

PARENTAL HUMAN CAPITAL INVESTMENTS

IN THEIR CHILDREN AND THE GOVERNMENT DEBT:

AN INTERGENERATIONAL ANALYSIS

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Abstract

The goal of this paper is to attempt to provide a new, partial explanation for government debts. In doing so, it combines two general observations - the inability of parents to appropriate the returns to their investments and the creation of tax liabilities for future generations implied by present-day government debt. Building upon these two concepts and making use of the intergenerational analytical framework developed by Park(1995), I derive the central theoretical insight of this paper - namely, assuming at least partial parental selfishness, as defined in this paper, government debts may arise as a means for parents to appropriate otherwise inappropriable returns to their human capital investments in their children and thus, raises the level of individual and aggregate human capital investments, positively affecting future income and hence social welfare.

I.INTRODUCTION

There are two, among many, widely noted, intuitively obvious ideas in economics. First, government debts incurred today may imply a tax liability for future generations. Second, in the absence of altruistic children or government intervention, parents cannot expropriate the returns to their investments in their own children. In this paper, using a three generations-in-each period model developed by Park(1995), I link the two ideas to form a new theory of government debts. Setting aside the immodesty of citing my own work, I would like to state the following qualification at the very outset - by no means does this paper even begin to attempt to provide a comprehensive explanation of government debts. Rather, it humbly seeks to provide an at most partial, yet new explanation.

The much-talked about “breakdown of family values” is my point of departure. However, it is increasing selfishness, to be defined later, on the part of the children rather than parents which, in the final analysis, drives government debts. This apparently paradoxical line of reasoning ceases to be paradoxical at all once we take into account the effect of increasingly selfish children on the parents’ returns to human capital investments in their children;they clearly fall, adversely affecting the parents and their incentives to make such investments. But ultimately, the children and the economy as a whole suffers because even though selfish parents invest in their children entirely out of selfish motives, the reduction in human capital investments has a negative impact on the productivity and hence income of the children when they become young workers.

There is a way for young parents to avoid the negative shock or lower returns implied by the greater selfishness of their children. The essential point to note here is that they can and do vote, lobby or engage in other political activities

while the children can't or don't. Consequently, young parents can, through the political process, induce the government to incur debts on their behalf, to be repaid by their children in the next period. That is, parents can compensate themselves for the reduction in voluntary transfers from their children by extracting involuntary, government-enforced transfers from them by using their political power.

Ironically, the government debt and the involuntary children-to-parents transfer it implies confer a benefit upon the children as well. The irony vanishes altogether once we recognize that by “restoring” the returns to their children-related human capital investments via the government out of (again) purely selfish purposes, young parents not only help themselves but help their children as well since, as a byproduct or positive externality of their selfishness, they invest more in their children, thus raising the productivity and income of their young, working children in the next period. An “intergenerational invisible hand” is working overtime here!

The central intuition of this paper is that government debts arise as a means of enabling parents to appropriate otherwise inappropriable returns to investments in their own children and, in the process, enhances social welfare by raising individual and aggregate human capital investments in children. To highlight the insight, suppose that parents rely entirely on their children for old-age support and the children turn completely selfish so that they become unwilling to provide any resources to their old parents. In the absence of government

debts or other forms of government-enforced young-to-old transfers, parents will starve to death when they become old due to their inability to appropriate the returns to their investments in their own children. This, however, means that they will no longer have any incentive to invest in their children. As a result, the children will fail to earn any income and also die off when they become young.

In this connection, Park(1995), which provides the basic model and analytical framework of this paper, discusses the effects of government-enforced transfers on human capital investments by parents in their children. Buiter and Kleitner (1991) studies the role of public debt in human capital formation. Drazen(1978) analyzes government debt, human capital and bequests in a life-cycle model while Laitner(1979) looks into bequests and government debt.

In addition, Verbon(1990) discusses transfers to the old, government debt and demographic change. Alogoskoufis and van-der-Ploeg(1990) argue that government debt reduces the growth rate of an economy. Boskin and Kotlikoff(1985) find that aggregate consumption is not independent of the age-structure of the population in the U.S.. Cremer, Kessler and Pestieau(1987) argue that fertility differentials lead to regressive effects of the government debt. Corsetti and Roubini(1991) predict that demographic changes may be needed to restore government solvency in some OECD countries. Lapan and Enders(1990) study the relationship between endogenous fertility, Ricardian equivalence and government debt management policy. Blanchard and Fischer(1989), among others, provide a general discussion of social security, savings and capital accumulation within the context of an overlapping generations model(OGM).

II. A MODEL OF THE EFFECTS OF “DEMOGRAPHIC” CHANGES ON THE LEVEL OF THE GOVERNMENT DEBT

1. The Setting of the Basic Model

The basic model used in this paper is identical to that of Park(1995). In each period, three generations live - the old, the young and the children. We assume the Representative Individual - everybody is identical in every relevant aspect. This identity or equality extends to the childbearing decision - every young person has one child so that in each period so that in each period, each “family” consists of a young person, his/her parent and his/her child and in the next period, the old pass away, the young become the old, the children become the young and have their own children. Consumption by the old, the young and the children in period t are denoted as:

$$\begin{aligned} C_{o,t} &= \text{consumption of an old person in period } t \\ C_{y,t} &= \text{consumption of a young person in period } t \\ C_{k,t} &= \text{consumption of a child(kid) in period } t \end{aligned}$$

Labor is the only factor of production and a person earns labor income only when he/she is young. We further assume that labor productivity and hence labor income of a period-t young person is, in turn, determined solely by the human capital investments made by the parents of the same person in period t-1. We define such investments broadly to include everything and anything, including food, clothing and housing, which may affect the productivity of a child when he/she becomes a young person in the next period. Furthermore, for simplicity, and without any loss of generality in terms of conclusions, we assume the returns to those investments to be positive and constant so that:

$$I_{y,t} = I_{y,t}(e_{y,t-1}) = (1 + r_e)e_{y,t-1}, I_{y,t}' = (1 + r_e) > 0 \text{ and } I_{y,t}'' = 0 \quad (1)$$

where $I_{y,t}$ = income of a period-t young person
 $e_{y,t-1}$ = “educational” investments made by the period-t young person’s parent in period t-1
 r_e = rate of return on “educational” investments

Of the three generations in each period, only the young optimize. The welfare of the children is determined solely by the actions of their parents while the welfare of the old depend entirely on their own actions in the preceding period. In contrast, the young face the decision of optimally allocating their labor income among various possible uses.

As in Park(1995), we use the word “demographics” somewhat loosely and broadly, to actually mean human capital. The rationale for this intentional terminological blunder is also identical to that set forth in Park(1995).

1.(a).The Selfish-Parents Case

The additional assumptions we make for this special case are as follows: first, the old depend entirely on their own children for old-age support. Second, people are selfish only toward their children but altruistic toward their parents in the sense that the young give away resources to their own old parents. By the way, this is an obvious corollary of the first assumption. Third, the ability of the young to take care of the old depends on the level of their income which, in turn, depends on the level of educational investments the old made in the young.

Taken together, the three assumptions generate an economy with a social security system in which the young in each period invest in their own children, who, in become the young in the succeeding period and “repay their debts” to their own parents. Of course, the precise level of the repayment depends on the level of altruism, which is likely to depend most heavily on factors such as

tradition, institutions, culture and social norms. We define the altruism parameter as λ and restrict it to lie between 0 and 1, where $\lambda = 0$ is the minimum level of altruism (“I don’t care if my parent starves to death.”) and $\lambda = 1$ is the maximum level (“I’ll starve to death so that my parent can enjoy life to its fullest.”).

Therefore, a period-t young person earns labor income and donates a fraction of the income to his/her parent as follows:

$$pt_{y,t} = \lambda I_{y,t}(e_{y,t-1}) \quad (2)$$

where $pt_{y,t}$ = private transfer of resources from a period-t young person to his/her own parent

Therefore, from the viewpoint of the period-t young person’s parent, his/her utility maximization problem in period t-1, when he/she was young, is as follows:

$$\begin{aligned} \max .U &= U(C_{y,t-1}, C_{o,t}), U_1 > 0, U_{11} < 0, U_2 > 0, U_{22} < 0 \\ s.t. & C_{y,t-1} + C_{o,t} = I_{y,t-1}(e_{y,t-2}) \end{aligned} \quad (3)$$

Due to our assumptions, old-age consumption is simply old-age income, which is a fraction λ of the income earned by one’s own child in period t+1. That is,

$$C_{o,t} = \lambda I_{y,t} \quad (4)$$

But the income of one’s own child in period t is not exogenous for the period-t young. Rather, it depends on the level of his/her educational investment in one’s own child in period t-1.

$$I_{y,t} = I_{y,t}(e_{y,t-1}) \Rightarrow \lambda I_{y,t} = \lambda I_{y,t}(e_{y,t-1}) = \lambda(1+r_e)e_{y,t-1} \quad (5)$$

Therefore, the optimization problem of the period-t young person ultimately boils down to:

$$\begin{aligned} \max_{e_{y,t-1}} & [C_{y,t-1}, \lambda(1+r_e)e_{y,t-1}] \\ s.t. & C_{y,t-1} + e_{y,t-1} = I_{y,t-1}(e_{y,t-2}) \end{aligned} \quad (6)$$

Substituting the budget constraint into the utility function gives us:

$$\max_{e_{y,t-1}} U[I_{y,t-1}(e_{y,t-2}) - e_{y,t-1}, \lambda(1+r_e)e_{y,t-1}] \quad (6)'$$

The first-order condition for (6) is:

$$\frac{\partial U}{\partial C_{y,t-1}} = \frac{\partial U}{\partial C_{o,t}} \lambda(1+r_e) \quad (7)$$

The interpretation of (7) is straightforward - a period-t-1 young person will invest in his/her child up to where his/her marginal cost of investment or foregone period-t-1 consumption equals his/her marginal benefit of investment or increase in period-t consumption due to transfers from his/her own child.

1.(a)' The Greater Selfishness of Children

Now suppose that there is a change in the values of the society such that the children become more selfish or less altruistic. In this connection, let us note that “breakdown of family values” and more fundamentally, “breakdown of the family” is an increasingly widespread and much-talked about phenomenon in many areas of the world. Regardless of what the root causes of this phenomenon may be, one of its implications is stronger selfishness or weaker altruism, as defined in our model. That is, children become less willing to transfer resources to their parents when the latter are old.

To be more concrete, let us assume that this increase in the selfishness of the children towards their own parents is permanent, and perceived and understood by everybody as such. Let us further assume that this permanent reduction of altruism occurs first among the period-t-1 children. Then the first-order condition for utility maximization by the period-t-1 young becomes:

$$\frac{\partial U}{\partial C_{y,t-1}} = \frac{\partial U}{\partial C_{o,t}} \lambda' (1 + r_e)$$

where $\lambda' < \lambda$ (7)'

Therefore, relative to before their children became more selfish, the period-t-1 young will invest less in their children and consume more while they are young; they will “live it up” while they are young since the reduction in the altruism of their children amounts to a reduction in the returns to their investments.

The critical point here is that the greater selfishness of the children ultimately hurts the children themselves because their parents invest less in them, lowering their productivity and hence income when they mature into young workers. (7)'

implies the following:

$$(e_{y,t-1}^*)' < e_{y,t-1}^* \Rightarrow I_{y,t} [(e_{y,t-1}^*)'] < I_{y,t} (e_{y,t-1}^*)$$
 (8)

where $(e_{y,t-1}^*)'$ = optimal level of educational investment
by a period-t-1 young person after the
children's change in tastes
 $e_{y,t-1}^*$ = optimal level of educational investment
by a period t-1 young person before the
children's change in tastes

Of course, there is also a gain from weaker altruism, in the form of a higher post-transfer income for any level of income.

$$(1 - \lambda') I_{y,t} > (1 - \lambda) I_{y,t}$$
 (9)

But the broader consequence of the reduced altruism is that each period-t young person will earn a lower total income, whether used for voluntary transfers to parents or for other purposes, and hence the aggregate income in period-t will fall. Moreover, since the greater selfishness is permanent, such negative effect on output will extend to period-t+1 and beyond.

Our analysis hardly changes if the change in tastes occurs with the young of a period rather than the children. The only qualitative difference will be that the old of that period will suffer an unexpected negative shock. The young, however, will take into account the new, lower level of altruism in optimally allocating their income between consumption and educational investments; we cannot expect the young to be so naive as to disbelieve “what goes around, comes around.”

An extreme, intuitively illuminating special case is that of the children turning completely selfish or λ becoming zero. In this case, young parents will consume up all their income when they are young, making no investments whatsoever in their children. In the next period, these same parents will die off for lack of old-age support, but so will their grown-up children for lack of income.

1.(a)''The Introduction of Government Debt

In our model, the only reason that parents can extract resources from their own children is the altruism of the latter. So, in a very real sense, the parents are absolutely powerless against the change in the tastes of their children. In particular, they cannot extract resources from their children when they are still children since, by assumption, children do not earn any income so they have no resources, for parental extraction or any other purpose.

All this changes if we introduce into our model government and government borrowing in period $t-1$. In particular, let us suppose that the government can incur debts on behalf of the period- $t-1$ young and these debts are to be repaid in period t , the children of the period- $t-1$ young (the period- t young). Then the

government is, in effect, transferring resources from the children to their parents.

In terms of the parents' incentives to make educational investments, the introduction of government debt mitigates the effects of reduced altruism and the consequent lower returns to such investments. Government debts are a form of children-to-parents transfer since children are taxed when they grow up to become young to pay up the debts, which was used up for consumption by their (young) parents in the preceding period. As such, government debts enable parents to appropriate otherwise unappropriable returns to their educational investments in their own children and thus, increases the incentives to make such investments in the first place. With the introduction of government debts, the utility-maximizing first-order condition for a period-t-1 young parent becomes:

The debts the government incurs in period t-1 on behalf of the period-t-1 imply a tax liability on the period-t young in period t. More precisely, for any given level of debts the government incurs on behalf of young parents, the government can, in principle, impose a tax on the income of the children, who have become young, in the next period which will be just sufficient to repay the debt.

$$d_{y,t-1} = tI_{y,t} \tag{10}$$

where $d_{y,t-1}$ = debt incurred by the government on behalf of a young person in period t-1.

t = the rate of the income tax imposed on the period-t young to repay the debt incurred in period t-1

Government debts do not come out of the blue. Rather, they are the outcome of the political process. The young are able to vote in debts or, equivalently, tax

liabilities against their children because the young can vote whereas children cannot. When the young suffer an unexpected negative shock in the form of greater selfishness on the part of their children, they have every incentive to vote or lobby the government for debts on their behalf. In particular, in the special case where the level of their children's altruism($=\lambda$) falls all the way down to zero, voting and political lobbying for the debt becomes literally a matter of life and death.

A note of caution is that the amount of debt the period-t-1 young can vote in or lobby for is not unlimited. Rather, it depends positively on the level of their educational investments and hence the income of their children in period t, which ultimately determines the “repayability” of the debt in period t. That is,

$$d_{y,t-1} = d_{y,t-1}(I_{y,t}), d_{y,t-1}' > 0 \Rightarrow d_{y,t-1} = d_{y,t-1}(e_{y,t-1}), d_{y,t-1}' > 0 \quad (11)$$

More specifically, combining (1), (10) and (11), we get:

$$\frac{dd_{y,t-1}}{dI_{y,t}} = t > 0, \frac{d^2 d_{y,t-1}}{dI_{y,t}^2} = 0 \Rightarrow \frac{dd_{y,t-1}}{de_{y,t-1}} = t(1+r_e), \frac{d^2 d_{y,t-1}}{de_{y,t-1}^2} = 0 \quad (12)$$

After all, the borrowing ability of even a government depends on its repayment ability.

In order for the period-t-1 young to restore their level of old-age(period t) income to “normal”, each person of that generation must receive a debt equal to the loss in old-age income due to the greater selfishness of the children. Since the ultimate source of the government debt is investment in children and the only reason for investing in children is old-age support, it follows that the period-t-1 young will spend all their government debt when they are old. In this sense, we

may treat the government debt as old-age income.

$$d_{y,t-1} = (\lambda - \lambda')I_{y,t} \Rightarrow I_{o,t} = d_{y,t-1} + \lambda'I_{y,t} = \lambda I_{y,t} \quad (13)$$

Combining (10) and (13), we see that government can restore “normalcy” by setting the tax rate on the period-t young in period t as follows:

$$t = (\lambda - \lambda') \Rightarrow t + \lambda' = \lambda \quad (14)$$

Notice that in politically inducing the government to transfer resources to them from their children by incurring debts, what young parents are choosing is, in the final analysis, the tax their children will have to face in the next period. In

(14), young parents are implicitly choosing the tax rate which will completely offset the negative shock they suffer due to the greater selfishness of their children. Therefore, the total transfer of resources they obtain from their children is the same as before, the only difference being the composition of those resources - whereas before all the transfers were voluntary, now a part of them are involuntary or government-enforced.

So far, we have completely ignored the possible reaction of the period-t-1 children to the tax they face in period t. This is unrealistic. In particular, they may very well reduce the level of their voluntary transfers when the government imposes a tax to repay the debts it incurred in period t on behalf of the period-t young. Let's suppose that for every dollar of tax they pay, they reduce the amount of their voluntary transfers to their own parents by one dollar:

$$\lambda'' = \lambda' - t \quad (15)$$

where λ'' = the “effective” level of altruism and $\lambda' > t$

$$\lambda'' + t = \lambda' \quad (15)'$$

Then, as (15)' shows, as long as $t < \lambda'$, the total amount of transfers, whether voluntary or government-enforced, from the period- t young to their parents will remain the same as before the introduction of government debt and the subsequent tax. In this sense, the tax is non-binding.

Consequently, the parents of the period- t young will be able to overcome the reduced altruism of their children if and only if, in politically choosing the level of the government debt, they implicitly choose $t > \lambda'$. If they do this, their children will cease to make any voluntary transfers whatsoever since they are already transferring more than they prefer. And, in this sense, the tax is binding.

$$t > \lambda' \Rightarrow \lambda'' = 0 \quad (16)$$

When the parents implicitly select a tax rate against their children which enables them to obtain more old-age resources than would be possible by voluntary transfers from their children, they are also implicitly forfeiting any voluntary transfer whatsoever. As such, government debt and more fundamentally, the government-enforced young-to-old transfer it implies will completely replace voluntary transfers as the old-age social security system of the economy.

Therefore, the returns to educational investments no longer depend on λ but rather t . More concretely, for a period- $t-1$ young parent:

$$I_{o,t} = C_{o,t} = t(1+r_e)e_{y,t-1} \quad (17)$$

And, the utility maximization problem of the period- $t-1$ person becomes:

$$\max_{e_{y,t-1}} U[I_{y,t-1} - e_{y,t-1}, t(1+r_e)e_{y,t-1}] \quad (18)$$

The first-order condition for (18) is:

$$\frac{\partial U}{\partial C_{y,t-1}} = \frac{\partial U}{\partial C_{o,t}} t(1+r_e) \quad (19)$$

As with (7) and (7)', the interpretation of (19) is simply that a period-t-1 young person will invest in his/her child up to where the marginal cost and marginal benefit of such investments are equal.

Since $t > \lambda'$, (19) implies a higher level of educational investments in period t-1 by the period-t-1 young than implied by (7)'. Thus, (19) also implies a higher level of income for the children of the period-t-1 young in period t.

$$(e_{y,t-1}^*)'' > (e_{y,t-1}^*)' \Rightarrow I_{y,t} [(e_{y,t-1}^*)''] > I_{y,t} [(e_{y,t-1}^*)'] \quad (20)$$

where $(e_{y,t-1}^*)''$ = the level of educational investments
by a period-t-1 young person after
introduction of government debt

The period-t-1 young can restore “normalcy” by implicitly selecting $t = \lambda$. If they do so, the utility maximization problem in (19) becomes, in effect, identical to that in (7).

$$\frac{\partial U}{\partial C_{y,t-1}} = \frac{\partial U}{\partial C_{o,t}} t(1+r_e) = \frac{\partial U}{\partial C_{o,t}} \lambda(1+r_e) \quad (21)$$

(21), in turn, implies the restoration of the optimal level of educational investment to its level before the change in the tastes of the period-t-1 children.

$$(e_{y,t-1}^*)'' = e_{y,t-1}^* \quad (22)$$

By inducing the government to incur debts through the political process, parents face stronger incentive to invest in their children since the debts enable them to capture otherwise inappropriable returns to such investments. In doing so out of such selfish motives, they also benefit their children, whose human capital and hence income would have otherwise fallen. That is, in helping themselves, the parents also unwittingly help their children.

It would be a serious mistake to believe that the amount of tax the parents can implicitly levy on their children is unlimited. In particular, the children are no longer children but young people with voting and other political powers in period t . Therefore, there will be political limits to the government's ability to tax the young in period t . The government's ability to borrow (on behalf of the period- $t-1$ young) in period $t-1$ will clearly be constrained by those limits. At a deeper level, the period- $t-1$ young will also into account those limits in implicitly selecting the level of the intergenerational tax.

This leads to another question - why would the period- $t-1$ young necessarily cough up the taxes when there is seemingly nothing in it for them? The answer is that there is something very valuable in it for them. Partial or total non-compliance is costly for them because it would diminish the ability of the government to borrow on their behalf. Surely, a poor track record adversely affects the borrowing power of even a government. In the extreme, intuitively illuminating case where λ falls all the way to zero, the period- t young need government debts for their very survival in period $t+1$. Noncompliance in this case would be tantamount to suicide. More generally, partial or total non-compliance would enable a period- t young person to consume more when he/she is young but force him/her to consume less when he/she is old. Since this implies young-age overconsumption and old-age underconsumption relative to the initial (before the permanent change in tastes) optimum, it pays the period- t young to comply instead.

An important caveat is that (17), (18) and (19) are less than perfectly accurate

once we take into account the fact that government debt and the government-enforced young-to-old transfer it implies are not one-to-one, child-to-own parent transfers but rather generation-to-generation, all children-to-all parents transfers. Hence, with government debts, the returns to every parent's educational investments are shared by all parents. However, in order to focus more clearly on the central issues of this paper, let us choose to ignore the possibility of free-riding and underinvestment raised by Park(1995) in this connection.

1.(b).The Altruistic-Parents Case

In this case, everybody saves to take care of themselves rather than rely on their own children when they are old. The only reason for a young parent to invest in his/her child is the welfare of the child, both when the child is a child and when the child becomes a young person. Consequently, the welfare of a period-t young person depends on his/her own period-t consumption, period-t+1 consumption, his/her child's period-t consumption and the same child's period-t+1 consumption. That is, for a period-t young person:

$$.U = U(C_{y,t}, C_{o,t+1}, C_{k,t}, C_{y,t+1}) \quad (23)$$

$$\text{where } \bullet U_1 > 0, U_{11} < 0, U_2 > 0, U_{22} < 0, U_3 > 0, U_{33} < 0, U_4 > 0, U_{44} < 0$$

With respect to savings, let us assume, for analytical convenience and without any loss of generality, that the only possible form of savings is a riskless asset which pays a constant, both across levels of savings and over time, interest rate. Then, a period-t young person's old-age(period-t+1) income and hence consumption is as follows:

$$I_{o,t+1} = C_{o,t+1} = (1+r_s)s_{y,t} \quad (24)$$

where r_s = constant rate of interest on the riskless asset
 $s_{y,t}$ = level of savings of a period-t young person

Therefore, for the same person, the marginal utility of savings is:

$$\frac{\partial U}{\partial s_{y,t}} = \frac{\partial U}{\partial C_{o,t+1}}(1+r_s) \quad (25)$$

Educational investments of a period-t young person enhances his/her child's welfare and hence his/her own welfare in both period-t and period-t+1. In period t, the level of educational investments is, in effect, the level of consumption of the child which, by assumption, gives satisfaction to the parent. In period-t+1, the level of educational investments increases the income of the period-t child, enabling him/her to achieve a higher level of consumption which, again by assumption, provides satisfaction for the parent. Therefore, for a period-t young person, the marginal utility of educational investments is:

$$\frac{\partial U}{\partial e_{y,t}} = \frac{\partial U}{\partial e_{y,t}} + \frac{\partial U}{\partial C_{y,t+1}} \frac{\partial C_{y,t+1}}{\partial I_{y,t+1}} \frac{\partial I_{y,t+1}}{\partial e_{y,t}} = \frac{\partial U}{\partial e_{y,t}} + \frac{\partial U}{\partial C_{y,t+1}} \frac{\partial C_{y,t+1}}{\partial I_{y,t+1}}(1+r_e) \quad (26)$$

A period-t young person can allocate his income among consumption, savings and educational investments. Hence, his/her budget constraint is:

$$C_{y,t} + s_{y,t} + e_{y,t} = I_{y,t} \quad (27)$$

Making use of (26) to express consumption as a function of savings and educational investments, the optimization problem of a period-t young person becomes:

$$\max U[I_{y,t} - s_{y,t} - e_{y,t}, (1+r_s)s_{y,t}, e_{y,t}, C_{y,t+1}(e_{y,t})] \text{ w.r.t. } s_{y,t} \text{ and } e_{y,t} \quad (28)$$

Solving for (27), we obtain the following first-order conditions:

$$\frac{\partial U}{\partial C_{y,t}} = \frac{\partial U}{\partial C_{o,t+1}}(1+r_s) = \frac{\partial U}{\partial e_{y,t}} + \frac{\partial U}{\partial C_{y,t+1}} \frac{\partial C_{y,t+1}}{\partial I_{y,t+1}}(1+r_e) \quad (29)$$

(29) has a straightforward meaning - at his/her optimum, a period- t young person allocates his income among consumption, savings and educational investments so as to equalize the marginal utility of each.

1.(b)' The Greater Selfishness of Children

Stronger selfishness or weaker altruism of the children toward their parents is a non-issue in the altruistic-parents case because the children are already as selfish(in the sense of our model) as possible. At a deeper level, altruistic parents do not expect or receive transfers from their children so whether or not the children turn selfish has no effects whatsoever on their educational investments, which depends entirely on how much they care about their children. Conversely, if, for whatever reason, the children turn less selfish or more altruistic and voluntarily transfer resources to their old parents, the latter will simply give back the transfers to the former.

1.(b)'' The Introduction of Government Debt

For reasons just discussed in 1.(b)', young parents will not vote in or lobby for a government debt on their behalf, at least not for the rationale for government debt outlined in this paper. Altruistic parents do not want any of the returns to educational investments, other than in the broad sense of the higher welfare of their children. Consequently, greater selfishness on the part of the children will not reduce their returns to educational investments and they face no incentive whatsoever to seek the government's help in securing those returns.

1.(c). The Intermediate Case:Selfish cum Altruistic Parents

As we have seen, the central theoretical proposition of this paper - namely,

government debt as a means to capture otherwise inappropriable returns to parental investments in the human capital of their children - holds only in the case of the selfish points. Therefore, the empirical validity of that proposition hinges critically on the relative empirical validity of the two diametrically opposed parental motivations for investing in children.

To see this point more formally, let us suppose that parents invest in their children out of both selfish and altruistic purposes and define a new altruism parameter, α , which embodies the relative altruism(or selfishness) of parents toward their children.

$$\begin{aligned} 0 < \alpha < 1 \text{ where } \alpha = 1 &\Rightarrow \text{complete parental altruism} \\ \alpha = 0 &\Rightarrow \text{complete parental selfishness} \end{aligned} \quad (30)$$

Intuitively, α reflects the relative importance the parent attaches to the “altruistic” benefits of educational investments(i.e.higher welfare of child) and conversely, $1 - \alpha$ mirrors the relative importance the same parent gives to the “selfish” benefits of such investments(i.e.increase in own old-age consumption).

As in the altruistic-parents case, we assume the parents save. And, as in the selfish-parents case, $\lambda > 0$ so that children transfer resources to old parents.

Then, the utility function of a period-t young parent becomes:

$$.U = U[I_{y,t} - s_{y,t} - e_{y,t}, (1 + r_s)s_{y,t} + (1 - \alpha)\lambda(1 + r_e)e_{y,t}, \alpha e_{y,t}, \alpha C_{y,t+1}(e_{y,t})] \quad (31)$$

One can easily verify that the utility function in (6) - $\lambda = 0$ or the selfish-parents case - and the utility function in (28) - $\lambda = 1$ or the altruistic-parents case - are special cases of (31). In the intermediate case($0 < \alpha < 1$), there are both “selfish” and “altruistic” benefits for parents to their educational investments in children.

More precisely, the first-order conditions for (31) are:

$$\frac{\partial U}{\partial C_{y,t}} = \frac{\partial U}{\partial [(1+r_s)s_{y,t} + (1-\alpha)\lambda(1+r_e)e_{y,t}]} = (1-\alpha)\left[\frac{\partial U}{\partial C_{o,t+1}} \lambda(1+r_e)\right] + \alpha\left[\frac{\partial U}{\partial e_{y,t}} + \frac{\partial U}{\partial C_{y,t+1}} \frac{\partial C_{y,t+1}}{\partial I_{y,t+1}} (1+r_e)\right] \quad (32)$$

The interpretation of (32) is as before. The only difference is that the marginal utility of educational investments consists of both marginal “selfish” utility and marginal “altruistic” utility, the relative weights of the two depending on α .

Now consider the effect of a fall in λ (=children’s altruism toward their parents). The marginal “altruistic” benefits of educational investments remain unaffected. What is affected is only the marginal “selfish” benefit of such investments; it falls, reducing the incentive to make educational investments. Therefore, the greater selfishness of the children will reduce the parents’ optimal level of educational investments only to the extent that $1-\alpha$ or relative importance of “selfish” benefits is significant.

Consequently, for $0 < \alpha < 1$, the incentive of parents to vote in or lobby for government debts on their behalf in the face of greater selfishness of the children is greater than in the altruistic-parents case but weaker than in the selfish-parents case. As α approaches zero, political pressures for government debts will rise. Conversely, as α approaches one, such political pressures will fade.

III. CONCLUSIONS AND POLICY IMPLICATIONS

In the absence of altruism on the part of their children, parents cannot reap the fruits of their human capital investments in their children. More generally, the ability to appropriate the returns to such investments will depend critically on the children’s level of altruism toward their parents. This market failure is

relevant only for “selfish” returns because, by definition, “altruistic” returns are ultimately returns to the children themselves and not intended for appropriation, except in a broad “what’s good for my child is good for me” sense, by the investors, the parents.

Therefore, assuming at least partial parental selfishness, a reduction in the altruism of the children will reduce the incentives to invest in children and thus, lead to a lower level of individual and aggregate child-related investments. The parents are not the only ones to lose from the increased selfishness of their children; the children themselves also lose due to the fall in their productivity and income due to their lower level of human capital which is, in turn, ultimately due to the increase in their own selfishness. That is, the change in tastes of the children comes back to haunt the children themselves. Since we assume the change in tastes to be permanent, the economy as a whole will move down to a lower output path.

Again assuming at least partial parental selfishness, the key conclusion of this paper is as follows: one possible theoretical explanation for government debts is that they are a means of enabling parents to collect otherwise inappropriable returns to their investments in their own children. Government debts can arise endogenously through optimizing behavior on the part of young parents because whereas they vote and engage in other forms of political activities, such as lobbying, the children do not. By providing a way around the failure of the market to provide returns to their intergenerational human capital investments, government debts make parental investments more attractive, which raises the

individual and aggregate levels of those investments, thereby generating higher levels of individual and aggregate productivity and income in the next period, when the children turn young. Hence, the partial explanation for government debts provided in this paper implies that there may be a potentially welfare-enhancing role for them.

Again, keeping in mind that the central insight of this paper provides at most a partial explanation for government debt, the significance of the policy implications of the insight depend critically on the empirical relevance of total or partial parental selfishness assumption, as defined here. Clearly, in many parts of the world, particularly in developing countries, old parents rely primarily on their children for support, due to cultural traditions, poorly developed financial markets and other reasons. On the other hand, this kind of parental selfishness is much less noticeable in developed countries.

The “truth” is probably somewhere inbetween. Most people probably invest in their children out of both altruism and selfishness. In particular, there are at least two plausible selfish rationales for why seemingly completely altruistic parents invest in children. First, one thing that almost all old-age parents want from their children is “love and affection.” To the extent that such emotions are a highly prized good with a correspondingly high implicit monetary price, parents may resort to government debts to compensate themselves when the Christmas cards stop coming. Second, even if there is no explicit transfers from the young to the old, the parents may reasonably regard their children as a form of old-age insurance. After all, where do you have a better chance of getting help

when some unexpected financial catastrophe befalls you when you are old and helpless? Your neighborhood bank or your (hopefully reasonably well-to-do) kids.

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