parents' level of wealth, which the parent chooses in the first period. The reason for this is that parents' wealth together with children's labor income determines whether gifts from parents occur. The tension arises as the possibility of gifts creates an incentive for the child to consume more leisure than is in the interest of the parent. Moreover, the parent anticipates this profligate behavior of the child in the first period which results in a savings policy by the parent which is not strictly increasing in own wealth (under-saving).

We then use our model to get a sense of what the welfare implications would be were the transfer obligation absent. At first thought the answer seems obvious: Since in the model children are not altruistic towards parents and never become parents themselves parents should unambiguously loose and children win. It turns out, however, that this is not the case for all families. In the absence of the norm the threshold by children of when to over-consume leisure increases. Thus, parents engage in larger savings which provides them with consumption-smoothing benefits that outweigh the loss of the transfer from children. In the presence of the norm these higher savings would not have been optimal as they would have induced children to consume even more leisure which is against the interest of the parent.

Related literature. Our paper contributes to a large literature on inter-

[5] Our notion of altruism is in the spirit of Becker (1974) and Barro (1974). The well-being of parents depends on the well-being of their children. That is, if $u(c^p)$ is the utility of the parent household from own consumption and $u(c^k)$ is the utility of the child household from own consumption then the parent's utility function in a static model with altruism is given by $u(c^p) + \alpha u(c^k)$, where $\alpha \in (0, 1]$ is the degree of altruism.

[6] We deliberately abstract away from having children and parents overlap in both periods as it would introduce a consumption-savings choice by children which is not our main focus.

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generational transfers. Much of the research on inter-vivos transfers has focused on the US. One of the most robust findings for the US is that the vast majority of these transfers flow downward from parents to children. Soldo and Hil (1995) and McGarry and Schoeni (1995), for example, find that between 30–40% of elderly parents give financial assistance to a child of at least $500 while less than 10% of parents receive a transfer from a child. On an aggregate level, Gale and Scholz (1994) find that transfers from children to parents is an order of magnitude smaller than those from parents to children. Furthermore, financial transfers have been found to be need-based in nature. Cox and Jappelli (1990), for example, find that transfers usually flow to liquidity-constrained individuals. Soldo and Hil (1995) and McGarry and Schoeni (1995) find that they disproportionately flow to less well-off children. McGarry (1999) finds that transfers are increasing in donor's wealth and labor income and decreasing in recipient's labor income a finding consistent with an altruistic transfer motive by parents. In stark contrast, we find that in Taiwan around 56% of elderly parents receive a transfer from a child whereas only 16% give a transfer. We find that the most important predictor of transfers from children to parents is the employment status of children and less the need of the parent. Nonetheless, similarly to the US, more educated parents (a proxy for permanent income) are less likely to receive transfers from children and more likely to give.

From a theoretical perspective, two of the more common frameworks used to analyze links between households, is the exchange hypothesis (e.g. Bernheim, Shleifer, and Summers (1985); Cox (1987); Cox and Rank (1992)) and altruistic preferences (e.g. Becker (1974); Barro (1974); Becker and Tomes (1986)). The exchange hypothesis theorizes that transfers flow in exchange for services provided by family members, such as, to compensate children for caring for their frail parents or compensating parents for time spend caring for their grandchildren. Through the lens of altruistic preferences, where the well-being of others enters one's own well-being, transfers occur to equalize marginal utility differentials.[7] Our evidence suggests that

[7]Altruism by parents need not lead to compensatory inter-vivos transfers for children within the same family. In fact, Stark and Zhang (2002) show that parents who are equally altruistic towards children transfer more to the child with the highest earning. We also note that a commonly entertained alternative to altruistic preferences is the joy-of-giving/warm glow hypothesis. Here, transfers flow not to compensate differences between family members but because the donor derives utility from the act of giving. Thus, rich children may also

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neither of these two commonly used paradigms is satisfactory to explain the large occurrence of financial transfers from children to parents. In line with the exchange hypothesis, we find that parents are indeed compensated for looking after grandchildren. However, the importance of this channel is nowhere near enough to explain the vast majority of child-to-parent transfers. Similarly, these upward transfers are hard to reconcile with altruism by children as characteristics such as gender of children and their employment status matter substantially more than their education level (a proxy for permanent income). Parental education, on the other hand, does reduce the probability of receiving a transfer fairly substantially which is consistent with altruistic preferences by parents.

In order to reconcile our empirical regularities for the case of Taiwan we propose a two-period model in which children face a norm to provide financial transfers to parents upon employment and parents have altruistic preferences. Our setting is similar to those found in Lindbeck and Weibull (1988) and Bruce and Waldman (1990). The key difference is that our focus is on transfers from children to parents by modeling a transfer rule from children to parents. Altruism by parents serves as a way to endogenously undo the transfer from the child. Similarly to these papers, our model features a *Samaritan's dilemma* in the form of the child over-consuming leisure in anticipation of transfers (instead of under-saving).

Given the widely-held belief that the family plays an important role in Taiwan, surprisingly little is known on financial transfers with only a few exceptions.[8] In some earlier work, Lo (1988) studies financial transfers between parents and children using survey data collected by the Multidisciplinary Research of Gerontology. The author shows that children's socioeconomic characteristics, parent's economic characteristics and parent-child co-residence are important determinants of transfers from children to parents which is in line with our findings. We go beyond this characterization by comparing Taiwanese transfer data to that from the US in an effort to

receive transfers. Warm glow is though mostly used to rationalize bequests and not inter-vivos transfers.

[8]Other forms of intergenerational transfers such as co-residence, caregiving, household chores, and material goods have been studied more widely; see Chattopadhyay and Marsh (1999), Lin et al. (2003) and Lee and Chuang (2003). Another strand of studies has focused on the effect of changes of transfer systems on life-cycle wealth; see Lee, Mason, and Miller (2003) and Mason and Lee (2013).

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identify key differences and to provide an underlying theory. Chen (1990) and Lee, Parish, and Willis (1994) use data from the 1989 Taiwan Family and Women Survey to investigate motives for intergenerational transfers and find that the altruistic model is most consistent with the data. Furthermore, similar to our societal norm, Lee, Parish, and Willis (1994) argue that children face a potentially indefinite obligation to support parents in need. In contrast, we argue that the norm to give primarily depends on employment by children and that better-off parents override it due to altruism.[9] The TLSA has been used in only very few studies regarding intergenerational transfers. Lin and Chiao (2013) focus on the connection between intergenerational relations and the subjective economic strain of elderly parents but not on financial transfers. Deng (2005) explores bequest behavior of the elderly in Taiwan and finds that parents leave higher bequests if they receive positive emotional support (i.e., feel loved and cared for by their children), a finding which is in line with the exchange-motive hypothesis.

The absence of empirical research on family behavior in Taiwan makes it challenging to formulate economic models where the response of the family matters. Barczyk and Kredler (2018), for example, show that the role of the family is critical when studying long-term-care policies in the US. Doing such an exercise for Taiwan would be highly policy-relevant. However, it would require an empirical understanding of the landscape of family interactions and a quantitatively credible model. In this respect we see the contribution of our paper as a first step towards a more complete theory of the family in Taiwan.[10]

The remaining paper is structured as follows. Section 2 provides our empirical analysis of inter-vivos transfers in Taiwan and the U.S. Section 3 presents the theoretical model and a counterfactual experiment where we study the erosion of the transfer obligation. Section 4 concludes.

[9] Relatedly, using data from the Panel Study of Family Dynamics (PSFD), Chu and Yu (2007) finds that social pressure matters for children's decision to give financial support to their parents.

[10] Barczyk and Kredler (2014b) and Barczyk and Kredler (2014a) provide a framework to build more realistic models of the family. However, they do not model endogenous labor supply and a transfer obligation which our results highlight to be important.

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2 Empirical framework

In our empirical work we make use of the Taiwan Longitudinal Study on Aging (TLSA) and the Health and Retirement Study (HRS) for the US. We begin by briefly describing these data sets.

2.1 Data description

The TLSA (previously known as the Survey of Health and Living Status of the Elderly in Taiwan) is a panel survey which in collaboration with the Institute of Gerontology at the University of Michigan originated in 1989. Up to date, a total of 8 surveys were conducted, in 1989, 1993, 1996, 1999, 2003, 2007, 2011 and 2015. As of 1996, the survey is nationally representative of the population aged 50 and above. All waves except the last one are currently available. However, the structure before 1996 is sufficiently different that the earlier years are not suitable for this paper. Also, due to newly established privacy policies by the government, key variables, most notably financial transfers, are no longer available as of the 2007 survey. We therefore limit our sample to waves 3, 4, and 5 (1996, 1999 and 2003).

Overall, the TLSA is very well-suited for our research question. It contains detailed information on whether financial transfers over the past year among family members occurred and if so how much was received or given. It contains several economic variables of interest for respondents (e.g. education, wealth) and to a more limited extent for their children (e.g. education, employment). The survey takes great care to distinguish variables by living arrangements, e.g. co-residency, which from an ex-ante perspective seems especially crucial in the Taiwanese context. Finally, the TLSA has a high response rate – it varies between 79% and 92% for the 1996–2003 period – which is reassuring that the sample is in fact a good representation of the population aged 50 and above.

The HRS is a well-established and well-known panel survey representative of Americans aged 50 and above conducted by the University of Michigan. Indeed, the HRS has been so successful that a very similar format has been adopted by researchers in many other countries including those of the TLSA. The HRS contains detailed information on many dimensions relevant to health and economics including several forms of intergenerational transfers. It also collects a sizeable amount of data on respondents' children. It has been fielded every two years since 1992. In our empirical analysis

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we use waves from 1998 to 2014. The reason we leave out earlier years is because the quality of the data (e.g. measurement of wealth) has improved after the first few waves. Furthermore, from 1998 on the HRS has also interviewed elderly who reside in a nursing home. This segment of the elderly population is important to our analysis since members of this group may be especially likely to receive transfers from their children.

2.2 Respondent characteristics

Table 1 provides an overview of basic characteristics of respondents in the TLSA and the HRS. Taiwanese parents tend to have more children and coreside with a child(ren) much more frequently than parents in the US. Furthermore, elderly Americans have substantially more education than their Taiwanese counterparts. In Taiwan, around 7 out of 10 elderly have at most a primary school education, whereas, in the US, this number is only around 1 out of 10. Similarly, income and wealth in Taiwan is much lower than in the US even after taking purchasing power into account. What is most striking, is the stark discrepancy in the fraction of respondents who have received a financial transfer from at least one child: Transfers from children to parents are almost 10 times more common in Taiwan than in the US. Moreover, the average transfer amount is far from trivial. Among those parents who obtained financial support from children, the average transfer over a one-year period corresponds to about one-fourth of GDP per capita in Taiwan for this period.[11] The corresponding transfer in the US is less than half in size from that in Taiwan. Figure 7 in the data appendix shows the empirical distribution of transfer amounts conditional on receiving and Table 8 provides percentiles of the transfer distribution for every survey year. Finally, Table 1 shows that inter-vivos transfers in the US also matter but mainly from parents to children.

2.3 Recipients and donors

We now focus on families in which transfers from children to parents flow. Table 2 differentiates between respondents depending on whether or not

[11] The average PPP-adjusted GDP per capita for 1996, 1999 and 2003 is $20,511.

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they receive transfers from children.[12] In both Taiwan and the US, transfer recipients tend to be older, more likely to be single, and have lower levels of education, income and wealth. In the US, co-residency with children is substantially higher among this group as is residency in a nursing facility. Overall these numbers suggest that transfer recipients in both countries tend to be worse off than those who do not receive transfers and that this is even more so the case in the US.

A shared qualitatively similar pattern as is the case for parents in these countries does not arise for the associated children households. In the US, children households of recipient and non-recipient parents are surprisingly similar. Their level of education is about equal as is their income and the fraction which is working. In contrast, children households in Taiwan tend to have a lower level of education and are more likely to be working (the TLSA does not collect information on income for children). Moreover, according to the son-to-daughter ratio, a Taiwanese parent who receives a transfer tends to have more sons than his counterpart: 1.13 (=0.53/0.47) vs. 1.08 (=0.519/0.481), a difference which is statistically significant at the 5% level. Although an American parent who is financially supported by their children also tend to have more sons (a son-to-daughter ratio of 1.03 and 1.02, respectively), the difference is not statistically significant. These numbers suggest a fundamental difference in how transfers are determined in Taiwan compared to the US.

We now further zero in on children who provide financial support to their parents and contrast them to their siblings who do not. Table 3 shows the comparison. What these countries have in common is that donors tend to have fewer children, fewer siblings, and a higher education level. The most striking fact is that donors in Taiwan are much more likely to be sons whereas in the US both genders are about equally represented in the donor group. The tilting towards sons points strongly to a cultural element in the

[12] In Table 2, kid household related variables are calculated as follows:

$$\frac{1}{N \times \mathrm{Card}(T)} \sum_{t \in T} \sum_{i=1}^{N} \frac{\sum_{j=1}^{M_i} \mathbf{x}_{ijt}}{M_i},$$

where $\mathbf{x}$ = [Age, Education, Gender of children, # children, Working, Income range], t is the year of survey conducted, i indicates the ith respondent, j identifies the jth child of a particular respondent, M_i is the number of children born to the ith respondent, and $\mathrm{Card}(T)$ is the cardinal number of the set T.

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Table 1: Characteristics of respondents

Sample period	TLSA (1996–2003)	HRS (1998–2014)
Age	67.3	68.4
Gender (1=male)	51.5%	36.9%
Marital status (1=married)	71.6%	52.5%
# children	4.2	3.4
Self-reported health	2.8	2.9
Nursing home	0.9%	2.8%
Living with children	72.8%	28.7%
Gender of children (1=male)	52.5%	50.7%
Education		
No formal education (< 6)	42.3%	4.3%
Primary school (6–8)	34.0%	7.8%
Junior High school (9–11)	9.1%	17.9%
High school (12–15)	11.0%	55.8%
College or above (16+)	3.6%	14.1%
Income	14.0K	53.8K
Wealth	175.1K	370.0K
Financial support from children	**56.1%**	**6.4%**
Amount	2,813.0	138.6
Amount (conditional)	5,180.6	2,190.3
Financial support to children	15.8%	36.0%
Amount	1,636.1	1,961.3
Amount (conditional)	10,615.5	5,479.7
Observations	14,284.0	107,910.0
# respondents	6,626.0	19,055.0

Note: Sample is based on respondent households with children. Income, wealth and the transfer amount are PPP adjusted and reported in US dollars. Self-reported health uses a five-category response scale: 1 = excellent; 2 = very good; 3 = good; 4 = fair; 5 = poor. Gender and education are time-invariant variables. Gender of children represents the average of the proportion of the respondent's children born male.

determination of transfers such as a form of obligation to give back to the parent which has traditionally been placed on the son. Furthermore, the fact that donor children in Taiwan are substantially more likely to be working compared to the US where this difference is relatively small suggests that the

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Table 2: Characteristics of families with child-to-parent transfers

Characteristic	TLSA Recipient parent (56.1%)	TLSA Non-recipient parent (43.9%)	All parents
Parent household:			
Age	68.8	65.3	67.3
Gender (1=male)	46.2%	58.2%	51.5%
Marital status (1=married)	67.8%	76.3%	71.5%
Education	**4.2**	**6.2**	5.1
Income	7.4K	22.0K	14.0K
Wealth	136.8K	224.1K	175.1K
Self-report health	2.9	2.7	2.8
Nursing home	0.8%	1.1%	0.9%
Living with children	73.5%	71.9%	72.8%
Number of children	4.5	3.7	4.2
Help to take care of grandchildren	21.7%	14.4%	18.5%
Kid household:			
Age	40.2	35.3	38.1
Education	**10.6**	**11.6**	11.0
Gender of children (1=male)	53.0%	51.9%	52.5%
# children	2.2	1.7	2.0
Working (1=employed)	**72.1**%	**62.8**%	68.0%
Income range	na	na	na

Characteristic	HRS Recipient parent (6.4%)	HRS Non-recipient parent (93.6%)	All parents
Parent household:			
Age	70.0	68.2	68.4
Gender (1=male)	23.7%	37.6%	36.7%
Marital status (1=married)	31.6%	53.8%	52.3%
Education	**11.5**	**12.2**	12.2
Income	28.1K	55.7K	53.9K
Wealth	139.5K	388.6K	372.4K

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Table 2: Characteristics of families with child-to-parent transfers (Cont.)

	HRS		
Characteristic	Recipient parent (6.4%)	Non-recipient parent (93.6%)	All parents
Self-reported health	3.3	2.9	2.9
Nursing home	5.6%	2.4%	2.6%
Living with children	44.2%	27.3%	28.4%
Number of children	3.7	3.4	3.4
Help to take care of grandchildren	12.7%	10.9%	11.0%
Kid household:			
Age	43.1	41.2	41.4
Education	**13.6**	**13.7**	13.7
Gender of children (1=male)	51.2%	50.6%	50.7%
# children	1.7	1.7	1.7
Working (1=employed)	**78.4**%	**78.7**%	78.7%
Income range	3.0	2.9	2.9

Note: Sample is based on respondent households with children. Education is the number of years of education completed. Income, wealth and amount of transfer are PPP adjusted and reported in US dollars. Self-reported health uses five-category response scales: 1 = excellent; 2 = very good; 3 = good; 4 = fair; 5 = poor. Values of kid household related variables are means. Children's income is categorized into seven bracket ranges: 1 = less than 10k; 2 = 10–35k; 3 = 35–70k; 4 = 70–100k; 5 = 35k+; 6 = 70k+; 7 = 100k+.

norm of giving is closely tied to the employment status of children.

2.4 Time trends

Finally, we study the evolution of transfer-recipients over time and across cohorts. In order to maintain the same sample over time, we only include those who were interviewed in 1996 in the TLSA and those who were interviewed in 1998 in the HRS. In order to isolate cohort effects, we further divide respondents into 7 age groups according to their age in the beginning of the sample period.

Figure 1 plots the percentage of parents who receive transfers from chil-

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Table 3: Characteristics of donor children

Characteristic	Kids give	Kids not give	All kids
Kid donor household (TLSA):			
Age	40.9	41.3	41.1
Gender (1=male)	**65.3%**	**32.7%**	51.1%
# children	2.2	2.4	2.3
Siblings	5.0	5.5	5.2
Living with parents	32.7%	19.5%	26.9%
Education	10.8	9.6	10.2
Working (1=employed)	82.5%	55.3%	70.6%
Income range	na	na	na
Kid donor household (HRS):			
Age	43.0	41.4	42.0
Gender (1=male)	**50.2%**	**51.3%**	50.8%
# children	1.6	1.9	1.8
Siblings	4.3	5.7	5.1
Living with parents	21.8%	12.8%	16.0%
Education	13.6	13.0	13.3
Working (1=employed)	83.3%	75.9%	78.6%
Income range	3.4	2.7	3.0

Note: Sample is based on parent households receiving financial transfers from their children. Education is the number of years of education completed.
Children's income is categorized into seven bracket ranges: 1 = less than 10k; 2 = 10–35k; 3 = 35–70k; 4 = 70–100k; 5 = 35k+; 6 = 70k+; 7 = 100k+.
Variables are calculated as follows:

$$\frac{1}{N \times \mathrm{Card}(T)} \sum_{t \in T} \sum_{i=1}^{N} \mathbf{x}_{it},$$

where $\mathbf{x}$ = [Age, Gender, # children, Siblings, Living with parents, Education, Working, Income range], t is the year of survey conducted, Card(T) is the cardinal number of the set T, i indicates the ith child, N is either the number of children who provide financial support to their parents, or the number of children who do not give but their parents receive transfers from other children.

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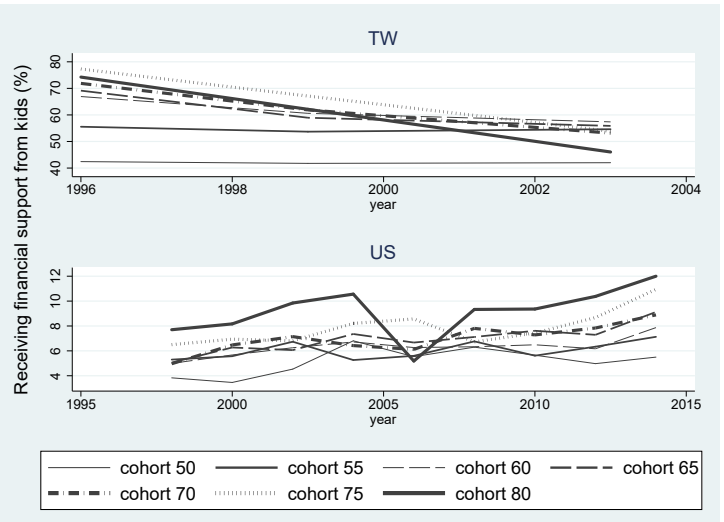


Figure 1: Time trend by various cohorts

dren by cohorts (e.g. 'cohort 50' includes respondents who were of age 50–54 in 1996 in Taiwan and in 1998 in the US, etc.). In both countries members in older cohorts are more likely to be transfer-recipients. However, cohort effects are more substantial in Taiwan than in the US. Moreover, as members of the older cohorts age we observe a relatively steep decline in the fraction of transfer recipients in Taiwan but not in the US where it tends to increase over age. For example, the oldest cohort in Taiwan experiences the strongest downward trend with the fraction plummeting from 75% to 46% whereas in the US this fraction increases from 8% to 12%. This suggests that financial transfers from children to parents in Taiwan are less need-based than in the US and provides further evidence that a cultural element is at work in Taiwan which is absent in the US.

2.5 Partial correlations

Our empirical regularities highlight important differences in transfer behavior between Taiwan and the US. We now further investigate how these differences play out when controlling for other variables. In order to do so, we estimate linear probability models. The dependent variable is a binary indicator which equals one if parents received financial transfers from any of their children and zero otherwise. We control for a number of factors

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related to demographic and socioeconomic variables such as cohort, education level,[13] income, wealth, health, living arrangement, number of children, and time. Variables regarding to characteristics of children such as the child gender ratio (number of sons over total number of children in a family), education and employment are also included.[14] We also include whether respondents helped to take care of their grandchildren since this is a potentially important form of exchange for financial support from adult children.

Table 4 contains our estimation results. Columns (1) and (2) refer to the TLSA and the HRS, respectively. In order to highlight the statistical significance of differences across these two countries, column (3) shows the estimation results when pooling both countries together and including an interaction term with a country dummy (the country dummy equals one for Taiwan). Broadly speaking, our previously documented unconditional facts remain intact. If anything, once controlling for other factors, previously found differences become even more pronounced.

The most important predictor of transfers in Taiwan is the employment status of children whereas the coefficient on children's education (a proxy for income) is comparatively tiny. In the US, on the other hand, both of these coefficients are rather small but fairly similar in size. The fact that the education level of children in Taiwan matters so little in contrast to the employment status suggests that altruism by children toward parents is not the main driving force behind transfers. Were altruism by children the central driving force we would expect to see a much larger coefficient on education. Instead, the estimation attributes the main importance to the mere fact that more children in a family are employed.

From the respondent's level of education we can see a steep negative gradient in the effect on the probability of receiving transfers which is consistent with the notion of altruism by parents. The sizeable negative coefficient on

[13] Education level is classified into four categories according to years of education. Different classifications are used between Taiwan and the U.S. In Taiwan, the classification is as follows: low $= 0 - 6$; middle $= 7 - 9$; middle-high $= 10 - 12$; high if years of education are no lower than 13. The classification for the U.S. is as follows: low if years of education are less than 12; middle $= 12$; middle-high if years of education are greater than 12 but less than 16; high otherwise.

[14] Children's education level is also classified into four categories according to years of education. The classifications are the same as in Footnote 13. Moreover, as a respondent may have more than one child, we use the average employment status to measure the employment status of children, which is a number between zero and one.

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Table 4: Linear probability model

	(1) Taiwan		(2) US		(3) Pooled	
	$\hat{\beta}$	t−*stat*	$\hat{\beta}$	t−*stat*	$\hat{\beta}$	t−*stat*
education						
middle	−0.065	−4.04***	−0.002	−0.61	−0.063	−3.89***
middle-high	−0.112	−6.33***	−0.004	−1.42	−0.108	−6.05***
high	−0.167	−8.62***	−0.001	−0.26	−0.166	−8.44***
income	−0.044	−25.87***	−0.015	−14.43***	−0.029	−14.80***
wealth	−0.001	−1.60	−0.004	−15.15***	0.003	3.21***
self-reported health	0.001	0.15	0.011	10.59***	−0.010	−2.38**
nursing home	−0.069	−1.28	0.050	6.39***	−0.119	−2.17**
number of children	0.037	13.41***	0.002	4.87***	0.035	12.37***
child gender ratio	**0.041**	2.22**	**0.002**	0.79	**0.038**	2.08**
max. education level of children	0.010	1.78*	0.019	15.00***	−0.009	−1.66*
employment status of children	**0.189**	12.18***	**0.015**	4.45***	**0.174**	10.98***
caregiving to grandchildren	0.073	6.24***	0.027	6.90***	0.046	3.73***
cohort						
55	0.051	3.07***	0.006	2.20**	0.045	2.64***
60	0.087	4.95***	0.003	0.95	0.084	4.72***
65	0.111	6.66***	0.009	2.77***	0.102	6.00***
70	0.111	6.65***	0.007	2.14**	0.104	6.08***
75	0.138	7.02***	0.011	2.71***	0.127	6.33***
80	0.104	4.30***	0.015	3.45***	0.088	3.59***
year						
1999	−0.040	−3.80***			−0.040	−3.80***
2003	−0.071	−6.27***			−0.071	−6.27***
2000			0.007	2.10**	0.007	2.10**
2002			0.013	4.04***	0.013	4.04***
2004			0.017	4.90***	0.017	4.90***
2006			0.013	3.74***	0.013	3.74***
2008			0.018	4.95***	0.018	4.95***
2010			0.014	3.70***	0.014	3.70***
2012			0.014	3.59***	0.014	3.59***
2014			0.024	5.81***	0.024	5.81***
TW					0.463	12.88***
observations	10,531		73,320		83,851	
R^2	0.146		0.026		0.311	

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

respondents' income further suggests the notion of altruistic parents. All else equal, more highly educated parents with relatively high incomes are substantially less likely to receive transfers in the first place or obtain such a transfer only for a short period of time which is not captured by the length of our data.

Moreover, we observe that cohort effects are much larger in Taiwan than in the US suggesting that individuals born at different times are inherently different when it comes financial transfers from children. Of course, there are several possible interpretations of the cohort effect, however, one that is

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consistent with other features of the data is that financial transfers from children to parents is driven by a social norm and that this norm is less prevalent among younger generations. Direct evidence for a cultural element in Taiwan for the determination of transfers is the statistical significance of the child gender ratio (the number of sons over the total number of children in a family) even after controlling for children's education (we use the highest level of education among children), employment status among children (here we take the average across children), and the number of children. Furthermore, our estimates on year shows that parents in Taiwan are less likely to receive transfers as they age. This is in stark contrast to the US and suggests that the nature of transfers in Taiwan is less based on needs than in the US. In line with this interpretation are the estimates on self-reported health and nursing home status which are statistically significant only in the US.

Overall our evidence suggests that the large occurrence of child-to-parent transfers in Taiwan is primarily driven by a social norm imposed on children and altruism by parents. To a first approximation, the social norm might be formulated in the following way: children (one child, often a son) face(s) the obligation to provide financial support to their parents conditional on employment. The duration of this obligation depends on the economic well-being of parents. More economically well-off parents receive transfers for a shorter period of time, or not at all, than economically worse-off parents. Thus, while everyone is aware of the moral obligation, parental altruism can make it irrelevant depending on the economic conditions of parents and children.

In closing, we observe that caregiving to grandchildren is also associated with a substantially higher probability of cash transfers from adult children to parents suggesting that some transfers flow in part to compensate parents for their time. Indeed, in Table 9 of the data appendix we also consider other possibilities such as the association between parents receiving financial transfers in exchange for having provided an early bequest or home ownership. In all cases we conclude that transfers from children as a form of compensation to parents is insufficient to account for the large fraction of parent households receiving transfers.

2.5.1 Robustness Checks

In order check the robustness of our empirical results we estimate two alternative model specifications. First, to control for individual-specific effects

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Table 5: Linear probability model with random effects

	(1) Taiwan		(2) US		(3) Pooled	
	$\hat{\beta}$	t−*stat*	$\hat{\beta}$	t−*stat*	$\hat{\beta}$	t−*stat*
education						
middle	−0.068	−3.59***	−0.000	−0.08	−0.072	−3.71***
middle-high	−0.117	−5.62***	−0.011	−2.62***	−0.110	−5.10***
high	−0.172	−7.82***	−0.011	−2.14**	−0.167	−7.25***
income	−0.040	−23.45***	−0.008	−8.27***	−0.029	−14.23***
wealth	−0.001	−1.38	−0.003	−8.90***	0.002	1.68*
self-reported health	0.000	0.10	0.008	6.88***	−0.008	−1.67*
nursing home	−0.053	−0.96	0.051	6.01***	−0.078	−1.42
number of children	0.037	12.03***	0.002	3.10***	0.035	10.91***
child gender ratio	**0.042**	2.04**	**0.000**	0.00	**0.046**	2.16**
max. education level of children	0.010	1.65*	0.016	8.69***	−0.006	−0.97
employment status of children	**0.183**	11.14***	**0.013**	3.30***	**0.162**	9.23***
caregiving to grandchildren	0.073	6.28***	0.021	4.78***	0.052	4.03***
cohort						
55	0.052	2.74***	0.007	1.62	0.045	2.31**
60	0.090	4.53***	0.005	1.14	0.087	4.24***
65	0.114	5.98***	0.011	2.21**	0.107	5.35***
70	0.114	6.01***	0.011	2.12**	0.104	5.22***
75	0.140	6.29***	0.016	2.70***	0.125	5.39***
80	0.106	3.91***	0.023	3.72***	0.083	2.97**
year						
1999	−0.043	−4.44***			−0.046	−4.69***
2003	−0.074	−6.87***			−0.076	−7.04***
2000			0.075	5.47***	0.007	2.48**
2002			0.083	5.97***	0.014	4.76***
2004			0.086	6.16***	0.017	5.52***
2006			0.083	5.92***	0.015	4.52***
2008			0.088	6.30***	0.020	5.92***
2010			0.084	6.02***	0.016	4.66***
2012			0.085	6.04***	0.017	4.63***
2014			0.094	6.63***	0.026	6.59***
TW					0.474	12.15***
observations	10,531		73,320		83,851	
R^2	0.146		0.025		0.309	

Note: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

we estimate the linear probability model when also including random effects. The results are shown in Table 5. Second, in order to address the concern that probabilities in the linear probability model do not need to lie between zero and one Table 6 shows the estimation results when using a random effect probit model instead. As we can see our main findings are robust to these alternative specifications.

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Table 6: Random effects probit model

	(1) Taiwan		(2) US		(3) Pooled	
	$\hat{\beta}$	t−$stat$	$\hat{\beta}$	t−$stat$	$\hat{\beta}$	t−$stat$
education						
middle	−0.207	−3.26***	−0.025	−0.63	−0.214	−2.64**
middle-high	−0.368	−5.14***	−0.144	−3.27***	−0.295	−3.24**
high	−0.558	−6.95***	−0.188	−3.24***	−0.471	−4.44***
income	−0.165	−16.06***	−0.088	−12.09***	−0.087	−6.47***
wealth	−0.003	−1.07	−0.025	−11.66***	0.022	5.60***
self-reported health	−0.004	−0.26	0.108	8.49***	−0.113	−5.40***
nursing home	−0.202	−1.09	0.365	6.24***	−0.526	−2.46**
number of children	0.127	11.28***	0.035	5.18***	0.110	7.75***
child gender ratio	**0.131**	1.82*	**0.039**	0.82	**0.116**	1.25
max. education level of children	0.044	2.16**	0.160	7.83***	−0.107	−3.54***
employment status of children	**0.635**	10.90***	**0.135**	3.02***	**0.565**	7.21***
caregiving to grandchildren	0.257	6.23***	0.261	5.12***	0.029	0.43
cohort						
55	0.169	2.62***	0.091	1.57	0.109	1.20
60	0.292	4.29***	0.066	1.13	0.277	2.93**
65	0.377	5.68***	0.117	1.92*	0.323	3.42***
70	0.367	5.62***	0.132	2.10**	0.294	3.11**
75	0.461	5.91***	0.197	2.96***	0.340	3.14**
80	0.333	3.59***	0.276	4.10***	0.117	0.95
year						
1999	−0.123	−3.43***			−0.142	−3.56***
2003	−0.233	−6.15***			−0.263	−6.25***
2000			0.074	2.15**	0.070	2.12**
2002			0.164	4.57***	0.157	4.51***
2004			0.203	5.48***	0.195	5.41***
2006			0.171	4.25***	0.162	4.15***
2008			0.232	5.79***	0.221	5.69***
2010			0.196	4.61***	0.185	4.50***
2012			0.199	4.53***	0.188	4.42***
2014			0.301	6.75***	0.288	6.67***
TW					2.602	12.86***
observations	10,531		73,320		83,851	
R^2	0.226		0.035		0.239	

Note: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

3 A model of intergenerational transfers

In this section we propose a simple two-period non-cooperative model of the family in Taiwan which formalizes two key features of the data. First, our empirical evidence points to the importance of a social norm which can be phrased as follows: Upon employment children face the obligation to give back to their parents. Second, our evidence shows that better-off parents are less likely to receive transfers and in fact are more likely to give transfers, a

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finding which is consistent with altruism by parents. In order to reconcile both of these features our model includes a social norm in the presence of parental altruism. The model successfully generates the empirical observation that transfers from working children to better-off parents do not need to occur despite the presence of a social norm that everyone adheres to.

3.1 The model

There are two time periods: period zero and period one. A family consists of a parent and a child household. Importantly, each household makes decisions unilaterally. There are two key ingredients. (1) A norm (moral obligation) prescribes that the child household transfers fraction τ of labor income y to the parent household; we call such a transfer an obligation tax and the associated fraction an obligation tax rate. Labor supply is elastic. (2) The parent household is altruistic towards the child household. It endogenously chooses transfers to the child household which we refer to as gifts, g. In order to have the simplest possible model that captures all the relevant features, only the parent exists in period zero and there is no uncertainty.

The timing is as follows. In period zero, the parent is endowed with $a_0 > 0$ and chooses consumption and savings. In the first stage of period one, the child chooses leisure l out of the time endowment t and supplies the remaining hours $t - l$ to market work at the wage rate w. In the second stage of period one, the parent chooses a non-negative gift, $g \geq 0$. Finally, consumption takes place and the game is over.

We solve the model by backward iteration. In the final stage of period one all resources are consumed. In the second stage of period one the parent, taking as given the child's leisure choice l, chooses gifts

$$\begin{aligned} \max_{g \geq 0} \ & \left\{ u(c_1^p) + \alpha \left[u(c_1^k) + v(l) \right] \right\}, \qquad (1) \\ \text{s.t. } c_1^p &= Ra_1 + \tau y - g, \\ c_1^k &= (1 - \tau) y + g, \\ y &= (t - l) w. \end{aligned}$$

The parent's altruism is expressed as valuing the child's utility from consumption and leisure, $u(c_1^k) + v(l)$, at $\alpha \in (0, 1]$. Parent wealth is a_1 and R is the gross risk-free interest rate. The obligation tax from the child household is fraction τ of labor income y.

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In the first stage of period one the child takes as given parent's savings a_1 carried over from the previous period and the parent's next-stage gift strategy, $g(a_1, y)$, and chooses leisure in the following way,

$$\begin{aligned} &\max_{l\in[0,t]} \left\{u\left(c_1^k\right) + v(l)\right\}, \\ &\text{s.t. } c_1^k = (1-\tau)y + g(a_1, y), \\ &\qquad y = (t-l)w. \end{aligned} \tag{2}$$

In period zero the parent takes as given the child's next-period leisure strategy, $l(a_1)$, when choosing savings,

$$\begin{aligned} &\max_{a_1\in[0,a_0]} \{u(c_0^p) + \beta\left[u(c_1^p) + \alpha(u(c_1^k) + v(l(a_1)))\right]\}, \\ &\text{s.t. } c_0^p = a_0 - a_1, \\ &\qquad c_1^p = Ra_1 + \tau y(a_1) - g(a_1, y(a_1)), \\ &\qquad c_1^k = (1-\tau)y(a_1) + g(a_1, y(a_1)), \\ &\qquad y(a_1) = (t - l(a_1))w. \end{aligned} \tag{3}$$

3.2 Logarithmic utility

For transparency it is useful to consider the case of logarithmic utility. Specifically, utility from consumption is $u(c) = \log(c)$ and utility from leisure is $v(l) = \gamma \log(l)$, $\gamma > 0$.

3.2.1 Period one

From the parent's problem (1), the first-order condition (FOC) with respect to gifts is

$$\frac{1}{c_1^p} \geq \alpha \frac{1}{c_1^k}, \quad \text{with equality if } g > 0.$$

If own marginal utility of consumption exceeds the altruistic value of the other gifts are zero. Otherwise, gifts are positive and equalize marginal utilities. The gift function is given by

$$\begin{aligned} g(a_1, y) &= \max\left\{0, \frac{\alpha\left(Ra_1 + \tau y\right) - (1-\tau)y}{1+\alpha}\right\}, \\ \text{s.t. } \frac{\partial g}{\partial y} &= \begin{cases} -\frac{1}{1+\alpha} + \tau & \text{if } g > 0, \\ 0 & \text{if } g = 0. \end{cases} \end{aligned}$$

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$\partial g/\partial y \leq 0$ if $(1/1+\alpha) > \tau$. As long as the tax is not excessive, gifts are non-increasing in labor income (non-decreasing in leisure). Consumption in the final period is given by

$$c_1^p = \begin{cases} Ra_1 + \tau y_{aut} & \text{if } g = 0, \\ \frac{Ra_1 + y_{wp}}{1+\alpha} & \text{if } g > 0, \end{cases} \qquad c_1^k = \begin{cases} (1-\tau) y_{aut} & \text{if } g = 0, \\ \frac{\alpha(Ra_1 + y_{wp})}{1+\alpha} & \text{if } g > 0, \end{cases}$$

where y_{aut} is child's labor income in the autarkic region (no-gift region) and y_{wp} is income in the wealth pooling region (gift region). When gifts are positive, consumption is proportional to total family resources, $Ra_1 + y_{wp}$, with factors of proportionality $1/(1+\alpha)$ for parents and $\alpha/(1+\alpha)$ for children. We denote the respective consumption levels by c_{aut}^p, c_{wp}^p, c_{aut}^k and c_{wp}^k.

From the child household's problem (2), the FOC for leisure is given by

$$\frac{1}{c_1^k}\left(1 - \tau + \frac{\partial g}{\partial y}\right) w \leq \frac{\gamma}{l}, \quad \text{with equality if } l < t. \tag{4}$$

It states that in addition to the after-tax wage, the marginal cost of leisure is also affected by the change in gifts, $-(\partial g/\partial y)w$. Since the gift increases in leisure, the marginal cost of leisure is lowered. When gifts are inoperative, $\partial g/\partial y = 0$, the usual trade-off obtains. Leisure and labor income in the autarkic region are given by

$$l_{aut} = \frac{\gamma t}{1+\gamma}, \quad y_{aut} = \frac{y_{max}}{1+\gamma}, \quad y_{max} = wt.$$

In the wealth pooling region leisure and labor income are given by

$$l_{wp}(a_1) = \min\left\{t, \frac{\gamma\,(Ra_1 + y_{max})}{(1+\gamma)w}\right\},$$
$$y_{wp}(a_1) = \max\left\{0, \frac{y_{max} - \gamma Ra_1}{1+\gamma}\right\}.$$

The child's strategy depends on parent's savings only in the case of wealth pooling. In the case of autarky, leisure and income are entirely determined by model parameters.[15]

We denote the period-one value functions in the autarkic and wealth pooling regions for children and parents by V_{aut}^k, $V_{aut}^p(a_1)$, $V_{wp}^k(a_1)$ and

[15] We discuss the case when children choose leisure equal to their time endowment below.

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$V^p_{wp}(a_1)$; for the closed-form solutions see equations (B.6)–(B.9) in Appendix B. In order to understand the economics in period one, there are three crucial levels of parent wealth to consider. The first one is the one for which the child is just indifferent between autarky and wealth pooling. We denote this threshold value by $\underline{a}_{wp}$ which follows from the value-matching condition, $V^k_{aut} = V^k_{wp}(\underline{a}_{wp})$. In the case of logarithmic utility there is an explicit solution which is

$$\underline{a}_{wp} = \frac{1}{R}\exp\big(\Gamma + \log(y_{max})\big) - \frac{y_{max}}{R},$$

where

$$\Gamma = \frac{\log[(1-\tau)(1+\alpha)/\alpha])}{1+\gamma} \geq 0,$$

Γ is non-negative for $\tau \in [0, \tau_{max}]$. Note, when $\tau = \tau_{max} = (1/1+\alpha)$ then $\underline{a}_{wp} = 0$. For a given α, $\underline{a}_{wp}$ decreases in τ and in γ. At $a_1 = \underline{a}_{wp}$ both the autarkic and the wealth-pooling levels of leisure yield a global maximum. Leisure in the autarkic regime is smaller (and consumption is larger) than leisure in the wealth pooling region (where consumption is smaller), however, the child is indifferent. How about the parent? Consumption of the parent at $a_1 = \underline{a}_{wp}$ when the child chooses wealth pooling is

$$c^p_{wp} = \frac{Y_{wp}}{1+\alpha}, \quad \text{where} \quad Y_{wp} = \frac{1}{(1+\gamma)}\exp\big(\Gamma + \log(y_{max})\big),$$

where Y_{wp} are total family resources. When instead the child chooses the autarkic regime, consumption of the parent at is

$$c^p_{aut} = \exp\big(\Gamma + \log(y_{max})\big) - y_{max} + \tau\frac{y_{max}}{1+\gamma}.$$

The parent is indifferent only if autarkic and wealth pooling consumption at $\underline{a}_{wp}$ are equal. This is because the child attains the exact same value, $\bar{V}_k$, under either choice and so for the parent we have that

$$\begin{aligned} V^p_{1,wp}(\underline{a}_{wp}) &= \log(c^p_{wp}) + \alpha\bar{V}^k, \\ V^p_{1,aut}(\underline{a}_{wp}) &= \log(c^p_{aut}) + \alpha\bar{V}^k, \\ \Rightarrow V^p_{1,aut}(\underline{a}_{wp}) - V^p_{1,wp}(\underline{a}_{wp}) &= \log(c^p_{aut}) - \log(c^p_{wp}). \end{aligned}$$

From the expressions for consumption we can see that these consumption levels in general are not equal. Numerically we find that it is always the case

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that $\log(c^p_{aut}) > \log(c^p_{wp})$ and so at $\underline{a}_{wp}$ the parent is strictly better off under autarky than under wealth pooling which is also the case in a neighborhood around $\underline{a}_{wp}$. However, the decision power at this stage of the game rests in the hands of the child and so its choice conflicts with the interests of the parents. This conflict of interest results in a discontinuity of the parent's value function, specfically, the parent's value jumps downward.

As we consider increasing parent's wealth above $\underline{a}_{wp}$, the parent's value rises and so the second crucial value of parent wealth is where the parent's value equals the one just prior to the downward jump; we denote this level of wealth by $\bar{a}_{wp}$, see equation (B.11). For $a_1 \in (\underline{a}_{wp}, \bar{a}_{wp})$ the parent is strictly better off with *fewer* resources but the parent is at the mercy of the child and has no move at this stage in the game.

The final crucial level of wealth is the one which induces the child to optimally choose leisure just equal to the time endowment t which we denote by a_{lt}. It is given by

$$a_{lt} = \frac{y_{max}}{\gamma R}, \quad y_{max} = wt.$$

The region which follows is also of the wealth-pooling type but for clarity we distinguish it and refer to it as the lt region. The main difference is that in the lt region the child's leisure choice always equals t and so is unaffected by the parent's wealth level. In this case, the parent is the family dictator. Paragraph 'Voluntary unemployment' in Appendix B shows that the child's leisure and consumption are continuous at a_{lt} but not differentiable. The value function of the parent is continuous at a_{lt}, however, it is not differentiable at that point. In fact, the marginal value of saving for the lt region is higher since the parent can implement her first-best allocation.

Figure 2 shows several key dimensions of economic behavior. Along the horizontal axis is parent wealth.[16] The critical values of wealth, $\{\underline{a}_{wp}, \bar{a}_{wp}, a_{lt}\}$, are marked with a circle and the corresponding outcomes by a star. The upper panel contains the child's optimal leisure (left) and consumption policies (right). Up to $a = \underline{a}_{wp}$ child's leisure and consumption coincide with the autarkic values which are constant. At $\underline{a}_{wp}$ leisure switches from the autarkic to the wealth pooling value and so jumps up whereas consumption jumps down. For larger values of a^p consumption and leisure increase

[16] For the purposes of this paper we set parameter values $\alpha = 1$, $\gamma = 0.5$, $\beta = 0.95$, $\tau = 0.15$, $R = 1.05$, $w = 5$, and the time endowment is 16 hours times 365 days, $t = 5,840$. Nothing essential changes when changing these values.

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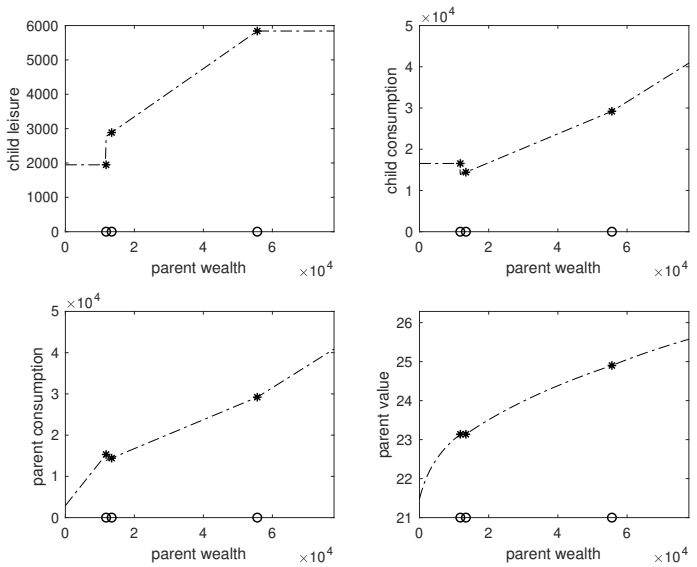


Figure 2: Period one economic behavior

Note: Figure shows the economics of parents and children in the period one for possible levels of wealth.

and follow the wealth pooling policies. From a_{lt} onwards leisure equals the time endowment. Consumption increases since gifts are increasing in parent wealth. The bottom panel shows consumption of the parent (left) and its value function (right). At $\underline{a}_{wp}$ parent's consumption jumps downward and the value of the parent displays a downward jump.

We will now see how the discontinuity in the period-one value function, which from the parent's perspective is not optimal, influences the parent's savings decision in period zero.

3.2.2 Period zero

The parent's problem in period zero is given by (3). We now restate the problem taking optimal future-period behavior into account. For this purpose we define the indicator function $\mathcal{I}_{wp}(a_1) = 0$ if $V^k_{wp}(a_1) \leq V^k_{aut}$, that is, for $a_1 \in [0, \underline{a}_{wp}]$, and $\mathcal{I}_{wp}(a_1) = 1$ if $V^k_{wp}(a_1) > V^k_{aut}$, that is, for

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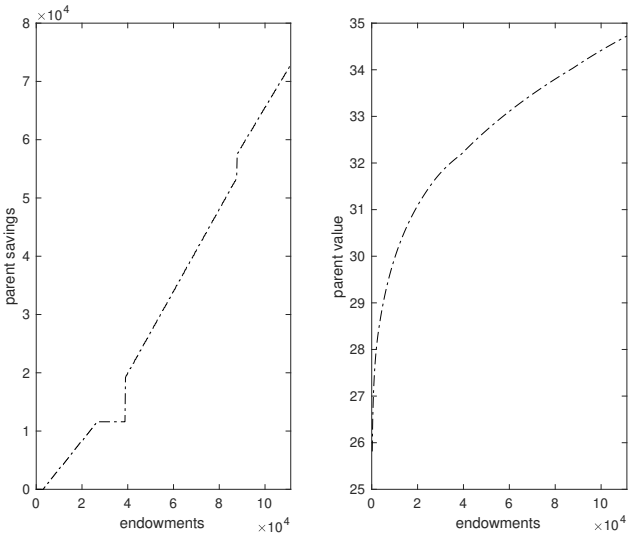


Figure 3: Period zero economic behavior

Note: Figure shows the economics of parents in the period zero: optimal savings correspondence and value function.

$a_1 \in (\underline{a}_{wp}, \infty)$. In words, it equals one if the child chooses wealth pooling in the first stage of the second period and zero otherwise.[17] The parent's problem is now given by

$$V_0^p(a_0) = \max_{a_1 \in [0, a_0]} \left\{ u(a_0 - a_1) + \beta V_1^p(a_1) \right\}, \tag{5}$$

$$\text{where} \quad V_1^p(a_1) = V_{aut}^p(a_1) + \mathcal{I}_{wp}(a_1) \left[V_{wp}^p(a_1) - V_{aut}^p(a_1) \right].$$

The key insight is that the function inside the curly bracket of problem (5) is discontinuous with a downward jump at $a_1 = \underline{a}_{wp}$.

Figure 3 (left) shows a typical optimal savings policy for the parent. The most unusual feature of it is the plateau followed by the subsequent upward jump. Both features are directly related to the critical values $\underline{a}_{wp}$ and $\bar{a}_{wp}$. As we have seen before, for future-level of savings that fall into the interval $[\underline{a}_{wp}, \bar{a}_{wp}]$ the parent is better off with *fewer* resources. In period

[17] When $V_{wp}^k(a_1) = V_{aut}^k$ we break the indifference between the two best responses of the child household in favor of autarky. This plays absolutely no role for the analysis.

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zero, therefore, the parent engages in additional consumption for a certain interval of initial endowments. For very low initial endowments, the parent saves nothing since it receives the obligation tax from the child in the next period. For somewhat higher endowments, the parent engages in autarkic savings up to the point at which the child switches from autarky to wealth pooling. Then, the parent follows constant optimal savings – the autarkic level which is in place at the first kink – in anticipation of shirking behavior of the child. For larger endowments the parent increases savings once again since the cost of shirking becomes small compared to the parent's own consumption-smoothing concerns, i.e. higher period-one consumption. Finally, if the parent's endowment is relatively large it saves so much that the parent becomes the family dictator as the child is voluntarily jobless.

The parent's period-zero value function is displayed on the right side of Figure 3. We can see that the discontinuity observed before in the period-one value function is smoothed out through optimizing behavior.

Figure 4 shows additional equilibrium outcomes for both parents and children. We can clearly see the over-consumption by the parent in period zero in anticipation of shirking behavior of the child. In period one, optimal parent consumption does not jump down as the parent prevented this from happening with a judicial choice of savings. Children's labor income is flat at the autarkic value and then jumps down upon entering the wealth-pooling region. Eventually it drops to zero.[18] Net transfers – children to parents – are first positive and constant in the autarkic region. Once the economy enters the wealth-pooling region the parent undoes the obligation tax from the child. The parent returns this transfer using altruistically-motivated transfers and provides even more. This is the way in which the model rationalizes the fact that transfers from children to parents do not flow in all families even in the presence of a social norm. If parents are sufficiently well-off the model predicts that we should not observe transfers from children to parents.

[18] The prediction that the child will not work at all when the parent is sufficiently rich is a borderline case of the model that does not capture other facets of reality. In reality there is presumably a stigma associated with being lazy because of rich parents. Also, parents may be wealthy because of a family business which they intend to bequeath to their children in which case children would still be working.

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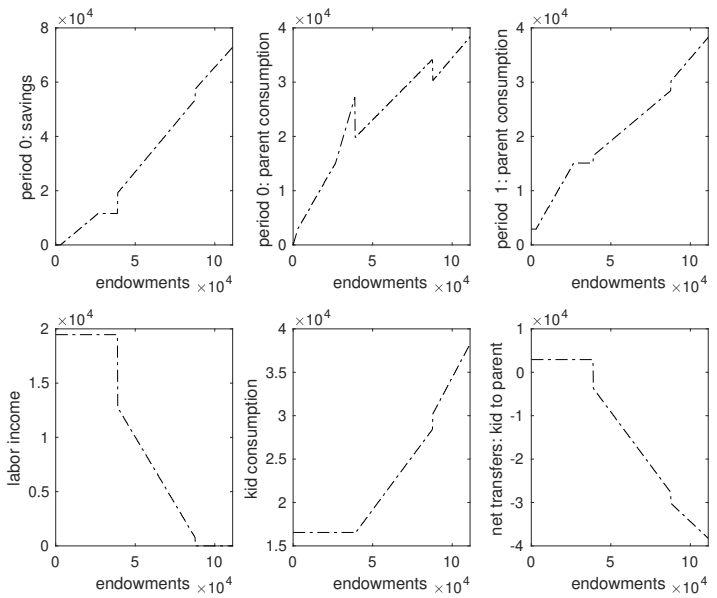


Figure 4: Equilibrium outcomes

Note: Figure shows equilibrium outcomes of parent in period zero and period one and of children in period one.

3.3 Counterfactual: Erosion of the transfer obligation

We now use the model to get a sense of the welfare implications were there no longer the obligation of child-to-parent transfers present, i.e. $\tau = 0$. We refer to this scenario as the no-norm economy. We do so by calculating consumption equivalent variation (CEV) of parents and children under the veil of ignorance. In particular, for parents we calculate the percentage η_p by which consumption in the first and the second period in the status quo (when the norm is present) would have to be changed so as to make them indifferent to the no-norm economy,

$$(1+\beta)\log(1+\eta_p) + V_0^p(a_0) = V_{0,no}^p(a_0)$$
$$1+\eta_p = \exp\left(\frac{V_{0,no}^p(a_0) - V_0^p(a_0)}{1+\beta}\right),$$

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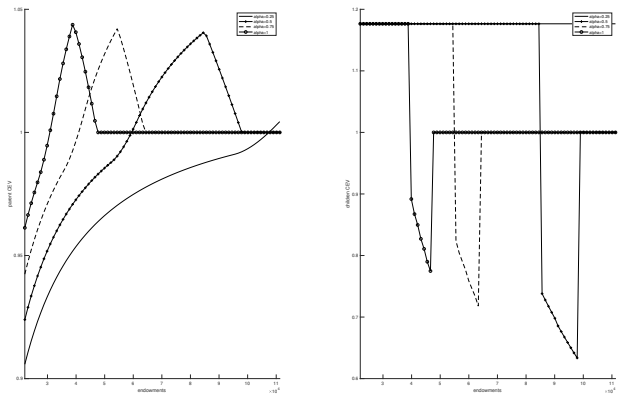


Figure 5: Consumption equivalent variation

Note: Figure shows consumption equivalent variation under the veil of ignorance for parents (left) and children (right) by wealth endowments and differing degrees of altruism.

where 'no' denotes the no-norm scenario. Analogously, the CEV for children is given by

$$1 + \eta_k = \exp\left(V^k_{no}(a_1) - V^k(a_1)\right).$$

A value for $1 + \eta$ greater than one means that the no-norm scenario is preferred to the status quo since compensation would be required to be born into the status quo.

Figure 5 shows the resulting CEVs for parents (left) and children (right) for differing degrees of parental altruism.[19] For any given level of altruism there are four intergenerational welfare regimes: (i) parents are worse off and children are better off, (ii) both are better off, (iii) parents are better off and children are worse off, and (iv) both are indifferent. Regime (iv) is straightforward: the family is in the wealth pooling region where only total family resources matter which are identical in either scenario. Regime (i) is also easy to understand. Relatively poor parents dislike the fact that they no longer receive a transfer from children in the autarkic region but children are better off since they can consume more and are selfish. What is less obvious

[19] Note that we exclude lower initial endowments due to our modeling assumption of zero second-period endowments for parents.

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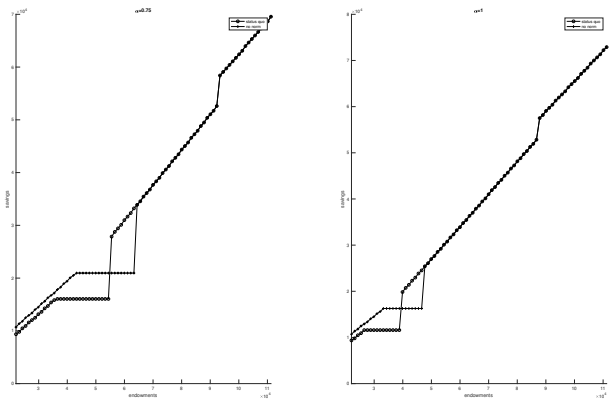


Figure 6: Equilibrium savings: status quo vs. no-norm

Note: Figure shows equilibrium savings in the status quo and the no-norm scenario by wealth endowments a low (left) and a high (right) degree of altruism.

is why parents are *better* off in regimes (ii) and (iii) and children are *worse* off in (iii). The reasons for these counterintuitive welfare implications stem from equilibrium savings as is shown in Figure 6. In the absence of the norm, savings exceeds those under the status quo and the wealth pooling region sets in at a higher level of wealth (the upward jump). Higher savings enable the parent to smooth consumption in a way that cannot be done in the status quo. The child prefers the status quo from the wealth level onwards at which the status quo enters the wealth pooling region since both consumption and leisure are higher.

4 Conclusions

In this paper we have provided a set of empirical facts on inter-vivos transfers between parents and children in Taiwan. Furthermore, we have conducted an empirical analysis of how transfer behavior in Taiwan differs from that in the US. We found that the central difference between Taiwan and the US is a norm that obligates children to financially support parents upon employment. In stark contrast to previous studies, which simply assume the presence of a norm when analyzing intergenerational interactions, we

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provide quantitative evidence of a norm by contrasting data of Taiwan with that of the US. Furthermore, our empirical results suggests that such a norm is not operative when parents are well-off due to parental altruism. Finally, we have proposed a non-cooperative model of the family for the context of Taiwan. Despite the fact that the model is kept as simple as possible its analysis and implications are not at all trivial. In a counterfactual exercise we explore the welfare consequences for generations of the erosion of the norm. Counterintuitively, we find that for certain families welfare of parents can actually increase and welfare of children can decrease. This may in part explain why some parents place a greater importance on this norm than others when raising their children.

A key prediction of our model is that children tend to over-consume leisure and parents tend to under-save in equilibrium. Testing these implications is beyond the scope of the current paper but would be very interesting to explore in future research. Extending the model to be quantitatively credible is yet another avenue for future research.

Future research could also provide empirical characterizations of other forms of intergenerational transfers. For example, a pressing issue in Taiwan is that of elderly care. It would be useful to know the extent to which the elderly are taken care of by family members, which is a transfer of time and possibly housing. It would then be informative to explore the motivations underlying caregiving. If, for example, a social norm is an important component of why children care for their parents, families may respond only weakly to subsidized nursing home care. However, even if such a norm is present, a low fertility rate combined with a high life expectancy could make it difficult for younger generations in Taiwan to care for their parents.

A Data appendix

A.1 Survey design

The Taiwan Longitudinal Study on Aging (TLSA) uses a multi-stage equal probability random sampling design.[20] Eligible respondents are randomly chosen according to their register address. The register includes all regular households, residents of old-age homes, nursing homes and long-term care hospitals. Selected respondents who were not residing at their regis-

[20] See Chang and Hermalin (1989).

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tered address were interviewed at their current address, wherever in Taiwan. However, those who appear in the registration system of the aboriginal areas of Taiwan were not considered until 2015. Before 2015, the TLSA only included a representative sample of the non-aboriginal populations.

Unlike the TLSA which chooses individuals, the Health and Retirement Study (HRS) selects households. Households are randomly selected and become one of the HRS observational households if at least one household member's age is cohort-eligible. If the cohort-eligible person has a spouse, the spouse is automatically selected and is also interviewed even though he or she is not cohort-eligible.

The HRS data we use is provided by the RAND Center for the Study of Aging. Two data files, RAND HRS Data File (v.P) and RAND HRS Family Data 2014 (V1), are used. These are longitudinal data sets and are ready for use. As for the TLSA, data is provided by the Survey Research Data Archive (SRDA). The original data sets from the SRDA are cross sectional and outliers are removed. We use the SRDA data from different years to construct panel data sets, and process and clean them further. In the following section, we document sample selection and how many observations we lost at each step. For variables related to income, wealth and amount of transfer, we provide an overview of questions in the questionnaire and associated imputation methods. Finally, we provide additional statistics on transfers.

A.2 Sample selection

Table 7 presents information about the number of cases, the number of respondents and the number left for use at each survey (1996, 1999, and 2003).

Since we focus on transfers from children to parents, we remove individuals who do not have children from the sample. The percentage of respondents without children is below 5%. The gender of children is one of the important characteristics we particularly care about in our analysis. In some cases, we found that the information about children's gender is vague and not consistent. We identify those who fail to provide correct information as recording error and thus drop them. We also drop observations for which the age gap between parents and children are too extreme to be reasonable. To be precise, children to whom the respondent reported to give birth at age below 15 are dropped, no matter whether the respondent is male or female.

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Table 7: TLSA samples

Survey year	Cohort	Age at survey	# respondents	# of cases	Response rate	# respondents w/o kid	Recording error	# left
1996	1	≥ 67	2,669	3,002	88.9%	120	52	2,497
	2	$50-66$	2,462	3,032	81.2%	75	39	2,348
1999	1	≥ 70	2,310	2,563	90.1%	104	1	2,205
	2	$53-69$	2,130	2,352	90.6%	60	1	2,069
2003	1	≥ 74	1,743	1,916	91.0%	77	0	1,666
	2	$57-73$	2,035	2,209	92.1%	53	1	1,981
	3	$50-56$	1,599	2,022	79.1%	80	1	1,518

Note: The number of cases is the denominator used in calculating response rates, which exclude samples who have died. As cohorts 2 and 3 were added in 1996 and 2003, respectively, the two cohorts' corresponding response rates in 1996 and 2003 reflect the percent of all selected individuals who completed a baseline interview. Except for cohort 2 in 1996 and cohort 3 in 2003, individuals who were not interviewed at the baseline are excluded from the sample and thus are not included in the number of cases.

Children to whom the respondent reported to give birth at age over 60 are dropped only when the respondent is female.

A.3 Value Imputations

The TLSA asks respondents about their household income, wealth and the amount of transfers received from their children during the past one year. These financially related questions follow the same surveying procedure. We use the amount of transfers as an example. The respondent is first asked if any child gave him/her and his/her spouse money as daily living expense. If yes, then the interview further asks the exact amount of money received. If the respondent is unable or unwilling to give an exact number, the following ranges are provided for the respondent to choose: less then NT$30,000; NT$30,000–50,000; NT$50,000–100,000; NT$100,000–200,000; NT$ 200,000–300,000; NT$300,000–400,000; NT$400,000–500,000; NT$ 500,000–1,000,000; over NT$1,000,000. For those who choose a range instead of providing the exact figure, we estimate the actual amount of the transfers by imputation using the median of each range except the last one. For the last category (more than NT$1,000,000), we impute by the lower bound, i.e., NT$1,000,000. Ranges and the cut-off values not only vary by income and asset, but also change between different waves. In general, the classification becomes finer and the cut-off value in the last category becomes

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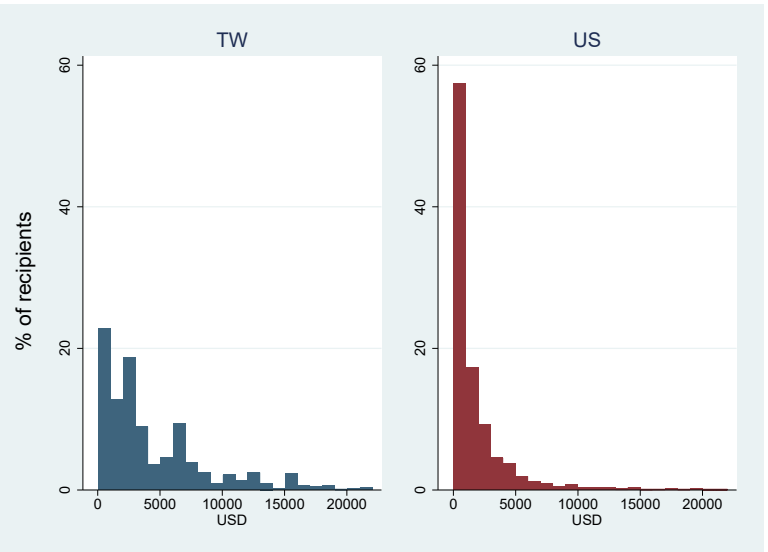


Figure 7: Transfer amount from children to parents

Note: Top 1% recipients are excluded. Values are PPP adjusted.

lager in the latter waves.

A.4 More about transfers

Here we supplement some more relevant facts about transfers. Figure 7 plots the empirical distributions of transfer amounts for our sample excluding non-receivers. We observe that while both distributions are skewed to the right, the one in Taiwan has a much heavier tail. Table 8 further presents the percentile of transfer amounts in each survey wave. Much fewer American parents receive transfers and smaller amounts are received in each survey wave. In Taiwan, over half of respondents obtained a transfer and the median was around $670, which is higher than the top 5% of American recipient. The median in Taiwan equals zero in 2003 because a new cohort with ages between 50–56 was added to the data set.

Table 9 considers both financial and non-financial transfer in a broader context of intergenerational transfers. First of all, it shows the relationship between financial transfers from children to parents and early distribution of wealth from parents to children. We can see that parents who distribute

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Table 8: Transfer amount from children to parents over time

	Survey year	Mean	Percentile 10th	25th	50th	75th	90th	95th	99th
Taiwan	1996	2,709	0	0	673	2,915	6,726	10,762	17,937
	1999	3,012	0	0	678	4,341	9,043	11,304	24,416
	2003	2,737	0	0	0	3,639	7,580	12,634	24,257
US	1998	113	0	0	0	0	0	100	2,500
	2000	121	0	0	0	0	0	250	3,000
	2002	159	0	0	0	0	0	450	4,000
	2004	144	0	0	0	0	0	400	3,600
	2006	108	0	0	0	0	0	300	2,800
	2008	153	0	0	0	0	0	500	4,000
	2010	140	0	0	0	0	0	400	3,500
	2012	139	0	0	0	0	0	350	3,500
	2014	173	0	0	0	0	0	500	3,500

Note: Values are PPP adjusted.

Table 9: Financial transfer and early bequest

Financial transfer	Wealth distributed to children		Home ownership transfer to kids		Housing provided by children	
	No	Yes	No	Yes	No	Yes
No	37%	7%	38%	6%	41%	3%
Yes	43%	13%	44%	12%	49%	7%
Total	80%	20%	82%	18%	90%	10%

Note: Housing provided by children means that the house is bought by children without any help from respondents.

their assets tend to receive money support from children. This is similarly the case for the transfer of home ownership. The home ownership transfer is identified when parents transfer their own house to children, or when parents buy children a house, or when parents help children in buying a house. On the other hand, housing provided by children can be seen as another form of transfer to parents. We find that children who provide housing to parents also tend to give financial support to parents. This may

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imply that children who are more capable help more in each perspective. However, it is worth noting that only a small portion of the sample has made such a early bequest or transfer of home ownership to their children and even fewer respondents stay in their children's house.

B Model appendix

B.1 Value functions

Autarky: The value functions in the autarkic region in the second period for the child and the parent are given by

$$V^k_{aut} = \mathcal{K}_{aut} + \log((1-\tau)y_{max}), \tag{B.6}$$

$$V^p_{aut}(a_1) = \mathcal{P}_{aut} + \log\left[(1+\gamma)Ra_1 + \tau y_{max}\right] + \alpha \log\left((1-\tau)y_{max}\right), \tag{B.7}$$

where

$$\mathcal{K}_{aut} = \gamma \log(\gamma h) - (1+\gamma)\log(1+\gamma),$$
$$\mathcal{P}_{aut} = \alpha\gamma \log(\gamma h) - (1+\alpha(1+\gamma))\log(1+\gamma).$$

Wealth pooling: $l < t$ The value functions in the wealth pooling region when $l < h$ for the child and the parent are given by

$$V^k_{wp}(a_1) = \mathcal{K}_{wp} + (1+\gamma)\log(Ra_1 + y_{max}), \tag{B.8}$$

$$V^p_{wp}(a_1) = \mathcal{P}_{wp} + (1+\alpha(1+\gamma))\log(Ra_1 + y_{max}), \tag{B.9}$$

where

$$\mathcal{K}_{wp} = \log\left(\frac{\alpha}{(1+\alpha)(1+\gamma)}\right) + \gamma \log\left(\frac{\gamma}{(1+\gamma)w}\right),$$
$$\mathcal{P}_{wp} \equiv \alpha\log(\alpha) + \alpha\gamma[\log(\gamma) - \log(w) - \log(1+\gamma)] - (1+\alpha)[\log(1+\alpha) + \log(1+\gamma)].$$

Wealth pooling: $l = t$ The parent's value function in the lt region is given by

$$V^p_{lt}(a) = \log\left(\frac{Ra}{1+\alpha}\right) + \alpha \log\left(\frac{\alpha Ra}{1+\alpha}\right) + \alpha\gamma \log(t). \tag{B.10}$$

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Value crossing: Denote the parent's value at the final moment before the downward jump by $\bar{V}^p_{aut} \equiv \log(c^p_{aut}) + \alpha \bar{V}^k$. For higher levels of wealth the economy enters the wealth pooling region. $V^p_1(a_1)$ is increasing in a_1 and eventually crosses $\bar{V}^p_{aut}$. Define the level of wealth at this point by $\bar{a}_{wp}$. It is given by,

$$\begin{aligned} \bar{V}^p_{aut} &= \mathcal{P}_{wp} + (1 + \alpha(1+\gamma)) \log(y_{max} + R a_1), \quad \text{(B.11)} \\ \log(y_{max} + R a_1) &= \frac{\bar{V}^p_{aut} - \mathcal{P}_{wp}}{1 + \alpha(1+\gamma)}, \\ \bar{a}_{wp} &= \frac{1}{R} \exp\left(\frac{\bar{V}^p_{aut} - \mathcal{P}_{wp}}{1 + \alpha(1+\gamma)} \right) - \frac{y_{max}}{R}. \end{aligned}$$

Voluntary unemployment: Denote the parent's level of wealth at which the child chooses $l = t$ by a_{lt} for the first time. From equation (4) this is the case when

$$\begin{aligned} \frac{1+\alpha}{\alpha R a} \frac{\alpha}{1+\alpha} w &= \frac{\gamma}{t}, \\ a_{lt} &= \frac{y_{max}}{\gamma R}. \end{aligned}$$

The child's leisure and consumption change continuously when entering the lt regime but consumption is not differentiable. Comparing the two consumption levels it becomes clear why,

$$\begin{aligned} c^k_{wp}(a) &= \frac{\alpha \left(R a + y_{wp}(a) \right)}{1+\alpha}, \quad c^k_{dic}(a) = \frac{\alpha R a}{1+\alpha}, \\ \frac{\partial c^k_{wp}}{\partial a} &= \frac{\alpha}{1+\alpha} \left(R + \frac{\partial y_{wp}}{\partial a} \right) = \frac{\alpha R}{(1+\alpha)(1+\gamma)} < \frac{\partial c^k_{dic}}{\partial a} = \frac{\alpha R}{1+\alpha}. \end{aligned}$$

In the dictator regime the child's consumption increases faster than under wealth pooling with unconstrained leisure. The parent's value function is given by

$$V^p_{dic}(a) = \log\left(\frac{Ra}{1+\alpha} \right) + \alpha \log\left(\frac{\alpha R a}{1+\alpha} \right) + \alpha\gamma \log(t).$$

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The value function of the parent is continuous at $a_{lt} = (y_{max}/\gamma R)$,

$$\begin{aligned}
V^p_{dic}(a_{lt}) &= \log\left(\frac{Ry_{max}}{\gamma R(1+\alpha)}\right) + \alpha\log\left(\frac{\alpha R y_{max}}{\gamma R(1+\alpha)}\right) + \alpha\gamma\log(t) \\
&= \alpha\gamma\log(t) + \log\left(\frac{y_{max}}{\gamma(1+\alpha)}\right) + \alpha\log\left(\frac{\alpha y_{max}}{\gamma(1+\alpha)}\right) \\
&= \alpha\left[\gamma\log(t) + \log(\alpha)\right] + (1+\alpha)\left[\log(y_{max})\right. \\
&\quad \left. - \log(1+\alpha) - \log(\gamma)\right], \\
V^p_{wp}(a_{lt}) &= \mathcal{P}_{wp} + (1+\alpha(1+\gamma))\log\left(\frac{y_{max}}{\gamma} + y_{max}\right) \\
&= \mathcal{P}_{wp} + (1+\alpha(1+\gamma))\log\left(y_{max}\left(\frac{1+\gamma}{\gamma}\right)\right) \\
&= \mathcal{P}_{wp} + (1+\alpha(1+\gamma))\log\left(\frac{1+\gamma}{\gamma}\right) \\
&\quad + (1+\alpha(1+\gamma))\log(y_{max}),
\end{aligned}$$

where

$$\begin{aligned}
\mathcal{P}_{wp} &= \alpha\log(\alpha) + \alpha\gamma[\log(\gamma) - \log(w) - \log(1+\gamma)] \\
&\quad - (1+\alpha)[\log(1+\alpha) + \log(1+\gamma)], \\
\Rightarrow V^p_{wp}(a_{lt}) &= \alpha[\gamma\log(h) + \log(\alpha)] + (1+\alpha)[\log(y_{max}) \\
&\quad - \log(1+\alpha) - \log(\gamma)] \\
&= V^p_{dic}(a_{lt}).
\end{aligned}$$

However, it is not differentiable at that point. In fact, the marginal value of saving for the dictator regime is higher since the parent can implement her first-best allocation.

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台灣家戶贈與行為之理論與實證

Daniel Barczyk
McGill University 經濟學系
林姿妤
國立成功大學經濟學系

本文探討台灣家庭父母與子女間的財富贈與行爲。我們發現, 台灣父母接受子女金錢餽贈的比例相當高, 是美國資料的十倍以上。資料顯示, 這樣的巨大差異來自於社會規範下的孝親行爲。因此, 有固定收入的子女傾向於提供孝親費。然而與美國類似的是, 經濟條件較佳的父母不僅拿取較少的孝親費, 甚至會提供子女金錢方面的幫助。根據實證上的觀察, 我們建構一個可用來解釋台灣家庭特徵的理論模型。

關鍵詞: 財富贈與, 社會規範, 利他行爲
JEL 分類代號: D10, D64, E21

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