Taxing the Dead: an analysis of intergenerational transfers and levies*

Aaron Cooke†

University of Connecticut

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Abstract

There has been many calls recently from politicians and economists to change the structure of the United States estate tax regime. The contribution of this paper is to analyze the impact of differing methods of taxing intergenerational transfers, in the context of a dynamic general equilibrium overlapping generations model with differential fertility. This paper is the first to consider the impact of switching from an estate to inheritance tax in the presence of differential fertility, and the fallout such a switch would have upon inequality and welfare. It also incorporates an empirical exploration of the effect of bequests on life-cycle savings using the Survey of Consumer Finances.

Keywords: Intergenerational transfers, endogenous fertility, wealth inequality, life-cycle savings.

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†Department of Economics, The University of Connecticut, Storrs, CT 06269-1063, United States. Email: aaron.cooke@uconn.edu.

1. Introduction

The contribution of this paper is to extend the model created in Cooke, Lee and Zhao (2017) [5] to achieve a greater degree of policy relevance. It includes several mechanisms to increase the richness of the model and allow for policy experiments and prescriptions. Specifically, allowing for intergenerational educational investment, accidental fertility, and a comprehensive tax regime. It also incorporates an empirical exploration of the effect of bequests on life-cycle savings using the Survey of Consumer Finances.

In addition, this paper embarks upon an extensive econometric analysis, searching for relationships between key variables of interest.

If rich people have fewer children, this could have significant impact on how the estate tax is viewed, and whether an inheritance tax would be more equitable and efficient. In short, an estate tax is levied on the deceased, while an inheritance tax falls upon the heirs. The number of heirs thus has a large impact on the distributional effect if the tax is progressive, as it almost always is. Many states and countries currently use an Inheritance tax, such as Iowa, Kentucky, Maryland, Nebraska, New Jersey, Pennsylvania, Japan, France, U.K., South Korea and Germany. Understanding the impact switching could have on the United States is an understudied element of U.S. tax policy.

Another addition could be to add discrete educational investment by parents into their children, which could have an impact on the debate between private and public education provision, and lead to different levels of investment depending on both wealth and family size. This will structure educational investment as a substitute for end of life bequests, leading to a more accurate mechanism for replicating the empirical distribution. The result of this addition will be to allow for interesting interaction effects between education, bequests and taxes.

Finally, incorporating accidental fertility, where the chances of an unplanned pregnancy are correlated with parental education and ability, could help replicate the fertility differences between rich and poor more comprehensively and accurately. Capturing not only the difference in first moments between the rich and poor, but the difference in the second moments is very important. The poor not only have more children, they also have higher variance in their birthrate according to U.S. Census data. A better representation of

fertility will allow for policy experiments increasing or decreasing fertility incentives, such as taxes or subsidies, with predictive power for the resulting inequality that is generated.

Recent US data shows a large concentration of wealth among few of its citizens. For instance, the top 1 percent holds nearly one third of the total wealth in the economy, and that share is growing [2]. The top 5 percent holds over half. This trend has been accelerating in the years since the 2008 financial crisis [25]. In addition, wealth inequality is significantly higher than labor earnings or total income inequality. In 1995 the Gini coefficient for annual labor earnings was .63 [24]. The Gini for wealth holding was much higher, at .8 [24]. Understanding the reasons for this relatively greater level of wealth inequality is important for the economic consequences faced by highly unequal economies, such as greater societal unrest and lower intergenerational mobility.

One of the major puzzles surrounding wealth inequality is why it is so much more pronounced than income inequality. Wealthy individuals act in a different way than would be expected by traditional economic models, relatively saving more and spending less, even as they reach the end of their lifespans [9]. In addition to this, wealthier people are much more likely to give bequests to their children at the end of their lives, even when relative wealth is accounted for. Historically the amount of wealth derived from intergenerational transfer has varied between one-tenth and one-fifth [22], however, more recent estimates place it as high as one half [10]. The top 2% of households receive nearly 70% of lifetime inheritances [12].

Standard dynamic models with heterogeneous agents have a difficult time replicating this savings behavior and targeting the level of wealth inequality seen in the data. For instance, Aiyagari (1994) [1] predicts in a calibrated simulation the top one percent will hold four percent of the wealth, while empirically the top one percent holds thirty percent. Why do rich people choose to possess such a high level of wealth instead of increasing their consumption?

Accounting for fertility decisions could be crucial to explaining wealth and income inequality. It has been made clear that there exists an inverse relationship between income and fertility [14]. According to the U.S. Census Bureau, births per one thousand women are 98.3 for women with family income below 10,000 and 54.8 for women with family income above 75,000. This is a significant difference and has major ramifications for an

overlapping generations model attempting to capture intergenerational transfers of ability and bequests. Knowles (2000) [17] finds in a 2-period OLG model with intergenerational transfers and endogenous fertility that fertility decisions help explain the concentration of wealth in the richest families.

In this paper, we wish to accomplish two goals. First is to build and run an overlapping generations model that includes differential fertility, intergenerational transfers and a comprehensive tax regime. Second is to look at the impact switching to an inheritance tax would have on inequality and welfare.

The rest of paper is organized as follows. In section 2, we describe the existing literature. In section 3, we describe the model and its stationary equilibrium. In section 4, we calibrate a benchmark specification using moment matching. In section 5, we discuss the results. In section 6, we conduct several robustness tests. The final section concludes.

2. Literature Review

2.1. Inequality and Bequests

Inequality and its causes have become a political and economic touchstone in recent years. However, defining what exactly is unequal is often left unsaid by the bumper stickers. There exists unequal distributions of productivity, income, wealth, consumption, bequests, shocks, choices, etc. Some of these elements, especially income and wealth, are treated as if they are equivalent. But the data shows large differences in the distributions of income and wealth in the United States. As found by Diaz-Gimenez et al. (1997) [8], the correlations between earnings and wealth and between income and wealth are surprisingly low, 0.230 and 0.321, respectively.

In 1992 the United State's Gini indexes for short term labor earnings, income, and wealth were, respectively, .63, .57, and .78 (Diaz-Gimenez et al. 1997) [8], while in 1995 they were .61, .55 and .80 (Budria et al. 2002) [24]. The shares of earnings and wealth of the households in the top 1 percent of the corresponding distributions are 15 percent and 30 percent, respectively (Castaneda et al 2003) [4].

Standard quantitative macroeconomic models have had difficulties in generating the observed degree of wealth concentration (De Nardi and Yang 2015) [7]. Specifically, these

models fail to account for the extremely long and thin top tails of the distributions and for the large number of households in their bottom tails (Castaneda et al 2003 [4], Quadrini and Rios-Rull 1997 [23]). However, if it is intergenerational transmission of wealth and ability that drives wealth inequality, as Kotlikoff and Summers (1981) [19] have argued, then a focus on life-cycle saving will fail to capture the relevant causes. Overlapping generations are an improvement at mimicking the data. Huggett (1996) [13] predicts that the top one percent will hold seven percent of the wealth. This model only accounted for accidental bequests, distributed equally to all individuals.

There has been multiple papers that argue that bequest giving is crucial to explaining wealth differentials. Most recently, De Nardi (2004) [6] and De Nardi and Yang (2015) [7] incorporates bequest leaving into the utility function as a luxury good, allowing for rich parents to value bequests more. If bequests are a luxury good such that the rich gain greater utility from leaving them, then greater inequality is generated. This is due to the emergence of large estates, or dynasties, where wealthy parents have well educated, high productivity children who they then leave large bequests to. These persistent rich often have smaller families, leading to greater relative concentration. This is consistent with Jones and Schoonbroodt (2016) [15] that smaller cohorts receive relatively large per child transfers from parents.

Bequests represent a large piece of intergenerational transfers. Gale and Scholz (1994) [10] use the Survey of Consumer Finances to find the amount of inter-vivos transfers and inheritance from 1983-85. Between support given, college expenses paid and inheritance given, the amount totaled over $350 billion. Of this, inheritance was nearly 40 percent and over 60 percent of those who reported receiving inheritance were in the top decile. Their central estimate is that intended life-time transfers (which they define as inter-vivos transfers, trust accumulations, and life insurance payments to children) account for at least 20 percent of aggregate net worth, and bequests, accidental or intended, account for 31 percent more.

Kopczuk and Lupton (2007) [18] find that three-fourths of the elderly single population has a bequest motive and about four-fifths of their net wealth will be bequeathed, half of which is due to a bequest motive as opposed to accidental bequests. This ratio is consistent with Lee and Tan (2017) [21] and Hendricks (2001) [12]. Hendricks also finds that the

effects of capital income taxes are nearly invariant to assumptions about bequest motives as well as to reasonable variations in the size of bequest flows.

2.2. Taxation

Taxes on wealth transfer have been a common theme throughout human history. Early examples include 7th century B.C. Egypt and 1st century A.D. Rome. The first American wealth transfer tax dates from 1797. This was a simple stamp levy on receipts for legacies and wills. The modern day incarnation of the estate tax is much more complex and wide ranging having gone through many repeals, reforms, expansions and one constitutional amendment. Today nearly every member of the OECD has some form of estate or inheritance tax [11].

Despite this ubiquity, there is substantial debate around both the size of this tax and whether it should exist at all. Opponents decry the morbidness of taxing corpses and the unfairness of ”double taxation,” as the recently deceased already paid taxes on their income before giving it to their inheritors. Supporters, ranging from liberals to libertarians, call large inheritances ”affirmative action for the wealthy” and support near-confiscatory taxes on bequests [26].

Some political opponents have labeled this levy a ”death tax.” This is not an accurate description though, as many people who die (the vast majority in fact) do not pay this tax upon dying. In addition this tax can be prepaid through insurance policies, and in some cases the tax can be spread over more than a decade. A more accurate term would be ”rich people giving their money to non-charities or non-spouses possibly around the time of their demise tax.” As this does not roll well off the tongue, I will be referring to transfer taxes more generally, and specifically estate, gift or inheritance tax throughout this paper.

Stiglitz (1978) [27] raises a major concern with the estate taxes effect on the economy. If the estate tax lowers savings, then this will lead to a reduction in the capital stock and lead to a lowering of the marginal product of labor and therfore wages. In short, abolition of the estate tax could raise wages and lead to a improvement in wage dependent household’s welfare. Laitner (2001) [20] finds that Stiglitz is correct, and a lowering or removal of the tax on bequests would raise savings. However it would also increase wealth inequality, specifically among the top 1 percent who are most effected by the estate tax. This also

does not take into account the finding in Cooke, Lee and Zhao (2017), that expected inheritances reduce savings among the beneficiaries by around 3%.

The level of taxes has effects on the amount of bequests given. Joulfiain (1998) [16] finds that an increase in the gift tax that was passed in 1977 led to a large increase in transfers made before the tax went into affect.

Concern that estate taxes unfairly impact small business and farms has led to provisions that allow transfers of closely held businesses to value themselves at use value rather than the much higher market value. They can also spread their tax burden across many years. In addition, the amount of small businesses that are affected by the estate tax is rather small. Farm assets and real estate were just 1.7 percent of taxable estate value on 2000 according to the IRS. Limited Partnership and "other noncorporate business assets" were 2.6 percent. Even generous estimates of the definition of a small business results in them being about one tenth of the total wealth transfer affected by the tax [11].

The last decade has seen major changes in the estate tax, with the basic exclusion amount rising from 1.5 million in 2004 to 5.5 million in 2016. The top bracket tax rates also saw major changes, decreasing from 55 percent (in 2001) to 35 percent (in 2010), and then increasing to 40 percent (in 2013) according to the IRS. Recently President Trump has called for an abolition of the Estate Tax, while his political opponents wish to increase it. Understanding the mechanisms and effects of this tax policy is therefore very important.

3. Model

Consider an economy inhabited by overlapping generations of agents who live three periods. In the first period individuals are not economically active. In the second period they make the fertility and labor supply decisions, and save for retirement. In the final period they receive bequests from their parents, consume some of their wealth and leave the remainder as bequests to their children in the next period. These bequests are taxed, and the tax is distributed equally to all living members of the economy.

3.1. Consumer's Problem

An individual makes no economic decisions in the first period.

Individuals in the second period differ along three dimensions: earning ability ψ, number of siblings n^p, and current wealth of their old-age parents x^p. They face the following utility-maximization problem:

$$V_2(\psi, n^p, x^p) = \max_{c,a,n} \left[\frac{c^{1-\sigma}}{1-\sigma} + \eta_1 n^{\eta_2} + \beta E[V_3(x)] \right]$$

subject to

$$c + a \leq \psi w + g$$
$$x = a + \frac{b^p(x^p)}{n^p}$$

The individual can calculate an expected bequest value as a function of parental wealth and the number of siblings in the next period, $b^p(x^p, \tau)/n^p$, where b^p is the total amount of bequests left by her parents and τ is the applicable tax rate. Thus the total wealth the individual possesses going into period 3 is $x = (1 + r)(a + b^p(x^p, \tau)/n^p)$, where a is the life-cycle saving from period 2 to period 3. Here and n is number of children. η_1 is the weight on the utility derived from children, and η_2 controls the curvature of the utility from children. g i a governmental transfer, the equally divided share of all governmental tax on intergenerational transfer.

An individual's ability ψ (effective units of labor representing human capital, luck or inherent ability) depends on their parental ability state, and it is assumed to follow the AR(1) process,

$$log(\psi) = \rho log(\psi^p) + \epsilon$$

where

$$\epsilon \sim N(0, \sigma^2), \text{i.i.d.}$$

n is determined by a stochastic draw, where $n = \mu + \delta$ and δ $N[o, \sigma^2]\sigma$ is the ability level

specific variance, calibrated later from U.S. Census data.

Individuals are retired in the third period, and their state in this period can be completely captured by one variable x, the amount of wealth held. They face the following utility-maximization problem:

$$V_3(x) = \max_{c,b} \left[\frac{c^{1-\sigma}}{1-\sigma} + \phi_1 (b(1-\tau) + \phi_2)^{1-\sigma} \right]$$

subject to

$$c + b \leq (1+r)x$$

Where b is total bequests and transfers allocated to your children, b/n is the amount left to each of their n children and where r is the interest rate. Parents have "warm glow" motive, where they enjoy giving to their children but do not care about the wellbeing of children. Note that parents take into account taxes when they formulate their choices, and the amount of the bequest that is taxed away has no impact on their utility.

The term ϕ_1 measures the weight on the bequest motive, while ϕ_2 measures the extent to which bequests are a luxury good. This is in congruence with De Nardi (2004) [6].

3.2. Firm's Problem

Firms are identical and act competitively. Their production technology is Cobb-Douglas:

$$Y = AK^{\theta} L^{1-\theta}$$

.

The profit-maximizing behaviors of firms imply that the marginal product of capital is:

$$r = A\theta K^{\theta-1} L^{1-\theta}$$

,

and the marginal product of one effective time-unit of labor is:

$$w = A(1-\theta) K^{\theta} L^{-\theta}$$

.

3.3. Government and Taxes

The Government runs a balanced budget every time period. They levy taxes either on the estates of the deceased before distribution, or on the heirs directly, depending on whether it is an estate or inheritance tax.

Let κ_2 and κ_3 represent the population distributions of individuals in period 2 and 3.

$$G = \int_x (\tau b) \partial \kappa_3(x)$$

$$g = \frac{G}{\int_\psi \int_{n^p} \int_{x^p} \partial \kappa_2(\psi, n^p, x^p)}$$

In the benchmark model, τ has a rate and an exemption level. All bequests below the exemption level are immune from taxation, all bequests above that level are taxed at a fixed rate.

3.4. Stationary Equilibrium

Let κ_2 and κ_3 represent the population distributions of individuals in period 2 and 3. A steady state in this economy consists of a sequence of allocations $[c_2, c_3, a, b]$, aggregate inputs $[K, L]$ and prices $[w, r]$ such that

1. Given prices, the allocations $[c_2, c_3, a, b]$ solve each individual's maximization problem.

2. Given prices, $[K, L]$ solve the firm's probelm

3. Markets clear:

$$K_t = \int_{\psi} \int_{n^p} \int_{x^p} (a) \partial \kappa_2(\psi, n^p, x^p) + \int_x (b) \partial \kappa_3(x)$$

$$L_t = \int_{\psi} \int_{n^p} \int_{x^p} (1 - n\gamma) \partial \kappa_2(\psi, n^p, x^p)$$

4. The distributions κ_2 and κ_3 are stable and evolve according to the followings law of motions: **Comment: the laws of motions needed**

4. Calibration

We obtain measurements for the American level of intergenerational income persistence, median lifetime income, long-run income gini, and time cost of child care. In addition we check the sensitivity of our results by using a different bequest motive and an alternate method of intergenerational transfer.

4.1. Demographics

The model period is 30 years. Individuals enter the economy when they are 30 years old (period 2). They retire at 60 years old (period 3) and die at the end of the period (at 90 years old).

Using the 1990 U.S. Census, I calculated the "children ever born" from the 1945-1955 birth cohort. I then broke it down using their occupational income (to correct for them being out of work at the current time) and found the first two moments for each of my ability groupings.

CEB mean and variance by Ability Group

ψ	1	2	3	4	5	6	7
$Mean$	2.65	2.26	2.41	2.04	1.76	1.80	1.51
$Variance$	2.32	1.94	2.06	1.76	1.58	1.63	1.47

Not only does fertility decline with income, the variance does as well.

We approximate the AR(1) process for earning ability ψ by a 7-state Markov chain using the method introduced in Tauchen (1986). The coefficient of intergenerational persistence, ρ, is set to 0.4 according to the estimates in Zimmerman (1992) and Solon (1992). The transition matrix and ability levels are shown in the appendix.

4.2. Preferences and Technology

The subjective discount factor β is chosen to match the capital-output ratio in the US, which is 3.0 according to Auerbach and Kotlikoff [3]. The resulting value of β is 0.37, which is equivalent to an annual discount factor of 0.967 (i.e. $.967^{30} = 0.37$). The capital share θ and relative risk aversion σ is set to the widely accepted 0.33 and 1.5 according to the quantitative macro literature.

Bequest parameter ϕ_1 calibrated to match the bequest/wealth ratio of 31% , calculated by Gale and Scholz (1994) [10]. ϕ_2 is calibrated to match the 90 percentile of the bequest distribution seen in the data. That value is $187,600 [14]. We do not include inter-vivos transfers or college expenses to be conservative in our estimates of the importance of intergenerational transfers. Our ability levels are normalized to 1.

We use the 2015 U.S. tax regime, with a 5.5m exemption level and a 40% rate. NOTE: Will likely change this to a different year as a comparison. Maybe 1990? 1980?

The parameter values are summarized in Table 1.

5. Quantitative Results

5.1. Distributionary Effects

Table 1: The Benchmark Calibration

Parameter	Value	Source
σ	1.5	Macro Literature
θ	0.33	Macro Literature
τ	.4	U.S. Tax Code
Ex	5.5m	U.S. Tax Code
Parameter	Value	Moment to match
ϕ_1		the bequest/wealth ratio: 31%
ϕ_2		90 percentile of the bequest distribution
β	0.37	Capital-output ratio: 3.0

5.2. Welfare Effects

6. Conclusion

7. Bibliography

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