

Wedges: Distribution, Distortions, and Market Integration

Giuseppe Bertola

Impressum:

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

Editors: Clemens Fuest, Oliver Falck, Jasmin Gröschl

www.cesifo-group.org/wp

An electronic version of the paper may be downloaded

- from the SSRN website: www.SSRN.com
- from the RePEc website: www.RePEc.org
- from the CESifo website: www.CESifo-group.org/wp

Wedges: Distribution, Distortions, and Market Integration

Abstract

This paper proposes a stylized model of policy determination and imperfect international integration. A country-specific policy wedge corrects labor market imperfections and/or redistributes welfare across differently wealthy agents. Capital market integration with the rest of the world, indexed by another wedge, shapes the politico-economic equilibrium policy through race-to-the-bottom and beggar-thy-neighbor channels. The policy and welfare implications of tighter international integration depend in sharp and empirically realistic ways on country-specific political and structural features.

JEL-Codes: F020, D330, J080.

Keywords: policy competition, capital mobility.

Giuseppe Bertola
Department of Economics and Statistics
University of Torino
Italy - 10153 Torino
giuseppe.bertola@unito.it

First draft March 2017. This draft August 2017.

This draft benefits from helpful comments by seminar participants at Università di Genova and Banca d'Italia. Any errors and opinions are the author's.

1 Introduction

This paper studies how country-specific policies respond to international market integration using a stylized model that defines a country in terms of imperfectly mobile factor endowments and of the political process that chooses the economic policies enforced within its boundaries, and focuses on how heterogeneous factor intensities jointly determine labor market policy and international mobility of capital.

Standard race-to-the-bottom intuition suggests that tighter integration increases the elasticity of market reactions to policies, and begets deregulation. When economic activity crosses the country's borders, however, beggar-thy-neighbor incentives also influence the politico-economic equilibrium policy. Bertola (2016) models labor policy motivated only by redistribution and shows that a transition from autarky to complete integration can imply reform and capital flow patterns consistent with those observed in Europe's Economic and Monetary Union (EMU). In this more technical paper the *laissez faire* may be inefficient, integration can be incomplete, and two modeling devices make it possible to obtain a richer and sharper set of results. Supposing that agents differ only in terms of factor endowments and ruling out lump-sum transfers lets structural imperfections and distributional motives interact simply as politico-economic determinants of policy choice. Supposing that international capital flows are subject to proportional "iceberg" relocation costs lets international integration vary gradually. It can then be shown that, regardless of whether the domestic policy also addresses *laissez faire* market imperfections, tighter integration implies more stringent regulation if the country experiences capital inflows, and deregulation if capital flows out of the country.

The model's structure and results, outlined in this introductory section, build on a variety of previous contributions. Section 2 sets up an economy where a flexible supply of labor is employed with capital, adopting the tractable functional forms introduced by Greenwood, Hercowitz, and Huffman (1988), and characterizes the individual welfare implications of the wedge between productivity and utility margins that in micro-founded macroeconomic models represent policy and market imperfections (Chari, Kehoe, and McGrattan, 2007). As in the Bertola (1993) model of factor income shares and savings and the Bertola (2004) model of labor policies that trade productivity off consumption smoothing, the distortions that

policy corrects or introduces have different welfare implications for agents endowed with different amounts of capital. Hence, the country's politico-economic equilibrium takes both aggregate efficiency and distributional considerations into account (Meltzer and Richards, 1981). Section 3 characterizes policy determination in autarky, supposing that the country's citizens own different proportions of a fixed aggregate stock of capital. Allowing relative factor intensity to differ also across the country's borders, Section 4 models imperfect integration with the rest of the world: foreign-owned domestic capital is less productive because of an "iceberg" transport cost parameter akin to that introduced by Samuelson (1954) and used by an abundant literature to model trade in goods, and by Martin and Rey (2000) to analyze the financial implications of international capital mobility. The resulting tractable formal framework delivers insights that are related to, but distinct from, those of the international policy competition literature (Wilson 1999, Sinn 2003, Keen and Konrad 2013). Because the country is not infinitesimally small, its policy can influence equilibrium factor prices and the international allocation of capital, and politico-economic incentives to do so depend on the degree of international integration. Policy reduces employment if the politically decisive agent is realistically capital-poor. Then, smaller international wedges are associated with deregulation if capital flows out of the country, but with tighter regulation if the country experiences capital inflows. Section 5 considers technical issues arising in the transition from autarky to non-zero capital flows and illustrates how the model's novel framework relates to previous work that, comparing only the limit cases of autarky and full integration, overstates the importance of race-to-the-bottom deregulation effects. Section 6 builds on this analysis to characterize welfare implications: tighter integration is necessarily beneficial for the average individual in perfectly competitive markets, but can be welfare-reducing on average if it weakens corrective policies, and for non-average decisive individuals damaged by integration's factor-price and domestic policy implications. Section 7 concludes discussing how the model and possible extensions may help interpret real-life integration experiences.

2 A model of labor allocation

Welfare increases in consumption of market goods which, in a static setting, coincides with the income $rk_i + wl_i$ of an individual who brings k_i units of capital and l_i units of labor to a factor market where units of these factors sell for r and w . Welfare declines in the amount of labor supplied to the market, accounting for the welfare contribution of leisure, or of activities that do not use the market's capital.

It greatly simplifies derivation and interpretation of the results to suppose that for all i preferences have the same quasi-linear form

$$U = rk_i + wl_i - B(l_i) \tag{1}$$

with $B'(l) > 0$ and $B''(l) \geq 0$, so that the first-order condition $w = B'(l)$ identifies the same optimal $l_i = l$ for all wage-taking individual. Heterogeneous nonlinear wealth effects would make it impossible to characterize explicitly macroeconomic relationships between factor prices and aggregate factor supplies. As in Greenwood, Hercowitz, and Huffman (1988) and other real business cycle models, functional form (1) rules income effects. This implies an increasing relationship between l and w that is not realistic along the individual intensive margin; in the context of this and other macro models, $B(l)$ refers to both intensive and extensive labor supply by unitary households that can transfer utility among their members: ruling out such transfers *across* households rationalizes distortionary policies in politico-economic equilibrium.

Production has constant returns as a function of all marketed factors.¹ Denote per capita production $y(al/k_d)k_d$ where l is labor supply and k_d capital use (both per capita) and a indexes total factor productivity. Labor's unit income,

$$w = \xi_\delta \xi_\tau y'(al/k_d)a, \tag{2}$$

deviates from its social marginal productivity $y'(al/k_d)a$ if $\xi_\delta \xi_\tau \neq 1$. Parameter ξ_τ indexes a distortion that shifts income across factors, while ξ_δ drives a wedge between labor's marginal

¹Because there are only two factors, higher l increases k 's marginal productivity. For some purposes, such as the study of migration, it would be appropriate to allow for multiple factors and accommodate substitutability.

productivity and private benefits but does not directly influence unit capital income at given l ,

$$r = y(al/k_d) - \xi_\tau y'(al/k_d) al/k_d. \quad (3)$$

Thus, the total income of an agent (individual, or household) who earns income from k_i units of capital and a proportion l_i of one unit of labor is

$$\begin{aligned} rk_i + wl_i &= \left(y \left(\frac{al}{k_d} \right) - \xi_\tau y' \left(\frac{al}{k_d} \right) \frac{al}{k_d} \right) k_i + \xi_\delta \xi_\tau y' \left(\frac{al}{k_d} \right) al_i \\ &\equiv c(l_i, k_i, al/k_d) \end{aligned} \quad (4)$$

and depends on aggregate l according to²

$$\frac{dc}{dl} = \left(\frac{1 - (1 - \gamma) \xi_\tau}{\xi_\delta \xi_\tau} (1 - \eta_\kappa) \frac{k_i}{k_d} + (1 - (1 - \eta_\kappa) \gamma) \right) \xi_\delta \xi_\tau a y'(al/k_d), \quad (5)$$

where $\eta_\kappa \equiv (l/k_d) dk_d/dl$ and $\gamma \equiv -(al/k) y''(al/k)/y'(al/k)$. In what follows, capital's employment elasticity η_κ will depend on international market integration, and γ will be treated as a constant technological parameter.³

The first-order condition for maximization of $c(l_i, k_i, al/k_d) - B(l_i)$ with respect to l ,

$$\left(\frac{1 - (1 - \gamma) \xi_\tau}{\xi_\delta \xi_\tau} (1 - \eta_\kappa) \frac{k_i}{k_d} + (1 - (1 - \eta_\kappa) \gamma) \right) \xi_\delta \xi_\tau a y'(al/k_d) = B'(l),$$

identifies the l that maximizes the welfare expression (1). Using the wage expression (2) it

²This expression follows from

$$\begin{aligned} \frac{d(al/k_d)}{dl} &= \frac{a}{k_d} (1 - \eta_\kappa), & \frac{d}{dl} [y(al/k_d)] &= y' \left(\frac{al}{k_d} \right) \frac{a}{k_d} (1 - \eta_\kappa), \\ \frac{d}{dl} \left[y' \left(\frac{al}{k_d} \right) \frac{al}{k_d} \right] &= \left(y'' \left(\frac{al}{k_d} \right) \frac{al}{k_d} + y' \left(\frac{al}{k_d} \right) \right) \frac{a}{k_d} (1 - \eta_\kappa), \\ \frac{d}{dl} \left[y' \left(\frac{al}{k_d} \right) al \right] &= y'' \left(\frac{al}{k_d} \right) \frac{a}{k_d} (1 - \eta_\kappa) al + y' \left(\frac{al}{k_d} \right) a. \end{aligned}$$

³The results are locally valid for functional forms with variable elasticity and the usual properties. It can be helpful to note that writing $y(al/k_d) = (al/k_d)^{1-\gamma}$ and collecting terms in (4) yields

$$c(l, k_i, al/k_d) = \left(\frac{1 - \xi_\tau(1 - \gamma)}{\xi_\delta \xi_\tau} k_i + (1 - \gamma) k_d \right) \xi_\delta \xi_\tau (al/k_d)^{1-\gamma},$$

however the derivations below are easier to type and interpret in terms of generic functions.

can be written in the form $\omega w = B'(l)$ where

$$\omega \equiv \left[\frac{1 - (1 - \gamma) \xi_\tau}{\xi_\delta \xi_\tau} (1 - \eta_k) \frac{k_i}{k_d} \right] + \left[1 - (1 - \eta_k) \gamma \right] \quad (6)$$

is the proportional wedge that agent i 's preferred labor allocation inserts between the market wage and $B'(l)$, the marginal opportunity cost of market work.⁴

To interpret this expression suppose first that $k_i = 0$. For an agent who only draws income from labor, the wedge only includes the second square bracket on the right-hand side of (6). If $(1 - \eta_k) \gamma > 0$, variation of l changes factor prices along a downward-sloping labor demand schedule. Starting from the *laissez faire* allocation, labor surplus increases if l declines, and is maximal when the wage exceeds the opportunity cost of labor supply by the monopolistic $(1 - (1 - \eta_k) \gamma)^{-1}$ proportional markup. This is dubbed a "monopoly union" effect in what follows.

If $k_i > 0$, then the welfare of agent i also depends on how l influences capital income in (3). Higher l increases production by $y'(al/k_d)a = w/(\xi_\tau \xi_\delta)$. In the absence of distortions capital would be paid a share γ of that marginal increase. When the marginal share of capital is $1 - \xi_\tau(1 - \gamma)$, and the portion of it that is paid to units owned by agent i is diluted by a proportional increase η_k of total capital, then

$$\frac{dr}{dl} = \frac{1 - (1 - \gamma) \xi_\tau}{\xi_\tau \xi_\delta} (1 - \eta_k) \frac{w}{k_d}.$$

The first square bracket on the right-hand side of (6) accounts for k_i units of this marginal income when computing higher l 's impact on agent i 's income. What follows refers to this as an "ownership effect".

2.1 Structural distortions

It will simplify typography and interpretation below to summarize the role of ξ_δ and ξ_τ with

$$m \equiv \frac{1 - (1 - \gamma) \xi_\tau}{\gamma \xi_\tau \xi_\delta}, \quad (7)$$

⁴For more general preferences the same wedge would appear in agent-specific first-order conditions for maximization with respect to l of $U(c(l_i, k_i, al/k_d), l_i)$. Nonlinearity would make it extremely cumbersome to characterize the economy's politico-economic aggregate equilibrium.

which equals unity if $\xi_\delta = \xi_\tau = 1$.⁵ Using (7) in (6), the proportional wedge

$$\begin{aligned}\omega &= (1 - \eta_\kappa) \gamma m \frac{k_i}{k_d} + 1 - (1 - \eta_\kappa) \gamma \\ &= 1 + \left(m \frac{k_i}{k_d} - 1 \right) (1 - \eta_\kappa) \gamma\end{aligned}\tag{8}$$

satisfies the first-order condition for maximization of agent i 's income.⁶ If $mk_i/k_d = 1$, then $\omega = 1$: the wage (2) corresponds to the effect of l on agent i 's total income and consumption, and the welfare-maximizing l equates it to the marginal opportunity cost $B'(l)$ of market work. If $mk_i/k_d \neq 1$ instead, then the total income implications of l differ from the wage in ways that depend on the economy's structure and individual factor ownership.

The deviations from unity of ξ_τ and/or ξ_δ that may imply $m \neq 1$ represent market distortions. In an economy where $\xi_\tau \neq 1$ drives a wedge between marginal productivity and the wage, or between marginal cost and price, labor's income share $\xi_\tau (al/k_d) y'(al/k_d)/y(al/k_d)$ differs from what would be determined by marginal productivity in perfectly competitive markets. This can be implied by pricing power in factor or product markets, from such externalities as market thickness in search and matching environments, and other market imperfections. Because $dm/d\xi_\tau = -(\xi_\tau)^2 (\xi_\delta)^{-1} < 0$, the preferred wedge expression (8) is larger for a smaller ξ_τ : all else equal, policy should boost employment more strongly if labor is paid increasingly less than marginal product.

Parameter ξ_δ represents a related but distinct type of distortion. If $\xi_\delta < 1$, then work contributes to worker's welfare less than to production: if market employment entails idiosyncratic yet uninsurable risk, for example, then labor supplied on a risk-adjusted basis falls short of the marginal productivity paid by competitive employers who can diversify the income of each unit of capital. Because $dm/d\xi_\delta = -m/\xi_\delta < 0$, the policy wedge (8) is larger when ξ_δ is smaller, and higher employment has more positive total income effects.

⁵It can be helpful to see that, using (7), the explicit income expression of footnote 3 reads $c(l, k_i, al/k_d) = (\gamma mk_i + (1 - \gamma) k_d) \xi_\delta \xi_\tau (al/k_d)^{1-\gamma}$.

⁶The first-order condition may alternatively and equivalently be taken with respect to specific policy instruments or, as in Bertola (2016), to the ω wedge.

2.2 Policy and politics

In the model economy all individuals are identical except for their relative wealth k_i . This makes it straightforward to see how collectively chosen and enforced policies may obtain an allocation with $\omega \neq 1$ with taxes and subsidies, or with wage or quantity constraints.⁷ A payroll tax or subsidy at rate $1 - \omega$ does insert a wedge between labor's marginal product and alternative use, and has the welfare implications modeled above if its revenue or cost is shared equally across individuals who, as assumed, have identical preferences and labor endowments. In this case there is no unemployment, because the agent-level optimality condition equates net wages to $B'(l)$ and coincides with the policy optimality condition. If the policy is enforced by a minimum wage that exceeds by a proportion $1/\omega$ the market-clearing wage, individual first-order conditions are slack, and denoting with $1/\beta$ labor supply's wage elasticity the resulting unemployment rate $1 - l/l_s \approx \log(\omega^{-1/\beta}) \approx (1 - \omega)/\beta$ has the welfare implications characterized above if (as in Merz 1995, Andolfatto 1996, and other real business cycle models) households can transfer utility among their employed and unemployed members. Quantity constraints (such as working time limits, minimum annual vacations, or mandatory retirement) have the same welfare implications as the wedge they introduce between demand and supply.⁸

From the point of view of a planner interested in maximizing average welfare, market imperfections may motivate "active" measures that imply $\omega > 1$ and increase l above its *laissez faire*. If $m > 1$ indicates that the private reward of labor market participation is lower than its social productivity, subsidizing employment increases average efficiency. The arguments just made and expression (8) however show that agents with different income sources have different views as to whether and how structural problems should be targeted by policy. The factor price effect of higher employment, in the absence of compensatory

⁷It is possible to model some features of a more complicated reality. If not only wealth but also the number of labor units n_i differ across households, policy preferences depend on $k_i/(n_i k_d)$ and $n_i dl_i/dl$. Most qualitative insights remain valid, but there would be heterogeneous and possibly discontinuous policy effects (working hour limitations, for example, may or may not be binding for specific agents).

⁸Job security provisions in models of uninsurable labor income risk and well-diversified capital income (Bertola, 2004) and active labor market policies in search-and-matching models have steady-state distributional implications that are qualitatively similar to those of this static wedge.

transfers, benefit owners of complementary capital. So the smaller is k_i , the less relevant are the structural imperfections that imply a larger m are less relevant to individual i 's preferred policy wedge (8).

Because individuals with different k_i prefer different wedges, it is necessary to specify a political decision mechanism. It is simplest to suppose that the preferences of a decisive agent who owns a fraction x of the economy's per capita capital determine the country's policy.⁹ Then, the politico-economic equilibrium policy wedge is given by expression (8) with $k_i = xk$,

$$\omega = 1 + (mx - 1)(1 - \eta_\kappa)\gamma.$$

The product mx indexes the joint and similar roles of structural imperfections and distributional considerations in determining the optimal l from the decisive agent's point of view, and the policy instruments that enforce it in equilibrium. Parameter x would be irrelevant to policy determination if lump-sum transfers could offset the welfare implications of factor-price changes. Because policy-makers cannot transfer utility across heterogeneous agents, policy reduces average welfare in order to influence its distribution, and x plays the same policy-shaping role as m , and as the inverse of the structural wedge ξ_δ : increasing employment above its *laissez faire* level is beneficial for the average individual if in *laissez faire* labor earns less than its marginal contribution (but capital does get an appropriate share), and is even more attractive for a relatively wealthy decisive agent who disproportionately gains from the higher productivity of the complementary capital she owns. As long as $mx > 0$, policy preferences internalize some of the positive implications of employment for capital income, and the "ownership effect" exerts a positive influence on the policy wedge and on the resulting l . However the wedge exceeds unity, and l is larger than in *laissez faire*, only if $mx > 1$.

The distinction between market imperfections and policies is not as sharp in reality as in the model. For example, the wage-setting power of unionized labor is something that would call for corrective policies from the social point of view. Without compensatory lump-sum transfers, however, it is problematic to correct market imperfections that have distributional

⁹An alternative policy determination framework would assign different social welfare weights to agents that are more or well endowed with capital. This would have qualitatively similar implications, but require a complete specification of factor endowments' distribution.

implications. Just like it would be politically awkward to subsidize a natural monopolist in order to maximize aggregate production, so there can be sound political rationales for policies, such as right-to-strike legislation, that strengthen rather than reduce labor market distortions.

3 Closed economy

This and the next sections inspect and interpret the economy's politico-economic equilibrium. It is useful first to illustrate the mechanisms at work when the policy's determination and effects take place in an economy with a given amount $k_d = k$ of locally owned capital. With $\eta_\kappa = 0$ and $k_i = xk$, the wedge expression (8) reads

$$\omega = 1 + (mx - 1)\gamma, \quad (9)$$

and has a simple and intuitive interpretation. Labor earns a share $1-\gamma$ of the income produced by higher l , so if policy reflected only the "monopoly union" effect then the wage would be marked up above marginal productivity by a proportion $1/(1-\gamma)$. Because individuals who own capital also partake of the complementary income fraction γ , the "ownership effect" offsets this exactly if $mx = 1$: this is the case when $x = m = 1$ and policy suits the average individual of an undistorted market economy, and also when each of x and m differs from one but there is no political support for correction of *laissez faire* distortions. It is instructive to inspect the optimal wedge when $x = 1$ but $m \neq 1$. If $\xi_\delta = 1$, then with $m = (1 - \xi_\tau) / \xi_\tau$ expression (9) yields $\omega = \xi_\tau$, so that labor is paid according to its marginal productivity. If $\xi_\tau = 1$, then $\omega = 1 + (1 - \xi_\delta)\gamma/\xi_\delta > 1$ rewards labor more than the *laissez faire* wage would, and internalizes to labor supply choices their contribution to capital income.

Figure 1 illustrates the economy's equilibrium for various values of x and a roughly realistic set of other parameters. The function that tallies the welfare loss in income-equivalent units from allocation of each agent's labor unit to production of marketable output has the constant elasticity form

$$B(l) = l^{1+\beta} / (1 + \beta), \quad (10)$$

In the figure, if $x = 1$ then the policy wedge corrects fully the imperfections represented by

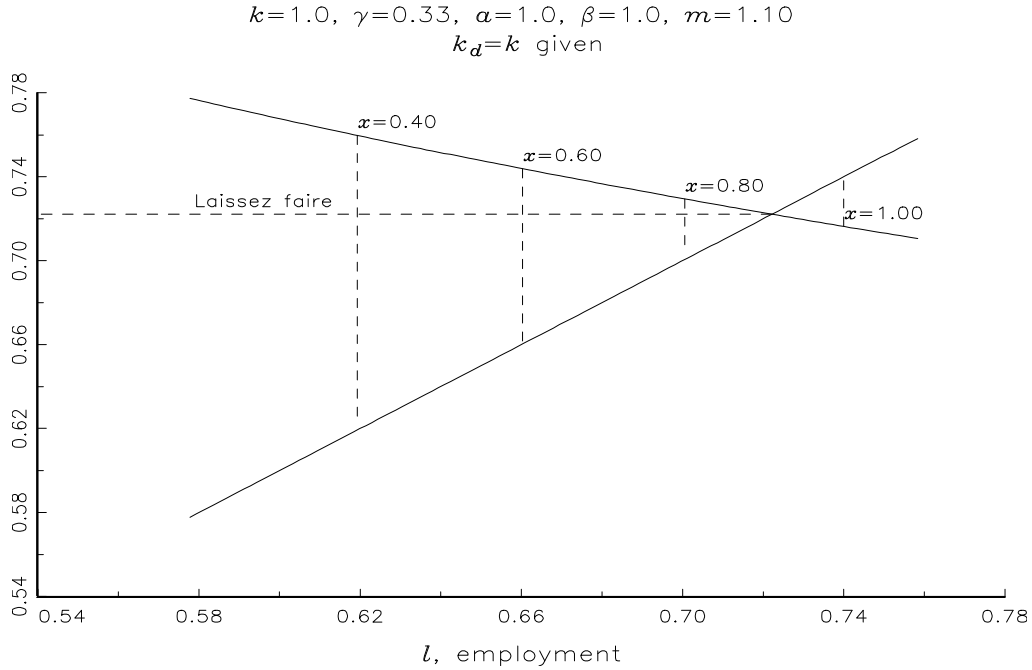


Figure 1: Policy wedges in a closed economy for various values of the decisive-individual relative wealth indicator x .

$\xi_\tau > 1$. This entails a 10% wage subsidy and, along a supply curve with unitary elasticity, a similar increase of employment above the *laissez faire*. In the model, $x = 1$ represents a country where there is no wealth inequality and/or policy can use the non-distortionary redistribution tools that operate within families. In reality these conditions might hold approximately in countries, such as Scandinavian ones, that indeed tend to adopt the "active" labor market policies represented by $\omega > 1$ in the model.

Because wealth is more unequal than labor income, however, it is natural to suppose that $x < 1$ when the decisive agent is the median voter in a democratic policy determination process. In reality, labor income is taxed and non-employment subsidized, and collective contracts or laws impose minimum rather than maximum wages, and upper rather than lower bounds on working time. Such "passive" policies enforce $\omega < 1$ and reduce the market's labor intensity. By (9), this is the model's equilibrium outcome, even when $m > 1$, if x is sufficiently below unity to imply $mx < 1$. The illustrations and derivations here and below focus on this case and do not always explicitly discuss the symmetric and less plausible implications of $mx > 1$.

For the parameters used in Figure 1, $x = 80\%$ more than fully offsets "active" labor policy

motives, and implies a 10% wage tax instead of the similar employment subsidy favored by the average individual. Lower values of x further reduce employment in the figure. It is easy to see in (9) that as $x \rightarrow 0$ the distortions that shape capital income become irrelevant to policy determination and the wedge ω approaches $1 - \gamma$ for any m , enforcing the proportional wage mark-up that would be chosen by an economy-wide monopoly union's disregard of all non-labor income.

In the reality that the model means to represent, "passive" labor policy serves the interests of agents who are not as wealthy as the economy's average. The shortfall below unity of the model's x depends on the extent and persistence of wealth inequality, as well as on the role of wealth in shaping political power. Like the structural features summarized by m also the political characteristics summarized by x depend on the country's culture and history, and are taken as given as the paper proceeds to study how they interact with international economic integration in determining policy.

4 Partial integration

Suppose it is possible for capital to be employed across the country's borders, but units of foreign-owned capital contribute less than those of the national stock k to the domestic capital stock k_d . Parameter $\nu \leq 1$ indexes the intensity of this phenomenon: when $\nu = 1$ capital that crosses country boundaries remains equally productive, representing perfect and complete market integration; $\nu < 1$ implies proportionally lower productivity, representing the contractual problems, capital controls, and taxes that in reality imply less than complete market integration. The rest-of-the-world economy has finite size and functions in much the same way as the model country's, with the same elasticity γ and A , L , and K in the same role as the corresponding lower-case symbols introduced above.¹⁰ If $k_d > k$, then the rest of the world employs a stock $K - (k_d - k)/\nu$ of capital, with marginal productivity $((K + (k - k_d)/\nu) / (AL))^{\gamma-1}$.

The model's country employs only its national capital stock if ν is small (and certainly

¹⁰While k and l are measured in per-capita terms, K and L are proportional to the rest of the world's relative population. It would be possible, if cumbersome, to let L depend on other countries' policy choices.

if $\nu = 0$). In this section ν is taken to be large enough to allow at least some international investment. Because a marginal unit of foreign capital is equivalent to only $\nu < 1$ units of the domestic capital stock, marginal productivities are equalized at

$$\nu \left(\frac{k_d}{al} \right)^{\gamma-1} = \left(\frac{K + (k - k_d)/\nu}{AL} \right)^{\gamma-1} \quad (11)$$

by

$$k_d = al\nu^{\frac{\gamma}{1-\gamma}} \frac{k + K\nu}{al\nu^{\frac{\gamma}{1-\gamma}} + AL},$$

which exceeds k if $k/al < \nu^{\frac{1}{1-\gamma}} K/AL$.

It will ease typography and interpretation below to define

$$\lambda(\nu; al, AL) \equiv \frac{al}{al + AL\nu^{-\frac{\gamma}{1-\gamma}}}, \quad \mu(\nu; k, K) \equiv \frac{k}{k + K\nu}, \quad (12)$$

so if $k/al < \nu^{\frac{1}{\gamma-1}} K/AL$ then $k_d/k = \lambda(\nu; al, AL)/\mu(\nu; k, K) > 1$.

If $k/al > \nu^{\frac{1}{\gamma-1}} K/AL$, the country exports capital. Symmetric derivations establish that $1/\nu$ plays exactly the same role as ν in a capital-importing country, and $k_d/k = \lambda(1/\nu; al, AL)/\mu(1/\nu; k, K) < 1$. The expressions below omit the arguments of λ and μ for simplicity.

The "iceberg" functional form of the international market wedge certainly oversimplifies the sources and resource costs of limited market integration but delivers a compact and tractable model of partial integration, and makes it easy in what follows to highlight its implications for the labor policy chosen by a decisive individual who owns a fraction $x = k_i/k$ of the country's per capital national capital.

When $k \neq k_d$, the interior optimality condition that yields expression (6) for the proportional wedge between l 's marginal market productivity and non-market utility can be written

$$\begin{aligned} \omega &= 1 + \left(mx \frac{k}{k_d} - 1 \right) (1 - \eta_\kappa) \gamma \\ &= \left[mx \frac{k}{k_d} (1 - \eta_\kappa) \gamma \right] + \left[1 - (1 - \eta_\kappa) \gamma \right] \\ &= 1 + (mx\mu - \lambda) \gamma. \end{aligned} \quad (13)$$

The brackets in the second line identify the "ownership" and "monopoly" effects. The third line recognizes from (11) and (12) that $xk/k_d = xk\mu/\lambda$ and $\eta_\kappa = 1 - \lambda$. International market integration implies a more positive η_κ , which lets domestic capital earn a larger share of the marginal income produced by higher l , but also implies that more of it is paid to foreigners. In a partially-integrated economy, the political and structural features summarized by x and m interact not only with each other, as in (9), but also with λ and μ , which have straightforward interpretations and play intuitive roles in determining the policy wedge. Expression λ is the country's share of an effective total employment measure that adjusts the foreign component by the power of ν implied by the market equilibrium condition (11). In the policy wedge, a larger λ associates variation of l with a smaller proportional capital variation to maintain equality in (11), and strengthens the "monopoly union" effect. Expression μ is the country's share of the effective capital that is potentially available for domestic production. In the policy wedge, a larger μ implies a smaller spillover to foreigners, and strengthens the "ownership effect".

In a closed economy, $\lambda = \mu = 1$ and (13) coincides with (9). At the other extreme, when $\lambda = \mu = 0$ the country is so small as to make its capital flows irrelevant to the outside world's economy: hence, $\omega = 1$, because domestic policy cannot and does not influence factor prices. In more realistic intermediate cases, tighter integration has unambiguous implications for the wedge (13): in a capital-importing country,¹¹

$$\frac{d\omega}{d\nu} = \left(-mx\mu(1 - \mu) - \lambda(1 - \lambda)\frac{\gamma}{1 - \gamma} \right) \nu^{-1} < 0,$$

so tighter integration implies a more "passive" policy. As shown in Figure 2, which uses the same functional forms and parameters as Figure 1, tighter international integration increase employment along the labor supply curve as larger capital inflows increase labor demand, but less than they would if labor policy were not reformed in the direction of stronger taxation and/or stricter wage and quantity constraints.

¹¹This uses the derivatives

$$\frac{d\lambda}{d\nu} = \lambda(1 - \lambda)\frac{\gamma}{1 - \gamma}\nu^{-1} > 0, \quad \frac{d\mu}{d\nu} = -\mu(1 - \mu)\nu^{-1} < 0.$$

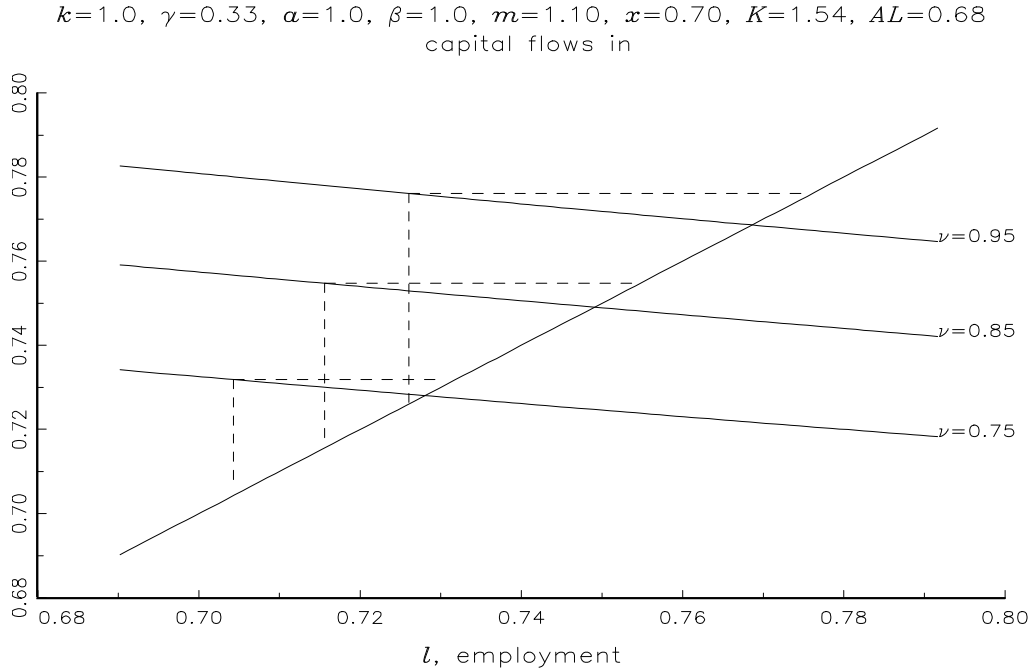


Figure 2: Policy wedges in a partially-integrated capital-importing country, for various values of the ν indicator of foreign-owned capital's relative productivity.

To see why, consider the decisive individual's incentives to distort l when $k_d > k$. The "ownership" effect is weaker when some domestic capital income is paid to foreigners, and tighter integration weakens it further: the decisive agent is all the more inclined to choose policies that decrease l below its *laissez faire* level if a larger ν reduces the country's share μ of the partially integrated market that supplies some of its capital. As to the "monopoly union" effect, incentives to reduce employment in a partially integrated country are weaker than in a closed economy when $\lambda < 1$ flattens the resulting wage increase: but if $k_d > k$ a larger ν increases a capital-importing country's effective share λ of the partially integrated market, and lets its policy exert a stronger influence on equilibrium marginal productivities. For both reasons, in a capital-importing country a larger ν is associated with a smaller ω wedge, and a more "passive" labor policy.

Because the country's policy-maker disregards foreign welfare, familiar beggar-thy-neighbor motives are at work. From the rest of the world's point of view, policy moves too much towards regulation in response to capital inflows, because the welfare implications of a lower l are positive for individuals who own immobile labor, and qualitatively similar to those of capital income taxes rebated to local citizens in standard models of policy competition (Wilson

1999, p.279).

If $k_d < k$, tighter integration symmetrically increases the (13) policy wedge.¹² The interpretation is also fully symmetric. In a capital-outflow country, the strength of the "monopoly union" effect depends on λ , which falls further below unity when a larger ν increases its capital's productivity abroad and makes it easier for capital flows to react to country-specific policies. And beggar-thy-neighbor policy motives strengthen the "ownership" effect: for the decisive agent, a higher l is a way to retain capital and support national rather than foreign labor incomes, and there is no reason to consider deregulation's negative welfare implications abroad.

5 From autarky to full integration

The linear functional form of international market frictions yields a neat characterization of interactions between capital flows and policy. As shown above, stronger capital inflows are locally associated with more regulation, and stronger outflows with less regulation, when both capital stocks and policy satisfy interior equilibrium conditions. The model however also features corner solutions and discontinuities, characterized in this section, that while technically intricate do provide insights into the relationship between the model's implications and those of models that only allow for autarky or full integration.

In deriving and interpreting analytical results it will be useful to refer to the numerical solutions shown in Figure 3, which use the constant-elasticity labor supply specification (10) and most of the same parameters as in previous figures, but consider four different configurations of the model country's relative capital intensity and politico-economic structure. In each panel of the figure, the relationship between the variable on the vertical axis and the ν partial-integration wedge is shown by continuous lines if the country is capital-poor relative to the rest of the world, by dashed lines if it is instead potentially integrated with a

¹²Recognizing that when the country experiences capital outflows $1/\nu$ replaces ν in (12), and differentiating as in footnote 11,

$$\frac{d\omega}{d(1/\nu)} = \left(mx\mu(1-\mu) + \lambda(1-\lambda)\frac{\gamma}{1-\gamma} \right) \nu^{-1} > 0.$$

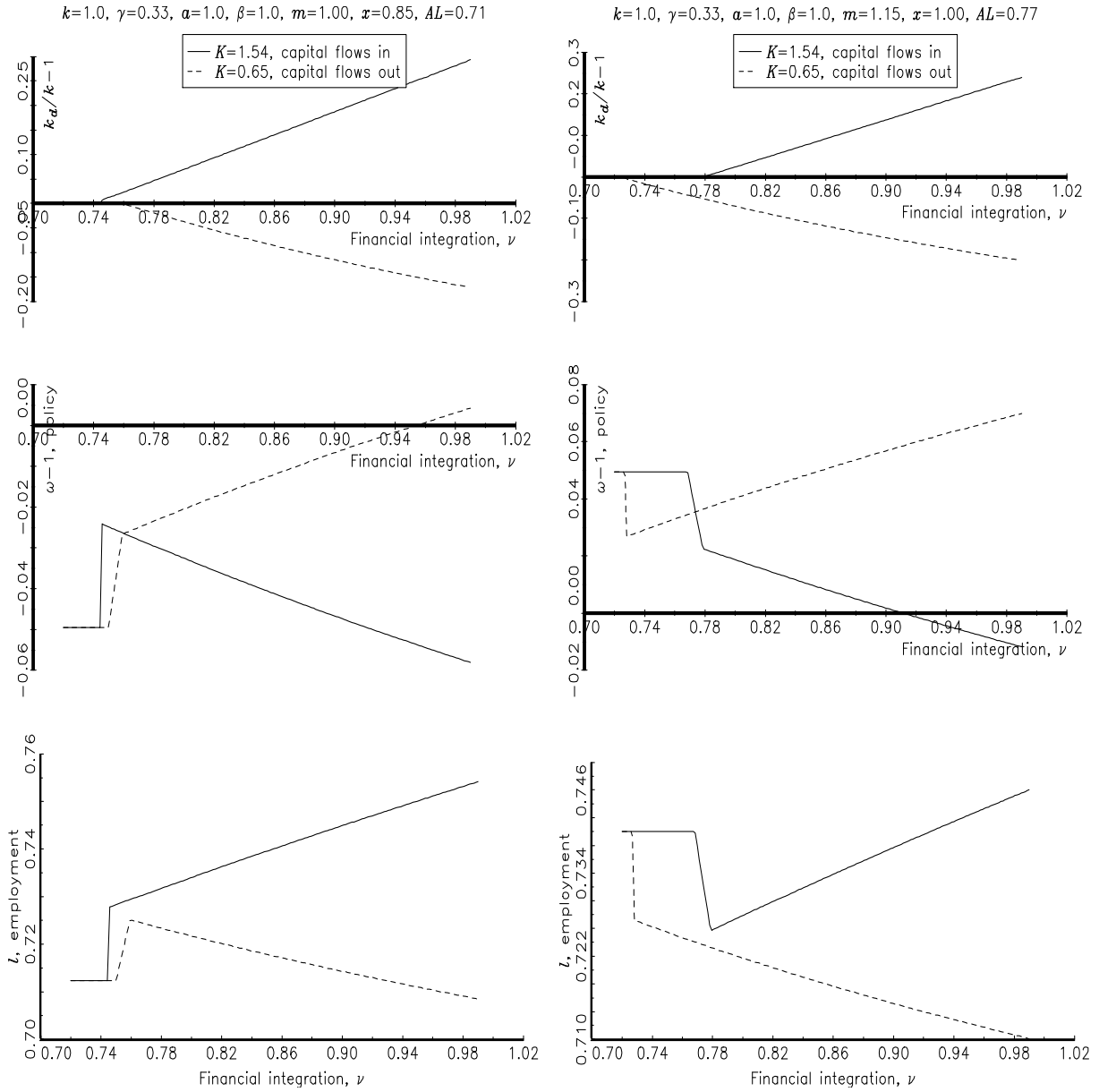


Figure 3: Implications of integration for capital mobility, policy wedges, and employment in four different countries.

relatively capital-poor foreign economy. The numerical exercise considers two such pairs of countries, which differ along a dimension of particular interest. In the left-hand column of panels $mx < 1$, so labor policy maximizes a relatively poor decisive agent's welfare and tends to drive l below its *laissez faire* level. In the right-hand panels, $mx > 1$, and *laissez faire* distortions motivate policy to increase l instead.

The top panels of Figure 3 display the proportional excess of domestic capital over the nationally owned stock. In the regions where this is not zero, and $k_d \neq k$, the numerical solution satisfies the first order condition (13). In the second panel from the top (where the axis is drawn at the $\omega = 1$ *laissez faire* level), as analytically shown above, the policy wedge moves opposite to the capital flows amplified by better financial integration. In the next panel down, as in Figure 2, l moves in the same direction as domestic capital, but less than it would if ω did not change.

5.1 Incipient integration

The country's capital intensity does not differ from the rest of the world's so much as to trigger either inflows or outflows of capital, and condition (11) is slack, if

$$\nu^{\frac{1}{1-\gamma}} < \left(\frac{k}{al}\right) / \left(\frac{K}{AL}\right) < \nu^{\frac{1}{\gamma-1}}, \quad (14)$$

where the endogenous variable l depends on policy. To ease comparisons the parameters used in the figure always imply the same autarky l_A , and the K/k to $AL/(al_A)$ ratio is $\nu^{1/(1-\gamma)}$ for the country represented by continuous lines, $\nu^{-1/(1-\gamma)}$ for that represented by dashed lines. Thus, for $l = l_A$ one of the inequalities in (14) becomes an equality at the same value of ν (set to 0.75 in the figure).

In the left-most portions of Figure 3's horizontal axis ν is small enough to prevent capital flows, so the wedge (9) is the same across countries in each panel (lower than unity in the left-hand side $mx < 1$ panels, larger in the right-hand panels where $mx > 1$). As ν becomes larger, the transition to the partial-integration wedge (13) is very different for countries that experience capital inflows and outflows.

To see why, note that the decisive agent's welfare is the upper envelope of the values of (1) conditional on no capital flows and on active capital flows. Varying l changes the

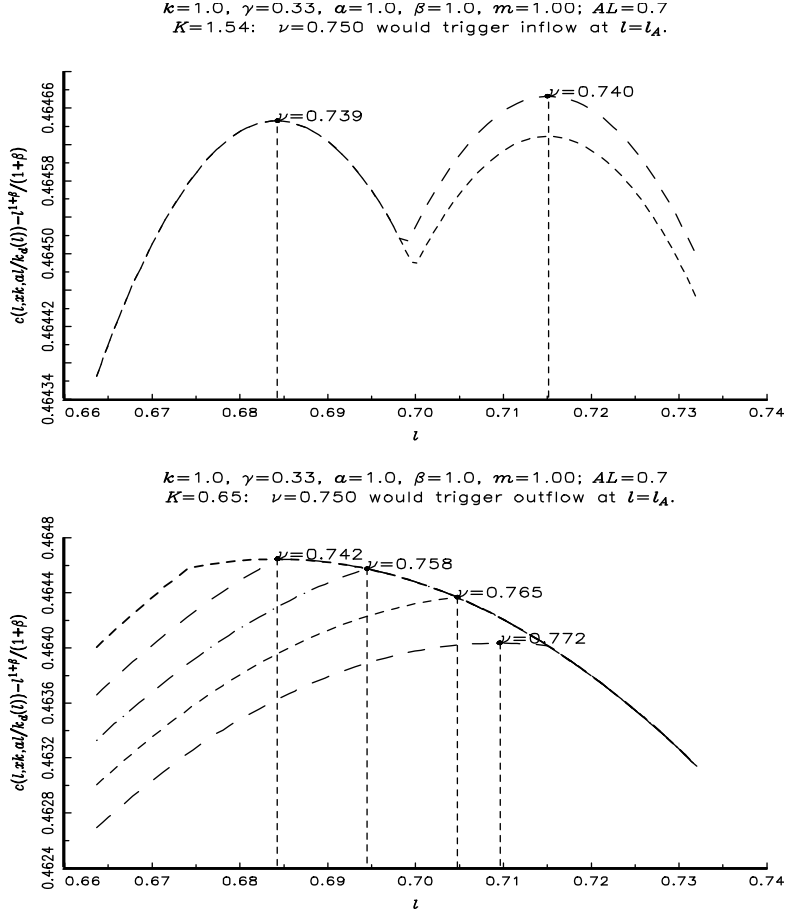


Figure 4: Transitions from autarky to partial integration. The lines plot welfare as a function of l for degrees of integration ν near the one that triggers capital mobility. Dots labeled by ν values mark the maximum of the upper envelope of welfare conditional on zero or active capital flows.

representative agent's income by a proportion $1 + (mx - 1)\gamma$ of the wage if there is no capital mobility and $\eta_\kappa = 0$, but by $1 + (mxk/k_d - 1)\gamma(1 - \eta_\kappa)$ if $k_d \neq k$ equalizes capital's adjusted marginal productivity. Hence, if $mx \neq 1$ then the slope of welfare with respect to l is discontinuous when $k = k_d$ satisfies one of the conditions in (11), and the first-order condition that yields (13) cannot identify the optimal policy when

$$l = \nu^{-\frac{1}{1-\gamma}} \frac{k}{a} / \left(\frac{K}{AL} \right) \quad \text{or} \quad l = \nu^{\frac{1}{1-\gamma}} \frac{k}{a} / \left(\frac{K}{AL} \right). \quad (15)$$

To characterize the model's implication at and around the points identified by (15) it is helpful to refer to Figure (4), which plots the decisive agent's welfare as a function of employment for various ν values for the two countries considered in the left-hand panels of

Figure 3. With $mx < 1$ welfare is more positively influenced by l when capital does flow than in autarky: because the decisive agent's welfare weighs labor more than capital, it grows more if a higher l attracts capital and increases the wage relative to capital income, as in the top panel of Figure 4. The decisive agent welcomes capital inflows, so l optimally jumps to the maximum of the active-flows welfare function as soon as ν allows the latter to exceed the maximum of the closed-economy welfare function (both of which satisfy first-order conditions). This occurs when ν is still below the value that would trigger capital inflows at the autarky employment level l_A , because capital mobility triggers deregulation: in Figure 3, both ω and l increase discretely as soon as capital begins to flow.

Symmetrically, welfare declines more if a smaller l accelerates capital outflows which with $mx < 1$, reduce the decisive agent's income and welfare. The bottom panel of Figure 4 illustrates this case. At the autarky employment l_A , capital would begin to flow out as soon as ν grows to the 0.75 critical value. As long as the closed-economy welfare function at some l exceeds the maximum of the integrated welfare, however, 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 reduces but cannot reverse the factor-price implications of tighter integration: in Figure 3, l increases and welfare declines smoothly in ν before capital begins to flow.

In the left-hand side panels of Figure 3, policy jumps as soon as inflows become positive, and moves gradually to smother incipient inflows. To interpret these transitions it is helpful to recall how the "ownership effect" shapes policy in the model. If the incipient flow is incoming, discrete deregulation lets it 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, it is better to keep employment just high enough to retain capital, and preserve its contribution to the immobile decisive agent's income. In the right-hand panels of Figure 3, where $mx < 1$ and the decisive agent prefers l to be higher than in *laissez faire*, capital outflows are beneficial, capital inflows are damaging, and transitions out of autarky are symmetric to those in Figure 4.

This reasoning also explains why ω moves towards unity when capital begins to flow. At

$k_d = k$ the "ownership effect" remains unchanged, but incipient capital mobility weakens the "monopoly union" effect. Thus, any transition out of autarky triggers deregulation. This race-to-the-bottom mechanism operates in the transitions discussed above and illustrated in Figure 4, not more generally: as ν tends to unity, in a country that imports capital and implements a "passive" policy tighter integration induces stronger rather than looser regulation.

5.2 Full integration

Consider next the $\nu = 1$ limit case.¹³ If capital flows freely across the country's borders, labor demand is more elastic than in autarky, as $\lambda(1; al, AL) = al / (al + AL) < 1$. The resulting weaker "monopoly union" effect implies a race-to-the-bottom tendency towards $\omega = 1$ which is stronger in a smaller country but, as long as $\lambda > 0$, can be more than fully offset by the "ownership" effect.

To see this, note that $\lambda = al / (al + AL)$ and $\mu = k / (k + K)$ in (13) yield a policy wedge

$$\omega = 1 + \left(mx \frac{k}{k + K} - \frac{al}{al + AL} \right) \gamma$$

that is larger than its closed-economy counterpart (9) if

$$mx > \frac{AL}{al + AL} / \left(\frac{K}{k + K} \right). \quad (16)$$

In words, when $\omega > 1$ then policy is even more "active" in perfect integration if the country's politico-economic index $mx > 1$ exceeds the rest of the world's relative labor intensity. Symmetrically, as shown in Bertola (2016), 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.

Two of the four numerical exercises of Figure 3 illustrate this analytical result. In the left-hand side panels, where $mx < 1$ implies a "passive" policy, the wedge grows towards unity

¹³Country borders defined by political and institutional features have the implications represented by $\nu \leq 1$. The model has a well defined solution also for a range of $\nu > 1$ values, which might perhaps represent technological phenomena that let foreign investment be more productive in exotic locations than domestically.

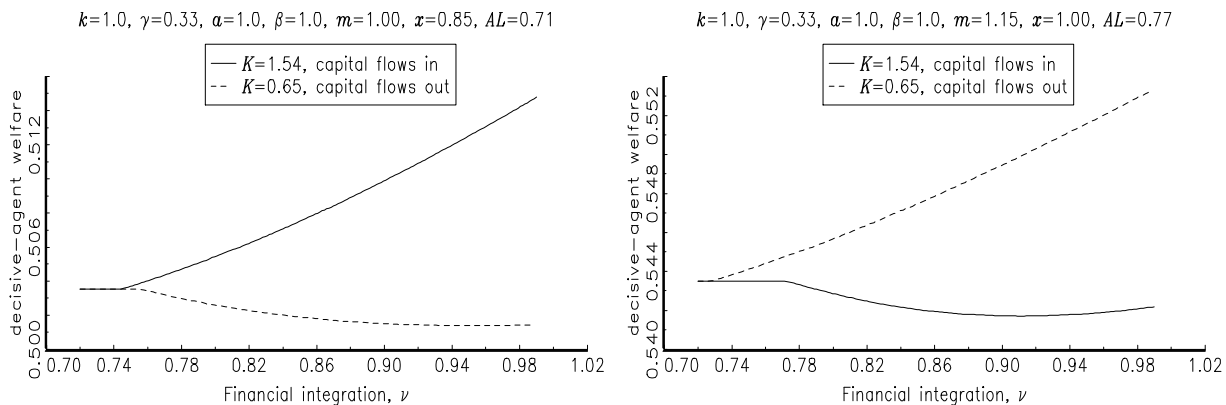


Figure 5: Decisive-individual welfare effect of international integration for the same countries as in Figure 3.

as ν begins to allow capital inflows, then moves in the opposite direction, and eventually exceeds its autarky level. Symmetrically, in the right-hand side panels both wedges initially fall towards unity, but the relatively capital-rich country's thereafter moves in the opposite direction, and eventually supports employment more than in autarky.

6 Welfare

The model's constant international wedge offers a simple characterization of partial and variable integration, but complicates the previous section's characterization of the transition between the two situations, and implies an excessively dramatic contrast between zero and even very small capital flows.¹⁴ The welfare effects that shape such transitions, however, are interestingly similar to those at work in the more realistic and tractable situations where capital flows and policy continuously react to gradual variation of international integration.

In Figure 5 continuous and dashed lines show numerical solutions for the decisive agent's welfare in the same four countries as in Figure 3. Because the decisive agent's welfare is always maximized by changing policy choices, the envelope theorem removes the first-order

¹⁴It might however be realistic for a capital-importing country with $mx < 1$ to experience a step increase of capital and discrete reforms, reminiscent of a double Big Bang liberalization of both cross-border (financial) and internal (labor) markets.

welfare effect through l of ν variation and makes it easy to characterize analytically the slope of the lines plotted in Figure 5.

By (1) and (4) at $k_i = xk$, the decisive-agent welfare effect of ν is

$$\frac{d}{d\nu}(c(l, xk, al/k_d) - B(l)) = \frac{\partial c(l, xk, al/k_d)}{\partial k_d} \frac{dk_d}{d\nu}. \quad (17)$$

The term $dk_d/d\nu$ captures the capital flow implications of the tighter integration represented by a larger ν . As integration strengthens capital movements, its effect on k_d is positive if easier capital mobility makes the country's domestic capital grow further above its national stock, negative if increases foreign employment of national capital.¹⁵ Using steps similar to those outlined in footnote 2 and the definitions of γ and m yields

$$\frac{\partial c(\cdot)}{\partial k_d} = - \left(mx \frac{k}{k_d} - 1 \right) \gamma \frac{l}{k_d} \xi_\delta \xi_\tau y' \left(\frac{al}{k_d} \right) a. \quad (18)$$

The welfare effect (17) is positive, and tighter integration benefits the decisive agent, if $(k_d/k) - mx < 0$ and capital inflows imply $\partial k_d/\partial \nu < 0$, or $(k_d/k) - mx > 0$ and capital outflows imply $\partial k_d/\partial \nu > 0$. So, tighter integration reduces the welfare of a capital-rich country's decisive individual if domestic capital as a fraction of national wealth is below the mx index of politico-economic equilibrium policy. The same $k_d/k < mx$ condition also implies in (13) that a "passive" $\omega < 1$ policy tends to reduce l below its *laissez faire* level: in Figure 5, the U-shaped lines begin to increase at the same degree of integration where $\omega - 1$ crosses the horizontal axis in Figure 3.

The mechanism underlying this neat result deserves a brief discussion. Because a larger domestic capital stock increases the wage and decreases capital's unit income, (18) may be positive or negative. The two effects cancel out when $kmx = k_d$, and in particular when

¹⁵Differentiation of the expressions in (12) yields

$$\nu \frac{d \log \lambda}{d\nu} = \frac{\gamma}{1-\gamma} (1-\lambda), \quad \nu \frac{d \log \mu}{d\nu} = -(1-\mu),$$

so if the country experiences capital inflows its domestic capital stock $k_d = k\lambda/\mu$ increases with ν by a proportion

$$\frac{\partial}{\partial \nu} \left(\frac{\lambda}{\mu} \right) = \frac{\lambda}{\mu} \left(\frac{\gamma}{1-\gamma} (1-\lambda) + (1-\mu) \right) \frac{1}{\nu} > 0$$

of the national capital stock k . If the country experiences capital outflows then k_d symmetrically declines by the negative of the same expression.

$x = m = 1$ and $k = k_d$: the welfare of a representative agent who owns all of the economy's capital remains unchanged (to first order) if employment adjusts optimally to factor prices (as mx tends to unity from below, the top and bottom panels of Figure 4 converge to each other, and so would their mirror images if mx converged to unity from above). When $kmx \neq k_d$, the sign of (18) depends on whether mx is larger or smaller than k_d/k , which also determines how the (13) policy wedge deviates from unity. To see why, note that a small mx means that the decisive agent's welfare depends more strongly on labor than on capital income: this implies that $\omega < 1$ enforces a "passive" policy, and lets the wage implications of k_d determine the sign of (18).

Because $k_d/k < 1$ in a capital-importing country and $k_d/k > 1$ in a capital-exporting country, tighter integration is certainly beneficial for the decisive agent if $mx = 1$ and no policy is enforced (either because there are no distortions and policy aims to aggregate efficiency, or because distortions suit the decisive agent). This follows directly from the fact that competitive equilibrium is in the "core" of an exchange economy: just like secession of a group of individuals cannot make them *all* better off on their own, so economic integration in a wider market cannot reduce average country welfare in *laissez faire*. But integration can damage groups of heterogeneous agents if lump-sum transfers are ruled out, as they must be to understand why policy distorts markets away from the allocation that maximizes aggregate welfare.

The decisive agent's welfare is particularly interesting because policies may determine the international wedge ν as well as the internal market wedge ω . Reforms partly offset the capital flow implications of integration, but do not change their sign, or that of its welfare implications. If $mx < 1$ rationalizes realistic "passive" policies, the tighter integration represented by a larger ν certainly increases the decisive agent's welfare if capital flows in, but can very well reduce it if capital flows out (or if l is set at the minimal level that prevents capital outflows). For a decisive agent who prefers to distort employment below its *laissez faire* level, for stronger capital outflows to be welfare-improving that agent must be close enough to average to introduce only a small ω wedge, and experience a positive welfare effect.

The numerical computations shown in Figure 6 use most of the same parameters as

$$k=1.0, \gamma=0.33, \alpha=1.0, \beta=1.0, m=1.25, AL=0.77, K=1.64$$

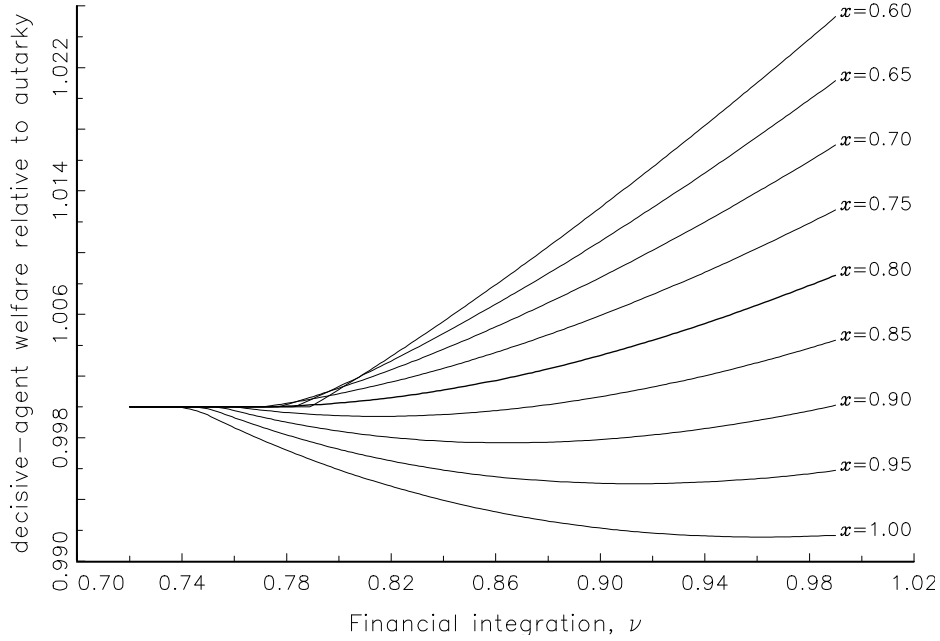


Figure 6: Decisive-agent welfare effect of international integration in a capital-importing country for various values of that agent's relative wealth.

previous figures, confirm standard insights and the analytical results above, and illustrate how the welfare implications of partial integration are shaped by deviations from unity of m and/or x . The lines plot for various values of x the proportional change that ν implies, through capital inflows and policy reforms, for a capital-importing country's decisive agent welfare. In all cases $m = 1.25$, so a representative decisive individual with $x = 1$ would find it optimal to distort l upwards with "active" policies.

The lowest line in the figure shows that such "active" policy action is weaker when its effects spill over to foreign owners of capital, and that tighter integration decreases the welfare of an average decisive individual through familiar race-to-the-bottom effects. The lines that illustrate welfare effects for decisive agents with $x < 1$ are U-shaped: race-to-the-bottom deregulation is damaging when capital flows are small, but further integration has positive welfare implications once the foreign-owned portion of domestic capital has become large enough to let beggar-thy-neighbor motives make it optimal to distort l downwards. The thicker line at $x = 0.80$ confirms that if $mx = 1$ makes *laissez faire* optimal in autarky, then integration always increases welfare. The lines above it show that, in this capital-importing

country, integration's welfare effects are more strongly positive when poorer decisive agents benefit from more intense capital inflows and more "passive" policy.¹⁶

These welfare effects could be characterized in more detail, if tediously, and not in closed form outside the *laissez faire* or autarky special cases. It is more interesting to note that the income, production, and welfare impacts of integration are in general comparable to those of the model country's structural and political features. If a decisive agent whose wealth differs from average prefers policies that imply a certain variation of a closed economy's capital intensity, then that deviation from average can offset or double the welfare implications of capital flows that induce that variation of domestic capital intensity. As in Figure 1, a 30% deviation of x from unity can justify a change of l and labor intensity in the order of 10%, which can also be implied by international integration if it results in imbalances and cross-border capital-income payments that, as a proportion of income and production, appear unusually large across countries (if not within politically unified countries, where households routinely own or owe large multiples of their annual income).

In Figure 6, welfare effects range through only about 3 percentage points as the country moves from autarky to full integration with a much more capital-intensive rest of the world, experiencing the much more dramatic capital inflow, employment, and policy effects shown in Figure 5. Welfare gains or losses only reach about 2% even as domestic capital and employment increase by some 30% and 10% respectively (and production grows by about 20% as a result). The parameters used in these figure are meant to be only very roughly realistic, but these computations illustrate a fully general insight: welfare changes are smaller by an order of magnitude than those of domestic employment and production, because they net out similar but symmetric changes of foregone leisure and capital income payments.

¹⁶Within the country, agents whose wealth differs from xk experience similarly shaped and potentially much larger welfare changes. Characterizing how welfare effects depend on variation of factor prices and policy reforms is conceptually straightforward but rather cumbersome. Bertola (2016) uses a simple two-classes numerical example to illustrate how welfare effects differ in sign and size across the country's population on transition from autarky to full integration.

7 Relevance and extensions

This paper's technical derivations yield sharp insights into the policy reform implications of exogenous variation of international integration, as may in reality result from technological developments that imply a larger efficient production scale and reduce transportation and information costs. Tighter integration may also result from removal of tax and regulatory policies that segment international markets. The model's welfare implications indicate that this benefits decisive agents if they all support *laissez faire* ($mx \approx 1$) and gain from trade, and also if policy reduces market activity ($mx < 1$) in poor countries while $mx > 1$ in rich countries. It would be interesting to see whether in history the balance of power was uneven in this way within the more or less developed portions of what peacefully became unified countries.

To the extent that policy tends to reduce employment and production also and perhaps especially in wealthy countries, however, the model's politico-economic mechanism cannot explain integration as an endogenous phenomenon. When $mx < 1$ everywhere, then tighter integration can generate beneficial capital inflows for poor countries' decisive agents only as the counterpart of damaging capital outflows for the relatively poor decisive agents of rich countries. Economic integration in history was rarely the result of democratic decision processes, and most often forced by conquest (Findlay and O'Rourke, 2009). For market integration to be politically acceptable in all countries, it has to imply favorable non-economic implications. The European experience is a case in point. Tighter integration should in theory and did in the early stages of EMU increase inequality and trigger labor policy deregulation in capital-rich countries (such as Germany), but non-economic motives (such as obtaining other countries' agreement for German reunification) could make this politically acceptable. Because the plausible size of economic welfare effects is rather small, non-economic motives need not be very strong to make integration politically acceptable, and their fluctuations can help interpret patterns of reforms and financial disintegration after the crisis (Bertola, 2017).

As in any rational equilibrium model, agents do not need to be aware of the whole structure of the economy to behave as they do in equilibrium. Within the model, investors respond to profit opportunities, and policy-makers and voters react to labor market performances.

Authors and readers of academic papers can and should take a broader view of the issues, and see whether and how policy coordination may prevent excessive regulation and deregulation by policy-makers who disregard the interests of foreigners. Subsidiary labor policies distort capital movements like a source-basis capital income tax. From the point of view of an average individual, they have the same harmful implications of trade tariffs, industrial subsidies, and other policies that the European Union regulates at the supranational level. Labor policy coordination would be unanimously preferable to competition if it were possible to aggregate a country's welfare to what is experienced by a representative citizen, and in each country policy-makers served that citizen's interests. When instead policy-makers do not represent the country's average individual, then coordination is beneficial "if and only if the elasticity of the tax base exceeds the policymaker's marginal propensity to waste tax revenue" (Edwards and Keen, 1996). From the points of view of heterogeneous agents within each country, "waste" is whatever damages them, even as it benefits others. Hence, subsets of each country's population may welcome market integration as a check on the power of policy-makers who to them look like a Leviathan. In principle, policies that compromise among conflicting interests in each country could be coordinated upon integration so as to please at least those who wield political power in their own countries. In practice, this would plausibly require cross-border transfers: to make tighter integration politically acceptable, payments would need to flow from the middle-class decisive agents of capital-poor countries to those of capital-rich countries in times of increasing integration, and in the opposite direction when integration becomes more difficult.

The present paper models market integration in terms of capital mobility and focuses on the factor price effects of flexible employment in a single-good economy. Further research may explore the results' relevance and robustness in other settings. The distributional implications of external tariffs or internal taxes in a two-sector economy at given aggregate factor supplies are similar to those studied here (Mayer, 1984), and depend on country size (Syropoulos, 2002) as in the derivations above and in the policy competition literature. A more complex and realistic model of international integration or disintegration could account for public goods and income level redistribution (Bolton and Roland, 1997) alongside policies that influence factor allocation and prices. Allowing for capital accumulation over time would

let not only labor but also investment and savings policy wedges (as in Gourinchas and Jeanne, 2013) determine the welfare of heterogeneously wealthy individuals (as in Bertola, 1992). The optimal capital income taxation literature suggests that a capital-accumulating economy tends to completely deregulate labor markets in steady state. Imperfect intertemporal financial market integration would remove this somewhat implausible implication, and play a role similar to that of this paper's international wedge in shaping politico-economic interactions.

References

- Andolfatto, David (1996) "Business Cycles and Labor Market Search" *American Economic Review* 86(1): 112-132.
- Bertola, Giuseppe (1993) "Factor Shares and Savings in Endogenous Growth" *American Economic Review* 83(5): 1184-1198.
- Bertola, Giuseppe (2004) "A pure theory of Job Security and Labor Income Risk" *Review of Economic Studies* 71(1): 43-61.
- Bertola, Giuseppe (2016) "Labor Policies and Capital Mobility in Theory and in EMU" *European Economic Review* 87: 62-77.
- Bertola, Giuseppe (2017) "EMU and Labor Market Policy: Tensions and Solutions" *European Economy Discussion Paper 054*, European Commission DG Economics and Financial Affairs.
- Bolton, Patrick, and Gerard Roland (1997) "The Breakup of Nations: A Political Economy Analysis" *Quarterly Journal of Economics* 112(4): 1057-1090.
- Chari, V. V., Patrick J. Kehoe, and Ellen R. McGrattan (2007) "Business Cycle Accounting" *Econometrica* 75(3): 781-836.
- Edwards, Jeremy and Michael Keen (1996) "Tax Competition and Leviathan" *European Economic Review* 40: 113-134.
- Findlay, Ronald and Kevin H. O'Rourke (2009) *Power and Plenty: Trade, War, and the World Economy in the Second Millennium*, Princeton NJ: Princeton University Press.
- Gourinchas, Pierre-Olivier and Olivier Jeanne (2013) "Capital Flows to Developing Countries: The Allocation Puzzle" *Review of Economic Studies* 80(4): 1484-1515.
- Greenwood, Jeremy, Zvi Hercowitz, and Gregory W. Huffman (1988) "Investment, Capacity Utilization, and the Real Business Cycle" *American Economic Review* 78(3): 402-417.

- Keen, Michael, and Kai A. Konrad (2013) "The Theory of International Tax competition and Coordination" in A.J.Auerbach, R. Chetty, M.Feldstein, and E. Saez (eds.), Handbook of Public Economics Volume 5, Amsterdam and Oxford: Elsevier, 257-328.
- Martin, Philippe and Hélène Rey (2000) "Financial Integration and Asset Returns" European Economic Review 44: 1327-1350.
- Mayer, Wolfgang (1984) "Endogenous Tariff Formation" American Economic Review 74(5) 970-985.
- Meltzer, Allan H., and Scott F. Richards (1981) "A Rational Theory of the Size of Government" Journal of Political Economy 89 (5): 914-927.
- Merz, Monika (1995) "Search in the Labor Market and the Real Business Cycle" Journal of Monetary Economics 36 (2): 269-300.
- Samuelson, Paul A. (1954) "The Transfer Problem and Transport Costs, II: Analysis of Effects of Trade Impediments" Economic Journal 64(254): 264-289.
- Sinn, Hans-Werner (2003) The New Systems Competition, Oxford: Basil Blackwell.
- Syropoulos, Constantinos (2002) "Optimum Tariffs and Retaliation Revisited: How Country Size Matters" Review of Economic Studies 69(3): 707-727
- Wilson, John Douglas (1999) "Theories of Tax Competition" National Tax Journal 52(2): 269-304.