Tax avoidance and intra-family transfers*

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Abstract

To what extent do people avoid taxes on intra-family transfers (bequests and gifts), and how would integration (unification) of the different transfers taxes affect tax avoidance? These issues are important for families and their welfare, as well as for governments and their possibilities of raising revenue from transfer taxes. In this paper we study the effects of transfer taxes on altruistic parents' transfers to their children. Using a theoretical model we find that altruistic parents do not necessarily tax minimize. However, in some cases when they do, there is an infinitely large excess burden of a transfer tax. We also find that integration of transfer taxes reduces tax avoidance. All tax avoidance is eliminated with complete integration.

JEL: D10, D64, D91

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1 Introduction

People make voluntary transfers to other people and to organizations, often charities. Most of these transfers, however, are made within the family, from parents to children. Parents can transfer both during their life (*inter vivos* gifts) and when they are deceased (bequests). These transfers are, of course, important for donors and donees, but the transfers are also important for society as a whole. The amounts transferred are considerable both for the people involved and as a share of total wealth.

Estates, bequests, inheritances, and *inter vivos* gifts are subject to taxation in many countries, and we will use the summarizing term transfer taxes for these taxes. These taxes tend to be controversial. During recent years there has been a big discussion in the US and in many other countries about the "death tax", see Gale et al. (2001). In many countries transfer taxes have recently been reduced or removed.[1]

The heat of the discussion is not, however, in proportion to the tax revenue that these taxes generate. Figure 1 reports the revenue from transfer taxes as a share of GDP in the OECD countries with the highest shares. Transfer taxes on average yielded tax revenue corresponding to slightly less than 0.2 percent of GDP in the OECD countries 2000. France is the country with the highest share, 0.6 percent of GDP. Belgium, the US, the Netherlands, and Japan also raise comparatively much tax revenue with transfers taxes.

Although transfer taxes do not contribute a lot to tax revenues, they might have strong effects on people's behavior. The incentive effects of the taxes might affect how much people transfer. But the taxes may also affect how people allocate their transfers between bequests and gifts as taxes might be avoided by changing the allocation. It might even be the case that altered transfer behavior is the reason for the small tax revenues. If this is the case the ongoing debate about these taxes' existence and magnitude is warranted.

Considerable welfare effects may arise when taxes change the behavior of people. Large excess burdens may be associated with low tax revenue. We find that the marginal excess burden of transfer taxes in some cases is infinitely large. Other situations when transfers taxes give rise to no or small

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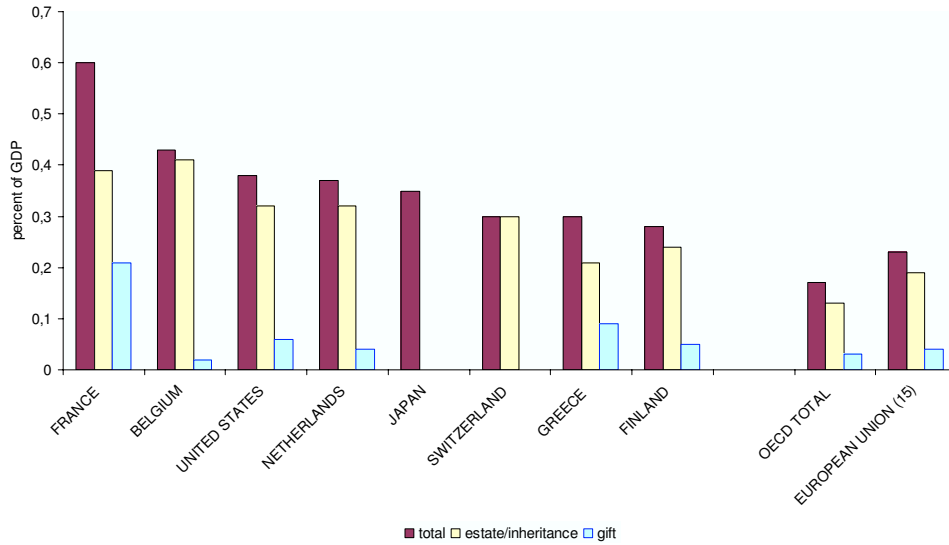[1] Cremer and Pestieau (2003) is a recent survey of the research on taxation of wealth transfers.

Figure 1: Revenue from taxes on estates, inheritances, and gifts as percentage of GDP, 2000. Source: OECD Revenue Statistics.

welfare effects are, however, also possible. Thus, it is not evident what the overall effects of these transfer taxes are, and policy makers have to make several consideration. One of them, the one we will concentrate on in this paper is the degree of integration of the different taxes.

In many Western countries the legislation is similar with an amount exempt from taxation for both gifts and inheritances, and above that amount transfers are taxed. Such progressive tax systems create incentives for tax avoidance by reallocation of bequests and gifts.

In this paper, we will focus on discussing three issues: First, we analyze the behavioral and incentive effects of transfer taxes. Second, we study what happens if transfer taxes are integrated rather than separate. Integration is an attempt to counteract tax avoidance, but the question is how efficient integration is in achieving this. Finally we try to theoretically understand whether altruistic parents tax minimize. Empirical evidence suggest that parents often do not minimize tax payments from transfer taxes. Joulfaian (2004) and Joulfaian and McGarry (2004) provide recent evidence for the US. The conclusion is that the gift behavior of the rich is not consistent with a tax minimization strategy. Poterba (2001), Joulfaian (2000), and Bernheim et al. (2001) also find evidence for this.

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According to the standard textbook theory, the larger part of the transfers should be made in terms of gifts rather than bequests if the child's income increases over time. However, bequests are much more common and sizable than *inter vivos* gifts in most developed countries. Another theoretical result is that only the wealthiest would bequeath, although empirical findings indicate that also less wealthy parents bequeath.

There are many different explanations for the observed pattern of transfers suggested in the literature. Some of these are that parents are uncertain about their future health status, long-term care needs, and how old they will get, and that parents want to "buy" services from their children when they are old. Parents may want to maintain influence over their children's behavior and they may believe that the children will waste the gifts. Other suggestions are that parents believe that they have better investment skills than their children and that parents simply do not have enough resources to give.

We find an additional explanation for the postponement of transfers, namely tax avoidance. Although many parents transfer amounts that are below the tax exempt limits common in many countries, the mere presence of transfer taxes may induces parents to bequeath rather than give *inter vivos* gifts to avoid taxes.

We study an altruism model to determine to what extent an altruistic parent will minimize taxes and how integrating the transfer taxes will affect the parent's behavior. If parents are altruistic, their children are credit constrained, and there is real wage growth, but no taxes, the standard theoretical result is that the major part of resources should be transferred as *inter vivos* gifts rather than as bequests. When transfer taxes are imposed our results change. Bequests increase at the expense of *inter vivos* gifts due to tax avoidance. The taxes lead to altered behavior and decreased family utility. Actually, we find situations when the marginal excess burden of transfer taxes is infinite, where the taxes distort behavior without generating any tax revenue. Further we show that utility maximization does not require tax minimization. Hence, the empirical result that parents do not minimize taxes is not inconsistent with altruistic and rational decision makers.

Finally, we study the effects of integrating transfer taxes and we find that integration reduces tax avoidance. If inheritances and *inter vivos* gifts

are taxed separately, but at the same rate, the tax avoidance possibility is smaller than with different tax rates. If also tax exempt amounts are integrated so that different transfers are treated as one and the same, all possibilities to avoid transfer taxes disappear.

The paper is organized as follows: Section 2 presents a benchmark altruism model without taxes. We introduce transfer taxes in section 3, first separate transfer taxes in subsection 3.1. Then subsection 3.2 discusses what happens if transfer taxes are completely integrated instead. The comparative statics for the transfer taxes are discussed in section 4. Finally, section 5 concludes.

2 A benchmark model

Our point of departure is an altruistic transfer motive, see Becker (1974) and Barro (1974). We study a model where objectives for a single parent and a single child overlap for two periods. The parent is altruistic towards the child. She can transfer property as *inter vivos* gifts and/or as *post mortem* bequests. There is no uncertainty concerning the length of life, so there are no accidental bequests. In contrast to, e.g., Becker and Tomes (1986) we assume that the child's human capital is exogenously determined. We concentrate on property transfers and do not take the possibility to invest in the child's human capital into account.[2]

Suppose that an altruistic parent maximizes a two-period utility function. To simplify we assume that she discounts future consumption with a zero percent discount rate. The degree of altruism is represented by $\gamma \in [0,1]$. We assume that the within-period utility functions, $u(c)$, are the same across periods and agents. Hence, the parent maximizes:

$$U = u(c_{1p}) + u(c_{2p}) + \gamma \left[u(c_{1k}) + u(c_{2k}) \right], \tag{1}$$

where the the parent's, p, and the kid's, k, consumption in the two periods are denoted in an evident way. The parent's initial wealth, W, is exogenously determined, as is the level of the child's human capital, h_k.[3] The child receives income in proportion to his human capital and the real wage rate is assumed to increase over time, i.e., $w_{k1} < w_{k2}$. This means that the

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[2]For an analysis of human capital investments in a similar model, see Nordblom (2003).
[3]At least it is not possible for the parent to affect it.

child would like to borrow to smooth consumption between the periods. Future wages cannot, however, be used as collateral because of asymmetric information. We, therefore, assume that the child is credit constrained. The parent, on the other hand, knows the level of the child's human capital and can, therefore, give a non-negative amount, ϱ, in the first period in order to smooth the child's consumption. The parent also chooses how much to save in the first period, s. Finally, in period 2 the parent consumes her savings and may choose to bequeath a non-negative amount, β, to the child. In this section we study optimal transfers when both gifts and bequests are tax free. This means that we can rewrite (1) as:

$$\max_{\{s,\varrho,\beta\}} U = u\left(W - s - \varrho\right) + u\left(s - \beta\right) + \gamma[u\left(w_{k1}h_k + \varrho\right) + u\left(w_{k2}h_k + \beta\right)]. \quad (2)$$

The resulting first order conditions from maximizing (2) can be rearranged to:

$$s: \qquad\qquad u'_{1p} = u'_{2p}, \qquad\qquad\qquad\qquad (3a)$$

$$g: \qquad\qquad u'_{1p} \geq \gamma u'_{1k}, \quad \varrho \geq 0 \quad \frac{\partial U}{\partial \varrho}\varrho = 0, \qquad (3b)$$

$$b: \qquad\qquad u'_{2p} \geq \gamma u'_{2k}, \quad \beta \geq 0 \quad \frac{\partial U}{\partial \beta}\beta = 0. \qquad (3c)$$

where subscripts indicate period and agent.

The amount saved should be set so that the parent's marginal utility of period 1 consumption equals that of period 2 consumption. This is the interpretation of (3a). The second and third conditions, (3b) and (3c), concern property transfers. If the child at any instant has a higher weighted marginal utility of consumption than the parent, there will be a non-negative transfer. Since the parent cannot take resources from the child there will be no transfer if the parent has a higher weighted marginal utility.

Suppose that we study a corner solution with no property transfers, $\beta = 0$ and $\varrho = 0$. We will then have $u'_{1p} = u'_{2p} = u'_p > \gamma u'_{1k} > \gamma u'_{2k}$. The parent will have higher weighted marginal utility in both periods than will the child.

Since the child cannot borrow, and since $w_{k2} > w_{k1}$, property transfers will mainly be made as gifts, ϱ. If the parent is relatively wealthy enough there will be a positive gift. This implies that $u'_p = \gamma u'_{1k} > \gamma u'_{2k}$. The gift is

Table 1: Conditions for property transfers in absence of taxes.

	$\varrho = 0$	$\varrho > 0$
$\beta = 0$	$u'_p > \gamma u'_{1k} > \gamma u'_{2k}$	$u'_p = \gamma u'_{1k} > \gamma u'_{2k}$
$\beta > 0$	never chosen	$u'_p = \gamma u'_{1k} = \gamma u'_{2k}$

then used to alleviate some of the capital-market imperfection that prevents the child from borrowing. The child gets a higher level of consumption in period 1, but still has higher consumption in period 2 than in period 1.[4] Hence, there will be no bequest in the second period. However, if the parent is even wealthier than the child, she can afford to increase and equalize the child's resources in both periods, so that $u'_p = \gamma u'_{1k} = \gamma u'_{2k}$. All weighted marginal utilities in (3a)–(3c) are then equalized.

In order to have a situation with both *inter vivos* gifts and bequests, in absence of taxes, it is, therefore, necessary that the parent has a sufficiently larger life-time wealth than the child.

3   Transfer taxes

Up to this point we have disregarded taxation. However, private transfers are subject to taxation in many countries. This taxation may distort the transfer behavior. We only consider taxes on transfers. No other taxes will be included in the model which, of course, is a restriction if we believe that transfer taxes might interact with other taxes.

3.1   Separate taxation

We start by considering separate transfer taxes, i.e., a tax system where *inter vivos* gifts and inheritances are taxed separately. However, in this section we will also study the special case when tax rates are integrated, which is the fact in many countries. We assume that the following transfer

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[4]The first-order conditions (3a) and (3b) hold with equality, while (3c) holds with inequality.

tax system is used. Gifts are taxed according to the following:

$$g = \begin{cases} \varrho & \text{if } \varrho \leq \bar{g} \\ \bar{g} + (1 - \tau_g)(\varrho - \bar{g}) & \text{otherwise,} \end{cases} \tag{4}$$

where g is the gift amount received by the child, ϱ is the amount given by the parent, τ_g is the gift tax, and $\bar{g}$ is the gift amount exempt from taxation. Inheritances are taxed correspondingly:

$$b = \begin{cases} \beta & \text{if } \beta \leq \bar{b} \\ \bar{b} + (1 - \tau_b)(\beta - \bar{b}) & \text{otherwise,} \end{cases} \tag{5}$$

where β is the bequeathed amount, b is the child's inherited amount, $\bar{b}$ is the tax free inheritance amount, and τ_b is the inheritance tax rate.

In the integrated tax rate case, there are still separate tax exempt amounts for *inter vivos* gifts and inheritances, but for transfers exceeding these amounts, the tax rate is the same, i.e. $\tau_g = \tau_b = \tau$.

The parent's problem from (2) is now slightly different:

$$\max_{\{s,\varrho,\beta\}} U = u(W - s - \varrho) + u(s - \beta) + \gamma u(w_{k1}h_k + g)\gamma + u(w_{k2}h_k + b) \tag{6}$$

subject to (4) and (5). The first order conditions are then:

$$s: \qquad u'_{1p} = u'_{2p}, \tag{7a}$$

$$\varrho: \qquad u'_{1p} \geq \gamma u'_{1k}\frac{\partial g}{\partial \varrho}, \quad \varrho \geq 0 \quad \frac{\partial U}{\partial \varrho}\varrho = 0, \tag{7b}$$

$$\beta: \qquad u'_{2p} \geq \gamma u'_{2k}\frac{\partial b}{\partial \beta}, \quad \beta \geq 0 \quad \frac{\partial U}{\partial \beta}\beta = 0. \tag{7c}$$

The partial derivatives, $\frac{\partial g}{\partial \varrho}$ and $\frac{\partial b}{\partial \beta}$ depend on the transferred amounts and possible tax wedges. If transfers are less than the tax exempt amounts, these partial derivatives are equal to one. If $\varrho > \bar{g}$, then $\frac{\partial g}{\partial \varrho} = (1 - \tau_g)$, and if $\beta > \bar{b}$, then $\frac{\partial b}{\partial \beta} = (1 - \tau_b)$. We can, therefore, end up in different combinations of bequests and gifts, depending on relative wealth and taxation. These solutions are represented by the cells in Table 2:

Table 2: Property transfers in presence of separate transfer taxes.

	$\varrho = 0$	$\varrho \leq \bar{g}$		$\varrho > \bar{g}$	
$\beta = 0$	$u'_p > \gamma u'_{1k} > \gamma u'_{2k}$	$u'_p = \gamma u'_{1k} > \gamma u'_{2k}$	$\varrho = \bar{g}$ $\gamma u'_{1k} > u'_p > \gamma (1 - \tau_g) u'_{1k}$ $u'_p > \gamma u'_{2k}$	**a** $u'_p = \gamma (1 - \tau_g) u'_{1k} > \gamma u'_{2k}$	
$\beta \leq \bar{b}$	never chosen	**b1** $\varrho < \bar{g},\ \beta < \bar{b}$ $u'_p = \gamma u'_{1k} = \gamma u'_{2k}$	**b2** $\varrho = \bar{g},\ \beta \leq \bar{b}$ $\gamma u'_{1k} > \gamma u'_{2k} = u'_p > \gamma (1 - \tau_g) u'_{1k}$	**c1** $\varrho > \bar{g},\ \beta < \bar{b}$ $u'_p = \gamma (1 - \tau_g) u'_{1k} > \gamma (1 - \tau_b) u'_{2k}$	**c2** $\varrho > \bar{g},\ \beta = \bar{b}$ $(1 - \tau_g) u'_{1k} > (1 - \tau_b) u'_{2k}$ $u'_{2k} > u'_{1k}$
$\beta > \bar{b}$	never chosen	**d** $\varrho = \bar{g},\ \beta > \bar{b}$ $u'_p = \gamma (1 - \tau_b) u'_{2k} > \gamma (1 - \tau_g) u'_{1k}$ $u'_{1k} > u'_{2k}$		**e** $u'_p = \gamma (1 - \tau_g) u'_{1k} = \gamma (1 - \tau_b) u'_{2k}$	

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We see that also in presence of taxes positive *inter vivos* gifts are necessary for positive *post mortem* bequests. The condition for a parent to transfer a positive gift is the same as in absence of taxes. For a parent who optimally transfers $\varrho \leq \bar{g}$ in absence of taxes, neither the condition, nor the transferred amount would be altered by taxation. The gift is still of the size that makes $u'_p = \gamma u'_{1k} > \gamma u'_{2k}$. However, if the parent's wealth was larger she allocated her transfers between gifts and bequests so that $u'_p = \gamma u'_{1k} = \gamma u'_{2k}$ in the situation without taxes. This is a possible solution also with taxes, and the condition is shown in the **b1** case in Table 2. Here, both ϱ and β falls below the tax exempt amounts in optimum.

If, however, $u'_p < \gamma u'_{1k}$ at the point where $\varrho = \bar{g}$ and $\beta = 0$, then the family will be affected by taxation. The parent would prefer to give more gifts, but cannot do this without distortion. There are then two possible ways to go. The size of the gift tax and the wage growth of the child determine if the parent will continue to transfer taxable gifts or if she will instead start to bequeath. If τ_g is low enough and the child's wage growth is strong enough, i.e., if $(1 - \tau_g) u'_{1k} > u'_{2k}$, the parent will go on with *inter vivos* gifts that are now due to the gift tax (**a** in Table 2). There will thus be a tax wedge, but no tax avoidance. When this solution is optimal, tax minimization is not consistent with utility maximization. However, with a higher τ_g implying that $(1 - \tau_g) u'_{1k} < u'_{2k}$ the parent instead gives exactly $\bar{g}$ and then starts to bequeath if $u'_{2k} > u'_p$. This will be the case even if $u'_p < \gamma (1 - \tau_g) u'_{1k}$ at the point where $\varrho = \bar{g}$ and $\beta = 0$. This solution is presented in **b2** in Table 2 and implies tax avoidance. Hence, we have tax minimization due to high τ_g in combination with low real wage growth. When $(1 - \tau_g) u'_{1k} < u'_{2k} < u'_{1k}$ at $\varrho = \bar{g}$, $\beta = 0$ there is thus tax avoidance on the margin. This marginal tax avoidance will be there irrespective of parental wealth. Parental wealth is, however, decisive for how much will totally be transferred. If the parent chooses to transfer $\varrho = \bar{g}$ and $\beta \leq \bar{b}$, ending up in **b2** in Table 2 there is tax avoidance in total transfers as well. This implies that parents alter their behavior, but do not pay any taxes. Hence, the mere existence of transfer taxes forces parents to switch to bequests at lower wealth levels than they would have in absence of taxes.

Due to the gift tax the parent will switch to bequests at a lower W than in absence of taxes. The lower is $\bar{g}$ and the higher is τ_g the less wealthy parents switch to bequests.

Proposition 1. *In the situation where* $\gamma u'_{1k} > u'_p > \gamma (1 - \tau_g) u'_{1k}$ *there is an infinite marginal excess burden of the gift tax rate. Abolition of the gift tax would thus be a Pareto improvement.*

Proof. If $u'_p < \gamma u'_{1k}$ at $\varrho = \bar{g}$, $\beta = 0$ the parent would like to give more *inter vivos* transfers, but is unable to do this undistorted. If the gift tax is sufficiently high, i.e. if $u'_{2k} > (1 - \tau_g) u'_{1k}$ at the transfer schedule $\varrho = \bar{g}$, $\beta = 0$, then the parent will start bequeathing although $u'_{1k} > u'_{2k}$. Thus behavior is altered and utility is lower due to the gift tax since $u'_{1k} > u'_{2k}$. Since there is a dead weight loss due to the tax, but no tax revenue is raised the marginal excess burden of the gift tax is infinite. In presence of the tax the parent transfers $\varrho = \bar{g}$ and $\beta > 0$ although $u'_{1k} > u'_{2k}$ when $\gamma u'_{1k} > \gamma u'_{2k} = u'_p > \gamma (1 - \tau_g) u'_{1k}$. Abolishing the gift tax, no bequest would be made, but the complete transfer would be a larger *inter vivos* gift, so that $u'_p = \gamma u'_{1k}$. Hence, total utility would be higher as a result. There are no tax payments, neither before, nor after the abolition, implying that an abolition of the gift tax would be Pareto improving. $\square$

Also the outcomes in **c2** or **d** in Table 2 are results of tax avoidance. If $\tau_g > \tau_b$ it may be the case that a parent who is wealthy enough to transfer taxable amounts rather does that through bequests than gifts. A tax avoidance situation **d** occurs if $\gamma u'_{1k} > u'_p = \gamma (1 - \tau_b) u'_{2k} > \gamma (1 - \tau_g) u'_{1k}$ at the point where $\varrho = \bar{g}$ and $\beta = \bar{b}$. Then the parent continues to increase bequests above the tax exempt level, keeping $\varrho = \bar{g}$, although $u'_{1k} > u'_{2k}$. Of course, **d** may only occur when $\tau_g > \tau_b$, so this tax avoidance possibility disappears with a common tax rate. The solutions in **c** may imply or not imply tax avoidance. If the parent wants to transfer a lot, and the child has a very much lower income in the first period than in the second, $\varrho > \bar{g}$ can be optimally combined with $\beta < \bar{b}$ with only a tax wedge, but no tax avoidance, **c1**. If the parent transfers both bequests and taxable gifts and if she has transferred so much so that $\gamma u'_{2k} > \gamma u'_{1k} > u'_p$ at the point where $\beta = \bar{b}$ she would like to increase her bequest. However, if the inheritance tax is very much higher than the gift tax it may be the case that $(1 - \tau_g) u'_{1k} > (1 - \tau_b) u'_{2k}$. Then, the parent chooses not to increase her bequest, but rather her *inter vivos* gift as an action of tax avoidance, as represented in **c2**. Also this case of tax avoidance would disappear with one common tax rate. It should be noted that the tax avoidance solutions in **c2** and **d** are not

both possible in the same tax system, since the former requires that $\tau_b > \tau_g$ and the latter that $\tau_g > \tau_b$. Finally, in **e** both types of taxes are paid, and therefore there is no avoidance.

Proposition 2. *A common tax rate on property transfers reduces the possibilities of tax avoidance.*

Proof. The tax-avoidance situation in **b2** in Table 2 will remain as long as there are separate tax exempt levels for gifts and inheritances. However, the tax avoidance in **c2** is due to the condition that $(1 - \tau_g) u'_{1k} > (1 - \tau_b) u'_{2k}$ at the same time as $u'_{2k} > u'_{1k}$. Obviously this can never be the case if $\tau_g = \tau_b$. Tax avoidance as it shows up in **d** is impossible with a common tax rate for the same reason. □

Proposition 3. *Tax minimization is not necessarily consistent with utility maximization.*

Proof. Tax minimization implies that further transfers above $\varrho = \bar{g}$ should be made through tax free bequests rather than by further gifts that are due to the gift tax. However, if $(1 - \tau_g) u'_{1k} > u'_{2k}$ the child can make better use of the smaller transfer in the first period.[5] The utility maximizing parent will therefore transfer the taxable gift and not the tax free bequest. □

In the case where tax minimization is not consistent with utility maximization, this is due to capital-market imperfections. The willingness to pay the gift tax can be regarded as the willingness to pay for mitigating the effects due to the child's inability to borrow in the capital market.

3.2 Completely integrated transfer taxes

In Section 3.1 we saw that integrating tax rates diminished the possibilities to avoid transfer taxes by altering the mix of gifts and bequests. In this section, we go one step further and also integrate the tax exempt amounts. This means that if total transfers are below a certain tax-free limit, no taxes are paid, irrespective of if they are made as *inter vivos* gifts or as bequests. When transfers have reached the limit, all further transfers, both gifts and

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[5]This is more likely with a low tax rate and a high real wage growth.

inheritances will be taxed at the same rate. We assume the following integrated transfer tax system:

$$g + b = \begin{cases} \varrho + \beta & \text{if } \varrho + \beta < \bar{g} + \bar{b} \\ \bar{g} + \bar{b} + (1 - \tau)\left(\varrho + \beta - \bar{g} - \bar{b}\right) & \text{otherwise,} \end{cases} \tag{8}$$

where g is the gift amount received by the child, b is the child's inherited amount, ϱ is the amount given by the parent, β is the bequeathed amount, $\bar{g} + \bar{b}$ is the total transfer exempt from taxation and τ is the transfer tax rate.

When the parent now maximizes (6) subject to (8) and obtains the first-order conditions (7a), (7b) and (7c), there is a difference from the separate-tax case. Since the transfers are integrated from the taxation perspective, $\frac{\partial g}{\partial \varrho} = \frac{\partial b}{\partial \beta}$ in (7b) and (7c). If the sum of transfers is less than the tax exempt amount, these partial derivatives are equal to one, but if $\varrho + \beta > \bar{g} + \bar{b}$, then $\frac{\partial g}{\partial \varrho} = \frac{\partial b}{\partial \beta} = (1 - \tau)$.

By studying Table 3, we see that the tax avoidance possibilities disappear with a completely integrated tax system. When total transfers count, instead of *inter vivos* gifts and bequests separately, it is not possible to avoid taxes by altering the mix of transfers. The transfer tax, τ still drives a wedge between the parent's and the child's consumption, but there is no longer any distortion between the child's consumption in the two periods. However, there is still a possibility that the parent chooses not to transfer taxable gifts, although $\gamma u'_{1k} > u'_p$, but this is not due to tax avoidance, but rather due to the tax wedge if $\gamma u'_{1k} > u'_p > \gamma(1 - \tau)u'_{1k}$, like in **f** and **g** in Table 3. Hence,

Proposition 4. *With completely integrated transfer taxes all tax avoidance is eliminated.*

In the following, we carry out a comparative statics analysis with respect to transfer taxes in the three tax regimes.

Table 3: Property transfers in presence of completely integrated taxes.

	$\varrho = 0$	$\varrho > 0$, tax free		ϱ taxable
$\beta = 0$	$u'_p > \gamma u'_{1k} > \gamma u'_{2k}$	$u'_p = \gamma u'_{1k} > \gamma u'_{2k}$	**f** $\varrho = \bar{g} + \bar{b}$ $\gamma u'_{1k} > u'_p > \gamma\left(1-\tau\right) u'_{1k}$	$u'_p = \gamma\left(1-\tau\right) u'_{1k} > \gamma u'_{2k}$
$\beta > 0$, tax free	never chosen	$u'_p = \gamma u'_{1k} = \gamma u'_{2k}$	**g** $\gamma u'_{1k} = \gamma u'_{2k} > u'_p > \gamma\left(1-\tau\right) u'_k$	impossible
β, taxable	never chosen	impossible		$u'_p = \gamma\left(1-\tau\right) u'_{2k} = \gamma\left(1-\tau\right) u'_{1k}$

4 Transfer tax comparative statics

We will report partial derivatives capturing the behavioral effects of changes in the tax rate. Complete equation systems and derivatives can be found in the Appendix. In solutions where no taxes are paid, no transfers will be affected by any changes in the transfer taxes because they lie below the tax exempt amounts.

4.1 Separate taxes

For people not receiving taxable gifts, an increase in τ_g is ineffective. If a parent initially transfers taxable gifts, but no bequest, i.e. the situation in **a** in Table 2, then an increased gift tax may cause a switch to the tax-avoidance solution in **b2**. However, if there is no jump, there can be either an increase or a decrease in the taxable gift if τ_g is increased. By differentiating the first-order conditions, (7a) and (7b) we can derive the following:

$$\left.\frac{\partial \varrho}{\partial \tau_g}\right|_a = \frac{2\gamma \left[u''_{1k}\left(1-\tau_g\right)\left(\varrho-\bar{g}\right)+u'_{1k}\right]}{u''_p + 2\gamma u''_{1k}\left(1-\tau_g\right)^2} \tag{9}$$

The sign of this derivative depends on relative strength of the income and substitution effects. If the substitution effect dominates, the parent will reduce her *inter vivos* gifts when τ_g increases. In this situation there is no bequest at all, so a decreased gift will mean a decreased total transfer from the parent to the child. This also implies increased savings for the parent, and by comparing (10) below with (9) we see that the effects on savings and gifts always go in opposite directions.

$$\left.\frac{\partial s}{\partial \tau_g}\right|_a = \frac{-\gamma \left(u''_{1k}\left(1-\tau_g\right)\left(\varrho-\bar{g}\right)+u'_{1k}\right)}{u''_p + 2\gamma u''_{1k}\left(1-\tau_g\right)^2} \tag{10}$$

In the situation where $\beta = \bar{b}$ and $\varrho > \bar{g}$ the results are similar. This is the tax-avoidance case in **c2** in Table 2. Here, the parent faces a constraint and bequeaths $\bar{b}$ irrespective of exogenous changes (as long as there is no jump to another solution). Also here, the effect of an increased gift tax is ambiguous due to counteracting income and substitution effects, and if the substitution effect is strong enough there may be a shift to **b2** in Table 2, where no tax is paid. Hence, in both these cases the increased gift tax may cause the parent to totally avoid taxes by decreasing the gift to the tax

exempt amount. If she does not, but decreases her *inter vivos* gifts due to the dominating substitution effect, we cannot tell what happens to tax revenue from the gift tax:

$$\left. \frac{\partial \tau_g \left(\varrho - \bar{g} \right)}{\partial \tau_g} \right|_{a,c2} = \left(\varrho - \bar{g} \right) + \tau_g \frac{\partial \varrho}{\partial \tau_g} \tag{11}$$

Hence, the increased tax rate may lead to either increased or decreased tax revenue if $\frac{\partial \varrho}{\partial \tau_g} < 0$.

If the parent transfers both bequests and *inter vivos* gifts and is not avoiding taxes, (i.e., the transfer schemes in cells **c1** and **e** in Table 2) she will alter her transfers according to (24)–(26) in the Appendix. We have the same counteracting income and substitution effects as we saw in the tax-avoidance solutions. If the gift tax is increased, the child receives a lower period 1 income, and thereby lower total income. To compensate for this the parent wants to increase total transfers. Because it is in period 1 the child gets poorer, the parent also wants to reallocate the transfers from bequests to gifts. However, the substitution effect goes in opposite direction. It becomes relatively more expensive to make transfers as gifts than as bequests, so the parent tends to substitute gifts for bequests. Transfers as a whole compared to own consumption also becomes more expensive, so total transfers tend to decrease. The sign of the effects therefore depends on the relative strength of the income and substitution effects. However, we can tell that gifts and bequests move in opposite directions. The effect on gifts is the strongest, which implies that $sign \left[\frac{\partial (\varrho + \beta)}{\partial \tau_g} \right] = sign \left[\frac{\partial \varrho}{\partial \tau_g} \right]$.

Now we have studied the effects of an increased gift tax, but the effects of an increased inheritance tax can be analogously analyzed. In the tax avoidance solution **d**, which is only possible if $\tau_g >> \tau_b$ an increased τ_b only has an effect on the bequest, and not on the *inter vivos* gift, which is constrained at the tax exempt amount. The effect on the bequest is ambiguous:

$$\left. \frac{\partial \beta}{\partial \tau_b} \right|_d = \frac{2\gamma \left(u_{2k}'' \left(1 - \tau_b \right) \left(\beta - \bar{b} \right) + u_{2k}' \right)}{u_p'' + 2\gamma u_{2k}'' \left(1 - \tau_b \right)^2} \lesseqgtr 0 \tag{12}$$

Due to the substitution effect the parent should decrease the bequest and thereby total transfers. However, in this tax avoidance solution, the parent already transfers less than preferred, due to the gift tax, and the

income effect tends to increase bequests instead. If the child has a relatively low marginal utility of consumption in period two, the tax increase may instead induce a shift to another cell in Table 2. If the substitution effect is very, very strong, the bequest decrease may be so large that the bequest falls below the tax exempt amount.

The very same reasoning holds for changes in the inheritance tax in the interior solution **e**, where the condition for total transfers and bequests to increase and for gifts to decrease when τ_b increases is that the income effect dominates the substitution effect.[6]

4.2 A common tax rate

With a common tax rate, $\tau_g = \tau_b = \tau$, but separate exemptions for inheritances and *inter vivos* gifts, some of the results from Section 4.1 still hold. When a taxable *inter vivos* gift is transferred when there is no bequest the effect of an increased tax rate is exactly that in (9) where $\tau_g = \tau$. However, in the solution **e** where both types of transfers are large enough to be taxable, an increased tax rate has a different effect than in a completely separate tax system. When the common tax rate is increased it does not affect the relative price of *inter vivos* gifts and bequests, as in the previous section. However, there are income and substitution effects between the parent's and the child's consumption, so both kinds of transfers will go in the same direction if they are both taxed. Hence, also with a common tax rate counteracting income and substitution effects prevents us from receiving unambiguous results.

4.3 Completely integrated taxes

The effects of increased taxation is the same with completely integrated taxes as with a common tax rate, when both types of transfers ar received and taxed. If taxation of property transfers is completely integrated, the interior solution of interest is the one where *inter vivos* gifts, as well as bequests are transferred and taxed. In this case all transfers are regarded as one from the taxation point of view. For simplicity we therefore assume that the joint tax-free level of transfers is zero when we do the comparative statics. The expressions are similar to those for a common tax rate in Equa-

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[6]See (28)–(30) in the Appendix.

tions (35)–(38), and can be found in Equations (39)–(42) in the Appendix. However, there are differences. When the tax exemption levels are note separate, we know that taxable gifts exceed taxable inheritances. Therefore an increased tax rate has a stronger income effect on gifts than on bequests. In Equation (13) below[7] we also notice that, irrespective of if transfers increase or decrease as a consequence of a higher tax, $\frac{\partial \varrho}{\partial \tau} - \frac{\partial \beta}{\partial \tau} > 0$, implying that the relative size of the gift as compared with the bequest will be larger with a higher tax rate. Therefore savings will also unambiguously decrease in this case.

$$\left. \frac{\partial \varrho}{\partial \tau} \right|_{integr} - \left. \frac{\partial \beta}{\partial \tau} \right|_{integr} = \frac{2\gamma^2 u_p'' u_k''^2 (1-\tau)^3 (\varrho - \beta)}{|A|} > 0 \qquad (13)$$

5 Conclusion

In this paper a theoretical model is used to show how altruistic parents choose to divide their transfers to their offspring. We study whether property transfers will take the form of *inter vivos* gifts or *post mortem* bequests. In absence of taxes most transfers will be *inter vivos* gifts, and only the wealthiest parents will also bequeath resources to their children.

Applying a tax rule like the one that is common in many Western countries, with both gifts and inheritances tax exempt to a certain amount, and thereafter due to taxation, this result is altered. Hence, the empirical finding that bequests constitute a large part of intra-family transfers is here explained by the existence of property transfer taxes. The wealth level where parents start to bequeath is lower with than without taxes, and it is decreasing in the gift tax rate and increasing in the tax exempt gift amount. This is because parents turn to bequeathing in order to avoid the gift tax. Hence, the mere existence of the tax induces an altered behavior, although it does not imply any tax revenues at all. In this case we can say that the marginal excess burden of the gift tax is infinite. In such a case, when behavior is distorted, but no tax revenue is raised, it would be Pareto improving to abolish the gift tax.

We have seen that with a common tax rate, but still separate tax exempt amounts of inheritances and *inter vivos* gifts, the possibilities of tax

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[7]Which is the same as (42) in the Appendix.

avoidance are limited. The parent can still avoid taxes by starting to leave bequests when she has reached the tax-free limit of gifts. However, the kind of tax avoidance where the parent transfers taxable amounts of the least taxed transfer and only a tax free amount of the more heavily taxed vanishes. In order to get rid of all tax avoidance also the tax exemptions must be integrated. If there is one total tax exempt transfer amount the parent cannot avoid taxes by altering the mix of *inter vivos* gifts and bequests.

Due to counteracting income and substitution effects, the effects of transfer taxes on the mix of transfers are not unambiguous. If the tax on inheritances increases we may actually see that more property is transferred as bequests, while *inter vivos* gifts are decreased.

A natural step would now be to analyze the questions raised in this paper in an optimal taxation setting. We have studied the behavioral effects and analyzed the incentives to allocate transfers in different ways in presence of different tax rules. If the government has a certain revenue requirement, what would be the optimal system for taxing intra-family transfers?

Appendix: Comparative statics

In constrained corner solutions where $\varrho = \bar{g}$ is binding, the following system for comparative statics is obtained by totally differentiating the first order conditions (7a) and (7c):

$$
\begin{bmatrix} 2u_p'' & -u_p'' \\ -u_p'' & u_p'' + \gamma u_{2k}'' \left(\frac{\partial b}{\partial \beta} \right)^2 \end{bmatrix} * \begin{bmatrix} ds \\ d\beta \end{bmatrix} \tag{14}
$$

$$
= \begin{bmatrix} u_p'' & 0 & 0 \\ 0 & -\gamma u_{2k}'' w_{k2} \frac{\partial b}{\partial \beta} & -\gamma \left(u_{2k}'' \frac{\partial b}{\partial \beta} \frac{\partial b}{\partial \tau_b} + u_{2k}' \frac{\partial^2 b}{\partial \beta \partial \tau_b} \right) \end{bmatrix} * \begin{bmatrix} dW \\ dh_k \\ d\tau_b \end{bmatrix}
$$

The system determinant in this case is

$$
u_p''^2 + 2\gamma u_p'' u_{2k}'' \left(\frac{\partial b}{\partial \beta} \right)^2 > 0 \tag{15}
$$

An increased inheritance tax has ambiguous consequences in this corner solution where $\beta > \bar{b}$ and $\varrho = \bar{g}$ (Cell **d** in Table 2).

$$
\left. \frac{\partial \beta}{\partial \tau_b} \right|_d = \frac{2\gamma \left(u_{2k}'' (1 - \tau_b) (\beta - \bar{b}) + u_{2k}' \right)}{u_p'' + 2\gamma u_{2k}'' (1 - \tau_b)^2} \lesseqgtr 0 \tag{16}
$$

and

$$
\left. \frac{\partial s}{\partial \tau_b} \right|_d = \frac{\gamma \left(u_{2k}'' (1 - \tau_b) (\beta - \bar{b}) + u_{2k}' \right)}{u_p'' + 2\gamma u_{2k}'' (1 - \tau_b)^2} \lesseqgtr 0 \tag{17}
$$

However, it is clear that $sign \left[\frac{\partial \beta}{\partial \tau_b} \right] = sign \left[\frac{\partial s}{\partial \tau_b} \right]$.

In corner solutions where $\beta = \bar{b}$ is binding, the following system for comparative statics is obtained by totally differentiating the first order con-

ditions (7a) and (7b):

$$\begin{bmatrix} 2u_p'' & u_p'' \\ -u_p'' & u_p'' + \gamma u_{1k}'' \left(\frac{\partial g}{\partial \varrho} \right)^2 \end{bmatrix} * \begin{bmatrix} ds \\ d\varrho \end{bmatrix} \qquad (18)$$

$$= \begin{bmatrix} u_p'' & 0 & 0 \\ u_p'' & -\gamma u_{1k}'' w_{k1} \frac{\partial g}{\partial \varrho} & -\gamma \left(u_{1k}'' \frac{\partial g}{\partial \varrho} \frac{\partial g}{\partial \tau_g} + u_{1k}' \frac{\partial^2 g}{\partial \varrho \partial \tau_g} \right) \end{bmatrix} * \begin{bmatrix} dW \\ dh_k \\ d\tau_g \end{bmatrix}$$

The system determinant in this case is

$$u_p''^2 + 2\gamma u_p'' u_{1k}'' \left(\frac{\partial g}{\partial \varrho} \right)^2 > 0 \qquad (19)$$

In Cell **c2** in Table 2 where $\varrho > \bar{g}$ and $\beta = \bar{b}$ we have that

$$\left. \frac{\partial \varrho}{\partial \tau_g} \right|_{c2} = \frac{2\gamma \left(u_{1k}'' \left(1 - \tau_g \right) \left(\varrho - \bar{g} \right) + u_{1k}' \right)}{u_p'' + 2\gamma u_{1k}'' \left(1 - \tau_g \right)^2} \lesseqgtr 0. \qquad (20)$$

and

$$\left. \frac{\partial s}{\partial \tau_g} \right|_{c2} = \frac{-\gamma \left(u_{1k}'' \left(1 - \tau_g \right) \left(\varrho - \bar{g} \right) + u_{1k}' \right)}{u_p'' + 2\gamma u_{1k}'' \left(1 - \tau_g \right)^2} \lesseqgtr 0. \qquad (21)$$

Hence, also in this corner solution there are counteracting income and substitution effects preventing us from generally signing the effects. However, we can tell that the effects on ϱ and on s go in opposite directions. Also with a common tax rate the above mentioned corner-solution effects are valid with the notation $\tau_g = \tau_b = \tau$. With completely integrated taxes, (20) and (21) show the comparative statics in the corner solution where taxable gifts, but zero bequests are transferred.

Comparative statics in interior solutions

The following equation system represents the comparative statics, given that property is transferred through bequests, as well as through gifts without

constraints, and is given by totally differentiating (7a)–(7c):

$$
\begin{bmatrix}
2u_p'' & u_p'' & -u_p'' \\
u_p'' & u_p'' + \gamma u_{1k}'' \left(\frac{\partial g}{\partial \varrho}\right)^2 & 0 \\
-u_p'' & 0 & u_p'' + \gamma u_{2k}'' \left(\frac{\partial b}{\partial \beta}\right)^2
\end{bmatrix}
*
\begin{bmatrix}
ds \\
d\varrho \\
d\beta
\end{bmatrix}
\tag{22}
$$

$$
=
\begin{bmatrix}
u_p'' & 0 & 0 & 0 \\
u_p'' & -\gamma u_{1k}'' w_{k1}\frac{\partial g}{\partial \varrho} & -\gamma \left(u_{1k}''\frac{\partial g}{\partial \varrho}\frac{\partial g}{\partial \tau_g} + u_{1k}'\frac{\partial^2 g}{\partial \varrho \partial \tau_g}\right) & 0 \\
0 & -\gamma u_{2k}'' w_{k2}\frac{\partial b}{\partial \beta} & 0 & -\gamma \left(u_{2k}''\frac{\partial b}{\partial \beta}\frac{\partial b}{\partial \tau_b} + u_{2k}'\frac{\partial^2 b}{\partial \beta \partial \tau_b}\right)
\end{bmatrix}
*
\begin{bmatrix}
dW \\
dh_k \\
d\tau_g \\
d\tau_b
\end{bmatrix}
$$

The system determinant of the left-hand side matrix is:

$$
|A| = u_p'' \left[2\gamma^2 u_{1k}'' u_{2k}'' \left(\frac{\partial g}{\partial \varrho}\right)^2 \left(\frac{\partial b}{\partial \beta}\right)^2 + u_p'' \gamma \left(u_{1k}'' \left(\frac{\partial g}{\partial \varrho}\right)^2 + u_{2k}'' \left(\frac{\partial b}{\partial \beta}\right)^2\right)\right] < 0
\tag{23}
$$

When both kinds of transfers are used and at least gifts are taxed, the effects of an increased gift tax are:

$$
\left.\frac{\partial \varrho}{\partial \tau_g}\right|_{e,c1} = \frac{u_p'' \gamma}{|A|}\left[u_p'' + 2\gamma u_{2k}''\left(\frac{\partial b}{\partial \beta}\right)^2\right]\left[u_{1k}''(1-\tau_g)(\varrho - \bar{g}) + u_{1k}'\right]
\tag{24}
$$

$$
\left.\frac{\partial \beta}{\partial \tau_g}\right|_{e,c1} = -\frac{u_p''^2 \gamma}{|A|}\left[u_{1k}''(1-\tau_g)(\varrho - \bar{g}) + u_{1k}'\right]
\tag{25}
$$

$$
\left.\frac{\partial(\varrho + \beta)}{\partial \tau_g}\right|_{e,c1} = \frac{2\gamma^2 u_p'' u_{2k}''\left(\frac{\partial b}{\partial \beta}\right)^2}{|A|}\left[u_{1k}''(1-\tau_g)(\varrho - \bar{g}) + u_{1k}'\right]
\tag{26}
$$

$$
\left.\frac{\partial s}{\partial \tau_g}\right|_{e,c1} = \frac{-\gamma u_p''}{|A|}\left[u_p'' + \gamma u_{2k}''\left(\frac{\partial b}{\partial \beta}\right)^2\right]\left[u_{1k}''(1-\tau_g)(\varrho - \bar{g}) + u_{1k}'\right]
\tag{27}
$$

If $\beta \leq \bar{b}$, then $\frac{\partial b}{\partial \beta} = 1$, and if $\beta > \bar{b}$ then $\frac{\partial b}{\partial \beta} = (1 - \tau_b)$. Although the we cannot generally sign the effects due to counteracting income and substitu-

tion effects, we notice that gifts and bequests move in opposite directions. The effect on savings has the same sign as the effect on the bequest.

Similar results are obtained when the inheritance tax is increased. In the following $\frac{\partial g}{\partial \varrho} = 1$ if $\varrho \leq \bar{g}$, and $\frac{\partial g}{\partial \varrho} = (1 - \tau_g)$ if $\varrho > \bar{g}$.

$$\left.\frac{\partial \beta}{\partial \tau_b}\right|_e = \frac{u_p'' \gamma}{|A|} \left[u_p'' + 2\gamma u_{1k}'' \left(\frac{\partial g}{\partial \varrho}\right)^2 \right] \left[u_{2k}'' (1 - \tau_b) \left(\beta - \bar{b}\right) + u_{2k}' \right] \qquad (28)$$

$$\left.\frac{\partial \varrho}{\partial \tau_b}\right|_e = \frac{-u_p''^2 \gamma}{|A|} \left[u_{2k}'' (1 - \tau_b) \left(\beta - \bar{b}\right) + u_{2k}' \right] \qquad (29)$$

$$\left.\frac{\partial (\varrho + \beta)}{\partial \tau_b}\right|_e = \frac{2\gamma^2 u_p'' u_{1k}'' \left(\frac{\partial g}{\partial \varrho}\right)^2}{|A|} \left[u_{2k}'' (1 - \tau_b) \left(\beta - \bar{b}\right) + u_{2k}' \right] \qquad (30)$$

$$\left.\frac{\partial s}{\partial \tau_b}\right|_e = \frac{\gamma u_p''}{|A|} \left[u_p'' + \gamma u_{1k}'' \left(\frac{\partial g}{\partial \varrho}\right)^2 \right] \left[u_{2k}'' (1 - \tau_b) \left(\beta - \bar{b}\right) + u_{2k}' \right] \qquad (31)$$

Also here we get ambiguous effects with gifts and bequests moving in opposite directions. The changes in total transfers, as well as in savings have the same sign as the change in bequests.

A common tax rate

With gifts and inheritances taxed separately, but at a common rate, τ, only the right-hand side of (22) changes in the interior solution. The system determinant $|A|$ remains unchanged. With a common tax rate τ the right-hand side of (22) is:

$$= \begin{bmatrix} u_p'' & 0 & 0 \\ u_p'' & -\gamma u_{1k}'' w_{k1} \frac{\partial g}{\partial \varrho} & -\gamma \left(u_{1k}'' \frac{\partial g}{\partial \varrho} \frac{\partial g}{\partial \tau} + u_{1k}' \frac{\partial^2 g}{\partial \varrho \partial \tau} \right) \\ 0 & -\gamma u_{2k}'' w_{k2} \frac{\partial b}{\partial \beta} & -\gamma \left(u_{2k}'' \frac{\partial b}{\partial \beta} \frac{\partial b}{\partial \tau} + u_{2k}' \frac{\partial^2 b}{\partial \beta \partial \tau} \right) \end{bmatrix} * \begin{bmatrix} dW \\ dh_k \\ d\tau \end{bmatrix}$$

With positive transfers of both kinds, but with only gifts taxable (i.e.

Cell **c1** in Table 2) the comparative statics are the following:

$$\left.\frac{\partial s}{\partial \tau}\right|_{c1} = \frac{-\gamma u_p''}{|A|} \left[u_p'' + \gamma u_{2k}''\right] \left[u_{1k}'' (1-\tau)(\varrho - \bar{g}) + u_{1k}'\right] \qquad (32)$$

$$\left.\frac{\partial \varrho}{\partial \tau}\right|_{c1} = \frac{\gamma u_p''}{|A|} \left[u_p'' + 2\gamma u_{2k}''\right] \left[u_{1k}'' (1-\tau)(\varrho - \bar{g}) + u_{1k}'\right] \qquad (33)$$

$$\left.\frac{\partial \beta}{\partial \tau}\right|_{c1} = \frac{-\gamma u_p''^2}{|A|} \left[u_{1k}'' (1-\tau)(\varrho - \bar{g}) + u_{1k}'\right] \qquad (34)$$

Here, we still have the result that bequests change in the same direction as savings and in the opposite direction as gifts. If both transfers are due to taxation (i.e. Cell **e** in Table 2) the comparative statics are instead:

$$\left.\frac{\partial s}{\partial \tau}\right|_{e} = \frac{-\gamma u_p'' u_k'' (1-\tau)}{|A|} \left[u_p'' + \gamma u_k'' (1-\tau)^2\right] \left(\varrho - \bar{g} - (\beta - \bar{b})\right) \qquad (35)$$

$$\left.\frac{\partial \varrho}{\partial \tau}\right|_{e} = \frac{\gamma u_p'' u_k'' (1-\tau)}{|A|} \left[u_p'' \left(\varrho - \bar{g} - (\beta - \bar{b})\right) + 2\gamma (1-\tau) \left[u_k'' (1-\tau)(\varrho - \bar{g}) + u_k'\right]\right] \qquad (36)$$

$$\left.\frac{\partial \beta}{\partial \tau}\right|_{e} = \frac{\gamma u_p'' u_k'' (1-\tau)}{|A|} \left[u_p'' \left(\beta - \bar{b} - (\varrho - \bar{g})\right) + 2\gamma (1-\tau) \left[u_k'' (1-\tau)(\beta - \bar{b}) + u_k'\right]\right] \qquad (37)$$

$$\left.\frac{\partial \varrho + \beta}{\partial \tau}\right|_{e} = \frac{\gamma \left[u_k'' (1-\tau)(\beta - \bar{b} + \varrho - \bar{g}) + 2u_k'\right]}{\gamma u_k'' (1-\tau)^2 + u_p''} \qquad (38)$$

Note also that since there is a common tax rate and $(1-\tau) u_{1k}' = (1-\tau) u_{2k}'$ the child has the same marginal utility of consumption in the two periods, i.e., $u_{1k}' = u_{2k}' = u_k'$. Since we assume the utility functions to be identical in the two periods, this furthermore implies that $u_{1k}'' = u_{2k}'' = u_k''$. Although the tax rate is the same for both transfers, so that there is no substitution effect concerning the choice between gifts and bequests, there is an income effect depending on the relative taxation of gifts and bequests.

If taxable gifts are sizable while taxable bequests are small, the higher tax rate imposes a higher cost on gifts than on bequests.

Completely integrated taxes

If taxation of property transfers is completely integrated, the interior solution of interest is the one where *inter vivos* gifts, as well as bequests are transferred and taxed. In this case all transfers are regarded as one from the taxation point of view. For simplicity we therefore assume that the joint tax-free level of transfers is zero when we do the comparative statics. The expressions are similar to those in Equations (35)–(37), but there are differences. When the tax exemption levels are note separate, we know that taxable gifts exceed taxable inheritances. Therefore an increased tax rate has a stronger income effect on gifts than on bequests. In Equation (42) below we also notice that, irrespective of if transfers increase or decrease as a consequence of a higher tax, $\frac{\partial \varrho}{\partial \tau} - \frac{\partial \beta}{\partial \tau} > 0$, implying that the relative size of the gift as compared with the bequest will be larger with a higher tax rate. Therefore savings will also unambiguously decrease in this case.

$$\left.\frac{\partial s}{\partial \tau}\right|_{integrated} = \frac{\gamma u_p'' u_k'' (1 - \tau)}{|A|} \left[u_p'' + \gamma u_k'' (1 - \tau)^2 \right] (\beta - \varrho) < 0 \qquad (39)$$

$$\left.\frac{\partial \varrho}{\partial \tau}\right|_{integr} = \frac{2\gamma u_p'' u_k'' (1 - \tau)}{|A|} \left[u_p'' (\varrho - \beta) + \gamma (1 - \tau) \left[u_k'' (1 - \tau) \varrho + u_k' \right] \right] \qquad (40)$$

$$\left.\frac{\partial \beta}{\partial \tau}\right|_{integr} = \frac{2\gamma u_p'' u_k'' (1 - \tau)}{|A|} \left[u_p'' (\beta - \varrho) + \gamma (1 - \tau) \left[u_k'' (1 - \tau) \beta + u_k' \right] \right] \qquad (41)$$

$$\left.\frac{\partial \varrho}{\partial \tau}\right|_{integr} - \left.\frac{\partial \beta}{\partial \tau}\right|_{integr} = \frac{2\gamma^2 u_p'' u_k''^2 (1 - \tau)^3 (\varrho - \beta)}{|A|} > 0 \qquad (42)$$

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