Economic Versus Political Symmetry and the Welfare Concern with Market Integration and Tax Competition

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Final Version: July 2001
forthcoming in *Journal of Public Economics*

Abstract

The paper studies the implications of increased capital market integration and the associated increased tax competition for world welfare. We consider a population with heterogenous endowments of capital in a model of redistributive politics. We show that if countries have the same average capital endowments but differ with respect to the endowments of their decisive majority, autarky may be socially preferred to integration under any aversion to inequality. We then reverse the conclusion by assuming that the decisive majority has the same endowment but countries differ in their average capital endowments. In proving these results we show that integration may decrease world output and increase the utility of the poorest members of the economy.

JEL Classification: D78, H23, H77

1 Introduction

Surely, a key feature of the world economy in the twentieth century has been increased economic integration of international markets. The mobility of factors and goods has been enhanced as new technologies have dramatically reduced transportation and communication costs and as institutional or political barriers to that mobility have fallen. It is then not surprising that one of the important themes in the media and the economics literature is about the consequences of a globalized economy on the economic structure of our societies.

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For most economists integration of international markets is viewed as a desirable development. At its core, it is about individuals exploiting mutually beneficial gains from trade with the obvious potential for the enhancement of efficiency. But increased integration also implies increasingly mobile tax bases, and as pointed out by Edwards and Keen (1996), this in turn raises the prospect of increasingly fierce international tax competition as national authorities attempt to expand their tax base by offering more favourable tax treatment. It has been argued that as tax rates are reduced to avoid flight of the tax base, the ability of national governments to provide public services and to undertake redistribution at traditional levels is threatened.

The competition for mobile capital is considered by some authors as one of the greatest dangers to the survival of the welfare state. Sinn (1994), for example, predicts an European Union where "...fiscal competition will wipe out redistributive taxes on mobile factors and reduce the tax system to mere benefit taxation".[1] He argues that the losers will include immobile workers who will bear a larger share of taxation and the poor who will lose because governments will not be able to maintain their current scales of redistribution.

The theoretical literature on capital tax competition is voluminous and began with the ideas of Hamada (1966) and Oates (1972), and the works of Wilson (1986), Zodrow and Mieszkowski (1986), and Wildasin (1988). This research largely supports the view that capital tax competition may lead to inefficiencies and reduce redistribution. The logic is simple. Imagine countries non-cooperatively choosing taxes on freely-mobile locally-employed capital to finance a uniform public service. As discussed in Wildasin (1988), when a government of one country considers increasing its tax rate in accounting for the capital flight it does not consider the benefit of increased tax base in the competing countries (a beneficial externality). Thus each country chooses a tax in equilibrium such that Pareto improvements are possible by a coordinated increase in tax rates and benefit levels.[2]

We consider a positive model of redistribution in the presence of fiscal competition. Capital and domestic labour are combined to produce a composite good. In each country, the redistributive policy consists of a tax on locally employed capital and a

[1] For antidotal evidence of tax competition, see Edwards and Keen (1996). The concern amongst policy practitioners that capital market integration intensifies tax competition is also evident in the policy coordination guidelines recently issued by the OECD and the EU [see OECD (1998) and European Commission (1998)].

[2] We refer the reader to a recent survey by Wilson (1999) which provides many references.

uniform benefit for redistribution and is democratically chosen by its self-interested inhabitants. By assumption, a country's decisive majority is endowed with less than the country's per capita capital stock which is well in line with empirical evidence. The model is designed to lead to stark redistributive politics which captures the redistributive concern above, to the extreme. Specifically, in the absence of integration (i.e., autarky) the equilibrium will involve expropriative capital taxation, full redistribution, and complete equality within a country. From this simple benchmark we study the integration of capital markets and determine equilibrium tax policies and the implied allocation in the capital tax competition game. On the distributional side the taxation of capital normally declines due to the voters' worry about capital flight. As a consequence, the equilibrium is characterized by fiscal competition in the sense that a (capital poor) majority in each country could be made better off by a coordinated increase in capital taxes. The logic is exactly the bidirectional beneficial externality discussed above.

Yet, in our opinion, the question which is not fully addressed in the existing literature is whether we should therefore be concerned about this "collapse" of the welfare state. This short paper focuses on this question. One might imagine that an answer would depend on the theory of justice — if the primary criteria is wealth maximization then integration may be desirable and if the primary criteria is helping the poor then integration may be undesirable. But this need not be the case. On one hand, we show that if countries are symmetric in their per capita endowments of capital but differ in the capital endowment of their decisive majority then autarky is socially preferred to integration under any world welfare function, in particular, the result holds for any aversion to inequality. On the other hand, we show that if countries are asymmetric in their per capita endowment of capital and symmetric in the capital endowment of their decisive majority then integration can be socially preferred to autarky under any aversion to inequality. In the process we also demonstrate that with a political equilibrium model of tax competition integration can reduce world output (which is necessary for autarky to dominate integration at a zero aversion to inequality) and can help the poorest individuals in the economy (which is necessary for integration to dominate under an infinite aversion to inequality).

The remainder of the paper is organized as follows. Section 2 lays out the model and characterizes equilibrium outcomes under autarky (Subsection 2.1) and integration (Subsection 2.2.), respectively. The welfare comparison is considered in Section 3. We briefly discuss the results and possible extensions of the model in a concluding Section 4.

2 The Model

Consider an economy that consists of two countries $j = 1, 2$, inhabited by a continuum of individuals who derive income from their factor endowments. While everybody inelastically supplies one unit of labour, individuals differ in their endowment k^i of capital. For simplicity, we assume that there are only two groups $i \in \{P, R\}$ of capital owners in each country with $k_j^P < k_j^R$.[3] In autarky capital can only be invested at home while with market integration it can costlessly be invested wherever the after–tax return is highest. Alternatively, capital owners may decide not to invest their capital at all (free disposal) if they incur losses. For simplicity, we assume that individuals are immobile and that the population (labour supply) is the same in both countries. Labour and capital are used as inputs in the production of the composite and numeraire commodity c by competitive firms. Both countries have access to a constant returns to scale production function which written in per-capita terms is $y_j = f(k_j)$ where y_j and k_j denote per capita output and per capita capital employed in j, respectively. We further assume that $f'(k_j) > 0$, $f''(k_j) < 0, f'''(k_j) \geq 0$.[4] The first–order conditions for profit maximizing imply that factors are paid the marginal product for capital $r_j(k_j) \equiv f'(k_j)$ and using the zero profit condition the wage, $w_j(k_j) = f(k_j) - r_j(k_j)k_j$.

A country's policy (t_j, g_j) consists of a source–based tax t_j on each unit of capital employed in j and a uniform per–capita grant g_j that redistributes public revenues among the residents of j. Accordingly the public budget constraint expressed in per–capita terms is

$$g_j \leq t_j k_j. \tag{1}$$

Policies are determined by majority vote of the inhabitants of country j. The timing is as follows: in the first stage, the inhabitants of each country j simultaneously vote on a tax rate t_j. In the second stage, individuals simultaneously decide whether and, if investment abroad is feasible, where to invest their capital. Finally firms hire factors

[3] Extending the model to continuous distributions of capital is straightforward. We will discuss this in our concluding section.

[4] The assumption on the third derivative of $f(.)$ is necessary to ensure the equilibrium existence in the fiscal-competition game [see Laussel and Le Breton (1998)]. It is satisfied by all specifications frequently used in the literature such as Cobb-Douglas, quadratic or exponential production functions.

and produce, residents receive their factor incomes, pay taxes, collect social benefits, and consume. An equilibrium must therefore satisfy the following conditions: a) given the tax policy in the other country, the implemented tax policy is preferred to any other by a majority in each country (political equilibrium); b) investment decisions are optimal given tax rates (t_1, t_2) and c) markets clear.

Using the fact that (1) will be always be binding, we can rewrite the consumption (income) of a country j citizen who belongs to group i and has invested at home as

$$\begin{aligned} c_j^i &= w_j(k_j) + [r_j(k_j) - t_j]k_j^i + t_j k_j \\ &= f(k_j) - [r_j(k_j) - t_j][k_j - k_j^i] \end{aligned} \tag{2}$$

where the last equality follows from $w_j(k_j) = f(k_j) - r_j(k_j)k_j$. To facilitate our subsequent welfare analysis, we assume that (2) also measures the utility of the respective individual.

Let $\bar{k_j}$ be the per–capita endowment of capital and k_j^m be the capital endowment of the group that is in a majority in country j. The economy-wide average capital endowment is denoted by $\bar{k}$. In the remainder, we assume that the (capital) poor are in a majority in both countries and that their endowment falls short of the average capital stock in the economy:

Assumption: $k_j^m = k_j^P$ and $k_j^m < \bar{k}, \quad j \in \{1, 2\}$

This assumption is well in line with empirical evidence. As the first part implies $k_j^m < \bar{k_j}$, it ensures that redistributive taxation will be supported by the (capital-poor) majority both within each country and for the economy as a whole. The political equilibrium now simply involves maximizing (2) for the majority group $i = P$, $j = 1, 2$.[5]

2.1 Autarky

Under autarky all individuals must invest at home so that $k_j = \bar{k_j}$. The most preferred tax rate of the majority in country j is the solution to

$$\max_{t_j} \; f(\bar{k_j}) - [r_j(\bar{k_j}) - t_j][\bar{k_j} - k_j^m],$$

[5] Note that (2) continues to hold if a group i individual has invested his capital abroad because net returns to capital $r_j - t_j$ have to be equalized in equilibrium.

subject to the constraint that the after-tax return to capital, $\rho_j = r_j(\bar{k_j}) - t_j$, is non-negative.[6] Because the objective function is monotonically increasing in t_j, the political equilibrium under autarky involves expropriative taxation of capital or

$$t_j^A = r_j(\bar{k_j}) \qquad \text{and} \qquad c_j^{iA} = f(\bar{k_j}) \tag{3}$$

for all $i \in \{P, R\}$ and $j \in \{1, 2\}$. Although this outcome under autarky is extreme it will serve as a useful benchmark for welfare comparisons to integration. Because it is characterized by complete redistribution within a country it will allow us to capture the concern about the breakdown of the welfare system under integration and the ensuing capital tax competition in full.[7]

2.2 Integration

Now suppose that individuals can freely and costlessly invest their capital in either country. Since capital is perfectly mobile, its net return must be equal across countries in an equilibrium at the investment stage or

$$\rho = r_1(k_1) - t_1 = r_2(k_2) - t_2. \tag{4}$$

As long as all capital is employed, i.e., $[k_1 + k_2]/2 = \bar{k}$ where $\bar{k}$ is the economy wide average capital stock, (4) uniquely determines the capital stock in each country, $k_j(t_1, t_2)$, and the equilibrium net return, $\rho(t_1, t_2)$, as a function of the tax rates.[8] Implicitly differentiating (4) yields the investment responses for $\rho \geq 0$

$$\frac{\partial k_j(t_1, t_2)}{\partial t_j} = \frac{1}{[f''(k_1) + f''(k_2)]} < 0. \tag{5}$$

[6] This constraint follows from our assumption of free disposability. Note that if $\rho_j = r_j(\bar{k_j}) - t_j < 0$, capital owners would withdraw their capital from the market until $\rho_j = r_j(k_j) - t_j = 0$ holds again. Due to $k_j < \bar{k_j}$, the consumption (2) of all individuals would be $c_j^i = f(k_j) < f(\bar{k_j})$. Since a tax rate $t_j = r_j(\bar{k_j})$ would be unanimously preferred, such a situation cannot be an equilibrium.

[7] The simplifying abstraction which leads to expropriative taxation is the assumption that capital is a fixed endowment and the resulting lump–sum nature of taxation in autarky. Due to the distortion of savings decisions and other costs of government taxation the marginal costs of public funds may exceed unity [see Persson and Tabellini (1992) and Perotti (1993) for formalizations along this line]. The numerical examples in Appendix 2 allow for a specific cost to taxation so that taxes are not expropriative and show that our qualitative results continue to hold.

[8] A formal argument why there can be no equilibrium where $[k_1 + k_2]/2 < \bar{k}$ (the capital stock is not fully utilized) can be found in Appendix 1.

Accordingly,

$$\frac{\partial\rho(t_1,t_2)}{\partial t_j} = -\frac{f''(k_h)}{f''(k_1)+f''(k_2)} = \frac{\partial r_j(t_1,t_2)}{\partial t_j} - 1 \in (-1,0). \tag{6}$$

The equilibrium tax rate in country j is now determined by

$$\max_{t_j}\ f(k_j(t_1,t_2)) - \rho(t_1,t_2)[k_j(t_1,t_2) - k_j^m], \quad t_h \text{ given},\ j \neq h,\ j,h \in \{1,2\} \tag{7}$$

subject to (4), $[k_1 + k_2]/2 = \bar{k}$ and $\rho(t_1,t_2) \geq 0$. Using (5) and (6), the first–order conditions can be written as

$$t_j = -f''(k_h(t_1,t_2))[k_j(t_1,t_2) - k_j^m], \quad j \neq h,\ j,h \in \{1,2\}. \tag{8}$$

Under our assumptions, equation (8) implicitly defines a single valued and increasing best–response function $t_j^{br}(t_h)$ which is valid for $\rho(t_j^{br}(t_h),t_h) \geq 0$. Otherwise, the solution to (7) is uniquely given by $t_j^{br}(t_h) = r_j(t_1{,}t_2) = f'(k_j(t_1,t_2))$, where k_j is derived according to (4) with $[k_1 + k_2]/2 = \bar{k}$.[9]

In both cases, $t_j^{br}(t_h)$ is the unique best reply of the electorate in country j to the policy t_h chosen by the electorate in the other country. The equilibrium tax rates (t_1^*, t_2^*) can be found at a point where the reaction functions intersect. Once those are determined, all other variables are determined and will be denoted by superscript $*$ in what follows.

3 Welfare Comparison

3.1 Economic Symmetry and Political Asymmetry

For some economists it would be taken as obvious that there are efficiency benefits to integration of world capital markets. After all integration simply allows individuals to exploit gains from trade.

Proposition 1. *Suppose countries have the same per-capita capital stock but differ in the capital endowment of the decisive majority. Then, there exists a unique equilibrium under integration, which is characterized by $t_1^* \neq t_2^*$. Hence, autarky is socially preferred to integration under any individualistic world welfare function satisfying anonymity.*

[9] Note that in this case, $t_j^*(t_h)$ is decreasing in t_h. A derivation of the best reply functions and their properties is provided in Appendix 1.

Proof. The maximization of world output requires $r_1(k_1) = r_2(k_2)$ or identical capital to labour ratios, $k_1 = k_2 = \bar{k}$. Now consider $\bar{k_j} = \bar{k}$ for all j and without loss of generality $k_1^m > k_2^m$. Autarky maximizes world output and leads to complete equality, that is, an equalitarian allocation, see (3). The equilibrium with integration does not a) maximize world output or b) lead to complete equality:[10]

a) Assume that the equilibrium with integration did maximize output, i.e., $k_1 = k_2 = \bar{k}$. Then $r_1(k_1) = r_2(k_2)$ implies $t_1^* = t_2^*$ by (4). In the appendix, we show that for $k_1^m > k_2^m$, there can be no equilibrium where $\rho^* = 0$ and $k_1 = k_2 = \bar{k}$. If $\rho^* > 0$, $k_1 = k_2 = \bar{k}$ implies $k_1^m = k_2^m$ from(8)—a contradiction to $k_1^m > k_2^m$.

b) Under our assumption $\bar{k_j} > k_j^m$, there is inequality within a country for $\rho^* > 0$. Given $k_1^* \neq k_2^*$, if $\rho^* = 0$ there is inequality across countries as $f(k_1^*) \neq f(k_2^*)$.

The equilibrium utility profile under autarky is along the equal utility line and characterized by a higher total utility than under integration. Autarky is therefore socially preferred under any individualistic world welfare function satisfying anonymity.[11] ■

The logic of the result is simple: there is no efficiency or distributional benefit of integration when $\bar{k_j} = \bar{k}$ for all j. Conversely, there is an efficiency loss as the different political objectives of the majority will distort the allocation of capital with unequal capital taxes [see (8)] and a distributional cost through the reduced control of capital taxes by the voters due to their accounting for capital flight.

On first thought, a primary benefit of integration would seem to lie in increased world output. If output increases as a consequence of integration, it must be socially preferred with a sufficiently low aversion to inequality. That opening borders to capital flows can actually reduce world output may seem unusual because the result requires that capital flows in the wrong direction from an efficiency perspective. Thus, even given the finding above, one might wonder about its robustness. It turns out that the result is only unusual from the perspective of the type of model frequently used in the existing capital tax competition literature. Consider a homogeneous population within each country and governments that are benevolent (maximize national income). A useful feature of our model is that it contains that model as a special case: let $k_j^i = \bar{k}_j$ for all $i \in \{P, R\}$, i.e., the population is homogeneous within each country. The objective in (2) is then proportional to national income. In this case capital will not move in the wrong direction with integration, that is, if country 1 is capital

[10] For a complete proof of existence and uniqueness, see Appendix 1.
[11] The role of anonymity is discussed below.

abundant or $\bar{k}_1 > \bar{k}_2$ then country 1 will not import capital or $k_1^* \le \bar{k}_1$. To see this, suppose $k_1^* > \bar{k}_1$. Then using $[k_1 + k_2]/2 = \bar{k} = [\bar{k}_1 + \bar{k}_2]/2$, we have $k_2^* < \bar{k}_2$ and $r_1(k_1^*) < r_2(k_2^*)$. The latter implies $t_1^* - t_2^* < 0$ by (4), which is inconsistent with equilibrium because from (8) with $k_j^m = \bar{k}_j$, the exporter subsidizes capital ($t_2 < 0$) and the importer taxes capital ($t_1 > 0$) in the attempt at manipulating the terms of trade, ρ. But once the model is generalized to allow for a heterogeneous population with redistributive and democratically chosen policies, that is no longer true. What is important for the political equilibrium is the factor endowment of a country's decisive majority (its median voter), not its mean endowment.

In Appendix 2 we offer an example where $\bar{k}_1 \neq \bar{k}_2$ and $k_1^P \neq k_2^P$ (countries and decisive majorities are asymmetric). The example specifies a Cobb–Douglas production function and also considers costs of taxation so that taxes in autarky are not expropriative. Still, integration reduces output because capital flows in the wrong direction and autarky is socially preferred to integration under any aversion to inequality.

3.2 Economic Asymmetry and Political Symmetry

For other economists it would be taken as obvious that there are distributional costs associated with the integration of world capital markets. After all the potential for capital flight leads to an incentive to cut capital taxes and levels of redistribution.

Define

$$\widehat{k} \equiv \bar{k} + f'(\bar{k})/f''(\bar{k}) < \bar{k}.$$

Proposition 2. *Suppose countries differ with respect to their per-capita capital endowments but are symmetric in the endowment of the decisive majority. If* $k_j^m \ge \widehat{k}$, *the unique equilibrium under integration is characterized by* $k_1^* = k_2^* = \bar{k}$ *and* $t_1^* = t_2^*$, *and involves* $\rho^* \to 0$ *as* $k_j^m \to \widehat{k}$. *If* $k_j^m < \widehat{k}$, *we have* $\rho^* = 0$ *and there is always an equilibrium with* $k_1^* = k_2^* = \bar{k}$. *Therefore, there exists a critical value* $k^{max} \in (\widehat{k}, \bar{k})$ *with* $\rho^* > 0$ *such that if the majority in each country has less capital than* k^{max}, *integration is socially preferred to autarky under any individualistic world welfare function satisfying anonymity.*

Proof: Suppose $k_1^m = k_2^m$ so that the reaction functions are symmetric. If $\rho^* > 0$, they cross only once and the first-order conditions (8) must hold for both countries at $t_1^* = t_2^* = t^*$ and $k_1^* = k_2^* = \bar{k}$. Hence,

$$t^* = -f''(\bar{k})[\bar{k} - k_j^m] < r^* = f'(\bar{k}) \quad \Leftrightarrow \quad k_j^m > \widehat{k}.$$

If $k_j^m = \widehat{k}$, there is again a unique intersection where both countries set a common tax rate $t^* = r^*(\bar{k})$. Finally, if $k_j^m < \hat{k}$, the reaction functions no longer intersect over the range where both are positively sloped. Then, there is a continuum of equilibria, including the symmetric equilibrium where $t_j^* = t^* = r^*(\bar{k})$ holds (see Appendix 1 for details).

Under autarky there is inequality between countries and world output is not maximized. For symmetric endowments of the majority in each country $k_j^m \leq \widehat{k}$, there always exists a symmetric equilibrium under integration in which the utility profile is along the equal utility line and characterized by a higher total utility than under autarky. Integration is then *strictly* preferred to autarky under any individualistic world welfare function satisfying anonymity. By continuity, then, this must still be true for capital endowments k_j^m larger than, but close to, $\widehat{k}$ (implying $\rho^* > 0$) and the result follows.■

The logic of the result is that there are potential efficiency benefits of integration when $\bar{k_1} \neq \bar{k_2}$ and there is no inefficiency loss as symmetric median voters do not distort the allocation of capital with unequal capital taxes. Further, if the capital endowment of the poor majority is sufficiently small (the political will to redistribute sufficiently large), integration and the associated fiscal competition effect does not give rise to distributional costs. This latter point requires some explanation. Even though there is loss of control over capital taxes by the decisive voters with integration, in particular, the conventional logic of capital taxes being too low from the perspective of a majority is correct, we may still approach expropriative taxation in the unique equilibrium. This happens if the redistributive incentive of the capital poor majority is very pronounced, i.e., if k_j^m approaches the lower bound $\widehat{k}$.[12] If k_j^m falls below $\widehat{k}$, the incentive is so strong that the upper bound on taxes (due to free disposability) becomes binding and we always have 100% taxation. This is obviously a stark conclusion that may not survive in more general models. But as stated in the Proposition, expropriative taxation is not required: for values k_j^m larger than (but close to) $\widehat{k}$, we have $\rho^* > 0$. Nevertheless, integration is socially preferred to autarky even when society is very concerned with inequality. The reason is that besides the efficiency effects and the loss of redistributive

[12]Note, however, that $\widehat{k}$ as defined above need not be positive for all conceivable production functions and parameter values, i.e., the full-taxation equilibrium does not always exist. In the case of a CES-technology, for instance, it is easily verified that $\widehat{k} \geq 0$ only if the elasticity of substitution is sufficiently low.

power for the poor with integration there is a third effect which can make integration beneficial from a distributional point of view. Consider an infinite aversion to inequality (Rawlsian) and the fact that the poorest individuals in the economy (the poor in the poor country) can be helped by integration due the inflow of capital and the correspondingly higher wages.

In Appendix 2 we provide an example where $k_1^m \neq k_2^m$ and $k_1^P \neq k_2^P$ (countries and majorities differ). The parameter values are such that $k_j^P > \widehat{k}$ so $\rho^* > 0$ and integration is socially preferred to autarky for any aversion to inequality. In the example, the relatively rich country has a relatively wealthy (poor) majority and exports capital with integration. It can be shown (see below) that the majority in the rich country must be worse off with integration, it sees its wages drop and loses some control over redistribution. Nevertheless the result is consistent with Proposition 2 – no matter your aversion to inequality integration is socially preferred to autarky. But notice if you were nationalist (of the rich country) and your ethics involved a significant degree of aversion to inequality you could conclude that integration was not a good policy. The reason why our result still holds is that the poorest individuals in the economy (the poor in the poorer country) are better off under integration and because of the anonymity axiom we employ. This most basic social choice axiom rules out greater social weight on an individual based on ethically arbitrary accidents of birth such as sex and race. In ruling out racism and sexism as ethically untenable principles, it also rules out place of birth, that is, nationalism as ethically untenable.[13]

4 Conclusion, Discussion, and Extensions

While integration of markets is about individuals exploiting gains from trade it is also about the political determination of the barriers to that trade. So besides the obvious potential for efficiency enhancing integration there is also the possibility that integration can hinder efficiency. Further, besides the potential for a race to the bottom and its impact on inequality in our societies, integration may increase the well–being of the poorest in the poor countries by increasing the amount of capital with which they work. Thus there are simple trade–offs on both efficiency and distributional grounds in considering the consequences of increased integration for welfare.

This paper has studied the implications of these trade–offs. We have considered

[13] Of course, this does not say that nationalism will not affect feasibility and, hence, social choices.

two countries with heterogeneous populations which pursue democratically chosen redistributive policies. How world welfare was affected by integration was shown to depend on how much the countries differ with respect to their economic and political conditions. In particular, if they share the same per-capita factor endowments, but differ with respect to the endowments of their decisive majority, autarky may be socially preferred to integration under any aversion to inequality. Conversely, if the decisive majority has the same endowment but countries differ in their average capital endowments, integration may be socially preferred to autarky under any aversion to inequality.

The framework in which our results were derived could be extended in several directions. First, the assumption that there are only two groups of capital owners in each country can easily be relaxed. Indeed, because the only country-specific parameters of the distribution that matter for the analysis are average and median endowments, our results immediately carry over to more general (non-degenerate) distributions. To see this, note that given the specific structure of individuals' preferences, the voter with median capital endowment k_j^m in each country will be decisive.[14] If we continue to realistically assume $k_j^m < \bar{k}_j$ and $k_j^m < \bar{k}$ for $j \in \{1, 2\}$, equilibrium policies are still characterized by (3) and (8), and the properties of the respective equilibria are unchanged. Moreover, an equilibrium that involves complete equality and maximal world output can still be used as a suitable reference point for the welfare analysis. Hence, both Propositions 1 and 2 fully apply.

Second, we have assumed that countries conduct purely redistributive politics, which allowed us to focus on the redistributive concern with globalization. A natural extension would be to consider more general public good provision.[15] Suppose we add a separate, publicly supplied good G_j with $MRT = 1$ and $U(c_j^i, G_j)$ where $c_j^i = w_j + [r_j - t_j][k_j - k_j^i] + g_j$ and $G_j = t_j k_j - g_j$, then along with the redistributive incentive to use capital taxes there would be an incentive to get the right mix of public and private expenditure. The latter objective could be achieved by using g_j as uniform head subsidy (tax), which leaves the majority free to use the capital tax for purely

[14] Since the utility function (2) is linear in the parameter k^i, it belongs to the class of intermediate preferences as defined by Grandmont (1987). For this type of preferences, the majority rule preference relation coincides with the preference relation of the median voter [for a formal proof in the present context, see Kessler et al. (1998)]. The analysis in the Appendix then continues to apply.

[15] Note that per-capita transfers g_j are an extreme case of a publicly provided good that is a perfect substitute for the private good.

redistributive reasons. If, on the other hand, the transfer g_j is no longer available when G_j is provided then there would be two targets (redistribution and the public/private mix) but only one tax instrument, the capital tax t_j. In this case the stark nature of our results would clearly be mitigated. In particular, taxation would not necessarily be expropriative under autarky because that would normally imply too much public good. Similarly, there would be a reduced incentive to cut capital taxes in response to integration and fiscal competition because that could imply too little public good.

Third, countries were assumed to be symmetric in their labour endowments. Although differences in labour endowments are of no consequence for Proposition 1, they will matter for the result in Propostion 2 for the following reason. In a traditional model of capital tax competition (with homogeneous population within countries and a public good) Bucovetsky (1991) and Wilson (1991) show that the smaller country, in terms of labour endowment, sets a lower equilibrium tax rate than the larger country. In this case, the small country could even win the tax competition "war" in the sense that it could be better off at the inefficient non-cooperative equilibrium than at the free trade allocation (with equal marginal products of capital and Samuelson conditions). Translated to our framework, these findings suggest that if countries differ in their labour force, the welfare consequences of integration are ambiguous even if other determinants of the electorate's political will (the capital endowment of the decisive majority) are equal. Specifically, integration may now be detrimental to world output and to the poor majority in the larger country, which highlights the importance of sufficiently similar political conditions across countries for integration to be beneficial from a normative point of view. A full-fledged analysis of this generalization is beyond the scope of the present paper, however.

Our analysis has attempted to provide some new insight or perspective on the ongoing normative globalization debate. But the related positive question is also of interest. Under which conditions could we expect a majority in each country to favour capital market integration? One way to address this issue in the present model could be to add a constitutional stage were the policy instruments are exogenous and you integrate if and only if there is a plurality in both jurisdictions. In this overly simple framework, it can be show that countries never integrate. The reason is that the poor majority in the region which exports capital is always worse off. There are three effects: they lose some control over the rich in their jurisdiction due to the fiscal competition; they have less capital to work with so they get lower wages; and they gain in after–tax capital income. But the latter and sole beneficial effect can be shown to never dominate.[16] So the conclusion would be that autarky is chosen if it is good (Proposition 1), but integration is not chosen even if it is good (Proposition 2). Yet, one should not place too much emphasis on this conclusion because doing so would mean to over interpret results from a model not designed or equipped for these questions. Constitutional negotiations are complicated political processes; they are not only about who you partner with, they are also about endogenous constitutional restrictions on policy instruments and on the nature of the system of governance itself (e.g. determination of equilibrium voting system). The role of normative analysis, of course, is to make some attempt at informing and influencing that complicated constitutional political process which leads to the determination of equilibrium institutions.

Finally, we did not address explicitly the implications of centralization in our model. Suppose in a fully integrated economy with a centralized redistributive function, a uniform tax rate is democratically chosen.[17] Consequently, the capital allocation between the two countries (regions) will be efficient under centralization. Also, because there is no possibility of capital flight from the unified economy, there is no potential for a race to the bottom with tax competition. Thus, the coordination advantages of centralized decision making are captured to the extreme. But even with centralization, integration may hurt the poorest individuals in the economy. The logic is simple. As has already been noted by, e.g., Bolton and Roland (1997), centralization will generally change the ruling majority. It may therefore entail a loss of political power for the poor in the poorer country and thus may lead to less preferred outcomes from their perspective.

[16]Without loss of generality assume country 1 is the exporter. Given $\rho^* \geq 0$ using (2), and due to the capital outflow, $k_1^* - k_1^m < 0$ is necessary for the majority in the exporting country to be better off with integration. It follows that $k_1^* < k_1^m < \overline{k}$ by our assumption $k_j^m < \overline{k}$. Hence $k_1^* < \overline{k} < k_2^*$ from $(k_1^* + k_2^*)/2 = \overline{k}$, which implies $k_2^m < \overline{k} < k_2^*$ under our assumption again. Therefore, $f'(k_2^*) < f'(k_1^*)$ or $t_1^* > t_2^*$ by (4). But using (8) then yields $t_1^* < 0 < t_2^*$, a contradiction.

[17]The assumption of a uniform federal policy is frequently imposed in the literature on fiscal federalism [see Oates (1972)]. Although it is certainly empirically relevant, it lacks motivation to a certain extent as it may involve a welfare loss if regions should be treated differently from an efficiency perspective [see e.g., Besley and Coate (1999) and Lockwood (1998)]. While this problem is of no concern in our model, a ruling majority in one country may still want to set distinct tax rates in order to change the international factor allocation to its favor.

References

Bucovetsky, S. (1991), “Asymmetric Tax Competition,” *Journal of Urban Economics*, 30, 167-181.

Besley, T. and S. Coate (1999), “Centralized vs. Decentralized Provision of Local Public Goods: A Political Economy Perspective, *NBER working paper*.

Bolton, P. and G. Roland (1997), The Break-Up of Nations: A Political Economy Analysis, *Quarterly Journal of Economics*, 112, 1057-1090.

Edwards, J. and M. Keen (1996), “Tax Competition and Leviathan,” *European Economic Review* 40, 113-134.

European Commission (1998), *Conclusions of the ECOFIN Council Meeting on 1 December 1997 concerning taxation policy*, OJ 98/C2/01.

Grandmont, J.-M. (1978), Intermediate Preferences and the Majority Rule, *Econometrica*, 46, 317-330.

Hamada, K. (1966), “Strategic Aspects of Taxation on Foreign Investment Income” *Quarterly Journal of Economics,* 80, 361–375.

Kessler, A., C. Lülfesmann and G. Myers (1998), “Redistribution, Fiscal Competition, and the Politics of Economic Integration,” *mimeo*, University of Bonn.

Laussel, D. and M. Le Breton (1998), ”Existence of Nash Equilibria in Fiscal Competition Models”, *Regional Science and Urban Economics,* 28, 283-296.

Lockwood, B. (1998), “Distributive Politics and the Benefits of Decentralisation”, *mimeo*, University of Warwick.

Oates, W. E. (1972), *Fiscal Federalism*, New York: Harcourt Brace Jovanovich.

Organisation for Economic Cooperation and Development (1998), *Harmful Tax Competition: An Emerging Global Issue*, Paris: OECD.

Perotti, R. (1993), “Political Equilibrium, Income Redistribution, and Growth,” *Review of Economic Studies*, 60, 755–776.

Persson, T. and G. Tabellini, (1992) "The Politics of 1992: Fiscal Competition and European Integration," *Review of Economic Studies*, 59, 689–701.

Sinn, H. W. (1994), "How Much Europe? Subsidiarity, Centralization, and Fiscal Competition," *Scottish Journal of Political Economy*, 41, 85-107

Wildasin, D. E. (1988), "Nash Equilibrium in Models of Fiscal Competition," *Journal of Public Economics*, 35, 229-40.

Wilson, J. D. (1987), "Trade, Capital Mobility, and Tax Competition," *Journal of Political Economy,* 95, 835–856.

Wilson, J. D. (1991), "Tax Competition with Interregional Differences in Factor Endowments," *Regional Science and Urban Economics*, 21, 423-451.

Wilson, J. D. (1999), "Theories of Tax Competition," *National Tax Journal,* forthcoming.

Zodrow, G. R. and P. Miezskowski (1986), "Pigou, Tiebout, Property Taxation, and the Underprovision of Local Public Goods," *Journal of Urban Economics*, 19, 356–370.

Appendix 1

Derivation of the Best-Response Functions.

We start with some preliminary observations. First, in any equilibrium the capital stock in the economy, $\bar{k}_1 + \bar{k}_2 = 2\bar{k}$ is fully utilized. To see why, suppose to the contrary that some capital is not invested, i.e., $[k_1 + k_2]/2 < \bar{k}$, implying $\rho = 0$. The equilibrium capital stock $k_j(t_1, t_2)$ is then uniquely determined by

$$r_j(k_j) - t_j = 0, \quad j \in \{1, 2\} \tag{9}$$

with $\partial k_j / \partial t_j < 0$. Using the fact that $\rho = 0$ in (2) yields $c_j^i = f(k_j)$ for all individuals. Since lowering t_j unambiguously increases k_j, the population in j would unanimously prefer a lower tax rate in such a situation, a contradiction. Hence, $t_j^{br}(t_h)$ is always such that $[k_1(\cdot) + k_2(\cdot)]/2 = \bar{k}$.

Next, due to our assumption $k_j^m \leq \bar{k}$, all equilibria must involve $t_j^* \geq 0$. To see this, observe first that if $t_j^{br} \leq t_h$ we must have $k_j \geq \bar{k} \geq k_h$ from (4) and $\frac{1}{2}k_1 + \frac{1}{2}k_2 = \bar{k}$ (all capital is used). Now suppose $t_j^{br} < 0$ so that $\rho > 0$. In this case, t_j^{br} is determined by the first-order condition (8). But (8) allows for $t_j^{br} < 0$ only if $k_j < k_j^m$ which together with $k_j^m < \bar{k}$ implies $k_j < \bar{k}$, a contradiction if $t_j^{br} \leq t_h$. Consequently, $t_j^{br}(t_h) \geq 0$ whenever $t_j^{br} \leq t_h$ and the result follows.

The preceding arguments have established that we can without loss of generality confine attention to best response functions $t_j^{br}(t_h)$ that lie in the non-negative orthant and are such that the economy-wide capital stock is fully employed. We are now in a position to derive those functions and their properties in more detail. In doing so, we follow and extend the line of argument in Laussel and Le Breton (1998) who consider completely symmetric countries with $k_j^m \equiv 0$.

As already mentioned in the text, two cases must be distinguished:

i) First, suppose $t_j^{br}(t_h)$ is such that $\rho(t_j^{br}(t_h), t_h) > 0$ so that k_j is determined according to (4) and (5) and (6) apply. Using the last two equations and the fact that $\partial k_h / \partial t_j = -\partial k_j / \partial t_j$, the derivative of the objective function in (7) can be expressed as

$$\begin{aligned} \frac{\partial c_j^m}{\partial t_j} &= -\frac{\partial \rho}{\partial t_j}(k_j - k_j^m) + t_j \frac{\partial k_j}{\partial t_j} \\ &= -\frac{\partial k_h}{\partial t_j}\left[f''(k_h)(k_j - k_j^m) + t_j\right] = \frac{\partial k_j}{\partial t_j} G_j(t_1, t_2, k_j^m), \end{aligned} \tag{10}$$

where $G_j(t_1, t_2, k_j^m) \equiv f''(k_h)(k_j - k_j^m) + t_j$. Observe that $G_j(t_j, t_h, k_j^m) < 0$ for t_j close to zero and $G_j(t_j, t_h, k_j^m) > 0$ for t_j sufficiently large (recall that we can confine attention to non-negative tax rates, i.e., $(t_1, t_2) \geq 0$). Hence, there must exist a value $t_j^{br}(t_h) \geq 0$ such that $G_j(t_j^{br}, t_h, \cdot) = 0$. As long as $\rho(t_j^{br}(t_h), t_h) > 0$, $t_j^{br}(t_h)$ is the best response function as it satisfies the first-order condition (8) by definition of G_j. Since at any such point,

$$\left.\frac{\partial G_j}{\partial t_j}\right|_{G_j = 0} = 1 + f''(k_h)\frac{\partial k_j}{\partial t_j} + \frac{f'''(k_h)}{f''(k_h)}\frac{\partial k_j}{\partial t_j} t_j^{br} > 0,$$

the best reply $t_j^{br}(t_h)$ not only exists, but is also unique. Furthermore, applying the implicit function theorem, using $\partial k_h/\partial t_h = \partial k_j/\partial t_j$, yields

$$\frac{dt_j^{br}}{dt_h} = -\frac{\partial G_j/\partial t_h}{\partial G_j/\partial t_j} = \frac{f''(k_h)\frac{\partial k_j}{\partial t_j} + \frac{f'''(k_h)}{f''(k_h)}\frac{\partial k_j}{\partial t_j}\, t_j^{br}}{1 + f''(k_h)\frac{\partial k_j}{\partial t_j} + \frac{f'''(k_h)}{f''(k_h)}\frac{\partial k_j}{\partial t_j}\, t_j^{br}} \in (0,1).$$

Hence, best responses are increasing with a slope less than unity. Finally, let us derive the range of t_h for which case i) applies. To this end, note that

$$\frac{d\rho}{dt_h} = \frac{\partial \rho}{\partial t_h} + \frac{\partial \rho}{\partial t_j}\frac{dt_j^{br}}{dt_h} < 0,$$

so that there exists a unique value of $\tilde{t}_h$ such that $\rho(t_j^{br}(\tilde{t}_h), \tilde{t}_h) = 0$. For all values $t_h \leq \tilde{t}_h$, t_j^{br} is indeed defined by (8) and the constraint $\rho(\cdot) \geq 0$ is (weakly) not binding.

ii) Next, suppose $t_h > \tilde{t}_h$ so that t_j^{br} as defined by (8) or $G_j(\cdot) = 0$ would imply $\rho(\cdot) = 0$ with the capital stock not fully utilized so that (5) and (6) no longer apply. From our argument above, best replies will now ensure that all capital is used in equilibrium, i.e., $k_j(t_j^{br}) + k_h(t_h) = 2\bar{k}$ must hold, with country j's capital stock being determined by (9) as a function of t_j only. Totally differentiation using $k_1(t_1) + k_2(t_2) = 2\bar{k}$ and (9) yields

$$\frac{dt_j^{br}}{dt_h} = -\frac{f''(k_j)}{f''(k_h)} < 0 \quad \text{with} \quad \frac{dt_j^{br}}{dt_h} \gtreqless -1 \;\Leftrightarrow\; t_j^{br} \lesseqgtr t_h. \tag{11}$$

To summarize, for $t_h \in [0, \tilde{t}_h]$, the best reply t_j^{br} of country j is a single valued, positive and increasing function of t_h. The net return to capital decreases in t_h and becomes zero at $(t_j^{br}(\tilde{t}_h), \tilde{t}_h)$. From then on (for values $t_h \geq \tilde{t}_h$), t_j^{br} is a single valued, positive function which is decreasing in t_h and we have $\rho \equiv 0$.

Existence, Properties, and Uniqueness of Equilibrium.

The equilibrium (t_1^*, t_2^*) is where the two best reply functions intersect. We proceed by way of a graphical argument. There are two possibilities to consider, which are illustrated in Figure 1 (a) and (b) respectively.

Suppose first the reaction functions cross at a point where $\rho^* > 0$ so that case i) applies [Figure 1 a)]. Since their slope is positive and less than unity, this intersection point is clearly unique. Also, it will lie off the diagonal if the equilibrium is asymmetric ($k_1^m \neq k_2^m$) and on diagonal otherwise ($k_1^m = k_2^m$).

Next, suppose case ii) is applicable and $\rho^* = 0$ [Figure 1 b)]. Note that this requires $t_j^{br}(\tilde{t}_h) > \tilde{t}_h$ for both countries so that the turning point of each reaction function emerges above (respectively, below) the diagonal. This is the only remaining case because there can be no intersection at a point where one curves slopes downwards while the other curve slopes upwards (as this would mean $\rho = 0$ and $\rho > 0$ simultaneously hold).

As drawn, the reply functions are not symmetric and intersect at a point where $t_1^* < t_2^*$ (the possibility where $t_1^* > t_2^*$ is analogous). To see why multiple equilibria cannot emerge in such a situation, reconsider (11). Starting from $t_1^{br}(\tilde{t}_2) > \tilde{t}_2$, country 1's reply has a negative slope, which is at first steeper than -1, then equal to -1 at $t_1^{br}(t_2) = t_2$ and further flattens

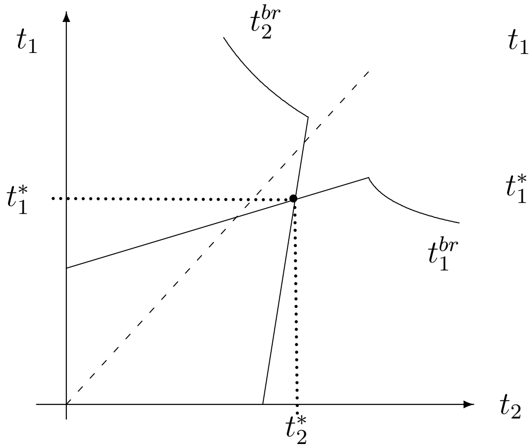

Figure 1 (a)

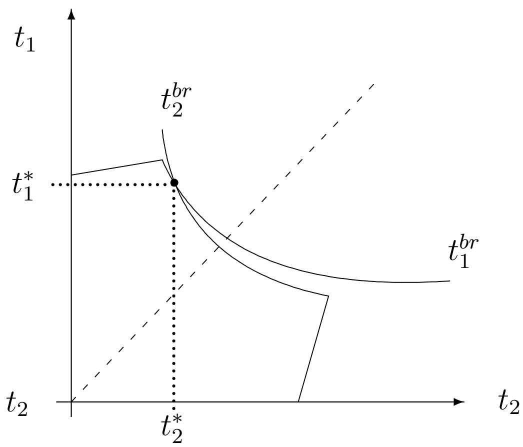

Figure 1 (b)

out for $t_1 > t_2$. This property is a direct consequence of our assumption $f'''(\cdot) \geq 0$ which not only ensures equilibrium existence, but also implies that the negatively sloped segments of t_j^{br} are weakly convex to the origin. Obviously, therefore, those segments can intersect at most once provided that they are not mirror images of each other, i.e., some asymmetry is present. Also, this intersection point must involve $t_1^* \neq t_2^* \Leftrightarrow k_1^* \neq k_2^*$ from (9) because otherwise, the slopes would be identical [see (11)], which is clearly impossible.

For identical decisive majorities with $k_1^m = k_2^m$, however, $\tilde{t}_1 = \tilde{t}_2 = \tilde{t}$ and the two segments coincide over the range $[\tilde{t}, t^{br}(\tilde{t})]$. Hence, all combinations (t_1^*, t_2^*) that lie on the joint arc of both segments form an equilibrium [see also Laussel and Le Breton (1998)]. In particular, this includes the (focal) point at the diagonal where $t_1^* = t_2^*$. For the proof of Proposition 2, finally note that for $k_1^m = k_2^m < \hat{k}$, we have $t^{br}(\tilde{t}) > \tilde{t}$ by definition of $\tilde{t}$ and $\hat{k}$. As argued above, the reaction functions no longer intersect over the range where both are positively sloped, so only points over the range $[\tilde{t}, t^{br}(\tilde{t})]$ that lie on the curve common to both negative segments are equilibria.

Appendix 2

Here, we provide two examples that do not display the extreme property of expropriative taxation of capital in autarky. Recall that the abstraction which leads to expropriative taxation is the assumption that taxation is not costly or distortionary. To alter this assumption in the simplest way, we assume that there are no costs of capital taxation at low enough levels but that once taxation reaches a critical level, $\bar{t_j} = \alpha r_j(k_j)$ with $0 < \alpha < 1$, there are prohibitive costs of further taxation.[18]

[18] For the cost of raising taxes above $\bar{t_j}$ to be prohibitive the marginal cost of increasing t_j must be greater than $\bar{k_j} - k_j^m$, which is the marginal benefit for the median voter. The assumption that total costs are zero for $t_j \leq \bar{t_j}$ is obviously strong. But our qualitative results also go through with positive

We assume a Cobb–Douglas production function or $f(k_j) = bk_j^a$ with $0 < a < 1$. Given this production technology and the cost of public funds as specified above, utility for individual i located in country j in political equilibrium under autarky is given by

$$\begin{aligned} c_j^{iA} &= f(\overline{k_j}) - [r_j(\overline{k_j}) - t_j][\overline{k_j} - k_j^i] \\ &= b\overline{k_j}^a - [1-\alpha]ab\overline{k_j}^{a-1}[\overline{k_j} - k_j^i]. \end{aligned}$$

To generate our numerical examples for integration we choose values for all parameters and solve (4), $(k_1 + k_2)/2 = \bar{k}$, and (8) for the capital allocation and taxes. At this allocation and tax levels, if $\rho > 0$ then by the results in Appendix 1 we have the unique political equilibrium under integration $\{t_1^*, t_2^*, k_1^*, k_2^*\}$ with $\rho^* = ab[k_1^*]^{a-1} - t_1^*$ and the utility of individual i located in country j in political equilibrium under integration is given by

$$c_j^{i*} = b[k_j^*]^a - \rho^*(k_j^* - k^i)$$

To make the welfare comparisons we assume cardinal ratio scale comparability. We also use the standard social choice axiom of anonymity. These assumptions lead to the following welfare function,

$$\begin{aligned} W &= (\sum_i (c^i)^{-v})^{\frac{-1}{v}} \text{ for } v \geq -1 \text{and} v \neq 0 \\ &= \prod_i c^i \text{ for } v = 0 \end{aligned}$$

For this function the aversion to inequality is 0 at $v = -1$ (classical utilitarianism) and is infinite as $v \to \infty$ (Rawlsian).

Example Where Autarky Dominates.

We assume two classes of individuals $i \in \{P, R\}$ with the poor in a 2/3-majority in each country. We then assume values for all parameters as follows: $a = 1/2$, $b = 1$, $\bar{k} = 1$, $\bar{k_1} = 21/20$, $\bar{k_2} = 19/20$, $k_1^P = 1$, $k_1^R = 23/20$, $k_2^P = 0$, $k_2^R = 57/20$, and $\alpha = 0.9$. Thus $k_1^m = 1$ and $k_2^m = 0$. For autarky $\bar{t_j} = \alpha r_j(\bar{k_j})$ or $\bar{t_1} = 0.439$ and $\bar{t_2} = 0.462$. The solutions for the equilibrium values under integration are $k_1^* = 1.185$, $k_2^* = 0.815$, $\rho^* = 0.396$, $t_1^* = 0.063$, $t_2^* = 0.158$, $r_1^* = 0.459$, and $r_2^* = 0.554$.[19].

This leads to the following equilibrium allocation under autarky: $c_1^{PA} = 1.022$, $c_1^{RA} = 1.030$, $c_2^{PA} = 0.926$, $c_2^{RA} = 1.072$. For integration it is: $c_1^{P*} = 1.015$, $c_1^{R*} = 1.075$, $c_2^{P*} = 0.580$, $c_2^{R*} = 1.709$.

The difference between welfare with integration and welfare with autarky at $v = -1$ is -0.024, at $v = 0$ it is -0.353, and as $v \to \infty$ it is -0.346. The first is consistent with lower output under integration due to capital flowing in the wrong direction (the capital rich region imports capital) and the last is consistent with integration hurting the poorest in the economy (the poor in the poor country). By plotting the difference, it is decreasing for $-1 < v < 0$, it is discontinuous at $v = 0$, and it is decreasing for finite $v > 0$. Thus, in this example

total costs of taxation as long as the costs are too large.

[19]Note $t_j^* < \alpha r_j^*$ in all examples

where taxation is not expropriative and both countries and voters are asymmetric, autarky dominates under any aversion to inequality.

Example Where Integration Dominates.

Again, let individuals (endowment classes) $i = P, R$ be such that the poor are in a 2/3-majority in each country. We then assume values for all parameters as follows: $a = 1/2$, $b = 1$, $\bar{k} = 1$, $\bar{k_1} = 7/4$, $\bar{k_2} = 1/4$, $k_1^P = 1$, $k_1^R = 13/4$, $k_2^P = 0$, $k_2^R = 3/4$, and $\alpha = 0.9$. Thus again $k_1^m = 1$ and $k_2^m = 0$. For autarky $\bar{t_j} = \alpha r_j(\bar{k_j})$ or $\bar{t_1} = 0.340$ and $\bar{t_2} = 0.900$. The solutions for variables at equilibrium for integration are exactly those for the previous example because the characteristics of the majority are unchanged: $k_1^* = 1.185$, $k_2^* = 0.815$, $\rho^* = 0.396$, $t_1^* = 0.063$, $t_2^* = 0.158$, $r_1^* = 0.459$, and $r_2^* = 0.554$.

This leads to the following equilibrium allocation under autarky: $c_1^{PA} = 1.295$, $c_1^{RA} = 1.380$, $c_2^{PA} = 0.475$, $c_2^{RA} = 0.550$. For integration it is $c_1^{P*} = 1.015$, $c_1^{R*} = 1.907$, $c_2^{P*} = 0.580$, $c_2^{R*} = 0.877$.

The difference between welfare with integration and welfare with autarky at $v = -1$ is 0.505, at $v = 0$ it is 0.293, and as $v \to \infty$ it is 0.105. The first is consistent with higher output under integration due to capital flowing in the right direction and the last is consistent with integration helping the poorest in the economy. By plotting the difference, it is increasing for $-1 < v < 0$, it is discontinuous at $v = 0$, and increasing for finite $v > 0$. Thus, in this example where taxation is not expropriative ($\rho^* > 0$) and both countries and voters are asymmetric, integration dominates under any aversion to inequality.