

Gifts and bequests

SUMMARY

Reforms reducing the generosity of pensions have distributional effects on future generations if individuals care about their descendants' welfare, but only affect elderly individuals if bequests are the unintentional result of precautionary savings. And safety-net programmes such as unemployment insurance may displace sources of private help, such as that provided by living parents to their children in need. This paper provides comparable measures of how expected bequests and transfers vary with cumulated parental earnings in the United States, West Germany and the United Kingdom. The strength of bequest motives is empirically very weak in the available data. Private inter vivos transfers, which appear to depend on the recipients' economic situation, are partly crowded out by public unemployment insurance programmes. Together, involuntary bequests and intentional inter vivos transfers appear to be an important channel of intergenerational inequality transmission, and strengthen substantially the relationship between an individual's and his parents' economic status.

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Inter vivos transfers and bequests in three OECD countries

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1. INTRODUCTION

Transfers from parents to adult children are important in major industrialized economies like the United States or Germany. Mid-1980s evidence from the United States suggests that parental inter vivos transfers, i.e. gifts from living parents to adult children, account for at least 11% of aggregate net worth. Accumulated bequests, i.e. post-mortem gifts, account for 30% of aggregate net worth in the economy of the United States. Comparable estimates for West Germany in the late 1980s suggest that bequests account for 10% of net worth.

From a public policy perspective, private monetary gifts between generations can affect the effectiveness of public programmes. First, population ageing in Europe and

This paper has benefited from the comments of David Casado, Michael Hurd, Tullio Jappelli, AnnaMaria Lusardi, Michael Reiter, and Joachim Voth and from participants at the 40th Panel of Economic Policy in Amsterdam, the fourth meeting of the Research Training Network 'Ageing and Retirement in Europe', and seminars at Universitat Pompeu Fabra, the London School of Economics and at CEMFI. Special thanks to the referees and discussants for very detailed and thoughtful comments. Catia Nicodemo and specially Gueorgui Kolev provided outstanding research assistance. Funding from the Fundación Ramón Areces and the Spanish Ministry of Science through grant SEC2001-674 is gratefully acknowledged.

Giuseppe Bertola was the Managing Editor in charge of this paper.

the United States has sparked a debate about the need of a reform of Social Security systems and the possibility of reducing the replacement rates guaranteed by post-retirement income. The distributional effect of these policy changes depends on the motivation of intergenerational transfers. If individuals care about the felicity of their descendants, and provide them with monetary transfers, a reduction of old age income may affect not only the elderly, but also their descendants. Conversely, if individuals do not derive utility from leaving bequests or transfers to their children, a reduction of old age income will affect mainly the recipient elderly. Secondly, programmes that provide individuals in need with a safety net are effective to the extent that public help does not displace other sources of private help like family transfers. Otherwise, they merely help the potential donors of the person in need.

This paper focuses on the relationship between the lifetime income of an individual and the amount of bequests and inter vivos transfers that the individual gives to all his or her children. It draws on the methodology in Altonji and Villanueva (2003), who develop methods to estimate the relationship between lifetime income and expected transfers and bequests and apply them to the United States.

The relationship between expected intergenerational transfers and the lifetime income of the potential donor conveys information about the determinants of gifts. Simple economic models predict that the relationship between intergenerational transfers and the lifetime income of the potential donor depends on preferences, on expected exposure to income and longevity risk in old age, and other factors. By comparing the relationship between income and gifts across different countries and different groups of the population within each country, it is possible to assess the extent to which altruistic motives drive the decision to transfer resources across generations. And, since the strength of the relationship between income and bequests contributes to determining the extent to which children of high-income parents inherit a privileged economic situation, it is interesting to study which institutions may affect intergenerational transmission of economic inequality through this channel.

The contribution of the present paper is then to provide comparable estimates of the relationship between lifetime gifts and lifetime income in three large industrialized economies, and to relate the differences in the estimates to features of the countries' public programmes. In a first step, the paper provides comparable measures of how expected bequests vary with cumulated earnings in the United States, West Germany and the United Kingdom. The estimates are similar in West Germany and the United Kingdom, at about 1 cent, and is larger in the United States at about 2 cents. A second step assesses the presence of a bequest motive. The data make it possible to compare the relationship between lifetime income and late-life wealth of elderly people who do have children to that of similar people who do not have children. If the latter group's bequests are involuntary, and reflect precautionary savings driven by uncertainty about longevity or health risks, the difference between the two groups' behaviour gives indications as to the strength of bequest motives, which appear empirically very weak in the available data. In a third step the paper, aiming to assess

how generations are linked through all possible transfers, examines the impact of parental lifetime income on lifetime inter vivos transfers. This is estimated at 1.2 cents for the United States and 0.7 cents for West Germany. To check whether the difference reflects institutional features, such as the generosity of unemployment insurance (UI) schemes, it is possible to estimate the displacement effect of unemployment benefits on private transfers in a sample of unemployed young individuals. The results suggest that, to a limited extent, private inter vivos transfers are crowded out by UI, since unlike (largely involuntary) bequests, they appear to depend on the recipients' economic situation.

The paper is organized as follows. Section 2 provides aggregate evidence on the relevance of bequests and inter vivos transfers in the United States, West Germany and the United Kingdom. Section 3 describes the alternative economic models of bequests and transfer giving, their implications for policy, and how different features of the economic environment affect the relationship of interest. Section 4 presents the data and the empirical methodology. Section 5 uses regression analysis to identify the responses of bequests to lifetime income in Germany, the United States and the United Kingdom. Section 6 analyses the response of inter vivos transfers to lifetime income and the implications of all these gifts for economic inequality. Section 7 discusses whether differences in wealth taxation, Social Security replacement rates, and health risk explain the discrepancy in the responses of transfers and bequests between Germany and the United States, and Section 8 concludes. Two Appendixes outline in detail the formal theory and empirical methodology underlying the paper's approach and results.

2. AGGREGATE EVIDENCE: GERMANY, UNITED STATES, UNITED KINGDOM

How large are intergenerational transfers like inter vivos monetary transfers to adult children and bequests, compared with GDP or with aggregate net worth in a society? This section reviews several aggregate statistics for the United States, West Germany and the United Kingdom. The sources of information about these intergenerational transfers are usually household surveys that ask individuals about the amount of money given to their adult children living in separate households. Bequests are obtained from responses to direct questions to recipients about the amount of the inheritance received. There are two sources of possible under-reporting of these flows in typical household surveys. The first is that survey respondents seem to find it more difficult to remember how much they have received in the form of monetary transfers than to remember how much they gave. Second, gifts are more likely to be prevalent among high-income households, typically hard to survey.

With these caveats in mind, Table 1 presents a comparison of magnitudes of bequests and inter vivos transfers to adult children in the United States, Germany and the United Kingdom. The main source of information in the US case is Gale and Scholz (1994), using data from the 1983 wave of the Survey of Consumer Finances. The

Table 1. The relative importance of inter vivos transfers and bequests in the United States and Germany

Variable	Country	Magnitude	Year of computation	Source
Panel A: Bequests				
1. Yearly flow of bequests per head, 1985 dollars	USA	431.24	1985	Gale and Scholz (1994)
	Germany	264.46	1987	Reil-Held (1999)
	UK	432.7	1996	International Longevity Centre UK
2. Bequests as a proportion of total net worth	USA	31%	1985	Gale and Scholz (1994)
	Germany	10%	1987	Reil-Held (1999)
Panel B: Inter vivos transfers				
3. Yearly flow of inter vivos transfers to adult children per head, living in separate households in 1985 dollars	USA	134.26	1985	Gale and Scholz (1994)
	Germany	88.76	1990	Reil-Held (1999)
	UK	n/a		
4. Inter vivos transfers to non-coresident children as a proportion of total net worth	USA	10% (excludes trusts and life insurance)	1985	Gale and Scholz (1994)
	Germany	not available		

Notes: All monetary magnitudes are expressed in billions of 1985 dollars. DM are converted into euro using the a exchange rate of 2, and then into US dollars using the purchasing power parity of 1 documented by the historical series of the OECD between 1992 and 1999. British pounds are converted into dollars at the OECD PPP exchange rate of \$1.53 per pound.

corresponding source for West Germany is Reil-Held (1999), who reports data from the 1988 wave of the German Socio Economic Panel (GSOEP). Less information is presented about the United Kingdom due to the lack of data. The aggregate bequest-giving magnitude was taken from the website of the International Longevity Centre.

The annual flow of bequests in the United States is \$104 billion (431.24 per head, dollars of 1985), almost 2.6% of the GDP in that year. The annual flow of inter vivos transfers in the United States is about a third of the flow of bequests. In West Germany \$16.5 billion were inherited in 1985 (264.46 1985 dollars per head). The corresponding flow of inter vivos transfers in 1990 was also about a third of the magnitude of annual bequests. The annual flow of bequests in the United Kingdom was £22 billion in 1996 (corresponding to 432.7 1985 dollars per head).

A possible benchmark to assess the relevance of intergenerational transfers received by individuals is to compare accumulated net transfers (including bequests) over the life cycle to aggregate net worth in an economy. A large ratio of intergenerational transfers to net worth is hard to reconcile with the notion that the main motivation behind household saving is to consume later in life or in bad circumstances and suggests that individuals save to pass on resources to their children. In such case, as

discussed in Section 3.1, the effectiveness of public policies that redistribute income across generations, like Social Security can be hindered. If individuals are concerned about the well-being of their descendants, public transfers that redistribute income from the young to the old can be partially reversed by private transfers in the opposite direction.

Analysing the effect of inter vivos transfers and bequests involves making assumptions about the interest rate, population growth, and on the ages in which individuals give and receive transfers. Gale and Scholz (1994) estimate that in the United States, the ratio of accumulated bequests to net worth is 30%. The corresponding ratio for inter vivos transfers (including life insurance and the value of trusts) is 20%. Merely focusing on direct inter vivos transfers to adult children, the corresponding estimate is 10%. At a minimum, it looks that intergenerational transfers are a substantial fraction of net worth in an economy. Reil-Held (1999) uses a similar method for West Germany, correcting for the fact that German potential donors experienced an abnormal poverty period after the Second World War, and documents that accumulated bequests account for 10% of the total net worth, below the corresponding estimate for the United States, but still a significant fraction of total net worth.

2.1. Beyond aggregates

Usually, these aggregate measures are taken to be suggestive evidence of the need to take into account bequest motives to understand the distributional impact of redistributive programmes. Aggregate measures, however, do not give much information on whether or not bequests and inter vivos transfers affect public policy. The incidence of inter vivos transfers depends on whether or not they are motivated by altruism or, in the case of bequests, whether they respond mainly to precautionary motives. As we shall see, to learn about the presence of a bequest motive, it is possible to compare the cross-sectional marginal response of expected bequests to lifetime income between the elderly who had children and those who did not.

Further, micro data can speak to distributional issues on which aggregate data are, by construction, silent. To see this, consider that a 30% bequest-to-aggregate wealth ratio can be present in two types of society: one in which everyone receives the same bequest from his or her parents, regardless of whether or not parents had low or high lifetime income. On the contrary, a large ratio can arise in a society in which only the children of individuals with high lifetime earnings receive bequests (see Masson and Pestieau 1997). In the first society, bequests would not contribute to perpetuate inequality between individuals. In the second one, bequests and inter vivos transfers would increase the inequality in well-being, as the children of individuals with higher income would start their lives in a better economic condition, as they could count on larger gifts from their parents. The results of this paper offer insights into where, in this spectrum, the real-life economies considered lie.

3. THE ECONOMICS OF INTERGENERATIONAL TRANSFERS

This section discusses why comparing the impact of the lifetime income of a parent on the lifetime monetary transfers given to adult children across different countries and groups of the population gives useful information about both preferences of the agents and about institutional features of the economy. Two types of transfers are considered in what follows. The first are post-mortem, or bequests. The second are inter vivos transfers given to adult children. Of course, there are other transfers flowing from parents to children, for example educational expenses or time services in the form of taking care of grandchildren. While crucial to understand many important issues like the formation of human capital, educational expenses are not easily measured in the data. Time transfers may be easier to measure, but are disregarded here to better focus on the relationship between monetary gifts and parental income. Available evidence for the United States (see Altonji *et al.* 1996) suggest that the link between the time that parents spend helping their children and parental income is weak and not statistically significant.

A second caveat is that since the paper's approach focuses on the impact of variation in the donor's lifetime income on gifts given to all children, the estimates can say little about the role of the family in compensating inequalities within the extended family. An analysis of the latter would call for a detailed analysis on the characteristics of the potential recipient, as in research focused on the allocation of transfers or bequests across siblings (see, among others, Hochguertel and Ohlsson 2003; McGarry and Schoeni 1995; or Light and McGarry 2004 for studies on how resources are redistributed within the family).

3.1. Models of bequests

There are two main explanations for the existence of bequests (see Appendix 1 for formal details). The first, usually termed as the pure life-cycle model, states that bequests are accidental. The second assumes that bequests are intended. The distinction matters for policy purposes.

According to the pure *life-cycle model*, individuals are uncertain about their date of death, and their utility level does not depend on the economic situation of the next generation. This model stresses that markets for annuity products or private insurance for health expenses are not available in many countries. Friedman and Warshawsky (1990) document that unfair pricing is a likely explanation of why private annuities are limited in the United States, and Brown and Finkelstein (2004) give an explanation about the non-existence of a market for private long-term insurance based on crowding-out by public programmes. Forward-looking individuals plan their savings during their working life taking into account that resources must be provided for their old age, after they retire. Retirement savings act as a buffer stock against the risks of 'living too long' or of facing large medical expenses in old age and bequests are observed when the elderly die early, without having exhausted their wealth.

Given that post-retirement consumption is a normal good, the accidental bequest model predicts that the relationship between the lifetime resources of an individual and post-retirement wealth is positive and that any characteristic of the utility function or the budget constraint that increases the marginal utility of consuming in old age must also increase the relationship between lifetime income and expected bequests. As discussed in Appendix 1, lifetime income and post-retirement wealth are linked at a lower level if a public programme is introduced that taxes income while individuals work to provide a non-bequeathable stream of post-retirement income. Similarly, imagine that elderly individuals anticipate that they will be exposed to some type of uninsurable consumption risk in old age, like medical expenses. Such a risk increases the expected marginal utility of post-retirement consumption, again increasing the relationship between income and post-retirement wealth.

According to the *intended bequest* model, aside from their own consumption, individuals are concerned about either the well-being of their (adult) children (altruistic motive) or about the mere fact of giving (warm-glow motive). The model of intended bequests also considers that individuals are uncertain about their longevity and about their income needs in their old age, but also introduces another reason for saving: providing resources to the next generation. In the presence of a bequest motive, the relationship between lifetime income and post-retirement wealth is larger in absolute value than in the accidental bequest model (see Appendix 1 for a more detailed discussion). Another testable implication is that, according to the intended bequest model, the impact of parental income on expected bequests should be larger for high-income parents than for low-income parents. The reason is that, holding everything else constant, even if everyone in the economy cares about leaving a bequest, those individuals with lower lifetime income have a higher marginal utility from their own consumption than from the consumption of their descendants, and will prefer consuming an extra dollar of lifetime income than bequeathing it to the next generation.

Whether bequests are intended or accidental has consequences both on the allocation of resources and on the distributional impact of public programmes that transfer income to the elderly.

3.1.1. Implications for the allocation of resources. Whether or not bequests are intended determines the amount of capital saved in an economy. Consider the case of unintended bequests first. Individuals save during their working life to provide resources for their old age. The introduction of a Pay-As-You-Go Social Security system will distort the savings decisions of households, so that in the aggregate, the capital stock will be lower than before the introduction. The reason is that a Pay-As-You-Go Social Security system redistributes income from the young, who have a relatively high marginal propensity to save, to the elderly, who have a lower marginal propensity to save. Crowding-out effects may arise in general equilibrium from redistribution (see Fuster *et al.* 2004). Computations for the United States by Kotlikoff and

Auerbach (1987) and Kotlikoff (1989) suggest that the crowding-out effect reduces the capital stock in an economy by up to 20%.

Conversely, macroeconomic simulations calibrated to the United States, assuming that inter vivos transfers and bequests are motivated by altruism find that Pay-As-You-Go Social Security systems displace only about 6–8% of the total stock of capital (Fuster 1999; Fuster *et al.* 2004). Altruistic individuals save to leave a bequest, in addition to other life-cycle motives. Therefore, elderly individuals do not necessarily have a lower marginal propensity to save than young individuals, and forced redistribution does not crowd as much capital as in the previous case.

3.1.2. Implications for the distribution of resources. The presence of a bequest motive also determines which groups benefit from public programmes that redistribute income across generations. Assume that a public programme redistributes income towards the elderly. If bequests are accidental, an unexpected increase in the income of the elderly will result in an increase in their consumption. Conversely, if bequests are intended, a fraction of that increase will be passed on to the next generation, effectively increasing the welfare of the adult children of the recipients. An extreme version of this result is the Ricardian Equivalence hypothesis. If all individuals in a society derive utility from the welfare of their descendants, and all individuals provide support to their children, a public programme that redistributes income from the young to the old will not affect the consumption of any of the cohorts involved. The reason is that a dollar taken from the young and given to the elderly through a public programme will be given back by the elderly through bequests.

Bequest motives are likely to be mixed in the population: some individuals may derive utility from leaving a bequest to their children, and other individuals may not (see Light and McGarry 2004). Still, it is important to know whether or not if, in the aggregate, bequests motives are operative.

3.1.3. Assessing the presence of a bequest motive. Intentional bequests are measured by comparing the response of expected bequests to lifetime income between individuals with and without children. The identifying assumption is that the savings of the elderly without children are mainly held because of precautionary motives. If individuals with children have a similar marginal propensity to bequeath out of lifetime income than otherwise identical elderly without children, then precautionary motives are likely to be the main determinant of wealth accumulation for both groups. If the marginal propensities to bequeath are larger for the elderly with children, a bequest motive appears to be present. Testing for bequest motives comparing the behaviour of the elderly with and without children is relatively standard. For example, Hurd (1987, 1989) compares the dissaving patterns among elderly with and without children in the United States and finds that both groups share very similar dissaving patterns. Jürges (2001) performs a similar exercise for West Germany, and again finds little evidence of differential dissaving between elderly with

and without children. On the other hand, some authors have reservations about this strategy (see Kopczuk and Lupton 2004 or Ando *et al.* 1993).

Before concluding this discussion two remarks are in order. First, a criticism to this strategy is that elderly with children should have lower wealth levels as they spent resources on children earlier in life. The test, however, does not consider wealth levels, just their relationship to lifetime income. According to the model of human capital of Becker and Tomes (1986), liquidity unconstrained parents invest in their children up to the amount for which an extra dollar increases the welfare of the child as much through educational investments as through direct gifts. Thus, even if parents spend resources in their children, an operative bequest motive leads to a positive relationship between lifetime income and bequests. Second, to fully assess whether programmes like Social Security are encouraging transfers from the elderly to the young, one needs to examine additional margins, like *inter vivos* transfers. Thus, the comparison of the marginal propensity to bequeath between elderly with and without children is informative about whether or not public transfers encourage private transfers through the bequest margin.

3.2. Models of *inter vivos* transfers

Potential decedents may not leave bequests intentionally, but donors certainly do intend to give *inter vivos* transfers. Economic theory stresses two main motivations for *inter vivos* transfers. The first is the altruistic model, described in the previous subsection. The second is the exchange model, in which donors transfer resources to their children in exchange for the provision of some costly action ('services') from the recipient.

Under the altruistic model, donors provide transfers to equalize the marginal utility of own consumption to that of the recipient of help. In that case, private help may be displaced by public support. The reason is that an extra dollar of public help improves the economic condition of the recipient, diminishing the incentive of the donor to provide resources.

Conversely, private transfers meant to compensate services received may in some cases reinforce redistribution implemented by the government. The reason is that an increase in public help improves the economic condition of the recipient. If the action that parents require in exchange of transfers is costly, the child may require higher transfer from the parent to be convinced to continue providing services (see Cox 1987 and Cox and Jakubson 1995). Therefore, private transfers reinforce the redistribution of resources made by the government.

The relationship between lifetime *inter vivos* transfers and parental income is positive under both models, albeit through different mechanisms. Under altruism, the relationship will be positive because parents with higher income levels will have a relatively lower marginal utility of own consumption than from the consumption of their children. Under an exchange model, the relationship will be positive because services from children are assumed to be a normal good.

Two alternative methods can assess the extent to which inter vivos transfers interact with public programmes. The first is to compare the differences in the marginal propensity to give transfers out of lifetime income between West Germany and the United States, two countries with very different levels of public insurance. Under altruism, if the income of the child falls, both the probability of giving a transfer and the impact of parental income on the probability of giving a transfer must increase. Thus, a country like West Germany with more generous public insurance should have a weaker relationship between parental income and inter vivos transfers. The second is to examine whether a particular public programme in Germany (unemployment insurance) increases or decreases inter vivos transfers, holding constant the lifetime income of both the parent and the child.

3.3. Relevance of economic policies

This section discusses whether or not differences in the impact of parental lifetime income on expected bequests and lifetime transfers can be explained by features of each country's public programmes. First, the focus is placed on factors that may explain differences in the relationship between lifetime income and expected bequests, and consider in turn the role of healthcare systems, of public and private compulsory annuitization of wealth, and expected longevity. The role of taxes on transfers is deferred to Section 7.1. Secondly, unemployment insurance is considered as a factor that may explain differences in the relationship between lifetime income and lifetime inter vivos transfers.

3.3.1. Public insurance of long-term care insurance. In parallel with the demographic changes in Western Europe, a growing risk among the elderly is the likelihood of becoming dependent, or needing long-term care. Brown and Finkelstein (2004) document that, in the United States, an elderly of 65 years of age faces a risk of 27% of entering a nursing home, the most expensive form of long-term care. Comas-Herrera and Wittenberg (2004) also document that exposure to the need of long-term care is substantial in West Germany and the United Kingdom. In 2001, 11% of the German population above 65 years of age were defined as 'dependents' (that is, they receive some form of public or private long-term care). The corresponding estimate for the United Kingdom was 15% in 2001. In all three countries considered, the market for private insurance against these costs is small. Hence, insurance against long-term care needs may only be obtained through family networks, through saving, or through public help. Traditional long-term care provided by families is likely to be insufficient in the future, since projections suggest that the need of insurance against long-term care risk will increase (see Comas-Herrera and Wittenberg 2004).

There are stark differences in the role of the public sector in the way of insuring those expenses. In the United States, long-term care is mainly provided by the private sector, but a public programme (Medicaid) covers long-term care costs for individuals who meet an income and asset test (35% of long-term care expenditures, according

to Brown and Finkelstein 2004). The same authors claim that the existence of Medicaid effectively discourages the demand for private insurance against the risk of needing long-term care for up to 90% of the wealth distribution.

Conversely, after 1993, 90% of individuals in Germany are covered for long-term care costs by mandatory social insurance (see Comas-Herrera and Wittenberg 2004 or the European Observatory of Health Care Systems 2000). Public insurance reimburses costs up to a limit, with means-tested social assistance to finance costs over the limit. In that respect, in principle, the German elderly are less exposed than the American elderly to the risk of large expenses related to long-term care.

Finally, in the United Kingdom, the provision of these services is provided both by the private and the public sector. Public services provided by local authorities are subject to a very strict asset test, while private provision is not subsidized.

These considerations lead us to consider that the elderly in the United States and in the United Kingdom are more exposed to health-risks in their old age than the elderly in West Germany. The discussion in Appendix 1 implies then a stronger relationship between lifetime income and wealth in the United States and in the United Kingdom than in West Germany.

3.3.2. Public and private annuities. We start with public income provision in old age. Upon retirement, the German public Social Security System in 2001 replaced 66.8% of net income prior to retirement with net benefits after retirement (see Table 2, row 1). The corresponding numbers for the United States and the United Kingdom were 39.6%, and 27.2%, respectively (Table 2, row 1). Further, gross replacement rates in the United States fall over the income distribution, being larger for individuals who had lower pre-retirement income.

As to private annuitization, among the three countries considered, the United Kingdom is the only one that has a relevant market for annuities. The Social Security system

Table 2. Differences between public pensions and unemployment insurance across countries

	United States	Germany	United Kingdom
Pension systems			
1. Replacement rate of public pension at average retirement age	39.6	66.8	27.2
2. Average retirement age	64.6	62.6	60.3
Other safety nets			
3. Replacement rate of unemployment insurance (1998)	60	73	64
4. Maximum duration of unemployment compensation (1998)	26 weeks	32 months	12 months

Notes: The figures for maximum duration of unemployment insurance for the United Kingdom do not include additional benefits received after the first year in unemployment.

Source: Börsch-Supan and Lusardi (2003).

in the United Kingdom has experimented with several reforms over the last decades (see Emmerson 2002 for a description of the reforms in the United Kingdom). Traditionally, the provision of income for old age has relied more on occupational pensions in the United Kingdom than in Germany. In 1978 a second-tier scheme was introduced (State Earnings Related Pension, or SERP). Between 1978 and 1988, individuals could opt out of the SERP scheme into an occupational pension or into a private defined-benefit scheme. A further reform in 1988 made it possible to opt out to a personal pension that could be defined-contribution. Individuals who chose the latter option were required to annuitize by age 75 three-quarters of their pension wealth. While currently there are not many annuitants in the United Kingdom, the relevance of this group is likely to grow over time.

The impact of forced annuitization, either public or private, on the relationship between accumulated earnings and post-retirement wealth depends on the presence of a bequest motive. In the case of accidental bequests, forced annuitization leads to a weaker relationship between accumulated earnings and post-retirement wealth. The reason is that individuals would like to invest all their wealth in annuities (see Yaari 1965). In the absence of private markets, increases in the degree of forced (actuarially fair) annuitization lead to (a) lower wealth holdings and (b) a weaker relationship between lifetime income and bequeathable wealth (see Appendix 1). In the presence of a bequest motive, increases in the degree of forced annuitization may not have an effect on bequeathable wealth. Imagine that individuals hold their desired level of bequeathable wealth. If the public sector forces income to be saved in ‘non-bequeathable’ assets, individuals will react by investing in life insurance (Kotlikoff 1989, Bernheim 1991). The reason is that life insurance is an asset that exactly undoes what extra annuitization imposes, that is, transfers resources to descendants in the event of death of the person. In this case, total bequests would remain unaffected.

3.3.3. Expected longevity. Higher expected longevity increases the relationship between accumulated lifetime income and post-retirement wealth (see Appendix 1). Expected longevity is very similar in the three countries considered. Focusing on females, Börsch-Supan and Lusardi (2003) document that expected longevity is 79.4 years in the United States, 80.5 years in Germany and 79.7 years in the United Kingdom. Possibly, most important for saving is not total expected life duration but expected longevity after retirement. Further, considering differences in retirement age exacerbates the differences, as West Germans retire by age 60, while UK and US individuals retire later in life. Those considerations would lead to a stronger link between lifetime earnings and retirement wealth in West Germany, holding everything else constant.

3.3.4. Unemployment insurance. Germany has an unemployment insurance system that provides a higher replacement rate upon the loss of a job than that of the United States or the United Kingdom. For a married person with two children, the replacement rate in West Germany in 1998 was 73% in 1998, while in the United

States it was 61%, and 64% in the United Kingdom (Table 2). In addition, the maximum duration of unemployment compensation is 26 weeks in the United States, and 12 months in the United Kingdom, while it can reach 32 months in West Germany. The role of private networks of insurance (like transfers *inter vivos*) is possibly larger in economies in which the public sector provides less help when individuals lose a job than in economies with a stronger welfare state.

4. DATA SOURCES AND DEFINITIONS

Our analysis is based on three samples drawn from household level data for the United States (Panel Study of Income Dynamics or PSID), West Germany (the German Socio Economic Panel or GSOEP), and the United Kingdom (British Household Panel Survey or BHPS). For several reasons, these data sources are especially appropriate to examine the relationship between lifetime earnings and household wealth. The first is that the three surveys are long panels that follow the income and fertility histories of individuals for more than 10 years. Those features allow us to construct reliable proxies for lifetime income of an individual and to have detailed information on their demographic history. The second advantage is that they are very similar in set-up: the GSOEP was modelled after the PSID, and the BHPS also borrows in structure from the PSID. Finally, the PSID and the GSOEP have been used in previous work on transfers (Altonji *et al.* 1997 for the United States or Jürges 2001 for Germany), or on previous work on the relationship between lifetime income and expected bequests for the United States (Laitner and Ohlsson 2001, Altonji and Villanueva 2003), whose sample provides a useful benchmark. A drawback of these datasets is that they are unlikely to survey the very wealthy, given their sample design. In the United States, for example, Juster *et al.* (1999) compare the PSID to a dataset that does contain the very wealthy (the Survey of Consumer Finances), and document that the PSID tracks wealth holding very well up to the top centile of the wealth distribution. Less is known about the other two datasets.

To measure the impact of lifetime income on bequests and on *inter vivos* transfers from parents to children, information is needed about *inter vivos* transfers, about bequests received by specific individuals, and about the income of their parents. *Inter vivos* transfers and measures of income are available in all surveys. Measures of bequests are harder to obtain, but of course the bequest left to the children by an individual who dies at age 75 is closely related to his or her wealth at that age. Hence, instead of using data on bequests, data on wealth held late in life are used in what follows. In other words, the relationship between bequests and income is inferred from the relationship between wealth levels after age 50 and lifetime income of the potential testator, weighed by average mortality rates. This measure is called ‘potential bequests’, and corresponds to the relationship described in Appendix 1. Among other researchers using this measure of potential bequests, see Kotlikoff (1989), Altonji and Villanueva (2003) or Reil-Held (1999). Potential bequests can overstate

bequests for two reasons. First, there may be substantial medical costs that drain a substantial amount of resources in the years prior to death. At least for the case of the United States, this may not be a major problem, based on recent evidence of Hurd and Smith (2002), who use panel data to compare wealth holdings late in life of elderly individuals to actual bequests (as reported by recipients), and document that out-of-pocket medical costs account for less than 8% of household wealth prior to death. Second, actual wealth may be bequeathed to charities or other relatives, rather than children. Again, in the United States, Hurd and Smith (2002) document that, among decedents who leave a positive estate, at most 8% of the estate is given to persons or institutions who are not children or the spouse.¹ To the best of the author's knowledge, there is no evidence from micro data for Germany or the United Kingdom. Aggregate statistics suggest that the amount given to charities in the United Kingdom is a lower fraction of the GDP than in the United States (0.55% in the United Kingdom and 2% in the United States: see Independent Sector 2001).

Wealth holding data are obtained by aggregating the assets reported by a household that can be bequeathed to children. These include the value of the house, other real estate, financial and tangible assets. There are categories that should also be included, such as the value of business held by the elderly, but the BHPS does not contain information on this category. Hence, the first specification excludes business wealth from the wealth measure in the United States and in West Germany and then presents robustness checks for the two countries for which more complete information on household wealth is available. An additional component worth mentioning is life insurance. West German households invest more than Americans in this component (Walliser and Winter 1998). In principle, life insurance products may reflect a bequest motive if the beneficiaries are the children of the person who contracts them. The GSOEP asks individuals about the cash surrender value of the life insurance policy, together with other private pensions and building savings accounts. Kotlikoff (1989) argues that net worth plus the face value of life insurance is the proper measure of what the estate of a person would be upon the event of death. In West Germany, however, information is only available regarding the cash surrender value, and a similar underestimate may result from the very similar measure of life insurance in the US PSID data. Other wealth components whose definitions may change across samples are related to financial wealth. Some components in the GSOEP sample have a lower level threshold, ignored in the estimation procedure. For the measure of wealth to reflect resources that are likely to be passed on to children, it is necessary to exclude annuitized wealth from the wealth measure. In the case of the United States, individuals are explicitly asked about the amount of wealth held as annuities, and it is possible to omit it from the wealth measure. The case of the United Kingdom is a bit more complicated. In principle, occupational pensions need

¹ Hurd and Smith (2002) document that the fraction of the estate that is given to charities among elderly without children is 17%. The rest goes to siblings or other relatives.

to be annuitized between retirement and before age 75 if they belong to the defined contribution type. No wealth measure includes occupational pensions, but some annuities, like personal pensions, may be included in the category 'other financial assets'.

In the case of the United States four years of data are available: 1984, 1989, 1994 and 1999. In the West German and UK cases, only one year of information on wealth is available: 2002 for West Germany and 2000 for the United Kingdom. The construction of the samples is discussed in Box 1. To analyse bequests, the samples are restricted to (a) years in which wealth information is surveyed (b) heads of households above age 50 and (c) households that have descendants (as mentioned above, a control group of elderly without descendants is also considered). Given that

Box 1. Description of the datasets

The US wealth data are drawn from the 1968–99 waves of the Panel Study of Income Dynamics (PSID), and is very similar to that used by Altonji and Villanueva (2003). The PSID is a panel survey that started in 1984 interviewing individuals in 5000 households. It included a random sample of the US population and an extra sample of poor individuals. In subsequent years, all individuals in the original 1968 household, were interviewed about their income and demographic information is available for all years. Household wealth is available for individuals interviewed in four waves: 1984, 1989, 1994 and 1999. The information on income is obtained from the yearly labour earnings of the husband and wife.

- *PSID wealth measure.* In the PSID, wealth is reported at the household level: (1) value of the house, net of mortgages; (2) other real estate; (3) vehicles, and motor homes; (4) cheque and savings accounts; (5) value of stock, bonds and individual retirement accounts; (6) other savings and assets. The measure contains neither annuities (that may be considered non-bequeathable) nor business wealth (that is not available in the BHPS). The sample contains 4,377 observations on individuals who are present in the original 1968 interview and become age 60 at some point in the interview.

- *PSID transfer data* is obtained from the 1988 Transfer Supplement from the PSID. In that year, respondents were asked about monetary transfers given to adult children living in their own household in excess of \$100.

The German sample is drawn from the 1984–2002 waves of the German Socio Economic Panel (GSOEP). The GSOEP contains yearly information on the labour earnings of each individual, as well as about their marital status and about other characteristics. The information on income is obtained from the Cross-National Equivalent File measure of labour earnings of the husband and wife.

- *GSOEP wealth information* is drawn from the 2002 wave and contains the following measures: (1) value of his or her house, and other real estate; (2) financial assets, including savings bonds and investments; (3) cash surrender value of private pension wealth, life insurance and building savings accounts; and (4) tangible assets, minus debts. Some questions include a lower threshold of €2500 that is ignored in the empirical analysis here. The omission may influence the international comparison, but it should not affect the comparison of the marginal propensity to bequeath of elderly with and without children. Unlike the PSID, questions are asked to each individual. The data analysed in the paper are obtained by aggregating the individual reports of the husband and the wife, only considering couples present in the original 1984 interview who are in the 2002 wealth sample. The average and median levels of household wealth in the 2002 wave of the GSOEP are €117 013 and €14 000, respectively. The corresponding values in the 1998 wave of the more widely used German sample called *Einkommens und Verbrauchsstichprobe* (EVS) are €113 639 and €38 685 (Börsch-Supan and Essig 2000).

The sample of elderly with children is restricted to individuals who are above 50 years of age in 2002, who report wealth, income and the demographics necessary to construct the lifetime income measure. Individuals must be present in the original 1984 interview. The number of children is drawn from information in the biography of births for females.

- *The German transfer data* are drawn from the 1988–2000 waves of the GSOEP. Every year except for 1992 and 1994 respondents are asked about the amount of inter vivos transfers given to all children living in separate households.

Finally, the UK data is obtained from the 1991–2001 waves of the British Household Panel Survey (BHPS). The income information is obtained from household yearly labour earnings.

- *The BHPS wealth data* is drawn from the 2000 wave. This measure contains information on (1) the net value of the house; (2) savings in bank accounts plus individual savings accounts; (3) investment products like National Certificates, shares and bonds; and (4) information on other debts. The survey asks separately the head and spouse of the household the wealth information in items (2)–(4), and for the present analysis it was aggregated at the household level using the ‘upper bound’ measure of Banks *et al.* (2003).

The sample includes 1028 individuals over 50 years of age in 2000 and who were present in the first survey in 1991, report wealth in 2000 and labour income in previous years to construct the lifetime income measure. The number of natural or adopted children is obtained using the cross-year information on fertility.

the distribution of wealth is very skewed, large outliers could significantly affect the precision of the results of a regression of wealth levels on income. Hence, all results reported below are obtained from samples that exclude observations with prediction errors above the top 0.5% or below the bottom 0.5% in median-regression models with the same set of covariates. Inter vivos transfers are obtained from questions asking respondents how much money they gave to children who lived outside the household of the respondents. Under some circumstances, parents may want to give more money to children who are in a worse financial situation. Hence, demographic and income data on the persons who are the potential recipients of these gifts is useful. In the United Kingdom, the information on transfers is available from the reports of the child. Nevertheless, while about 5% of individuals reported having received a transfer, very few respondents reported actual amounts. Hence, the information on the United Kingdom is not used in what follows.

4.1. Comparing measures of wealth and patterns of giving across countries

Table 3 documents the average wealth holding in the sample used for bequests in the three countries under consideration. All monetary magnitudes are expressed in 1995 dollars (see the notes to Table 1 for details; the conversion factors affect the levels of the variables, but are irrelevant to the relationship of interest between transfers, bequests and income). The average wealth holdings are similar across countries, about \$180 000. Nevertheless, a direct comparison of those measures is misleading, as the data from the United States pools observations on the period spanning 1984 and 1999 in which household wealth has been subject to considerable time shocks. The average household wealth in 1999 is \$229 586 (of 1995), much larger than the corresponding averages for the United Kingdom and West Germany (\$174 156 and \$176 603, respectively).²

To obtain a measure of lifetime economic status, it is useful to construct a household's 'permanent annual income'. It is an average across several years of the yearly labour earnings of the husband and wife, normalized so that its average represents the average earnings of a 40-year-old person. As the working lives of many of the individuals in the sample include post-war years with strong growth of average earnings (especially important in the German case), the measure of permanent income includes an adjustment for these years (see Appendix 2 for details). The measure of permanent yearly labour income is highest in the United States (\$42 927), and lowest in West Germany (\$33 236).

We start by checking whether the data are consistent with the widely documented differences in savings rates across the three countries. In 2001, the aggregate savings ratio in the United States was 2.5%, and the corresponding statistics for Germany and the United Kingdom were 10% and 6.2%, respectively (estimates from Börsch-Supan and Lusardi 2003). The data do not make it possible to compute actual

² Of course these statistics are not representative of average wealth in these countries, because the samples are unlikely to contain very high wealth levels, were screened for outliers, and contain only individuals above 50 years of age.

Table 3. Summary statistics of sample used for the wealth regression

	United States Mean (standard deviation)	West Germany Mean (standard deviation)	United Kingdom Mean (standard deviation)
Wealth holding US, year 1999 [median]	229,586 [124,58] (301,435)		
Wealth holding, all years [median]	173,390 [88,740] (260,825)	176,603 [135,581] (214,679)	174,156 [117,460] (184,209)
Parental permanent annual income	42,927 (27,714)	33,236 (20,382)	36,075 (22,699)
Age of oldest parent (if present)	64.62 (8.56)	63.66 (8.317)	59.1 (6.14)
Father is a widower	0.06 (0.24)	0.04 (0.18)	0.02 (0.14)
Mother is a widow	0.18 (0.38)	0.13 (0.34)	0.07 (0.26)
Divorced parents	0.207 (0.40)	0.12 (0.33)	0.07 (0.25)
Divorced female	0.063 (0.24)	0.069 (0.24)	0.032 (0.17)
Average number of children	3.45 (2.55)	2.41 (1.39)	2.57 (1.28)
Sample size	4,377	977	1,028

Notes: Wealth outliers are trimmed in the three samples. All monetary magnitudes are expressed in 1995 dollars. DM were converted into US dollars using purchasing power parity of \$1 per euro. British pounds were converted into US dollars using purchasing power parity of \$1.53 per pound. The definition of wealth in all countries includes value of the house, other real state, tangible assets, financial assets, minus mortgage debt and other debts. Business wealth is not included. The United States sample is a panel of 4 waves: 1984, 1989, 1994 and 1999. Respondents are present in the original 1968 survey. The German sample is a cross-section of respondents to the 2002 GSOEP Wealth Supplement who had at least one child and were interviewed in the original 1984 interview. The British sample is a cross-section of respondents to the 2000 BHPS Wealth Supplement who had at least one child.

Source: The data in the first column is based on a PSID sample constructed by Altonji and Villanueva (2003). The data in the second and third columns are obtained from own computations from the GSOEP and the BHPS.

savings ratios, as panel data on wealth are not available for all countries, but it is possible to examine a related variable: the ratio of current wealth to permanent income. The first row of Table 4 presents wealth-income ratios over the distribution of permanent income in the United States, West Germany and United Kingdom. The median wealth-income ratio is 3.76 in West Germany, higher than the corresponding estimate for the United States. The wealth ratio in the United Kingdom is 3.59. The samples are thus consistent with smaller wealth-income ratios in the United States than in West Germany and the United Kingdom, as documented by many other researchers.

Nevertheless, the relationship between wealth-income ratios and permanent income is very different across countries. Rows 2 through 6 of Table 4 condition median wealth-income ratios by permanent income quintile. The first column of Table 4 documents that wealth-income ratios in the United States uniformly increase with income. For the lowest quintile of the income distribution, the wealth-income ratio is 1.8. For the highest quintile, the wealth-income ratio is more than twice as large (see

Table 4. Median wealth-income ratios, by income quintiles

	United States Wealth- income ratio	West Germany Wealth- income ratio	United Kingdom Wealth-income ratio
1. Median wealth-income ratio	2.92	3.76	3.59
2. Lower income quintile	1.80	1.2	5.8*
3. Second income quintile	2.15	3.12	4.73*
4. Third income quintile	2.88	3.6	3.23
5. Fourth income quintile	3.01	4.28	2.88
6. Highest income quintile	5.15	3.72	3.21
Number of observations:	749	977	1028

Notes: The data of the United States correspond to 1999. Heads older than 50 years of age. Income is permanent annual income, defined in Appendix 2.

* These estimates are noisy.

Source: Own computations from the GSOEP, PSID and BHPS.

Dynan *et al.* 2004 for a similar result). In Germany, wealth-income ratios are fairly flat across income quintiles. In the United Kingdom, declining wealth-income ratios are observed for the bottom two quintiles, but these estimates are somewhat noisy.

Two of the institutional differences discussed in Section 3 are consistent with the finding that wealth-permanent income ratios increase more with lifetime income in the United States than in West Germany. The first is exposure to risk of needing long-term care in the old age. As discussed in Section 3, asset and income means testing implicit in the Medicaid programme in the United States provides a higher degree of insurance against long-term care costs for low-income households than for high-income households. Conversely, mandatory health insurance in Germany for almost all the population does not create a differential incentive to save out of lifetime income for high-income households. Nevertheless, that explanation alone does not fit the evidence for the United Kingdom, where long-term care must also be purchased in the private sector, and wealth-income ratios are rather flat.

Second, the degree of mandatory wealth annuitization also is a potential candidate to explain these differences (in the absence of a bequest motive). Old age income replacement ratios fall with pre-retirement income in the United States, while they do less in West Germany (Börsch-Supan and Reil-Held 1999). That may create a higher incentive to save out of lifetime income among high-income households than among low-income households. A possible explanation for the weak relationship between lifetime income and wealth-income ratios in the United Kingdom would lie on the degree of forced annuitization.

The descriptive analysis in Table 4 does not hold constant other characteristics that may be correlated both with lifetime income and wealth, like the age of the potential testator, his or her marital status and the number of descendants. Section 6 performs a regression analysis, controlling for these characteristics. Yet, the increasing pattern of wealth-income ratios over the income distribution in the United States, against the relatively flat one for the West Germany and the United Kingdom points to a larger

Table 5. Summary statistics of the samples used for the analysis of inter vivos transfers, both countries

	United States			West Germany		
	Total	Transfers > 0	No transfer	Total	Transfers > 0	No transfer
Transfer given to any child (0 if not gave, 1 otherwise)	0.31 (0.46)	1 –	0 –	0.17 (0.37)	1 –	0 –
Total transfers from parents	758 (3,680)	2,415 (6,267)	0 –	660.5 (2,215)	3,811 (4,042)	0 –
Parental permanent annual income	53,455 (28,281)	39,370 (34,125)	38,584 (24,019)	42,927 (23,923)	49,750 (26,846)	36,244 (22,580)
Mean permanent income of children	44,401 (24,927)	47,467 (25,491)	43,010 (24,554)	44,554 (20,628)	38.648 (20,389)	45.716 (20,479)
Year of birth, oldest parent	1932 (8.91)	1932 (8.91)	1932 (8.91)	1934 (5.97)	1934 (5.46)	1934 (6.03)
Year of birth, child	1961 (5.98)	1962 (5.04)	1961 (6.28)	1965 (4.32)	1965 (4.26)	1965 (3.82)
Father is a widower	0.036 (0.19)	0.034 (0.19)	0.037 (0.18)	0.033 (0.18)	0.011 (0.10)	0.04 (0.19)
Mother is a widow	0.14 (0.34)	0.018 (0.13)	0.192 (0.39)	0.08 (0.27)	0.079 (0.26)	0.091 (0.19)
Divorced parents	0.23 (0.42)	0.19 (0.39)	0.24 (0.42)	0.064 (0.242)	0.076 (0.26)	0.038 (0.19)
Average number of children in sample	4.26 (2.53)	4.17 (2.54)	4.31 (2.5)	1.82 (0.86)	1.78 (0.73)	1.82 (0.89)
Sample size	1378	433	945	3,082	534	2,548

Notes: The US sample is a cross-section of 1259 original households, who report transfers in 1988. The German sample is an unbalanced panel of 491 parents, interviewed for the first time in 1984. Each observation is a combination of parent-year. Included waves: 1984–2000, except 1992 and 1994. Monetary magnitudes are all expressed in 1995 dollars, using purchasing power parity reported by the OECD.

Source: The data in the first three columns is based on the sample in Altonji and Villanueva (2003). The data in columns 4 through 6 is drawn from the GSOEP.

increase of wealth with income in the United States than in the other two economies. That pattern of results is consistent with the findings below.

Table 5 shows the average transfers given by US and German donors, their own incomes and the income of their descendants. Thirty-one per cent of US households report having given a transfer to any of their children, while the estimate for Germany is lower at 17%. In both countries, parents who give tend to have higher levels of permanent income than parents who do not give. These summary statistics point to a positive relationship between inter vivos transfers and income of the potential donor in both countries, and to a positive impact of lifetime income of the donor on the transfer amount.

5. THE MARGINAL PROPENSITY TO GIVE THROUGH BEQUESTS

The section starts by outlining the basic framework to estimate the relationship between lifetime income and expected bequests. The methodology is taken from Altonji and Villanueva (2003), and is also similar to Kotlikoff's (1989). Given that the monetary

value of income and wealth varies over the life-cycle of the parent, we discount all monetary measures to the moment the parent reaches age 70. Following the discussion in Section 3, bequests are savings for old age, which any model with forward-looking agents relates to the lifetime income of the potential donor. The procedure assumes that lifetime income of a household has two main components: the stream of labour earnings during the working life of the members and post-retirement income. After retirement, parents receive a flow of post-retirement earnings that lasts until their death at age 86.³ The lifetime income of an individual is then the value of the flow of earnings of the household and the expected flow of post-retirement income, discounted to age 70. These computations rely on key assumptions about the interest rate and age-specific mortality rates. Plausible rates of return are 4.5%, the real rate of return used for the United States by Gale and Scholz (1994), following historical averages from Kotlikoff and Summers (1981); for Germany, Reil-Held (1999) estimates an interest rate of long-term saving net of inflation of 2.39%. To allow for comparability of the estimates, the results are reported first for a 4% rate of return in all countries, then for a 2% real interest rate below. The mortality rates used are average rates for the populations as a whole. Appendix 2 discusses in detail the computation of the components of individual lifetime incomes.

The estimation method examines potential bequests, that is, the stock of wealth late in life, weighted by the probability that the individual dies (as in the computations for a married household, the bequest is assumed to occur after the death of the last person of the couple). Here, and in all the following expressions, average income is subtracted from individual incomes. This makes it possible to interpret the coefficient of lifetime income as the impact of lifetime resources on wealth at each age, evaluated at sample mean of estimated lifetime resources.

Consider first a regression relationship between lifetime income of an individual, Y , and the wealth holding of that individual after age 50, W .

$$W = \gamma_0 + \gamma_1 Y + \gamma_2 Y^2 + \gamma_3 Y(\text{age} - 70) + \text{controls} + \varepsilon \quad (1)$$

In Equation (1), the coefficient of lifetime income Y measures the extent to which wealth at each age depends on cumulated earnings, and is identified by cross-individual variation in cumulated earnings controlling for marital status, race and the number of dependants. The rationale for holding constant those demographic variables is that, for the United States, Smith (1995) documents that wealth holdings vary with demographics that are also related with lifetime income, such as the marital status or the race of the head of the household. Also, to avoid problems of heterogeneity in savings motives for individuals of different races, only whites are analysed in the United States.

³ Age 86 is possibly an early date of death in most Western countries, but the GSOEP and the BHPS samples do not contain enough elderly individuals to assess properly the relationship between income and age at ages after 90. In the US the results were not affected by extending the comparison to age 100 (in the PSID individuals are up to 92 years of age), possibly due to heavy discounting of very late-age years.

In a second step, estimates from Equation (1) are used to find out how much expected bequests vary with the lifetime resources of an individual. The strategy is to weight the impact of lifetime income on wealth at each age by the probability that death happens at that age, and then aggregate over all ages. In other words, the computation of the impact of lifetime resources on expected bequests should take into account that the probability of death of a female who survived until age 79 is 5%, while the same probability at age 61 is 0.6%. Nevertheless, at both ages there is a chance of observing a bequest, so both should be included in the computation. The result of this computation reveals how much expected bequests increase with an additional dollar of lifetime income, for a couple that faces *ex-ante* the average survival rates. The details are provided in Appendix 2.

As mentioned above, a variety of economic models, with different implications for public policy are consistent with a positive impact of lifetime resources on expected bequests. To provide a benchmark for the presence of a bequest motive, similar computations are performed for childless elderly persons in the three countries. Under the assumption that individuals are more concerned about the utility of their children than about the utility of other relatives or charities, childless couples are less likely to have a bequest motive than individuals with children and, holding income constant, are equally likely to save for precautionary purposes. In addition, other legal constraints penalize inheritances to individuals other than children or parents of the potential donor. In the United Kingdom, the intestacy law places a higher tax on inheritances passed on to siblings or other relatives (12%) than to inheritances passed on to children, parents or grandchildren (4.5%). In Germany, the tax system also discourages giving to individuals who are not descendants or ascendants of the donor.

5.1. The impact of parental lifetime resources on current wealth

The coefficient of parental lifetime income in the regressions shown in Table 6 shows the impact of cumulated earnings on wealth held by individuals at each age, controlling for the age of the oldest person in the household, the marital status, and the number of descendants that the person ever had. As the age of the oldest person in the household is the difference from 70, and the regression includes an interaction term between lifetime income and age, one can interpret the coefficient of cumulated earnings as the increase in wealth at age 70 when cumulated earnings increase by one dollar. The first column shows the results in the United States, the second column the estimates for West Germany and the third column shows the corresponding estimates for the United Kingdom. An extra dollar of lifetime resources of the parent increases wealth holdings late in life by 4.13 cents among white individuals. Perhaps surprisingly, the estimate of the interaction between parental lifetime resources and the age of the parent is positive, implying that the impact of lifetime income on wealth does not fall with age. If individuals saved only for precautionary purposes, one would expect the impact of income on wealth to diminish with age because all

Table 6. The impact of an extra dollar of lifetime income on wealth holding at age 70, parents
Dependent variable: Wealth holding, in thousands of dollars

	United States (1)	West Germany (2)	United Kingdom (3)
Parental lifetime income	0.0413 (0.0033)**	0.029 (0.0042)***	0.02 (0.005)**
Parental lifetime income, squared	2.11e-06 (4.24e-07)**	1.33e-06 (2.93e-07)**	5.83e-07 (3.36e-07)*
Parental lifetime income, cubed	-6.17e-11 (1.18e-11)**	-	-
Income* (age-70)/10	0.0061 (0.0018)*	-	-0.0005 (0.0003)
Income* widow	-0.014 (0.004)**	-0.0138 (0.0082)	-0.0003 (0.008)
Income* divorced	-0.017 (0.0045)**	-0.0248 (0.0059)***	-
Income* nonwhite	-0.013 (0.0045)**	-	-
Age parent -70	-0.156 (0.978)	-1.856 (1.02)**	-1.65 (3.03)
Age parent -70, squared	-0.21 (0.056)**	-0.184 (0.077)**	-0.236 (0.14)
Divorced	-76.36 (14.51)**	-143.07 (19.433)***	-71.019 (28.93)**
Widow/er	-61.32 (14.98)**	-57.843 (25.81)	5.37 (51.45)
Widow	-70.71 (12.08)**	-23.34 (27.17)***	-20.02 (28.116)
Single	-	-145.95 (27.08)***	-
Female, divorced	-17.23 (15.70)	-23.21 (21.02)	-16.67 (28.24)
Inverse number of children	23.64 (18.77)	13.94 (22.26)	33.41 (22.025)
Constant	225.68 (16.11)**	208.83 (15.96)***	191.52 (19.199)***
Observations	4,377	977	1,028
R-squared	0.40	0.24	0.14

Notes: Estimation method: Ordinary Least Squares

$$W = \gamma_0 + \gamma_1 Y + \gamma_2 Y^2 + \gamma_3 Y(\text{age} - 70) + \gamma_4 (\text{age} - 70) + \gamma_5 (\text{age} - 70)^2 + \beta X + \varepsilon$$

Wealth outliers trimmed (see Appendix 2). Standard errors in parentheses account for heteroscedasticity, and in the United States, for autocorrelation between observations from the same individual. Parental permanent earnings Y_i is the deviation from the unweighted sample mean (for each country). All monetary magnitudes are expressed in 1995 dollars, using the OECD PPP of DM per dollar and \$1.53 per British pound. For the case of the United States, we omit time dummies.

*, **, *** denote that the estimate is significantly different from zero at the 10, 5 and 1% confidence level, respectively.

Source: Samples in Table 3. Results in Column 1 based on Altonji and Villanueva (2003).

the elderly, regardless of income, would 'target' a zero bequest. The coefficient of lifetime income squared is positive and significant, implying that higher-income households save more of an extra dollar of lifetime income than low-income households.

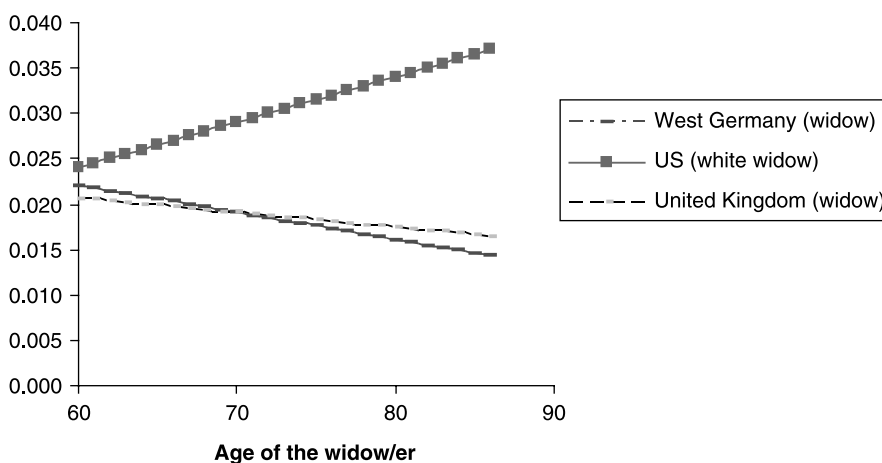


Figure 1. The impact of an additional dollar of lifetime income on wealth holding, by age

The coefficient of lifetime income for West Germany implies that at the average income level, an individual with one extra dollar of lifetime income has 2.9 extra cents of wealth (at age 70, given the normalization of age) about 85% of the corresponding magnitude for the United States. Unlike in the United States, the magnitude of the impact of lifetime resources on wealth levels does not change with age, and is excluded from the regression. Combining the coefficients of lifetime income and of the interaction of lifetime income and widow status, for a German couple one extra dollar of lifetime income increases wealth holding by age 80 by about one and a half cents. Given that the probability of death (and thus of observing a bequest) increases with age, these estimates suggest that the association between lifetime income and expected bequests is weaker in Germany than in the United States. The results for the United Kingdom are very similar to those in West Germany.

Figure 1 summarizes the results in Table 6 displaying to what extent wealth between the ages of 60 and 86 depends on cumulated earnings for the three countries. The estimates are evaluated for a widowed person with the average level of permanent income. In the United States a widowed person whose lifetime income was one dollar larger than the mean has 2.9 cents more wealth at age 70 than the average income person, and the estimate reaches 3.5 cents at the age of 80, when the probability of death is highest (the 2.9 estimate is obtained by subtracting from the coefficient on lifetime income, 4.13 the interaction between lifetime income and widow, -1.4). The corresponding estimates for West Germany and United Kingdom are very similar.⁴

⁴ Two notes are in order. First, given that the patterns of wealth accumulation among non-white US households are not well understood, only white households are reported, but non-whites are not dropped from the sample and contribute to the estimation of other parameters in the regression, like age. Second, one could claim that the fact that widows have a lower relationship between lifetime income and wealth in West Germany and the United States reflects bequests made upon the death of the first member of the couple, not the second (early bequests). In that case, the impact of lifetime income on wealth holding in the case of the US would be larger in reality than in the estimates.

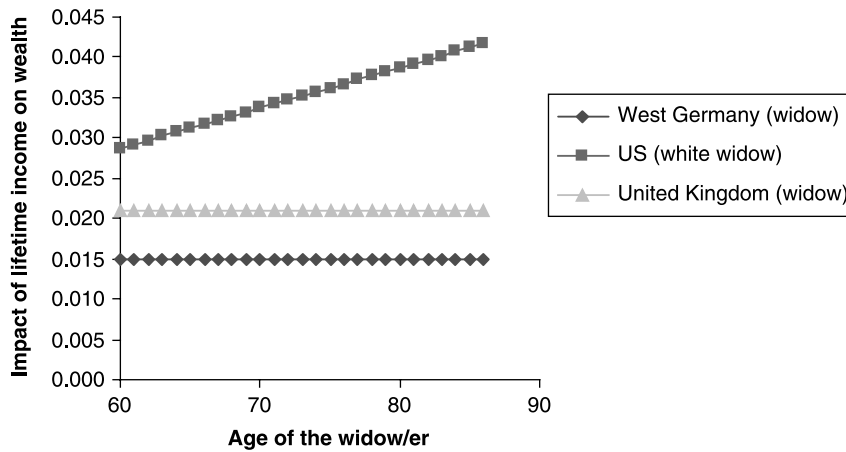


Figure 2. The relationship between lifetime income and wealth at each age, childless elderly

A German individual whose income exceeded the mean by \$1 had 1.9 more cents in wealth at age 70 than a person with mean lifetime income. The gap in the marginal propensity to save out of lifetime resources between the United States on the one hand, and West Germany and the United Kingdom on the other increases with age. Loosely speaking, there are factors operating in the US economy that induce the high-income elderly to remain wealthier in the old age than their European counterparts. One possibility is that preferences are different: for example, a bequest motive may be present in the United States but not in Europe. Other factors may be related to precautionary savings in the old age.

To examine if bequest motives underlie the differences in the propensity to save, Figure 2 displays to what extent lifetime income explains wealth holding at each age for elderly individuals without children in the three economies. As mentioned before, childless elderly are a group of the population for which bequest motives are less likely to be present than among elderly with children. The magnitudes and patterns of the estimates are remarkably similar to those in Figure 1. If a bequest motive is driving accumulation of resources in the old age of the average income household, it cannot be detected in differences in the cross-sectional response of wealth holding of individuals above 50 to their cumulated earnings.

5.2. Impact of parental lifetime resources on expected bequests

Next, each of the age-specific derivatives of the impact of lifetime resources on current wealth, discounted to age 70 of the potential decedent using a 4% interest rate, are weighted by the probability that the last survivor of a couple dies at that specific age. The mortality probabilities used are those of the average person in the German and UK economy. A possible concern is that the mortality rates among low-income

Table 7. The impact of an extra dollar of lifetime resources on expected bequests, by country
Measure of wealth excludes business wealth
Assumed interest rate: 4%

	Parent permanent earnings level used to evaluate lifetime income		
	10th percentile (1)	Average (2)	90th percentile (3)
1. United States (whites)	0.0122 (0.0034)	0.0193 (0.002)	0.0239 (0.0033)
2. United States (whites), childless elderly	0.004 (0.011)	0.015 (0.005)	0.027 (0.0067)
3. West Germany	0.0049 (0.003)	0.0098 (0.003)	0.0155 (0.0037)
4. West Germany, childless elderly	0.014 (0.0067)	0.014 (0.0067)	0.014 (0.0067)
5. United Kingdom	0.0088 (0.005)	0.0112 (0.0048)	0.0139 (0.004)
6. United Kingdom, childless elderly	0.0137 (0.0062)	0.0116 (0.004)	0.0091 (0.0033)

Notes: The 10th, average and 90th percentile of parental permanent earnings in the US are \$19 646, \$48 734 and \$80 029 of 1995. The 10th, average and 90th percentile of parental permanent earnings in West Germany are \$24 324, \$39 828 and \$68 779 of 1995. The 10th, average and 90th percentile of parental permanent earnings in the United Kingdom are \$13 973, \$40 557 and \$70 973 of 1995. The estimates show the impact of an extra dollar of (gross) lifetime income on expected bequests to all children, using the estimates in Table 6. Standard errors, corrected by heteroscedasticity, are reported in parentheses. The computations assume a common real interest rate in both countries of 4%.

Source: Results based on the estimates in Table 6 and Table A3 (in the Appendix), using the PSID, the GSOEP and the BHPS.

individuals differ substantially from the average mortality rate. Then, aggregation would yield an incorrect estimate. For the United States this is likely to be less of an issue. Following Altonji and Villanueva (2003), average mortality rates are allowed to depend on individual lifetime incomes, using longitudinal information in the PSID on mortality and lifetime income. The estimates do not change substantially in the United States, but the aggregate results should be taken with care in the other countries.

The estimates in Table 7 measure the extent to which expected bequests depend on cumulated earnings for individuals at various points of the income distribution. The estimate in row 1, column 2 suggests that in the United States, a white couple with one dollar of lifetime income more than the mean leaves 1.9 cents more to all children than a couple at the mean of lifetime income. The estimate at the 10th percentile of the income distribution is 1.2 cents and at the 90th percentile is 2.39 cents. The estimates increase weakly with permanent income.

By themselves, these numbers do not tell us much about the presence or not of a bequest motive. Row 2 in Table 7 presents a benchmark reporting, at several points of the income distribution, the marginal propensity to bequeath of elderly who did not have children. At the average level of income, the relationship between cumulated earnings and expected bequests is remarkably similar between both groups. For

elderly with children, the estimate of the impact of an additional dollar of lifetime income on expected bequests is 1.9 cents. The corresponding estimate at the sample mean for elderly without children is 1.5 cents, and the difference is not significantly different from zero. In light of the limited sample size, it is important to experiment with alternative specifications of the wealth regression for the sample of elderly without children. Alternative specifications were estimated, and the marginal propensity to bequeath among individuals without children is never different from the corresponding estimate for elderly with children. Column (3) in Table 7 shows the estimate of how expected bequests change with lifetime income at the 90th percentile of the distribution of permanent income, where a bequest motive is most likely to operate. The results are even larger for the sample of elderly without children (estimates from a regression of wealth on the lifetime income of individuals without children are reported in Table A3 of the Appendix). To the extent that childless elderly have less of a bequest motive than elderly with children, these results suggest that most of the saving for the old age responds to precautionary motives.

Row 3 of Table 7 presents comparable estimates for West Germany. The point of evaluation of the income distribution is not the same as in the United States, as the distribution of permanent income is different across countries.

An extra dollar of lifetime income increases wealth holding late in life by 1 cent in West Germany, at least at the average of the income distribution. The point estimate is significantly lower than the corresponding US estimate at the 1% confidence level. The estimate for Germany is higher at the 90th percentile of the income distribution: around 1.5 cents (Table 7, row 3, column 3). Again, the point estimate is lower than the corresponding estimate for the United States. The comparison with the same magnitude for childless elderly gives another useful benchmark, especially at the average income level, where the estimate is most precise. The computation of the marginal propensity to bequeath in West Germany for elderly couples is 1.4 cent, even larger than the corresponding estimate for individuals with descendants. In the German case, at the 90th percentile of the income distribution, the marginal propensity to bequeath is 1.53 cents (Table 7, row 3, Column 3). The point estimate is somewhat larger than the corresponding estimate for elderly without children (1.4 cents, row 4 Column 3) but the difference is not significantly different from zero.

These findings are consistent with other evidence for the United States and West Germany. Hurd (1987) documents that, contrary to the predictions of a model with an operative bequest motive, individuals without children dissave in their old age at a similar rate than individuals with children. Jürges (2001) documents a similar result for West Germany. The results obtained from the data analysed here for the United Kingdom are remarkably similar to those in Germany. Parents who have lifetime income \$1 larger than the average leave a bequest 1.12 cents larger than parents with average lifetime income. The estimate is very similar among the group of individuals who never had children.

Overall, it is possible to draw two conclusions from the results in Table 7. The first is that out of an extra dollar of lifetime income, white US households headed by a white, pass on a higher fraction of resources through bequests than households in West Germany and in the United Kingdom. Second, in the three countries under consideration – and for most households in the income distribution – the relationship between lifetime income of an individual and expected bequests does not depend much on the presence of children of individuals at the average of the income distribution, and without children is very similar to the marginal propensity to bequeath of individuals with at least one adult child.

For the most part of the income distribution, the evidence in Table 7 is not consistent with an operative bequest model. This evidence does not rule out the possibility that there are substantial bequests motivated by altruism in the top centile of the income distribution, unlikely to be represented in the samples used here.

Finally, a further caveat is that having children is a lifetime decision that can be correlated both with the propensity to hold wealth and the lifetime income of individuals. At least in the summary statistics of the three countries considered, however, systematic differences are not apparent (compare Table 3 and Table A1 in the Appendix).

5.2.1. Robustness checks. The results in Table 7 have been obtained under a set of strong assumptions. This subsection explores the impact on the results of relaxing some of these assumptions. First, Table 7 presents estimates obtained assuming an interest rate of 4%. Nevertheless, Reil-Held (1999) estimates a lower interest rate for West Germany, around 2.39%. Panel A of Table 8 reports estimates of the marginal propensity to bequeath using an interest rate of 2%. A lower interest rate exacerbates the differences between the United States (4.8 cents at the average income level) on one hand and Germany and the United Kingdom on the other (around 1 cent at the average income level). That is not surprising, given the estimates reported in Figure 1: differences in wealth holding across income groups actually increase with age in the United States, while they tend to stay constant in the two European countries. A lower interest rate implies less discounting of the impact of lifetime income on wealth at later ages. As the impact of lifetime income on wealth at ages beyond 70 is large in the United States, using a 2% interest rate leads to a stronger link between lifetime income and expected bequests than using the benchmark 4% rate. The opposite effect is present in West Germany and the UK.

Secondly, it is advisable to see whether including business wealth in the wealth measure affects the results. For the sake of comparability with the BHPS data, which does not contain measures of business equity, the measure of household wealth reported in Table 7 omitted business wealth. Yet, business wealth is a very important component of national net worth. The results are shown in Panel B of Table 8, and are very similar to the results in Table 7 (albeit less precise for Germany).

A second concern with the results in Table 7 is that the lifetime measure described in Appendix 2 is based on an average of positive income realizations. One may argue

Table 8. Lifetime resources and expected bequests (specification checks)

	Parent permanent earnings level used to evaluate lifetime income		
	10th percentile (1)	Average (2)	90th percentile (3)
Panel A: Assumed interest rate: 2%			
1. United States (whites)	0.031 (0.008)	0.048 (0.006)	0.06 (0.008)
2. West Germany	0.002 (0.006)	0.009 (0.007)	0.017 (0.008)
3. United Kingdom	0.01 (0.007)	0.0129 (0.006)	0.0161 (0.006)
Panel B: Measure of wealth includes business wealth			
1. United States (whites)	0.0127 (0.0057)	0.0193 (0.003)	0.023 (0.005)
2. West Germany	0.0023 (0.005)	0.0078 (0.005)	0.014 (0.0058)
Panel C: Permanent income measures include observations of income that equal zero			
1. United States (whites)	0.012 (0.003)	0.019 (0.0025)	0.024 (0.003)
2. West Germany	0.0057 (0.0033)	0.0095 (0.0032)	0.014 (0.003)
3. United Kingdom	0.014 (0.002)	0.015 (0.0015)	0.016 (0.014)
Panel D: Estimation method: median regression			
1. United States (whites)	0.0094 (0.0009)	0.0156 (0.0006)	0.020 (0.0006)
2. West Germany	0.0068 (0.003)	0.010 (0.0028)	0.0148 (0.0030)
3. United Kingdom	0.006 (0.002)	0.007 (0.0011)	0.0154 (0.0015)

Notes: See Table 7. In Panel D, standard errors are not corrected for heteroscedasticity, and are probably understated.

Source: Own computations from the GSOEP, BHPS and the PSID.

that this ignores the impact on lifetime income of long periods of unemployment. To address such concerns, the income measure can be computed accounting for periods in which individuals have zero earnings. Instead of running the log-income model in Appendix 2 (Equation A.1), an alternative specification on income levels can include periods with zero earnings levels. The permanent income measure is defined as the sum of the average of prediction errors (including deviations from zero income) plus the constant in the regression. The results are shown in Panel C of Table 8, and are again remarkably similar to those in Table 7. Thus, failing to consider periods of unemployment in the lifetime income measure does not alter the main results of interest.

Finally, the cross-sectional distribution of wealth in a society is rather skewed, with a small proportion of households holding a large share of total household wealth (De Nardi 2004 reports that 1% of the households in the United States hold 29% of the total wealth in the economy). In that setting, the mean of the distribution of wealth may be a misleading statistic. To examine whether this is a problem, Panel D of Table 7

presents the impact of lifetime income on the median wealth held by a household. While the interpretation of these coefficients is not straightforward (the model in Appendix 1 is stated in terms of average wealth, not of median wealth), the results are very similar to those in Table 7, hence skewedness of the wealth distribution does not appear to be driving the results.

5.3. Comparing the estimates to simulated data

At face value, the magnitude of the coefficients looks small. This section provides another benchmark against which one can compare the results for the United States. De Nardi (2004) presents a model with incomplete annuity and income insurance markets. Individuals who therefore bear longevity and lifetime-income risk maximize an isoelastic utility function that depends on own consumption, and may also depend on the size of the bequest left to children. Calibrating the model to income processes derived from US data, only when a bequest motive is present the model can reproduce the extent of US inequality. A similar message emerges from an artificial-data experiment for the United States, also used in Altonji and Villanueva (2003), whose results are shown in Table 9. The dependent variable is the expected bequest. The first two columns report how average bequests depend on cumulated earnings holding age constant in artificial data. The estimates are evaluated at several points of the distribution of lifetime resources. The first column shows estimates generated by a model in which agents do not have a bequest motive. The second column contains estimates obtained in data generated by a model in which agents do have a bequest motive. Finally, the third column shows the same estimates on a sample of elderly

Table 9. Derivative of lifetime bequests with respect to lifetime resources, model calibrated to United States
Assumed interest rate: 6%

Percentiles, income distribution	Simulated data, De Nardi (2004)		Actual data for US	
	No bequest motive	Bequest motive	White couple, children	White couple, no children
10th percentile	0.004 (0.0003)	0.006 (0.002)	0.006 (0.0025)	0.0076 (0.007)
Median	0.007 (0.0001)	0.007 (0.0015)	0.008 (0.0016)	0.0105 (0.0053)
75th percentile	0.008 (0.002)	0.014 (0.0007)	0.01 (0.0016)	
90th percentile	0.006 (0.0001)	0.019 (0.0011)	0.011 (0.0022)	0.013 (0.0033)
95th percentile	0.003 (0.0003)	0.028 (0.0032)	0.012 (0.003)	
R squared	0.85	0.14	0.33	0.32

Source: Altonji and Villanueva (2003), based on data by De Nardi (2004).

with children from the PSID. There are discrepancies between the estimates in Table 9 and Table 7 because De Nardi used an interest rate of 6%, instead of 4% (used in Table 7).

Four remarks are in order regarding this comparison. Either with or without a bequest motive, the results in De Nardi's model are in the order of magnitude of ours. The estimates either with or without a bequest motive are in the ballpark of 1–3 cents, not far from the estimates in Table 7. This suggests that, even with a bequest motive, the impact of cumulated earnings on expected bequests is a small number. Second, if a bequest motive is operative in the United States, it is only among high-income households. At the 10th and 50th percentiles of the income distribution, the estimates are remarkably close both under a bequest motive and under life cycle saving. Only above the 75th percentile of the income distribution, different utility functions produce different relationships between lifetime income and expected bequests. Third, albeit smaller, the estimates on real data are more in line with the specification that contains a bequest motive. For example, the PSID, the impact of lifetime income is lower for low-income households than for high-income households. This occurs in the simulated model with a bequest motive, but not in the data produced by a model of accidental bequests. Fourth, the model simulated on artificial data with a bequest motive is close to the estimates in Column 4 that presents comparable results on a sample *without* children. A possible explanation for that similarity is that households without children in real data do have a bequest motive. Another is that a theoretical model in which households only face longevity risk in their old age does not reflect well the relationship between income and wealth in the old age, as households face risks in their old age related to health, leading to a higher propensity to save out of lifetime income. The second explanation appears more convincing. Using a very different set-up, Dynan *et al.* (2002, 2004) conduct simulations of simple life-cycle models and obtain that longevity risk is not enough to generate a pattern of wealth-income ratios that is consistent with the data.

6. THE IMPACT OF PARENTAL RESOURCES ON INTER VIVOS TRANSFERS

Bequests are only one of the channels that parents can use to transfer resources to their adult children. Over their lifetime, parents can also raise the welfare of their children through inter vivos monetary transfers (see Appendix 3 for formal models of this behaviour). This section quantifies the impact of lifetime income on inter vivos transfers using a similar methodology to that in Section 5. First, it examines the relationship between yearly inter vivos transfers and lifetime income. Second, it aggregates the responses over the life cycle of the parent, taking into account the probability of parent's survival at each age.

The coefficients of lifetime income in Table 10 show how yearly inter vivos transfers to all adult children depend on cumulated earnings of the donor, holding constant the average cumulated earnings of the recipient children, the age of the parent,

Table 10. The effect of an extra dollar of lifetime resources on inter vivos transfers

Estimation method:	United States		West Germany	
	OLS	Probit	OLS	Probit
Dependent variable:	Transfer amount (includes zeroes)	1 if transfer 0 if not	Transfer amount (includes zeroes)	1 if transfer 0 if not
Lifetime income/100	0.041 (0.01)**	0.0124 (0.0025)**	0.017 (0.0058)**	0.015 (0.003)***
Lifetime income/100, squared	2.80E-04 (1.4e-04)**	3.72e-6 (5e-05)*	2e-04 (1.2e-04)	0.000076 0.00008
Lifetime income/100, cubic	-5.20E-06 (1.43e-6)**	-1.24e-6 (6.12e-7)*	-1.48e-6 (6.42e-7)**	-
Lifetime income/100* (age-70)	0.000537 (0.00045)	0.00021 (0.00021)	-3.29e-04 (4.73e-04)	-0.00028 (0.00026)**
Lifetime income/100* Divorced	-0.025 (0.008)	-0.00028 (0.0035)	-0.012 (0.009)	-0.0108 (0.0084)*
Lifetime income/100* Widow	-0.035 (0.0094)	-0.009 (0.005)	-0.006 (0.006)	-0.0021 (0.0039)
Mean lifetime income, children/100	-0.0049 (0.004)	0 (0.002)	-0.009 (0.0003)**	-0.00765 (0.0020)***
Parental age -70	0.034 (0.020)	0.020 (0.0065)**	-0.0019 (0.012)	0.0015 (0.01)
Mean age of children -40	-0.038 (0.017)*	-0.050 (0.010)**	-0.066 (0.023)*	-0.0503 (0.0194)
Father is a widower	-1.05 (0.37)	0.07 (0.28)	-0.24 (0.33)	-0.650 (0.221)
Mother is a widow	-1.01 (0.21)**	-1.34 (0.19)	-0.30 (0.157)*	0.059 (0.178)
Divorced parents	-0.73 (0.16)**	-0.74 (0.168)	-0.017 (0.228)	0.319 (0.201)
Inverse number of siblings	-0.74 (0.36)		-0.308 (0.212)	-0.121 (0.188)
Constant	1.11 (0.337)**		0.77 (0.246)	-1.02 (0.152)
Observations	1,391	1391	3082	3082
R-squared	0.25		0.094	

Notes: Lifetime income is the deviation of parental lifetime income from the mean lifetime resources. Standard errors are reported in parentheses. In all countries, they are corrected by heteroscedasticity and correlation of cases belonging to the household of the original interview. The specification for Germany also includes wave-specific dummies. Estimates in Columns (2) and (4) are the coefficients of latent indexes models.

* denotes that the estimate is significantly different from zero at 5%; ** significant at 1%.

Source: US results are obtained from regressions in Altonji and Villanueva (2003). German results are obtained from own computations from the GSOEP.

the mean age of the recipient child and other demographic variables. The first column shows the estimates for the United States, and the second column the estimates for West Germany. Parents who have a dollar of lifetime income above the mean level give on average 0.04 cents to all their children in an average year.

The corresponding estimates in West Germany are about a half the magnitude of the estimates for the United States. An increase of lifetime labour earnings of a dollar increases yearly inter vivos transfers to all children by 0.017 cents. In both countries,

Table 11. The impact of an extra dollar of lifetime resources on expected transfers, by country
Assumed interest rate: 4%

	Parent permanent earnings level used to evaluate Y_p		
	10th percentile	Average	90th percentile
1. United States (whites) (OLS)	0.0013 (0.0048)	0.020 (0.006)	0.018 (0.008)
2. West Germany (OLS)	0.006 (0.0046)	0.0108 (0.0022)	0.0155 (0.0037)
3. United States (whites) (Probit + OLS on positive transfers)	0.0007 (0.0046)	0.012 (0.0054)	0.018 (0.0127)
4. West Germany (Probit + OLS on positive transfers)	0.0012 (0.0008)	0.0075 (0.0017)	0.0106 (0.0036)

Notes: The 10th, average and 90th percentile of parental permanent earnings in the US are \$19 646 , \$48 734 and \$80 029 of 1995. The 10th, average and 90th percentile of parental permanent earnings in West Germany are \$24 324, \$39 828 and \$68 779 of 1995. The estimates show the impact of an extra dollar of (gross) lifetime income on expected bequests to all children, using the estimates in Table 10. Standard errors, corrected by heteroscedasticity, are reported in parentheses. The computations assume a common real interest rate in both countries of 4%.

Source: Results obtained from the estimates in Table 10.

the coefficient of the lifetime income of the recipient is negative, indicating that, holding parental resources constant families tend to give more inter vivos transfers if children are on average in a worse relative situation in the labour market. Nevertheless, the magnitude is small: a decrease in the lifetime income of children of \$100 diminishes *yearly* inter vivos transfers by half a hundredth of a cent.

The coefficient of the mean age of the recipient children is negative and significantly different from zero, suggesting that inter vivos transfers happen early in the life cycle of the recipient children, when children are more likely to be liquidity constrained.

Next, as parents do not only give transfers in a single year, aggregating the previous derivatives over the lifetime of a parent yields the total amount transferred out of an extra dollar of lifetime resources (see Appendix 4). To perform the aggregation, it is necessary to make assumptions about the age difference between the parent and the child: the computations assume that parents are 25 years older than their average child, and that the interest rate is 4%.

Table 11 summarizes the propensities to give to all children through inter vivos transfers in both countries. At the average value of the distribution of permanent annual income, parents in the United States pass about 2 cents in transfers out of a dollar of lifetime resources. The corresponding estimate for Germany is 1.1 cents. These differences are significantly different from zero at the 5% confidence level. Nevertheless, that result is somewhat specification-dependent. Experimenting with alternative functional forms reduces the quantitative differences (1.2 cents in the United States versus 0.75 cents in West Germany, marginally different from each other). Examining the responses of lifetime inter vivos transfers to lifetime income over the income distribution, the qualitative patterns are similar in both countries: the

marginal propensity to give through inter vivos transfers increases over the income distribution. In both countries, the marginal propensity to give is negligible at the bottom of the income distribution, suggesting a limited role of intergenerational forms of insurance among low-income groups. The marginal propensity to give inter vivos transfers operates mainly in the upper half of the income distribution.

We draw two conclusions from the analysis of inter vivos transfers. The first, from Table 10, suggests that inter vivos transfers are weakly equalizing, in the sense that holding parental income constant, parents whose children are worse off on average give higher transfers. The second is that there is some indirect evidence that inter vivos transfers may interact with public redistribution, in the sense that in West Germany, a country with a more generous welfare state, parents do not pass on throughout their lifetime more of an additional dollar than in the United States, where the overall level of unemployment benefits is much lower. Of course, any cross-country comparison is difficult, and another test of this conjecture is reported in Section 7.4.

6.1. Implications for intergenerational transmission of economic inequality

This section quantifies if inter vivos transfers and bequests are important channels of transmission of economic inequality between generations. Models of inequality suggest that parents can increase the material well-being of their children through two alternative mechanisms: investing in the human capital of their children while children live at their parents' home, and giving direct monetary transfers, which may encompass both inter vivos transfers and bequests (see Becker and Tomes 1986). The first channel operates through the relationship between the level of human capital of the child and his or her future earnings. Several researchers have assessed how important are these investments in human capital by examining the relationship between the earnings of the parent and the earnings of children at similar ages (see Solon 1999 for a survey). Nevertheless, it is not clear to what extent the correlation between the labour earnings of parents and children captures not only both human capital investments (if higher income parents spend more on the education of their children) but also correlation across generations in their genetic ability in the labour market.

Following Altonji and Villanueva (2003), a simple measure can be computed to assess the contribution of lifetime gifts to that process of transmission of economic inequality in the United States and in West Germany. Imagine that the lifetime consumption of an individual C depends on three components: his or her own labour income (Y), that may depend on the parent's Y_p , the expected amount of lifetime gifts from parents while parents are alive $E(\text{Transfer}(Y_p))$ and the expected amount of gifts after the death of the parents $E(\text{Bequest}(Y_p))$.

$$C = Y(Y_p) + E(\text{Transfer}(Y_p)) + E(\text{Bequest}(Y_p)) \quad (2)$$

If any of the three components in Equation (2) depends positively on parental income, children of high-income parents ‘inherit’ the economic status of their parents, and the magnitude of the dependence of the consumption of a child on the resources of a parent is then an index of the degree of intergenerational immobility in a society. The role of inter vivos transfers and bequests in the process of ‘inheritance’ of economic status is characterized by differencing (2) with respect to parental income. The result is:

$$dC_k/dY_p = dY_k/dY_p + dE(\text{Transfer}(Y_p))/dY_p + dE(\text{Bequest}(Y_p))/dY_p \quad (3)$$

The contribution of inter vivos transfers and bequests to inequality is the ratio of the last two terms to the overall sum.

There is a large literature estimating the correlation between the labour earnings of parents and children. For the United States, Solon (1999) reports that parents who at the age of 40 have \$1 of earnings above the mean have children whose labour earnings at the age of 40 are about 40 cents above the mean. Couch and Dunn (1997) report a strikingly similar estimate for West Germany when they compare the correlation in income between equivalent parent-and-son pairs in both countries. Hence, the computations here use the same estimate for both countries, 40 cents.⁵ One final note is in order. The evidence surveyed in Solon (1999) assesses how permanent earnings of the child at some age (usually 40) depend on permanent earnings at that same age. Nevertheless, the estimates reflect how gifts in dollars at the age of 70 of the parent depend on lifetime income at age 70 of the parent. If we assume that children are around 25 years younger than their parents monetary magnitudes at the age of 70 of the parent are equivalent to magnitudes at the age of 45 of the child. To put the magnitudes in the same monetary units, it is necessary to discount the estimates to the age 70 of the child, rolling them 25 years forward, using a 4% interest rate.

6.1.1. United States. The results in Section 5.3 and 6 suggest that parents who have a dollar more of lifetime income than the average give 1.9 cents more than the average income parent to all their children via bequests (Table 7, row 1), and 1.2 via transfers (Table 11, row 3). The impact of parental lifetime resources on the income of the child is 3.1 cents. That is, if the lifetime income of the parent increases by a dollar, the child gets 40 cents through genetics, parental investments in health and education, and 3.1 cents through inter vivos transfers and bequests. Using an interest rate of 4%, 3.1 cents at the age of 45 of the child, amounts to 8.3 cents at age 70. Thus, comparing the weight of the transfers and bequest channel of transmission amount (8.3 cents) with respect to total transmission of economic inequality in the United States (8.3 cents plus 40 cents of the coefficient of cross-sectional regression of earnings of the parent on earnings of the son) yields an estimate of 17%. This is

⁵ Replicating Solon’s strategy for the GSOEP, the slope coefficient is 0.37 when regressing the level of (5-year average) earnings of sons on the level of (5-year-average) earnings of the father, examining both at around 40 years of age.

possibly an overestimate, as the estimates assume that a single child receives all gifts, while the average parent has three children in the sample. To account for the number of children, it is advisable to rerun the specifications in Tables 7 and 11 using wealth per child and transfers per child as the dependent variable. The amounts transferred on a per-child basis by a parent with three children through bequests and transfers are 1.3 and 0.66 cents respectively. At the age of 70 of the child, and with an interest rate of 4%, these amount to 5 cents. As a fraction of the overall effect of parental income on the consumption of the child (5 cents plus 40 cents), the estimate implies that monetary gifts amount to 12% of the total transmission of economic inequality.

6.1.2. West Germany. On a per-child basis, West German parents who have \$1 of lifetime income over the mean leave to each child 1.1 more cents through bequests and 0.66 more cents through transfers *inter vivos* than a parent with the average lifetime income level. 1.76 cents at the age of 45 of the child amount to 4.6 cents at the age of 70.

Again, compared to the total effect of parental income on consumption, transfers and bequests amount to 10.4%, slightly lower but similar to the US estimate. The results of this simple exercise suggest that gifts received by adult children once they leave the household of their parents increase inequality in a non-negligible way. This impact is slightly larger in the United States than it is in Germany, due to the weaker relationship between lifetime income and bequests in the latter country.

7. INSTITUTIONS AND INTERGENERATIONAL TRANSFERS

This section discusses what institutions may underlie possible discrepancies in the marginal propensity to give among the countries considered. It discusses in turn whether differences in the taxation of transfers and bequests, differences in the degree of annuitization, public provision of healthcare and differences in the unemployment insurance explain differences in the cross-country estimates.

7.1. Differences in the taxation of transfers and bequests

Can the smaller marginal propensity to bequeath in West Germany and the United Kingdom reflect differential treatment of taxes on bequests? The answer is unlikely to be positive for the type of households considered here. The US system taxes estates (the wealth of the donor prior to death). In principle, estates are taxed only when they exceed \$600 000 for most of the time period considered (see Poterba 2001). The wealth holdings of the PSID households are far below that threshold. Hurd and Smith (2002) suggest that only 3% of the estates in the United States are above that threshold.

The German tax system taxes inheritances and gifts with the same rates, and the exemption threshold is relatively generous – DM600 000 for spouses and DM400 000 for children (Jülicher 2001). In addition to that, some of the components of estates,

like housing wealth, were not valued at their market prices but at lower ones until 1995. To compute the fraction of households that would be affected by the inheritance tax if they died in the present year, it is possible to value the house at 50% of its value, and compute total 'taxable wealth' per child. The number of households who exceeded the limit was 7.5% of the sample. Still, the number may be an overestimate, as some of this wealth will be passed on to the spouse, with a more generous exemption limit. Of course, this is not likely to be the case for the wealthy, possibly under-represented in the GSOEP.

Finally, discussing the differences in the distribution of financial wealth between the United States and the United Kingdom, Banks *et al.* (2003) document that a small fraction of UK decedents is subject to estate taxation.

7.2. Public and private annuities

Appendix 1 suggests that one of the reasons that lead individuals to save less of an extra dollar for their old age are compulsory savings in the form of non-bequeathable wealth. Assume that individuals save only to smooth lifetime consumption, without any bequest motive. If annuity markets are not an option, any public programme that redistributes income over time 'annuitizes' wealth, depressing the need for higher savings. As mentioned in Section 3.3.2, the result does not necessarily hold if a bequest motive is present in the data. The results in Table 7 lead us to consider that for most of the population, a bequest motive is unlikely to be operative.

To examine if forced savings diminish the relationship between lifetime income and expected bequests, compare the savings behaviour of the German self-employed to the rest of the German working population. The majority of the German self-employed can voluntarily choose to participate in the Social Security system. Schnabel (2000) documents that a legal reform in 1984 diminished the expected value of the contributions to the Social Security system, and that a large fraction of the German self-employed reacted to the change by 'opting out' of the Social Security system. On the other hand, the Long-Term Care Insurance Act in 1994 established mandatory private insurance for long-term care costs for groups like the self-employed (see Comas-Herrera and Wittenberg 2004).

If the relationship between bequests and lifetime income reflects precautionary saving, we should observe that the impact of lifetime resources on wealth after age 50 and expected bequests should be larger for this subgroup of the population. Of course, this evidence should be taken with care if one considers that the same set of unobserved variables that leads an individual to become an entrepreneur may also affect the propensity to save of that individual.

Table 12 presents the results of a specification very similar to that shown in Table 6, but including an intercept dummy for whether the individual was self-employed during the years of the interview in the GSOEP, and an interaction between that 'self-employed' status and the lifetime income of the person. The coefficient of

**Table 12. Does the relationship between lifetime income and wealth depend on replacement rates?
The impact of lifetime resources on wealth holding among self-employed in Germany**
Dependent variable: Wealth in thousands of dollars

	(1)	(2)
Business wealth included?	NO	YES
Parental lifetime income	0.0273 (0.0044)	0.0286 (0.0046)
Parental lifetime income * Self-employed	0.018 (0.0085)**	0.024 (0.010)**
Self-employed	82 475 (21.960)	102 865 (22.598)

Notes: Standard errors, corrected for heteroscedasticity in parentheses. The specification of the regression is the same as in Table 6, but adding two extra regressors:

(a) whether the individual worked for more than two periods as Self-employed ('Self-employed');

(b) an interaction between self-employed and lifetime income ('Parental lifetime income * Self-employed')

*, ** and *** denote that the estimate is significantly different from zero at the 10%, 5% and 1% respectively.

Source: Own computations from the GSOEP.

interest is the interaction between lifetime income and the indicator of whether the individual was a self-employed person. That coefficient captures differential effects of cumulated earnings on the wealth of the self-employed with respect to the rest of the German population. If the discussion in Appendix 1 is correct, that coefficient should be positive. Indeed, the self-employed save between 1.7 cents and 2.4 cents more than the employees out of an extra dollar of lifetime income. The marginal propensity to bequeath out of an extra dollar is also computed to be larger among the self-employed than among the rest of the working population.

Finally, it is possible to test whether the results in Table 12 are due to the self-employed being a specially 'altruistic' subgroup of the population, estimating an expanded version of the model shown in the third column of Table 10: including an interaction between lifetime income and self-employed, and a dummy for self-employed, makes it possible to test whether the self-employed are more altruistic than the average, in which case they should have a larger propensity to give through inter vivos transfers. The interaction of income and self-employed was not significant.

These results suggest that forced annuitization via public programmes and, consequently, lower risk in old age play a role in explaining the relationship between lifetime income and wealth in old age.

7.3. Public funding of long-term care

Section 3 discusses that the relationship between lifetime income and wealth in old age and expected bequests can be informative about the degree to which individuals are exposed to risks in their old age. An important difference across the countries we examine is the public insurance of certain health risks in old age. In particular, following the discussion in Section 3, due to means testing in programmes that reimburse long-term care costs, high-income US and UK households have a stronger

incentive to accumulate wealth for their old age than West Germans. Walker (2004) documents that American elderly living in states where the provision of Medicaid is more generous hold less wealth. That is consistent with health risks explaining the differences in wealth levels. Nevertheless, as we report in Section 4, increasing exposure to health risk does not explain the difference between the United States and United Kingdom, with similar health systems for the elderly.

7.4. Unemployment Insurance versus inter vivos transfers

The empirical findings suggest that families use inter vivos transfers to redistribute income to their worse-off members. Table 10 documents that, holding parental income constant, US and German parents who had children with lower average income gave higher yearly inter vivos transfers than parents whose children had higher income (albeit the magnitude of the compensation effect was small). Moreover, Table 11 documents that, out of an extra dollar of lifetime income, parents in the United States (a country with a less generous welfare state) give more to their children through inter vivos transfers than in West Germany. Those signs are roughly consistent with an altruistic model, which predicts that the redistribution of resources done by the extended family may be displaced by public help.⁶ This subsection focuses on unemployment insurance, a specific programme in Germany to examine if public help displaces private help.

If transfers were motivated by altruism, any programme that increases the income of adult children could be displacing private transfers from the parents. That is, unemployment benefits effectively subsidize those parents who would help their children if the programme were not operative.

Conversely, if transfers to adult children are motivated by other strategic motives, inter vivos transfers may not displace private help, but actually encourage it, as shown formally in Appendix 3 (and Cox 1987, or Cox and Jakubson 1995). Under the first scenario (parents are concerned about the living standard of their children), the relationship between public and private transfers ought to be negative. Under the second scenario (parents care about services provided by the child), the relationship can be positive.

In the GSOEP, it is possible to test the degree of substitution between public and private transfers, exploiting matched information about unemployment benefits and transfers given by the parents of the recipient. Individuals who are currently not employed and have been in that position for less than a year may or may not, depending on their job experience, qualify for unemployment insurance benefits (*Arbeitslosen Geld*).⁷

⁶ Nevertheless, the magnitude of the effects is not consistent with the predictions of the altruism model, see Altonji *et al.* (1997), McGarry and Schoeni (1995) or Masson and Pestieau (1997).

⁷ Individuals who lose their job involuntarily in Germany may qualify for unemployment insurance for up to one year. After a year, and conditional on not having received a suitable job offer, unemployed individuals qualify for other means-tested programmes.

Table A2 (in the Appendix) reports summary statistics for the available sample of such individuals. They are mainly female, together with their siblings receive from their parents on average \$1093 per year (higher than the average transfer of \$682 given by German parents to all children, regardless of their status), and the average amount of their unemployment benefits is \$2091. Only 25% of the sample receives such benefits, however; this is possibly due to the fact that females are likely to be non-employed and to drop out of the labour force than males, and may not satisfy the eligibility criteria to receive unemployment compensation because of part-time jobs and limited job spells.

To assess whether or not public help displaces inter vivos transfers, it is useful to examine the relationship between the amount of inter vivos transfers received by an unemployed person from his or her parents and the level of unemployment insurance received, holding constant the lifetime income of the parents, the age of the receiver and his or her lifetime income. In the regression:

$$R = \max(\alpha_0 + \alpha_1 UI + \alpha_2 Y_p + \alpha_3 Y_k + \varepsilon, 0) \quad (4)$$

R denotes inter vivos transfers; UI denotes the monthly unemployment insurance benefits received by an individual (see Schoeni 2000, for a similar specification). Since the many females in the sample may not be the main earners in German households, the regression controls for the measure of the permanent income of the child described in Section 3, Y_k . As parental income determines the possibility to give transfers, the regression also controls for the permanent income of the parent, Y_p . The parameter of interest is the coefficient on unemployment insurance, UI , that measures the amount by which private transfers are reduced when public help increases by \$1, holding constant the lifetime income of the recipient of help, and that of the donor.

If public help displaces private monetary transfers, an extra dollar of public benefits must reduce transfers, so the impact of public help on private monetary transfers must be negative, and its magnitude measures how many cents are displaced by an extra dollar of public help. Nevertheless, data limitations in the GSOEP prevent us from observing the transfer given by parents to each adult child living in a separate household. Since only the overall amount given to all children is observed, it is only possible to estimate by how much transfers to all children react to the unemployment benefits of one of them. Since parents with more children are more likely to report higher overall transfers, the number of adult siblings of the respondent is included in the regression.

The first row of Table 13 (column 1) presents an estimate of the impact of the amount of unemployment insurance received by an unemployed individual on the total amount of transfers given by the parents of that individual. The coefficient of unemployment insurance benefits in the first column is negative, consistent with the hypothesis that an extra dollar of public help diminishes inter vivos transfers. The magnitude of the estimate suggests that an extra dollar of unemployment insurance reduces the amount of parental transfers given *to all children* by about 12 cents. The second column reports a different estimate: the impact of the amount received on the probability that the parent gave any transfer to any of the children. The coefficient

Table 13. Do unemployment benefits displace inter vivos transfers? Evidence from West Germany

Estimation method:	[1] OLS	[2] Probit	[3] Tobit
Dependent variable:	All transfers (including zeroes)	1 if received transfer0 otherwise	All transfers (including zeroes)
1. Unemployment insurance benefits	-0.118 (0.0437)***	-0.019 (0.010)*	-0.478 [-0.086] (0.184)***
Sample size	389	389	389
R ²	0.26	0.32	0.13
2. Instrumenting with predicted unemployment benefits	-0.098 (0.719)	-0.0033 (0.0699)	0.0966 (1.48)
Sample size	249	249	249
R ² of second-stage regression	0.18	0.29	0.29

Notes: Regression specification:

$$R = \max(\alpha_0 + \alpha_1 UI + \alpha_2 Y_p + \alpha_3 Y_k + \varepsilon, 0)$$

where R is the inter vivos transfers given by the parent of the unemployed to all children; UI is the amount of unemployment insurance received; Y_p is the income of the parent of the unemployed person; and Y_k is the lifetime income of the recipient person.

The coefficients in Column 2 denote the impact of unemployment insurance on the probability of receiving a transfer, evaluated at sample means. In Column 3, the coefficient is the average impact of unemployment benefits on inter vivos transfers, among the children whose parents give transfers. The coefficient in brackets is the average impact of unemployment benefits on inter vivos transfers, among all adult children. Standard errors in parentheses, corrected for heteroscedasticity and autocorrelation between observations of children from the same 1984 households. In row 2, standard errors are not corrected for generated regressors.

*, ** and *** denote that the estimate is significantly different from zero at the 10%, 5% and 1% respectively.

Source: Own computations from the GSOEP.

in the second column indicates that the propensity to give transfers to all children falls by 1.9 percentage points when unemployment benefits increase. Finally, the third column reports the response of inter vivos transfers given by parents to a dollar increase in unemployment insurance, among parents who give. Within this selected group, an extra dollar of public help diminishes the transfer amount falls by 48 cents, which indicates a substantial degree of crowd-out among individuals receiving parental help. Nevertheless, the 48 cents estimate is not the most relevant for public policy, as it is conditional on a highly selected sub-sample of the population. The Tobit estimate assesses the impact of an extra dollar of public help on total inter vivos transfers (not only on the subset of parents who give transfers): the displacement effect is estimated to be 8.6 cents at the sample means of the income of the parent and child (row 1, column 3, in brackets).

The experiment in the second row of Table 13 uses variation in entitlement to unemployment benefits to identify the effect of unemployment benefits on private transfers. Since 1984, unemployed without children in Germany have a 63% unemployment insurance replacement rate, in contrast to the 68% of unemployed with children. Thus, it is possible to predict unemployment benefits on the basis of the

individual's last wage *and* demographic situation. The advantage of this approach is that it only exploits variation due to the legal restrictions, rather than due to take-up. The result in the second row of Table 10, in the first column is -0.098 (0.72) negative, similar in magnitude to that in row 1, but much less precise and not significantly different from zero. Possibly, the difference in benefits is too small to detect a significant change in the amount of benefits received.

Overall, the results in this section point out that inter vivos transfers are limited substitutes of public help. A possible way of interpreting the results is that a reduction of unemployment benefits will not translate one-for-one into income losses of the unemployed. The estimates suggest that a dollar in public help increases private transfers by between 8 and 12 cents, depending on the specification.

8. SUMMARY AND POLICY IMPLICATIONS

This paper has estimated the impact of an extra dollar of lifetime income on expected inter vivos transfers and bequests given by a parent to all children in three countries of the OECD: the United States, West Germany and the United Kingdom. In a second step, the paper compared the magnitudes estimated across countries and across groups of the population to learn what features of the economies may underlie the patterns of giving.

The marginal impact of lifetime income of potential decedents on expected bequests is estimated to be about 2 cents in the United States, about 1 cent in the United Kingdom and West Germany. These estimates are only half as large as those obtained from calibrations of a macroeconomic model that assumes a bequest motive, and there are several reasons to believe that precautionary savings explain most of the relationship between lifetime income and expected bequests. First, even at the top of the income distribution, the relationship between parental lifetime income and wealth after 50 years of age and expected bequests is similar between elderly with and without children in the three countries considered. Second, in countries where the elderly have a higher degree of wealth annuitization through the public sector (West Germany) or through the private sector (the United Kingdom), the relationship between lifetime income and expected bequests is weaker than in countries like the United States, where less wealth is annuitized. Third, there is evidence that the relationship between cumulated earnings and wealth after age 50 is steeper among the German self-employed, a group of the population that faces on average lower old age income security than among the rest of the population. The fact that a bequest motive is unlikely to be operative for most households has consequences for public policy. On the one hand, if household saving for old age is motivated primarily by uncertainty about longevity or income in old age, a reduction of the replacement ratios in a Social Security Pay-As-You-Go system is likely to have a strong impact on capital accumulation. On the other hand, the fact that bequests are unintended increases the scope for redistributive activity by the state.

The paper also assesses the relationship between inter vivos transfers and parental lifetime income. There is some evidence that, unlike bequests, inter vivos transfers are directed to worse-off recipients. Hence, public transfers may crowd out private transfers; in the available data, receipt of an extra dollar of help through the unemployment insurance system displaces current private transfers by about 8 to 11 cents.

Finally, the paper has assessed the extent to which intergenerational transfers contribute to the inheritance of economic status in the United States and in West Germany. Combining the paper's estimates with those in the literature that estimates the correlation between permanent income of parents and children, in West Germany and in the United States lifetime gifts appear to strengthen by about 10% the relationship between an individual's own economic status (lifetime income, plus all types of monetary transfers received from parents) and parental income. To the extent that a substantial fraction of bequests seems unintended, this is a peculiarly inefficient channel of economic inequality transmission.

DISCUSSION

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The aim of the paper is to appraise bequest and inter vivos transfer behaviour in the United Kingdom, the United States and West Germany. For that purpose, it estimates the impact of an additional dollar in lifetime income on each of these transfers. Such a project is important for assessing various policy issues. In order to appraise the impact of a PAYG system on saving and capital accumulation, or the impact of inheritance taxes on the transmission of inequalities, for instance, one needs a good understanding of the motives for accumulating wealth. The relative sizes of the so-called life cycle and altruistic motives are especially crucial.

What do we learn? Two aspects can be distinguished. One concerns the 'general' lessons to be drawn, and the other deals with the cross-country comparisons.

On the former, there are two important results. First, bequests are mainly 'accidental'. Second, overall, the impact of intergenerational transfers, whether inter vivos or at death, on the transmission of inequalities is rather small. More precisely, at most 15% of the very large correlation between parental and child income would be due to monetary transfers, the remaining being 'explained' by cultural and sociological factors.

On the cross-country comparisons, the propensity to give out an extra dollar of lifetime income is much larger (twice as much) in the United States than in the United Kingdom and West Germany (both for inter vivos transfers and bequest). This result can be due to various differences in public policies. However, it is a bit striking in view of some other data, especially with the saving ratio in the United

States compared to West Germany. This raises some questions about the reliability of the results and their interpretation.

The data and methods employed to regressions of transfers (bequests, or *inter vivos*) on lifetime income, in fact, deserve some discussion. As to the data, bequests are not observable. Thus, they are computed as a weighted sum of wealth levels between age 60 to 86. The weight is equal to the discount rate multiplied by the probability of death conditional of age. The choice of the weights, even if understandable, is somewhat arbitrary. Also the wealth levels are extrapolated from those reported in the survey. Thus the estimated wealth level may differ substantially with the wealth effectively bequeathed because of large health expenses just before death. It would be interesting to compare the estimated bequest over the sample with some other available data, so as to check whether estimated bequests are reasonable. Lifetime income is not observable either. It is computed from permanent income, which is estimated from some earnings reported at different dates. The interest (real) rate is assumed to be constant in most of the analysis.

The methods neglect heterogeneity and uncertainty. Bequests and *inter vivos* transfers can be explained by various competing motives (altruism, exchange, precautionary motives, etc.). If individuals widely differ, one may wonder whether the estimation of an aggregate bequest function makes sense. Actually, the author is aware of this since, in the United States, the non-whites are treated differently, because their behaviour differs too much from others. The analysis neglects any uncertainty factor. At the time individuals save or give to their children, they simply do not know their lifetime income (think of the German after 1945). It would be interesting to introduce some indicator of earnings risk in the estimation (individual earnings data at several dates are available) to account for precautionary savings. Also the level of the interest (real) rate could be risky, or be adjusted to real data, instead of being constant.

Various explanations are possible for the striking differences in results across countries. Some pertain to differences in institutional environment, others to the methodology and the data. Overall, if indeed bequests are mainly accidental, the results suggest that in the United States people accumulate more wealth (and bequeath more) simply because they need more (for their medical expenses). The same could be true for *inter vivos* transfers: education costs are higher, and duration of unemployment benefits is lower, in the United States than in Germany. Differences in taxation on bequests and *inter vivos* transfers could matter. Due to non-linearity in taxes, they may play an important role even if the aggregate amount of collected taxes is not that high. Some differences may be also due to definition of wealth. For example, private pensions are included in wealth but not public pensions. Since wealth is used to estimate bequest, private pensions may artificially increase bequests in the United States where they are much larger than in Germany. At this point it is difficult to assess the role of these various explanations.

In conclusion, the results are very interesting, but comparisons across countries may need further analysis.

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This paper is a remarkably rich addition to the empirical literature on intergenerational transfers, most of which focuses on either *inter vivos* or post mortem transfers (bequests), but rarely on both, as the present paper does. Transfers typically flow from the old to the young. Since government programmes often redistribute from young to old, private transfers may have an impact on the efficacy of social policy when households partially undo redistribution. This motivates the paper.

The main empirical issue addressed here is whether such transfers are important enough in the first place to be of policy relevance. To this end, a ‘marginal propensity to give or bequeath out of lifetime income’ is calculated, essentially a summary statistic that informs policy makers on the extent of intergenerational resource-shifting.

The main contribution of the paper lies in the international comparison for three major economies where different institutional designs of redistributive policies and social security provide differential needs and incentives for private transfers. The relevant institutions are, in particular: long-term care insurance, public (PAYG) and private (funded) annuitization of wealth, and other social insurances such as unemployment insurance.

International comparisons of this sort have gained attention recently as they allow in principle (despite their few degrees of freedom) the investigation of the impact of institutional variation that is seldom available (save institutional reforms) in single-country data. The empirical novelty of the present paper includes the analysis of comparable micro panel data from the three countries where the crucial information on wealth and transfers and longitudinal data on incomes is available in sufficient depth. The author is to be commended on what appears a major effort on the data.

The extent to which policy neutralization occurs (with Ricardian equivalence in the limit) crucially depends on people’s altruistic sentiments. Villanueva adopts the strategy to infer an operative bequest motive from comparing wealth accumulation across households with and without children, and to test whether or not *inter vivos* transfers react to changes in (donors and) recipients’ incomes.

It is found that the effect of life-time resources on transfers made is significantly positive, but of limited magnitude. The marginal effects are typically higher in the United States than in Europe. Striking similarities are found between Germany and the United Kingdom. The evidence is consistent with the notion of accidental bequests and weakly equalizing *inter vivos* transfer behaviour. In sum, the estimates cast doubt on a substantial interaction between redistribution and insurance systems and private transfer activity.

Direct international comparison asks for harmonization of measured concepts and regression specifications, but only to some extent as the data are not pooled across countries. Given that the different data sets are differentially informative on various aspects of the data, an alternative strategy would have been to allow for more flexibility

between countries. As it stands, we learn less about transfer behaviour in the United Kingdom, for instance, than the data appear to allow. More information is exploited indeed for the case of Germany (in particular the exercises on unemployment insurance and self-employment).

Perhaps also because of comparability, the paper deliberately ignores a couple of aspects whose analysis may be informative for understanding the transfer-channel. One relates to singling out the transfer motives as these are of crucial importance for policy. The identification of the relevant parameters in the present paper comes entirely from the 'cross-section' at the parental level. Yet, within-family variation of transfers made on the level of individual recipients can help determine if different siblings of the same parents are treated differently when their needs or circumstances are different. Relying on transfers to all children, as currently done, blurs the picture considerably and may result in biased estimates (see Hochguertel and Ohlsson 2003).

In addition, the intertemporal aspect of *inter vivos* transfers is largely neglected. To the extent that they are used to overcome liquidity constraints, their incidence may have different implications for the debate on whether or not they interfere with government programmes. Research on Italian data suggests that housing market imperfections motivate the timing of transfers in conjunction with parental considerations that control behavioural incentives for their children (e.g., Guiso and Jappelli 2002).

This paper offers a contribution to the literature that will hopefully serve as a point of reference and departure for future work. Much work, in fact, still lies ahead. Substantial progress has been made in the last couple of decades in understanding various channels along which both individuals and whole economies adjust to the looming demographic challenges and their implications for the organization of systems of social insurance and redistribution in many countries. The bigger picture involves, among others, endogenous reactions of household savings and annuitization, and politico-economic considerations that determine the design of the welfare state. Transfers do play an important, but not a dominant role.

Pondering about additional suggestions for future work, the issue of distributional effects is an interesting one and can be more gainfully investigated by exploring behaviour at higher quantiles (rather than the mean or the median). The skewedness of all underlying distributions (wealth, earnings, transfers) is likely to show differential marginal effects off the central location (as stressed in various places in the paper). Notwithstanding the (insurmountable) problem that the richest people will be vastly under-represented in any of the data sets analysed, there is reason to believe that transfer behaviour at the upper decile(s) of the wealth and income distributions differ substantially from that elsewhere.

Decisions made (or relevant for periods) late in life, such as discussed in this paper may be strongly affected by morbidity. As the paper points out, there is not much cross-country variation in terms of average life expectancy. This, however, does not allow for differential morbidity across the wealth distribution. In addition, considering that out-of-pocket medical expenditures can rise to very substantial amounts for

elderly people (see Smith 1999), it may be more interesting and important to explore the joint determination of wealth accumulation and health behaviour at the micro level. Such considerations deserve additional attention in future work.

On the policy-relevance side, it seems that transfers are an inefficient way to smooth consumption and share risks once imperfections of more formal credit and financial markets are removed. Weaknesses of private transfers from a policy point of view include not only their implications for the cross-sectional distribution of wealth (dynastic bequests will reinforce inequalities) but also their being a very imperfect substitute for cross-sectional and intertemporal insurance as they rely on the stability of family networks over time.

Panel discussion

As regards the role of public policy programmes, Carol Propper remarked that parental transfers may pay for services rendered by children to their parents in the latter's old age. Thus, important interactions may be present between transfers, the organization of elderly care, and public income support for the unemployed (who may be caring for disabled parents). Lans Bovenberg agreed and noted that while unemployed people may have time to provide services to their parents, the extent to which they are available may depend, through means-testing, on the parents' resources and gift-giving. The author responded that high income individuals may not receive services from children who are not living with them.

Sweder van Wijnbergen thought that lack of healthcare provision in the United States might not be important, as those without health insurance are for the most part low income and would probably also have no bequest. Carlo Favero remarked that wealth levels could feature extreme outliers. The author responded that they were removed from the analysis. Pierre-André Gourinchas noted that such top-coding may not be advisable, as most of the relevant information might indeed be provided by the behaviour of the rich, who may set up living trusts, reflecting tax-avoidance as well as control considerations.

Tullio Jappelli saw a strong relation between this paper and the large literature on crowding out of savings in relation to pay as you go pension schemes. He thought the paper was less about the bequest motive than about why people save, and thought that the age profiles of wealth in the data would be most informative in that respect. The author agreed but remarked that all existing estimates of transfer crowding-out need to make assumptions about bequest motivations.

Christian Gollier noted that as the altruism motive should be increasing in the difference between children's and parents' wealth, and that these two are highly correlated, it is not surprising to find small effects of parental resources on transfers. Hans-Werner Sinn remarked that a 1–2% impact of parental resources on amounts given to children appears very small indeed. He and other panellists thought that the results, while very interesting, are importantly qualified by the fact that only transfers

to adult children who have left the family home are taken into account. People who have children typically have already given them a lot (in the form of care, education, and learning resources) before that stage, and it is difficult to assess the overall link between generations' welfare on the basis of monetary wealth only.

APPENDIX 1: MODELING THE INCOME/BEQUEST RELATIONSHIP

This discussion of the determinants of the impact of an additional dollar of lifetime income on expected bequests draws heavily on Abel (1985) and Kotlikoff (1989).

Accidental bequests

Assume that (egoistic) individuals live for one period (working period) and that with probability P , survive to a second one (retirement). No annuity markets are available. Individuals have an isoelastic utility function that depends on first- and second-period consumption, discounted by β .

$$U(c_1, c_2) = \frac{c_1^{1-\gamma}}{1-\gamma} + \beta P \frac{c_2^{1-\gamma}}{1-\gamma}$$

During their working life, individuals receive an exogenous income stream Y , that can be saved for the second period at an interest rate r . Bequests are then due to the non-existence of annuity markets, and occur when individuals die early. The expected bequest can be expressed as:

$$E(B) = (1 - P)(Y - c_1) = (1 - P)aY$$

where $a = (1 + r)(\beta P)^{1/\gamma}(1 + r + (\beta P)^{1/\gamma})^{-1}$. Expected bequests are proportional to lifetime income, and the proportion increases with the probability of survival P , the interest rate r and with the patience of the individual β .

Intended bequest (Andreoni 1989)

Individuals derive utility from their own consumption but also from the fact that (a) if they die at the end of the first period, their cumulated savings b_1 pass on to their descendants and from the fact that (b) contingent on survival to the second period, individuals also obtain utility from an end-of-life bequest b_2 . We make two assumptions on functional form. The first is that the utility from the bequest takes an isoelastic form with the same curvature as the utility derived from own consumption. The second is that parents weight the utility from the bequest with a weight of η , a positive number less than one. Under the intended bequest models, individuals maximize the utility function:

$$U(c_1, c_2, b_1, b_2) = \frac{c_1^{1-\gamma}}{1-\gamma} + \eta\beta(1 - P)\frac{b_1^{1-\gamma}}{1-\gamma} + \beta P\left(\frac{c_2^{1-\gamma}}{1-\gamma} + \eta\frac{b_2^{1-\gamma}}{1-\gamma}\right)$$

The budget constraints that the individual faces are the following. In the first period, consumption plus savings (Sav) must equal discounted lifetime income:

$$c_1 + Sav \leq Y$$

Conditional on survival to the next period, second period consumption equals:

$$c_2 \leq Sav(1 + r)$$

Bequests at the end of period 1 equal $Sav(1 + r)$ – that is, accumulated savings for old age. Maximizing the utility function with respect to b_2 , one can get

$$b_2 = \frac{(\eta\beta)^{1/\gamma}}{1 + r + (\eta\beta)^{1/\gamma}} b_1(1 + r)$$

Finally, substituting the expression of b_2 into the first order conditions, and maximizing with respect to b_1 one gets:

$$b_1 = \frac{1}{1 + c} Y$$

where

$$c = \left((1 - P)\eta\beta(1 + r)^{-\gamma} + P\beta \frac{(1 + r)^{-2\gamma}}{((\eta\beta)^{1/\gamma} + (1 + r))^{-\gamma}} \right)^{-1/\gamma}$$

is a positive constant that decreases with β and η .

Expected bequests are:

$$E(B) = (1 - P)b_1 + P \frac{b_2}{(1 + r)}$$

The impact of an extra dollar of Y on expected bequests, discounted to period 1, is

$$\frac{\partial E(B)}{\partial Y} = (1 - P) \frac{1}{1 + c} + \frac{P}{(1 + r)} \frac{(\eta\beta)^{1/\gamma}}{1 + r + (\eta\beta)^{1/\gamma}} \frac{1}{1 + c}$$

Note that when η equals zero, the expression reduces to that above for the accidental bequest model, and that the impact of lifetime income on expected bequests is when bequests are intended.

Comparative statistics

1. *Funded Social Security (accidental bequests)*: Consider the impact of a programme that takes tY dollars in the first period to provide $tY(1 + r)$ dollars in the second period, contingent on survival. That programme reduces the incentive to save for old age. In that case, the impact of Y on expected bequests can be expressed as $\partial E(B)/\partial Y = (1 - P)(1 - a - t)$.

2. *Health risks in old age*: Assume that individuals are subject to non-insurable risk in old age, such as long-term care costs in the United States. If we model that risk as an increase in the marginal utility of consumption in the second period, contingent on survival, the propensity to bequeath from an extra dollar of lifetime income Y would increase.
3. *Longevity*: An increase in longevity can be viewed as an increase in P , that increases the marginal propensity to bequeath in all models.

APPENDIX 2: EMPIRICAL STRATEGY

This Appendix describes the empirical strategy to recover the marginal propensity to give through inter vivos transfers and bequests that follows Altonji and Villanueva (2003). Four steps are followed.

Step 1: Constructing permanent income

Given that a person's lifetime income Y is not observed in most datasets, permanent income is used as a proxy. Current income y_{it} of the head and spouse of the household that individual i belongs to in period t is supposed to be a function of the age of the head of the household, of an aggregate shock D_t , of the education level S_i , and of two unobserved components. The first (u_i) is individual-specific and is assumed to be constant over time, thus reflecting permanent income. The second unobserved component α_{it} is a perturbation that reflects both Identically and Independently Distributed (iid) income shocks and reporting error.

$$\log y_{it} = \delta_0 + f(\text{age}_{it} - 40) = \sum_{\text{year}} \delta_t D_t + \lambda S_i + u_i + \alpha_{it} \quad (\text{A1})$$

Age is included to account for the fact that we observe the income of individuals in different moments of their life-cycle. Time dummies capture the secular increase in earnings that occurred after World War II, especially stark in Germany. Finally, education is a constant variable that is intended to capture the 'quality' of the cohort.

The measure of permanent income of an individual is y_i , an average of yearly predicted income expressed as the sum of an aggregate time shock D_t , the individual component u_i and the level of education. Namely

$$y_i = \frac{1}{\text{years_work}} \sum_{\text{year0}}^{\text{yearT}} \exp(\delta_0 + \delta_{\text{year}} D_t + \lambda S_i + u_i)$$

Three notes are in order. First, individuals are assumed to have entered the labour force at age 25, and an average of predicted income is computed up to the last observation in which the individual is observed. Second, the expression does not contain age, as the estimated life-cycle profile is the same for all individuals, inclusion would amount to a rescaling of the variable. For the United States, Altonji and

Villanueva (2003) experiment including the predicted effects of age in the expression, without noticeable effects on the results. Third, the expression in (A1) does not include other variables like occupation or industry, which are observed for a small number of periods, because y_i is evaluated also for out-of-sample periods, when the occupation is not observed. Finally, note that the construction of y_i involves calculating the aggregate shock D_t in years in which the individual may not be observed. For example, a German person of 70 years of age in 2002 will only be 54 years of age in the first year of the GSOEP (1984), but it is necessary to impute his or her earnings for all the periods in his or her career. For years in which earnings are not observed the aggregate shock is approximated by the per-capita GDP, rescaled so it is consistent with the magnitude of the time dummies as estimated in (A1).

Expression (A1) is estimated on a sample of all respondents in the three surveys who were between 25 years and 62 years of age and earned above \$400. The estimation method is OLS regression on different samples for males and females. Current household earnings are regressed on a fourth order age polynomial, education year dummies, and dummies for married, female, female married and the number of children in the sample (race in the case of the United States). No adjustment is made for selection due to censoring from below, and u_i is obtained as the average of individual-specific errors from the regression (implicitly assuming that α_i is transitory error).

The median number of observations on income of individuals used to construct u_i is 17 for the United States, 14 for Germany, and 10 for the United Kingdom.

Step 2: Construction of lifetime earnings.

Define Y as the discounted sum of earnings, y_{age} are labour earnings at age age , $P(\text{alive} = age)$ is the probability of being alive at age a , and y_{age}^{retired} represent non-asset income after retirement.

$$Y_i = \sum_{age=age_0}^{age=age_R} (1+r)^{70-age} y_{i,age} + \sum_{age=age_R}^{age=age_{death}} P(\text{alive} = age)(1+r)^{70-age} y_{i,age}^{\text{retired}}$$

where r is the interest rate. To predict Y based on y_i ,

$$E(Y_i | y_i) = \sum_{age=age_0}^{age=age_R} (1+r)^{70-age} y_i + \sum_{age=age_R}^{age=age_{death}} P(\text{alive} = age)(1+r)^{70-age} E(y_{i,age}^{\text{retired}} | y_i)$$

where $E(y_{i,age}^{\text{retired}} | y_i)$ repr is obtained from a regression of non-asset post-retirement income on permanent income y_i on a sub-sample for which we observe both labour earnings and post-retirement earnings.

Step 3: The relationship between lifetime income and current wealth

We infer the relationship between wealth and lifetime income from the regression of wealth of individual i on lifetime income of that individual Y_i .

$$W_i = \gamma_0 + \gamma_1 Y_i + \gamma_2 Y_i^2 + g(\text{age} - 70) + \delta X_i + \varepsilon \quad (\text{A2})$$

W_i are (non-annuitized) wealth holdings of an individual i . Current wealth is assumed to be closely related to the *potential* bequest that parents would give to their children if they died on that year (or contingent bequest). The implicit assumption is that, conditional on lifetime income and demographics, the wealth of survivors at an age a is close to the bequest left by individuals who died at that same age. ε summarizes the impact on wealth of unobserved factors uncorrelated with lifetime income. For current wealth holding to be close to bequests, we use a sample in which the youngest head of household is 50.

Equation (A2) includes a polynomial in income to allow for non-linear effects of lifetime income on wealth (see Section 3). It also includes the age of the oldest member of the couple to control for possible systematic changes in household wealth owing to dissaving. Interactions between age and income are included to account for the fact that high-income households may dissave at a higher rate than low-income households (see Hurd 1999 and Dynan *et al.* 2004). Second, wealth in the United States varies widely among demographic groups, like widows, divorced and demographic minorities (Smith 1995; Altonji *et al.* 2000). Some of these differences in wealth accumulation are difficult to reconcile with economic theory. Hence, the specification includes interactions of income and widow, income and divorced and income and non-white to isolate the effect of lifetime income on wealth for a white couple, for whom wealth accumulation processes are better understood.

The measure of lifetime income Y only varies *across* individuals. Hence, the coefficients in (A2) are identified through cross-sectional variation in the permanent income of individuals. Even in the United States case, in which potentially repeated information is available on the wealth holding of the same individual, it is not possible to control for individual fixed-effects.

An omitted variable bias could arise as wealth holdings are correlated with year-of-birth effects. In all countries considered individuals born in the beginning of the century had lower income levels than individuals born toward the middle of the century, and were thus able to accumulate less wealth. If the income measure does not consider the part of the life-cycle in which we observe an individual the relationship between wealth and income would be downward biased. Permanent income is allowed to depend on wage growth (proxied by GDP per capita during the working life of an individual) and on cohort effects (which may reflect different educational achievements).

Step 4: The impact of lifetime income on expected bequests

The expected bequest that an individual will leave to his or her children, measured in dollars of the age of 70 of that person is defined as:

$$E(B_i) = \sum_{\text{age}=60}^{\text{age}=\text{age}_{\text{death}}} P(\text{death} = \text{age}) W_{\text{age}} (1 + r)^{70-\text{age}}$$

where $P(\text{death} = \text{age})$ denotes the average mortality rate of the last member alive in a married couple at age a (conditional on surviving until the previous year), and r denotes the interest rate. The impact of an extra dollar of lifetime income on expected bequests is thus

$$\frac{\partial E(B_i)}{\partial Y} = \sum_{\text{age}=60}^{\text{age}=\text{age}_{\text{death}}} P(\text{death} = \text{age}) \frac{\partial W_{\text{age}}}{\partial Y} (1+r)^{70-\text{age}}$$

That is the empirical counterpart to the impact of lifetime income on expected bequests reported in Appendix 1. Finally, two notes on the implementation of the procedure.

When estimating Equation (A.2), Y is replaced by the product of $\frac{\partial E(Y|y_i)}{\partial y}$ and y_i , and the resulting ‘generated regressor’ is problematic. For selected specifications, the standard errors are corrected for the fact that Y depends on y and on the derivative of post-retirement income with respect to permanent income. The corrected standard errors, available upon request, are very similar to the uncorrected ones.

Second, consider the computation of the probability of observing a bequest. All computations refer to a couple that reaches age 60. Using the Human Mortality Databases for West Germany, the United Kingdom and the United States, we calculate the survival and mortality probabilities of a male and a female. The probability of observing a bequest is the probability that the second member of the couple dies. Given the age-specific survival probability at a given age a S_{ma} (for males) and S_{fa} (for females), and the mortality rates, conditional to surviving to the age $a - 1$, H_{ma} and H_{fa} , the probability of observing a bequest is:

$$P(\text{age}_{\text{death}} = a) = S_{ma}(1 - S_{fa})H_{ma} + S_{fa}(1 - S_{ma})H_{fa} + S_{ma}S_{fa}H_{ma}H_{fa}$$

APPENDIX 3: MODELS OF INTER VIVOS TRANSFERS

Following Cox (1987), and Cox and Jakubson (1995), consider two possible motives for inter vivos transfers between parents and children. The first is the altruistic model, in which the parent cares about the welfare of the child. The second is the exchange model, in which the parent uses transfers as a way to obtain a service from the child.

Altruistic motive

The preferences of the potential donor depend on own consumption (c_p) and on the utility level of the recipient of help U_c , possibly weighted by a factor η (lower than one). The potential donor and the potential recipient have income levels I_p and I_c , respectively, and the donor chooses the level of the transfer t to maximize his or her own utility, that can be expressed in the following way:

$$U(c_p, c_c) = U_p(I_p - t) + \eta U_c(I_c + t)$$

Hence, the parent will decide to give whenever, for a level of zero transfers, the marginal utility of an extra unit of own consumption is smaller than the marginal utility of the consumption of the child (weighted by the altruism parameter). The parent will give up to the point when an additional dollar transferred reduces the utility derived from own consumption by the same amount that it increases the utility level of the recipient of help (weighted by the altruism parameter). That is, if transfers are positive,

$$\frac{dU_p}{dc_p}(I_p - t) = \eta \frac{dU_c}{dc_c}(I_c + t)$$

It is easy to show that the level of transfers depend positively on the income of the parent, and negatively on the income of the child (see Altonji *et al.* 1997; Hochguertel and Ohlsson 2003; and McGarry and Schoeni 2000 for empirical tests of these hypotheses in the United States).

Importantly for public policy a programme that increases the income of the adult child (like unemployment benefits) reduces the amount of private transfers received by children who would be receiving transfers in the absence of the programme. Imagine that the child is receiving positive transfers t from his or her parent. An extra dollar of public help that increases I_c by UI will change parental transfers by the following (negative) amount:

$$\frac{dt}{dUI} = - \frac{\eta U_c''(I_c + t + UI)}{U_p''(I_p - t) + \eta U_c''(I_c + t + UI)}$$

Effectively, the public programme is crowding out private monetary help from the parents.

Exchange motive

In the exchange model, parents derive utility from own consumption and from the provision of some service by their children (S). The service is assumed to be hard to replace with market goods, like spending the weekend in the company of the parent, or helping with household chores. The utility of the parent takes the form $U_p(c_p, S)$. If the provision of the service is costly for the child, then parents must give a monetary incentive to their children to obtain the service (that is, the child must be compensated in such a way that attains an utility level over some threshold \bar{U}). In other words, parents choose the level of transfers and services to solve the following problem:

$$\begin{aligned} \max \quad & U_p(I_p - t, S) \\ \text{s.t} \quad & U_c(I_c + t, S) \geq \bar{U} \end{aligned}$$

Transfers motivated by exchange must increase with the income of the parent. Reconsidering the example mentioned in the altruistic case, the relationship between monetary transfers and the income of the recipient child is not unambiguous (see Cox 1987). In

particular, one can imagine a situation in which it is positive. If the child gets a positive income shock, the threshold utility level may increase. If the parent wants to obtain the service, the level of compensation must increase. Contrary to the case of altruism, public programmes do not crowd out private transfers, but may actually increase them.

APPENDIX 4: EMPIRICAL ANALYSIS OF INTER VIVOS TRANSFERS

This Appendix discusses the methodology used to establish the link between lifetime income and inter vivos transfers.

Yearly inter vivos transfers and lifetime income

We estimate what is the average increase of yearly inter vivos transfers from parents to adult children living in separate households at different ages of the parent. Note that these transfers occur when almost all children in our sample have completed their education, and thus they are unlikely to pick up expenses of college fees or food-sharing. The proportion of parents who transfer money from their parents to any of their children is relatively low across countries and ranges between 17% (Germany) and 33% (United States). Hence, there is a mass point at zero transfers. In other words, average transfers R in a year can be expressed as the product of the proportion of parents who give transfers, $P(R > 0 | Y, age)$, and the average transfer given among parents who give, $E(R | Y, R > 0, age)$. In formal terms, $E(R | Y, age) = P(R > 0 | Y, age)E(R | Y, R > 0, age)$.

Either the model of exchange model of transfers or the altruism model predict that parents with lifetime incomes are both more likely to give monetary transfers to their children, and that, conditional on giving, the amount of transfers given increases with income. The total effect of lifetime income on inter vivos transfers can be separated into two parts, namely:

$$\frac{\partial E(R | Y, age)}{\partial Y} = E(R | Y, R > 0, age) \frac{\partial P(R > 0 | Y, age)}{\partial Y} + P(R > 0 | Y, age) \frac{\partial E(R | R > 0, Y, age)}{\partial Y}$$

In the expression above, expected yearly inter vivos transfers R depend on the age of the parent. We experiment with two alternative specifications. The first simply overlooks the problem that many parents do not report transfers, and estimates an ordinary least squares regression of yearly inter vivos transfers given to all children (including zeroes) on a polynomial in lifetime income of the parent, and other demographic variables, and also the average lifetime income of the children.

The second specification does take into account the censoring problem, and uses an alternative specification in which $\frac{\partial P(R > 0 | Y, age)}{\partial Y}$ is estimated using a Probit of the probability of receiving transfers on lifetime income, and $\frac{\partial E(R | R > 0, Y, age)}{\partial Y}$ by ordinary

least squares in a sub-sample of positive transfers. For the German case, we have access to several waves of data. We just pool observations from the same individual.

Lifetime inter vivos transfers and lifetime income

Finally, aggregate the response of yearly gifts to lifetime income into a response of lifetime inter vivos transfers to lifetime income. That is, we aggregate the responses over the life cycle of the parent. We assume that the parent is 25 years older than the child, that the child has average income, and that the interest rate is 4%. We also assume that parents start giving transfers at the age of 45. The impact of lifetime income on expected lifetime transfers can be obtained from the expression:

$$\frac{\partial E(R|Y)}{\partial Y} = \sum_{age=45}^{age=86} (1+r)^{70-age} P(\text{alive} = age) \frac{\partial E(R|Y, age)}{\partial Y}$$

Note that our analysis focuses on the impact of lifetime income on inter vivos transfers given to all children. We do not discuss the important issue of how parents allocate transfers among their multiple children. Inter vivos transfers may reduce

Table A1. Summary statistics of sample used for the bequest regression, childless elderly

	United States	West Germany	United Kingdom
	Mean (standard deviation)	Mean (standard deviation)	Mean (standard deviation)
Wealth holding [median]	203 [89.174] (446.10)	188.368 [76,829] (304,805)	168,624 [113.671] (178,170)
Parental permanent annual income	47.292 (30.682)	48,736 (28,579)	41,750 (26,741)
Age of oldest parent (if present)	69.32 (9.87)	62.59 (8.73)	58.34 (6.85)
Widower	0.02 (0.14)	0.053 (0.22)	0 (-)
Widow	0.18 (0.39)	0.11 (0.31)	0.07 (0.26)
Never married	0.33 (0.47)	0.25 (0.43)	0.5 (0.50)
Divorced	0.18 (0.38)	0.17 (0.38)	0.091 (0.29)
Married	0.49 (0.50)	0.42 (0.49)	0.40 (0.49)
Sample size	302	189	109

Notes: Wealth outliers are trimmed in the three samples. All monetary magnitudes are expressed in thousands of 1995 dollars. The definition of wealth in all countries includes value of the house, other real state, tangible assets, financial assets, minus mortgage debt and other debts. Business wealth is not included. The United States sample is a panel of 4 waves: 1984, 1989, 1994 and 1999. Respondents are present in the original 1968 survey. The German sample is a cross-section of respondents to the 2002 GSOEP Wealth Supplement who report not having children. The British sample is a cross-section of respondents to the 2000 BHPS Wealth Supplement who report not having children.

Table A2. Summary statistics of transfer of not employed adult children

Parents gave a transfer to any child	0.23 (0.426)
Transfer amount (including zeroes)	1093 (2,851)
Monthly unemployment benefits*12	2091 (3,278)
Receives unemployment benefits	0.254 (0.436)
Age of the oldest parent	53.87 7.58
Age of child	27.99 (4.71)
Permanent income, parents	40 049 (20 863)
Permanent income, children	36 258 (20 728)
Child is a married female	0.524 (0.50)
Child is a married male	0.082 (0.27)
Child is a single female	0.228 (0.42)
Child is a single male	0.16 (0.37)
Number of observations All magnitudes in 1995 dollars	389

Table A3. The impact of an extra dollar of lifetime income on wealth holding at age 70, elderly without children
Dependent variable: Wealth holding, in thousands of dollars

	United States (1)	West Germany (2)	United Kingdom (3)
Y_p	0.0159 (0.008)*	0.015 (0.0086)**	0.0197 (0.007)**
$Y_p * Y_p$	3.55e-06 (2.03e-06)	—	-8.30E-07 (8.53e-07)
$Y_p * (\text{age} - 70) / 10$	0.003 (0.005)	—	—
$Y_p * \text{widow}$	0.0115 (0.0149)	—	—
$Y_p * \text{divorced}$	0.022 (0.012)	—	—
$Y_p * \text{nonwhite}$	0.0014 (0.0129)	—	—
Age parent -70	0.0875 (4.026)	-9.13 (4.59)**	-10.68 (10.90)
Age parent -70, squared	-0.3454 (0.138)**	-0.725 (0.269)**	-0.89 (0.52)
Divorced	96.85 (70.649)	-112 (42)***	37.12 (88.54)
Widower	268.15 (370.75)	-58.56 (25.81)	—
Widow	49.12 (42.14)	-110 (64)***	-51.82 (124)
Single	—	-68.03 (54.36)	—
Constant	233.28 (51.17)**	257.733 (257.733)***	232 (44.64)**
Observations	302	189	109
R-squared	0.35	0.10	0.17

Notes: Estimation method: Ordinary Least Squares. Wealth outliers trimmed. Standard errors in parentheses account for heteroscedasticity. Parental permanent earnings Y_p is the deviation from the unweighted sample mean (for each country). All monetary magnitudes are expressed in 1995 dollars, using the OECD PPP of DM2 per dollar and \$1.53 per British pound. For the case of the United States, regressions include time dummies, omitted in the table.

* denotes that the estimate is significantly different from zero at 5%; ** significant at 1%.

between-sibling disparities in labour income. Nevertheless, the main use we make in this paper of the magnitude of the response of transfers to income is to understand the impact of parental income on between-family dispersion in outcomes. For what we know, between-family dispersion in income is much larger than within-family dispersion (see Solon 1999). Second, data limitations in Germany prevent us from doing disaggregated analysis at the recipient level.

REFERENCES

- Abel, A.B. (1985). 'Precautionary savings and accidental bequests', *American Economic Review*, 75(4), 777–91.
- Altonji, J., U. Doraszelski and L. Segal (2000). 'Black/white differences in wealth', *Economic Perspectives*, 24(1), 38–50.
- Altonji, J., F. Hayashi and L. Kotlikoff (1996). 'The effects of income and wealth on time and money transfers', NBER Working Paper 5522.
- (1997). 'Parental altruism and inter vivos transfers: Theory and evidence', *Journal of Political Economy*, 105(6), 1121–66.
- Altonji, J. and E. Villanueva (2003). 'The marginal propensity to spend on adult children', NBER Working Paper 9811.
- Ando, A., L. Guiso and D. Terlizzese (1993). 'Dissaving by the elderly: Transfer motives and liquidity constraints', NBER Working Paper 4569.
- Andreoni, J. (1989). 'Giving with impure altruism: Applications to charity and Ricardian equivalence', *Journal of Political Economy*, 97(6), 1447–58.
- Banks, J., R. Blundell and J. Smith (2003). 'Wealth inequality in the United States and in the United Kingdom', *Journal of Human Resources*, 38(2), 241–79.
- Becker, G. and N. Tomes (1986). 'Human capital and the rise and fall of families', *Journal of Labor Economics*, V 4(3), S1–S39.
- Bernheim, D. (1991). 'How strong are bequest motives? Evidence based on estimates of the demand for life insurance and annuities', *Journal of Political Economy*, V. 99(5), 899–927.
- Börsch-Supan, A. and L. Essig (2000). 'Household saving in Germany: Results of the first SAVE study', NBER Working Paper 9902.
- Börsch-Supan, A. and A. Lusardi (2003). 'Saving: Cross-national perspective', in A. Börsch-Supan (ed.), *Life-Cycle Savings and Public Policy: A Cross-National Study in Six Countries*. Academic Press, New York.
- Börsch-Supan, A. and A. Reil-Held (1999). 'How much is transfer and how much insurance in a Pay-As-You-Go System? The German case', University of Mannheim Working Paper.
- Brown, J. and A. Finkelstein (2004). 'The interaction of public and private insurance: Medicaid and the long-term care insurance market', NBER Working Paper 10989.
- Comas-Herrera, A. and R. Wittenberg (2004). 'European study of long-term care expenditure', Report to the European Commission, Employment and Social Affairs DG.
- Couch, K. and T. Dunn (1997). 'Intergenerational correlations in labor market status: A comparison of the United States and Germany', *Journal of Human Resources*, 32(1), 210–32.
- Cox, D. (1987). 'Motives for private income transfers', *Journal of Political Economy*, V. 95(3), 508–46.
- Cox, D. and G. Jakubson (1995). 'The connection between public transfers and private interfamily transfers', *Journal of Public Economics*, 57, 129–67.
- De Nardi, M. (2004). 'Wealth inequality and intergenerational links', *Review of Economic Studies*, V. 71(3), 743–68.
- Dynan, K., J. Skinner and S. Zeldes (2002). 'The importance of bequests and life-cycle saving in capital accumulation: A new answer', *American Economic Review*, V. 92(2), 274–78.
- (2004). 'Do the rich save more?', *Journal of Political Economy*, V. 112(2), 397–445.
- Emmerson, C. (2002). 'Pension reform in the United Kingdom: Increasing the role of private provision?', Institute for Fiscal Studies Working Paper 402.
- European Observatory of Health Care Systems (2000). 'Health care systems in transition: Germany'.
- Friedman, B. and M. Warshawsky (1990). 'The costs of annuities: Implications for saving behavior and bequests', *Quarterly Journal of Economics*, 104(2), 135–54.

- Fuster, L. (1999). 'Is altruism important for understanding the long-term effects of social security?' *Review of Economic Dynamics*, V. 5(5), 1221–48.
- Fuster, L., S. Imrohoroglu and A. Imrohoroglu (2004). 'A welfare analysis of social security in a dynastic framework', *International Economic Review*, forthcoming.
- Gale, D. and J.K. Scholz (1994). 'Intergenerational transfers and the accumulation of wealth', *Journal of Economic Perspectives*, V. 8(4), 145–60.
- Guiso, L. and T. Jappelli (2002). 'Private transfers, borrowing constraints, and the timing of home ownership', *Journal of Money, Credit and Banking*, 315–39.
- Hochguertel, S. and H. Ohlsson (2003). 'Compensatory inter vivos gifts,' University of Uppsala Working Paper.
- Hurd, M. (1987). 'Savings of the elderly and desired bequests', *American Economic Review*, V. 77, 398–12.
- (1989). 'Mortality risk and bequests', *Econometrica*, 52, 421–34.
- (1999). 'Mortality risk and consumption by couples', NBER Working Paper 7048.
- Hurd, M. and J. Smith (2002). 'Expected bequests and their distribution', NBER Working Paper 7380.
- Independent Sector (2001). *Giving and Volunteering in the United States*, <http://www.independentsector.org/>
- Jülicher, M. (2001). 'Inheritance and donations tax in Germany', mimeo.
- Jürges, H. (2001). 'Do Germans save to leave an estate? An examination of the bequest motive', *Scandinavian Journal of Economics*, V. 103(3), 391–414.
- Juster, T., J. Smith and F. Stafford (1999). 'The measurement and structure of wealth', *Labour Economics*, V. 6(2), 253–75.
- Kopczuk, W. and J. Lupton (2004). 'To leave or not to leave: The distribution of bequest motives', Columbia University Working Paper.
- Kotlikoff, L. (1989). 'Estimating the wealth elasticity of bequests from a sample of potential decedents', in L. Kotlikoff (ed.), *What Determines Savings?* MIT Press, Cambridge, MA.
- Kotlikoff, L. and A. Auerbach (1987). *Dynamic Fiscal Policy*. Cambridge University Press, New York.
- Kotlikoff, L. and L. Summers (1981). 'The role of intergenerational transfers in capital accumulation', *Journal of Political Economy*, 89, 706–32.
- Laitner, J. and H. Ohlsson (2001). 'Bequest motives: A comparison of Sweden and the United States', *Journal of Public Economics*, V. 79(1), 205–36.
- Light, A. and K. McGarry (2004). 'Why parents play favorites: Explanations for unequal bequests', NBER Working Paper 9745.
- Masson, A. and P. Pestieau (1997). 'Bequest motives and models of inheritance', in G. Erreygers and T. Vendevelde (eds.), *Is Inheritance Legitimate?* Springer Verlag, Berlin.
- McGarry, K. and R. Schoeni (1995). 'Transfer behavior in the health and retirement study: measurement and the redistribution of resources within the family', *The Journal of Human Resources*, 30, s268–s292.
- Poterba, J. (2001). 'Inter vivos transfers and the incentive effects of estate and gift taxes in the US', *Journal of Public Economics*, V. 79, 237–64.
- Reil-Held, A. (1999). 'Bequests and aggregate wealth accumulation in Germany', *The Geneva Papers on Risk and Insurance*, 24(1), 50–63.
- Schnabel, R. (2000). 'Opting out of social security: Incentives and participation in the German Public Pension System', SFB 504 Discussion Paper No. 99–42.
- Schoeni, R. (2000). 'Does unemployment insurance displace family assistance?', Papers 00–05, RAND – Labor and Population Program.
- Smith, J. (1995). 'Racial and ethnic differences in wealth in the health and retirement study', *Journal of Human Resources*, 30, S158–83.
- (1999). 'Healthy bodies and thick wallets: The dual relation between health and economic status', *Journal of Economic Perspectives*, 13(2), 145–66.
- Solon, G. (1999). 'Intergenerational mobility in the labor market, in *Handbook of Labor Economics*, Elsevier Science, North-Holland, Amsterdam.
- Yaari, M. (1965). 'Uncertain lifetime, life insurance, and the theory of the consumer', *Review of Economic Studies*, 32(2), 137–50.
- Walker, L. (2004). 'Uncertain nursing home expenses and retirement wealth', University of Michigan Working Paper.
- Walliser, J. and J. Winter (1998). 'Tax incentives, bequest motives and the demand for life insurance: Evidence from Germany'. University of Mannheim Discussion Paper No. 99–28.