Labor Market Policies and European Crises

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Abstract

This paper studies theoretically and empirically how labor market policies shape the relationship between production and employment on the one hand, and income stability and inequality on the other. It proposes a specific stylized model wher labor policy addresses security-vs-growth tradeoffs influenced by structural factors, inspects the empirical relevance in European data of such policies' motivation and effects, and outlines that theoretical perspective's implications for reform design in crisis-hit economies.

1 Introduction

Labor market reforms could significantly increase productivity and speed up growth in Europe, especially if accompanied by product market reforms (see e.g. Barkbu et al., 2012, and its references). The reasons why some European countries forsake opportunities to increase their citizens' average income by reforming their heavily regulated labor markets need to be understood. Some policies may unambiguously benefit all members of society, increasing the size of the production "pie" without decreasing that of anybody's "slice." But reforms introducing such policies would be obvious free lunches, that are unlikely to remain undetected until discovered by economists.

Economic research can more plausibly help policy-makers by outlining how trade-offs between higher incomes and other objectives are shaped by structural and political characteristics of different countries and periods. This type of argument is not often spelled out explicitly by advocates and adversaries of growth-enhancing reforms. There is an understandable but problematic tendency in policy debates to "fight the previous war," and advocate adoption of institutions that have performed well in specific previous instances (such as "flexicurity" in times of growth and structural transformation, or German structure in the current crisis) without a proper analysis of the reasons underlying that good performance.

In reality, no set of labor market institutions is optimal in all circumstances. Regulatory and tax-and-subsidy policies do reduce production efficiency, but do so in order to redistribute consumption

over individual lifetimes, smoothing it, as well as across individuals (whether towards disadvantaged members of society, or towards special interests). Markets are not as perfect and complete as economists would like them to be, and policy-makers are not as powerful as they would like to be, and labor policy must balance between the horns of such trade-offs in ways that cannot be uncontroversial, because individual welfare is differently influenced by features that determine the amount and stability of labor income.

Section 2 sets up a pedagogical model focused on uninsurable income shocks as a motivation for labor market policy. Section 3 outlines how this and more general models that characterize policy choices and effects in terms of their underlying motivation can help interpret labor policy patterns in terms of distributional tensions and international economic integration, as well as in terms of narrower and harder to assess structural features. Section 4 discusses European experiences, focusing in particular on the possible relevance of labor policy's effects on distribution and productivity in eurozone countries before and during the recent crisis. Section 5 discusses the implications of the proposed theoretical perspective and of past experience for reform prospects in the current crisis situation, and Section 6 concludes with some more general considerations.

2 A model

Consider an economy where labor earnings (gross of any tax or subsidy) amount to marginal productivity

$$w_1 = \alpha_1 - \beta_1 l + \upsilon_1 \tag{1}$$

for individuals who pay a cost k before realization of a random shock $\upsilon_1 \sim N(0, \sigma_1^2)$, and to

$$w_2 = \alpha_2 - \beta_2 (1 - l) + \upsilon_2 \tag{2}$$

for individuals who do not do so, where $\upsilon_2 \sim N(0, \sigma_2^2)$ is an independent and possibly differently distributed shock. The mean level of earnings is linearly related to l, the fraction of the population that chooses the costly option of drawing earnings from (1). With parameters such that $\alpha_2 + k < \alpha_1$, $0 < \alpha_2 < \alpha_1$, $\beta_1 > 0$, $\beta_2 \geq 0$, this represents in a stylized way some crucial aspects of the reality in which labor policies are implemented. In the model, as in reality, productivity differs across workers for two reasons. The first is that individual workers choose to perform effort or human capital investments that entail cost k and, in equilibrium, should be compensated by higher earnings. In this simple model, as l increases above zero expected gross earnings may increase in (1) and definitely decline in (2): this represents the decreasing marginal productivity of each employment opportunity, and will make it possible below to identify the value of l that maximizes expected production. The second reason why in reality individual earnings differ is luck. In this

simple model, random shocks make individual earnings deviate ex post from those that could be expected at the time when the choice to pay k is made.

Figure 1 illustrates the model economy's structure. On the horizontal axis, the fraction l of labor employed in the set of jobs indexed by 1 increases from left to right, and the dashed downward sloping line plots on the vertical axis the expected value of earnings for those units of labor from (1). That line meets its upward-sloping counterpart from (2) at the point where all of the economy's labor is employed at the same marginal productivity. Setting $\beta_1 = \beta_2 = \beta$ for simplicity, in the figure that parameter and the α_1 and α_2 intercepts are such that if allocating labor to jobs of type 1 were costless, then all labor should be allocated to such jobs, and be paid its marginal productivity $(\alpha_1 + \alpha_2 - \beta)/2 = \alpha_1 - \beta$ at the level identified by horizontal dashes.

When financial markets are imperfect, consumption cannot be completely sheltered from income shocks, and individual welfare generally increases in expected income and decreases in income variance. A tractable formalization of this general insight lets utility be a negative exponential function of consumption, $u(c) = -\exp(-\nu c)$, and simply supposes that $c = y + a$, where y is disposable labor income and a denotes other resources on which individual consumption can draw. When a variable z is normally distributed, then $-E\left[\exp\left(-\nu z\right)\right] = -\exp\left(-\nu E\left[z\right] + \frac{1}{2}\nu^2 \text{var}\left[z\right]\right)$: hence, expected utility is a monotonic increasing function of the linear expression

$$V = -E\left[y + a\right] + \frac{\nu}{2}\text{var}\left[y + a\right]. \tag{3}$$

In the economy's laissez faire equilibrium, labor income amounts to w_1 from (1) or w_2 from (2), and every individual should be indifferent between earning the former and paying k, or earning the latter. Non-labor income a may differ across individuals, but this is irrelevant to labor allocation under the constant absolute risk aversion assumption underlying the welfare criterion (3). In equilibrium, earnings differentials must offset the cost k of allocating labor to employment opportunities that are more productive on average, and may entail a different amount of uncertainty. In Figure 1, the solid downward sloping line plots the marginal benefit in welfare terms $\alpha_1 - \beta l - k - \nu\sigma_1^2/2$ of paying k and allocating more labor to jobs that produce according to (1), and meets at $l < 1$ the upward-sloping marginal welfare benefit $\alpha_2 - \beta(1 - l) - \nu\sigma_2^2$ of not doing so.

It is not generally possible in reality to disentangle the relevance of choices and luck in determining labor incomes. The model can represent this fact under the assumption that labor income is observable, but it is not possible to tell whether a specific individual draws it from the earnings distribution (1) or from (2). And the model can represent the motivation and implications of many labor market policies supposing that observed earnings are subject to a proportional tax τ, and that the revenues of that tax are used to pay a subsidy s to each individual. Intuitively, taxation and redistribution of the portion of earnings that is due to random shocks is beneficial for risk-averse individuals. If the individual costly actions that influence mean earnings as in (1) and (2)

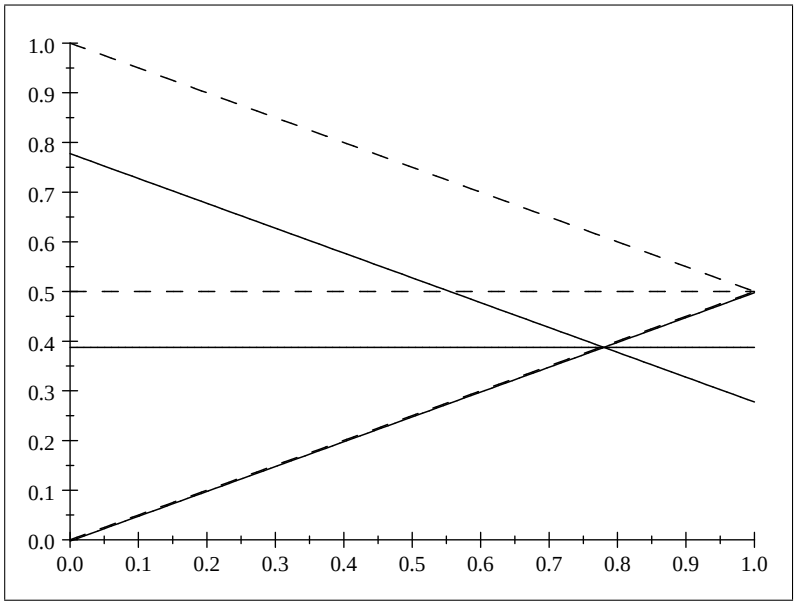

Figure 1: The model economy without policy. Parameters values $\alpha_1 = 1$, $\alpha_2 = 0.5$, $\beta = 0.5$, $k = 0.1$, $\sigma_1 = 0.35$, $\sigma_2 = 0.05$, $\nu = 2$.

cannot be observed, however, the scheme (which could also represent suitably enforceable private insurance contracts) unavoidably also taxes the earning differentials that reward such actions, and reduces incentives to perform them.[1]

Formally, the choice of paying k and earning $y_1 = (1-\tau)w_1 + s$ rather than $y_2 = (1-\tau)w_2 + s$ should be a matter of indifference in an equilibrium where that choice can be made by ex-ante identical individuals. Since s and a do not depend on that choice or on the shocks υ, indifference obtains when the welfare expression (3) evaluated at $E[y_1] = (1-\tau)(\alpha_1 - \beta_1 l)$ and $\text{var}[y_1] = (1-\tau)^2\sigma_1^2$, minus k, equals (3) evaluated at $E[y_2] = (1-\tau)(\alpha_2 - \beta_2(1-l))$ and $\text{var}[y_2] = (1-\tau)^2\sigma_2^2$. In a rational expectations equilibrium, therefore, it should the case that

$$(1-\tau)(\alpha_1 - \beta l) - (1-\tau)(\alpha_2 - \beta(1-l)) = k + \frac{\nu}{2}(1-\tau)^2\left(\sigma_1^2 - \sigma_2^2\right): \tag{4}$$

the net-of-tax expected earnings differentials should equal the cost of choice, in terms of risk as

[1] The assumption that it is impossible to tell whether earnings are drawn from (1) or (2) nearly follows from the more basic assumption that the costly action that determines the mean and variance of earnings is not observable, as is appropriate for e.g. effort. Income realizations can take any value when they are influenced by normally distributed shocks, and while large realizations are more likely to be drawn from a higher-mean distribution, random shock largely obscure the signal provided by observed earnings. The model's optimal taxation scheme could take into account the signal provided by observed earnings as regards the mean of the distribution from which they are drawn, but this would not affect the qualitative validity of the tradeoff highlighted by the simple model: as long as luck plays a significant role in determining individual labor market outcomes, earnings provide a partial and noisy indication of individual choices.

well as of investment or effort.

In the resulting equilibrium, each unit of labor receives a subsidy

$$s(\tau) = \left(l(\tau)w_1 + (1 - l(\tau))w_2\right)\tau,$$

where

$$l(\tau) = \left(\frac{1}{2} + \frac{1}{2\beta}\left(\alpha_1 - \alpha_2 - \left(\frac{k}{1-\tau} + \frac{\nu}{2}(1-\tau)\left(\sigma_1^2 - \sigma_2^2\right)\right)\right)\right) \tag{5}$$

satisfies (4), and the welfare yield of disposable income from each individual's unit of labor is

$$\begin{aligned} & (1-\tau)w_1 + s - k - \frac{\nu}{2}(1-\tau)^2\sigma_1^2 \\ = \;& (1-\tau)w_2 + s - \frac{\nu}{2}(1-\tau)^2\sigma_2^2 \\ = \;& l(\tau)w_1 + (1-l(\tau))w_2 - kl(\tau) - \frac{\nu}{2}(1-\tau)^2\left(l(\tau)\sigma_1^2 + (1-l(\tau))\sigma_2^2\right). \end{aligned} \tag{6}$$

The economy also produces non-labor income, because in each of the two employment opportunities average production exceeds payments of marginal productivity to labor. These consumable resources need to be accounted for by a in (3), which is conveniently additive in labor and non-labor income (supposed certain, to represent the possibility of financial diversification). If all individuals are entitled to the per capita amount of non-labor rents then

$$a = \beta\left(\frac{1}{2} - l(\tau)\left(1 - l(\tau)\right)\right)$$

should be added to the expression in (6) to obtain an index of the welfare of the economy's typical individual:

$$V_{\text{rep}}(\tau) = \alpha_1 l(\tau) - \frac{\beta}{2}l(\tau)^2 + \alpha_2\left(1-l\right) - \frac{\beta}{2}\left(1-l(\tau)\right)^2 - kl(\tau) - \frac{\nu}{2}(1-\tau)^2\left(l\sigma_1^2 + (1-l)\sigma_2^2\right). \tag{7}$$

This expression is the economy's output, minus the investment cost, minus the risk–aversion-adjusted variance of average income. It depends on τ directly, because redistribution supplies valuable income smoothing to uninsured risk-averse individuals, as well as on the labor allocation which in turn depends on τ as in (5).

If human capital investment or effort implies higher risk as well as higher expected earnings, then redistribution may make it more attractive. In the model, the derivative of the expression in (5) is positive at $\tau = 0$ if $\frac{\nu}{2}\left(\sigma_1^2 - \sigma_2^2\right) > k$, and if this is the case then there is a range of τ values where more redistribution increases investment. In the parameter set used in the figures to illustrate the model's implications, the variance of earnings in jobs that require an investment is indeed much higher than that of other jobs. In Figures 2 and 3, l and output (gross of the labor reallocation costs indexed by k) both increase through a range of small τ values (peaking when only about 10

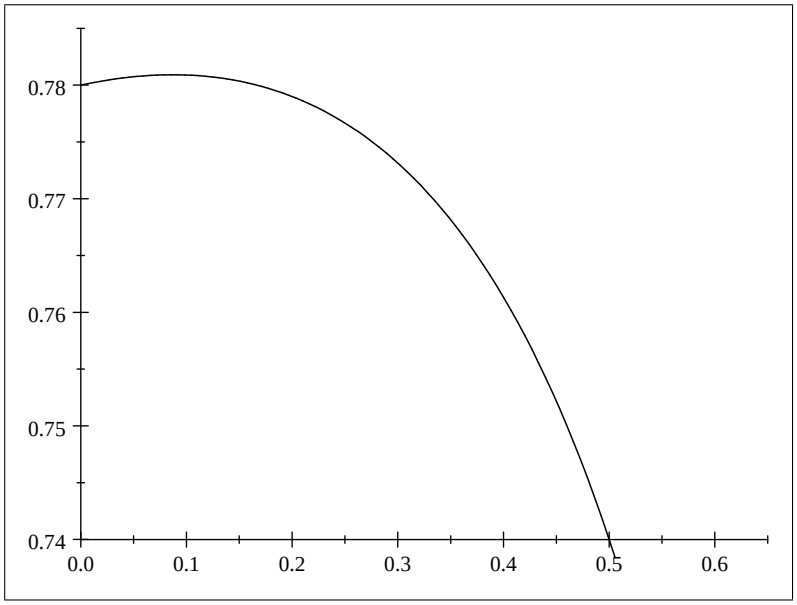

Figure 2: Equilibrium l on the vertical axis, as a function of τ on the horizontal axis. Other parameters as in Figure 1.

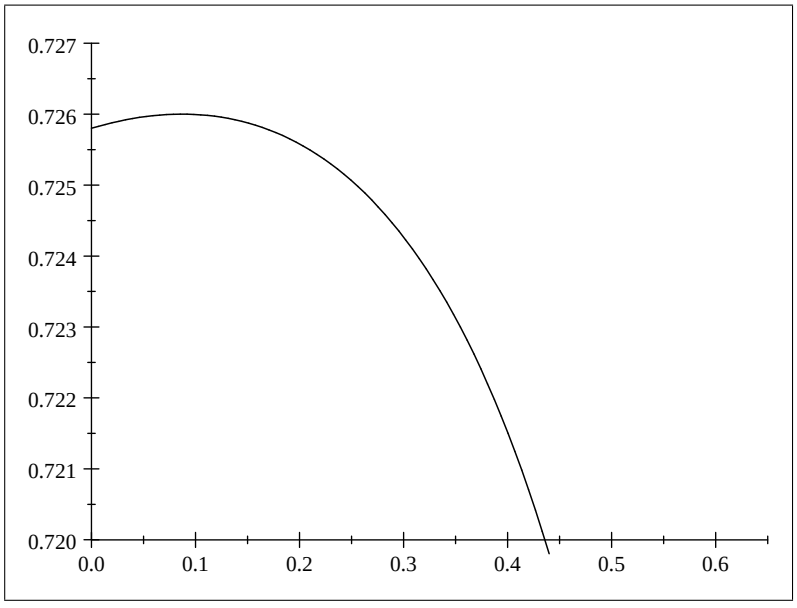

Figure 3: The solid line plots output $l(\tau)\alpha_1 + (1 - l(\tau))\,\alpha_2 - \beta\left(\frac{1}{2} - l(\tau)\,(1 - l(\tau))\right)$on the vertical axis as τ varies on the horizontal axis. Other parameters as in Figure 1.

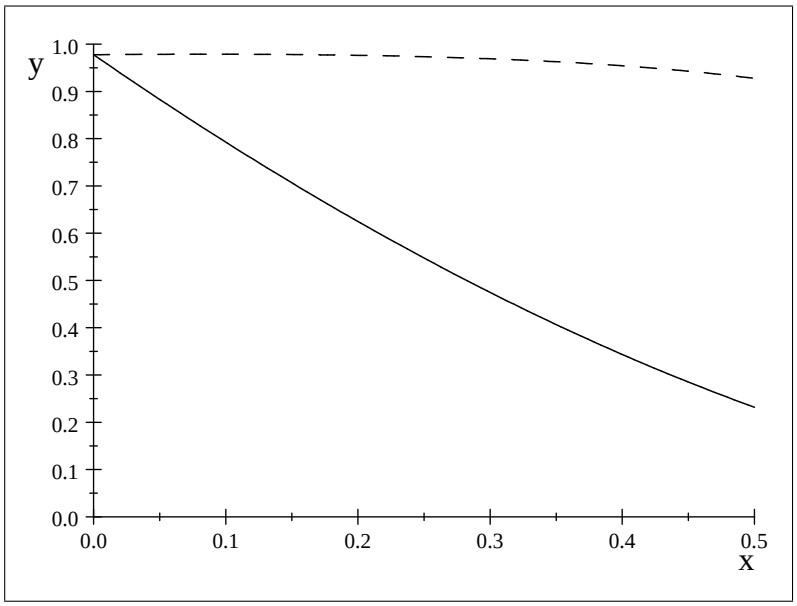

Figure 4: On the vertical axis the solid line plots the variance of net earnings $\left(l(\tau)\sigma_1^2 + (1-l(\tau))\sigma_2^2 + l(\tau)(1-l(\tau))\left(\alpha_1 - \alpha_2\right)^2\right)(1-\tau)^2$ as τ varies on the horizontal axis; the variance of gross earnings is higher than the net by a factor $1/(1-\tau)^2$ and is plotted as a dashed line. Other parameters as in Figure 1.

per cent of labor income is redistributed). This represent in the model the incentives to risk taking provided by a social safety net (Sinn, 1996; Andersen, 2010). While this effect makes it more likely that redistribution is socially beneficial, welfare depends on the riskiness as well as the total amount of production. At the margin, additional production comes with additional costs in terms of risk, as well as of investment: to maximize $l\left(\alpha_1 - \frac{\nu}{2}\sigma_1^2\right) + (1-l)\left(\alpha_2 - \frac{\nu}{2}\sigma_2^2\right) - \beta\left(\frac{1}{2} - l\left(1-l\right)\right) - kl$, which subtracts from output the kl investment cost as well as welfare cost of allocating more labor to riskier jobs, it would be optimal to set $\tau = 0$ in (4).

The pros and cons of redistribution are rooted in the fact that luck and choice cannot be disentangled in observed labor incomes. Varying τ in this model implies a negative relationship between the average amount and the cross-sectional variance of income that is reminiscent of the classic "equity vs. efficiency" trade-off: to the extent that observed inequality correspond to ex-ante risk, however, variation of τ also plots out welfare-ranked outcomes. The type of policies represented by the model's redistribution scheme are beneficial inasmuch as they reduce uninsurable uncertainty inframarginally, and while larger values of τ make the economy's labor market increasingly sclerotic and unproductive, they also bring it towards a configuration that with lower investment effort, and lower observed inequality: as shown in Figure 4, the same increases of τ that reduce output in Figure

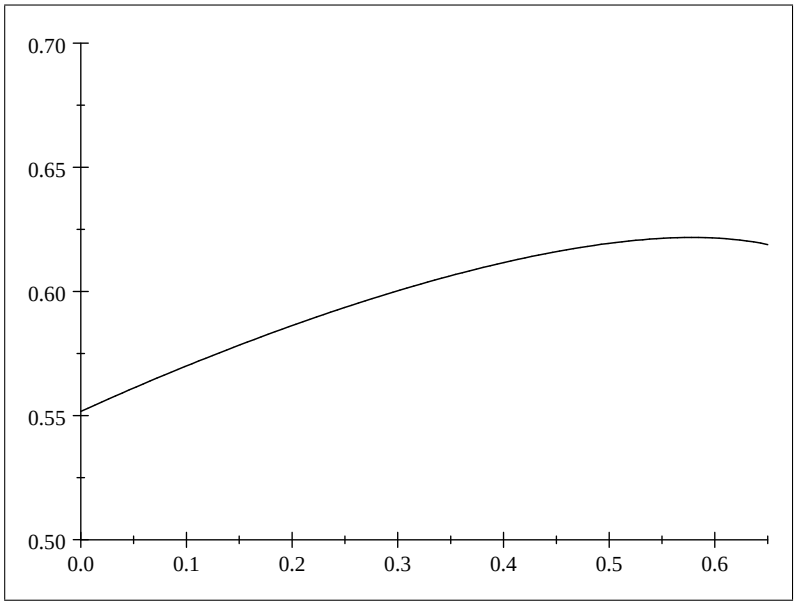

Figure 5: Welfare of an individual entitled to the economy's per capita income as a function of τ. Other parameters as in Figure 1.

3 also reduce the dispersion of observed net-of-tax labor incomes (and, perhaps less obviously, also the variance of gross labor incomes: while pre-tax expected earnings differentials must be larger when taxation reduces the portion of them that is available to offset investment or effort costs, fewer high earners are observed as l declines as in Figure 2, and the distribution of wages is more skewed but not more dispersed around its declining mean).

Variation of τ not only drives output and inequality in opposite directions, but also determines welfare and identifies an optimal policy (which, as discussed below, depends in interesting ways on the model's structural parameters, and on the identity of specific individuals within an ex-ante unequal economy). The appropriate measure of the typical individual welfare is (7), which accounts for the benefits arising from the reducing uninsurable income volatility at any given labor allocation l, and faces policy choices with a trade-off between those benefits and the output implications of changes in l. Labor income redistribution should optimally trade its production implications, through labor allocation, off its implications for consumption smoothing. For an individual who is entitled to the economy's per capita income (inclusive of the income of non-labor factors), Figure 5 shows that higher tax rates continue to increase welfare long after they have ceased to increase output. For the parameter values used to illustrate the model's implications, which feature a large variance of uninsurable shocks and a substantial level of risk aversion, welfare only peaks when more than half of labor income is redistributed.

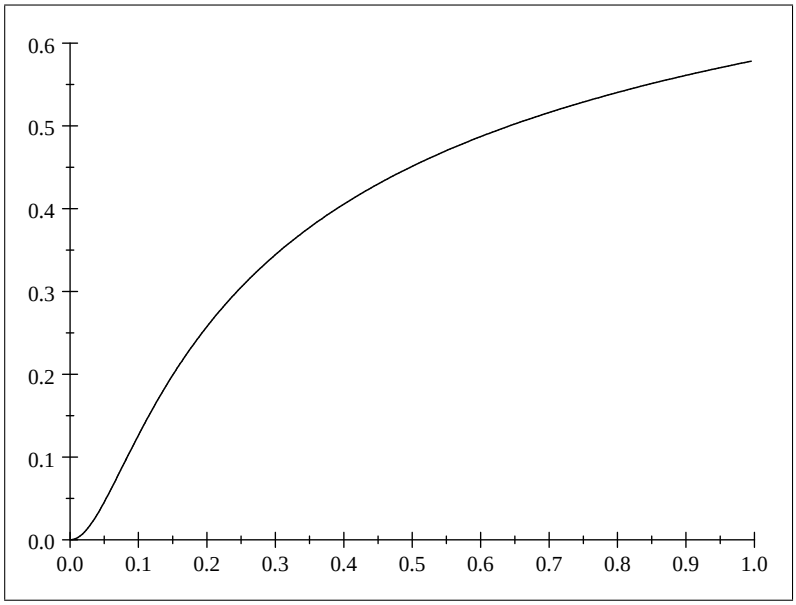

Figure 6: The solid line plots on the vertical axis the welfare-maximizing redistribution parameter τ^* as uncertainty varies: $\sigma_1 = 0.35x$ and $\sigma_2 = 0.05x$, for x the value reported on the horizontal axis. Other parameters as in Figure 1.

The first order condition for maximization of (7) does not yield an interesting closed form solution for the optimal tax rate, but its properties are easy to characterize numerically and analytically. To understand why the baseline model calls for so much redistribution, for example, it interesting and intuitive to see in Figure 6 that no redistribution would be optimal in the absence of uncertainty, and that the τ level that maximizes the typical individual's welfare increases towards the level identified by the peak in Figure 5 as the variance of uninsurable income shocks becomes as large as it is supposed to be in the model economy.

The implications for the optimal policy choices of the slope β of earnings with respect to labor allocation are particularly important from the model's equilibrium perspective, and represent features of reality that are argued below to play an important role in reality. For this reason they deserve to be shown in full generality by standard comparative statics methods. Totally differentiating the first order condition $\partial V(\tau, \beta)/\partial \tau = 0$ for maximization of the typical individual's welfare,

$$\frac{d\tau^*}{d\beta} = \frac{\partial V(\tau, \beta)}{\partial \beta \partial \tau} / \left(-\frac{\partial^2 V(\tau^*, \beta)}{\partial \tau^2} \right). \tag{8}$$

The denominator is positive when the first order condition identifies a maximum of $V(\tau, .)$, and

differentiating (7) yields

$$\begin{aligned}\frac{\partial V(\tau,\beta)}{\partial \beta} &= -\frac{1}{2}l^2 - \frac{1}{2}(1-l)^2 \\ &= -\frac{1}{2} + l(1-l):\end{aligned}$$

hence, the expression in (8) has the same sign as

$$\frac{d}{d\tau} l(\tau)\left(1-l(\tau)\right) = \left(1-2l(\tau^*)\right) l'(\tau^*),$$

which is negative for $l(\tau) > 0.5$ and $l'(\tau) < 0$. When productivity and earnings depend more strongly on labor allocation (in the model, when β is larger), then the optimal intensity of redistribution is lower (in the model, τ^* is smaller). Intuitively, redistribution remains appealing for the economy's typical individual because it smooths uninsurable income shocks, but its collateral damage in terms of average production, through smaller incentives to perform investments or effort, is larger when production depends more strongly on labor allocation.

3 Models and reality

The model of labor income redistribution outlined above can help interpret productivity and inequality data along the lines illustrated in Figures 3 and 4, and simple modeling variations have qualitatively similar implications for the employment and unemployment effects of unemployment insurance, minimum wages or binding collective wage agreements, and other policies that are meant to isolate the welfare of workers from uninsurable shocks, and generate effort and efficiency side effects. To see this, consider a reinterpretation of the model's structure where allocation of labor units to employment opportunities that do not require investment of k corresponds to non-employment rather than to occupations with lower total productivity. It would then be appropriate to set $\beta_2 = 0$, so that returns are constant in terms of production-equivalent leisure or informal employment, or to suppose that any rents generated by such informal activities accrue to labor rather than to other factors of production (and are neither taxed nor redistributed). The resulting model could accommodate policies that impose lower bounds on the marginal productivity of formal employment (such as minimum wages, or payroll taxes that fund subsidy payments to unemployed or retired workers), would have similar implications for observed labor income inequality and productivity, and would also trace the implications of such policies to observed output and employment. (Employment protection legislation is somewhat harder to model formally, but is shown in e.g Bertola, 2004 to have similar motivation and effects.)

All such model variations represents "labor" policies (rather than, say, general income taxation)

because redistribution occurs within labor income, and influences incentives to perform costly actions that affect individual earnings as well as the economy's overall productivity.The model and its redistribution policy treat all workers equally, and abstract from distributional conflicts across ex-ante heterogeneous workers, which may if present influence the politico-economic appeal of the policies represented by the model's τ: if individuals who expect to earn differently receive the same per capita subsidy, then those who expect to earn should be less inclined to favor redistribution. As in Agell (2002), the equilibrium intensity of distortions and redistribution would depend on the political power of individuals who face different trade-offs between expected income losses and better income smoothness. Allowing for such heterogeneity would also open the way to more direct "rent seeking" tensions, such as struggles over the size of the individual lump-sum transfers that in the model are as homogeneous across individuals as their ex ante characteristics.

Features of the model economy bear on the optimal intensity of redistribution in intuitive ways. The effects illustrated in 6 represent in the model the familiar effects discussed by Mulligan's (2012) and other models of individual incentive-compatible social insurance. (A related, but different, mechanism is at work when policies fail to react to changes in the amount of uncertainty: as in Bertola and Ichino, 1995, and Sargent and Ljungqvist, 1998, the effects of higher volatility on an economy's performance depend on its institutional structure.) Risk aversion, and the size of the ex ante cost k, have similarly intuitive qualitative implications for the optimal intensity of redistribution, which in turn determines productivity and inequality as in Figures 3 and 4. To interpret the real-life form and evolution of labor market policy, however, it is helpful to focus on features that may be easier to pin down at least suggestively, and that both happen to bear on the slope effects characterized analytically at the end of the previous section.

3.1 Wealth inequality

It is interesting for this paper's purpose to consider another source of individual heterogeneity and political disagreement. Wealth inequality is not only realistic, but a natural theoretical implication of any model where consumption-smoothing individuals are subject to uninsurable labor income shocks: if the static model outlined here were extended to allow each individual to save rather than consume some of the windfall represented by the shocks v to their earnings, then it would be optimal to spread the consumption implications of labor income over multiple periods, and wealth and consumption inequality would increase over time (all the faster when redistribution is mild, and without bounds if, as is the case when absolute risk aversion is constant, consumption levels are irrelevant to consumption smoothing incentives as well as for labor allocation choces).

Even when all individuals are similarly endowed with labor ex ante and treated similarly by redistribution of ex post income, the labor allocation and risk reduction effects of redistribution are differently relevant for individuals who are entitled to different amounts of non-labor income.

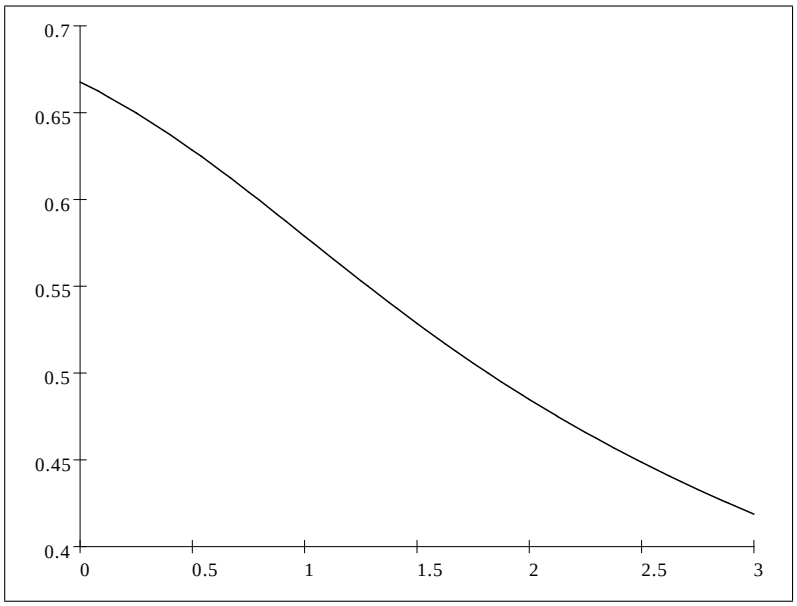

Figure 7: Optimal tax τ^* on the vertical axis from the perspective of an individual who owns ω (plotted on the horizontal axis) times the economy's per capita non-labor income.

In the model, the welfare of an individual who is entitled to income of a unit of labor (indifferently allocated to either sector) and to ω_i units of the other factors that produce the economy's output is given by (7), plus $\omega - 1$ times the amount $\beta\left(\frac{1}{2} - l\left(1-l\right)\right)$ of the economy's per capita non-labor income. The resulting expression

$$V_{\mathrm{i}}(\tau) = \alpha_1 l(\tau) - \frac{\beta(2-\omega_i)}{2} l(\tau)^2 + \alpha_2\left(1-l\right) - \frac{\beta(2-\omega_i)}{2}\left(1-l(\tau)\right)^2 - kl(\tau) - \frac{\nu}{2}(1-\tau)^2\left(l\sigma_1^2 + (1-l)\sigma_2^2\right) \tag{9}$$

has the same form as (7), with $\beta(2-\omega)$ replacing β.

When an individual is entitled to a smaller-than-average portion of the economy's non-labor income, and $\omega_i < 1$, his or her policy choice problem effectively features a smaller β. As shown above when establishing the sign of expression (8), and as illustrated in Figure 7, this implies a larger preferred intensity of redistribution. Intuitively, individuals entitled to different amounts of the economy's non-labor income are differently affected by redistribution's collateral damage in production efficiency terms: "capitalists" are more damaged, and quite realistically prefer less regulation.

3.2 Market reactions

The rationale of redistribution policy in this model is related to, but subtler than, the straightforward rent seeking at work in models where wage floors or non-employment subsidies funded by payroll taxes increase the wage bill at the same time as they decrease employment and profits. In either setting, the optimal labor market policy has side effects that are less worrisome for individuals who are not entitled to rents. From this perspective, the many policies and institutions that do trade production efficiency off other objectives are neither intrinsically right nor intrinsically wrong everywhere and for everybody. Much depends on the ability on the part of policy-makers to ensure consensus, possibly by redistribution of resources other than labor income: in the context of the simple model outlined above, redistribution of wealth resulting from past good luck could serve that purpose ex post, but would have exactly the same incentive implications as labor income redistribution if it were expected ex ante.

It is also interesting to consider how the policy-choice problem changes when non-labor income includes not only rents (paid to exogenously given factors, such as land) but also payments to a factor (such as financial capital) that has alternative uses. The model's linear-quadratic production functions can be modified to let a second factor be used in amount X_1 along with labor that does and does not choose to pay k: if the production function is

$$(\alpha_1 + \delta_1 X_1)l - \frac{\beta_1}{2}l^2 - \frac{\gamma_1}{2}X_1^2,$$

and imposing that $\delta l - \gamma X_1 = \rho$ so that the marginal productivity of X_1 equals a given alternative income ρ implies that (1) is replaced by

$$w_1 = \alpha_1 - \left(\beta_1 - \frac{\delta_1^2}{\gamma}\right) l.$$

In the simple case where only the intercepts differ across the two employment opportunities, and $\delta_1 = \delta_2 = \delta$ as well as $\beta_1 = \beta_2 = \beta$ as above, the welfare objective function of policy choice has the same form as ((7), with a different intercept and, more interestingly, $\beta - \delta^2/\gamma$ in place of β. This once again implies that a smaller τ maximizes welfare: intuitively, the beneficial uninsurable income smoothing effect of the tax is traded off an output reduction effect that, with

$$l'(\tau) = -\frac{1}{2\left(\beta - \frac{\delta^2}{\gamma}\right)}\left(\frac{k}{(1-\tau)^2} - \frac{\nu}{2}\left(\sigma_1^2 - \sigma_2^2\right)\right),$$

is magnified at each τ by $\delta > 0$. The larger is δ, i.e. the more complementary to labor is the elastically supplied factor X, the smaller is the τ^* that maximizes the welfare of an individual who is entitled to the income of a unit of labor, to a portion of the per capita rents that decreasing

returns allow after X and labor are paid their marginal productivity, and to the unit income ρ earned, regardless of redistribution, by the units of X he or she owns.

4 Sources and effects of European labor market policies

The model's insights into the role of wealth inequality in shaping policy-makers' labor policy choices can explain why Continental European labor markets became more rigid in the 1970s, when the Golden Age of post-war growth had accumulated a large stock of unavoidably unequally distributed wealth, not owned by a political majority that was willing to trade better income security for production efficiency (and a productivity slowdown). Since the implications of rent ownership by decisive individuals are qualitatively similar to those of elastic supply of factors other than labor, the model can also illustrate the implications of a well-known and potentially relevant driver of policy evolution: market integration across areas subject to independently chosen policies should shift choices towards less redistribution, and result in higher inequality and stronger productivity. Adoption of the single currency was indeed associated with an increase in inequality, and with a tendency to deregulate labor markets, in the euro area relative to other European Union and OECD members. It is not surprising from the simple model's perspective to observe patterns of increasing inequality and flexibility-oriented reform at times of increasingly close integration not only within the euro area, but in the enlarging EU, and globally. Comparing countries that did and did not join the euro area, and the 1995-99 and 2000-04 periods, Bertola (2010a,b) finds that the tighter economic integration implied by the 'One Market, One Money' paradigm was indeed associated with substantially faster deregulation of their product markets, some deregulation of their labor markets, and lower social policy expenditure. As a result, disposable income inequality grew faster in countries adopting the single currency, and these differences (like similar ones in employment and unemployment developments, analyzed in Bertola 2010b) were completely accounted for by differences in social policy and other policy indicators, rather than by economic integration directly.

It is also possible, on a case-study basis, to verify that deregulation incentives are stronger for countries experiencing more elastic market responses to relative policy differences. Which country is more strongly subject to systems competition pressure depends on the specific integration experiment. When the Netherlands found itself the smaller partner of an essentially complete economic and monetary union with Germany, it was logical for it to adopt the wage moderation and deregulation policies implemented by the 1982 Wassenaar agreement. The German "Agenda 2010" reform framework only took a similar path in the first half of the 2000s (Rinne and Zimmermann, 2012), after the country's reunification, euro adoption, and Eastern enlargement had changed the trade-off between high wages and idle labor on the one hand, and better competitiveness on the other, accepting more inequality to get more production efficiency. Carlin and Soskice (2009) argue

that this mechanism can account for part of Germany's macroeconomic developments since the country's unification.

Of course, not only tighter economic integration without policy coordination may explain lower social policy expenditure, labor market deregulation, and stronger labor income instability. The appeal of redistribution is lower when other margins of adjustment and financial market development reduce the need for protection from labor market risk, and labor reallocation can have a more beneficial effect on productivity when shocks hitting labor markets are more likely to be region- or industry-specific than country-specific. Both factors arguably did play a role in the period before the Great Recession across all of Europe. From the model's perspective, it is also possible to try and interpret another crucial European development during that period: in the aftermath of euro adoption, peripheral countries in the eurozone began to accumulate negative international imbalances, largely mirrored by positive imbalances in Germany and other core countries. Only part of these current account imbalances reflected investment patterns driven by equalization of capital intensity. A large portion was instead due to public and private consumption booms (and in particular to housing expenditures), which as pointed out in Bertola (2013) were financed on the basis of productivity convergence expectations that were not realized ex post, resulting in the euro debt crisis.

To the extent that labor market policies choose to trade off productivity for income and consumption stability, they can in principle play a role in this mechanism. In the aftermath of euro adoption, it might have been sensible to trade efficiency for security in the periphery, and security for efficiency in the core. Just like private or public consumption, including expenditure on housing and durables, the current account and asset imbalances implied by the resulting competitiveness changes would not have been problematic if relative efficiency was expected to improve in the periphery, consistently with the idea that joining the Single Market and adopting the *aquis communataire* should lead to more civilized institutions and better organized production. In fact, between 2000 and 2007 total factor productivity increased in the core but declined in the periphery, and movements along the model's trade off between productivity and inequality (or employment) may have played a role in determining expected and actual growth trajectories before and after the European crisis.

4.1 Regression evidence

It is interesting to assess the relevance of such structural phenomena in more formal fashion. Ideally, regression specifications should include policy indicators and explain their behavior in terms of shifting optimal choices, determined for example the wealth distribution and tax base elasticity implications of financial development and international economic integration. In practice, it is impossible to measure accurately the wide variety of institutional features that can in reality have

Table 1: Accounting for total factor productivity developments with inequality and emploument variation.

TFP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inequality	0.69	0.72	0.77	0.88	0.63	0.53	0.65	0.64
	(2.87)	(3.27)	(3.30)	(3.98)	(2.75)	(2.42)	(3.33)	(3.10)
Employment		0.79		1.00			1.06	0.91
		(5.53)		(4.42)			(8.12)	(4.38)
Institutional quality					0.13	0.20	0.20	0.19
					(4.17)	(5.41)	(7.10)	(5.37)
Country effects	yes	yes	yes	yes	yes	yes	yes	yes
Year effects	no	no	yes	yes	no	yes	no	yes

Robust t statistics in parentheses.

EA12 except Luxembourg, annual 1996-2011 sample (172 observations). Inequality is the Gini coefficient (basis points) of equivalized household income, interpolated when unavailable; source: Eurostat. Employment rate (percent) and Total Factor Productivity (1990=100); source: The Conference Board. Institutional quality: average of the six World Bank Governance Indicators. Source: The World Bank.

the effects represented by the model, and especially to model empirically the long and variable lags with which variation of such policies affects observable outcomes in reality. Available data are unfortunately neither as accurate nor as plentiful as would be necessary to do so.

A very indirect but intriguing indication of the theoretical mechanism's empirical relevance is offered by the descriptive regressions in Table 1, which inspect the relationship between total factor productivity and various other variables of interest in the original group of euro area countries (The regressions are limited to EU countries by inequality data availability, and the relationship is much stronger across the original members of EMU where inequality changes are much more pronounced than across the euro outs. The results are similar for other groups of countries, but the variation of interest is more pronounces in this sample than in the EU15; comparable inequality indicators are not available for most of the more recent EU members).

Since productivity is measured as an index with a common basis in 1990, all specifications include country fixed effects and gather information on within-country dynamic developments. In columns 1 and 2, inequality is significantly and positively related to productivity, both when country effects highlight within country dynamics, and when year effects additionally control for common developments. In columns 2 and 3, the estimated coefficient of inequality remains similar when employment rates (also plausibly influenced by labor market policy in the model variations discussed above) are included in the regression, with a positive coefficient that also suggests a

Table 2: Relationships between the inequality, unemployment, and institutional factors related to productivity in Table 1.

Inequality	(1)	(2)	(3)	(4)	(5)	(6)
Institutional quality	-0.06	0.01	0.04	-0.07	0.01	0.04
	(-11.29)	(0.78)	(2.52)	(-10.98)	(0.72)	(2.62)
Employment				0.13	-0.01	-0.13
				(2.12)	(-0.11)	(-1.54)
Country effects	no	yes	yes	no	yes	yes
Year effects	no	no	yes	no	no	yes

Robust t statistics in parentheses.

sensible association between an economy's productivity and labor market deregulation. These associations suggest that movements along the trade-off illustrated by the model may have been at work in recent European experience.

Evidence that productivity growth is stronger where inequality and/or employment both increase, and (especially) where institutional quality improves, is remarkably robust to inclusion of year effects but of course only suggestive and unavoidably less than structural. Disposable income inequality is decreased by labor income redistribution but increased by wealth concentration, that implies more redistribution in a democratic society (but perhaps less so if wealth conveys power), and pre-tax income inequality is influenced by a host of factors, including international economic integration and ethnic differentiation, that are also relevant to policy-making processes. If wealth is more unequally distributed than labor income, inequality can in theory be reduced by higher capital intensity's wage effects.

In columns 5-8, the regressions include as an explanatory variable of within-country total factor productivity variation a general indicator of institutional quality (the average across six subject areas of the World Governance Indicators, http://www.govindicators.org, which aggregate and normalize by cross-sectional standard deviations a large number of variables drawn from individual opinion surveys and reports by private and public information providers). Its strong significance indicates that each economy's productivity is determined by more general features than labor market policies, and evidence of an inequality-efficiency trade-off is remarkably stable across these specifications. In fact, institutional quality is rather loosely related to inequality and employment in the data's within'country dimension. In Table 2, inequality is very significantly lower and employment higher in countries with better institutions: this confirms that specific groups of countries differing in these (and probably many other) respects display widely different labor market performances (Sapir, 2006). These relationships, however, are weaker or absent when controlling for fixed effects.

The inequality and employment indicators help interpret productivity developments even when institutional quality developments are accounted for, and scatter plots of the relationships between economic productivity and inequality (in Figure 8) or employment (in Figure 9) tell intriguing tales of country-specific trajectories in the period considered (only some of the data points are labeled to preserve legibility, but it is possible to see that peripheral and core countries traded places along a fairly stable relationship before, during, and after the imbalances build up period). To the extent that country fixed effects capture the implications of relatively slow-moving factors (such as demograohcs, ethnicity, and size), and time effects those of trade and technological developments, the relationship between productivity, inequality, and employment traced by these regressors may indeed be driven by past changes in labor market policies and institutions. Empirically, however, a stronger explanatory role for productivity is played by institutional quality (illustrated in Figure 10). The standard errors used to compute the statistics in the table are robust to heteroskedasticity, and similar to those obtained assuming homoskedasticity; when the estimates allow for country-level error clustering, significance levels drop markedly, but institutional quality remains highly significant. The current account imbalances resulting from international integration's interaction with policy-making incentives arguably played a role in the recent and still current crisis, and labor market reforms are a plausible driver of current account imbalances more generally (Bertola and Lo Prete, 2012). In the euro area experience, however, they appear less relevant than broader institutional changes. This suggests that it would be misleading to focus too narrowly on labor market policy (disregarding its distributional benefits) as the driver of productivity dynamics in general, and in particular of those experienced in the euro area before the crisis.

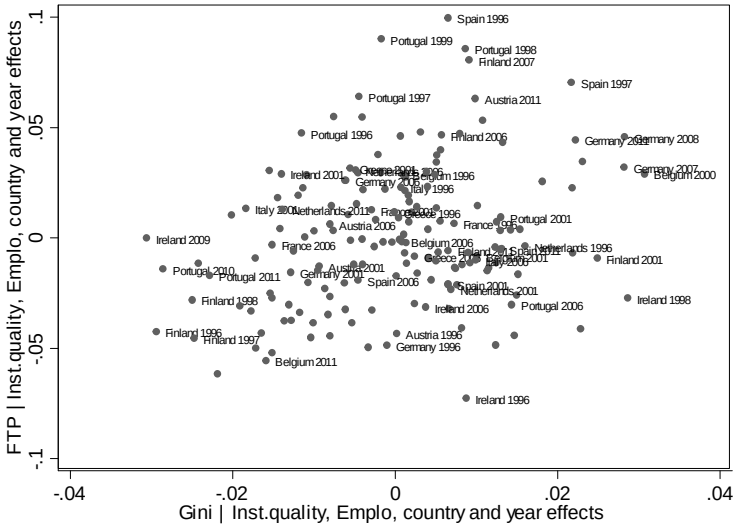

Figure 8: Partial association between total factor productivity and inequality, controlling for employment rate, institutional quality, country and year effects (from the regression in column 8 of Table 1).

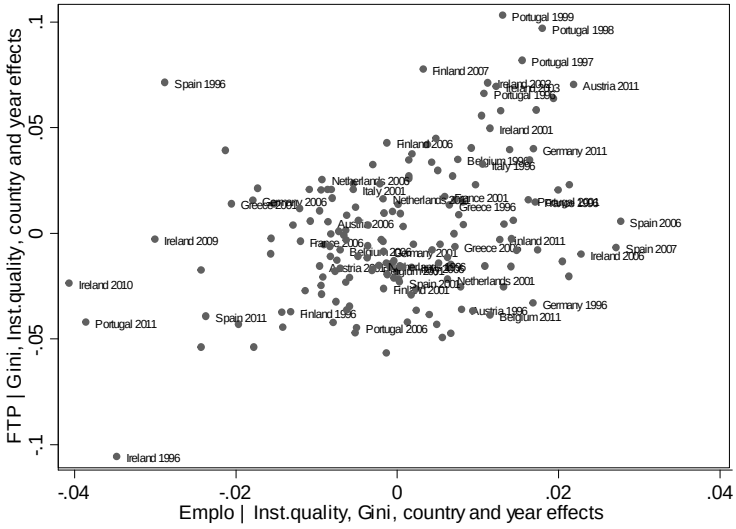

Figure 9: Partial association between total factor productivity and employment rate, controlling for inequality, institutional quality, country and year effects (from the regression in column 8 of Table 1).

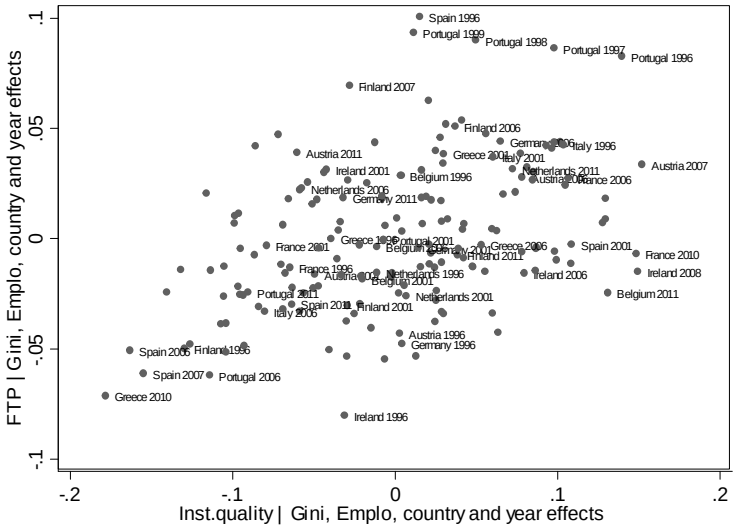

Figure 10: Partial association between total factor productivity and institutional quality, controlling for employment rate, inequality, country and year effects (from the regression in column 8 of Table 1).

5 Structural reforms in crisis situations

In the simple model economy of Section 2, looser labor market regulation can increase production at the expense of labor income smoothing: while this can be the optimal policy response to politico-economic developments, the effects of reforms take place with a lag in the model because key labor allocation choices are made before uncertainty is realizes. In reality, the lag between policy causes and effects can be long. Just like falsified expectations of productivity growth may have contributed to the onset of the current European crisis, the uncertainty surrounding reform processes can hinder suitable adjustment in the aftermath of the crisis.

When changes in structural conditions and crisis shocks call for reforms, two difficult issues arise in the model and in reality. On the one hand, the higher productivity deregulation aims to requires workers to perform costly actions in the model, and may not be ex ante attractive when the reform announcement is not credible. On the other hand, policy uncertainty by itself reduces welfare in a model where disposable income volatility is unpleasant for consumption-smoothing individuals with imperfect access to financial markets. In the model, what matters for labor allocation and productivity is the policy configuration expected to shape incomes at the time when investment choices are made, and the pros and cons of labor market policies are unavoidably heterogeneous across individuals who at a point in time happen to be differently entitled to the economy's non-

labor income.

Expectations and perceptions play a crucial role in both respects. Policy uncertainty lowers the welfare of consumption-smoothing individuals, reduces the incentives for each worker to undertake the risky investments that increase the economy's overall productivity, and introduces potentially undiversifiable risk in the model's rental income. In such an environment, reform processes can be strengthened by virtuous expectation feedbacks, but can just as easily be derailed by negative feedbacks: deregulation is unpopular if it is perceived to magnify individual income risk without suitable payoffs in terms of income growth expectations; lack of popular support damages the credibility and effectiveness of reforms; and the resulting policy uncertainty riddles the reform path with macroeconomic pitfalls, as reluctance to spend in the presence of large downside risks reduces economic activity and growth expectations.

In reality, reform processes should aim to credibly link current adjustment problems to future gains, and to address distributional issues in politically sustainable ways. In principle, and in the long run, all markets and policies should be reformed in complementary ways, addressing the issues arising from changing circumstances as discussed above, and aiming to remove barriers to change and competition rooted in a culture that myopically privileges defense of one's own existing resources, and prevents market exchanges from benefitting all parties. In practice, reforms are necessarily gradual and need to be credible, because their effects are far from instantaneous and depend crucially on expectations of future developments. Changes of life- and career-shaping institutions (in education, labor market, and pensions) cannot quickly influence behavior, and they modify the conditions in which choices made a long time ago have effects. Reforms steps should be sequenced so as to ensure dynamic stability, because a tentative reform that is widely believed to be reversed soon can very well be worse than no reform at all.

Credibility is as necessary for labor reforms as for monetary or fiscal policies, and similarly elusive at times of political as well as economic turmoil. To be fruitful, a reform package needs to be aware of the problems addressed by collective policies, and to address them coherently in the face of changing circumstances. Support for social protection and labor market regulation may well be rooted in the myopic defensive culture that prevents positive growth feedbacks. But it is also motivated by the impact of product and financial market imperfections on the level and volatility of labor income, which for a very large majority of households accounts for a major portion of lifetime resources. To be feasible, reforms needs credibility and consistency over time. For both reasons it may be inappropriate for reform processes to introduce labor market flexibility in the midst of crisis: not only do easier dismissals tend to multiply the effects of weak labor demand without automatically encouraging job creation (which depends on expected future institutions), but stronger risk aversion (likely to be decreasing in reality rather than constant as in the model) magnifies the welfare impact of uninsurable income risk in times of crisis.

To the extent that productivity growth appears in the regression above to reflect more general institutional features, sustainable sequencing of reforms may well need to start from other areas, such as retail, business, and financial services. In many European countries, including those that are doing well in the current crisis, supply of producer services is largely sheltered from international as well as domestic competition. Transparent, well regulated, corruption-free product markets and financial markets increase the purchasing power of households and make it easier to undertake more technically and politically difficult reforms of labor and social policies. Self-employment is common in countries where both labor and product markets are heavily regulated, but it is not as attractive and easily accessible there as in less regulated markets, where it is neither unusual nor particularly unpleasant for redundant white collar employees to open their own business. Of course, efficiency-enhancing reforms have a superficially detrimental impact on output gaps (as it is obviously not so useful to increase supply when demand is lacking). To the extent that output gaps arise from price rigidities and expectations-based expenditure restraints, however, product market reform can contribute to reducing them if it fosters price flexibility and suitable expectations-driven adjustment. Credibility of the reform process again plays a crucial role in the latter respect. It would be wishful to suppose that product (and labor) market reforms could, like an ideal problem-free devaluation, quickly restore macroeconomic equilibrium though their impacts on prices (lower) and demand quantities (higher). In a modern economy, prices and wages are always sticky. Dynamically, expectations of decreasing prices clearly reduce domestic consumption demand: along with efficiency enhancements in the tradable sector (and in non-tradable sectors that provide inputs to tradable production) they can however encourage export- and import-substitution investments, provided that such investments are not restrained by downside risks surrounding the reform process's future path.

6 Conclusions

Labor market policy can be very useful, but need to be used sensibly. It would be wrong to blame all problems on it, as long as insurance markets and compensatory transfers are not perfectly able to internalize efficiency. Structural reforms are the appropriate response to structural changes that alter the trade-off between the pros and cons of the existing policies. In recent European experience, tighter economic integration resulting from technological progress in transportation and communication implies more elastic responses to taxation, and calls for tax-rate reduction, and labor market institutions that were appropriate for mass-production structures may well need to be reconsidered in light of technological and organizational innovation. Hopes that financial markets may more efficiently address individual risk similarly made it less necessary to interfere with laissez faire labor market outcomes, and reduces the welfare relevance of the portion of inequality

that reflects temporary income fluctuations. Crisis shocks change the extent to which production efficiency losses appear affordable in light of other benefits. In peripheral countries, expectations of fast growth led public expenditures and policies to be upgraded to a level that appeared within reach upon euro are accession, but is no longer affordable in the crisis aftermath. Reforms of institutions that redistribute resources across different individuals and groups are triggered or constrained by political feasibility considerations. For example, demographic trends, migration flows, and changes of family structure can influence support for pay-as-you-go pension scheme, or for labor market rigidities that make it difficult for youth to find employment at the same time as they protect their parents' income.

This general perspective can helps understand the sources and consequences of structural reforms of the 1980s (in the United Kingdom and in the Netherlands), of the 1990s (in Sweden's post-financial crisis experience), of the pre-crisis 2000s (in Germany's Hartz reforms, and in other countries' similar introduction of flexibility at the margin). Such past experiences and the simple model outlined in this paper, however, also help understand why reform experiences are difficult and infrequent. It may be true that radical reforms can only be passed in the face of extreme crisis situations, not least because their consequences are typically very difficult to predict. But while the appeal of reforms is limited when things are going well, a sense of crisis is possibly necessary but certainly not sufficient foster reforms. Political processes do not always channel crises into reforms. The reforms that we do observe in reality always result from a combination of structural factors and shocks that alter the pros and cons of status quo policies, and of specific political factors, such as Mrs. Thatcher's stubborn personality or the willingness of Mr. Schroeder's left-of-center government to sacrifice immediate popularity. A fruitful reform process has to follow a narrow path between complacency and defeatism. A sense of crisis can trigger reforms if a "there is no alternative" perspective supports an economically sensible, politically sustainable, and suitably credible reform path. But it can lead to destructive unraveling of the existing policy framework if "all is lost anyway" attitudes prevail: crises may be aggravated when they produce political paralysis, and poor growth experiences and prospects can only too easily foster "real deflation" feelings (that things are not too bad, and change is too risky) which make it difficult for a society to adapt and reform. Analysis of prospective reforms should recognize that their design and sustainability depend on the one hand on proper consideration of changing external circumstances, as may be provided to National policy-making processed by the EU market integration and supranational policy framework; on the other, on political aspects that reflect internal social shifts, which may be violent and unpredictable in crisis situations.

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