Human Capital and Globalization: The Missing Factor?

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Abstract:

There is an enormous literature in political science and economics on the implications of international economic integration for (i) the distribution of resources between capital and labor, (ii) global flows of capital and labor, and (iii) the ability of governments to engage in demand-side macroeconomic policy. However the literature has produced little analysis of the supply-side of the international economy and its effect on public and private investment in skills. Attempting to remedy this neglect, this paper examines the effects of international economic integration on (i) the distribution of resources between the skilled and the unskilled, (ii) global flows of human capital, and (iii) the ability of governments to engage in supply-side microeconomic policy. The paper presents a formal model of electoral competition over the size of tax revenues and their composition between redistribution and investment in human capital, under the constraint of human capital exit. The analysis suggests four strategies that states might employ to prevent human capital exit: compensation, trading, barriers to exit, and autocracy. The implications of the model are then empirically tested using cross-sectional data on public human capital investment.
1. Introduction

The title of this panel asks “Does Globalization Matter?”: a question to which a one word answer might be more succinct and revealing than this fifty page article. Although there has recently been a renaissance in the anti-convergence literature, it nonetheless seems perverse to pretend that the global economy has had zero impact on domestic politics. A more revealing question, then, might be “How does Globalization Matter?”, for it forces us to define (a) what we mean by “globalization”, and (b) what the objects are that are allegedly impacted by “globalization”.

Traditionally in political science, the definition of “globalization” has been the increasing openness of domestic economies to imported goods and foreign capital. Since goods are presumed to incorporate varying mixes of capital and labor, standard trade theory predicts that changes in the volume and pattern of international trade will have corresponding implications for the distribution of resources between capital and labor in both home and foreign polities. Work on capital mobility focuses on the increased “exit option” for domestic capital and the constraint this places on monetary and fiscal policy, as well as on the incentives for states to attract foreign capital.

Thus, traditional work on globalization has concentrated on the following three interrelated topics: (i) the increase in international flows of goods (containing capital and labor) and finance capital, (ii) the distributional (and hence political) impact of these flows on the balance of resources between labor and capital within the domestic arena,
and (iii) the (in-)ability of governments to promote macroeconomic policies that rely on the control of the money supply, tariff barriers, and redistributive tax policy.

However, the capital/labor dichotomy may not provide the most useful simplification of the current “post-industrial” economy. Since manufacturing occupies an increasingly small share of national production and because of the increasing tradability of services, the most salient distinction in political economy appears to be the ownership of human capital, rather than the nineteenth century emphasis on ownership of physical capital. Indeed, the positive correlation between income and education/skills has held up robustly over a series of econometric tests dating back to Becker’s defining early work.¹

From the policy perspective, human capital also appears increasingly fundamental to national economic welfare.² As demonstrated by Carles Boix and Geoffrey Garrett, among others,³ in an age where demand-side policies have become discredited or impractical because of adaptive/rational expectations and mobile finance capital, governments seeking to promote economic growth have adopted supply-side microeconomic policies. These policies seek to upgrade human capital (as well as infrastructure and some public works) so as to increase productivity without decreasing employment.

¹ Most of Becker’s defining articles on this topic are collected in Becker, Gary, Human Capital, 1961.
² Indeed a number of popular business and policy works like Robert Reich’s The Work of Nations, and Michael Porter’s The Comparative Advantage of Nations, brought this insight to a wider audience in the late 1980s and early 1990s.
Finally, a further impetus to the study of human capital is its increased global mobility. The lowering of transportation costs, the rise of English as the international language of business, the third wave of democratization, multinational enterprises, and international migration agreements like the European Union’s Schengen agreement, have all facilitated the transfer of skilled workers between states. This at once creates both a carrot and stick effect for states. The provision of lower taxation or improved public services and transfers might serve to attract highly-skilled foreign workers. Conversely, as the attractiveness of emigration rises, states stand to lose skilled individuals in whom they have invested via public education and training.

This paper seeks to join together these three intuitions in a manner analogous to the literature on the roles of trade and finance capital in the global economy. Thus, it integrates (i) the increased ability of highly skilled individuals to move globally, (ii) the distributional effects of this mobility on the balance of resources between the skilled and the unskilled, and (iii) the consequences for government supply-side policy and the composition of public expenditure. Moreover, this paper attempts to move beyond a partial equilibrium analysis of just human capital. In analyzing strategies for reducing human capital exit the paper also integrates trade theory into its argument. Thus, a hybrid argument concerning the politics both of globally mobile human capital and of trade is fleshed out.
In the next section, I examine the literature on globalization and that on the “post-industrial”\textsuperscript{4} political economy in an attempt to trace the lineage of my argument in the extant literature and to note its innovations. I then proceed to lay out formally the core analysis of this paper. Following this theoretical exposition I turn to an analysis of potential state “strategies”\textsuperscript{5} for dealing with the dilemmas that my theory raises: the compensation, trading, barriers to exit and autocratic “strategies”. These “strategies” suggest a number of testable hypotheses that are consequently subjected to empirical confirmation in the following section. I conclude by suggesting future avenues for research on the integration of the globalization literature with human capital.

\textsuperscript{4} Throughout this analysis, “post-industrial” refers to economic activity utilizing human capital as well as the “industrial” factors, labor and capital. The term “post-industrial” is, however, notoriously subject to conceptual stretching, so its use will be kept to a necessary minimum.

\textsuperscript{5} These “strategies” are not strategies in the game-theoretic sense, although they certainly derive from formal analysis as responses to the dynamics of the model. They might be best thought of as policy options that might be employed in response to the threat of human capital exit.
2. Globalization and Post-industrialism – the state of the literature

The current consensus on globalization in International Political Economy resembles more the bolting together of a set of tangentially related research programs than a unified theory of politics under global economic interdependence. The literature has produced some extremely powerful results on the separate effects of the movement of goods, and of finance capital, on the preferences of capital and labor, or the owners of specific versus mobile assets. A number of different studies have also analyzed the implications of changes in such movements or of variation in preferences on the types of fiscal, tariff, monetary or exchange-rate policies chosen by governments.

What is lacking then in such analyses? For the most part they remain partial equilibrium theories since they tend to analyze only the effects of one mobile factor on one government policy or on one dimension of preferences. Examples abound of such analyses: the effects of increased trade in goods on the preferences of capital and labor; the consequences of mobile finance capital for monetary policy; the effects of migration on right-wing political parties, etc. These are clearly critical first steps in the building of a simplified theory of globalization’s political impact. Yet these articles often ignore the trade-offs between (a) the movement of different factors, (b) different dimensions of preferences, and (c) functionally different government policies. For example, how do the movements of goods and of investment capital interact? Are they complements or substitutes? Do they effect the capital/labor and skilled/unskilled preference dimensions differently? Do changed fiscal policies then have effects on monetary policies or on
investment policies? This necessarily cursory literature review notes how insights from a number of important recent works might be combined or reinterpreted in the aim of forming a theory of the political economy human capital under globalization.

The IPE literature on trade has largely focused on two substantive areas: the effects of increased movement of goods on the preferences of groups and the translation of these patterns of preferences into tariff policy. The classic modern formulation of this argument is Rogowski’s analysis of the effects of increased movement of goods on owners of abundant and scarce factors. These preferences were then assumed to translate directly into policy given various coalitions between land, labor and capital. Rogowski’s analysis thus neglects the actual voting process and concentrates its energies on explaining coalition shape and tariff policy rather than the extension of this analysis into other policy areas or along other preference dimensions. One extension that this paper touches upon is the incorporation of a fourth factor (human capital) into traditional trade theory analyses. Rogowski also focuses on the international movement of factors through the indirect medium of trade (that is factors move only in as much as they are embodied in goods) rather than allowing the direct mobility of labor or capital to enter his analysis. This paper asserts that direct and indirect mobility of factors may be substitutes under certain conditions (the “trading strategy” outlined later).

A number of important studies have considered the significance of direct factor mobility. Typically like Frieden (1991) and Simmons (1999) they focus on the way in which factor mobility (in both of these cases capital mobility) permits or constrains

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governments’ domestic economic policy.7 These analyses also focus on how increased factor mobility changes individual preferences. However, despite their integration of factor mobility, preferences and policy, such analyses have not developed fully-specified micro-mechanisms that combine these. Moreover such works have focused largely on demand-side policies because of their focus on capital mobility. The Mundell-Fleming conditions impose particularly conspicuous constraints on monetary policy but fiscal policy and supply-side policies also face serious limitations under globalization – indeed, ones with often greater electoral salience.

Supply-side policies have not, however, been entirely ignored by the IPE literature. Geoffrey Garrett’s work, for example, examines the interaction between monetary and fiscal policy, integrating this with a focus on the persistence of partisan policy differences under globalization. Carles Boix’s work, while less focused on the impact of globalization than Garrett, nonetheless provides a powerful analysis of the effects of international economic integration and partisan preferences on taxation and investment policies.8 However, globalization in both of these analyses is dealt with as an exogenous shock requiring reformulation of past policies by political parties, rather than as a series of incentives and constraints for citizens and voters. This paper attempts to move beyond a focus on politicians and their adaptation of policies to globalization to an examination of how increased global movement of human capital changes the preferences of citizens. Thus, the paper abstracts to a lower level of analysis than party-based arguments about

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supply-side policy, attempting to provide a coherent micro-mechanism that can explain changing preferences.

In this sense, despite its focus on a different policy area (supply-side policy rather than tariff policy) this paper bears some similarity to Kenneth Scheve and Matthew Slaughter’s recent work on trade preferences and human capital.\(^9\) Like Scheve and Slaughter, I assume that owners of human capital are likely to prefer free trade provided that they will benefit from a shift to the global rate of return on human capital. However, I also examine the importance of permitting individuals to move (along with their human capital) to countries paying closer to the market rate of return. Whereas Scheve and Slaughter assumes citizens are characterized by asset specificity (primarily home ownership) and relative international immobility, I target the analysis in this paper towards the changes wrought by increased mobility and the consequently different role played by human capital under these conditions.

\[^9\] Scheve, Kenneth and Matthew Slaughter, “What determines individual trade policy preferences?”, *Journal of International Economics,*
3. A Formal Model of Human Capital and Globalization

Before commencing the formal modeling it might prove helpful to outline the structure of the following analysis. Firstly, I construct the two key equations in the model: the individual utility function and the individual propensity (to exit) function. I also define the key parameters and variables used within these models and produce a number of figures demonstrating the mechanics of these functions. The second step is to introduce the median voter into this model and allow them to set policy subject to the constraints of human capital exit. Two policy types are examined: the tax rate, and the composition of taxes between immediate redistribution and investment in human capital. For each of these policy areas open and closed economies (with regard to human capital mobility) are examined and the relative tax rates and tax compositions examined. This concludes the core analysis of the formal model, presenting the key policy dilemmas that the “strategies” laid out in section four of this paper address.

3.1 The Utility Function and the Propensity Function

Throughout this model all individuals are distinguished by their income, which we can think of as a linear transformation of skills (e.g. $y_i = k \cdot h_i + c$) where $y_i$ is individual income and $h_i$ is an individual endowment of skills. These individuals vote over a linear tax rate $t$. The government then decides on the composition of public spending derived from the tax revenues: $a$ is invested in human capital and $(1-a)$ is redistributed immediately as a uniform subsidy. Thus, we simplify individual lifetimes to a two-stage
model, with voting over taxation and the choice of expenditure composition in round one, and the returns on investment in round two. We abstract from private savings, which are subsumed into net income.\(^\text{10}\) Thus, the individual utility function is modeled as follows:

\[
u_i = (1 - \tau)y_i + (1 - \alpha)\bar{\tau}(\Pi) + \delta[y_i(1 + b \cdot \ln[\bar{\tau}(\Pi)\alpha])]
\]

Individual utility is thus a function of net income \((1 - \tau)y_i\), the redistributed tax revenue gained in round one \((1 - \alpha)\bar{\tau}(\Pi)\), and the discounted future income plus return on investment \(\delta[y_i(1 + b \cdot \ln[\bar{\tau}(\Pi)\alpha])]\). A brief synopsis of the variables used:

- \(\bar{y}\) is mean income, which is dependent on \(\Pi\), the propensity of human capital to exit (intuitively - as highly skilled individuals leave, mean income is reduced).
- \(d\) is the discount rate for round two.
- \(b \cdot \ln[\bar{\tau}(\Pi)\alpha]\) is the return on public investment in human capital. This is modeled as a logarithmic transformation of the proportion \(a\) of tax revenues from round one used for investment rather than redistribution. \(b\) is a linear multiplier of this level of investment.

The propensity of human capital to exit was mentioned above and it plays a critical role in the logic of the model. Each individual has a different propensity to exit – however, there is a one-to-one transformation of the distribution of income to the

\(^{10}\) Thus, we also neglect private investment in human capital – this can be justified by noting that such investment operates as a return in round two on round one private savings and thus can be thought of as a component of net income in round one.
propensity to exit – thus the highly skilled (and high income) individuals exit first. The
individual propensity function appears as follows:

\[ \pi_i = \left[ y_i \left( h - \tau^* \right) - (1 - \tau) \right] + \left[ (1 - \alpha^*) \tau^* \bar{y}^* - (1 - \alpha) \bar{y} \right] + \delta \gamma_i \left[ (h - 1)(b \ln(\alpha \bar{y})) - \gamma \right] \quad (2) \]

The individual propensity function is thus dependent upon the differing returns available abroad and at home (simplifying temporarily to a two country world). In this function, \( h \) is the multiple of domestic income available abroad, where \( h = 0 \) and \( h > 1 \) if foreign pays a higher rate of return for skills than home. All foreign variables are marked with asterisks – of particular importance is the foreign tax rate, \( t^* \). Thus, the individual propensity function depends firstly on the opportunity cost of remaining at home in terms of first round net income: \( y_i \left( h - \tau^* \right) - (1 - \tau) \). Secondly it depends on the difference between foreign and home subsidies: \( (1 - \alpha^*) \tau^* \bar{y}^* - (1 - \alpha) \bar{y} \). Thirdly, it depends on the returns on first round home investment in both home and abroad in the second round: \( \delta \gamma_i \left[ (h - 1)(b \ln(\alpha \bar{y})) \right] \). Finally, all individuals face a uniform fixed cost of leaving, \( \gamma \).

The most intuitive way to interpret the propensity function is to note that if \( p_i > 0 \), the individual will leave home and join foreign\(^\text{11}\). Of course, given a nontrivial population the decision of just one individual has no effect on those of others. Hence, our interest is in \( \gamma \), the total proportion of individuals leaving – or in the language of the model, the

\(^{11}\) But surely just because opportunities are better abroad than at home it does not mean people automatically leave? This is certainly true. However, this natural or intuitive inertia is incorporated into the model through \( \gamma \). Since \( \gamma \) is uniform it applies an equal natural weight against leaving to all individuals. Thus, the model assumes that no individual is more naturally “foreign-acceptant” than any other, except through the income effect. Even if there was a distribution of “foreign-acceptance” the model would still be satisfactory provided that such a condition was equally distributed throughout society, although the aggregate propensity function would be reduced as the mean of the “foreign-acceptance” distribution lowered.
aggregate propensity function. How do \( p_i \) and \( ? \) interrelate? This depends entirely on the exact form taken by the distribution of income. The following figures demonstrate this relationship more clearly.

Figure One: The Propensity Function

Figure One shows the basic propensity function, with income on the x-axis and the propensity to exit on the y axis. Since the propensity to exit is linear in income (according to the assumptions made earlier), the figure is simple to interpret. The propensity function intercepts the y axis at \( (1 - \alpha)\gamma - (1 - \alpha)\bar{y} \). Thus as the fixed cost of exit increases this intercept becomes lower (the remaining terms show the opportunity cost of exiting in terms of the redistributive subsidy funded through taxation). Since this forces the whole function downwards, lower fixed costs will mean the propensity function crosses zero at a higher level of income.

The slope of the propensity function, conversely, is linearly related to the level of individual income. Hence the slope of the propensity function is determined by
Thus the slope is increasing in the opportunity cost of round one disposable income \((h - \tau^*) - (1 - \tau)\) and also increasing in the opportunity cost of round two returns on investment \(\delta((h - 1)b \ln(\alpha T))\). The effects of home taxation are more complex: an increase in home taxation lowers home net income in round one but raises the amount of public investment in round two. Moreover, we cannot categorically demonstrate the effects of human capital productivity \(b\), since we need to know the balance between foreign and home payment for skills (i.e., whether \((h-1) > 0\) or \((h-1) < 0\)). We will explore these comparative statics shortly. Figure Two demonstrates how the propensity function is related to \(\gamma\), the proportion of the population who exit. Note that, at least in this model, the proportion of those leaving is not evenly distributed throughout the population. Rather, propensity to leave is a linear function of income. Hence, the wealthiest individuals in this model are those who exit first.

Figure Two – The Propensity Function and the Population Distribution \(f(y_i)\)
To solve for the exact proportion of exiters we need only know the identity of the threshold individual. This threshold individual, \(y_p\), has a propensity function of \(p_i = 0\). The identity of the threshold individual can be calculated from the propensity function:

\[
y_p = \frac{\gamma - [(1 - \alpha^*)\tau^* \bar{y}^* - (1 - \alpha)\bar{y}]}{(h - \tau^*) - (1 - \tau) + \delta[(h - 1)b \ln(\alpha\bar{y})]} \quad (3)
\]

Note that we assume that the fixed cost of leaving is nontrivial (that is, it is larger than the immediate subsidy arbitrage that individuals might like to engage in - or \(\gamma - [(1 - \alpha^*)\tau^* \bar{y}^* - (1 - \alpha)\bar{y}] > 0\) - else all individuals would immediately leave since they could grab a subsidy abroad at no cost). Some quick comparative statics will demonstrate the effect of differing variables upon the income level (and hence identity) of this threshold individual:

\[
\frac{\partial y_p}{\partial \gamma} = \frac{1}{(h - \tau^*) - (1 - \tau) + \delta[(h - 1)b \ln(\alpha\bar{y})]} > 0 \leftrightarrow (h - \tau^*) > (1 - \tau) \quad (4a)
\]

\[
\frac{\partial y_p}{\partial h} = \frac{\gamma - [(1 - \alpha^*)\tau^* \bar{y}^* - (1 - \alpha)\bar{y}]}{[(h - \tau^*) - (1 - \tau) + \delta[(h - 1)b \ln(\alpha\bar{y})]]^2} < 0 \quad (4b)
\]

As might be expected, we see that higher fixed costs of exit are associated with a wealthier threshold individual – and hence less emigration. Conversely, as the foreign rate of return on skills increases, the threshold individual is less wealthy, and thus emigration increases. However, despite these relatively obvious results the role of
domestic taxation is less determinate and thus must wait until the political elements of the model are fully spelled out.

We have discussed the individual decision to exit but how do these decisions aggregate? In order to calculate the level of ?, we need to know the distribution of wealth throughout the population, $f(y_i)$. Throughout this article I make the conventional assumption that income is distributed in a log-normal form — that is, it resembles a normal distribution skewed to the right. This assumption provides the familiar result that mean income is higher than median income. As in the Meltzer-Richard formulation, this implies that the median voter (who, by definition, has the median income) will desire a positive level of redistribution.\(^{12}\) Notwithstanding these observations on the precise functional form of income distribution, we can still get a great deal of traction with the analysis simply by noting that since all individuals with income higher than $y_p$ exit, it must be that:

$$\Pi = \int_{\hat{y}}^{y} f(y_i)dy_i \text{, where } \hat{y} \text{ is the highest individual income} \quad (5)$$

In Figure Two, $\chi$ is the shaded area beneath the population distribution $f(y_i)$. Using this reduced form will simplify the following results and also enables us to change the income distribution (for example to a uniform, or normal distribution) without altering the results fundamentally.

Figure Three demonstrates the dynamics of the individual propensity function. As the rate of return available abroad changes (to choose a simple example), the slope of the

propensity function alters. Since this change of slope leads to a change in the identity of the threshold individual – and now that we know how to calculate the aggregate level of emigration for a given population distribution - we can calculate the change in aggregate exit from the changing area under the population distribution curve.

Figure Three – Effect of changing the foreign rate of return on population exit

3.2 Introducing the Median Voter

So far we have largely ignored the role of politics in setting the tax rate. Since we assume voters and politicians to be rational (or at least are aware of the effects of tax policy on exit), we must incorporate the aggregate propensity to exit into any model of voting over taxation. To begin with, let us presume that the median voter in the population has the ‘final word’ on tax levels. Obviously, this is a somewhat artificial formulation that essentially assumes a complete Downsian convergence to the median. It
is, however, a useful starting point from which to develop the analysis. What affects the median voter’s choice of taxation? Recall the utility function outlined earlier. We can simply adapt the form of this to get the median voter’s utility (where the subscript \(m\) stands for median):

\[
u_m = (1 - \tau)y_m + (1 - \alpha)\bar{y}(\Pi) + \delta\left[y_m(1 + b \cdot \ln[\bar{y}(\Pi)\alpha])\right]
\]  \hspace{1cm} (6)

Now, we want to take the derivative of this function with respect to the level of taxation and set it to zero (on the assumption that since the median voter has control of the political process she will be able to maximize her utility). It is critical to remember at this stage that \(\delta\) depends on the level of taxation.\(^{13}\) Hence we can expand the above utility function and take its derivative with respect to the tax rate:

\[
u_m = (1 - \tau)y_m + (1 - \alpha)\bar{y}(\Pi(\tau)) + \delta\left[y_m(1 + b \cdot \ln[\bar{y}(\Pi(\tau))\alpha])\right]
\]  \hspace{1cm} (7a)

\[
\frac{\partial u_m}{\partial \tau} = -y_m + (1 - \alpha)\bar{y}(\Pi) + \left[(1 - \alpha)\tau \cdot \frac{\partial \bar{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \tau}\right] + \left(\delta y_m b \cdot \frac{\partial \Pi}{\partial \Pi} + \left(\delta y_m b \cdot \frac{\partial \Pi}{\bar{y}} \cdot \frac{\partial \bar{y}}{\partial \tau}\right)\right)
\]  \hspace{1cm} (7b)

This derivative demonstrates neatly the tradeoffs of taxation inherent in a model permitting exit. There are five important effects from an increase in taxation:

\begin{itemize}
  \item[i)] the loss of gross round one income (or the decrease in net income): \(-y_m\)
\end{itemize}

\(^{13}\) The propensity function also depends on the mean level of income (hence we have mutual causation of mean income and propensity). While this makes precise calculations more complex, this does not change the qualitative results in any way since the two variables are always negatively related: thus, as mean income rises the propensity to leave lowers (since home subsidies and investment become higher), and as the propensity to leave rises mean income becomes lower (since the wealthiest individuals leave first).
ii) the growth of the subsidy in round one: \((1 - \alpha)\bar{y}(\Pi)\)

iii) the effects on this subsidy from a change in the mean level of income, itself caused by a change in the propensity to leave: \(\left(1 - \alpha\right)\tau \cdot \frac{\delta \bar{y}}{\delta \Pi} \cdot \frac{\delta \Pi}{\delta \tau}\)

iv) an increase in the return on public investment in round two: \(\left(\frac{\delta y_m b}{\tau}\right)\)

v) the effects of the change in propensity to leave, and thereby mean income, on the return on public investment: \(\left(\frac{\delta y_m b}{\bar{y}} \cdot \frac{\delta \bar{y}}{\delta \Pi} \cdot \frac{\delta \Pi}{\delta \tau}\right)\)

Note that the propensity function has two indirect effects (the propensity effects) on the derivative of the median voter’s utility with respect to taxation – (iii) and (v) above. To be clear this effect emerges because (a) the level of taxation changes the propensity to exit, (b) the aggregate level of exit changes the mean income of the state, and (c) changes in mean income alter the level of the round one subsidy and the round two return on public investment. Even more intuitively, raising taxes leads to the exit of those who provide most in terms of transfers: thus it amounts to killing the goose that laid the golden egg.

The description above outlines the mechanics of the propensity function. However, what we do not yet know is the qualitative effect of taxation on the median voter’s utility through these propensity effects. There are two critical components of the propensity effects: the derivative of mean income with respect to the aggregate propensity function, or \(\frac{\delta \bar{y}}{\delta \Pi}\); and the derivative of the propensity function with respect to the level of taxation, or \(\frac{\delta \Pi}{\delta \tau}\). The former we know to be negative – a simple glance at Figure Two
demonstrates that as $\tau$ gets larger, the threshold individual who chooses to leave becomes poorer and thus the mean income of those left must also become smaller. The latter derivative is less clear and benefits from analysis. Firstly recall the individual propensity function:

$$\pi_i = \left[ y_i \left[ (h - \tau^*) - (1 - \tau) \right] + \left[ (1 - \alpha^*) \tau^* \bar{y}^* - (1 - \alpha) \bar{y} \right] + \delta y_i \left[ (h - 1) b \ln(\alpha \bar{y}) \right] - \gamma \right] \quad (2)$$

Let us take the derivative of this individual function with respect to taxation:

$$\frac{\partial \pi_i}{\partial \tau} = y_i - (1 - \alpha) \bar{y} + \frac{\delta y_i (h - 1) b}{\tau} = y_i \left( 1 + \frac{\delta (h - 1) b}{\tau} \right) - (1 - \alpha) \bar{y} \quad (8a)$$

We can see that this derivative is positive (that is, increased taxes lead to a higher individual propensity to leave) unless the round one subsidy is greater than the loss of round one income plus the opportunity cost of round two returns on home public investment. Or,

$$\frac{\partial \pi_i}{\partial \tau} > 0 \iff y_i \left( 1 + \frac{\delta (h - 1) b}{\tau} \right) > (1 - \alpha) \bar{y} \quad (8b)$$

Unless, home rates of return exceed those available abroad (i.e. unless $h<1$), it must be that the derivative of the individual propensity function with respect to taxation is always positive for any individual with income higher than the original mean. Since the wealthiest individuals exit first and having shown that the above derivative is always
positive for those with higher than mean income (provided h>1), we know that higher taxes must mean a higher aggregate exit; thus, \( \partial \Pi / \partial \tau > 0 \).

Turning back to the effects of taxation on the utility of the median voter – Equation (6) above:

\[
\frac{\partial u_m}{\partial \tau} = -y_m + (1 - \alpha)\bar{y}(\Pi) + \left( (1 - \alpha)\tau \cdot \frac{\partial \bar{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \tau} \right) + \left( \frac{\partial y_m b}{\tau} \right) + \left( \frac{\partial y_m b}{\bar{y}} \cdot \frac{\partial \bar{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \tau} \right)
\]

We now know that \( \partial \bar{y} / \partial \Pi < 0 \), and \( \partial \Pi / \partial \tau > 0 \); and thus, \( \partial \bar{y} / \partial \tau < 0 \). Given this analysis we can reinterpret the five effects of taxation on the median voter: (i) the direct income effect remains negative, (ii) the direct subsidy effect remains positive, (iii) the first propensity effect is negative – that is, since taxation lowers the mean income through exit, it also lowers the value of subsidies, (iv) the investment effect remains positive, and (v) the second propensity effect is negative – that is since taxation lowers mean income, the amount of public investment available is lowered.

3.3 Tax Rates in Open and Closed States

We can now examine the first-order conditions for the tax rate that maximizes the median voter’s utility in an open state (that is, one that permits human capital exit, denoted by a superscript \( o \)):
Marginal Costs | Marginal Benefits
---|---
\[
\frac{\partial u_m^c}{\partial \tau} = 0 \Rightarrow y_m - (1 - \alpha)\tau^* + \frac{\delta y_m b}{y} \left( \frac{\partial y}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \tau} \right) = (1 - \alpha)\bar{y}(\Pi) + \left( \frac{\delta y_m b}{\tau^*} \right) \quad (9a)
\]

Note that the marginal costs from taxation are on the left hand side (loss of round one income and the lowering of mean income because of tax-induced exit)\(^{14}\), whereas the marginal benefits are on the right-hand side (round one subsidy and round two return on investment. The optimal tax rate for the median voter, \(t^\circ\), is the rate that balances these costs and benefits. A useful way to interpret the importance of exit to this model is to view the comparable first-order conditions for a state without exit, and hence with no effect of the propensity function (denoted by superscript \(c\)):

Marginal Costs | Marginal Benefits
---|---
\[
\frac{\partial u_m^c}{\partial \tau} = 0 \Rightarrow y_m = (1 - \alpha)\bar{y}(\Pi) + \left( \frac{\delta y_m b}{\tau^*} \right) \quad (9b)
\]

Note that the marginal cost side of the equation decreases substantially because the propensity effect is excluded. In this example the marginal benefits of taxation thus need not be as high as in the model with exit. Since we assume that the benefits of taxation are concave (and indeed the second derivative of the above equation is negative), it must be that a higher tax rate is set by the median voter in the model without exit.\(^{15}\) This, of

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\(^{14}\) Note also that because we know the derivative of mean income with respect to taxation, via the propensity mechanism, to be negative, the left-hand side of this equation is strictly positive (despite the slightly unintuitive minus sign).

\(^{15}\) The analytical logic runs as follows – marginal costs decrease in the no-exit model. Since marginal benefits equal marginal costs they must also decrease. Because a concave function flattens as the \(x\) variable
course, makes a good deal of intuitive sense – the threat of exit constrains the median voter in the tax level she can set. This logic is further illustrated in Figure Four.

**Figure Four – The Concavity of Utility with respect to Taxation**

3.4 The Composition of Taxation in Open and Closed States

Similar results obtain when we examine the composition of taxation: that is if we examine the derivative of the median voter’s utility with respect to a, the proportion of tax revenues spent on public investment in human capital. As above we again compare the exit and no-exit models to show the differences in composition caused by the ability to exit.

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increases its marginal increase lowers as x increases. Because the marginal increase in the benefits of taxation has decreased it must be that x (i.e. the tax rate) has increased. Hence the no-exit model has higher tax rates than the exit model.
\[
\frac{\partial u_{m}}{\partial \alpha} = -\tilde{\nu}(\Pi) + \left( (1 - \alpha) \tau \cdot \frac{\partial \tilde{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha} \right) + \left( \frac{\partial y_{m}b}{\alpha} \right) + \left( \frac{\partial y_{m}b}{\tilde{y}} \cdot \frac{\partial \tilde{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha} \right) \tag{10a}
\]

Once again, the open model allowing exit (denoted by a superscript ‘o’) is composed of direct and indirect (propensity) effects. In this case, increasing the proportion of taxation devoted to investment in human capital has four effects:

i) a decrease in the round one subsidy: \(- \tilde{\nu}(\Pi)\)

ii) an indirect effect on mean income and hence the size of the round one subsidy induced through the propensity function: \((1 - \alpha) \tau \cdot \frac{\partial \tilde{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha}\)

iii) an increase in round two returns on investment: \(\frac{\partial y_{m}b}{\alpha}\)

iv) an indirect effect on investment through changes in mean income induced through the propensity function: \(\frac{\partial y_{m}b}{\tilde{y}} \cdot \frac{\partial \tilde{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha}\)

The derivative for the individual propensity function can also be solved:

\[
\frac{\partial \nu_{i}}{\partial \alpha} = \tilde{y} + \frac{\partial y_{i}(h - 1)b}{\alpha} > 0 \text{ provided } h > 1 - \frac{\tilde{\nu}\alpha}{\partial y_{i}b} \tag{10b}
\]

This means, given that \(\frac{\partial \tilde{y}}{\partial \Pi} < 0\), that elements (ii) and (iv) of the derivative of utility with respect to tax composition are negative and can thus be interpreted as
marginal costs. So taking a first order condition and viewing the balance of marginal costs versus marginal benefits (as before with costs on the left) we get:

Open Model
\[ \tilde{\gamma}(\Pi) - (1 - \alpha)\tau \cdot \frac{\partial \bar{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha} - \left( \frac{\partial y_m b}{\bar{y}} \cdot \frac{\partial \bar{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha} \right) = \left( \frac{\partial y_m b}{\alpha} \right) \]  

(10c)

Compare this with the equivalent derivative and first-order conditions for the no-exit model, where

\[ \frac{\partial u^{r_m}}{\partial \alpha} = -\tilde{\gamma}(\Pi) + \left( \frac{\partial y_m b}{\alpha} \right). \]

Closed Model
\[ \tilde{\gamma}(\Pi) = \left( \frac{\partial y_m b}{\alpha} \right) \]  

(10d)

Note that as in the derivatives for the optimal tax rate, the open model provides higher marginal costs than in the closed model. We can use a similar logic to that developed earlier to discover how tax composition differs in the closed and open polities. In the closed polity the marginal costs of increasing the investment share are lower (because of the absence of propensity effects), hence in equilibrium the marginal benefits of increasing the investment share must also be lower. Once more, recalling Figure Four, we know that the effect of investment on utility is concave and thus since marginal benefits are lower, it must be that the actual proportion of tax revenues devoted to
investment is higher. Hence, the closed polity should have a higher proportion of investment in human capital than the open polity.

Why should this be the case? In the open model taxes end up being spent on immediate redistribution rather than on investment because of the exit option. Since such investments have a global market return (h) individuals have the incentive to emigrate to seek this return. As the increase in the investment share of composition increases the propensity of individuals to leave this reduces the level of mean income and thus reduces the level of round one subsidy and round two investment received by the median voter. The median voter thus prefers to redistribute in round one.
4. Potential Strategies To Reduce Exit

The analysis above show that a clear trade-off appears to exist between increased mobility of human capital on the one hand and tax rates and public investment rates on the other. Given the median voter’s desire for a higher tax rate and greater investment in education than is obtained in the open to exit model above, how could such preferences be achieved. In this section I examine four “strategies” that governments, representing the preferences of the median voter, might adopt in order to achieve the desired levels of tax and expense on public education: the compensation, trading, barriers to exit, and autocratic strategies.

4.1 The “Compensation” Strategy

The median voter is unable to achieve their desired level of taxation under the open model outlined above because the top end of the tax base will exit in response to tax increases. However, one might be tempted to look for a manner in which the median voter could “bribe” the wealthy and skilled to stay. The “compensation” strategy attempts to buy off the wealthy by compensating them for redistribution by increasing the proportion of taxation that goes to human capital investment, from which all citizens benefit. In the closed economy (where exit impossible), investment is favored by the wealthy over redistribution. We can see this by looking at the composition that would optimize individual utility:

$$\frac{\partial u_i}{\partial \alpha} = -\delta y + \frac{\delta y b}{\alpha} \text{ and hence } \alpha^* = \frac{y_i}{y} \frac{\delta b}{\delta}$$ (11)
In this formulation, \( a^* \) is increasing in income. Thus, it might appear that “buying off” the wealthiest individuals could be achieved through increasing the proportion of revenues spent on investment. The “compensation” strategy would allow the median voter to increase taxes without increasing exit by the wealthy through tilting the composition of expenditures toward investment. If such public investment raises national income by substantial amounts the wealthy’s share of the overall increase in national income could compensate them for the increase in taxation on their present income. In the language of this model, a rise in the share of investment would counterbalance the rise in taxation leaving the wealthy individual’s propensity function unchanged.

The problem with this strategy is two-fold. Firstly, increases in investment enable individuals to earn more on the world market than they could previously – it thus increases their propensity to leave. The propensity function outlined in this article allows the wealthy to exit accompanied by the investment in human capital derived from taxation in round one and receive the foreign rate of return on this investment in round two. Thus, the home government cannot capture the full investment it makes in these individuals since they exit. The second problem is that the median voter cannot commit to the \( a^* \) preferred by the wealthiest since their preferred proportion of investment is lower than the wealthy’s preferred proportion. Thus promises of increased investment to

\[\text{16} \] This is, in some sense, a simplification of the social democratic strategy of various Scandinavian governments whose emphasis on increasing productivity compensated the wealthy for the relatively high rates of taxation they faced.

\[\text{17} \] Note that this capturability dilemma is not present with supply-side investment in physical capital like infrastructure. Thus, high taxation could conceivably be accompanied by large amounts of such investment. However, there is ample reason to suspect that decreasing returns set in much earlier with investment in physical capital than human capital (i.e. the former has a lower “b”). Moreover, investment in physical capital does not usually involve a direct personal endowment for individuals, hence they have less incentive to vote for such investment since it plays the role of a public good.
compensate for increased taxation may not be credible to the wealthy and hence also fail to stem exit. This assertion leads to the following hypothesis:

\[ H1: \text{Governments representing the median voter cannot use increased expenditure on public education as a perfect trade-off for increased taxation.} \]

4.2 The “Trading” Strategy

If the strategy of buying off the wealthy by promising that tax rises will be compensated for through increased investment is compromised by the problems of that very investment being internationally mobile, and by the non-credibility of such promises, what other strategies might the median voter employ? So far, we have assumed a world where individuals essentially get paid a wage specific to their location (in home or foreign) and to their skill levels. This, however, assumes a strange mix of autarkic trade (or lack of it) and globalized labor movement. What if individuals were able to trade their human capital across borders? If the home region were able to pay the global rate of return for human capital to its workers they would be able to close the gap in opportunity costs that raises the individual propensity function. Although differentials in taxation would still matter, because of the fixed cost (gamma) of moving between countries the aggregate propensity function would be lowered. The following equations clarify this assertion.\(^1^8\)

\(^{18}\) “Open” in these formulations refers to open markets for trade – it is assumed throughout all four strategies that human capital is potentially mobile and thus we are in a world characterized by the open model from section four
\[ \pi_i^{\text{autarky}} = [y_i(h - \tau^*) - (1 - \tau) + (1 - \alpha^*)\tau^* \bar{y}^* - (1 - \alpha) \bar{y}] + \delta y_i[(h - 1)(b \ln(\alpha \bar{y})) - \gamma] \] (12a)

\[ \pi_i^{\text{open}} = [y_i(h - \tau^*) - (h - \tau) + (1 - \alpha^*)\tau^* \bar{y}^* - (1 - \alpha) \bar{y}] + \delta y_i[(h - h)(b \ln(\alpha \bar{y})) - \gamma] \] (12b)

Simplifying this latter expression we get:

\[ \pi_i^{\text{open}} = [y_i(\tau - \tau^*) + (1 - \alpha^*)\tau^* \bar{y}^* - (1 - \alpha) \bar{y}] - \gamma \] (12c)

Note however, that since “h” is only an element of the propensity function and not the utility function, the utility benefits from investment in human capital remain identical to their previous formalization. Thus once more we turn back to Equation (1):

\[ u_i = (1 - \tau)y_i + (1 - \alpha) \bar{y}^j(\Pi) + \delta[y_i(1 + b \cdot \ln[\bar{y}(\Pi)\alpha])] \]

If we examine the effects on the individual threshold function in the autarkic and open environments of a change in the tax rate it is apparent how the distinction operates:

\[ \frac{\partial \pi_i^{\text{autarky}}}{\partial \tau} = y_i - (1 - \alpha) \bar{y} + \frac{\delta y_i(h - 1)b}{\tau} \quad \frac{\partial \pi_i^{\text{open}}}{\partial \tau} = y_i - (1 - \alpha) \bar{y} \]

We also know that if \( \frac{\partial \pi_i^{\text{autarky}}}{\partial \tau} > \frac{\partial \pi_i^{\text{open}}}{\partial \tau} \) it must be that \( \frac{\partial \Pi^{\text{autarky}}}{\partial \tau} > \frac{\partial \Pi^{\text{open}}}{\partial \tau} \).
With this analysis complete we can turn to the optimal tax rate and tax composition set by the median voter under the open trade system. Recall the balance of marginal costs and benefits of taxation at the optimal rate, as laid out above:

$$\frac{\partial u_m}{\partial \tau} = 0 \Rightarrow y_m - \left(1 - \alpha\right)\tau + \frac{\delta y_m b}{\bar{y}} \left(\frac{\partial \bar{y}}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \tau}\right) = (1 - \alpha)\bar{y}(\Pi) + \left(\frac{\delta y_m b}{\tau}\right) \quad (9a)$$

Note that since $\partial \Pi_{\text{autarky}} / \partial \tau > \partial \Pi_{\text{open}} / \partial \tau$, it must be that the left-hand side of the above equation is smaller in the open trading system than in the autarky (remembering that $\partial \bar{y} / \partial \tau$ is negative and hence as $\partial \Pi / \partial \tau$ gets larger the left-hand side grows bigger). Since this means the marginal cost of taxation is smaller it must be that the marginal benefit of taxation is smaller. We know that the benefits of taxation are concave for the median voter, hence it must be that the rate of tax is higher in the open trading system than in the autarkic trading system.

A similar logic holds for the composition of taxation. Contrast the following derivatives with respect to the redistribution/investment trade-off $\alpha$:

$$\frac{\partial \pi_{\text{autarky}}^i}{\partial \alpha} = \bar{y} + \frac{\delta y_i (h - 1) b}{\alpha} \quad \frac{\partial \pi_{\text{open}}^i}{\partial \alpha} = \bar{y}$$

Hence, $\frac{\partial \pi_{\text{autarky}}^i}{\partial \alpha} > \frac{\partial \pi_{\text{open}}^i}{\partial \alpha}$ and $\frac{\partial \Pi_{\text{autarky}}}{\partial \alpha} > \frac{\partial \Pi_{\text{open}}}{\partial \alpha}$.

As before with marginal costs of increasing the proportion of investment equaling the marginal benefits.
\[
\tilde{\gamma}(\Pi) - \left( (1 - \alpha) \tau \cdot \frac{\partial Y}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha} \right) - \left( \frac{\partial y_m b}{\partial y} \cdot \frac{\partial \Pi}{\partial \Pi} \cdot \frac{\partial \Pi}{\partial \alpha} \right) = \left( \frac{\partial y_m b}{\alpha} \right) (10c)
\]

Note once more that the left-hand side of this equation (marginal costs) must be smaller in the open trading system model. Hence the right hand side (marginal benefits) must also be smaller and thus a be larger.\(^{19}\) Thus under the open trading system, a greater share of tax expenditures goes to investment than under the autarkic system.

The preceding results demonstrate a surprising result. Increased potential global mobility of human capital and increased taxation can be complements but only under conditions of highly open trade. As the market return to human capital decreases from its global peak it becomes more difficult to sustain high taxation as wealthy individuals seek less constricting tax environments. Moreover as the domestic return on human capital decreases relative to the global rate it also becomes increasingly difficult to devote high proportions of tax expenditures to the development of human capital. Rather, tax revenues will be spent on immediate redistribution.

The above analysis suggests, however, that given the increased international mobility of highly skilled individuals, trade can actually play a beneficial role in halting this exodus. Moreover, high levels of taxation may still be sustainable provided rates of return on skills do not differ sharply from the global rate. Many academics have noted the

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\(^{19}\) Referring once again to the logic underlying Figure Four.
The correlation between openness to trade and large government. The arguments explaining this relationship tend to emphasize the importance of having a large government and high tax rates as a way of insuring against the volatility caused by high volumes of trade. My analysis takes a slightly different tack in explaining this relationship. As opposed to openness to trade causing volatile behavior, I posit that it is actually high levels of taxation that could cause volatility through the exit of the skilled and wealthy. In my model openness to trade actually has a beneficial, calming effect on this process since it allows the equalization of domestic and global rates of return on human capital.

\[ H2: \text{For countries facing the possibility of human capital exit, increased openness to trade and higher tax rates should be complements.} \]

\[ H3: \text{For countries facing the possibility of human capital exit, increased openness to trade and higher investment in human capital should be complements.} \]

### 4.3 The “Barriers to Exit” Strategy

The trading strategy has much to recommend it and not only for its direct ability to raise incomes and thus lower exit but also for many of the traditional reasons that free trade is thought to be beneficial: specialization, diversity, efficiency. However, as a mechanism for reducing the propensity of the skilled to exit it is not watertight. For one

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thing, raising incomes does not entirely compensate for increasing taxation – it merely reduces the propensity effect, rather than removing it entirely. Tax differentials still matter, and as the fixed cost of international movement asymptotes to zero (as might be the case for finance capital, for example), perfect tax arbitrage governs the movement of the skilled.

Moreover, the ability to provide incomes matching the global market return for skills is a debatable assumption. Given that trade in services and high-value goods is hardly as advanced as that of commodities, expecting, market returns to equalize is over-optimistic. Additionally, the above model assumed that nations’ skill distributions were identical. While this does not appear controversial in the very long-run, it is clear that in the present global economy levels of development are tightly correlated with the mean of the skill distribution across states – put more simply, levels of education and levels of GNP are positively related.\(^\text{21}\) Thus, while the trading strategy might be applicable inside of the OECD, where incomes and skill distributions are comparable, this may not be a implementable strategy in developing states.

A different strategy, the “barriers to exit” strategy provides a more direct method of dealing with exit than the “trading” strategy: raising the fixed costs of exit to near-insurmountable levels. In the language of the above model this means raising ?, so that for any given level of taxation/home-foreign income differential/tax composition/etc, the size of the aggregate propensity function is lower (that is, there is less exit). How might this be achieved? It could be unilateral: closing the borders, preventing émigrés from returning to visit families, creating post-emigration taxation schemes. It could be multilateral: the international institution of visas, customs control, immigration

agreements, or systems of certification which prevent professionals in one state from transferring seamlessly to another. Finally, it could be natural costs: distance, language differences, state size.

Clearly, only some of these fixed costs to exit can be manipulated by the median voter / government. Those involving multilateral agreement must be negotiated, raising the many difficulties that beset interstate cooperation and institutional innovation. Natural costs can only be lowered through technological change or the remaking of states. Nonetheless, we should remain aware of these unalterable barriers to exit since they help to explain the broad international variation we see in levels of taxation, human capital investment, and human capital exit. We should also consider that such costs might effect the potency of a “trading strategy”: that is, certain attempts to raise the fixed costs of exit might also worsen trade relations or devalue the human capital of the state’s citizens (for example, emigration/immigration controls may discourage trade and investment, language barriers may reduce the value of citizens’ human capital). Thus, at some level the “trading” strategy and the “barriers to exit” strategy may be substitutes.

How does the “barriers to exit” strategy operate within the model? We should look firstly at the effect on the individual propensity function. We discovered earlier that the identity of the threshold individual was positively related to the fixed cost of exit, or:

\[
\frac{\partial y_x}{\partial \gamma} = \frac{1}{(h - \tau^*) - (1 - \tau) + \delta[(h - 1)b \ln(\alpha \tau^*)]} > 0 \iff (h - \tau^*) > (1 - \tau) \quad (4a)
\]
We know also that as $y_p$ gets larger, $\gamma$ gets smaller since it reduces $\int_{y_x}^{y} f(y)dy$.

Thus, it must be that $\partial \Pi/\partial \gamma < 0$. This reduction, for any given tax level, of the propensity to exit leads to the conclusion that for a given level of exit, taxes can be higher if fixed costs of exit are also higher. Since the median voter in the model with closed exit prefers a higher rate of tax than her counterpart in the model that allows full human capital exit, we can presume higher rates of taxation in states with higher fixed costs. Moreover, if the median voter can set the fixed costs of exit, she will do so, so as to maximize her preferred level of taxation.

A second, slightly more nuanced, strategy of raising “barriers to exit” is through the actual investment in human capital made in the model. We assume that human capital has a unique global market rate ($h$). However, it might be that some human capital is state-specific – that is, its rate of return outside the country of investment is a degree lower. If, for example, for some skill $s$, $h_s < 1$, the propensity to individuals to leave will drop dramatically, perhaps to less than zero for all individuals (unless tax differentials are particularly important). Or it could be that general skills and state-specific skills are generated separately, with the latter produced through the public-investment component and the former in the original skill distribution. State-specific skills could include training in such non-transferable skills as unique legal codes, civil service work, language skills, country-specific certification, etc. We should thus expect to see higher rates of taxation, and higher tax composition of human capital investment in states where human capital is itself state-specific.
**H4:** Increased “barriers to exit” and increased taxation should be complements.

**H5:** Increased “barriers to exit” and increased public investment in human capital should be complements.

### 4.4 The “Autocratic” Strategy

One final strategy for stemming human capital exit is to simply ignore the wishes of the median voter. In autocracies, or highly oligarchic voting environments, governments need not follow the tax level / tax composition preferences of the median voter. They may wish instead to follow the preferences of the wealthiest individual (a tax rate asymptoting toward zero), we can refer to such regimes as *wealth-biased autocracies*. Conversely some autocracies (for example those producing the East Asian tigers Singapore and South Korea) might favor technocratic development plans (which might, for example, push all tax expenditure toward investment in human capital): we can refer to these regimes as *developmental autocracies*.

Although such governments may not be immediately able to match the global rate of return for human capital (i.e. \( h > 1 \)) they may be able to counteract this effect on exit by reducing tax levels a commensurate amount (*wealth-biased autocracies*), or by shifting the composition of tax expenditure to investment (*developmental autocracies*). This latter
strategy was made impossible in earlier models since the median voter could not commit to a suboptimal (for them) ratio of tax composition.

The autocracy cannot of course prevent the higher levels of human capital investment from increasing the potential returns for exit but the aforementioned differentials in tax levels may compensate for this. Moreover, given that the autocratic state is not beholden to the wishes of the median voter or indeed to democratic / liberal values, we might expect such a state to create high fixed costs of exit, as in the previous strategy – thereby, enabling higher levels of human capital investment without commensurate increases in aggregate exit (such a state may not, however, be tempted to raise taxes – unless it takes the form of a “predatory” state).

H6: Wealth-oriented autocracies should produce lower rates of taxation and lower levels of public investment in human capital.

H7: Developmental autocracies can produce higher levels of human capital investment while maintaining relatively low tax rates.
5. Empirical Testing of the Model

The four strategies that states might employ to prevent exit, as laid out above, permitted us to develop some testable hypotheses. However, given the scarcity of data on actual human capital mobility, such tests at present must focus on the presumed consequences of such mobility.\(^{22}\) In particular, in this section I present some preliminary empirical observations on cross-national differences in educational expenditure (or public human capital investment). Recall the discussion in the analysis above of \(a\), the proportion of tax revenues spent on human capital investment. The analysis suggested that \(a\) ought to be lower, the higher the propensity to exit is. The strategies to reduce exit should thus be correlated with higher levels of \(a\), given that these strategies reduce the propensity to exit.\(^{23}\)

The following empirical test examines two particular strategies using data from Barro and Lee’s 1994 cross-sectional database of 134 countries\(^{24}\). Given that the relevant data from this source does not provide comprehensive coverage of the post-1960 period (that is, some important variables only have a truncated period of observation), I have chosen to use only cross-sectional data for the year 1985 (the final period in Barro/Lee 1994). As noted, this empirical work is thus preliminary.

\(^{22}\) This paper represents my preliminary research on this topic and the empirical testing also reflects this early stage of development. The next step will be to obtain information on human capital flows between states, on the human capital ‘mix’ of traded goods and services, and on the inter- and intra-national distribution of income between the skilled and unskilled. The present absence of such data reflects both the novelty of the topic and the difficulty of data collection in this area.

\(^{23}\) This holds for all the strategies except for the \textit{wealth-oriented} autocratic strategy in which the government reflects only the preferences of the wealthiest citizens who favor low investment in human capital and low taxation.

\(^{24}\) This data was chosen because it provides the basis for Rodrik’s (1999) well-known finding that openness to trade was a significant determiner of government size – a finding suggested by the analysis in this article, albeit for somewhat different reasons. The data is available at www.nber.org/pub/barro.lee/ascii/.
The next stage of research will necessarily involve the incorporation of time-series analysis and fixed effects. Despite these numerous caveats, a cross-sectional analysis nonetheless produces some highly suggestive results.

A brief discussion of the variables will help illustrate how the empirical tests in this paper relate to the analysis developed above. The dependent variable used is the average proportion of GDP spent on education by the government in 1980-1990 (GEETOT5). This variable is scaled from zero to one, with one representing one hundred percent of GDP spent on education (a graduate student’s dream). This variable is intended to be a proxy for $a$, the proportion of tax revenues spent on public human capital investment. Figure Five demonstrates the density function for GEETOT in the given dataset—it has a roughly normal distribution with a mean of 0.0443 and a standard deviation of 0.0184 (thus the mean percentage of GDP spent on public education is 4.4% and approximately 95% of states spend between 2.6% and 6.3% of GDP on education). Thus, our analysis above should lead us to conclude that as the propensity to exit goes up, ceteris paribus GEETOT5 should decline. Since we do not have precise data on such a propensity (and indeed like utility, propensity is inherently directly unobservable), we need to analyze variables that might effect this propensity. This leads us to the kinds of independent variables suggested by the analysis of state strategies to reduce exit, as outlined earlier.

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25 I choose to analyze only the composition of expenditure (i.e. the proportion spent on education) rather than the size of taxation and expenditure (the other core focus of the analysis above) because I would to a large degree (and especially with the data I use) be merely replicating Rodrik’s result on the relationship between openness and size of government. Thus, the value added in this article lies in the analysis of a rather than of $t$, to use the language of the formal analysis above. Future tests should look at rates of tax rather than the size of government (since purely redistributive taxation may not show up as government consumption) and relate this to openness, etc.
The tests in this article focus on only two of the strategies – the trading strategy and a version of the autocratic strategy. The compensation strategy, as explained above, is not truly viable in an age of mobile human capital – thus I refrain from testing it. The “barriers to exit” strategy conversely is certainly viable and much anecdotal evidence suggests it is widespread. However, at present there does not appear to be a good data source for ascertaining the strength of exit barriers like post-emigration tax, certification, visa agreements, etc. Natural barriers are easier to operationalize, for example, percent speaking English, size of country, etc. However, given that I do not have access to satisfactory data on “policy” barriers, I choose to ignore the “barriers to exit” strategy in this analysis. If such barriers correlate significantly with the variables incorporated into the empirical analysis below, it is possible that my findings could be biased.
Having qualified my choice of “strategies” to analyze, I turn to my operationalization of the “trading strategy” and the “autocratic” strategy. In order to examine whether states may compensate for higher incomes abroad by opening their borders to trade and thus allowing returns to human capital to equalize internationally (the “trading strategy”) we need two kinds of information. Firstly, it is desirable to know the actual level of trade as a proportion of GDP. To this end I take the common approach of measuring openness as exports plus imports over GDP and this data is taken for the average of 1980-1990 (EXIM5). Secondly, we would want to know the potential level of trade that states might expect to engage in – and this should be thought of as a function of both size (larger states can expect to have a greater diversity of resources) and distance (assuming that transportation costs continue to matter). Barro/Lee 1994 supplies us with a useful measure of this potentiality, called FREEOP.26 Incorporating this potential effect allows us to control for the effect of geography on states’ abilities to utilize certain exit-reducing “strategies”.

The source I use to operationalize the “autocratic strategy” is PRIGHTS5, taken from Barro/Lee 1994 (as the rest of the data is) – a one to seven scale of the level of political rights obtaining in a given state in 1980-1990, with one as most rights. I rescaled this data from zero to one and then subtracted the result from one thus giving me a new variable (still called PRIGHTS5) where zero has the least political rights and one has the most rights. This permits easier interpretation of the resulting

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26 The equation for FREEOP was developed by Lee (1993) and is as follows: FREEOP = .528 - .026 log(AREA) -.095 log(DIST).
coefficients. Nonetheless, this variable is hardly perfect, largely because its source predates the much more commonly used Polity IV dataset. Thus the scores provided by Barro and Lee may leave something to be desired. Nonetheless, the data seem reliable enough to produce at least suggestive results.

What should we expect this variable to show us? Recall the “autocratic strategy”, developed above, noted that autocratic states did not have to pay heed to the median voter and hence could, if they chose to do so, favor their wealthy clients. The analysis above suggested that the wealthy tend to prefer lower levels of taxation and public expenditure on education (since their education tends to be privately funded). Thus, we should expect that wealth-favoring autocracies limit the proportion of GDP spent on education. A possible exception might be found in East Asian states, whose leaders, though often autocratic, were far more “developmental” in aims than typical autocrats. Thus, I include a dummy variable for East Asian states in the analysis (ASIAE).

A number of other control variables have also been incorporated so as to lessen the likelihood that the results obtained derive from missing variables or spurious correlations. In particular I incorporate demographic and macroeconomic variables that are typically associated with education expenditure. Firstly I include demographic controls: the proportion of the population under 15, the total

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27 I make the, not altogether unlikely, assumption that autocracies favor the wealthy (see for example Meltzer and Richard (1984), and Acemoglu and Robinson, Political Origins of Dictatorship and Democracy (2003), for similar views). Better data, for example the Jaggers/Gurr Polity IV dataset might provide a more effective operationalization of this assumption.
population, and the ratio of total workers to population in 1985 (P1585, POP85, WORKER85). In terms of macroeconomic controls, I use the GDP per capita, GDP growth rate and private investment rates for 1980-90 (GDPWB85, GRWB5, INVWB5). In order to also control for the “Rodrik”-type effects of openness on total government expenditure (and also the effect of total expenditure on education costs) I use the ratio of government expenditure to GDP, and I also include the level of defense spending to control for the guns-butter trade-off that might exist in war-torn states, both variables measuring the average between 1980-1990 (GEXP5, GDE5).

I performed a standard OLS regression with robust standard errors in order to ascertain the effect of the treatment variables (EXIM5 and PRIGHTS5) on the proportion of GDP spent on education (GEETOT5). Given that this is a simple cross-sectional regression with an interval level dependent variable, such a simple statistical model is relatively adequate, at least in terms of providing suggestive results. However, due to missing data the number of countries in the analysis drops quite substantially from 134 to 68. This halving of the cases presents a serious caveat to the findings laid out in Table One below.

28 Clearly, the introduction of time-series data in later research will necessitate the use of more advanced techniques than have been employed in the above statistical model.
Table One

<table>
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<th>Coefficients</th>
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<th>P&lt;Sig.</th>
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<td>.022</td>
<td>.105</td>
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Dependent variable GEETOT5. n = 68. All variables with p < 0.05 in **bold.**

The regression, despite these qualifications, produces a number of interesting results. Firstly, openness does appear to be positively related to the proportion of GDP spent on public investment in human capital. An increase in openness (imports plus exports) from zero to one hundred percent of GDP (approximately from a near autarky like Burma to a classically open economy like Norway) accounts for a change in the percentage of GDP spent on education of around 2.5%. Since this change is significantly larger than the standard deviation of GEETOT (around 1.8%), such an increase is quite suggestive.

Secondly, an increase in political rights is also strongly associated with increased public expenditure on education. Shifting from a pure autocracy to a liberal democracy is associated with a 2.6% increase in the amount of GDP spent on public education. The control variables have mostly expected effects: the proportion of under-15 year olds, the
proportion of workers and the proportion of GDP as government expenditure all have statistically significant positive effects on educational expenditure. Surprisingly, GDP per capita does not have a significant effect (and indeed, surprisingly the coefficient is negative). Perhaps equally unlikely is the result that expenditure on defense is a very strong predictor of expenditure on education, a rise of the amount of GDP spent on defense from zero to ten percent would correspond to a 1.68% rise in the amount spent on education – a surprising result given our normal intuitions about guns and butter.
7. In Conclusion

The last few decades have seen an unprecedented shift to knowledge-based industries, a dramatic reduction in the costs of international travel and an increased emphasis on supply-side investment policies at the expense of demand-led Keynesian policies. Yet, much writing in international political economy remains wedded to the theories of “embedded liberalism”, largely stressing the balance of resources between labor and capital and the efficacy, or lack thereof, of monetary policy and competitive exchange rate policy. Thus, a theoretical lacuna is opening up between globalization as occurring and as theorized. This paper makes a very preliminary start at filling this gap by integrating internationally mobile human capital into theories of globalization. In particular the paper stresses that the ability of human capital to exit changes the preferences of the skilled and unskilled, and moreover restricts the kinds of economic policies that can be put into place.

To reiterate the theory laid out in the formal model above, under conditions of mobile human capital, the median voter is forced to set lower taxes and lower investment in human capital than she would prefer under conditions of no exit. This dynamic emerges for two reasons. Firstly, the model demonstrates the expected relationship between taxation and exit – permitting the exit of those who contribute most to the tax base incentivizes the median voter to reduce their tax demands. The second mechanism is the more unique contribution of the paper: increasing investment in human capital does not directly encourage the rich and skilled to leave since they benefit from this more than
from redistribution. However, it is this very investment in human capital that further increases the rate of return on their human capital that individuals can expect to receive on the world market. Thus investment in human capital is lower when individuals can exit. This dynamic can, however, be tempered using a number of strategies. In particular this paper suggests that openness to trade can permit higher tax rates and higher investment in human capital since it allows skilled individuals to earn their global market return. Conversely, states could adopt a “barriers to exit” strategy where they place constraints on exit or provide state-specific human capital. Finally, states could simply ignore the problem, either by refusing the wishes of the median voter or by committing to lower taxes but higher investment: these strategies however can only be achieved under autocratic regimes.

What are the next steps that this analysis should take? The analysis above has presented a very limited theory, as is necessary for a first step into uncharted theoretical territory. One possible extension would be the incorporation of a more complex modeling of electoral politics. The model presented in this paper has an extremely simple political mechanism, largely relying on the median voter theorem to produce political outcomes. While there is much to recommend an Occam’s razor approach to theory-development, given that much of the most important recent work on supply-side policy focuses on differences in partisan preferences over types and levels of public investment (for example, Garrett 1998 and Boix 1998), the introduction of parties into my analysis seems necessary. A further extension would be a more complex modeling of the interaction between trade and human capital mobility. In particular, introducing terms of trade
constraints (for example by examining the scarcity or abundance of human capital in different states) would complicate the ability of states to enter into “trading strategies”. Moreover, as noted above, differing levels of development prevent equalization of rates of return. These caveats aside, picturing a global rate of return for human capital (in a manner analogous to globally converging interest rates) seems to be a fair long-run assumption. A final point of departure might be to consider the provision of physical supply-side investment under globalization. Since this differs from human capital investment because of its relative immobility a different form of analysis would be necessary. Nonetheless this seems to be an important contribution to the shift in the international political economy literature towards the systematic study of supply-side policy under globalization.