Abstract

Actual bequests are an hybrid of canonical types and in particular of accidental bequest and paternalistic bequest related to some joy of giving. In this case the estate consists of two components: an amount intended by altruistic parents and an amount which results from the "premature" death of parents. Taxing those two types of bequests separately is known to have different implications. The purpose of this paper is to see the distributive incidence of estate taxation when those two components are indistinguishable.

Wealth transfer taxation with both accidental and planned bequests[1]

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1 Introduction

The purpose of this paper is to assess the desirability of wealth transfer taxation when bequests result from lifetime uncertainty and from a mere joy of giving.[1] In the absence of private annuity market uncertainty about the length of life leads to some unexpected bequest. At the same time, parents may very well draw joy from giving some wealth to their children. These two types of bequests – accidental bequests and bequests based on the joy of giving – are known to have different implications and react to taxation in contrasting ways. If they could be distinguished they should be taxed specifically. Unfortunately they cannot be distinguished and this makes the problem of taxation quite difficult. Not surprisingly its incidence is then highly sensitive to the relative importance of the two bequest motives.

To study this issue we use a two-period overlapping generations (OLG) growth model in a closed economy. There is some idiosyncratic uncertainty on the length of life in the second-period and there is no annuity markets. This leads to accidental bequests and to a certain heterogeneity among individuals who however face the same lifetime uncertainty. Individuals have the same labor productivity and the standard result is that a 100% tax on accidental bequests has no adverse effects on efficiency but can contribute to more equity. There is another source of bequests. Parents leave part of their saving to their children out of some joy of giving. This type of bequests sometimes labeled as last period consumption induces also some heterogeneity among individuals. However taxing these bequests is likely to have some effect on the level of capital accumulation (positive or negative depending on the intertemporal elasticity of substitution). In this paper we are concerned by the effect of estate taxation on the coefficient of variation of lifetime income. In other words we are not concerned by the optimal taxation issue but rather by the marginal effect of estate taxation on what is considered as a reasonable index of equality. The reason of this choice (coefficient of variation rather than social welfare function and tax reform rather than optimal taxation) is one of analytical simplicity. Even within this single specification the problem happens to be difficult.

[1] While we were completing this paper, we came across a paper by Blumkin and Sadka (2002) which deals with the same issue but in a static framework.

2 The model

2.1 Consumers

To deal with this problem we adopt a standard OLG model with lifetime uncertainty. Individuals belonging to generation t live for two periods. They work and earn w_t in the first; they also inherit h_t at the beginning of this period. They then devote their resources, $w_t + h_t$, to present consumption c_t and saving s_t. Saving is then devoted to consumption d_{t+1} in their retirement period and to some intentional bequest x_{t+1}.

Uncertainty in the length of lifetime is captured by assuming that each individual lives with certainty the entire first period but that they live for a fraction θ, $0 \leqslant \theta \leqslant 1$, of the second period, that of retirement. This fraction θ is distributed randomly across each generation and the distribution is the same for all generations. The value of θ is known neither to individuals nor to the social planner but its distribution is common knowledge.

Individuals preferences are represented by a utility function which is separable, homothethic and strictly concave. We thus write:

$$u_t = u\left(c_t\right) + \beta\,\bar{\theta}\,u\left(d_{t+1}\right) + \gamma\,u\left(x_{t+1}\right) \tag{1}$$

where $u\left(z\right) = z^{1-\frac{1}{\sigma}}\left(1 - \frac{1}{\sigma}\right)^{-1}$, β and γ are parameters reflecting time preference and altruism respectively, $\bar{\theta}$ is the average length of life[2], $\sigma > 0$ and $\neq 1$. For $\sigma = 1$, $u\left(z\right) = \ln z$. In our formulation, individuals derive some joy of giving from intentional bequests but not from the accidental one which is equal to $\left(1-\theta\right) d_{t+1}$. This is the consequence of our specification of paternalistic altruism. With pure altruism this latter transfer should be introduced in the utility of the however accidental donor.

The budget constraints for individuals belonging to generation t are simply:

$$\Omega_t = h_t + w_t = c_t + s_t \tag{2}$$

and

$$R_{t+1}\,s_t = d_{t+1} + x_{t+1}\left(1+n\right), \tag{3}$$

where h_t is the bequest received, Ω_t lifetime income, s_t saving and $1+n$ the number of children per household.

[2]Actually $\bar{\theta}$ is the length of the retirement period and $1+\bar{\theta}$ is the length of life.

Furthermore inherited wealth can be written as:

$$h_t = x_t + \left(\frac{1-\theta_t}{1+n}\right) d_t, \tag{4}$$

where R_{t+1} is the interest factor.

With a specification such as (1), we write:

$$\begin{aligned} s_t &= \tilde{s}\left(R_{t+1}\right)\left(w_t + h_t\right); \\ d_{t+1} &= \delta\, R_{t+1}\, s_t; \\ (1+n)\, x_{t+1} &= (1-\delta)\, R_{t+1}\, s_t, \end{aligned} \tag{5}$$

with $\tilde{s}\left(R\right) = \left[1 + \delta\,\tilde{\beta}^{-\sigma}\, R^{1-\sigma}\right]^{-1}$ and $\delta = \left[1 + (1+n)^{1-\sigma}\left(\gamma/\tilde{\beta}\right)^{\sigma}\right]^{-1}$.

In this expression $\tilde{\beta} = \beta\,\bar{\theta}$; $\tilde{s}$ is the saving rate and δ is the share of saving devoted to second period consumption and hence to accidental bequest; $1-\delta$ is thus the share of saving devoted to planned bequest ($\gamma = 0 \Rightarrow \delta = 1$).

2.2 Production

The production sector is summarized by a profit maximizing firm with a CRS production function:

$$Y_t = F\left(K_t, L_t\right)$$

or

$$Y_t/L_t = f\left(k_t\right)$$

with Y_t, total output; K_t, the capital stock; L_t, the labor force but also the size of the generation and $k_t = K_t/L_t$, per worker output. We have:

$$w_t = f\left(k_t\right) - f'\left(k_t\right) k_t \equiv \omega\left(k_t\right) \tag{6}$$

and

$$R_t = f'\left(k_t\right). \tag{7}$$

We assume total depreciation in one period. For further use we denote by σ_F the elasticity of substitution between L and K. All individuals have the same productivity and thus the same wage earning. The only heterogeneity in this model is the length of life, and naturally the ensueing level of inherited wealth.

2.3 Equilibrium

Let us define the intertemporal market equilibrium of our economy. The distribution of $\theta_t \in [0,1]$ is time invariant with mean $\bar{\theta}$ and coefficient of variation $CV(\theta)$. There is an initial distribution of wealth held by the old born in time -1. It is denoted s_{-1} with mean $\bar{s}_{-1}$ such that

$$(1+n)\,k_0 = \bar{s}_{-1}.$$

The equilibrium is given by the sequence of macro-variables (K_t, L_t, Y_t), the sequence of prices (w_t, R_t) and the sequence of micro-variables $(d_t, x_t, h_t, c_t, s_t, \Omega_t)$ defined by the choices made by individuals given the market prices.

For the initial period, we have $d_0 = \delta\, R_0\, s_{-1}$; $x_0 = \dfrac{1-\delta}{1+n} R_0\, s_{-1}$ and $h_0 = x_0 + \left(\dfrac{1-\theta_0}{1+n}\right) d_0$. For the later periods the micro-variables are given by (2)-(5). Finally, capital accumulation is given by:

$$(1+n)\,k_{t+1} = \bar{s}_t = \tilde{s}\,(R_{t+1})\left(w_t + \bar{h}_t\right). \tag{8}$$

For each household the dynamics of wealth transfer is given by (4) that can be rewritten as:

$$h_{t+1} = \left(\frac{1-\delta\theta_{t+1}}{1+n}\right) R_{t+1}\,\tilde{s}\,(R_{t+1})\,(w_t + h_t). \tag{9}$$

By assumption h_t and θ_{t+1} are stochastically independent. We thus have:

$$\bar{h}_{t+1} = \left(1-\delta\,\bar{\theta}\right) R_{t+1}\, k_{t+1}. \tag{10}$$

It consists of a fraction $(1-\delta)$ of planned bequests and a fraction $\left(1-\bar{\theta}\right)\delta$ of accidental bequests:$1-\delta+\left(1-\bar{\theta}\right)\delta = 1-\delta\,\bar{\theta}$.

Coming back to (8) we write:

$$(1+n)\,k_{t+1} = \tilde{s}\,(f'(k_{t+1}))\left[f(k_t) - \delta\,\bar{\theta}\,k_t\,f'(k_t)\right].$$

Since $f(k_t) - \delta\,\bar{\theta}\,k_t\,f'(k) = \left(1-\delta\,\bar{\theta}\right) f(k_t) + \delta\,\bar{\theta}\,\omega\,(k_t)$ is increasing in k_t, the necessary and sufficient condition for a monotonic dynamic path is that

$k/\tilde{s}\left(f'\left(k\right)\right)$ is an increasing function of k. Under this condition the dynamics of k_t converge to a steady-state k^* and the dynamics of $\bar{h}_t$ converge to $\bar{h}^*$:

$$\left(1+n\right)k^* = \tilde{s}\left(f\left(k^*\right)\right)\left[f\left(k^*\right) - \delta\,\bar{\theta}\,k^* f'\left(k^*\right)\right]$$

and

$$\bar{h}^* = \left(1-\delta\bar{\theta}\right)\,k^* f'\left(k^*\right).$$

2.4 Lifetime income distribution

In this paper we use the coefficient of variation of lifetime income as a measure of inequality. It can even be used as a measure of welfare for a given level of average lifetime income.[3] It would have been better to adopt a standard social welfare function and to study estate tax incidence on this function. Unfortunately this is not analytically tractable even within the simple model considered here.

From (9) the square of the CV of h_t is:

$$\begin{aligned} CV^2\left(h_{t+1}\right) &= CV^2\left(w_t+h_t\right)\left(1+CV^2\left(1-\delta\theta\right)\right)+CV^2\left(1-\delta\theta\right) \\ &= \left(\frac{\bar{h}_t}{w_t+\bar{h}_t}\right)^2\left(1+A\right)CV^2\left(h_t\right)+A \end{aligned}$$

where $A \equiv \dfrac{\delta^2\bar{\theta}^2 CV^2\left(\theta\right)}{\left(1-\delta\,\theta\right)^2}$. This term A depends on the parameters of the distribution of θ and on those of the utility functions. A is time invariant. The other term $\dfrac{\bar{h}_t}{w_t+h_t}$ varies over time except with a Cobb Douglas function in which case it is also time invariant.

Even though we are not concerned by the dynamics it is clear that $CV^2\left(h_t\right)$ has a long-run solution

$$CV^{*^2}\left(h\right) = \frac{A}{1-\left(1+A\right)\bar{h}^2/\left(\dfrac{\bar{h}^*}{w^*+\bar{h}^*}\right)^2}.$$

It will converge smoothly to this solution if $\left(1+A\right)\bar{h}^2/\left(w^*+\bar{h}^*\right)^2 < 1$.

[3] See Sen (1997).

3 Wealth transfer tax

We now introduce wealth transfer taxes the proceeds of which are distributed uniformly to children. Even though the gist of our paper is that one cannot distinguish in one's estate the bequest motives we first use different taxes for accidental bequests τ_θ and planned bequests τ_x.

Now inherited wealth is written as:

$$h_t = x_t + (1-\tau_\theta)(1-\theta_t)\frac{d_t}{1+n}. \tag{11}$$

Intended bequest x_t is net of tax[4] whereas accidental bequests $d_t(1-\theta_t)/(1+n)$ is gross of tax. The proceeds of the tax are used to transfer a lump-sum amount T_t to generation t:

$$T_t = \tau_x\,\bar{x}_t + \tau_\theta\left(1-\bar{\theta}\right)\bar{d}_t/(1+n). \tag{12}$$

With these instruments we rewrite the above budget constraints as follows:

$$\Omega_t = w_t + h_t + T_t = c_t + s_t$$

and

$$R_{t+1}\,s_t = d_{t+1} + (1+n)(1+\tau_x)\,x_{t+1},$$

which gives the FOC's:

$$u'(c_t) = \tilde{\beta}\,R_{t+1}\,u(d_{t+1}) \quad \text{and} \quad \tilde{\beta}(1+n)(1+\tau_x)\;u'(d_{t+1}) = \gamma\,u'(x_{t+1}).$$

We now write the following relations:

$$d_{t+1} = \delta_\tau\,R_{t+1}\,s_t \quad \text{and} \quad (1+n)(1+\tau_x)\,x_{t+1} = (1-\delta_\tau)\,R_{t+1}\,s_t$$

[4] An alternative formulation would be one such that the parent's benefit depends on the gross gift (his own sacrifice) and not on the net amount (the benefit to the donee). The welfare implications of these alternative formulations are different and as noted by Kaplov (2001) existing empirical work does not say much as to their respective relevance.

where $\delta_\tau = \left[1 + (1+n)^{1-\sigma}(1+\tau_x)^{1-\sigma}\gamma^\sigma\tilde{\beta}^{-\sigma}\right]^{-1}$ denotes the share of saving devoted to second period consumption, $(1-\delta_\tau)$ being the share devoted to intentional bequests. Observe that δ_τ is independent of τ_θ; but it depends on τ_x.

It is now possible to express both the inherited wealth and the wealth transfer taxes as proportions of savings:

$$h_t = x_t + (1-\tau_\theta)\frac{(1-\theta_t)}{1+n}d_t = \mu_t \frac{R_t\, s_{t-1}}{1+n}$$

and

$$T_t = \tau_x \bar{x}_t + \tau_0 \frac{\left(1-\bar{\theta}\right)}{1+n}\bar{d}_t = \lambda_\tau \frac{R_t\, \bar{s}_{t-1}}{1+n}$$

where $\mu_t \equiv \dfrac{1-\delta_\tau}{1+\tau_x} + (1-\tau_\theta)\,\delta_\tau\,(1-\theta_t)$ and $\lambda_\tau = \dfrac{\tau_x\,(1-\delta_\tau)}{1+\tau_x} + \delta_\tau\,\tau_\theta\left(1-\bar{\theta}\right)$.

The parameter μ_t is the fraction of capital income that is devoted to net of tax bequest; it depends on the longevity of the donor (θ_t); the parameter λ_τ is the fraction of aggregate capital income that is taxed and will thus be given back uniformly to all children. The sum $\lambda_\tau + \bar{\mu} = 1 - \delta_\tau\,\bar{\theta}$ represents the fraction of average saving that is transferred to the next generation.

When we assume that there is a single estate tax, tax authorities being unable (or unwilling) to distinguish the sources of bequests, we will use $\tau = \tau_x = \dfrac{\tau_\theta}{1-\tau_\theta}$ in which case $\mu_t = (1-\delta_\tau\theta_t)/(1+\tau)$ and $\lambda_\tau = \tau\left(1-\delta_\tau\,\bar{\theta}\right)/(1+\tau)$. The saving rate is now $\tilde{s}(R_{t+1}) = \left(1+\delta_\tau\tilde{\beta}^{-\sigma}R_{t+1}^{1-\sigma}\right)^{-1}$ and thus $s_t = \tilde{s}(R_{t+1})\,\Omega_t$.

We now analyze the dynamics of mean values such as k_t and $\bar{h}_t$ and then the dynamics of individuals' lifetime income Ω_t.

3.1 Dynamics of mean values

Capital accumulation is given by:

$$(1+n)\,k_{t+1} = \bar{s}_t = \tilde{s}(R_{t+1})\,\bar{\Omega}_t.$$

We know that $\bar{\Omega}_t = w(k_t) + \bar{h}_t + T_t = w(k_t) + (\bar{\mu}_t + \lambda_\tau)\,R_t\,\dfrac{\bar{s}_{t-1}}{1+n}$. Given that $\bar{\mu}_t + \lambda_\tau = 1 - \delta_\tau\,\bar{\theta}$ and that $\dfrac{R_t\bar{s}_{t-1}}{1+n} = R_t\,k_t = f(k_t) - w(k_t)$, we have:

$$\bar{\Omega}_t = \delta_x \bar{\theta}\, w\ (k_t) + (1-\delta_\tau \theta)\ f\,(k_t)\,.$$

We can now see that estate taxation affects capital accumulation only through the term δ_τ, the share of capital income devoted to second period consumption:

$$(1+n)\ \ k_{t+1} = \tilde{s}\,(f'\,(k_{t+1}))\left[\delta_\tau\, \bar{\theta}\, w\ (k_t) + \left(1-\delta_\tau \bar{\theta}\right)\ f\,(k_t)\right]$$

or

$$(1+n)\ \ k_{t+1}\left(1+\delta_\tau\, \tilde{\beta}^{-\sigma}\ f'\,(k_{t+1})^{1-\sigma}\right) = f\,(k_t) - \delta_\tau \bar{\theta}\ f'\,(k_t)\, k_t.$$

Assuming that $k\left(1+\delta_\tau\, \tilde{\beta}^{-\sigma} f'\,(k)^{1-\sigma}\right)$ increases with k [5], then the dynamics of k_t is monotonic $\left(\dfrac{\partial k_{t+1}}{\partial k_t} > 0\right)$ and $\dfrac{\partial k_{t+1}}{\partial \delta_\tau} < 0$. Also for $\sigma \lesseqgtr 1$, $\dfrac{\partial k_t}{\partial \tau_x} \lesseqgtr 0$ whereas $\dfrac{\partial k_t}{\partial \tau_\theta} = 0$.

3.2 Dynamics of income distribution and tax incidence

We now turn to individuals' lifetime income:

$$\Omega_t = w_t + h_t + T_t.$$

We have:

$$\frac{\Omega_t}{\bar{\Omega}_t} - 1 = \frac{h_t - \bar{h}_t}{\bar{\Omega}_t} = \frac{\bar{h}_t}{\bar{\Omega}_t}\left(\frac{h_t}{\bar{h}_t} - 1\right)$$

which implies

$$CV^2\,(\Omega_t) = \frac{\bar{h}_t^2}{\bar{\Omega}_t^2}\, CV^2\ (h_t)\,.$$

We also have:

$$CV^2\ (h_t) = CV^2\,(\mu_t\, \Omega_{t-1}) = CV^2\,(\Omega_{t-1})\left(1+CV^2\ (\mu_t)\right) + CV^2\ (\mu_t)\,,$$

[5] For a CES production function (with elasticity σ_F), $kf'\,(k)^{1-\sigma}$ is increasing in k if $\sigma_F \geqslant 1-\sigma$. See de la Croix and Michel (forthcoming).

$$CV^2\left(\mu_t\right) = \left(\frac{\left(1-\tau_\theta\right)\delta_\tau\bar{\theta}}{\bar{\mu}}\right)^2 CV^2\left(\theta\right),$$

and

$$\bar{h}_t^2 = \bar{\mu}^2\left(f'\left(k_t\right)k_t\right)^2.$$

Combining these expressions we can write:

$$CV^2\left(\Omega_t\right) = \left\{\frac{\bar{\mu}^2 + \left[\left(1-\tau_\theta\right)\delta_\tau\bar{\theta}\right]^2 CV^2\left(\theta\right)}{\left(1-\delta_\tau\bar{\theta}+\varrho\left(k_t\right)\right)^2}\right\} CV^2\left(\Omega_{t-1}\right) + \left\{\frac{\left(1-\tau_\theta\right)^2\delta_\tau^2\,\bar{\theta}^2}{\left(1-\delta_x\bar{\theta}+\varrho\left(k_t\right)\right)^2}\right\} CV^2\left(\theta\right), \tag{13}$$

where

$$\bar{\mu} = \frac{1-\delta_\tau}{1+\tau_x} + \left(1-\tau_\theta\right)\delta_\tau\left(1-\bar{\theta}\right) \tag{14}$$

and $\varrho\left(k_t\right) = \omega\left(k_t\right)/k_t f'\left(k_t\right)$ is the ratio of factor incomes. It is constant for a Cobb-Doublas and it increases with k with an elasticity of substitution larger than 1. It is interesting to note that the only effect of any induced variation of k_t on the coefficient of variation goes through $\varrho\left(k_t\right)$. In other words for an elasticity of substitution (σ_F) equal to 1 a reduction (or an increase) in k_t affects equally the denominator and the numerator of the coefficient of variation. To keep thinks simple, we assume in the following that $\sigma_F = 1$, namely $\varrho\left(k_t\right)$ is constant. With this assumption we are not concerned by the tax incidence on capital accumulation.

From above we know that τ_θ has no incidence and τ_x has a depressive (positive) incidence on δ_τ if σ is smaller (higher) than 1. For further use we observe that $\dfrac{1-\delta_\tau}{1-\tau_x}$ decreases with τ_x for any value of σ. Indeed we have

$$\frac{1-\delta_\tau}{1+\tau_x} = \frac{b}{\left(1+\tau_x\right)^\sigma + b\left(1+\tau_x\right)}$$

with $b = \left(1+n\right)^{1-\sigma}\gamma^\sigma\tilde{\beta}\sigma$.

We can now study the effects of τ_x and τ_θ on $CV^2\left(\Omega_t\right)$. We will focus on two terms $\bar{\mu}^2$ and δ_x, the fraction of saving devoted to both bequests and the share of saving devoted to second period consumption. The simplest case is that of τ_θ. It has no effect on k_t and δ_τ. It has only direct effects on $CV^2\left(\Omega_t\right)$ and these effects are negative as expected.

The effects of τ_x are more complex except when $\sigma = 1$. In that particular case it is clear from (13) that τ_x only influence $CV^2\ (\Omega_t)$ through $\bar{\mu}^2$ and that influence is negative.

When $\sigma < 1$, the effect of τ_x on $CV^2\ (\Omega_t)$ is also negative. The direct effect through $\bar{\mu}^2$ is negative; the effect through δ_τ is negative as well.

Finally when $\sigma > 1$ the incidence of τ_x is ambiguous as it appears on Table 1. The effect on $\bar{\mu}^2$ cannot be signed whereas the effect on δ_τ is inequality increasing.

Table 1

Effects of τ_x on

	$\bar{\mu}^2$	δ_τ	$CV^2\,(\Omega_t)$
$\sigma > 1$	$-$	$-$	$-$
$\sigma = 1$	$-$	0	$-$
$\sigma < 1$	?	$+$	?

3.3 Single tax

As already discussed it is not easy in practise to distinguish between the two types of bequests and therefore it is useful to study the incidence of a single tax. We denote this single tax $\tau = \tau_x = \dfrac{\tau_\theta}{1-\tau_\theta}$. With such a tax we rewrite (13) as follows:

$$CV^2\ (\Omega_t) = \frac{\left(1-\bar{\theta}+(1+\tau)^{1-\sigma}b\right)^2 CV^2\,(\Omega_{t-1})+\bar{\theta}^2 CV^2\,(\theta)\left(1+CV^2\,(\Omega_{t-1})\right)}{\left[(1+\tau)\left(1+\varrho(k_t)-\bar{\theta}\right)+(1+\tau)^{2-\sigma}b(1+\varrho(k_t))\right]^2} \tag{15}$$

A sufficient condition for $CV^2\ (\Omega_t)$ to decrease with τ is that $\sigma \leqslant 2$. Alternatively, it would be interesting to know when the tax increases inequality. Let us consider the effect of the tax when $CV\ (\Omega_{t-1}) = 0$. Then, one has:

$$\left.\frac{\partial CV^2\,(\Omega_t)}{\partial \tau}\right|_{CV\,(\Omega_t - 1)=0} = \frac{-CV^2(\theta)\left[1+\varrho(k_t)-\bar{\theta}+(2-\sigma)(1-\tau)^{1-\sigma}b(1+\varrho(k_t))\right]}{CV^2\,(\Omega_t)}$$

Namely, inequality increases if $\sigma > 2 + \dfrac{1+\varrho\,(k_t)-\bar{\theta}}{b\,(1+\varrho\,(k_t))}$.

On needs a large σ to get such an outcome particularly when b is small. The term b is linked to the parameter γ that represents the intensity of the joy of giving.

As the above discussion indicates to get an increased inequality one has to rely on the effect of taxation on planned bequests that itself depends on σ being higher than 1 and it is important that the joy of giving motive is relatively important in total bequeathing.

4 Conclusion

To sum up, the incidence of the estate tax when the bequest motives cannot be distinguished depends on the elasticity of substitution σ and or the relative importance of planned bequests in total bequests.

This is not surprising and means that any recommendation must start by a close look at the empirical evidence. Unfortunately the two motives adopted in this paper seem to be those which are the most frequently observed and with about the same intensity.

We have to note that in our model the only source of inequality is life expectancy; unlike Blumkin and Sadka (2002) we have assumed identical productivity across individuals. With our specification, a 100 % estate tax brings total equality but at the cost of a lower capital stock (if $\varepsilon > 1$).

Finally our model rests on two key assumptions. The first is the welfare criterion used, namely the minimization of the coefficient of variation. Even though in a static framework there is a close relation between maximizing a utilitarian social welfare function and minimizing the coefficient of variation; this is not as clear in a dynamic framework.

The second assumption is that of homothetic preferences and furthermore of identical substitution between c and d on the one hand and between d and x on the other hand. Empirically it seems that the substitutability between c and d is much lower than that between d (or c) and x. We plan in future work to adopt a truly normative approach and to use a more general utility function.

References

[1] Blumkin, T. and E. Sadka, (2002), Estate taxation, *Journal of Public Economics*, (forthcoming).

[2] de la Croix, D. and Ph. Michel, (2001), A Theory of Capital Accumulaiton. Dynamics and Policy in Overlapping Generations, Cambridge University Press, Cambridge, (under press).

[3] Gale, W.G., J.R. Hines and J. Slemrod (eds), [2001], *Rethinking Estate and Gift Taxation*, Brooking Institution Press, Washington.

[4] Kaplow, L., [2001], Arguments for and against estate and gift taxation, in Gale *et al.* (2001).

[5] Sen, A., (1997), On Economic Inequality, Clarendon Paperback, Oxford.

[6] Sheshinski, E. and Y. Weiss, [1981], Uncertainty and optimal social security systems, *Quarterly Journal of Economics*, 96, 189-206.