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ABSTRACT

This paper explores the effects of one nation's taxation of consumption on the welfare of future generations of other countries. To do this, it presents an otherwise standard one-good, two-country optimal growth model with free capital markets, but where each date represents the lifetime of a generation which cares not only about its own consumption and leisure, but also that of its descendants.

Relative to a no tax benchmark, a policy of one country taxing consumption of its initial generations has ambiguous welfare effects for future generations of the other country, as long as those future generations are not too far in the future. Higher initial savings in the first country raises capital levels, and thus wages, in both countries, raising welfare of future generations in the second country, but also induces lower bequests in the second country, lowering the welfare of its future generations. In the long run, or for generations born near the steady state, the welfare effects of the first country inducing lower consumption of its initial generations are unambiguous: future generations of the second country are made worse off. Households born in the second country will regret that their ancestors allowed such policy-induced intertemporal trade.

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1 Introduction

> *"Imagine that I, Warren Buffett, can get the suppliers of all that I consume in my lifetime to take Buffett family IOUs that are payable, in goods and services and with interest added, by my descendants. This scenario may be viewed as effecting an even trade between the Buffett family unit and its creditors. But the generations of Buffetts following me are not likely to applaud the deal."*
>
> — Warren Buffett, Fortune Magazine, 2003[1]

Since Q3-1991, the United States has run a current account deficit in every quarter, averaging 3% of US GDP per year. In that same period, federal debt held by foreigners has gone from roughly 8% to 30% of US GDP, and the net foreign asset position of the US has gone from roughly zero, to negative 60% of US GDP. Atkeson, Heathcote and Perri (2025) attribute much of this change in the net foreign asset position to the US stock market outperforming foreign stock markets. Nevertheless, throughout this period, current account deficits have necessarily been financed by net sales of US assets to foreigners. Which raises a natural question: to what extent does this kind of intertemporal trade hurt future generations of Americans? Is the current generation selling the prosperity of its descendants? More generally, does one country inducing "oversaving" by its residents, in a world of free capital flows, hurt or help future generations of other countries?

This paper explores this latter question. To do this, it presents an otherwise standard one-good, two-country optimal growth model, but where each date represents the lifetime of a generation which cares not only about its own consumption and leisure, but also that of its descendants. It first derives conditions for, properly defined, Pareto efficiency. These conditions are shown to be exactly the same as if households lived forever, except the standard intertemporal condition holds as an inequality rather than as an equality.

Next, it considers tax/subsidy schemes under an assumption of free international capital markets, and demonstrates that non-negative saving subsidies or weakly decreasing consumption taxes (with offsetting labor subsidies) by either or both countries induce Pareto efficient equilibria. The focus on Pareto efficient tax schemes is intentional. Moving from one Pareto efficient joint tax scheme to a different Pareto efficient joint tax scheme necessarily creates winners and losers. In particular, it allows the discussion of the winners and losers, by generation and country, when one country, through its tax policy, induces lower consumption/higher savings in its initial generations. Importantly, it allows the discussion of the welfare effects of such policies on generations in the *other* country. Put simply, when one country induces higher savings of its own households, with free capital markets, this also induces lower savings in other countries, which has generational welfare effects.

[1] Buffett (2003)

The main results are as follows: Relative to a benchmark where neither country ever taxes consumption or subsidizes savings, a tax policy by one country to induce lower initial consumption for its own households has, for nearby generations, ambiguous welfare effects for the households of the other country. Higher initial savings in the first country raises capital levels, and thus labor productivity/wages, in both countries, raising welfare of future generations in the second country. But the policy also induces lower worldwide returns to capital, and thus simultaneously induces lower bequests in the second country. Lower capital returns alter the tradeoff in the second country between own consumption and altruistic gifts to descendants. In the long run, or for generations born near the steady state, the welfare effects of the first country inducing lower consumption/higher savings of its initial generations are unambiguous: future generations of the second country are made worse off. In the long run, capital/labor ratios, and thus capital and labor productivity, are independent of the policies which induced lower consumption/higher savings of the households in the first country. But relative steady state wealth levels are *not* independent of these policies. Households born in the second country will regret that their ancestors allowed such policy-induced intertemporal trade.

A second, somewhat surprising, result is that if one country subsidizes savings through tax policies, those tax policies can themselves cause *budget* deficits in other countries by inducing an otherwise absent negative bequest motive. That is, it is at least theoretically possible that **both** US current account deficits **and** US federal budget deficits are caused by foreign tax policies, as opposed to one causing the other.

2 Related Literature

The study of Costinot, Lorenzoni and Werning (2011) is perhaps the most closely related to this paper. They study a two country model where one country is passive and the other uses capital controls to optimally alter the terms of trade in its favor. Since many tools (say capital controls vs. taxes) can achieve the same outcomes, what distinguishes this paper from theirs is the focus on the welfare of future generations, not the focus on tax policies vs. capital controls.

The study of Obstfeld (2025) discusses the empirical plausibility of alternative explanations of recent US current account deficits. The result that US budget deficits themselves can be caused by foreign tax policies is relevant to this discussion (although this paper makes no empirical claims). Likewise, Bernanke (2005) and Bernanke (2007) regarding the "global savings glut" is closely related to the results here that consumption reducing policies in one country, in a world of free capital flows, affects savings behaviors in the rest of the world.

Overall, the literature on the consequences of free (or more free) international capital markets is large. The idea that free (or more free) capital markets can induce increases in public debt levels is present in Azzimonti, de Francisco and Quadrini (2014), although their mechanism is not through intergenerational bequest incentives. Halac and Yared (2018) consider the effects on *optimal* fiscal policy in response to freer international capital markets. Coeurdacier, Guibaud and Jin (2015) give a policy other than taxation (credit constraints) that could act similarly to the stylized tax policies presented in this paper. Caballero, Farhi and Gourinchas (2008) invoke differing financial market sophistication to get a similar outcome. Finally, Turnovsky (2019) considers to the role of demographics in generating persistant current account deficits. While in this paper current account deficits are caused by differing tax policies, the effects of them on future generations should continue to hold independent of their cause.

3 Environment

Time is discrete with dates, $t \in \{0, T\}$. At each date, there exist two countries, $i \in \{A, B\}$, each populated by a unit mass continuum of identical agents who live for one period. In each country and date, if $k_{i,t}$ units of capital and $\ell_{i,t}$ units of labor from inhabitants of that country is used in production, the country produces $f(k_{i,t}, \ell_{i,t})$ units of the single non-storable consumption good, where $f(k, \ell) = z\, k^{\alpha} \ell^{1-\alpha}$. Initial capital levels $k_{A,0}$ and $k_{B,0}$ are exogenous.

Agents live for one period, but associated with each agent at a given date t are particular agents born at dates $s > t$, his descendants, and agents born at dates $s < t$, his ancestors, one for each date. Let $\{c_{i,t}, \ell_{i,t}\}_{t=0}^{T}$ denote a specification of consumption and labor over generations. An agent born in period t in country i ranks such specifications according to

$$\sum_{s=t}^{T} \beta^{s-t}(u(c_{i,t}) - v(\ell_{i,t})),$$

where $u'(c) > 0$, $u''(c) < 0$, $v'(\ell) > 0$, $v''(\ell) > 0$, and the usual Inada conditions apply. In words, agents care about the consumption and leisure of themselves and their descendants, but not their ancestors.

Define an allocation as one where all agents born in the same country, i, at the same date t, consume the same amount, $c_{i,t}$, and work the same amount, $\ell_{i,t}$, as a specification

$$\{\{c_{i,t}, \ell_{i,t}, k_{i,t+1}\}_{i \in \{A,B\}}\}_{t=0}^{T},$$

where $k_{A,T+1} = k_{B,T+1} = 0$.

An allocation is considered feasible if for all $t \in \{0, \dots, T\}$,

$$c_{A,t} + c_{B,t} + k_{A,t+1} + k_{B,t+1} \leq f(k_{A,t}, \ell_{A,t}) + f(k_{B,t}, \ell_{B,t}). \tag{1}$$

In words, this condition implies the consumption good can be costlessly shipped across country borders, labor is immobile, and a unit of the consumption good at date t can either be consumed or it becomes capital at date $t+1$.

4 Efficiency

Consider the following planner's problem:

$$\max_{\{c_{i,t},\ell_{i,t},k_{i,t+1}\}} \sum_{i\in\{A,B\}} \sum_{t=0}^{T} \gamma_{i,t} \left(\sum_{s=t}^{T} \beta^{s-t}(u(c_{i,t}) - v(\ell_{i,t})) \right), \tag{2}$$

subject to the resource constraint (1), and exogenous specifications $k_{A,0}$ and $k_{B,0}$. Here, $\gamma_{i,t}$ is the weight the planner puts on the altruism inclusive payoff to an agent born at date t in country i. The objective function (2) can be rearranged as

$$\max_{\{c_{i,t},\ell_{i,t},k_{i,t+1}\}} \sum_{i\in\{A,B\}} \sum_{t=0}^{T} \Gamma_{i,t}(u(c_{i,t}) - v(\ell_{i,t})),$$

where $\Gamma_{i,t} \equiv \sum_{s=0}^{t} \beta^s \gamma_{i,t-s}$ denotes the weight the planner puts on delivering while-alive utils to an agent born at date t in country i, accounting for the altruism of the agent's ancestors.

An allocation is *Pareto efficient* if it solves the planner's problem for some specification $\{\{\gamma_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$ such that $\gamma_{i,t} \geq 0$ for all (i,t) and at $\gamma_{i,t} > 0$ for some (i,t).

The following proposition shows that conditions for Pareto efficiency are exactly the same as as those as if periods $t > 0$ are interpreted as future periods of life of an agent born at $t = 0$, as opposed to future generations, with one exception — the standard intertemporal (or Euler) condition becomes a weak inequality rather than an equality.[2]

Proposition 1. *An interior feasible allocation is Pareto efficient if and only if*

- *for all $t \in \{0,\ldots,T\}$ the resource constraint (1) holds as an equality,*
- *for all $t \in \{1,\ldots,T\}$,*

$$f_k(k_{A,t},\ell_{A,t}) = f_k(k_{B,t},\ell_{B,t}), \tag{3}$$

[2] A similar result is in Phelan and Rustichini (2018) in a single country model. See also Phelan (2006), Farhi and Werning (2007), and Farhi and Werning (2010)

- *for all* $t \in \{0, \dots, T\}$ *and* $i \in \{A, B\}$

$$u'(c_{i,t}) f_\ell(k_{i,t}, \ell_{i,t}) = v'(\ell_{i,t}), \tag{4}$$

- *for all* $t \in \{0, \dots, T-1\}$*, and* $i \in \{A, B\}$*,*

$$u'(c_{i,t}) \geq \beta f_k(k_{i,t+1}, \ell_{i,t+1}) u'(c_{i,t+1}), \tag{5}$$

Proof. The necessity of the conditions of the proposition is straightforward. If the resource constraint does not bind at any date, the consumption of an agent can be increased. If the marginal products of capital are not equated across countries, condition (3), marginally increasing capital in the higher marginal product country and decreasing it in the lower increases output, allowing the consumption of an agent to be increased. If condition (4) is violated for a particular (i, t), $c_{i,t}$ and $\ell_{i,t}$ can be marginally varied, holding everything else constant, to improve the welfare of the agent born at date t in country i (as well as the welfare of all his ancestors). Finally, if condition (5) is violated for a particular (i, t), $c_{i,t}$ be marginally decreased, $k_{i,t+1}$ marginally increased, and $c_{i,t+1}$ marginally increased by $f_k(k_{i,t+1}, \ell_{i,t+1})$ to not only improve the welfare of an agent born at date $t+1$ in country i, but also his father (and all previous ancestors).

For sufficiency, take as given an allocation satisfying the conditions of the proposition and consider the Lagrangian associated with the planner's problem with λ_t denoting the multiplier associated with the date t resource constraint.

One can use the first order conditions of the Lagrangian with respect to $c_{A,t}$ and $c_{B,t}$, substituting out the Lagrange multiplier for the date t resource constraint, to derive

$$\frac{\Gamma_{B,t}}{\Gamma_{A,t}} = \frac{u'(c_{A,t})}{u'(c_{B,t})}, \tag{6}$$

for all $t \in \{0, \dots, T\}$, recalling that $\Gamma_{i,t} \equiv \sum_{s=0}^{t} \beta^s \gamma_{i,t-s}$. Next, one can use the first order conditions with respect to $c_{A,t}$, $c_{A,t+1}$, and $k_{A,t+1}$ to derive

$$\frac{\Gamma_{A,t}}{\Gamma_{A,t+1}} = \frac{u'(c_{A,t+1})}{u'(c_{A,t})} f_k(k_{A,t+1}, \ell_{A,t+1}), \tag{7}$$

for $t \in \{0, \dots, T-1\}$. If one lets $\Gamma_{A,0} = 1$, then (6) defines $\Gamma_{B,0}$, and (7) defines $\Gamma_{A,1}$. Iterating in this manner, one derives $\Gamma_{i,t}$ for all i and $t \in \{0, \dots, T\}$, each guaranteed positive.

If one sets $\lambda_t = \Gamma_{A,t} u'(c_{A,t})$, the first order conditions of the Lagrangian associated with $c_{A,t}$ are automatically satisfied, and the first order conditions associated with $c_{B,t}$ are implied by (6). For each $i \in \{A, B\}$, the first order conditions for $\ell_{i,t}$ are implied by the first order condition for $c_{i,t}$ and

$u'(c_{i,t})f_\ell(k_{i,t}, \ell_{i,t}) = v'(\ell_{i,t})$ from the statement of the proposition. Finally, the first order conditions for $k_{A,t}$ are implied by (7), and the first order conditions for $k_{B,t}$ are implied by the first order condition for $k_{A,t}$ and $f_k(k_{A,t}, \ell_{A,t}) = f_k(k_{B,t}, \ell_{B,t})$ from the statement of the proposition. Thus all the first order conditions of the Lagrangian hold, along with the resource constraints holding with equality.

The last step is then showing that the planner weights $\gamma_{i,t}$ are non-negative. Since $\gamma_{A,0} = \Gamma_{A,0}$ and $\gamma_{B,0} = \Gamma_{B,0}$, $\gamma_{A,0}$ and $\gamma_{B,0}$ are each positive. On the other hand, $\gamma_{i,1} = \Gamma_{i,1} - \beta\Gamma_{i,0}$, which is not guaranteed to be non-negative.

From the first order conditions for $c_{i,0}$, $c_{i,1}$, and $k_{i,1}$

$$\frac{\gamma_{i,1} + \beta\gamma_{i,0}}{\gamma_{i,0}} = \frac{u'(c_{i,0})}{f_k(k_{i,1}, \ell_{i,1})u'(c_{i,1})}.$$

Solving this for $\gamma_{i,1}$ delivers

$$\gamma_{i,1} = \frac{\gamma_{i,0}}{f_k(k_{i,1}, \ell_{i,1})u'(c_{i,1})}(u'(c_{i,0}) - \beta f_k(k_{i,1}, \ell_{i,1})u'(c_{i,1})),$$

which is non-negative if and only if $u'(c_{i,0}) \geq \beta f_k(k_{i,1}, \ell_{i,1})u'(c_{i,1})$, as guaranteed in the statement of the proposition. Given $\gamma_{i,1} > 0$, one can iteratively proceed in this manner to show $\gamma_{i,t} \geq 0$ for all $i \in \{A, B\}$ and $t \in \{2, \dots, T\}$. □

The basic intuition behind this result is that having altruistically-linked generations doesn't change very much. It is still necessary that resource constraints hold with equality. It is still necessary that the standard intratemporal labor/consumption tradeoff holds. It is still necessary that returns to capital are equated across countries. What is no longer necessary is that an infinitely lived household's marginal rate of substitution between date t consumption and date $t+1$ consumption (the ratio $u'(c_{i,t})/(\beta u'(c_{i,t+1}))$ equals the marginal rate of transformation between the consumption good at date t and $t+1$, $f_k(k_{i,t+1}, \ell_{i,t+1})$. With infinitely lived households, such a condition is necessary because if, say, $u'(c_{i,t})/(\beta u'(c_{i,t+1})) < f_k(k_{i,t+1}, \ell_{i,t+1})$ for a given i and t, one can marginally decrease c_t, marginally increase c_{t+1} by $f_k(k_{i,t+1}, \ell_{i,t+1})$ units per unit of decrease in c_t, and make the infinitely lived household in country i better off without making anyone worse off. And, in fact, this continues to hold if household's live for only one period but care about their descendants. But in this case, this example is that of marginally decreasing a father's consumption and marginally increasing his son's. Nevertheless, if $u'(c_{i,t}) < \beta f_k(k_{i,t+1}, \ell_{i,t+1})u'(c_{i,t+1})$, this makes both the father and the son better off. Note however, this does not work in the other direction. If $u'(c_{i,t}) > \beta f_k(k_{i,t+1}, \ell_{i,t+1})u'(c_{i,t+1})$, marginally increasing $c_{i,t}$ and appropriately marginally decreasing $c_{i,t+1}$ will indeed make the father better off, but it will make the son worse off, and is thus not a Pareto improvement. Thus condition (5) need hold only as an inequality.

That these conditions are collectively sufficient is then a matter of backing out the Pareto weights associated with any allocation satisfying the conditions. This is done without using the intertemporal condition (5). Condition (5) as an inequality is both necessary and sufficient, however, for these implied Pareto weights to be non-negative, a necessary condition for Pareto efficiency.

5 Decentralized Trade with Taxes and Subsidies

In this section, the economy is decentralized as a competitive economy with taxes and subsidies. Along with households, assume for each country there is a single government, and a single profit maximizing, price-taking firm which rents capital and labor to produce output. From the assumption of constant returns to scale, ownership of these firms is left unspecified.

5.1 Markets

Assume there are spot markets in each country for trading the consumption good for labor and capital, where $w_{i,t}$ and $r_{i,t}$ are the wage and rental rate of capital in country i at date t in terms of the consumption good at that date.

Finally, assume free international capital markets. Let $k_{i,t}$ denote the physical amount of capital in country i at date t, and $k_{i,j,t}$ denote the capital in country j owned by residents of country i. Thus for $i \in \{A, B\}$,

$$k_{A,i,t} + k_{B,i,t} = k_{i,t}.$$

Agents at date $t = 0$ initially own arbitrary non-negative quantities of their own and the other country's capital such that for each country $j \in \{A, B\}$, $k_{A,j,0} + k_{B,j,0} = k_{j,0}$. Agents born at date $t < T$ can bequeath non-negative capital of either country to their date $t + 1$ child.

Like capital, assume free international capital markets in government debt. Let $b_{i,t}$ denote the amount of the consumption good country i promises to pay at date t, and $b_{i,j,t}$ denote the debt in country j owned by residents of country i. Thus for $i \in \{A, B\}$,

$$b_{A,i,t} + b_{B,i,t} = b_{i,t}.$$

At each date $t \in \{0, \dots, T-1\}$, the government of each country i auctions $b_{i,t+1}$ units of debt. Agents born at date $t < T$ can bequeath non-negative quantities of the government debt of either country to their $t + 1$ child. Let $Q_{i,t}$ denote the price of country i's government debt, payable at date $t + 1$, in terms of date t consumption.

5.2 Taxes

Let $\tau_{i,t}$, $s_{i,t}$, and $\phi_{i,t}$ denote a date t, country i, consumption tax, labor subsidy, and investment subsidy, respectively, and $S_{i,t}$ denote a lump sum subsidy given to residents of country i by its government. Assume $\tau_{i,t}$, $s_{i,t}$, and $\phi_{i,t}$ for $t \in \{0, \dots, T\}$, and $b_{i,t}$, for $t \in \{1, \dots, T\}$, are exogenous policy parameters, where $b_{i,0}$ is exogenous, and that the sequence $\{S_{i,t}\}_{t=0}^{T-1}$ solves the flow budget constraint for the government at each date,

$$S_{i,t} = \tau_{i,t}c_{i,t} + Q_{i,t}b_{i,t+1} - (b_{i,t} + s_{i,t}w_{i,t}\ell_{i,t} + \phi_{i,t}(k_{i,A,t+1} + k_{i,B,t+1})), \tag{8}$$

for $t \in \{0, \dots, T-1\}$, with

$$S_{i,T} = \tau_{i,T}c_{i,T} - (b_{i,T} + s_{i,T}w_{i,T}\ell_{i,T}). \tag{9}$$

5.3 Firm optimization

For each country $i \in \{A, B\}$ and date $t \in \{0, 1\}$, firm i solves

$$\max_{k_{i,t},\ell_{i,t}} f(k_{i,t}, \ell_{i,t}) - w_{i,t}\ell_{i,t} - r_{i,t}k_{i,t}. \tag{10}$$

5.4 Household optimization

An agent born at date T in country i who inherits $k_{i,A,T}$ units of country A capital, $k_{i,B,T}$ units of the other country's capital, $b_{i,A,T}$ units of country A bonds, and $b_{i,B,T}$ units of country B bonds solves

$$W_{i,T}(k_{i,A,T}, k_{i,B,T}, b_{i,A,T}, b_{i,B,T}) = \max_{c_{i,T},\ell_{i,T}} u(c_{i,T}) - v(\ell_{i,T}) \tag{11}$$

subject to all choice variables weakly positive, and

$$c_{i,T}(1 + \tau_{i,T}) \leq w_{i,T}(1 + s_{i,T})\ell_{i,T} + r_{A,T}k_{i,A,T} + r_{B,T}k_{i,B,T} + b_{i,A,T} + b_{i,B,T} + S_{i,T}. \tag{12}$$

An agent born $t < T$ in country i who inherits $(k_{i,A,t}, k_{i,B,T}, b_{i,A,T}, b_{i,B,T})$ solves

$$\begin{aligned} W_{i,t}(k_{i,A,t}, k_{i,B,t}, b_{i,A,t}, b_{i,B,t}) = &\max_{c_{i,t},\ell_{i,t},k_{i,A,t+1},k_{i,B,t+1},b_{i,A,t+1},b_{i,B,t+1}} \\ u(c_{i,t}) - v(\ell_{i,t}) + \beta W_{i,t+1}&(k_{i,A,t+1}, k_{i,B,t+1}, b_{i,A,t+1}, b_{i,B,t+1}) \end{aligned} \tag{13}$$

subject to all choice variables weakly positive, and

$$c_{i,t}(1+\tau_{i,t}) + (k_{i,A,t+1} + k_{i,B,t+1})(1-\phi_{i,t}) + Q_{A,t} b_{i,A,t+1} + Q_{B,t} b_{i,B,t+1} \leq \\ w_{i,t}(1+s_{i,t})\ell_{i,t} + r_{A,t} k_{i,A,t} + r_{B,t} k_{i,B,t} + b_{i,A,t} + b_{i,B,t} + S_{i,t}. \tag{14}$$

A competitive equilibrium, given policies,

$$\{\{\tau_{i,t}, s_{i,t}, \phi_{i,t}, b_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T},$$

(where $\phi_{i,T} = 0$ for $i \in \{A, B\}$) is an allocation,

$$\{\{c_{i,t}, \ell_{i,t}, k_{i,t+1}\}_{i\in\{A,B\}}\}_{t=0}^{T},$$

with $k_{A,0}$, $k_{B,0}$, $k_{A,A,0}$, $k_{A,B,0}$, $k_{B,A,0}$, $k_{B,B,0}$ given and $k_{A,T+1} = k_{B,T+1} = 0$, bequests,

$$\{\{k_{i,A,t}, k_{i,B,t}, b_{i,A,t}, b_{i,B,t}\}_{i\in\{A,B\}}\}_{t=0}^{T},$$

prices

$$\{\{w_{i,t}, r_{i,t}, Q_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T},$$

and lump sum transfers

$$\{\{S_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T},$$

such that the resource constraints (1) at each date hold with equality, government budget equations (8) and (9) hold each period, capital markets clear, or

$$k_{A,A,t} + k_{B,A,t} = k_{A,t}, \;\; k_{A,B,t} + k_{B,B,t} = k_{B,t},$$

$$b_{A,A,t} + b_{B,A,t} = b_{A,t}, \;\; b_{A,B,t} + b_{B,B,t} = b_{B,t},$$

and the allocation and bequests solve the programming problems defined by (10), (11), and (13).

The following proposition establishes that competitive equilibrium pins down quantities, prices, and the *value* of bequests, but not the form of the bequests. For instance, in a completely symmetric equilibrium, one could have agents of country A make bequests in country A capital and debt, and agents of country B make bequests in country B capital and debt in one equilibrium, and in another equilibrium, the agents of each country make bequests in terms of the other country's capital and debt.

Proposition 2. *For policy specification* $\{\{\tau_{i,t}, s_{i,t}, \phi_{i,t}, b_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$*, consider a given competitive equilibrium with quantities,*

$$\{\{c_{i,t}, \ell_{i,t}, k_{i,t+1}\}_{i\in\{A,B\}}\}_{t=0}^{T},$$

prices

$$\{\{w_{i,t}, r_{i,t}, Q_{i,t}\}_{i\in\{A,B\}}\}_{0\leq t\leq T},$$

and bequests

$$\{\{k_{i,A,t}, k_{i,B,t}, b_{i,A,t}, b_{i,B,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}.$$

Let

$$\{\{\hat{k}_{i,A,t}, \hat{k}_{i,B,t}, \hat{b}_{i,A,t}, \hat{b}_{i,B,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$$

be an alternative specification of bequests such that for all $t \in \{1, \dots, T\}$ *and* $i \in \{A, B\}$*,*

$$r_{A,t}\hat{k}_{i,A,t} + r_{B,t}\hat{k}_{i,B,t} + \hat{b}_{i,A,t} + \hat{b}_{i,B,t} = r_{A,t}k_{i,A,t} + r_{B,t}k_{i,B,t} + b_{i,A,t} + b_{i,B,t},$$

along with $\hat{k}_{A,i,t} + \hat{k}_{B,i,t} = k_{i,t}$*, and* $\hat{b}_{A,i,t} + \hat{b}_{B,i,t} = b_{i,t}$*.*
Then the same quantities and prices with the alternative specification of bequests is a competitive equilibrium.

Proof. Bequests enter the conditions for a competitive equilibrium only through the budget constraints (12) and (14). By construction, the budget set of agents born at $t = T$, condition (12), is unaffected.
For agents born at $t = T - 1$, the right hand side of their budget constraint, condition (14), is similarly unaffected. Next, that $\hat{k}_{A,A,T} + \hat{k}_{B,A,T} = k_{A,T}$, $\hat{k}_{A,B,T} + \hat{k}_{B,B,T} = k_{B,T}$, $\hat{b}_{A,A,T} + \hat{b}_{B,A,T} = b_{A,T}$, and $\hat{b}_{A,B,T} + \hat{b}_{B,B,T} = b_{A,T}$ implies that the total date $T - 1$ value of bequests across both countries from date $T - 1$ parents to date T children is unchanged at $k_{A,T} + k_{B,T} + Q_{A,T-1}b_A + Q_{B,T-1}b_B$. Thus if the budget constraint for a $T - 1$ agent is violated for one country's agents, it is slack for the other country's, which contradicts household optimization for the original equilibrium.
Iterating backwards completes the proof. □

In any equilibrium where the value of bequests for (i, t) is strictly positive, *local* Ricardian equivalence regarding the sequence of debt levels, $\{\{b_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$, holds (assuming consumption taxes, labor subsidies, and investment subsidies remain unchanged). That is, small perturbations in the sequence of government debt will induce the same equilibrium allocation. Nevertheless, Ricardian equivalence does not hold overall in this economy due to the assumed restriction of non-negative bequests and that agents own their own labor. The usual arguments apply. That is, it is possible to generate examples where, for a given sequence of consumption taxes, labor subsidies, investment subsidies and debt levels for each country, if negative bequests are allowed, there exist a date t and country i such that the total value of bequests from date t agents to date $t+1$ agents is negative. Since such negative bequests are not allowed, household optimization implies $k_{i,A,t+1} = k_{i,B,t+1} = b_{i,A,t+1} = b_{i,B,t+1} = 0$. In such a case, if the government of country i increases $b_{i,t+1}$, government i's date t flow budget constraint (14) implies an increase in the lump sum transfer $S_{i,t}$ to date t county i agents, allowing them increase their consumption while still giving a zero value bequest.

The next proposition is the main result of this section: If both governments weakly subsidize investment in each period, through a combination of weakly decreasing consumption taxes or investment subsidies, coupled with offsetting consumption taxes with labor subsidies, then regardless of the sequence of government debt sequences, the resulting equilibrium allocation is Pareto efficient. Put differently, a policy induced wedge in a household's intertemporal condition does not create an inefficiency, but instead causes a movement *along* the Pareto frontier, as long the wedge pushes consumption towards future generations. Note that this result is due to future generations explicitly mattering in the definition of Pareto efficiency, rather than mattering only through the altruism of the first generation. If Pareto efficiency were defined as if only the first generation mattered, such wedges would indeed induce inefficient allocations.

Proposition 3. *Suppose* $\{\{\tau_{i,t}, s_{i,t}, \phi_{i,t}, b_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$ *is a policy specification where for* $i \in \{A, B\}$ *and* $t \in \{0, \ldots, T\}$, $\tau_{i,t} = s_{i,t}$ *and for* $t \in \{0, \ldots, T-1\}$, $\frac{1+\tau_{i,t}}{1+\tau_{i,t+1}}\frac{1}{1-\phi_{i,t}} \geq 1$. *Further suppose allocation*

$$\{\{c_{i,t}, \ell_{i,t}, k_{i,t+1}\}_{i\in\{A,B\}}\}_{t=0}^{T}$$

is supported as a competitive equilibrium associated with policies $\{\{\tau_{i,t}, s_{i,t}, \phi_{i,t}, b_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$. *Then allocation* $\{\{c_{i,t}, \ell_{i,t}, k_{i,t+1}\}_{i\in\{A,B\}}\}_{t=0}^{T}$ *is Pareto efficient.*

Proof. For all $t \in \{0, \ldots, T\}$, firm optimization implies $w_{i,t} = f_\ell(k_{i,t}, \ell_{i,t})$, and $r_{i,t} = f_k(k_{i,t}, \ell_{i,t})$. The first order conditions of the country i, date t household problem with respect to $c_{i,t}$ and $\ell_{i,t}$ substituting out the Lagrange multiplier on the budget constraint imply $u'(c_{i,t})w_{i,t}\frac{1+s_{i,t}}{1+\tau_{i,t}} = v'(\ell_{i,t})$. That $\tau_{i,t} = s_{i,t}$ and $w_{i,t} = f_\ell(k_{i,t}, \ell_{i,t})$ then implies $u'(c_{i,t})f_\ell(k_{i,t}, \ell_{i,t}) = v'(\ell_{i,t})$. (Condition (4) for Pareto efficiency).
For both $i \in \{A, B\}$ and $t \in \{0, \ldots, T-1\}$, from the first order conditions of the household problem for $k_{i,i,t+1}$, $c_{i,t}$ and the envelope condition determining $\frac{\partial W_{i,t+1}}{\partial k_{i,i,t}}$, one can derive

$$u'(c_{i,t}) \geq \beta r_{i,t+1} u'(c_{i,t+1})\frac{1+\tau_{i,t}}{1+\tau_{i,t+1}}\frac{1}{1-\phi_{i,t}},$$

(with equality if $k_{i,i,t+1}$ or $k_{i,-i,t+1}$ are strictly positive). This, $r_{i,t} = f_k(k_{i,t}, \ell_{i,t})$, and $\frac{1+\tau_{i,t}}{1+\tau_{i,t+1}}\frac{1}{1-\phi_{i,t}} \geq 1$ then implies condition (5) for Pareto efficiency.

Finally, in any competitive equilibrium, due to infinite marginal productivity at zero, capital must be strictly positive in both countries at every date. Thus for at least one country $i \in \{A, B\}$, $k_{i,A,t} + k_{i,B,t} > 0$. From the first order conditions for $k_{i,A,t+1}$ and $k_{i,B,t+1}$, and the envelope conditions determining $\frac{\partial W_i}{\partial k_{i,A,t+1}}$ and $\frac{\partial W_i}{\partial k_{i,B,t+1}}$, one can derive $r_{A,t} = r_{B,t}$. This then implies $f_k(k_{A,t}, \ell_{A,t}) = f_k(k_{B,t}, \ell_{B,t})$. (Condition (3) for Pareto efficiency).

The resource constraints at each date holding with equality are implied by allocation $\{\{k_{i,t}, c_{i,t}, \ell_{i,t}\}_{i\in\{A,B\}}\}_{t=0}^{T}$ being supported as a competitive equilibrium. Thus the conditions for Proposition (1) are satisfied. □

Note that Proposition (3) does not imply that the taxes and subsidies don't matter. If labor subsidies offset consumption taxes and the effective investment subsidy $\frac{1+\tau_{i,t}}{1+\tau_{i,t+1}} \frac{1}{1-\phi_{i,t}} - 1$ is weakly positive, the competitive equilibrium will be efficient, but **which** Pareto efficient allocation occurs will in general be a function of these tax levels, since although setting $\tau_{i,t} = s_{i,t}$ leaves intratemporal tradeoffs undistorted, each agent's intertemporal tradeoff is still affected by taxes. Nevertheless, as long each agent's intertemporal tradeoff is distorted toward giving more to their descendants (an implication of weakly positive investment subsidies), this represents a movement along the economy's Pareto frontier, not an inefficiency.

6 Current Account Imbalances and Welfare

This section uses the results of the previous sections to consider the main question of the paper: What are the effects on the welfare of future generations from policies which induce current account surpluses or deficits? In particular, it focuses on policies which move the world economy from one Pareto efficient allocation to another, implying that for at least one generation in one country, welfare declines, and for at least one generation in one country, welfare improves. Further, it focuses on the welfare of future generations of the *other country* when a given country uses policy to induce a trade surplus early on. That is, it seeks to answer the question of whether consumption suppressing policies in one part of the world hurt or help future generations in the rest of the world.

To this end, suppose countries A and B are otherwise identical, but country A creates a savings wedge for its initial generations while country B does not. How does such a policy by country A affect the welfare of future generations of country B?

Here, I present two main results. First, I consider a two period example where, depending on the altruism parameter β and the tax policies of country A, those born in the second generation of country B can either be harmed or helped from tax policy which suppresses the consumption of the first generation in country A. The purpose of the two period example is not to be quantitatively realistic (it isn't), but instead provide a counterexample to the idea that one can sign the effects on the welfare of later generations in country B to tax policy in country A when T is small.

The second main result, however, is that one **can** sign the effect of country A's tax policy on the later generations of country B when T is large. In particular, I present a proposition that independent of parameters, early consumption suppressing tax policies in country A unambiguously lower steady state welfare in country B. Put informally, the early current account deficits for country B induced by country A's consumption suppressing tax policy indeed hurts country B's future generations if T is sufficiently large such that there exist future generations close enough to the steady state.

For a two period example (where $t \in \{0, 1\}$), consider the perhaps the simplest parameter specification of $u(c) = 2c^{\frac{1}{2}}$, $v(\ell) = \frac{1}{2}\ell^2$, $k_{i,0} = 1$, and $f(k, \ell) = k^{\frac{1}{3}}\ell^{\frac{2}{3}}$. Next, set $\tau_{A,0} = s_{A,0} = \frac{5}{2}$ and all other taxes and subsidies and debt levels equal to zero. (One could likewise set $\tau_{A,0} = s_{A,0} = 0$ and $\phi_{A,0} = \frac{5}{7}$, resulting in the same intertemporal wedge for the $t = 0$ generation of country A.) Again note that these parameters and policies are chosen only to demonstrate the effect of taxes on welfare is ambiguous for close by generations. Nothing is targeted to be realistic.

If the altruism parameter $\beta = .9$, then compared to no taxes or subsidies in any country or date, the high consumption taxes in period $t = 0$ in country A makes the $t = 0$ households in country A worse off, their children better off, the $t = 0$ households in country B better off, and their children worse off.

Country/Generation	0	1
A	Worse Off	Better Off
B	Better Off	Worse Off

Welfare change when Country A imposes $t = 0$ consumption tax, $\beta = .9$

For these parameters, the children in country B are made worse off (relative to no taxes in either country) because the effect of A's tax policy on bequests outweighs its effect on wages. That is, without any taxes and $\beta = .9$, the world's allocation is

Country	$c_{i,0}$	$\ell_{i,0}$	$k_{i,A,1}$	$k_{i,B,1}$	$c_{i,1}$	$\ell_{i,1}$	$w_{i,0}$	$w_{i,1}$	$r_{i,0}$	$r_{i,1}$
A	.72	.83	.16	0	.41	.65	.71	.42	.30	.84
B	.72	.83	0	.16	.41	.65	.71	.42	.30	.84

Allocation given no taxes, $\beta = .9$

When country A imposes a tax policy to suppress $t = 0$ consumption, the world's allocation becomes

Country	$c_{i,0}$	$\ell_{i,0}$	$k_{i,A,1}$	$k_{i,B,1}$	$c_{i,1}$	$\ell_{i,1}$	$w_{i,0}$	$w_{i,1}$	$r_{i,0}$	$r_{i,1}$
A	.30	1.15	.35	.45	.74	.63	.64	.55	.37	.50
B	.85	.78	0	0	.45	.82	.72	.55	.28	.50

Country A imposes $t = 0$ consumption tax, $\beta = .9$

With the high $t = 0$ consumption taxes in country A, country A parents save more than with no taxes, pushing down the common rate of return on capital in both countries to sufficiently induce the parents in country B to leave a zero bequest. This zero bequest offsets, from the perspective of the children in country B, a positive effect of the consumption taxes in country A: period $t = 1$ wages in country B (as well as country A) are higher than they would have been because capital at $t = 1$ is higher in both countries due to the higher country A bequests induced by the tax policy. For the children in country B, it then becomes a quantitative question of which effect dominates. For these parameters, the bequest effect dominates the wage effect.

If instead the altruism parameter $\beta = .1$, so parents in both countries care less about their children, then compared to no taxes in any country or date, which direction welfare moves is the same for three out of the four country/generation combinations: the high consumption taxes in period $t = 0$ in country A makes the $t = 0$ households in country A worse off, their children better off, and the $t = 0$ households in country B better off. But with the low altruism parameter, the children in country B are better off with country A's high $t = 0$ consumption taxes than if country A hadn't taxed.

Country/Generation	0	1
A	Worse Off	Better Off
B	Better Off	Better Off

Country A imposes $t = 0$ consumption tax, $\beta = .1$

For these parameters, the children in country B are made better off (relative to no taxes in either country) because the effect of A's tax policy on wages outweighs its effect on bequests. That is, without any taxes and $\beta = .1$, the world's allocation is

Country	$c_{i,0}$	$\ell_{i,0}$	$k_{i,A,1}$	$k_{i,B,1}$	$c_{i,1}$	$\ell_{i,1}$	$w_{i,0}$	$w_{i,1}$	$r_{i,0}$	$r_{i,1}$
A	.84	.79	.012	0	.14	.50	.72	.19	.28	4.1
B	.84	.79	0	.012	.14	.50	.72	.19	.28	4.1

Allocation given no taxes, $\beta = .1$

Note the small bequests by parents of both countries given no taxes. Now when country A

imposes a tax policy to suppress $t = 0$ consumption, the world's allocation becomes

Country	$c_{i,0}$	$\ell_{i,0}$	$k_{i,A,1}$	$k_{i,B,1}$	$c_{i,1}$	$\ell_{i,1}$	$w_{i,0}$	$w_{i,1}$	$r_{i,0}$	$r_{i,1}$
A	.78	.81	.04	.05	.31	.51	.71	.29	.29	1.8
B	.31	.51	0	0	.19	.66	.72	.29	.29	.50

Country A imposes $t = 0$ consumption tax, $\beta = .1$

Here, the explanation for why children in country B are made better of by country A's tax policy is that with no taxes in either country and low altruism, parents in both countries leave small capital bequests. When country A's tax policy induces country A parents to save more, this increases $t = 1$ capital in both countries, raising the $t = 1$ wage and decreasing the rental rate of capital in both countries. While this induces the parents in country B to again set their bequests to zero, this has a small effect on their children's welfare since the low altruism parameter meant these requests, while positive, were already small. And this effect is small enough to be overwhelmed by the effect on welfare for the country B children by having a higher wage.

Effectively, for small time horizons, the effect of country A's tax policy on country B's capital stock and thus wage will leave the welfare effects of the tax on policy on future generations in country B ambiguous.

We next consider the effect of large T, and in particular focus on steady states. That is, suppose tax policy is such that not only do the conditions of Proposition (3) hold, there further exists a date $\bar{t}$ such that $\frac{1+\tau_{A,t}}{1+\tau_{A,t+1}}\frac{1}{1-\phi_t} = 1$ for all $t \geq \bar{t}$, and that $b_{i,t} = 0$ for all $t \geq \bar{t}$ and $i \in \{A, B\}$. That is, assume that eventually, country A sets the savings wedge to zero. This implies that if T is sufficiently large relative to $\bar{t}$, the time path of the economy becomes arbitrarily close to a steady state for an arbitrarily large number of periods. Let $(c_A^*, \ell_A^*, c_B^*, \ell_B^*, k_A^*, k_B^*)$ denote such a steady state. Then the welfare, including altruism towards descendants, of a household in country i at such a date is approximated by $\frac{1}{1-\beta}(u(c_i^*) - v(\ell_i^*))$, where c_i^* and ℓ_i^* are the steady state values for consumption and labor in country i.

Proposition 4. *Suppose $w_{A,\bar{t}} \equiv k_{A,A,\bar{t}} + k_{A,B,\bar{t}} > k_{B,A,\bar{t}} + k_{B,B,\bar{t}} \equiv w_{B,\bar{t}}$ (or households in country A are wealthier than households in country B when taxes become zero), and T is sufficiently large that the time path of the economy becomes arbitrarily close to a steady state, $(c_A^*, \ell_A^*, c_B^*, \ell_B^*, k_A^*, k_B^*)$, for an arbitrarily large number of periods. Next, let $(\bar{c}^*, \bar{\ell}^*, \bar{k}^*)$ denote the steady state for each country if taxes are set to zero at all dates $t \geq 0$. Then $u(\bar{c}^*) - v(\bar{\ell}^*) > u(c_B^*) - v(\ell_B^*)$.*

Proof. Consider the economy starting at date $\bar{t}$, and consider first an environment not only with zero taxes, but also no restrictions on negative bequests. The first order conditions of the planner's problem with respect to $c_{i,t}$, $c_{i,t+1}$, and $k_{i,t+1}$ imply

$$u'(c_{i,t}) = \frac{\Gamma_{i,t+1}}{\Gamma_{i,t}} f_k(k_{i,t+1}, \ell_{i,t+1}) u'(c_{i,t+1}),$$

while the first order conditions on the parent's maximization problem implies

$$u'(c_{i,t}) = \beta f_k(k_{i,t+1}, \ell_{i,t+1}) u'(c_{i,t+1}),$$

and thus $\Gamma_{i,t+1} = \beta\Gamma_{i,t}$. From the definition of $\Gamma_{i,t}$, $\Gamma_{i,\bar{t}+1} = \gamma_{i,\bar{t}+1} + \beta\gamma_{i,\bar{t}}$ and thus $\gamma_{i,\bar{t}+1} = 0$. Continuing, $\gamma_{i,\bar{t}+2} + \beta\gamma_{i,\bar{t}} + \beta^2\gamma_{i,\bar{t}} = \Gamma_{i,\bar{t}+2} = \beta\Gamma_{i,\bar{t}+1} = \beta\gamma_{i,\bar{t}} + \beta^2\gamma_{i,\bar{t}}$ implies $\gamma_{i,\bar{t}+2} = 0$, and so on.
So one can rewrite the planner's problem starting at date $\bar{t}$, putting all weight on agents born in this period, so future generations matter only through the altruism of those born at $\bar{t}$:

$$\max_{\{c_{i,t},\ell_{i,t},k_{i,t+1}\}_{t\geq\bar{t}+1}^{T}} \gamma_A \sum_{t=\bar{t}}^{T} \beta^{t-\bar{t}}(u(c_{A,t}) - v(\ell_{A,t})) + \gamma_B \sum_{t=\bar{t}+1}^{T} \beta^{t-\bar{t}}(u(c_{B,t}) - v(\ell_{B,t})),$$

subject to the sequence of resource constraints, where γ_A and γ_B are the planner weights put on the $t = \bar{t}$ generation in each country, and where $\gamma_A > \gamma_B$ is implied by $w_{A,\bar{t}} > w_{B,\bar{t}}$.
Taking the first order conditions with respect to $c_{A,t}$ and $c_{B,t}$ and dividing one by the other to eliminate the Lagrange multiplier on the resource constraint implies

$$\gamma_A u'(c_{A,t}) = \gamma_B u'(c_{B,t}), \tag{15}$$

for all t. Likewise, taking the first order conditions with respect to $\ell_{A,t}$ and $\ell_{B,t}$ and dividing one by the other to eliminate the Lagrange multiplier on the resource constraint implies

$$\frac{\gamma_A v'(c_{A,t})}{f_\ell(k_{A,t}, \ell_{A,t})} = \frac{\gamma_B v'(c_{B,t})}{f_\ell(k_{B,t}, \ell_{B,t})},$$

which simplifies to

$$\gamma_A v'(\ell_{A,t}) = \gamma_B v'(\ell_{B,t}), \tag{16}$$

since $f_\ell(k_{A,t}, \ell_{A,t}) = f_\ell(k_{B,t}, \ell_{B,t})$ from $f_k(k_{A,t}, \ell_{A,t}) = f_k(k_{B,t}, \ell_{B,t})$. That is, Cobb-Douglas production implies that when returns to capital are equated across the two assumed identical countries, returns to labor are equated as well. This then implies a constant ratio of the marginal disutility of labor at all dates equation (16) along with a constant ratio of the marginal utility of consumption across all dates equation (15).
Next, the first order conditions with respect to $c_{i,t}$, $c_{i,t+1}$ and $k_{i,t+1}$ (for $i \in \{A, B\}$) imply

$$u'(c_{i,t}) = \beta f_k(k_{i,t+1}, \ell_{i,t+1}) u'(c_{i,t+1}). \tag{17}$$

Likewise, the first order conditions with respect to $c_{B,t}$ and $\ell_{B,t}$ imply the intratemporal condition

$$u'(c_{B,t})f_\ell(k_{B,t},\ell_{B,t}) = v'(\ell_{B,t}). \tag{18}$$

(The correspondent intratemporal condition for country A is implied by (15), (16), (17), and (18).)
Equations (15), (16), (17), and (18) along with the steady state resource constraint define six steady state conditions for the six steady state variables $(c_A^*, \ell_A^*, c_B^*, \ell_B^*, k_A^*, k_B^*)$:

$$\gamma_A u'(c_A^*) = \gamma_B u'(c_B^*),$$

$$\gamma_A v'(\ell_A^*) = \gamma_B v'(\ell_B^*),$$

$$1 = \beta\, f_k(k_A^*, \ell_A^*), \tag{19}$$

$$1 = \beta\, f_k(k_B^*, \ell_B^*), \tag{20}$$

$$u'(c_B^*)f_\ell(k_B^*,\ell_B^*) = v'(\ell_B^*),$$

and

$$c_A^* + c_B^* + k_A^* + k_B^* = f(k_A^*,\ell_A^*) + f(k_B^*,\ell_B^*).$$

Next, let (w_A^*, w_B^*) denote the steady state wealth levels of the economy with no negative bequest constraints, where $w_i^* = k_{i,A}^* + k_{i,B}^*$. These are pinned down by market clearing condition

$$w_A^* + w_B^* = k_A^* + k_B^*, \tag{21}$$

and the budget constraint for agents in country B,

$$c_B^* + w_B^* = f_\ell(k_B^*,\ell_B^*)\ell_B^* + f_k(k_B^*,\ell_B^*)w_B^*. \tag{22}$$

(The budget constraint for agents in country A is implied by (21) and (22)).
Suppose $u(c_B^*) - v(\ell_B^*) \geq u(\overline{c}^*) - v(\overline{\ell}^*)$. Then either $c_B^* \geq \overline{c}^*$, or $\ell_B^* \leq \overline{\ell}^*$. But since

$$\frac{v'(\ell_B^*)}{u'(c_B^*)} = f_\ell^* = \frac{v'(\overline{\ell}^*)}{u'(\overline{c}^*)},$$

if $c_B^* \geq \overline{c}^*$, then $\ell_B^* \leq \overline{\ell}^*$, and if $\ell_B^* \leq \overline{\ell}^*$, $c_B^* \geq \overline{c}^*$. Thus $c_B^* \geq \overline{c}^*$ and $\ell_B^* \leq \overline{\ell}^*$. Further, if $\gamma_A > \gamma_B$, then $u'(c_A^*) < u'(c_B^*)$, thus $c_A^* > c_B^*$. Likewise, $\gamma_A > \gamma_B$ implies $v'(\ell_A^*) < v'(\ell_B^*)$, which implies $\ell_A^* < \ell_B^*$. Thus $c_A^* > c_B^* \geq \overline{c}^*$ and $\ell_A^* < \ell_B^* \leq \overline{\ell}^*$.
Next note equations (19) and (20), and their counterpart when $\gamma_A = \gamma_B$ imply $k_A^*/\ell_A^* = k_B^*/\ell_B^* = \overline{k}^*/\overline{\ell}^*$. That is, the steady state equations pin down the steady state capital/labor ratio in both countries independent of γ_A and γ_B. This then implies $f_k(k_A^*,\ell_A^*) = f_k(k_B^*,\ell_B^*) = f_k(\overline{k}^*,\overline{\ell}^*)$ and $f_\ell(k_A^*,\ell_A^*) = f_\ell(k_B^*,\ell_B^*) = f_\ell(\overline{k}^*,\overline{\ell}^*)$. Since $\ell_A^* < \ell_B^* \leq \overline{\ell}^*$, fixed capital/labor ratios imply $k_A^* < k_B^* < \overline{k}^*$, and thus

$k_A^* + k_B^* < 2\overline{k}^*$.

Finally, consider the steady-state budget constraints at equality for countries A and B, as well as the symmetric case when $\gamma_A = \gamma_B$, where f_k^* and f_ℓ^* are the common returns on capital and labor:

$$c_A^* + w_A^* = f_\ell^* \ell_A^* + f_k^* w_A^*, \tag{23}$$

$$c_B^* + w_B^* = f_\ell^* \ell_B^* + f_k^* w_B^*, \tag{24}$$

and

$$\overline{c}^* + \overline{k}^* = f_\ell^* \overline{\ell}^* + f_k^* \overline{k}^*. \tag{25}$$

Adding (23) and (24) and subtracting two times (25), using (21) and $f_k^* = \frac{1}{\beta}$, delivers

$$k_A^* + k_B^* - 2\overline{k}^* = \frac{\beta}{1-\beta}((c_A^* + c_B^* - 2\overline{c}^*) - f_\ell^*(\ell_A^* + \ell_B^* - 2\overline{\ell}^*)).$$

Since $c_A^* + c_B^* > 2\overline{c}^*$ and $\ell_A^* + \ell_B^* < 2\overline{\ell}^*$, $k_A^* + k_B^* > 2\overline{k}^*$, a contradiction. Thus the result is proved if the continuation equilibrium at $\overline{t}$ features non-negative bequests even when negative bequests are allowed. Suppose instead no-negative-bequest restriction binds in the continuation equilibrium from $\overline{t}$. Here, consider the continuation equilibrium from the steady state itself. If the no-negative-bequest restriction binds in the steady-state, then $w_B^* = 0$ and the same argument applies. If the no-negative-bequest restriction does not bind in steady state, consider the the continuation equilibrium from the last day it binds, where again wealth is zero for country B households. Again the same argument applies.

□

The intuition behind the proposition is that in all steady states, the marginal product of capital in both countries is pinned down by the steady condition $f_k(k_i^*, \ell_i^*) = 1/\beta$. That is, regardless of whether the global steady state is one where country A is rich and country B is poor, or one where they both have the same wealth, the marginal product of capital in both countries is $1/\beta$. But then from the assumption that $f(k, \ell) = zk^\alpha \ell^{1-\alpha}$ (and thus $f_k(k, \ell) = \alpha z(\frac{k}{\ell})^{\alpha-1}$), this pins down the capital/labor ratio for both countries in all steady states. Finally, since $f_\ell(k, \ell) = (1-\alpha)z(\frac{k}{\ell})^\alpha$, this implies steady state wages are the same for both countries in all steady states. Thus if country A enacts a temporary consumption tax policy to make later generations in country A wealthier, eventually this has no effect on wages in country B, but continues to have effects on wealth levels in country B, making steady state welfare in country B worse than if no country had ever taxed.

7 Current Account Deficits as a Potential Cause of Government Budget Deficits

In the paper so far, government budget deficits are exogenous since government debt levels $b_{i,t}$ are exogenous. Further, as discussed in Section 5, Ricardian equivalence holds if bequests are always positive. But notably, Ricardian equivalence does not hold if bequests in country i are zero.

In this section, using a two period example, I argue that the tax policy in country A can induce a desire by $t = 0$ parents in country B for a government budget deficit. Thus, in this limited sense, domestic consumption suppressing tax policies in country A can *cause* a budget deficit in country B if the $t = 0$ budget deficit in country B, rather than being exogenous, instead reflect the preferences of the $t = 0$ citizens of country B.

This can be seen by considering the first two-period example of Section 6. In that example, when debt and taxes in both countries are zero at both dates, parents in both countries leave positive bequests. But also in that example, when country A sufficiently taxes consumption (and subsidizes labor) at $t = 0$, bequests in country B fall to zero — the non-negativity constraint on bequests in the parent's optimization problem binds. Put differently, if the parents in country B could leave a negative bequest, they would, since in that example

$$u'(c_{B,0}) > \beta r_{B,1} u'(c_{B,1}).$$

Here, the left hand side is the gain to the parent, while the right hand side is the loss *to the parent*, of leaving a small negative bequest (starting from zero).

But then note, if the government of country B leaves consumption and labor subsidies unchanged at zero, but marginally increases beginning of second period debt, $b_{B,1}$, this increases the first period lump sum transfer to $t = 0$ citizen of country B (from equation (8)) by $Q_{B,0}$, the $t = 0$ price of country B debt. From the first order conditions of the country A parents (who are not against any corners and can invest both country B capital and country B debt), $Q_{B,0} = 1/r_{B,1}$. Thus the gain to country B parents of marginally increasing $b_{B,1}$, $u'(c_{B,0})/r_{B,1}$, exceeds the loss to the country B parents, $\beta u'(c_{B,1})$. In words, because of the tax policy of country A, country B parents prefer their own government to run a budget deficit at date $t = 0$ since it loosens their binding non-negative bequest constraint.

8 Conclusion

This paper makes the following simple point: under standard growth model assumptions and open capital markets, consumption suppressing policies in one country move the world's economy along the appropriately defined Pareto frontier. To the extent that these policies raise capital levels in all countries, later generations in countries where consumption is not suppressed benefit through higher wages, but suffer due to lower bequests induced through lower worldwide rates of return on capital. For a long enough time horizon, only the latter effect matters: consumption suppressing policies in one part of the world hurt future generations in the rest of the world, and lead to an obvious conclusion: To the extent the rest of world puts weight on the welfare of their future generations, policies to combat such policies may be warranted.

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