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Labor Policies and Capital Mobility in Theory and in EMU

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Abstract

"Race-to-the-bottom" deregulation is to be expected when markets operate across the borders of countries that independently choose and enforce labor policies. Less obviously, in pre-crisis EMU reforms of labor market policies were uneven and related to international imbalances. That pattern is readily explained by this paper's model of financial integration between differently capital-abundant countries, within which labor policies benefit individuals with wealth/labor income ratios different from country's aggregate.

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1 Introduction

In Continental Europe, stringent labor market regulation and generous Welfare State schemes redistribute and smooth incomes, at a cost in terms of lower employment and productivity. These policies are rooted in country-specific historical factors and political compromises, and for this reason have remained an almost completely National competence even as the Economic and Monetary Union (EMU) process achieved essentially complete integration of goods and financial markets. Empirically, EMU was associated with labor market deregulation, lower social policy expenditure, and growing inequality of disposable incomes (Bertola 2010a,b, 2013, and references therein). These outcomes may be lamented if one values social policy objectives, or welcome if one resents the Leviathan powers of governments, but are far from surprising. International competition makes it difficult for national governments to enforce regulation and redistribution, uncoordinated policy choices tend to reproduce among systems the same competitive outcomes as *laissez faire* markets (Sinn, 2003), and deregulation is an obvious implication of decentralized labor and social policy choices within ever more closely integrated markets.

This paper is motivated by the more surprising observation that deregulation patterns are not only uneven across the member countries, but also related to internal and external macroeconomic developments. Germany stands out within Europe as much because of the Hartz labor market reforms as of its persistent current account surplus, and "sick man of Europe" early 2000s economic slump (Carlin and Soskice, 2009; Rinne and Zimmermann, 2012). And a more general relationship is apparent between capital outflows in the EMU pre-crisis experience and the country-specific labor market reform information available in the European Commission, Directorate General for Economic and Financial Affairs and Economic Policy Committee LABREF database of labor policy measures.[1] As in Koltay, Pierini

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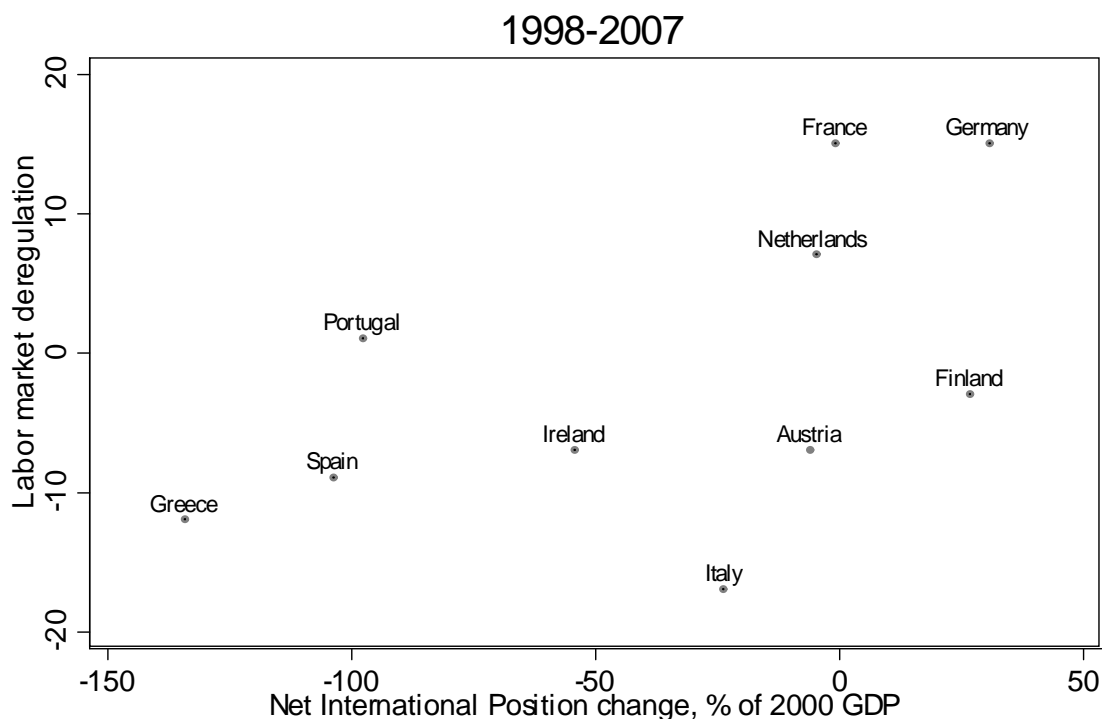[1] The data are accessible and documented at

Figure 1: Horizontal axis: Variation 1998-2007 of Net International Position, normalized by 2000 nominal GDP (source: Eurostat); Vertical axis: count of measures labeled "Decreasing" net of measures labeled "Increasing" adopted between 1999 and 2007 in the domains listed in the text, source: DG EcFin LABREF database.

and Turrini (2014), it is possible to summarize these data in terms of a cumulative count of measures deemed to be increasing flexibility, net of those deemed to decrease it, in the "Job Protection (EPL)", "Labour Taxation", "Unemployment benefits", "Wage Setting", "Working Time", "Other welfare-related benefits" domains (reforms in the "Active labour market policies", "Early Withdrawal", "Immigration/Mobility", and "Pensions" domains are less relevant and more difficult to sign, hence neglected). Figures 1 and 2 show that this rough indicator of cumulative deregulation from the 1999 start of the dataset until 2007 is positively related to familiar international imbalance trends over the period, whether measured

http://ec.europa.eu/economy_finance/db_indicators/labref/index_en.htm.
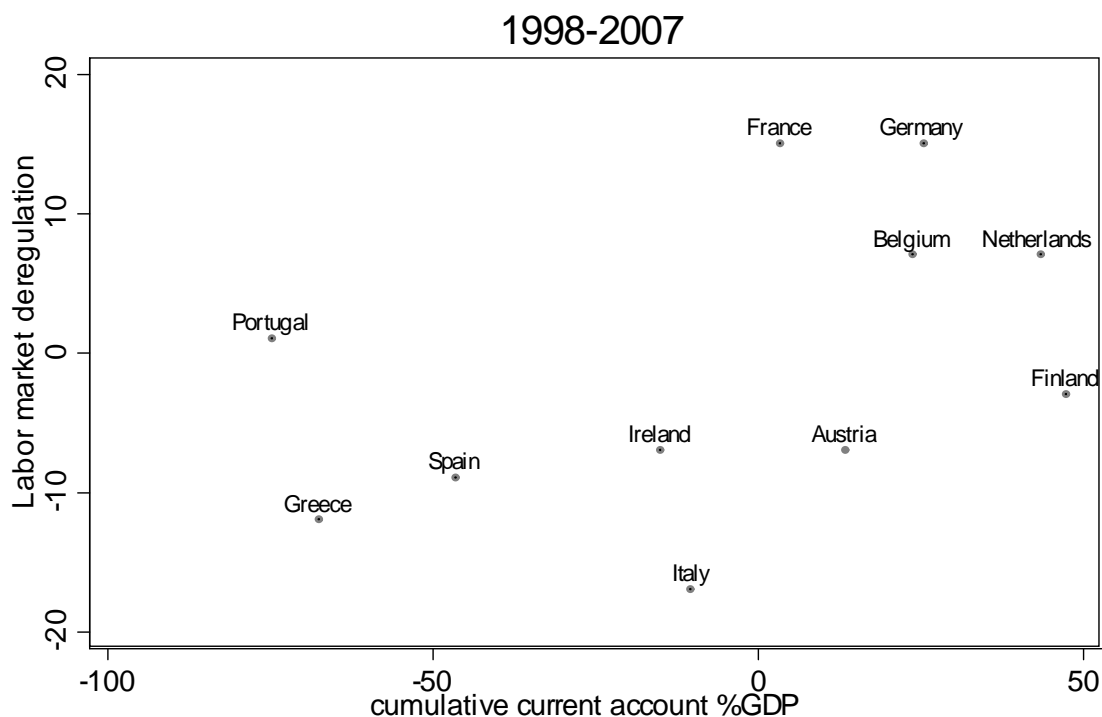
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Figure 2: Horizontal axis: Cumulation 1998-2007 of Current Account/GDP ratios (source: Eurostat); Vertical axis: as in Figure 1.

in terms of Net International Positions or of cumulated current account/GDP ratios.

This evidence is consistent with a possible causal relationship running from reforms to competitiveness and trade balances. Perhaps virtuous "core" countries exported more than they imported because increasingly flexible labor market institutions boosted their competitiveness through wage moderation, as well as through the productivity-enhancing effects of flexible labor allocation and individual wage determination. The negative external balances of "peripheral" countries could be blamed on poor competitiveness of the overcompensated, misallocated, and lazy workforce of relatively sclerotic labor markets. This reading of the evidence would imply that the latter countries took advantage of easy financing terms to indulge in relaxed work conditions, as well as in private and public consumption. It is tempting

to conclude that they were duly punished by the financial and economic crisis, and that all countries should in the future follow the example of the righteous, flexible, and competitive core countries. Such reasoning, however, treats as exogenously given both favorable financial conditions in peripheral countries, and policy reform patterns.[2]

Recognizing that labor policies pursue politically sensible objectives, and that policy choices depend on the circumstances in which they are made, makes it possible to formulate a somewhat deeper interpretation of linkages between economic integration, international balances, and country-level labor policies in EMU, and possibly in other regions and periods. Section 2 outlines a model where interference with *laissez faire* labor markets originates from redistributive motives across individuals who are heterogeneous in terms of whether their income is earned by "labor" or from "capital." Labor policy realistically tends to boost wages and reduce employment if the capital/labor ratio of politically decisive individuals is lower than the economy's average. Section 3 studies how the model endogenously determines capital reallocation and the evolution of labor market policies when capital (but not labor) is mobile across the boundaries of economically integrated policy choice and enforcement areas. For given labor policies, capital flows depress wages and employment in a capital-rich country (Germany, for concreteness) and boost them in a capital-poor one (Spain). Capital mobility also triggers race-to-the-bottom policy reforms in both countries, but the intensity of this effect depends on integration-induced variation of each country's politically decisive individual's relative capital endowment. If that individual in Germany is capital-poor relative to the German average, but less capital-poor relative to the average of Germany and Spain, the politico-economic equilibrium in Germany automatically swings towards deregulation more strongly than in Spain—where the politically decisive individual becomes even more

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[2]Similarly superficial implications may be drawn from divergent unit labor cost dynamics. As discussed by Gabrisch and Staehr (2012) and other references in ECB (2013), they need not accurately measure "competitiveness" and, to the extent that they are related to real exchange rates, can be a consequence of capital inflows rather than a cause of trade imbalances.

capital-poor, and the labor market reform implications of economic integration are smaller and ambiguous in sign. Section 4 discusses the model's implications for other empirical aspects of EMU experience, and Section 5 concludes.

2 Labor policy

Consider an economy that produces a single good using two factors, "capital" and "labor", in a constant returns production function with disembodied productivity a and (for simplicity) constant elasticity α. When nl units of labor are employed together with k units of capital, the economy produces $k^{\alpha}(anl)^{1-\alpha} = (\kappa)^{\alpha} anl$, for $\kappa \equiv k/anl$ the capital/effective labor ratio, and units of the two factors are paid their marginal productivities

$$w = a\left(1 - \alpha\right)\left(\kappa\right)^{\alpha}, \ r = \alpha\left(\kappa\right)^{\alpha-1}. \tag{1}$$

The economy is populated by individuals with possibly heterogeneous endowments of the two factors. Individual i earns r on each of k_i units of capital, and chooses how much of n_i should be employed in market production, rather than in an alternative use (such as leisure, or household production). For simplicity, the income-terms welfare loss resulting from market production has constant elasticity $1 + \beta$ in the total welfare or full income expression

$$u_i = rk_i + wn_il_i - b\frac{(l_i)^{1+\beta}}{1+\beta}n_i, \tag{2}$$

where l_i indexes market utilization of labor. In this specification, a larger n_i (which might represent better physical health, more energy, a longer life, ...) improves the productivity of market and non-market labor utilization. To represent personal characteristics that influence labor utilization choices it would be straightforward, but will not necessary in what follows, to let parameter b vary across individuals.

To maximize (2), wage-taking individual sets l_i so as to equate the marginal benefits of market and non-market uses of labor. As discussed in the next subsection, labor market policies typically insert a proportional wedge $\omega \neq 1$ between the two sides of this marginal condition: $b\left(l_i\right)^\beta = \omega w$ and (1) imply that

$$l_i = \left(\omega \frac{a}{b}\left(1-\alpha\right)\left(\kappa\right)^\alpha\right)^{1/\beta} \tag{3}$$

for all individuals who only differ in terms of k_i and n_i, and are faced by the same ω.

Inserting (1) and (3) in (2) yields

$$u(\omega; k_i, n_i) = \alpha\left(\kappa\right)^{\alpha-1} k_i + \left(1-\alpha\right)^{\frac{1+\beta}{\beta}}\left(\kappa\right)^{\alpha\frac{1+\beta}{\beta}} \omega^{\frac{1}{\beta}}\left(\frac{1+\beta-\omega}{1+\beta}\right)\left(a/b\right)^{1/\beta} an_i, \tag{4}$$

where the labor policy wedge ω is not indexed by i because it applies to all of the individual's economy.

Each individual's indirect utility function as in (4) of course also depends on k_i and n_i. It is maximized with respect to ω when

$$\alpha(1-\alpha)^{-\frac{1}{\beta}}\left(\kappa\right)^{-\frac{\alpha+\beta}{\beta}}\frac{k_i}{\left(a/b\right)^{1/\beta} an_i\omega^{1/\beta}}\eta_{\kappa\omega} = \frac{\alpha}{\beta}\left(1+\beta-\omega\right)\eta_{\kappa\omega} + \frac{1}{\beta}\left(1-\omega\right), \tag{5}$$

where

$$\eta_{\kappa\omega} \equiv \frac{\omega}{\kappa}\frac{\partial\kappa}{\partial\omega}$$

is the elasticity of the effective capital intensity

$$\kappa \equiv \frac{k}{anl} = \frac{k}{an\left(\omega\frac{a}{b}\left(1-\alpha\right)\left(\kappa\right)^\alpha\right)^{1/\beta}}:$$

the second expression recognizes that $l = \left(\omega w/b\right)^{1/\beta}$ by (3) and (1), and makes it possible to

solve for obtain

$$\kappa = (1 - \alpha)^{-\frac{1}{\alpha+\beta}} \left(\frac{k}{(a/b)^{1/\beta} \, an\omega^{1/\beta}} \right)^{\frac{\beta}{\alpha+\beta}} , \quad \eta_{\kappa\omega} = -\frac{1}{(\alpha+\beta)}.$$

Inserting these expressions in (5) it is possible to solve for the policy parameter,

$$\omega^*(k_i, n_i) = 1 + \alpha \left(\frac{k_i/n_i}{k/n} - 1 \right),$$

that maximizes the welfare of an individual who earns income from k_i and n_i in an economy where the aggregate endowments amount to k and n.

The *laissez faire* allocation implied by $\omega = 1$ is optimal from the point of view of an individual who owns the two factors in the same proportions as the aggregate economy, $k_i/n_i = k/n$. That production-efficient allocation is the natural one for an the economy that admits a representative individual, either because all individuals are indeed identical, or because resources can be redistributed on a lump-sum basis by public transfers or private contracts. Otherwise, in the economy's politico-economic equilibrium $\omega \neq 1$ reduces total income and welfare at the same time as it shifts it towards a particular subset of the heterogeneous population.

2.1   Implementation

Most if not all micro-founded macroeconomic models can be represented as a competitive economy with wedges representing the effects of productivity, labor and investment taxes, and government consumption (Chari, Kehoe, and McGrattan, 2007). In fact, a proportional wedge ω between the marginal value of market and non-market use of labor is implied by a variety of realistic labor market policies.

The outcome favored by a non-representative individual can be implemented by a suitably rebated proportional payroll tax τ. Equating take-home pay $(1 - \tau)w$ to the outside option

bl^β readily implies that $\omega = 1 - \tau$, and welfare amounts to (4) if the revenue of the payroll tax is rebated to each individual in proportion to n_i. Should it be the case that $x > 1$, then employment should be subsidized, and taxation of n_i would keep all redistribution within labor incomes.

Employment levels can also be distorted by wage bounds. For example, a minimum wage that prices labor out of employment may be imposed on individual work hours: then, each individual would prefer to work more at the going wage, but all are rationed (while enforcing $\omega > 1$ would again entail slavery). Should minimum wages or binding collective agreements be imposed on each individual's total market income, some individuals would be involuntarily unemployed. As in monopoly union models, the unequal welfare impact of such policies may be smoothed across workers by informal household transfers, or over the life-cycle of each individual worker. The *ex ante* welfare implications of possible *ex post* involuntary unemployment can be represented formally in terms of an employment lottery, as in micro-founded macroeconomic models where preferences take a form similar to (2) and a nonlinear function of average consumption replaces income only in order to model savings (Andolfatto, 1996, and Merz, 1995).

In (3), policy lowers the market employment level below the laissez faire outcome by a proportional factor $\hat{\omega} = \omega^{\frac{1}{\beta}}$, and a similarly distorted allocation can be enforced by quantity constraints. Any $\omega < 1$ can be implemented limiting weekly work hours, imposing minimum annual holidays, or perhaps by penalizing excessive effort on the job. Should $x > 1$ imply that $\omega > 1$, policy would take the form of minimal working time rules, or other forms of forced labor. As $\beta \to \infty$ it becomes impossible for taxes or wage bounds to distort perfectly inelastic labor supply; it remains possible to restrict the quantity, but this is never optimal in the limit where the non-market use of labor has zero value.

Any such implementation only approximates real-life labor policies, and all those consid-

ered above see underemployment as the only efficiency cost of income redistribution across factors of production. Employment protection legislation (EPL) is harder to model formally, and implies a wedge of ambiguous average size between labor's marginal productivity and value in alternative uses. As shown in e.g. Bertola (2004), however, the motivation and effects of EPL are similar to those of other labor market policies, in that it increases the welfare of risk-averse uninsured workers, who benefit from stabilization of labor income in the face of labor demand shocks, at the same time as it reduces production efficiency and non-labor income.

The welfare losses implied by redistribution-motivated policies can be large, especially when they take the form of rent seeking activities that strive to circumvent rationing. But it would be naive to suppose that regulatory distortions are so large as lower the welfare of the very individuals they are meant to help. In a second-best world, labor market policy can (indeed, must) benefit the individuals who have the power to implement and enforce it. In reality, labor income is taxed, non-employment is subsidized, collective bargaining or legal minimum wages set wage floors rather than ceilings, and employment is protected. These and other policies and institutions distort employment below its *laissez faire* level, maximize the welfare of an individual whose capital/labor ratio is smaller than the aggregate one, and are represented by $\omega < 1$ in the stylized model of this section.

Since the different implications across individuals of $\omega \neq 1$ are monotonically related to the composition of their income sources, the role of income distribution and political mechanisms in determining policy choices can be summarized by

$$x \equiv \frac{\tilde{k}_i/\tilde{n}_i}{k/n}, \tag{6}$$

where k/n is the economy-wide ratio of factors that, respectively, must and may not be employed in market production, and $\tilde{k}_i/\tilde{n}_i$ the same ratio in the income sources of the

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politically decisive individual whose welfare is maximized by

$$\omega(x) = 1 + \alpha \left(x - 1 \right). \tag{7}$$

If policy is chosen by majority voting, and the distribution of capital is realistically more unequal and more skewed than that of labor, then the median capital/labor ratio is lower than the average, and $x < 1$. Labor policy tends to reduce l, and the model implies an economy-wide version of labor supply restraints familiar from monopoly union models. The model's implications for the policy effects of economic integration, however, do not depend on the more or less democratic character of the politico-economic mechanism that maps heterogeneous economic interests into a choice of ω, as long as that mechanism remains unchanged when a country joins a broader market while retaining its power to set and enforce labor policies.

3   Capital mobility

Representing many diverse labor policies in terms of a single labor wedge ω makes it difficult to obtain detailed implications for inequality and employment or unemployment, but makes it easy to characterize how a country's politico-economic choice of any such policy interacts with integration of economies that, like individuals, also feature different capital/labor ratios.

To represent economic integration, let the "capital" factor become mobile beyond the borders of a country like that modeled in the previous section, where k units of it are available. Within the integrated economy, countries are entities that set and enforce policy, rather than geographical or cultural regions. Their boundaries need not be related to the tastes and technology of individuals and firms and for this reason, as well as for simplicity, it is sensible to suppose that returns to scale are constant and that the elasticity parameters

α and β are the same throughout the integrated economy. For the present paper's purposes it is instead essential to allow the available amounts of the two factors to differ across the integrating countries, as well as within each.

Consider the simple case where the country introduced in Section 2 integrates with just one other country, where capital and labor amount to K and N rather than k and n, and the labor policy wedge is also denoted by an upper case Ω rather than by ω. The productivity of market and non-market activities may be different in the two countries: $a \neq A$ and $b \neq B$ represent cultural or geographical features that happen to be heterogeneous over the same historically determined areas where different policies are enforced, or the productivity implications of policies other than those captured by ω and Ω. It is possible, at the cost of unnecessarily complicated notation, to consider a larger number of countries and/or allow for taste and technology heterogeneity across subsets of each country's citizens.

The mobile factor dubbed "capital" can correspond in each country to the accumulation of unconsumed and undepreciated past production. In a dynamic extension of the model, policy determination and capital accumulation could be analyzed along the lines of Bertola (1993) and Bertola, Foellmi, and Zweimueller (2006). When applying the model to economic integration it may be empirically important and feasible to develop a more disaggregated framework where "capital" corresponds to relatively skilled labor that is more intensively employed in the tradable sectors of the integrating economies, and/or finds it easier to migrate.

For the present paper's purposes, capital is mobile in financial terms. Across the borders of integrated countries, domestic investment can be funded by foreign savings. If some countries saved more in the past (whether because of their residents' patience, or peculiar demographics, or consumption-smoothing storage of unusually positive production), their relative capital abundance makes investment within their borders less productive than in-

vestment in relatively capital-poor countries. To the extent that such "downhill" capital flows contribute to external imbalances within the euro area (Blanchard and Giavazzi, 2002) and labor policies are chosen at the National level (as is the case in Europe), the model can speak to the relationship between labor policy, imbalances, and inequality developments shown in the Figures above.

When the capital stocks available in the two countries can move across their borders, the k_d and $K_d = (K+k) - k_d$ amounts used in each country's domestic production must have the same marginal productivity. Imposing $\alpha \left(k_d\right)^{\alpha-1} (anl)^{1-\alpha} = \alpha \left((K+k) - k_d\right)^{\alpha-1} (ANL)^{1-\alpha}$ implies that the effective capital intensity is equalized across the integrated economic area at

$$\frac{k_d}{anl} = \frac{K_d}{ANL} = \frac{k+K}{anl + ANL} = \kappa$$

Using (3) and its upper-case counterpart $l = \left(\Omega A \left(1-\alpha\right) \left(\kappa\right)^\alpha / B\right)^{1/\beta}$, in equilibrium

$$\kappa = \frac{k+K}{\left(an \left(\omega \frac{a}{b}\right)^{1/\beta} + AN \left(\Omega \frac{A}{B}\right)^{1/\beta}\right) (1-\alpha)^{1/\beta} \left(\kappa\right)^{\frac{\alpha}{\beta}}}$$

is solved by

$$\kappa = (1-\alpha)^{-\frac{1}{\alpha+\beta}} \left(\frac{k+K}{(a/b)^{1/\beta} an \left(\omega\right)^{1/\beta} + (A/B)^{1/\beta} AN \left(\Omega\right)^{1/\beta}}\right)^{\frac{\beta}{\alpha+\beta}}, \qquad (8)$$

with elasticity

$$\eta_{\kappa\omega} = -\frac{\lambda(\omega,\Omega)}{\alpha+\beta}, \text{ where } \lambda(\omega,\Omega) = \frac{an \left(\omega a/b\right)^{1/\beta}}{an \left(\omega a/b\right)^{1/\beta} + AN \left(\Omega A/B\right)^{1/\beta}}.$$

Inserting these expression in the condition (5) for maximization with respect to the policy parameter ω of the lower-case country's residents, and using the definition of x in (6), yields

$$\omega^*(x) = 1 + \alpha \left(\frac{\beta\lambda(\cdot)}{\alpha(1-\lambda(\cdot)+\beta)}\right) \left(\frac{k}{K+k} \frac{1}{\lambda(\cdot)} x - 1\right): \qquad (9)$$

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the preferred policy parameter ω differs from unity if x does, i.e., whenever the country's policy privileges the interests of individuals whose income sources differ in composition from the country's average.

3.1 Symmetry and size

In the integrated economy's equilibrium, the similar condition

$$\Omega^*(X) = 1 + \alpha \left(\frac{\beta(1-\lambda(\cdot))}{\lambda(\cdot)\alpha + \beta} \right) \left(\frac{K}{K+k} \frac{1}{1-\lambda(\cdot)} X - 1 \right), \tag{10}$$

identifies the optimal Ω for the economically integrated policy-making entity denoted by upper-case variables. In the model, labor policy choices reflect the redistribution motives represented by $x \neq 1$ and $X \neq 1$. As long as migration or political system reforms do not alter either country's policy-making framework, there is no reason for those parameters to change upon integration, when the equilibrium policies ω and Ω should simultaneously satisfy (9) and (10).

A simple closed-form solution is available if the two countries are completely symmetric. When $K = k$, $A = a$, $N = n$, $B = b$, and $X = x$, then $\lambda = 1/2 = k/(k+K)$, and

$$\omega = 1 + \frac{\beta}{\alpha + 2\beta}\alpha\,(x-1) = \Omega. \tag{11}$$

Since $\beta/(\alpha + 2\beta) < 1$, integration brings each country's policy parameter closer to unity than in the autarky situation where condition (7) applies. Policy spillovers trigger a race to the bottom because inflows of the complementary mobile factor increase the immobile factor's income. Each country's decisive individual has incentives to attract or retain capital, and uncoordinated competition for its elastically supplied stock brings policy closer to the *laissez faire* $\omega = \Omega = 1$ configuration.

In models of tax competition (Keen and Konrad, 2013) the burden of financing public

spending falls on immobile factors. Here, capital mobility prevents distortionary labor policy from shifting income towards immobile labor. Other results of the tax competition literature are also applicable in this context. Just like relatively small constituencies within economically integrated areas impose lower tax rates, because their tax base is more elastic than that of larger areas, so the labor policies they enforce should be more lenient. To see this, note that ω tends towards its unitary *laissez faire* value as λ and $k/\left(K+k\right)$ tend to zero in condition (9), which instead becomes its (7) autarky counterpart as λ and $k/\left(K+k\right)$ tend to unity. In general, the right-hand side of (9) depends on the lower-case country's share λ of effective labor according to

$$\frac{d}{d\lambda}\left(1+\frac{\alpha\beta\lambda}{\alpha(1-\lambda)+\beta}\left(\frac{k}{K+k}\frac{1}{\lambda}x-1\right)\right)=-\frac{\alpha\beta}{(\alpha+\beta-\alpha\lambda)^2}\left(\alpha\left(1-\frac{k}{K+k}x\right)+\beta\right),$$

$$(12)$$

which is certainly negative if $x<1$. When labor policy realistically favors relatively capital-poor individuals, ω is more strongly biased below unity if the policy is enforced over a larger proportion of the integrated economic area.

3.2   Capital flows and policy reforms

The model's structure implies that the relevant indicator of countries' effective size is a function $\lambda(\omega,\Omega)$ of their endogenous policy choices. This prevents closed-form solution when countries are asymmetric, but some analytical results are readily available. The deregulation represented by an increase of ω towards its unitary laissez-faire level increases the country's relative size in terms of effective labor,

$$\frac{\partial\lambda(\omega,\Omega)}{\partial\omega}=\frac{1}{\beta\omega}\left(1-\lambda(\omega,\Omega)\right)\lambda(\omega,\Omega)>0,$$

while deregulation by the other country decreases it,

$$\frac{d\lambda(\omega, \Omega)}{d\Omega} = -\frac{1}{\beta\Omega}\lambda(\omega, \Omega)(1 - \lambda(\omega, \Omega)) < 0,$$

which in light of (12) implies a "race-to-the-bottom" policy complementarity mechanism: deregulation elsewhere encourages domestic deregulation.

Deregulation would be welcome from the point of view of a hypothetical representative individual who earns income from the two factors in the aggregate proportions and, by (7), has maximal welfare in *laissez faire*. It is also intuitive, and easy to show formally, that in the $\omega = \Omega = 1$ *laissez faire* configuration both country-level representative individuals benefit from integration of countries with different factor proportions. If instead each country's politico-economic equilibrium justifies distortionary policies motivated by redistribution across heterogeneous individuals, then economic integration influences each country's internal income distribution, through both capital mobility and policy choices.

In the case of completely symmetric countries, there is no capital mobility, and only the latter effect is at work: the policy shift from (7) to (11) benefits individuals whose endowments are closer to their economy's average than each country's decisive individual, but decreases the decisive individuals' welfare in both countries. When integration by itself has no implications for economic efficiency, it can be supported by the same political mechanisms that determine internal policies only if an area-wide policy-making framework prevents uncoordinated reforms from decreasing the welfare of politically decisive individuals.

In reality, economic integration also improves efficiency through channels unrelated to factor intensities (such as economies of scale and increased variety), and is driven by cultural or technological factors as well as by politico-economic ones. In the model, integration of economies with different factor ratios is welfare-improving in *laissez faire* for the two countries' average individuals, who do support $\omega = \Omega = 1$ in each country's autarkic situation.

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Uncoordinated policy reforms boost employment after integration, however, and the resulting $\omega > 1$, $\Omega > 1$ policy configuration does not maximize the welfare of either country's (nor of the integrated economy's) average individual. The model's policy spillovers are very similar to those that motivate regulation of state aid within the EU but are largely neglected in the labor and social policy field, where National politics and wide heterogeneity of Welfare State structures prevent effective coordination and harmonization.

The conditions that determine policy in autarky as in (7) and within the integrated economy as in (9) differ not only because $\beta\lambda(\omega,\Omega)\left(\alpha(1 - \lambda(\omega,\Omega)) + \beta\right)^{-1}$ differs from unity (representing the familiar policy spillover mechanism discussed above), but also to the extent that

$$\frac{k}{K + k}\frac{1}{\lambda(\omega,\Omega)} = \frac{k}{an\left(\omega a/b\right)^{1/\beta}}\frac{an\left(\omega a/b\right)^{1/\beta} + AN\left(\Omega A/B\right)^{1/\beta}}{K + k} \neq 1.$$

When the country's share of immobile effective labor in the integrated economy differs from its share of mobile capital, then its policy determination mechanism supports a different policy choice. Intuitively, the country's decisive individual can be more or less capital poor relative to the integrated economy than in autarky, and this insight arguably explains some aspects of EMU experience. In a country that (like Germany) upon integration experiences capital outflows, the (unchanged) decisive individual is less capital-poor relative to the integrated economy than relative to the country in isolation, and the model predicts an increase ω towards unity. Such labor market deregulation may be implemented by an incumbent government, or by a shift in political sentiment towards a different government; in Germany, the two were observed in sequence. The opposite is the case for countries that are capital-poor relative to the integrated area, and upon integration experience capital inflows.
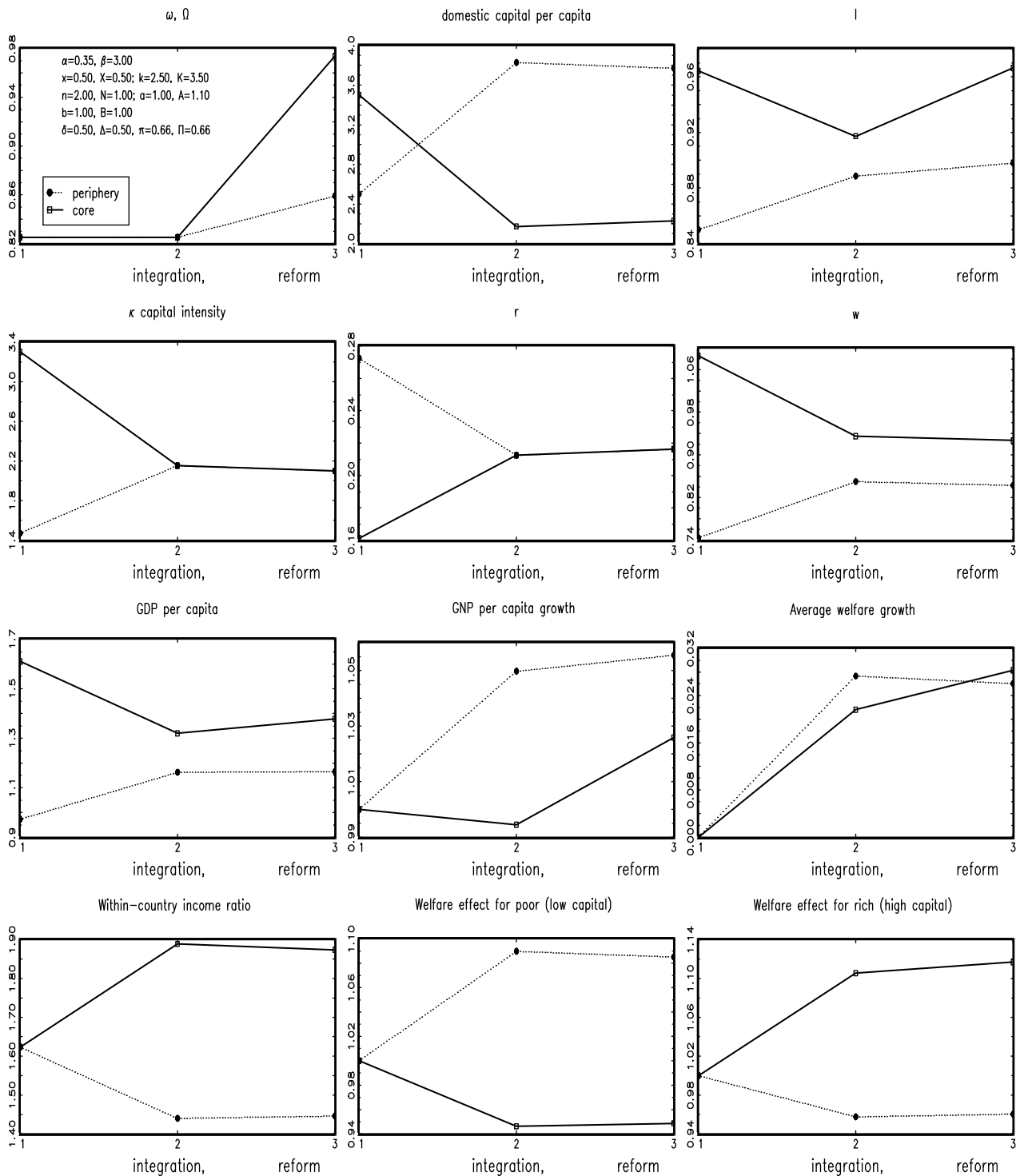
Figure 3: Implications of economic integration: numerical solution for policy reforms and various observable outcomes. The functional forms are those shown in the text, for the parameters listed in the top-left panel.

3.3 Numerical illustration

Figure 3 shows a numerical solution of the model. In each panel, variables on the vertical axis move from left to right from the closed-economy situations of a lower-case "periphery" capital-poor country and an upper-case "core" capital-rich country, to those implied by integration at unchanged policies (a situation where the core country might perhaps represent Germany after EMU but before the reforms), and finally to the combined effect of integration and policy changes.

The top-left panel of the figure shows that integration implies deregulation everywhere, but less in the peripheral country than in the core country. As shown above, the intensity of deregulation depends on relative size and capital abundance. With $n = 2N$ and $a < A$ (which prevents full convergence of effective wage rates), the peripheral country is larger, and with $k/n < K/N$ it has lower capital intensity. Both imply that the core country should deregulate very strongly, as shown in the figure. For the parameters used in computing the solution the peripheral country still deregulates but only slightly, and much less than the core country.

In equilibrium, capital flows and changes of the labor supply indicator l have to equalize the countries' capital intensity and unit capital income. The next panels of the figure show how capital moves from the core to the periphery upon integration, then how relative deregulation patterns partly offset this effect. For the parameters used in this example, the capital/population ratio is actually reversed by integration, because the labor supply indicator l increases in the periphery and declines in the the core so much as to more than offset the difference between the technological parameters a and A.

In the core country, integration implies a decline of GDP per capita and labor supply, which are offset by labor market deregulation (only partly for GDP but more than fully for labor supply, in the numerical example). This pattern fits Germany's experience in the euro

area, where the country "*was the largest capital exporter and plunged into a deep slump. Only one-third of its savings was invested at home, the rest being exported. As a result, during the early years of the euro the country had the lowest net investment rate and the lowest growth rate in Europe. Rapidly rising unemployment forced the Schröder government in 2003 to enact painful social reforms*" (Hans-Werner Sinn, Financial Times, July 22, 2013).

Both the model and EMU experience also indicate that GDP per capita increases in the periphery. Before concluding that some countries are damaged and other benefit from economic integration, it is of course useful to recognize that GNP is a better indicator of integration's and reforms' heterogeneous welfare implications, and to note that the GDP movements implied by capital flows are partly offset by international capital income flows in Figure 3. Moreover in the model, and arguably in reality, the income-terms contribution of non-market activities to individual welfare should be netted out of income, as in (2). For the parameterization illustrated in Figure 3 welfare improvements are very similar across countries: at unchanged policies, the core country's average individual benefits from integration slightly less in proportional terms than the peripheral country's, but the combined effect of integration and reforms gives to the former a slightly larger proportional welfare improvement than to the latter.

Those average individuals need not correspond to any real-life individual. Figure 3 also sketches the evolution of income and welfare inequality within each economy under a set of simple assumptions: the labor amount n_i is the same and unitary for all individuals, of which fractions π and Π within the two economies own δk and ΔK units of capital, while the rest owns $(1 - \delta\pi) k / (1 - \pi)$ and $(1 - \Delta K) K / (1 - \Pi)$. Supposing that $\delta < 1$ and $\Delta < 1$, $\pi > 0.5$ and $\Pi > 0.5$, a group of individuals is poorer but more numerous than the the other, and its income sources are biased towards labor.

The combination of integration- and policy-related unit factor incomes has intuitive and

widely different implications for the income and welfare of individuals with different factor endowments within each of the integrating countries. Integration obviously benefits owners of factors that in each country's autarky situation were relatively abundant (rich individuals in the core, poor individuals in the periphery), and damages the others. In each country, the politically decisive individuals are capital-poor: since they are damaged by integration in the core country, that country's choice to accept integration must be motivated by non-economic considerations, or perhaps by economic implications of integration that the model neglects (such as gains from intra-industry trade and economies of scale). In the Figure, post-integration labor market reforms increase the welfare of both rich and poor individuals in the core country, because in this simple example they are all capital-abundant within the integrated economy, and benefit from a decline in its capital intensity.

3.4   Many countries

The two-country analysis above usefully illustrates the key mechanism at work in the model. It is equally straightforward to characterize the policy responses of each of N countries joining a common financial market. After integration, capital intensity is uniform at

$$\kappa = (1 - \alpha)^{-\frac{1}{\alpha+\beta}} \left(\frac{\sum_{c=1}^{N} k_c}{\sum_{c=1}^{N} (a_c/b_c)^{\frac{1}{\beta}} a_c n_c (\omega_c)^{\frac{1}{\beta}}} \right)^{\frac{\beta}{\alpha+\beta}},$$

and each country's policy wedge moves from an expression in the form (7) to the solution, which has to be found numerically, of a system of N expressions in the form (9).

Figure 3 illustrates such a solution for $N = 10$ countries that randomly differ mostly in terms of capital intensity, and to some extent also in terms of size n and efficiency a; in all countries the other parameters, and in particular the capital abundance of decisive individuals, are the same as those assumed for both the core and periphery countries in
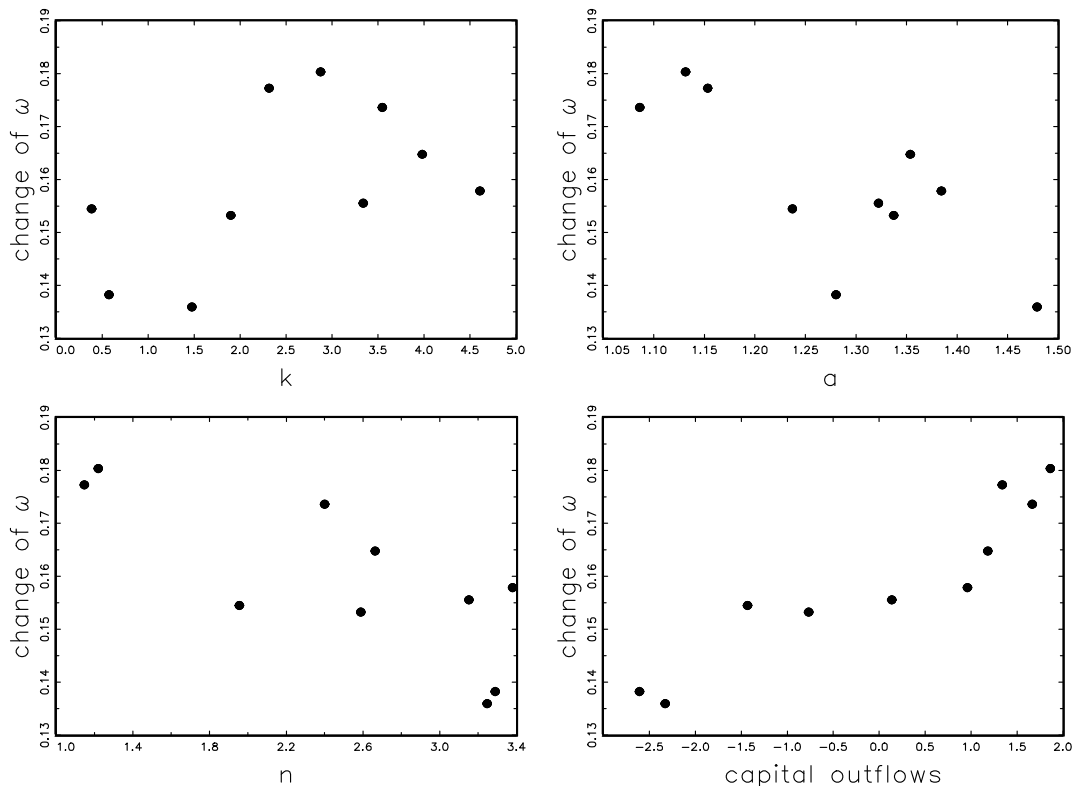
Figure 4: Role of capital abundance, size, and productivity in determining reform and capital flows upon financial integration of ten countries with randomly generated characteristics. Numerical illustration for the functional forms displayed in the text, other parameters as in Figure 3.

Figure 3. Size- and capital-intensity patterns are linear and even out across countries, so the model predicts that average deregulation should depend only on the number of uncoordinated policymakers. Qualitatively, cross-country patterns are similar to those discussed in the two-country example: deregulation is less pronounced in countries that are larger (in terms of the number and/or efficiency of their immobile factor) or less capital abundant; since the latter countries experience capital inflows, the bottom-right panel of the figure represents in the theoretical model a relationship similar to the empirical one plotted in Figure 2. Quantitatively, policy shifts in the transition from autarky to integration are magnified, and result in almost complete deregulation everywhere, when each country accounts for only a

small fraction of the integrated area's effective labor.

4 The EMU experience

The combined effects of integration and policy reforms imply relationships between observable variables that can be compared to their empirical counterpart.

4.1 Inequality

The inequality parameters used in computing the solution shown in Figure 3 imply a positive relationship between within-country inequality changes and international imbalances upon integration. As shown in Figures 5 and 6 this was empirically true in EMU (see also Bertola, 2013, Figure 11). This pattern is in fact implied directly by factor income convergence as long as within each country capital is more unequally distributed across individuals than labor income.

In reality, inequality is also influenced by trade-related relative wage changes and (on the post-tax-and-transfer basis of the Figures' data) by labor and social policy reforms. In the model, countries could of course be allowed to differ in terms of skilled labor abundance. This would realistically let integration influence labor income inequality and may matter for some labor policy choices, but would not be relevant to the capital flows on which the present paper focuses. The simple model's labor policy does not directly influence personal income inequality, because at a given capital intensity proportional income inequality does not depend on wage and employment levels when the production function has constant elasticity (a constant labor share also implies that conventional unit labor cost measures are constant in the model of this paper). Of course, specific labor policies can in more detailed models influence gross and net income inequality. For example, in Bertola (2014)
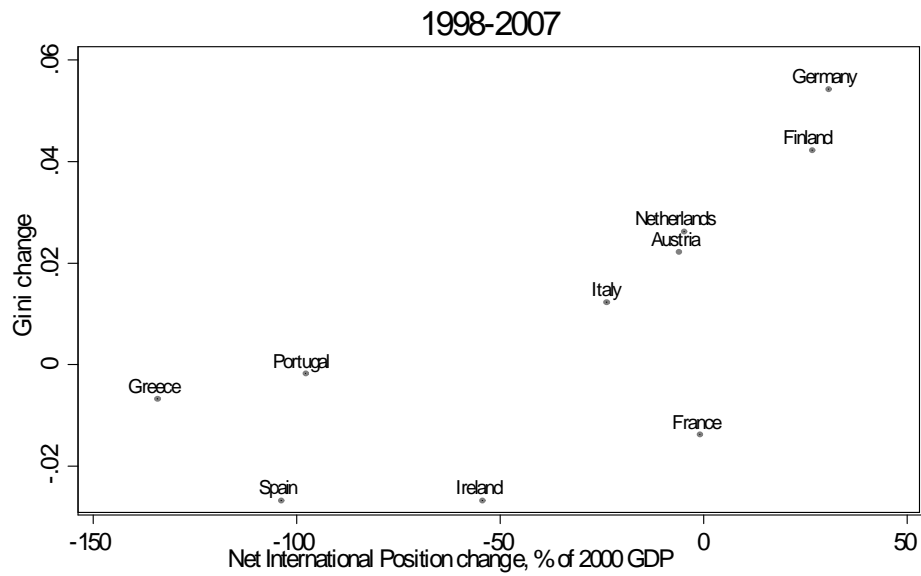
Figure 5: Vertical axis: Variation of Gini coefficient of equivalized household income (source: Eurostat); Horizontal axis as in Figure 1.
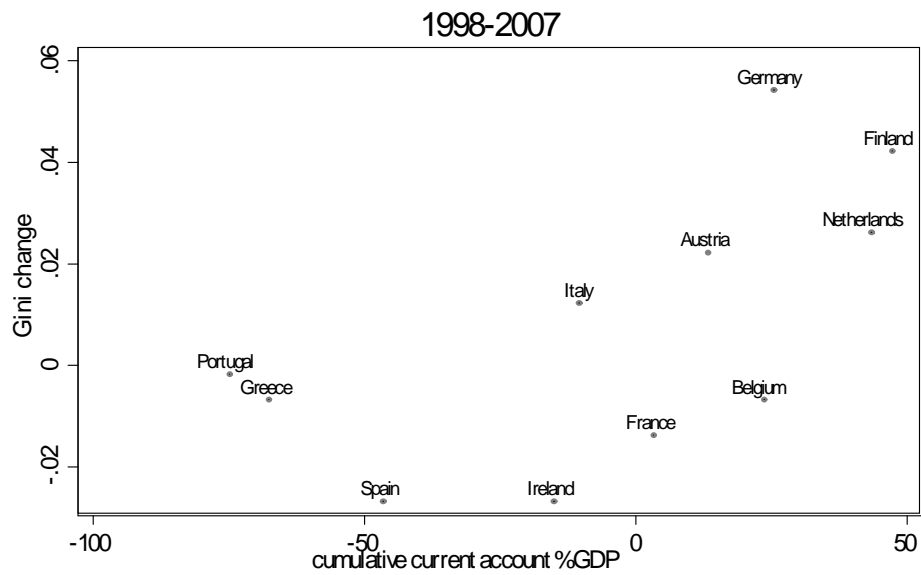

Figure 6: Vertical axis as in Figure 5; Horizontal axis as in Figure 2.

progressive taxation of income smooths consumption while reducing effort incentives, and has heterogeneous implications for individuals who differ in terms of wealth and exposure to uninsurable risk, with implications for the policy effects of international economic integration that are similar to those emphasized here, but more complicated to characterize analytically.

The model predicts that, for given capital intensity and capital flows, smaller policy-making entities should have stronger incentives to deregulate. This fits some specific reform experiences, such as the wage moderation and flexibility implemented by the 1982 Wassenaar agreement in the Netherlands, which at the time was a small portion of a completely integrated German economic area. In Germany, labor market reforms only took a similar path in the mid-2000s, when adoption of the euro and Eastern enlargement of the EU had integrated the country within a larger area, and made it attractive to forsake high wages and idle labor (represented in the model by small ω and l values) in order to improve competitiveness.

In principle, it would be desirable to go beyond such case studies, and assess the explanatory power of the proposed theoretical perspective also in terms of aspects other than those that motivate this paper's modeling effort. In practice, as usual in macroeconomics, potentially relevant and observable variables are much more numerous than observations, and many features of reality neglected by the model matter empirically for international capital flows and/or labor market policies and outcomes.

4.2   Imbalances

The model's transition from complete autarky to full capital mobility can only approximate the 1998-2007 period, when EMU implied different transitions from partial to less than perfect integration across the boundaries of the member countries. The fact that France's current account surplus and reforms are similar to Germany's may indicate that the two countries' effective capital intensities were similar, or that their financial markets were al-
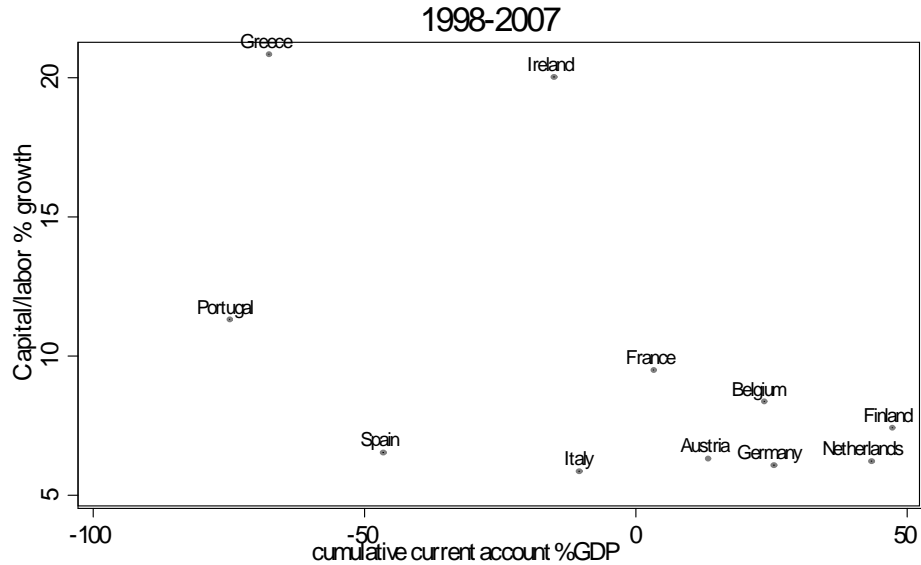
1998-2007

Figure 7: Vertical axis: contribution of capital growth per hour worked to output growth, source: Conference Board; Horizontal axis as in Figure 2.

ready integrated, at the beginning of the period considered.

As Figure 7 shows, the correlation between external imbalances and capital deepening is not as sharp in the data as it should be if, as in the model, the current account were driven only by different returns to investment. Part of the reason may be data quality: the capital/labor substitution series available in the European Commission's AMECO database reports much smaller increases for Greece and Ireland. But even in theory capital's contribution to growth is loosely related to current accounts driven not only by investment patterns but also by the consumption-smoothing implications of immobile factor productivity convergence expectations. Peripheral countries in the pre-crisis period perhaps anticipated consumption of the future income growth implied by adoption of better policies and institutions, an expectation that did not materialize according to available indicators of relative institutional qualities (Bertola, 2013). Extending the model to an intertemporal welfare function that is concave in consumption would make it possible for this channel to also re-

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flect the expectations of future wage growth when it takes time for investment to increase production.

4.3   Relative prices

In reality, the data are generated by more complex mechanisms than those implied by a sharp distinction between an immobile and a mobile factor in a model where production is expressed common units.

The model's "labor" factor is characterized both by availability of a non-market employment option, and by international immobility. The latter may be realistic for individuals who are culturally attached to specific geographic locations. It is fully realistic for land, and it is worth mentioning that in a dynamic version of the model the prices of immobile capital assets that entitle their owners to a share of production is increasing in GDP and decreasing in the rate of return, hence should fall in the capital-abundant countries and increase in capital-poor countries. This fits evidence of relative house price divergence across EMU core and periphery countries, without invoking "bubbles."

It is easy to see that ownership of immobile production factors other than labor influences the welfare impact of integration, and of labor (and other) policies. Formal analysis would substantially complicate the model, in particular by making it necessary to characterize the politico-economic implications of multiple dimensions of heterogeneity across individuals, and to address portfolio diversification issues. Moreover, the model measures incomes and productions in terms of a single numeraire, but housing services are not tradable, and would be appropriate and may be insightful to recognize that these and other goods are imperfectly substitutable across countries. When traded goods are produced with different technologies, the implications of factor price equalization would be qualitatively similar to those of financial capital mobility. Allowing for non-traded goods and services or cross-country taste differences

would make it necessary to define country-specific price indices; to measure empirically the rate-of-return convergence implied by capital mobility, it would be necessary to measure expected inflation in terms of such indexes.

4.4   Labor utilization

It would be interesting, but is not easy, to characterize empirically the supply responses indexed by β that in the model play a key role in determining equilibrium policy choices, which are ill-defined in the limit cases of $\beta = 0$ (where returns to capital cannot be equalized across asymmetric countries) and $\beta \to \infty$ (where zero value of non-market labor use makes it moot for policy to interfere with *laissez faire* outcomes). While the model has qualitatively similar reform implications for any $0 < \beta < \infty$, the size of β determines the extent to which l varies in response to capital flows and policy reforms, and real-life counterparts of this parameter can plausibly differ across countries in ways that make empirical work difficult.

Empirical testing is also hampered by the fact that the policy implementations outlined in Section 2.1 imply a wide variety of possible empirical counterparts for the model's (market) labor utilization indicator l. Since EU member countries regulate their labor markets in very different ways, the policies summarized by ω and Ω in the model can influence employment, effort, hours, and unemployment in country-specific ways.

In the data, employment rates and hours worked are not as sharply related to capital flows as would be implied by the model's policy-determination mechanism in response to factor-price-equalizing capital flows. The labor market participation elasticity that determines the size of β in the model might well be heterogeneous across and within countries in ways that may depend on demographics, which also may affect both labor market and capital flows outcomes directly (e.g. because youth are more likely to be unemployed and have lower savings rates). The effects of reforms for labor market outcomes depend on country-
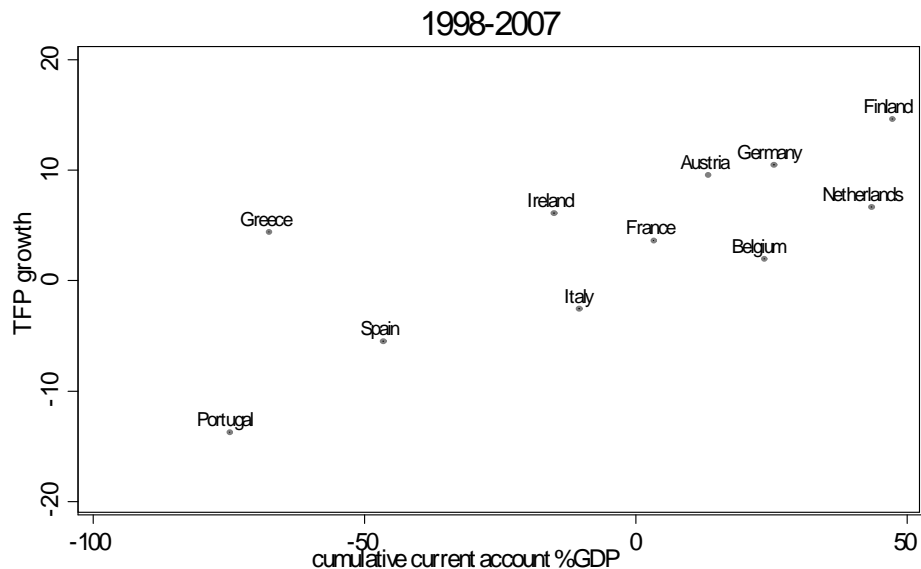
Figure 8: Vertical axis: Total Factor Productivity Growth, source: Conference Board; Horizontal axis as in Figure 2.

specific factors in a way that is poorly captured by fixed effects, and is difficult for interacted specifications to model convincingly in limited data.

Since labor policies tend to reduce production efficiency, or to the extent that the model's labor supply choice variable l may be interpreted as effort, policy-related variation might plausibly be empirically apparent in total factor productivity (TFP) indicators. In Figure 8, TFP growth is closely and positively related to the international imbalances that the model and EMU experience associate with labor market reforms (AMECO data are again somewhat different, especially for Greece and Ireland). If consumption-smoothing imbalances were generated in the data by expectations of relative productivity growth patterns, and those expectations were realized, TFP growth should be slower in surplus countries. What is observed in EMU is the opposite pattern, which is consistent with plausible efficiency effects of the reforms associated with capital flows by the politico-economic mechanism characterized above.

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5 Conclusion

Across financially integrated economies, domestic production depends on immobile factor endowments and on the structural and institutional features that determine their productivity. The model of this paper focuses on distributional issues, offers a stylized representation of concerns with protection from *laissez faire* market forces (whether within the country, or across countries' borders) in the absence of compensating transfers, and yields a novel set of predictions for capital mobility and labor market reform patterns.

The sharp and somewhat peculiar paths of labor policies in EMU offers a rare opportunity to observe the implications of economic integration in a situation where other factors may have played a relatively small role. While the model is extremely simple, and its class-based policy determination mechanism may appear old-fashioned, its predictions are intriguingly close to what was observed when technological trends in communication and transport, and a political motivation to pursue peace and stability, drove European countries towards ever closer economic union, and eventually triggered adoption of a common currency by some of them. The remarkable fit of streamlined policy-determination mechanism and inequality patterns does suggest that labor market institutions and other redistribution-motivated policies should be prominent not only in empirical analyses of employment and productivity developments before and after the crisis, but also in the design of Europe's economic and monetary union. The present paper's approach dispenses with monetary policy or public finance, and suggests that reforms were on the one hand a natural implication of subsidiary policy competition, on the other not uniformly painful within countries. If such basic insights were poorly understood, the consequences of integration came as a surprise, and the ensuing crisis threatens to break an integration process that has more complicated and politically difficult implications than many appear to have thought. Policy coordination in the

labor and social field is certainly difficult, but cannot be impossible, and should be a crucial element of the EMU project.

The model's perspective on integration-related changes of labor market institutions and other redistribution-motivated policies may be applicable to other experiences and has similarly positive (rather than normative) policy predictions for other issues, such as heterogeneous political support for trade barriers in models of factor-intensity-based trade (Mayer, 1984). In particular, it implies that each country's relatively capital-poor individuals would favor selective deregulation for foreign direct investment (which would violate State Aid rules in Europe), aiming to attract capital and boost wages without forsaking the inframarginal welfare gains afforded by domestic regulation—a mechanism similar to that which explains the political appeal of marginal deregulation and two-tier labor market.

It is more difficult to draw normative implications from this paper's theoretical and empirical analysis. There are excellent economic and non-economic reasons to favor European integration, and reform pressure can be welcome for policies that had been made obsolete by technological progress, globalization, or financial market development. If a social planner could be identified and empowered for all of Europe, then labor market policy coordination would obviously be better than competition among systems. Admitting that policy is shaped by distributional issues, however, opens a Pandora's box of difficult implications. Redistributive policies are always difficult to discuss and often impossible to agree upon. This explains why politically sensitive labor and social policies have so far remained a National competence and also why, in the EMU crisis, the governments of core countries insist that peripheral countries should deregulate their labor markets: in negotiations aimed at policy harmonization, the political representatives of a capital abundant country would like labor markets to be deregulated not only in their own country, but in all of the integrated economic area.

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