Wedges: Distribution, distortions, and market integration

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Giuseppe Bertola *

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Abstract

This paper's model lets an international wedge continuously index a country's capital market integration with the rest of the world, and studies politico-economic determination of a domestic labor wedge that corrects market imperfections and/or redistributes welfare across differently wealthy voters. International integration influences the equilibrium policy, at given country-specific political and structural features, through the strength of factor price effects and through ownership of domestic and foreign capital by the country's citizens. If policy reduces market employment, then it unambiguously does so more strongly when a capital-poor country integrates more tightly with the rest of the world.

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* Università di Torino, CEPR, CESifo.

1 Introduction

This paper characterizes politico-economic determination of policies that redistribute welfare across owners of production factors within and across a country's borders. Because international integration elicits more elastic market responses to uncoordinated policy-makers' actions, standard race-to-the-bottom intuition suggests that it should trigger deregulation of national policies. Beggar-thy-neighbor motives to distort international factor prices are also relevant, however: race-to-the-bottom pressures can be more than offset by the policy's terms-of-trade implications if the country owns a sufficiently large portion of the integrated economy's immobile factor, and a large capital-poor country's representative agent might upon moving from autarky to full integration increase source-basis capital income tax rates (DePeter and Myers, 1994).

The paper's formal model studies these general issues with a specific focus on labor policy implications of capital market integration, motivated by the labor market evidence generated by Economic and Monetary Union (EMU) in Europe. Many models would predict that integration results in wage restraint, but this was not generally observed in EMU (Mikosch and Sturm, 2012), where there is only weak and uneven evidence of race-to-the-bottom effects (Bertola 2016, 2017a).

The technical derivations extend those of Bertola (2016) and its references in two directions: country-specific policies may respond to domestic market inefficiencies as well as to redistributive motives, and proportional capital mobility costs make it possible to study the implications of gradual international integration. These features, and the results, are novel in an international policy competition literature that has focused mostly on policy choices by country-specific representative agents[1] and almost exclusively on the comparisons of autarky and full integration extremes.[2] Because the model's country is not infinitesimally small, its policy can influence equilibrium factor prices: how it does so in politico-economic equilibrium depends on *laissez faire* market imperfections and on the distributional motives of country-specific decisive individuals, and on the tightness on market integration. Intuitively, capital-poor decisive agents are inclined to reduce employment because this changes factor prices in their favor. Their ability and inclination to so depend on capital mobility's implications not only for the elasticity of labor

[1] Distributional issues are discussed briefly in Keen and Konrad (2013) and play a key role in Lockwood and Makris (2006) where capital market integration shifts tax incidence from capital to labor in a price-taking economy with rigid labor supply and heterogeneous factor endowments and policy preferences. Lai (2010) finds that the effects of international integration are ambiguous in a model of special-interest lobbying.

[2] Wilson (1999) notes this limitation of the literature and cites the simple two-period model proposed by Lee (1997), which appears to have remained the only attempt to address issues of policy competition when capital mobility entails transaction costs.

demand, but also for foreign ownership of domestic capital stocks: foreigners are politically irrelevant in determining national policy, which more aggressively shifts income from capital to labor when more capital is foreign-owned. The latter effect may or may not overturn race-to-the-bottom predictions in comparisons of autarky with full integration, as in previous work. The present model's less extreme and arguably more realistic smooth variation of international integration has an implication that overturns race-to-the-bottom intuition for a case of practical interest: policy must more strongly reduce employment when a capital-importing country becomes more tightly integrated with the rest of the world.

Section 2 sets up a static economy where flexibly supplied labor is employed with complementary capital: Subsection 2.1 models capital market equilibrium when cross-border flows reduce capital productivity as in Samuelson's (1954) "iceberg" transport cost specification for trade in goods, used also by Martin and Rey (2000) to analyze the financial implications of international capital mobility; Subsection 2.2 characterizes the welfare implications for differently wealthy individuals of a wedge between labor's productivity and utility margins that represents market imperfections and policies, treated as exogenous in macroeconomics (Shimer, 2009) and endogenously determined in models that rule out compensatory lump-sum transfers and let distortions redistribute welfare across heterogeneous agents (Meltzer and Richards, 1981). Section 3 studies the interaction of politico-economic equilibrium policies and international integration. Subsection 3.1 characterizes policy in autarky, where it depends on *laissez faire market* imperfections and on whether politically decisive agents are capital-poor within the country. Subsection 3.2 studies how the equilibrium depends on capital market integration. As both employment levels and capital flows vary continuously and endogenously with market integration, formal derivations are somewhat intricate, but deliver clear substantive results. If policy reduces employment below *laissez faire* in a capital-poor country, it unambiguously does so more strongly when integration becomes tighter. Market integration is likely to (but need not) imply race-to-the-bottom deregulation only if capital flows out of the country. Subsection 3.3 studies technical issues arising in the transition from autarky to non-zero capital flows and Subsection 3.4 discusses the results' relationship to those of models that, comparing only the limit cases of autarky and full integration, tend to overemphasize race-to-the-bottom deregulation implications. Section 4 concludes outlining briefly how the model and possible extensions may help interpret real-life interactions between national policy and international integration.

2 Economic structure

Per capita production is a constant-returns, constant-elasticity function

$$y(l, k_d) = l^{1-\gamma} (k_d)^{\gamma}, \ 0 < \gamma < 1$$

of effective labor l and domestic capital k_d The two factors' unit incomes are

$$r\left(l,k_d\right)=\tilde{\gamma}\left(k_d/l\right)^{\gamma-1} \tag{1}$$

$$w\left(l,k_d\right)=\left(1-\tilde{\gamma}\right)\left(k_d/l\right)^{\gamma} \tag{2}$$

and do not coincide with their marginal productivities if $\tilde{\gamma}\neq\gamma$ represents structural distortions, such as pricing power in factor or product markets.

Capital may flow into or out of a rest-of-the-world economy that functions in much the same way as the model country's: K denotes its per capita wealth, L its per capita labor supply, and N its relative population size. The results hinge on N being finite, because the country's policy cannot influence income distribution if it is so small as to take factor prices as given, but the effects of interest have the same sign for all $N<\infty$. Technology is the same in the rest of the world as in the model's country, with the same elasticity parameter γ, and any distortions imply the same $\tilde{\gamma}$. This greatly simplifies notation and derivations and lets the model focus on market integration across boundaries defined by immobile factors and by policy choice and enforcement rather than by different structural features.

2.1 Partial integration

To represent simply the contractual, cultural, and institutional problems that underlie less than complete market integration, let $\nu\leq 1$ denote the relative productivity of foreign-owned capital. The country uses some foreign-owned capital if it is sufficiently capital-poor and ν is large enough to let $k_d>k$ equalize the marginal productivities of capital flows. In the country, foreign capital units that contribute $\nu<1$ to the effective capital stock have marginal productivity $\nu\left(k_d/l\right)^{\gamma-1}$. In the rest of the world, the capital stock is $KN-\left(k_d-k\right)/\nu$, with marginal productivity $\left(K/L+\left(k-k_d\right)/\left(\nu NL\right)\right)^{\gamma-1}$. Marginal productivities are equal when

$$\nu^{\frac{1}{\gamma-1}}k_d/l=K/L+\left(k-k_d\right)/\left(\nu NL\right). \tag{3}$$

It will be convenient to write the domestic capital stock that satisfies this condition in the form

$$k_d=\frac{\lambda(\nu,l)}{\mu(\nu)}k,\text{ for }\lambda(\nu,l)\equiv\frac{l\nu^{\frac{\gamma}{1-\gamma}}}{l\nu^{\frac{\gamma}{1-\gamma}}+NL},\quad \mu(\nu)\equiv\frac{k}{k+NK\nu}. \tag{4}$$

Capital does flow into the country if $k/l<\nu^{\frac{1}{1-\gamma}}K/L$, which implies $k_d>k$ in (4).

If $k/l>\nu^{\frac{1}{\gamma-1}}K/L$, symmetric derivations establish that $k_d/k=\lambda(1/\nu,l)/\mu(1/\nu)<1$ and capital flows out of the country. When

$$\nu^{\frac{1}{\gamma-1}}<\frac{k/l}{K/L}<\nu^{\frac{1}{1-\gamma}} \tag{5}$$

capital does not flow, and $k_d=k$.

In these expressions l is endogenously determined by policy in politico-economic equilibrium, as discussed next. It would be possible, but will not be necessary, to model L in terms of other countries' policy choices.

2.2 Individual welfare

Individual i's consumption of market goods, in a static setting, coincides with the income $rk_i + wl_i$ earned by k_i units of capital and l_i units of labor, which is supplied elastically in order to maximize a welfare objective function that for all i has the same quasi-linear form

$$U = r\left(l, k_d\right) k_i + w\left(l, k_d\right) l_i - B(l_i),\ B'(l) > 0,\ B''(l) \geq 0. \tag{6}$$

The first-order condition $w\left(l, k_d\right) = B'(l)$ identifies the same optimal $l_i = l$ for all i when only wealth is heterogeneous and does not influence the marginal utility of labor, because preferences are quasi-linear. Absence of income effects makes it possible to relate factor prices and factor supplies without specifying the distribution of wealth. It implies a positive relationship between l and w that is not particularly realistic along the intensive margin: in the context of this and other macro models, l represents both intensive and extensive labor supply by unitary households that can transfer utility among their members. Ruling out such transfers *across* households rationalizes policy distortions.

When $k_i \neq k_d$ or $\tilde{\gamma} \neq \gamma$ then the individual welfare expression

$$U(k_d, l; k_i) = k_i \tilde{\gamma} \left(k_d/l\right)^{\gamma - 1} + \left(1 - \tilde{\gamma}\right) l^{1-\gamma} \left(k_d\right)^{\gamma} - B(l)$$

differs from the economy's per capita welfare, $y(l, k_d) - B(l)$. Its derivative with respect to l is

$$\begin{aligned} \frac{\partial U(k, l; k_i)}{\partial l} &= \left(\frac{k_i}{k_d}\tilde{\gamma} + \left(1 - \tilde{\gamma}\right)\right)\left(1 - \gamma\right)\left(k_d/l\right)^{\gamma} - B'(l) \\ &= \left(1 + \left(m\frac{k_i}{k_d} - 1\right)\gamma\right) w\left(l, k_d\right) - B'(l), \end{aligned} \tag{7}$$

where the second equality uses (2) and defines

$$m \equiv \frac{\tilde{\gamma}\left(1 - \gamma\right)}{\left(1 - \tilde{\gamma}\right)\gamma}. \tag{8}$$

This expression exceeds unity when $\tilde{\gamma} > \gamma$ and labor's market income falls short of productivity. It appears also in the derivative of individual welfare with respect to k_d,

$$\begin{aligned} \frac{\partial U(k_d, l; k_i)}{\partial k_d} &= \left(k_i \tilde{\gamma} \left(k_d/l\right)^{\gamma - 1} \left(\gamma - 1\right) + \left(1 - \tilde{\gamma}\right) l^{1-\gamma} \left(k_d\right)^{\gamma} \gamma\right) / k_d \\ &= \left(1 - m\frac{k_i}{k_d}\right) \gamma w\left(l, k_d\right) \frac{l}{k_d}. \end{aligned} \tag{9}$$

Capital's equilibrium relationship to l need not be differentiable (see Subsection 3.3) but it is when domestic capital satisfies (3): then, (4) implies

$$\frac{\partial k_d(\nu,l)}{\partial l} = (1-\lambda(\nu,l))\,\frac{k_d}{l},$$

which with (7) and (9) yields the expression

$$\begin{aligned}\frac{dU(k_d(l),l;k_i)}{dl} &= \frac{\partial U(k,l;k_i)}{\partial l} + \frac{\partial U(k_d,l;k_i)}{\partial k_d}\frac{\partial k_d(\nu,l)}{\partial l} \\ &= \left(1+\left(m\frac{k_i}{k_d}-1\right)\gamma\lambda(\nu,l)\right)w\,(l,k_d) - B'(l) \qquad (10)\end{aligned}$$

for the total welfare impact of l variation in individual i's welfare. The model's structure lets it be influenced by international capital mobility, as indexed by ν, and by the heterogeneous wealth k_i of otherwise identical individuals.

3 Politico-economic implications of international integration

Because policies that determine l have different implications for the model economy's individuals, it is necessary to specify a political decision process. When non-zero capital flows let welfare be differentiable and (10) represent the welfare effect of l, the first-order condition that sets (10) to zero identifies individual i's preferred l if the second-order condition is satisfied, i.e., the derivative of (10) with respect to l is negative. Because expression (10) is monotonically (and, under quasi-linear preferences, linearly) increasing in k_i at given l, total differentiation of the first-order condition establishes that individual i's preferred l is increasing in k_i. Hence, when expression (10) is zero at the $k_{\bar{\imath}}$ wealth level of a decisive agent $\bar{\imath}$ it is negative for $k_i < k_{\bar{\imath}}$, positive for $k_i > k_{\bar{\imath}}$: individuals poorer than $\bar{\imath}$ would like to decrease l, and richer ones would like to increase it, no other l is favored by a democratic majority if $k_{\bar{\imath}}$ is the median of the country's wealth distribution.[3]

This argument relies on differentiability and concavity of individual policy objectives. The functional form assumptions in (1), (2), and (6) make the objective function concave in l at given k_d. Concavity is difficult to establish analytically when variation of l induces variation of k_d through the functional forms in (4), but it is easy to verify it numerically (see Subsection 3.3 below, which also verifies at least weak monotonicity of individual welfare at non-differentiable points).

Focusing for now on interior solutions, and denoting $k_{\bar{\imath}}/k \equiv x$ the fraction of the economy's per capita

[3] Policy choices could alternatively assign different social welfare weights to agents that are more or well endowed with capital. This approach would yield qualitatively similar implications, but require a complete specification of factor endowments.

capital owned by the decisive agent, the politico-economic equilibrium l inserts a proportional wedge

$$\omega = 1 + \left(mx \frac{k_d}{k} - 1 \right) \lambda(\nu, l)\gamma \tag{11}$$

between the market wage and $B'(l)$, the marginal opportunity cost of market work. To highlight two conceptually distinct reasons why this expression generally does not equal unity, as it would in *laissez faire*, it is useful to rewrite (11) in the form

$$\omega = \left[mx \frac{k}{k_d} \lambda(\nu, l)\gamma \right] + \left[1 - \lambda(\nu, l)\gamma \right].$$

If $x = 0$ the decisive agent disregards capital income, and maximizes labor surplus: the first square bracket vanishes, and $(1 - \tilde{\gamma}) (k/l)^{\gamma}$ exceeds the marginal opportunity cost $B'(l)$ by a proportional markup $(1 - \lambda(\nu, l)\gamma)^{-1}$. This is dubbed a "market power" effect in what follows. If $x > 0$ the decisive agent's welfare includes some of the capital income effects of l. The first square bracket equals $\lambda(\nu, l)\gamma$ when $xk = k_d$ and $m = 1$: because variation of l has no marginal effects on total production, its labor and capital income effects offset each other exactly from the point of view of a decisive agent entitled to aggregate capital's marginal productivity; in this case, the politico-economic equilibrium ω is unitary, and *laissez faire* obtains. In general, ω accounts for a marginal capital income share that is distorted if $\tilde{\gamma} \neq \gamma$, and diluted if the decisive agent does not own all domestic capital. This is dubbed a (capital) "ownership" effect in what follows.

The equilibrium policy depends on the country-specific structural features summarized by m and political characteristics summarized by x, and on international market integration: recalling from (4) that when capital does flow across the country's borders then $xk/k_d = xk\mu(\nu)/\lambda(\nu, l)$, policy sets

$$\omega = 1 + \left(mx\mu(\nu) - \lambda(\nu, l) \right) \gamma. \tag{12}$$

This compact expression shows how the political and economic factors represented x and m interact with the functions defined in (4), evaluated at ν if capital flows into the country and at $1/\nu$ if it flows out. These have straightforward interpretations and play intuitive roles in determining ω. Expression $\lambda(\cdot)$ is the country's share of an effective total employment measure that adjusts the foreign component by the function of ν implied by equilibrium condition (3): a larger $\lambda(\cdot)$ associates variation of l with a smaller proportional variation of domestic capital, and the market power effect makes policy more effective. Expression $\mu(\cdot)$ is the country's share of the effective capital that is potentially available for domestic production: a larger $\mu(\cdot)$ implies that less capital income is paid to foreigners, and the ownership effect implies that policy tends to increase ω.

3.1 Distribution and distortions in autarky...

The country's capital intensity may lie within the bounds defined by (5). In this case, which deserves a brief preliminary discussion because it highlights the roles of country-specific political and economic features, the economy uses only its national capital stock k and the welfare effect of l is given by (7): the preferred l is monotonically increasing in k_i, and the decisive agent's policy choice implies

$$\omega_A = 1 + (mx - 1)\,\gamma. \tag{13}$$

If the country is autarkic, the wedge is the one implied by $\mu(\cdot) = \lambda(\cdot) = 1$ in (12).

This expression depends on γ, which indexes factor shares and labor demand elasticity, and on the product of m and x, which indexes the joint roles of structural imperfections and distributional considerations in determining the optimal l from the decisive agent's point of view. Because the marginal income shares of labor and capital sum to unity, ownership offsets market power exactly whenever $mx = 1$: both when $x = m = 1$, so that policy suits the average individual of an undistorted market economy, and also when $x \neq 1$ denies political support to correction of $m \neq 1$ distortions.

When $x = 1$ expression (13) simplifies to $(1 - \gamma) / (1 - \tilde{\gamma})$, so policy compensates fully the deviation of the wage from marginal productivity, or of marginal cost from output price, represented by $\tilde{\gamma} \neq \gamma$: should $\tilde{\gamma} < \gamma$ imply $m > 1$, the private reward of labor market participation is lower than its average social productivity, and for $x = 1$ an "active" policy enforces $\omega > 1$ and increases l above its *laissez faire* level.

When $x \neq 1$, the decisive agent does not maximize average welfare: because utility cannot be transferred, policy reduces average welfare in order to influence its distribution through factor prices. If in *laissez faire* labor earns less than its marginal contribution to the country's production, a higher l increases average welfare, and increases even more the welfare of individuals who own relatively more complementary capital. Policy accounts for the positive implications of employment for capital income as long as $mx > 0$, but if $mx < 1$ the wedge exceeds unity and enforces a lower l through such "passive" policies as payroll taxes redistributed to workers (or per capita in the model, where all individuals supply the same labor); minimum wages, which have similar welfare implications if households can transfer utility among their employed and unemployed members;[4] or such quantity constraints as working time limits, minimum annual vacations, or mandatory retirement, which have the same welfare implications as the wedge they introduce between demand and supply.

[4] The unemployment rate is $1 - l/l_s \approx \log\left(\omega^{-1/\beta}\right) \approx (1 - \omega)/\beta$ if the wage exceeds the market clearing wage by a proportion $1/\omega$ and $1/\beta$ is the wage elasticity of labor supply.

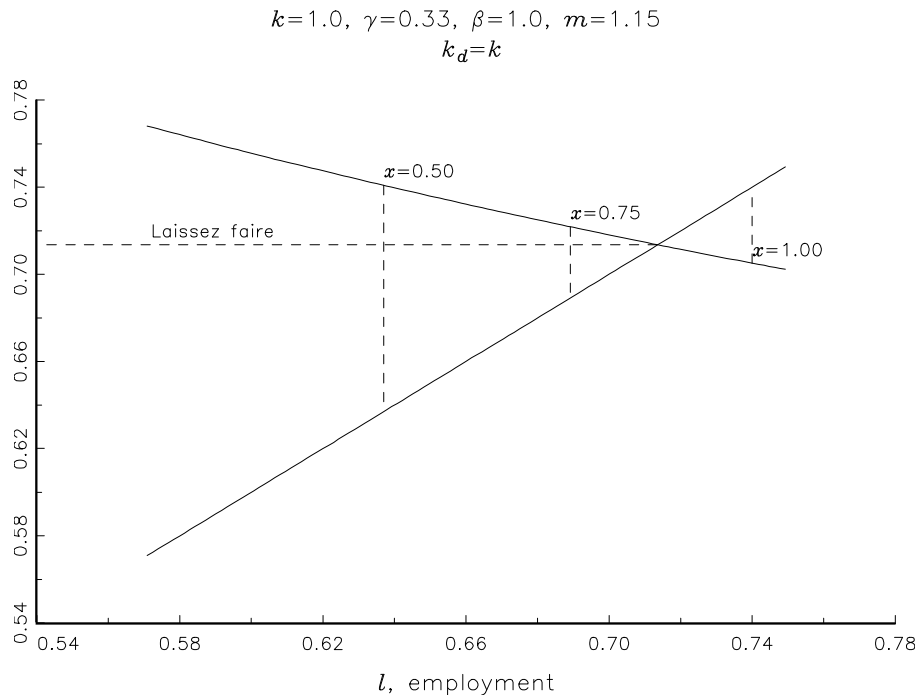

Figure 1: Policy wedges in a closed economy for various values of the decisive-individual relative wealth indicator x.

Figure 1 illustrates the equilibrium for various values of x and a constant-elasticity $B(l) = l^{1+\beta}/(1+\beta)$ functional form for labor's income-equivalent opportunity cost. In the figure, when $x = 1$ correction of distortions calls for a 10% wage subsidy and, along a supply curve with unitary elasticity, implies a similar increase of employment above the *laissez faire*. For smaller values of x, the structural imperfections that imply $m > 1$ are increasingly less relevant in the policy wedge (11). In Figure 1, x =75% more than fully offsets active labor policy motives, and replaces the 5% employment subsidy favored by the average individual with a tax at a similar rate. Lower values of x further reduce employment: by (13), as $x \to 0$ the wedge ω approaches $1 - \gamma$ for any m, enforcing the proportional wage mark-up chosen by an economy-wide monopoly union that disregards all non-labor income.

3.2 ...and in partial integration

Consider next the policy determined by politico-economic equilibrium when capital is allocated across countries by condition (3). The neat expression (12) is not a closed-form solution for the equilibrium policy wedge ω because when capital does flow $\lambda(\cdot)$ depends nonlinearly on l, which in turn depends on ω. The numerical solutions in Figure 2, which use the same functional forms and parameters as Figure 1, show that tighter international integration increase employment along the labor supply curve as capital inflows increase labor demand, but less than if labor policy were not reformed in the direction of stronger

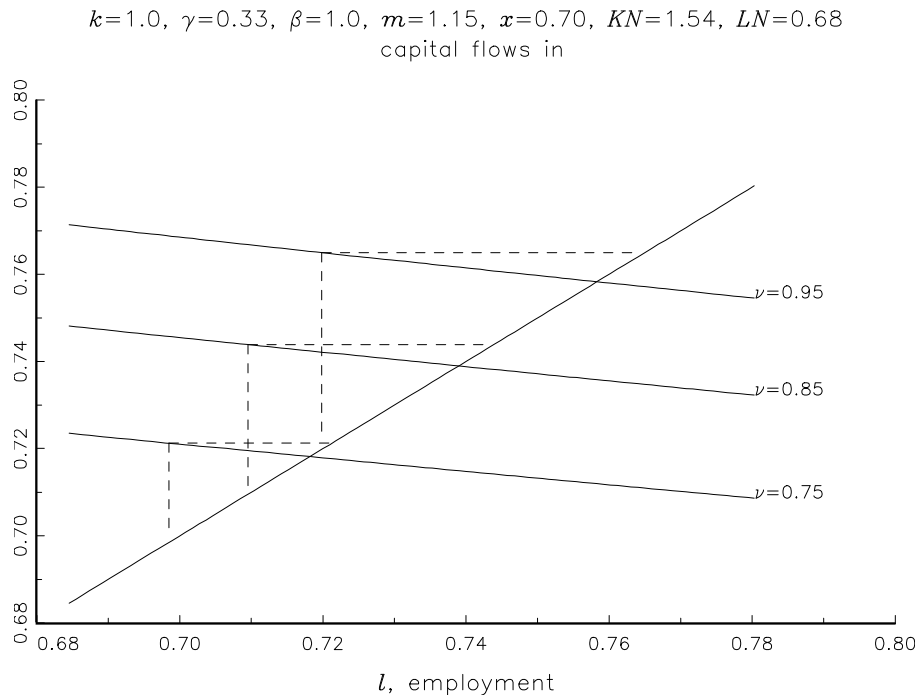

Figure 2: Policy wedges in a partially-integrated capital-importing country, for various values of the ν indicator of foreign-owned capital's relative productivity.

taxation and/or stricter wage and quantity constraints. Intuitively, the higher marginal productivity of labor implied by capital inflows make it optimal for the economy's capital-poor decisive agent to increase employment.

It is possible but not straightforward to characterize analytically the joint behavior of l and ω. The implications of tighter integration for the wedge (12) are unambiguous when the country enforces passive policies and experiences capital inflows: it can be shown that, as in Figure 2, larger values of ν imply a smaller ω and higher unemployment. To see this, differentiate $\lambda(\cdot)$ and $\mu(\cdot)$ and (omitting their arguments for typographical simplicity) use the resulting expressions

$$\frac{\partial\lambda(l,\nu)}{\partial\nu}=\frac{(1-\lambda)\lambda}{\nu}\frac{\gamma}{1-\gamma}>0,\quad \frac{\partial\lambda(l,\nu)}{\partial l}=\frac{(1-\lambda)\lambda}{l}>0,\quad \frac{d\mu}{d\nu}=-\frac{(1-\mu)\mu}{\nu}<0, \tag{14}$$

to write the derivative of (12) in the form

$$\left.\frac{d\omega}{d\nu}\right|_{k_d>k}=\gamma\frac{d}{d\nu}\left(mx\mu-\lambda\right)=\gamma\left(-mx\frac{(1-\mu)\mu}{\nu}-(1-\lambda)\lambda\left(\frac{\gamma}{1-\gamma}\frac{1}{\nu}+\frac{1}{l}\frac{dl}{d\nu}\right)\right). \tag{15}$$

This expression is certainly negative, and associates tighter integration with a more passive policy stance, if $dl/d\nu>0$, i.e., tighter integration increases employment. The Appendix shows formally that $dl/d\nu>0$ if the country that receives capital inflows and implements a passive policy: in this case, tighter integration unambiguously implies a stronger distortion of below its *laissez faire* level.

To understand and interpret this result, which runs counter to the usual "race-to-the-bottom" intuition, note that a larger ν reduces the country's share μ of the partially integrated market that supplies some of its capital: when a larger portion of domestic capital income is paid to foreigners, the ownership effect induces the decisive agent to choose policies that decrease l further below its *laissez faire* level. Larger values of both ν and l imply that the country's policy controls a larger effective share λ of the partially integrated market's immobile factor, and exerts a stronger influences on marginal productivities. This market power effect makes it optimal to adopt a more passive policy. Hence, if the country receives capital inflows and enforces a passive policy all equilibrium effects of a larger ν move the policy wedge in the same direction, and more than suffice to establish that the tighter integration represented by a larger ν implies a smaller ω wedge and more passive policies.

Policy is passive not only if $mx < 1$, so that the country's politico-economic structure would support a passive policy in autarky, but also if $mx > 1$ and capital inflows sufficiently weaken the ownership effect. Note in particular that for $mx = 1$ then policy does not disturb the *laissez faire* in a capital-poor country, but is passive when foreigners own some of the country's domestic capital, and more strongly passive as tighter integration amplifies capital inflows. Symmetrically, policy tends to become active, or less passive, if capital flows out of the country.

The formal derivations in the Appendix can be readily adapted to show, symmetrically, that tighter integration makes an active policy more strongly active in a capital-importing country. It does not appear possible to obtain analytic sufficient conditions for a passive policy's reaction to tighter integration in a capital-importing country: stronger capital outflows change ownership in a way that tends to imply deregulation, but market power is not obviously weaker when deregulation increases l at given ν. Analytical results are symmetrically ambiguous in the case of a capital-importing country that implements an active policy.

3.3 Transitions out of autarky

The derivations above suppose that both capital stocks and policy satisfy interior equilibrium conditions. In that case, the linear functional form of international market frictions yields a neat characterization of interactions between capital flows and policy and of relationships between the domestic (ω) and international (ν) "wedges", both of which would equal unity in the *laissez faire* equilibrium of complete international integration. However, politico-economic equilibrium features corner solutions and discontinuities at zero capital flows, because linear transaction costs vanish abruptly at that point. This section characterizes such situations, which entail somewhat intricate technicalities but also provide substantive insights into the relationship between the results above and those of models that only allow for autarky

or full integration.

It will be useful to refer to the numerical solutions drawn in Figure 3. The parameters are mostly the same as in previous figures, but two values of K and two of mx make it possible to inspect four different configurations of the model country's relative capital intensity and politico-economic structure. In the left column of panels $mx < 1$, and passive policy reduces l below its *laissez faire* level in autarky; panels on the right let $mx > 1$, so active policy increases l. Each panel shows how the variable on the vertical axis depends on the ν partial-integration wedge by continuous lines when a large K makes the country capital-poor relative to the rest of the world, by dashed lines if a small K implies that the country's market integrates with a relatively capital-poor foreign economy. It is easier to visualize and interpret the results if the inequalities in (5), where l is endogenous, become an equality at the same $\bar{\nu}$. Denoting with l_A the autarky employment level, in the figures $(K/k)/(L/(l_A))$ equals $\bar{\nu}^{1/(1-\gamma)}$ for the country represented by continuous lines, $\bar{\nu}^{-1/(1-\gamma)}$ for that represented by dashed lines, and $\bar{\nu} = 0.75$.

The top panels of Figure 3 display the proportional excess of domestic capital over the nationally owned stock, which is zero when the country is in autarky and $k_d = k$. When $k_d \neq k$, the numerical solution satisfies the first-order condition and verifies that (12) identifies the decisive agent's optimal choice. In the second panel from the top (where the axis is drawn at the $\omega = 1$ *laissez faire* level) the policy wedge becomes more passive as financial integration amplifies capital inflows, more active if it amplifies outflows. In the next panel down l moves in the same direction as domestic capital but, as in Figure 2, less than it would if ω did not change.[5]

In the left-most portions of Figure 3's horizontal axis ν is small enough to prevent capital flows, so the wedge (13) is the same for both countries (lower than unity in the $mx < 1$ panels on the left, larger than unity in the right-column panels). The transition to the partial-integration wedge (12) is very different for countries that experience capital inflows and outflows, for reasons discussed next.

To characterize policy and employment reactions to incipient capital flows, note that the decisive agent's welfare is the upper envelope of the values of (6) conditional on whether capital does or does not flow across the country's borders. As l varies, income changes by $1+(mxk/k_d-1)\gamma\lambda$ times w if k_d varies, by $1+(mx-1)\gamma$ times w if $k_d = k$ and $\lambda = 1$. Hence, if $mx \neq 1$ the slope of welfare with respect to l is discontinuous when $k = k_d$ satisfies (3) or the symmetric no-arbitrage condition for incipient capital

[5] The numerical solutions shown conform to the analytical result supported by the sufficient condition proved in the Appendix. They are largely symmetric in cases where analytical results are not available, such as that of a capital-exporting country that implements a passive policy. Numerical experimentation indicates that in somewhat extreme parameter configurations tighter integration may also in this case imply a more passive policy, and defy race-to-the-bottom intuition.

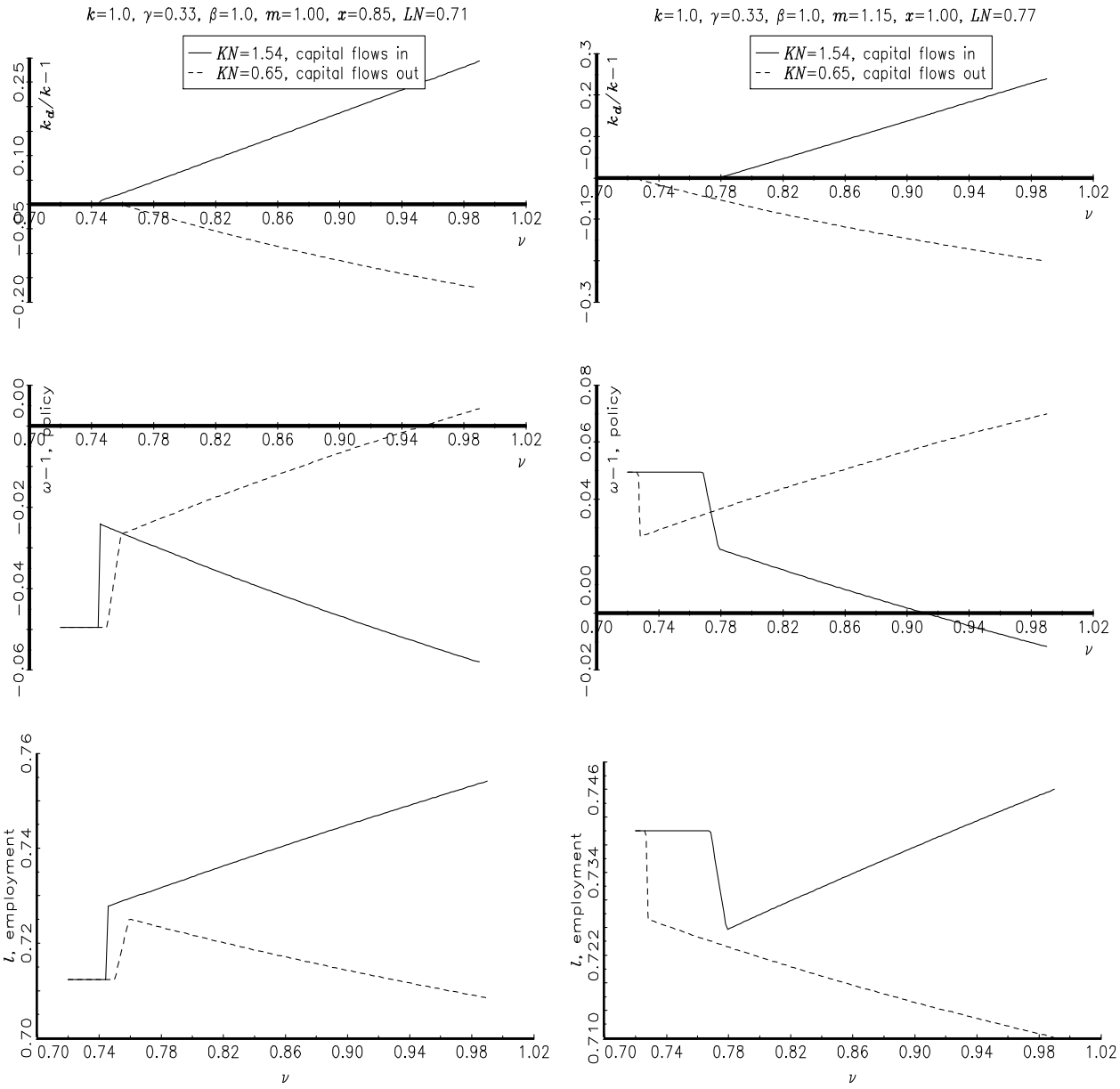

Figure 3: Implications of integration for capital mobility, policy wedges, and employment in four different countriy parameterizations.

flows: when $l = \nu^{-\frac{1}{1-\gamma}} kL/K$ or $l = \nu^{\frac{1}{1-\gamma}} kL/K$, the first-order condition that underlies (12) does not identify the optimal policy.

The resulting corner solution are illustrated in Figure 4's plots of the decisive agent's welfare as a function of employment, for various ν values and the same parameters as in the left column panels of Figure 3. Because $mx < 1$, labor income has larger weight than capital income in the decisive agent's welfare.

The top panel of Figure 4 shows how welfare depends on employment in a country where market integration implies capital inflows. In this case, a higher l can attract foreign capital, and it is optimal for l to jump to maximize the welfare function conditional on positive capital flows as soon as ν allows that maximum to exceed the maximum of the closed-economy welfare functions. Both these maxima satisfy first-order conditions: the ω wedge is given by (13) in autarky, and jumps to that given by (12) when capital begins to flow. This policy reform takes place when ν is still below the value that would trigger capital inflows at the larger autarky employment level l_A, and both ω and l increase discretely as soon as capital begins to flow in Figure 3.

The bottom panel of Figure 4 illustrates the symmetric case where l influences the intensity of capital outflows. Because these reduce the decisive agent's income and welfare when $mx < 1$, as long as the closed-economy welfare function at some l exceeds the maximum of the integrated welfare welfare it is optimal to deregulate just enough to retain capital: the wedge that implements this corner solution places l at a kink of the upper-envelope welfare function, where neither the autarky nor the partial-integration first-order condition hold. This explains why l increases and welfare declines smoothly in ν before capital begins to flow out in Figure 3's left-column panels, where $mx < 1$.

To understand these asymmetric transitions out of autarky it is helpful to consider how ownership shapes policy. If $mx < 1$, incipient capital inflows trigger discrete deregulation and boost a capital poor decisive agent's income as soon as ν is large enough to let capital flow at the resulting level of l. If instead the incipient flow is outgoing, optimal policy keeps employment just high enough to retain capital, and preserve its contribution to the decisive agent's income.

When $mx > 1$, as in the right-column panels of Figure 3, transitions out of autarky are symmetric to those in Figure 4. The interpretation is also fully symmetric: a decisive agent who prefers l to be higher than in *laissez faire* benefits from capital outflows, and finds it optimal to trigger them by discretely reducing active policy. As mx tends to unity from below, the top and bottom panels converge to each other in Figure 4. If mx converged to unity from above, their mirror images would also converge to the case where $mx = 1$ supports *laissez faire* in autarky, and the transition out of autarky sees policy responding smoothly to incipient capital flows in either direction.

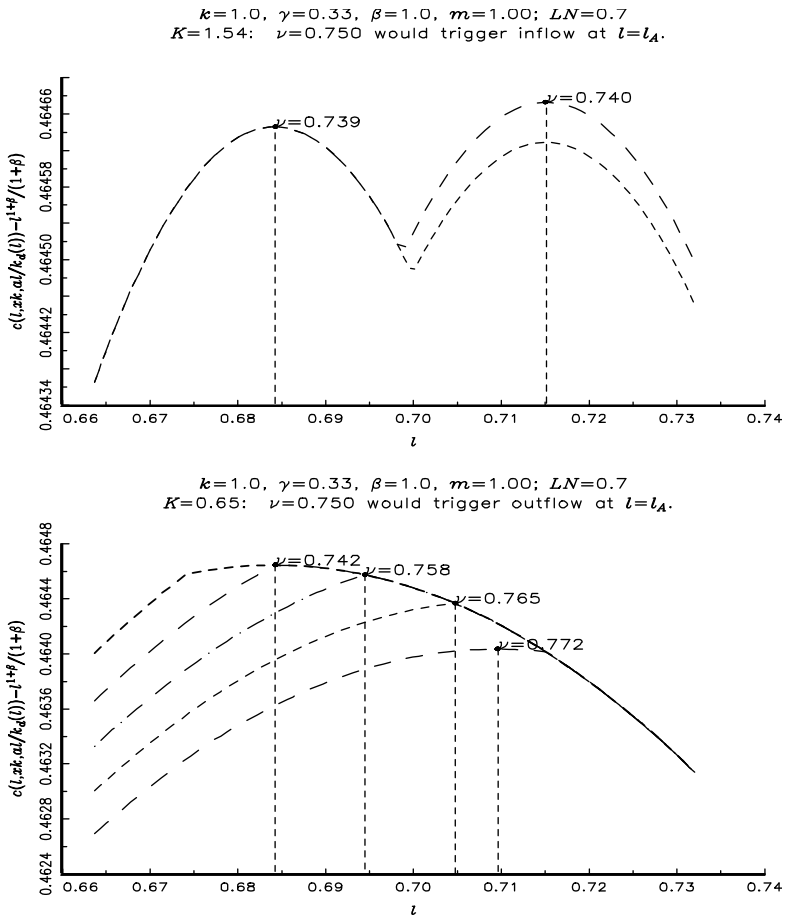

Figure 4: Transitions from autarky to partial integration. The lines plot welfare as a function of l for degrees of integration ν near the one that triggers capital mobility. Dots labeled by ν values mark the maximum of the upper envelope of the welfare functions in autarky and when capital flows.

This reasoning explains why $\omega = 1 + \gamma\,(xm\mu - \lambda)$ is closer to unity, as $\lambda < 1$ and $\mu < 1$, than the autarky wedge $1+\gamma\,(x-1)$. At $k_d = k$ ownership is the same as in autarky, but incipient capital mobility weakens market power. Thus, all transitions out of autarky imply a race-to-*laissez faire* in Figures 3 and 4. It may be interesting to note that a capital-poor country with $mx < 1$ experiences a step increase of capital and discrete domestic policy reforms, which represents a Big Bang liberalization of both cross-border (financial) and internal (labor) markets. The model's simple representation of international market wedges, however, implies an excessively dramatic contrast between zero and even very small capital flows: deregulation need not accompany more realistic gradual changes of international integration.

The characterization above of decisive-individual policy preferences and country-specific policies is directly applicable to the policy preferences of individuals within an economy where they may or may not be decisive. Figure 5 plots relationships between the individually optimal l and individual wealth k_i in some of the country configurations illustrated in Figure 3. As discussed above, policy preferences

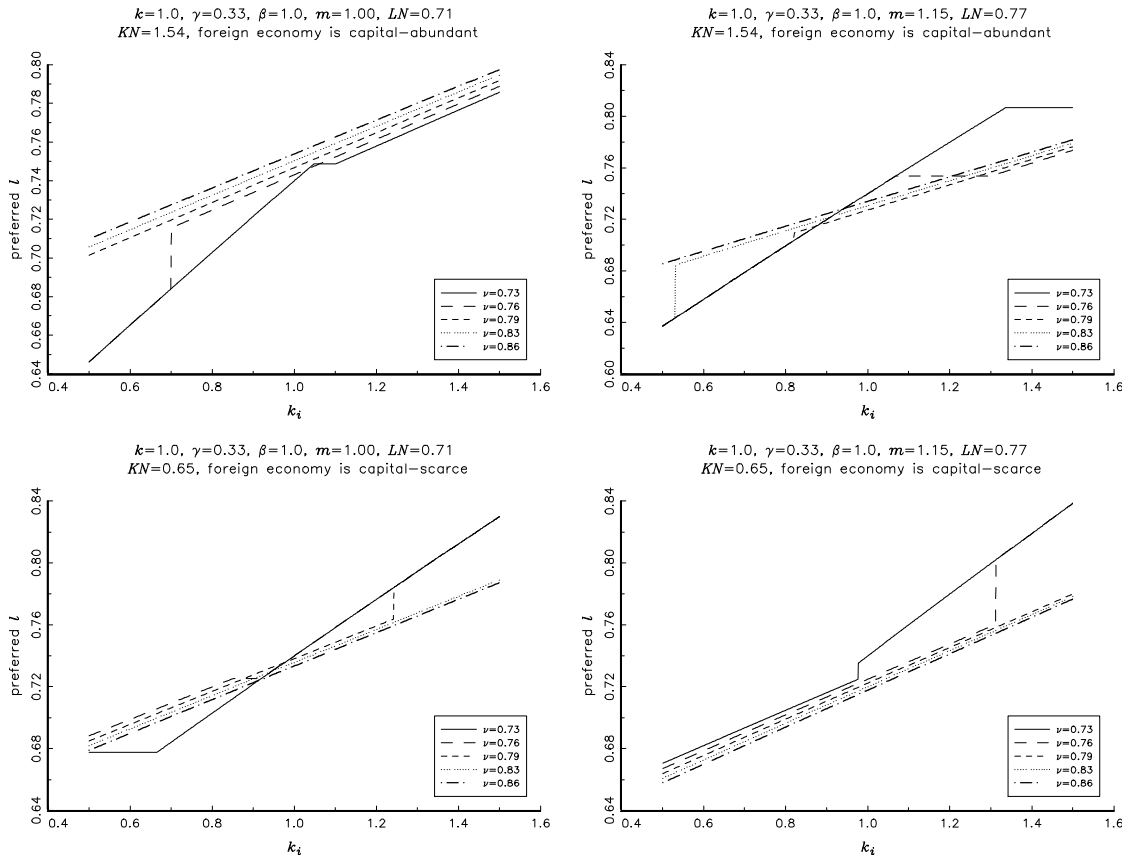

Figure 5: Preferred l allocations across differently wealthy individuals in four differently parameterized countries, for various degrees of integration ν.

are monotone, with different slopes, within the autarky region and when active capital flows support an interior solution. If (depending both on the country's capital abundance and on the individual's preferred autarky policy) policy changes would trigger capital outflows, the autarky employment level continues to be supported through a range of individual wealth levels k_i. The preferred l increases discretely when the individual wealth level reaches the point where (at the individual's preferred autarky policy) capital inflows are beneficial. In both cases, the preferred policy is at least weakly monotone in wealth, validating the median-agent policy determination mechanism. When the decisive agent's wealth falls in regions where the relationship is only weakly monotone, the supporting majority is strictly larger than 50% even for a continuous cumulative wealth distribution function.

3.4 Complete integration

To complete discussion of how the model's predictions relate to those of standard models of policy competition, which focus on the contrast between autarky and complete integration, consider next the

$\nu = 1$ limit case.[6] Labor demand is more elastic than in autarky when capital flows costlessly across the country's borders. The resulting weaker market power moves the domestic wedge ω towards unity, more strongly in a smaller country, but can be more than fully offset by the ownership effect. To see this note that (12) with $\lambda(1, l) = l/(l + L)$ and $\mu(1) = k/(k + K)$ yields

$$\omega_I = 1 + \left(mx \frac{k}{k+K} - \frac{l}{l+L} \right) \gamma,$$

which is larger than its closed-economy counterpart (13) if

$$mx > \frac{L}{l+L} / \left(\frac{K}{k+K} \right). \tag{16}$$

Hence, capital-poor countries may implement more passive policies within integrated economies than they would in autarky: if $mx < 1$, then ω falls further below unity if the inequality in (16) is reversed. Symmetrically, a $\omega > 1$ policy is more active in complete integration than in autarky if the country's politico-economic index $mx > 1$ exceeds the rest of the world's relative labor intensity. Two of the four numerical exercises of Figure 3 illustrate this analytical result. In the left column of panels, where $mx < 1$ implies a passive policy, the wedge grows towards unity as ν begins to allow capital inflows, then moves in the opposite direction, and eventually exceeds its autarky level. In the right-column panels, both wedges initially fall towards unity, but the relatively capital-rich country's then moves upwards, and eventually increases l more than in autarky.

4 Relevance and extensions

This paper's derivations let domestic policy be endogenously determined by a country-specific politico-economic mechanism as international market integration varies exogenously. In the model, lack of non-distortionary transfers or enforceable contracts let political redistribution motives operate across differently wealthy individuals within the country as well as across the country's borders. Because foreigners do not vote, policy aims at shifting welfare away from them and towards the country's politically decisive individual, rather than towards the representative individuals who populate standard international policy competition models. The policy reform implications of tighter integration then depend on the direction of capital flows and of policy distortions, regardless of whether market imperfections or political redistribution motivate the latter.

Future research may modify and extend the framework that delivers these results and explore its empirical relevance. In reality, efficiency-enhancing transfer schemes within and across policy-setting

[6] It is realistic to suppose that $\nu \leq 1$ but the model has a well defined solution for a range of $\nu > 1$ values.

entities can bring observed policies closer to those that would be chosen by average individuals than to those preferred by country-specific median voters in real-life political decisions processes, where wealth would plausibly matter through political influence or vote participation. These and other policy determinants are certainly different across countries and over time. The model's stylized representation of labor policies' economic and political motives offers useful insights for empirical work. Whether countries implement "passive" or "active" labor market policies in autarky depends on *laissez faire* labor market distortions, on wealth inequality and the extent to which wealth matters in political decision processes, and on access to non-distortionary redistribution tools (as may be provided by the government's administrative capacity). In integrated markets, foreign asset positions also matter in ways that depend on whether policy is active or passive and capital flows into or out of the country: a passive policy becomes more passive if capital inflows grow, tends to become active in a small, capital-rich country experiencing stronger capital outflows.

As usual, empirical counterparts to these easily listed theoretical determinants are difficult to measure and identify in practice. At given country-specific characteristics, the model's implications are consistent with evidence that European Economic and Monetary Union tended to make labor market policies more passive in countries that ran current account deficits (Bertola 2016, 2017a). Bertola (2017b) finds suggestive empirical support in a broader sample for the model's prediction that the intensity and effects of labor market policies depend on financial integration, proxied by current account to GDP ratios. The paper's theoretical perspective, focused on factor-price effects, can be brought to bear on patterns of cross-country policy configurations and reforms (see Arpaia and Mourre, 2012, for a recent and comprehensive survey of empirical approaches and findings). The model's x and m concisely summarize the "social conflict" and "efficient institutions" approaches in the relevant literature, where legal traditions also matter and "second best" interactions between different policies appear empirically relevant. In reality, policies do span more dimensions than the present model's single factor-abundance source of preference heterogeneity and single labor-wedge policy instrument. Unfortunately, policy determination is vastly more complicated in multi-dimensional politico-economic settings (see Boeri et al., 2012, for a model of heterogeneous preferences between multiple policy instruments when individuals differ in terms of skills, and there is no international integration).

The model's static framework takes as given relative wealth and capital abundance at the individual and country levels. The cross-section mechanism characterized here would continue to operate if it were embedded in a dynamic framework where changing integration jointly determines policies and capital accumulation, which would also depend on many other aspects of countries' past experience and future prospects. It would be exceedingly complicated to formulate and solve such a model, in particular

because of the need to recognize and address the policy commitment problems underlying well-known excessive long-run capital taxation issues. While race-to-the bottom mechanisms that restrain excessive taxation are Pareto-improving for country-specific representative agents (Quadrini, 2005), international integration without policy commitment and international coordination would have interestingly different implications for country-specific decisive agents in a dynamic extension of this paper's politico-economic framework.

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Appendix

What follows proves that the politico-economic equilibrium l increases in the ν index of international integration if (H1) capital flows into the country and (H2) interior optimality conditions determine a passive policy that distorts l downwards. Formally, and omitting the arguments of $\lambda(\cdot)$ and $\mu(\cdot)$ to simplify notation,

$$k_d > k \Leftrightarrow \mu < \lambda < 1, \tag{H1}$$

$$\omega < 1 \Leftrightarrow mx\mu < \lambda. \tag{H2}$$

Standard comparative statics on the first-order condition $\omega(\nu, l)w(l, k_d(\nu, l)) - B'(l) = 0$ and the second-order condition for maximization establish that $dl/d\nu > 0$ if $\partial\left(\omega(\nu, l)w(l, k_d(\nu, l))\right)/\partial\nu > 0$, or

$$\frac{\nu}{\omega}\frac{\partial\omega(\nu, l)}{\partial\nu} + \frac{\nu}{w}\frac{\partial w(l, k_d(\nu, l))}{\partial\nu} > 0. \tag{a.1}$$

Using (14), differentiation of (11) yields

$$\left.\frac{\partial\omega}{\partial\nu}\right|_{k_d>k} = \gamma\left(-mx\frac{(1-\mu)\mu}{\nu} - (1-\lambda)\lambda\frac{\gamma}{1-\gamma}\frac{1}{\nu}\right)$$

and differentiation of (2) yields

$$\begin{aligned}\frac{\partial w(l,k_d(\nu,l))}{\partial \nu} &= \frac{\partial w(l,k_d(\nu,l))}{\partial k_d}\frac{\partial k_d}{\partial \nu}\\ &= \frac{\gamma w}{k_d}\frac{\partial\left(\lambda(\nu,l)k/\mu(\nu)\right)}{\partial \nu}\\ &= \frac{\gamma w}{k_d}\left(\frac{\gamma}{1-\gamma}(1-\lambda)+(1-\mu)\right)\frac{k_d}{\nu}.\end{aligned}$$

Inserting these expressions in the left-hand side of (a.1), it reads

$$\begin{aligned}&\frac{\gamma\left(-mx\frac{(1-\mu)\mu}{\nu}-(1-\lambda)\lambda\frac{\gamma}{1-\gamma}\frac{1}{\nu}\right)\nu}{1+(mx\mu-\lambda)\gamma}+\frac{\nu}{w}\frac{\gamma w}{k_d}\left(\frac{\gamma}{1-\gamma}(1-\lambda)+(1-\mu)\right)\frac{k_d}{\nu}\\ &=\frac{\gamma}{1-\gamma}\left(\frac{-mx(1-\mu)\mu(1-\gamma)-(1-\lambda)\lambda\gamma}{1+(mx\mu-\lambda)\gamma}+\left(\gamma(1-\lambda)+(1-\mu)(1-\gamma)\right)\right).\end{aligned}$$

and is positive if

$$\frac{\lambda(1-\lambda)\gamma+mx\mu(1-\gamma)(1-\mu)}{1+(mx\mu-\lambda)\gamma}<\left(\gamma(1-\lambda)+(1-\gamma)(1-\mu)\right)$$

or, defining

$$Z_1\equiv\frac{mx\mu(1-\gamma)+\lambda\gamma}{1+(mx\mu-\lambda)\gamma},\quad Z_2\equiv\frac{\lambda}{mx\mu(1-\gamma)+\lambda\gamma},$$

if

$$Z_1\left(Z_2\gamma(1-\lambda)+(1-\gamma Z_2)(1-\mu)\right)<\left(\gamma(1-\lambda)+(1-\gamma)(1-\mu)\right). \tag{a.2}$$

Condition (H2) and $\lambda<1$ imply $mx\mu<(1-2\lambda\gamma)/(1-2\gamma)$, hence $Z_1<1$. So condition (a.2) holds, and the result is proved, when $Z_2\gamma(1-\lambda)+(1-\gamma Z_2)(1-\mu)<\gamma(1-\lambda)+(1-\gamma)(1-\mu)$, or

$$(Z_2-1)\gamma(1-\lambda)<(Z_2-1)\gamma(1-\mu):$$

the inequality follows from (H2), which implies $Z_2>1$, and (H1), which implies $1-\lambda<1-\mu$.

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