



ELSEVIER

Contents lists available at ScienceDirect

Journal of Comparative Economics

journal homepage: www.elsevier.com/locate/jce

Regulation and taxation: A complementarity

Benjamin Schoefer

Harvard University, Department of Economics, Littauer Center 200, Cambridge, MA 02138, USA

ARTICLE INFO

Article history:

Received 10 November 2009
 Revised 23 April 2010
 Available online 25 July 2010

JEL Classification:

H1
 H21
 J22
 L51
 K31

Keywords:

Regulation
 Taxation
 The scope of government

ABSTRACT

Schoefer, Benjamin—Regulation and taxation: A complementarity

I show how quantity regulation can lower elasticities and thereby increase optimal tax rates. Such regulation imposes regulatory incentives for particular choice quantities. Their strength varies between zero (*laissez faire*) and infinite (command economy). In the latter case, regulation effectively eliminates any intensive behavioral responses to taxes; a previously distortionary tax becomes a lump sum. For intermediate regulation (where some deviation is feasible), intensive behavioral responses are still weaker than under zero regulation, and so quantity regulation reduces elasticities, thereby facilitating subsequent taxation. I apply this mechanism to labor supply and present correlational evidence for this complementarity: hours worked in high-regulation countries are compressed, and these countries tax labor at higher rates. *Journal of Comparative Economics* 38 (4) (2010) 381–394. Harvard University, Department of Economics, Littauer Center 200, Cambridge, MA 02138, USA.

© 2010 Association for Comparative Economic Studies Published by Elsevier Inc. All rights reserved.

1. Introduction

The *Ramsey rule of public finance* (1927) states that governments should tax inelastic factors and goods at higher rates than elastic ones. The literature typically assumes these elasticities are shaped solely by exogenous preferences or technologies. This paper shows how regulatory policies affect actors' elasticities of factor supply and thus the optimal tax rate. Regulating governments should (and do) have higher taxes.

Quantity regulation provides incentives for actors to choose a certain quantity of a particular good or activity, imposing costs for deviations from this regulatory target. But as a side effect, this "regulatory friction" reduces the elasticity of the choice variable with respect to its tax rate. The strength of such regulation varies between zero (*laissez faire*) and infinite (command economy) and determines the degree to which individuals can deviate from the regulatory target. Limited in the scope of behavioral responses, the resulting lower elasticity reduces the distortion of taxation. Regulation thereby facilitates higher rates of taxation.

This interdependence suggests a fiscal "double dividend" of regulation because a regulated activity becomes a preferable target of taxation. For example, shortly after the U.S. implemented quantity restrictions on various ozone-depleting chemicals in compliance with the Montreal Protocol, it subsequently imposed high taxes as well to generate fiscal revenue (Merrill and Rousso, 1991). But such clear events are rare, and regulatory constraints are typically persistent and embedded in a legal and regulatory system that is difficult to disentangle empirically.

While the mechanism holds for quantity regulation in general, I apply it to labor supply. Unlike conventional models, which assume an ideal labor supply function that adjusts freely to changes in taxes, my model introduces regulatory

E-mail address: schoefer@fas.harvard.edu

incentives to comply with a target quantity. For example, regulators enforce statutory retirement ages, minimum vacation times, legal holidays, obstacles to taking a second job, limitations on hours, and overtime wages for employees “deviating” in their labor supply.

Rates of taxation – and thus the fiscal sizes of government – differ substantially across countries. Wage taxation is perhaps the best example of this phenomenon. Among OECD countries, the “tax wedge” (the wage paid by the employer minus the sum of all tax and payroll burdens on labor that a single average earner faces) ranges from 15.6% and 19.6% in Mexico and New Zealand, to 29.7% and 30% in the United Kingdom and the United States, and to 50.7% and 55.6% in Germany and Belgium. The average tax wedge in the OECD countries stands at over 37%, with a standard deviation of almost 11%. On top of such direct wage taxes, indirect taxes (VAT, sales taxes, . . .) distort the labor/leisure choice and vary across countries.

My model implies, for instance, that taxation caused much less distortion during the existence of the inflexible French 35-hour working week than in the *laissez-faire* US labor market, which exhibits more elastic labor supply as it lacks such regulatory constraints. Therefore, the 48% tax wedge in France was easier to sustain than it would have been in the US, where the tax wedge for a single average earner is only 30%. The “fiscal opportunity cost” of taxation was much lower in the rigid French labor market, where the hypothetical no-taxation hours would have still been constrained by the 35-hour cap. Supporting the model, my empirical analysis finds that countries with high rates of wage taxation tend to be active regulators that constrain the choice of hours worked, i.e. countries follow the institutional equilibria of high (low) taxes and high (low) regulation. Furthermore, I find that highly regulated labor forces exhibit a lower variance in actual hours worked.

Most of the literature does not treat regulation and taxation as complements, but rather as substitutes (Kaplow and Shavell, 2002; Weitzman, 1974) or as independent policy instruments. Atkinson-Stiglitz’ (1984) classic textbook brushes aside “constraints of choice” by pointing out that the long-run equilibrium should reflect a menu of individuals’ preferences. They furthermore highlight the econometric challenges associated with quantity constraints. Hausman (1981) proposes econometric solutions, and Chetty et al. (2009) explain the resulting discrepancy between short-run and long-run elasticities with adjustment costs associated with switching between hours and wage bundles.

Optimal income tax models (Mirrlees, 1971; Diamond, 1998; summarized in Manikw et al., 2009) derive tax rules for maximizing social welfare, subject to the incentive-compatibility constraints of the labor force. As in Ramsey’s commodity taxation, elasticities crucially determine the efficiency costs of taxation (Saez, 2001). However, public finance has not explored how governments can actively use regulation to affect elasticities. Conversely, the regulation literature does not focus on taxation or tax-relevant elasticities (see Shleifer, 2005).

Related theoretical research focuses on nonlinear pricing schemes and contract-theoretical applications. Spence (1977) examines how quantity-dependent pricing (discounts, premia) affects consumption of a single good, which makes nonlinear pricing preferable to linear prices in a wide variety of contexts. In that model, quantity rationing is a special case of nonlinear pricing. My simple model is similar to this work in that I model regulation as a continuous quantity-dependent cost to the actor. But my specification of regulation does not affect prices and does not directly yield revenue. In a sense, my model explores how the elasticity with respect to a linear price (the tax) responds to an (unrelated) nonlinear, quantity-dependent incentive (the regulation) when the government is restricted to such (realistically) crude policy instruments. Furthermore, my model explicitly traces the effects on elasticities, which, as the key parameter of all taxation problems, in turn affect taxation.

Some papers explore related issues. Summers et al. (1993) relate unions’ coordination of hours and wage schedules to internalization of tax costs and benefits, which explains the correlation between high taxes and high unionization. Alesina et al. (2005) ascribe working hour differences across countries to regulation and unionization. Slemrod and Kopczuk (2002) conduct an abstract thought experiment of a policy instrument with which the social planner could affect (any sort of) hypothetical elasticities, e.g. through closing tax loopholes of the corporate tax and legally broadening the tax base. These papers neither treat regulation nor provide microfoundations. Diamond (1980) shows how fixed working hours enable the social planner to infer an individual’s skill from his income, thereby easing the informational asymmetry that prevents skill-specific targeting. His paper neither endogenizes hours constraints as a policy tool, nor does it treat labor supply elasticities.

Section 2 presents the basic model of how labor regulation affects elasticities of a homogeneous population and draws implications for taxation; Section 3 adds heterogeneity. Section 4 presents empirical evidence for the correlation between labor regulation and taxation. Section 5 explores the empirical relationship between the distribution of hours worked and the strength of labor regulation. Section 6 concludes.

2. Taxing homogeneous labor under regulation

The basic mechanics of the model can be illustrated in a simple functional form. With a quasilinear utility function, regulation enters as a quadratic cost caused by deviations from a target quantity of labor supply.¹ For example, this target could be the standard working week, from which deviations are costly if the “full-time” schedule makes the addition of a second job difficult. For example, a part-time worker may not receive the same benefits (such as job security or insurance) as a full-time worker, for whom the employer may be mandated to provide benefits. Similarly, if the employer is required by law to provide

¹ A treatment of a more general utility function, a more general regulation specification and an optimal-tax model can be obtained in a supplementary appendix from the author upon request. The basic mechanism persists, but additional trade-offs emerge.

benefits to every employee, he will prefer individuals to work full-time to minimize costs, while direct or indirect maximum-hours regulation (as is prevalent in many European countries) will prevent the employer from hiring employees to work above-standard-quantities of time because regulation makes overtime labor more expensive. Whether regulation applies on a worker level or on a job level coincides with high switching costs, and this paper assumes worker-level regulation. But even with job-level regulation, high-regulation countries tend to make the addition of a second, third or fourth job difficult. Some countries discourage work on weekends, even prohibit work on Sundays or impose yearly vacation minima. Finally, the static optimization can capture margins of dynamic labor supply in a net-present-value perspective, if individuals face, for example, mandated retirement ages or minimum years of education. Despite the complexity with which quantity regulation of labor enters into an individual's choice, my simple and intuitive understanding of its "net effect" assumes a target quantity of labor supply, deviations from which lead to some disadvantage for the employee.

2.1. Labor supply

Workers receive a wage per unit of labor supply L that is equal to their skill n , which yields post-tax wage $(1 - t)n$. Skill n is constant across workers (who are of measure one); the next Section introduces heterogeneity. I assume that the tax collector and the regulator do not set taxes and regulation in a way that makes all (identical) workers exit the labor market. Quasilinearity lets me disregard income effects and redistribution of taxes as public goods. Individuals solve the following maximization problem:

$$\max_{L,C} U = \max \left\{ C - \frac{L^2}{2} - \frac{\lambda}{2}(\psi - L)^2 \right\} \text{ s.t. } C \leq (1 - t)nL \tag{1}$$

The regulation term $\frac{\lambda}{2}(\psi - L)^2$ imposes a target quantity ψ on the choice variable L and quadratically "punishes" deviations, scaled by *strength of regulation* λ . The *regulation target* ψ is the (for now exogenous) level of economic activity that the regulator seeks to induce, or a side effect of the regulatory framework. If λ (e.g. monetary penalties or bureaucratic hassle) is high, the worker operates in a high-regulation environment, with little freedom to choose his working hours.

The optimal labor supply is:

$$L^* = \frac{(1 - t)n + \lambda\psi}{1 + \lambda} = \frac{1}{1 + \lambda}L_{\lambda=0}^* + \frac{\lambda}{1 + \lambda}\psi \tag{2}$$

By construction, *regulated labor supply* L^* is a *weighted average of the unregulated labor supply* $L_{\lambda=0}^* = (1 - t)n$ and the *regulation target* ψ , *weighted by the strength of regulation* λ . The stronger the regulation-driven incentives in an individual's utility, the less weight is put on the income term; setting L^* in line with the regulation term becomes more important for maximizing utility. Individuals whose unregulated $L_{\lambda=0}^*$ is greater than ψ reduce their labor supply towards the target, while low-supply individuals increase it. The introduction of regulation-driven incentives of ψ reduces the relative relevance of the post-tax wage $(1 - t)n$ for the labor choice. The elasticity of labor supply with respect to $(1 - t)$, $\epsilon_{L,(1-t)} = \left(1 + \frac{\lambda\psi}{(1-t)n}\right)^{-1} = \left(1 + \lambda \frac{L_{\lambda=0}^*}{L_{\lambda=0}^*}\right)^{-1}$, is one for $\lambda = 0$ and in this unregulated case exogenously determined by preferences. In contrast, the elasticity of regulated labor supply decreases in regulation:

$$\frac{\partial \epsilon_{L,(1-t)}}{\partial \lambda} = \frac{-n\psi}{(n(1 - t) + \lambda\psi)^2} < 0 \tag{3}$$

This simple model demonstrates how quantity regulation of labor supply decreases its elasticity. The next step spells out the implications of this regulatory side effect for tax policy.

2.2. Tax collection

I consider a government that collects taxes to either maximize revenues or to redistribute taxes as public goods. I show that regulation attenuates the usual "Laffer curve" effect through its effect on elasticities. Once it has implemented labor regulations, a regulating government will also increase taxes. I assume in this Section the smooth adjustment on the intensive margin not to violate the worker's participation constraint.

In my regulation-augmented model, tax revenue $R = t n L^* = t n ((1 - t)n + \lambda\psi)/(1 + \lambda)$ depends on exogenous preferences and skills, and on endogenous policy instruments of tax rate and regulation. Differentiating R with respect to tax rate t , I obtain the Laffer curve:

$$\frac{\partial R}{\partial t} = nL + t n \frac{\partial L}{\partial t} = nL \left(1 - \frac{t}{1 - t} \cdot \epsilon_{L,1-t} \right) \tag{4}$$

nL represents the mechanical increase of revenue in response to an increase in the tax rate, absent any evasive responses. $n \frac{\partial L}{\partial t}$ represents the behavioral response by those individuals being taxed, who reduce their labor supply. As the second derivative of tax revenue with respect to the tax rate t is negative, each further increase in taxation yields increasingly less revenue due

to evasive responses. Decreasing marginal revenue characterizes the parabola-shaped Laffer curve the tax-setting government faces ($\frac{\partial^2 R}{\partial t^2} = 2n \frac{\partial L}{\partial t} + tn \frac{\partial^2 L}{\partial t^2} < 0$).

Attenuating this distortion, regulation “linearizes the Laffer curve” as the parabolic component of the revenue function loses relevance. Like labor supply in (2), revenue can be decomposed into a weighted sum of the parabolic (behavioral responses) and linear revenue (fixed by regulation):

$$R = n \left(t(1-t)n \frac{1}{1+\lambda} + t \frac{\lambda}{1+\lambda} \psi \right) \quad (5)$$

For high regulation, revenue is approximately linear in t , as the linear regulation component of (5) dominates the parabolic term. The elasticity of revenue relates to that of labor supply:

$$\epsilon_{R,t} = \frac{t}{R} \frac{\partial R}{\partial t} = 1 - \frac{t}{1-t} \epsilon_{L,1-t} \quad (6)$$

This model implies that increases in regulatory strength lower the elasticity of revenue with respect to the tax rate, with the sign independent of the target quantity ψ . Because regulated labor is easier to tax than laissez-faire labor, regulation attenuates the Laffer curve. The next Section shows how this permits the government to collect more taxes with less distortion. For example, in a command economy, individuals do not set their own quantities. Assuming the participation constraint is satisfied, a tax becomes a lump-sum transfer because labor supply is fixed. In a laissez-faire economy, individuals set their own labor supply, and a tax has the full distortionary impact that conventional models predict. In the intermediate cases, quantity-regulating governments can afford higher taxes.

2.3. Joint determination of taxation and regulation

I now endogenize regulation by assuming that the government is the tax collector *and* the regulator and aims to maximize either social welfare or simply meet a revenue requirement:

$$\max_{G,\lambda,t} \{U(n) + bG\} \text{ s.t. } G \leq t \int_{n_0}^{n_b} nL(n)f(n)dn \quad (7)$$

The government cares about individuals with weight one and puts weight b on tax revenue, where b could also represent the tastes for public goods in a utilitarian social welfare function.² As in the typical tax problem, the government can only raise revenue through distortionary taxation of labor, which detracts from tax revenue because the marginal revenue is decreasing in tax t .

The optimal tax rate is given by the following expression:

$$t^* = \frac{b-1}{b} \frac{L}{-\partial L/\partial t} = \frac{b-1}{2b-1} \left(1 + \lambda^* \frac{\psi}{n} \right) \quad (8)$$

The optimal tax rate balances off the marginal benefit of the tax (numerator) with the marginal cost from the Laffer curve (denominator). The marginal benefit is the difference between the comparative advantage, $b-1$, at which the government transforms tax revenue into public goods, where $b > 1$ is the utility per tax input that the public goods yield, minus the marginal cost of raising this tax input, which is one, times the labor output. The denominator denotes the counteracting marginal cost of tightening taxation, as it represents the foregone revenue due to the behavioral effects of $\frac{\partial L(n)}{\partial t}$. The denominator is multiplied by b , the advantageous rate at which this forgone tax input would have generated public goods.

As $b \rightarrow \infty$, i.e. in the revenue-maximizing case, the benefit ratio $(b-1)/(2b-1)$ approaches $1/2$, after which the Laffer curve is downward sloping. Regulation shifts the revenue-maximizing point of the revenue curve, and it does so by reducing the elasticities. Intermediate values of b yield higher-than-unregulated tax rates as well.

Now consider how the government would set regulation – which has no direct fiscal costs except via its effects on L . Assume for convenience that $\psi > (1-t)n$, i.e. that regulation encourages workers to supply more labor, and that the optimal regulation does not violate the workers' participation constraints. The optimality condition for λ yields:

$$\frac{1}{2} (L(n) - \psi)^2 = btn \frac{\partial L(n)}{\partial \lambda} \quad (9)$$

The left-hand side of this expression represents the direct utility cost that the social planner imposes on individuals through regulation. By increasing λ , the workers suffer from higher regulatory costs. The right-hand side shows that a social planner with utilitarian objectives will only impose regulation $\lambda > 0$ if regulation increases tax revenue sufficiently through behavioral responses $\frac{\partial L}{\partial \lambda}$ towards ψ .

² This objective function can either represent a utilitarian social welfare function (note that individuals are of measure one) or be derived from individual utility functions $V(n,G) = bG + U(n)$ that include public good G , which the individuals value linearly with $b > 1$ (due to (quasi-)linearity, the government's function here is not to redistribute as in the typical optimal-taxation models). This interpretation would set $b = \infty$ for a revenue-maximizing government (when the government does not care about the workers' utilities), and $b > 1$ in the public goods interpretation. b can be thought of as the shadow value (multiplier) of the (budget) constraint in the Lagrangian if the government must meet a revenue requirement, and quasilinearity makes these interpretations interchangeable.

Note that independently of the direct fiscal effects of regulation derived here, the key comparative static shows that the optimal tax rate is unambiguously increasing in regulation strength λ , which reduces the labor supply elasticity:

$$\frac{\partial t^*}{\partial \lambda} = \frac{b-1}{2b-1} \frac{\psi}{n} > 0 \quad (10)$$

This means that if a government faces an exogenous increase in regulation, it will also increase the tax rate on labor income. This comparative static finds support in my empirical Section 4, as high-regulation countries tend to have higher taxes.

2.4. Discussion of the tax and regulation motives

It is unlikely that regulatory policy is fiscally motivated in reality. Regulation, in policy practice, may well be exogenous to the tax problem, either because the regulator and the tax collector are not aligned institutionally, or because the government does not internalize the effects of regulation on taxation. Treating regulation as set exogenously vis-à-vis taxation preserves the unambiguous result that regulation increases tax rates. The only necessary assumption is that the tax collector follows the theoretically robust and fundamental tax rule of the negative relation between elasticity (reduced by regulation) and taxation.

Typical motives for the use of regulatory instruments are orthogonal to non-Pigouvian taxation, such as hours coordination, safety regulation, externalities or political economy. With this caveat in mind, the last Subsection presented the direct fiscal considerations of regulation when set in the fiscal problem. Such exogenous increases could be due to differences in the legal system, political economy processes, cultural preferences, or simply unintended side effects of any industrial or labor regulation that indirectly causes workers to be constrained in their labor supply. For example, a realistic nonfiscal rationale for quantity regulation of labor would be to socially coordinate leisure and work time (see e.g. Alesina et al., 2005). This function could be easily integrated by simply adding a term representing disutility from miscoordination (e.g. $\beta \int_{n_0}^{n_b} (L(n) - \alpha)^2 f(n) dn$, which will entail a positive optimal λ for nonfiscal reasons).

The key message is not the fiscally endogenized optimal regulation but rather the comparative static of how the tax rate changes with exogenous regulation. While non-Pigouvian taxes fulfill exclusively fiscal or redistributory functions, the vast majority of regulatory policies is motivated nonfiscally. This insight justifies my regression analysis in Section 4 and the focus on the comparative static (10), which, derived above, predicts an unambiguously positive relationship between the tax rate and regulation strength and operates via the elasticity mechanism.

While a government with weights on utilitarian welfare and tax revenue is a practically courageous yet theoretically clean case, any government faces constraints when providing public goods. Since regulation relaxes subsequent distortion, higher tax rates become optimal, along with bigger government, no matter the revenue motive. This relationship can explain why quantity regulation and taxation of labor are co-institutional equilibria and not independent of each other.

In a more general optimal-taxation treatment,³ the curvature of the individual utility functions of heterogeneous individuals and the inequality-aversion of the social planner would create direct welfare effects of regulation. Crucially, since regulation compresses incomes of the working population, it may relax the redistribution motive that the social planner trades off with the efficiency costs of taxation. The net effect of regulation on taxation is then somewhat ambiguous: an exogenous increase in regulation decreases the need for redistributory taxation because regulation decreases inequality, but through the original elasticity mechanism regulation continues to decrease the distortionary efficiency costs of taxes. My empirics, however, suggest that this counteracting effect is second-order and that the elasticity effect dominates.

3. Taxing heterogeneous labor under regulation

In the presence of heterogeneity of skill n , regulation and taxation have two effects on labor supply: the previous intensive response, whereby individuals adjust their hours worked smoothly, and the extensive choice between working and unemployment, under which they evade regulation and taxation. While many steps are analogous to the homogeneous case, I derive new testable predictions for the two-way relationship of heterogeneity and regulation.

3.1. Implications of heterogeneity

The elasticity effects mirror the homogeneous case but include the extensive margin. Skills are now distributed according to a distribution $F(n)$ with bounds $[n_a, n_b]$ and density $f(n)$. Through the participation constraint, I obtain the skill level n_0 at which n_0 -individuals are indifferent between staying in the labor market and becoming unemployed. With homogeneous agents, the only options were full or zero employment for all agents. Heterogeneity may make it optimal to violate low- n -individuals' participation constraints to implement stronger regulation and taxation schedules, of which the lower bound

³ This treatment can be obtained from the author as a supplementary appendix upon request.

n_0 is a function via the reservation utility.⁴ Total labor supply, and thus total output and revenue, are $L^{total} = \int_{n_0}^{n_b} L(n)f(n)dn$, $Y^{total} = \int_{n_0}^{n_b} nL(n)f(n)dn$ and $R^{total} = t \int_{n_0}^{n_b} nL(n)f(n)dn$, respectively.

The aggregate elasticity takes into account the smooth adjustment of hours conditional on supplying labor (intensive margin), as well as the discrete drop to zero hours that occurs when marginal individuals exit the labor market (extensive margin). The Leibniz rule implies:

$$\epsilon_{L,1-t}^{aggregate} = \frac{(1-t) \left(\int_{n_0}^{n_b} \frac{\partial L}{\partial(1-t)} f(n)dn - L_0 f(n_0) \frac{\partial n_0}{\partial(1-t)} \right)}{\int_{n_0}^{n_b} L f(n)dn} \tag{11}$$

The first term in the numerator is the intensive response, while the second term represents the labor lost because of the participation constraint. A similar analysis holds for aggregate revenue.

These properties mirror the homogeneous case and add the additional consideration of the practically important extensive margin (e.g. Saez, 2002). In addition, the case of heterogeneity yields the empirically testable prediction that regulation compresses heterogeneity around the target. Specifically, recall that the effect of regulation on an individual’s labor supply is positive or negative depending on the relationship between target ψ and hypothetical zero-regulation supply $(1-t)n$. If target ψ exceeds (falls short of) this supply, then regulation provides incentives for the worker to, at the intensive margin, supply more (less) labor, to avoid higher penalties. The second moment of labor supply centered around ψ is therefore strictly decreasing in regulation strength λ , and for target ψ set sufficiently close to the mean, this statement holds for the conditional variance of the working population as well. The empirical Section 5 finds cross-sectional evidence for this relationship.

3.2. Joint determination of taxation and regulation

The government’s objective function under heterogeneity is analogous to the homogeneity case:

$$\max_{G,\lambda,t} \left\{ \int_{n_a}^{n_b} U(n)f(n)dn + bG \right\} \text{ s.t. } G \leq t \int_{n_0}^{n_b} nL(n)f(n) \tag{12}$$

where all terms follow the homogeneous interpretation; the analogy between the weight-on-revenue and the public-good interpretation persists as the workers are of measure one and the public good enters linearly into everyone’s utility function, whether employed or unemployed. The derivative with respect to t leads to the optimal tax rate t^* :

$$t^* = \frac{(b-1) \int_{n_0}^{n_b} nL(n)f(n)dn}{b \left(\int_{n_0}^{n_b} n \left(-\frac{\partial L(n)}{\partial t} \right) f(n)dn + n_0 L(n_0) f(n_0) \frac{\partial n_0}{\partial t} \right)} \tag{13}$$

Thus, this implicit expression (n_0 is a function of t) relates the marginal social benefit of the tax to the marginal social cost. The new term here is the extensive behavioral effect in the denominator, which is due to the exit of the labor market by low-skill individuals, from whom $n_0 L(n_0) f(n_0)$ in output is forgone.

The optimality condition for regulation strength λ yields an implicit expression:

$$\int_{n_0}^{n_b} \left(\frac{1}{2} (L(n) - \psi)^2 \right) f(n)dn = bt \left(\int_{n_0}^{n_b} n \frac{\partial L(n)}{\partial \lambda} f(n)dn - n_0 L_0 f(n_0) \frac{\partial n_0}{\partial \lambda} \right) \tag{14}$$

where the n_0 -individual’s utility is, by the participation constraint, zero (an extensive application of the envelope theorem). This optimality condition equates utility losses from higher regulation strength λ on the left-hand side with the net public-good gain (the intensive and extensive effects of raising λ on government revenue times benefit parameter b). The extensive-margin loss in output $-n_0 L_0 f(n_0)$ is always negative, and in order to yield a net gain in social welfare, the intensive gain must compensate for the exit at the extensive margin.⁵

⁴ Setting reservation utility $U_0 = 0$ allows me to abstract from redistribution issues and unemployment benefits. n_0 depends on lump-sum transfers since a quasilinear set-up only eliminates intensive, but not extensive, income effects. $n_0 = \frac{\psi}{1-t} \left(\sqrt{\lambda^2 + \lambda} - \lambda \right)$, so the n_0 -individual would supply labor $L_0 = \frac{(1-t)n_0 + \lambda\psi}{1+\lambda} = \sqrt{\frac{\lambda}{1+\lambda}}\psi$ and produce output $y_0 = \frac{\psi^2}{1-t}\lambda \left(1 - \frac{\lambda}{1+\lambda} \right) \cdot \frac{\partial n_0}{\partial \lambda} > 0$ and $\frac{\partial n_0}{\partial t} < 0$ imply that the lower the tax rate, the more individuals work, and the stronger regulation, the higher the skill threshold for people to enter the labor force. This implication is consistent with empirical evidence found in Botero et al. (2004) and the political economy-literature; both find that regulation tends to hurt outsiders and low-income, low-skill individuals.

⁵ I now rewrite (14). The n_ψ -individual would, at the specific $(1-t)$, supply exactly the target level. Namely, $\psi = L(n_\psi) \equiv n_\psi = \frac{\psi}{1-t}$ yields n_ψ . Those individuals with skill $n < n_\psi$ increase their labor supply towards target level ψ (or exit the labor market), whereas those with skill $n > n_\psi$ converge further to ψ by decreasing their output. Whether positive regulation is desirable – for purely fiscal reasons – depends on the specific distribution of skills, i.e. the mass of the population for whom $n > n_\psi$ and how much labor they would supply. Rewriting (14) illustrates this trade-off:

$$bt \int_{n_0}^{n_\psi} n \frac{\partial L(n)}{\partial \lambda} f(n)dn = \int_{n_0}^{n_b} \left(\frac{1}{2} (L(n) - \psi)^2 \right) f(n)dn + bt \left(n_0 L_0 f(n_0) \frac{\partial n_0}{\partial \lambda} + \int_{n_\psi}^{n_b} n \left(-\frac{\partial L(n)}{\partial \lambda} \right) f(n)dn \right)$$

As in the homogeneous case, comparative statics of t^* with respect to λ work through λ 's attenuating the responsiveness of labor supply to taxation. Let β denote the denominator that represented the behavioral costs from distortionary taxation. Then we get:

$$\frac{\partial t^*}{\partial \lambda} = \frac{b-1}{b} \frac{\frac{\partial L}{\partial \lambda} \beta - L \frac{\partial \beta}{\partial \lambda}}{\beta^2} \quad (15)$$

Assuming that the aggregate effect of tightening regulation is not reducing labor supply (too much), the effect of regulation on the optimal tax rate is increasing, again through the channel of attenuating the responsiveness of labor supply to the tax rate as $\partial \beta / \partial \lambda < 0$.

Finally, regulation under heterogeneity yields two new implications: regulation compresses heterogeneity, and heterogeneity constrains regulation. The latter can be seen from the optimality condition (14) for λ . It implies that *regulation is more costly to social welfare the more heterogeneous the population*. First, the least-square solution of an optimal ψ that would minimize the right-hand side of (14) is the mean of the hours. Second, in this case, the right-hand side is roughly the conditional variance of the working population, i.e. for $\psi \approx E[L|n > n_0]$, $\int_{n_0}^{n_b} (\frac{1}{2}(L(n) - \psi)^2) f(n) dn / (1 - F(n_0)) \approx \text{Var}[L|n > n_0]$. Therefore, empirically, both implications predict a positive correlation between the degree of regulation and the variation of hours worked.

4. Do governments tax highly what they regulate?

The theoretical part of my paper predicts a correlation between taxation and regulation. Quantity regulation of labor has not held a fiscal significance in political economy, comparative economics and public economics; I propose it as a determinant of variation in labor supply elasticities and the costs of taxation. All data come from 2006 (except union density and power of the left, which are from 2002).

4.1. Data on regulation

My regulation data come from the World Bank's *Doing Business* reports, which classify economic systems on many regulatory dimensions. Local law firms code the data on a by-country basis and make unifying assumptions about the representative employee's characteristics.⁶ I use the "rigidity of hours" subindex of the employment regulation section. It runs from zero to one hundred and quantifies employment regulations that affect the ease with which employment hours can be adjusted. It is the composite index of five categories:

- (i) whether night work is unrestricted; (ii) whether weekend work is unrestricted; (iii) whether the work week can consist of 5.5 days; (iv) whether the workweek can extend to 50 hours or more (including overtime) for 2 months a year to respond to a seasonal increase in production; and (v) whether paid annual vacation is 21 working days or fewer.

If a high-regulation country scores negatively on all five dimensions, its score will be one hundred, with each component adding twenty "rigidity points" to the indicator. This index has become an accepted measure of regulatory rigidity (see Lee, 2007). Botero et al. (2004) created the index to measure the impact of labor regulation on the performance of labor markets. Since then, a host of other papers have used this index, and the World Bank has extended the data to more than 140 countries.

4.2. Data on taxation

The OECD computes data for 33 member countries for the "tax wedge" on labor, which includes social security payments, income taxes, and all other employer and employee contributions. Simply comparing income tax rates would show France as taxing labor less than the US, a difference resulting from not counting all tax-like components of the wage wedge. The OECD tax wedge is the one that an unmarried, average earner faces, which is crucial as quantity regulation of labor typically applies to employees who do not face the highest marginal tax rates. The regulation indices collect data for a similar benchmark employee. The underlying assumption is that labor bears the majority of the tax wedge.⁷

⁶ "The worker: Is a 42-year-old, nonexecutive, full-time, male employee. Has worked at the same company for 20 years. Earns a salary plus benefits equal to the economy's average wage during the entire period of his employment. Is a lawful citizen who belongs to the same race and religion as the majority of the economy's population. Resides in the economy's largest business city. Is not a member of a labor union, unless membership is mandatory." "The business: Is a limited liability company. Operates in the economy's largest business city. Is 100% domestically owned. Operates in the manufacturing sector. Has 201 employees. Is subject to collective bargaining agreements in economies, where such agreements cover more than half the manufacturing sector and apply even to firms not party to them. Abides by every law and regulation but does not grant workers more benefits than mandated by law, regulation or (if applicable) collective bargaining agreement."

⁷ If labor were the only income source, an ideal measure on all taxes distorting the labor/leisure choice would include all indirect taxes. I constructed an extended subsample measure incl. VATs; all results remained fully robust. I found the version of direct taxes more transparent and in line with the literature. For example, Manikw et al. (2009) use the same measure.

4.3. The correlation between regulation and taxation

Fig. 1 plots the pervasive correlation between quantity regulation of labor and wage taxes. A cluster of the typical Anglo-Saxon “market economies” like Canada, the United States, the United Kingdom and New Zealand emerges. These countries have low regulation and low levels of taxation. At the other end, a clear cluster of Western European “Third-Way” economies consisting of Belgium, Germany, France, Austria and Finland form the co-institutional equilibrium of high regulation and high taxation. Denmark has very high labor taxes but a very flexible labor market. Mexico regulates as strongly as rigid Italy but taxes labor the least in the sample since its oil revenues likely replace labor tax revenue.

4.4. OLS

I find strong and robust evidence for my hypothesis that labor-market and employment regulation are correlated with higher equilibrium tax rates of labor income across countries. I make use of several datasets that cover my core set of 29 OECD countries. My controls are union density, average unemployment rate in the last ten years, a proxy for how often left-leaning governments ruled, average past growth, log population, and the government’s consumption share of GDP to control for the size of government.

I run simple cross-country OLS regressions with a core sample of the 29 overlapping OECD countries. The dependent variable is the tax wedge and log tax wedge; while I use the latter throughout, both specifications work. Table 1 presents the OLS results. Column 1 regresses the tax wedge on hours regulation. The coefficient is significantly positive, reflecting the visual evidence shown in Fig. 1.

Column 2 adds log per-capita GDP, the government consumption share of GDP and population size as controls. The consumption share proxies for the size of government, which may be an omitted variable as it may produce bureaucratic economies of scale that facilitate regulation. Hours regulation remains a significant predictor of high tax wedges as well as of log tax wedges (Column 3). The magnitude of the coefficient on regulation suggests that moving from the U.S. level of regulation (0) to the French level (60) is associated with a 12% tax increase, roughly two thirds of the tax difference between the U.S. and France.

Columns 4–6 add controls like “left power” (fraction of simultaneous left-wing or center ruling parties and chief executives in recent decades), average unemployment rates, and union density. The relationship between hours regulation and the tax wedge remains significant.

4.5. Robustness checks

Table 2 reports several robustness checks. I examine whether the positive relationship between regulation and taxation holds for non labor taxation regressed on labor regulation. My model predicts that labor regulation should not affect elasticities other than labor supply. Columns 3 and 4 keep the controls but replace labor taxes with statutory corporate tax rates. No significant relationship emerges. This finding supports that my regulation indicator does not merely pick up “big government” in all areas but rather identifies the labor domain. Governments specifically tax more highly what they regulate strongly.

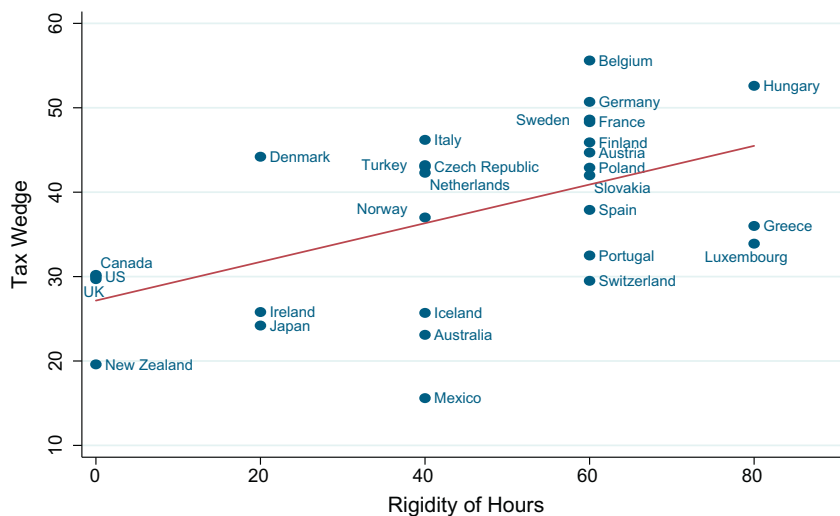


Fig. 1. Correlation between regulation and taxation: hours regulation, labor tax wedge. Notes: correlation: 0.57. Sources: rigidity-of-hours: the rigidity-of-hours index from Botero et al./Ease of Doing Business. Tax Wedge: “The percentage of gross earnings given up in tax, including any social security contributions. Calculated for a single worker without children, earning 100% of the average wage”. (OECD data, 29 OECD countries that both data sets cover.)

Table 1
OLS regressions of labor taxation on quantity regulation and controls.

	(1) TaxW	(2) TaxW	(3) lnTaxW	(4) lnTaxW	(5) lnTaxW	(6) lnTaxW
HoursReg	0.187* (0.0688)	0.198** (0.0565)	0.00592** (0.00179)	0.00595** (0.00177)	0.00565* (0.00230)	0.00553* (0.00242)
lnGDPpc		3.901 (5.124)	0.146 (0.181)	0.126 (0.237)	0.108 (0.236)	0.0793 (0.263)
lnPop		1.671 (1.089)	0.0461 (0.0310)	0.0417 (0.0344)	0.00218 (0.0390)	0.0224 (0.0649)
SizeGov		0.996** (0.287)	0.0293** (0.00931)	0.0291** (0.00993)	0.0292* (0.0108)	0.0284** (0.0123)
Growth				−0.0121 (0.0470)	0.00262 (0.0500)	0.00455 (0.0525)
AvgUnem_91–00					−0.000 (0.000)	−0.000 (0.000)
UnionDens						0.186 (0.339)
LeftPower						−0.0717 (0.219)
Constant	28.87*** (3.610)	−45.29 (60.73)	0.855 (2.100)	1.128 (2.795)	1.688 (2.631)	1.751 (2.690)
adj. R ²	0.158	0.334	0.313	0.286	0.224	0.144
N	29	29	29	29	25	25

Heteroskedasticity-robust standard errors in parentheses.

+ $p < 0.10$.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 2
Other dependent variables, regulation controls and IV.

	(1) lnTaxW	(2) SizeGov	(3) CorpTx	(4) lnCorpTx	(5) IV_lnTW
rigidhours	0.006* (0.00212)	−0.063 (0.0396)	0.0327 (0.0430)	0.0013 (0.00169)	0.0113* (0.00464)
lnGDPpc	0.150 (0.180)	−3.823 (2.745)	1.082 (1.134)	0.0222 (0.0389)	0.136 (0.293)
lnPop	0.0460 (0.0342)	−1.269* (0.504)	3.308*** (0.709)	0.125*** (0.0286)	0.0199 (0.0610)
SizeGov	0.0293** (0.009)		−0.0149 (0.158)	−0.0005 (0.007)	0.0301* (0.0133)
RegFiring	−0.0003 (0.0045)				
RegHiring	0.0012 (0.003)				
CostFiring	0.0003 (0.003)				
TaxWedge		0.293** (0.0886)			
Growth		0.0685 (0.859)	−0.907** (0.287)	−0.0384** (0.0132)	0.00314 (0.0619)
AvgUnem_90–00			0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
LeftPower			−0.208 (3.591)	0.0002 (0.151)	−0.0820 (0.241)
UnionDens			0.400 (4.298)	0.0459 (0.192)	0.108 (0.309)
RHrs instr'd w/LegOrgs	No	No	No	No	Yes
Constant	0.803 (2.094)	60.89* (30.83)	−12.36 (14.6)	1.944*** (0.544)	0.982 (3.162)
adj. R ²	0.226	0.266	0.370	0.349	−0.104
N	29	29	53	53	25

Heteroskedasticity-robust standard errors in parentheses.

+ $p < 0.10$.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Analogously, I expect to find no significant relationship between non hours labor regulation (such as hiring or firing protection) and labor taxes. In Column 1, I check whether my quantity-regulation subindex remains significant when controlling for other, non-hours regulation. The coefficient on hours regulation remains positive and significant, while the other forms of regulation are insignificant. The same holds for the composite index of labor-market rigidity that the *Doing Business* dataset contains.

Controlling for the tax wedge and making the GDP share of government the dependent variable, Column 2 shows that regulation is not just a proxy for big government (the correlation is even insignificantly negative), which suggests that the mechanism is specific to labor taxation. Column 5 attempts an instrumental-variable regression of hours regulation with legal origins, which continues to return a significantly positive relationship. Yet beyond yielding suggestive evidence, the exclusion restriction may be violated because of the multi-institutional impact of legal origins (see Glaeser and Shleifer, 2001).

These regressions reassure that the correlation between regulation and taxation is robust and in line with the model's predictions. While my regressions do not show causality, this correlation is a new puzzle to the literature. If anything, the usual view of taxation and government intervention implies that distortions not only add up but aggravate each other (say, quadratically, in the Harberger Triangle, see e.g. Auerbach and Hines, 2002). Most strands of the literature would lead one to believe that regulation and taxation behave as substitutes, whereas my model and my empirics suggest that they are in fact complements.

5. Do regulation and lower heterogeneity go together?

Section 3 suggests that regulation compresses variation in labor supply and that homogeneity facilitates regulation. No matter the causal relationship, my model predicts a negative relationship between the strength of regulation and the variance of hours worked. This Section explores the empirical relationship between the shape of the hours distribution and quantity regulation of labor. The hours data come from the 2006 round of the International Social Survey Programme (ISSP), which conducts annual cross-sectional surveys in 50 countries and inquires hours worked per week. To my knowledge, the ISSP is the most comprehensive survey covering hours worked. Throughout, I use data from male employees.

I start with illustrative case studies from different co-institutional clusters as identified in Fig. 1. Figs. 2–6 present histograms with normal kernel density estimates of hours worked by male employees in low-regulation countries such as the United States and the United Kingdom, and in highly regulated countries such as France, Germany and Sweden.

As Fig. 2 shows, the US hours distribution has a standard deviation of over 12, with individuals bunching at 40 hours. This cap is not fully binding and hours are remarkably evenly spread out beyond the 20-hours range and between 40 and 80 hours. The rigidity index is zero, which means that the US has a very flexible labor market.

Fig. 3 shows British hours worked per week. As a flexible labor market with an index of zero, the high standard deviation of actual hours worked is expected because only weak labor regulation compresses the distribution of hours. There is a relatively uniformly distributed cluster of individuals between 40 and 60 hours.

Fig. 4 presents the French distribution of weekly hours worked. Given the rigid French regulation and (in 2006 still) the famous 35-hours working week in place, it is unsurprising to see the vast majority of employees bunch at this point. This cap on hours worked is relatively binding, as France scores a 60 on the index and thus has little variation around the standard 35 hours: the standard deviation is only 7.7, 60% of the US standard deviation.

Fig. 5 presents the German hours distribution. Unlike France, German employees work over 43 hours per week on average. However, the histogram hints at the same pattern in high-regulation countries: the standard deviation of labor supply is low (8.4) as regulation pushes individuals towards the mode – the standard 40-hours working week.

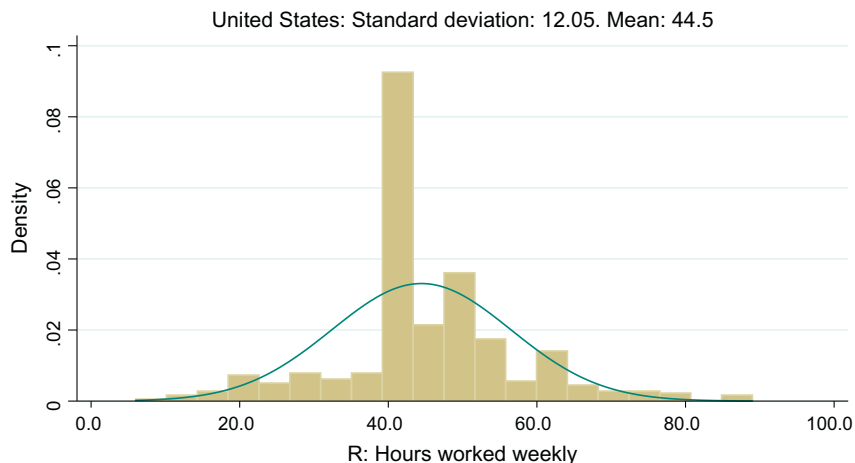


Fig. 2. Distribution of hours worked in the US. Hours rigidity: 0.

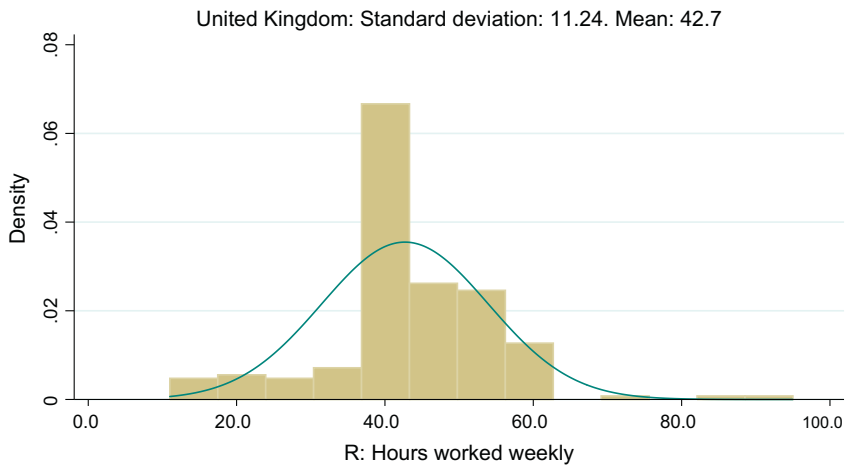


Fig. 3. Distribution of hours worked in the UK. Hours rigidity: 0.

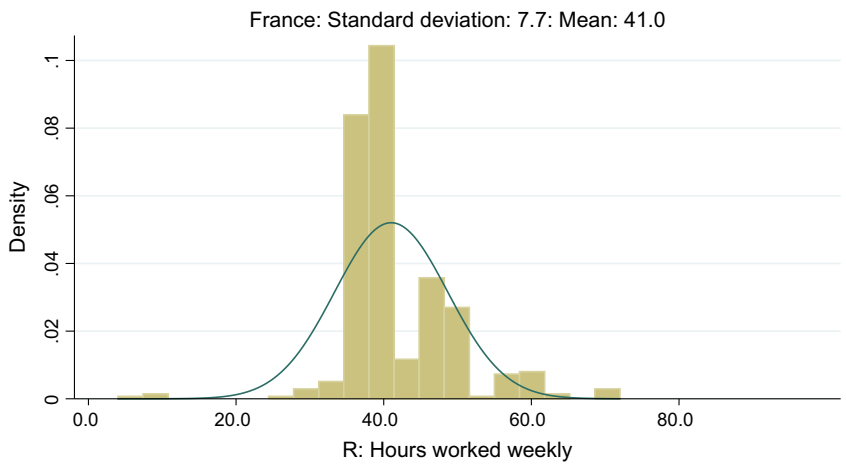


Fig. 4. Distribution of hours worked in France. Hours rigidity: 60.

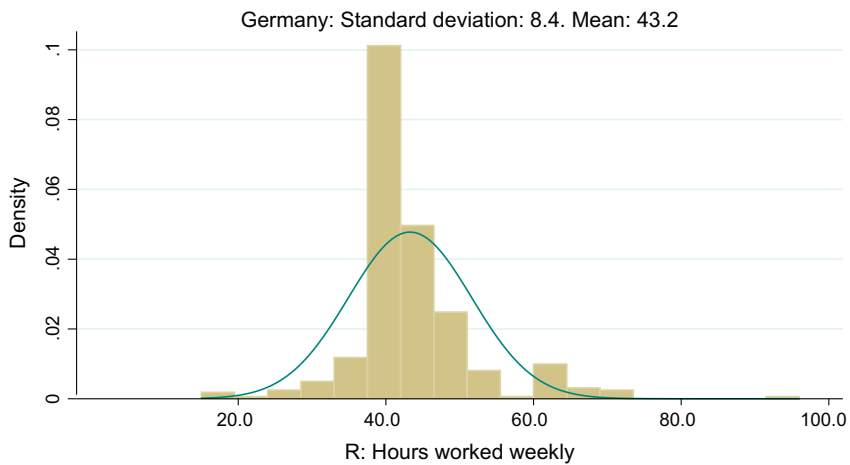


Fig. 5. Distribution of hours worked in Germany. Hours rigidity: 60.

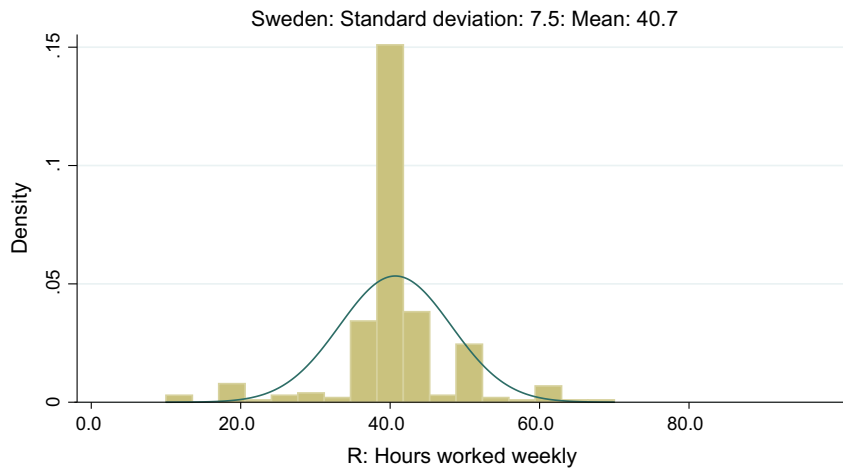


Fig. 6. Distribution of hours worked in Sweden. Hours rigidity: 60.

Fig. 6 shows the most extreme example of compression of hours into the 40-hours standard. An extremely low kurtosis of the distribution and the vast majority of the employees supplying exactly 40 hours hints at the strong Swedish labor regulation. Its hours regulation index is 60, and the standard deviation of hours is merely 7.5.

This anecdotal evidence suggests that regulation and variation in hours correlate negatively, as predicted by my model: in highly regulated labor markets, labor supply is compressed around what in my model is the target supply ψ . A realistic ψ value is the 40 hours per week that the regulator seeks to induce. The regulatory strength λ – empirically identified in the rigidity-of-hours index – determines the extent to which regulation constrains the individuals' labor supply. The distinction between ψ (the formal target) and λ (the relevance of the target) is crucial and explains the irrelevance of the official 40-hours workweek standard in the United States (see Lee, 2007, for a similar argument).

Regressions support my anecdotal results. Fig. 7 shows a scatter plot with a fitted line relating the rigidity-of-hours measure to the residual standard deviation of labor supply in the sample of 33 countries for which the ISSP and the regulation data overlapped in 2006. As with the regulation–taxation correlation in Fig. 1, clear clusters emerge in Fig. 7: Canada, the United States and Ireland exhibit large variation in hours worked and weak regulation. Germany, France, Sweden and Russia regulate labor extensively, which according to my mechanism explains the very small deviation in hours worked in these populations.

Table 3 reports that regulation-induced rigidity of working hours is negatively correlated with the standard deviation of hours worked. After controlling for the mean hours worked, this finding is robust to controls such as log per-capita GDP,

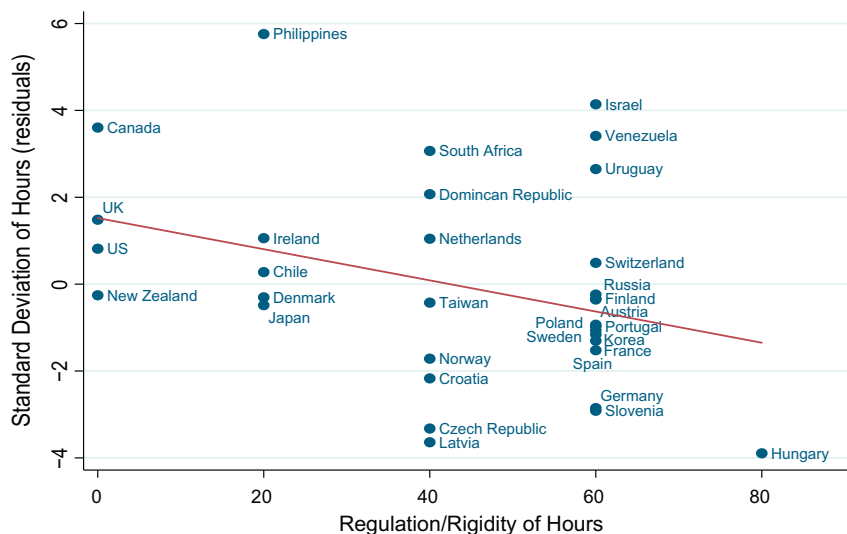


Fig. 7. Correlation between hours regulation and standard deviation of hours worked. Notes: the residuals of the standard deviation have been obtained by first regressing it on the mean of hours worked. The mean is strongly positively correlated with the standard deviation, but the significance of regulation is robust to controlling for the average. The relationship between the mean hours and regulation is reverse U-shaped. This scatter plot is the relationship between the standard deviation and regulation, net of the effects that the mean level of the hours exerts.

Table 3

Regressions of the standard deviation of actual hours worked by male employees on hours regulation and controls.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
RegHours	−0.0381 (0.0258)	−0.0481** (0.0150)	−0.0468** (0.0147)	−0.0381** (0.0112)	−0.0390** (0.0111)	−0.0386* (0.0144)	−0.0402* (0.0170)
AvgHours		0.814*** (0.117)	0.723*** (0.112)	0.554*** (0.137)	0.552*** (0.142)	0.505*** (0.118)	0.440* (0.162)
lnGDPpc			−1.393* (0.744)	−2.141** (0.685)	−2.089** (0.676)	−1.878* (0.723)	−0.571 (0.922)
SizeGov				−3.520* (1.536)	−3.175* (1.378)	−2.386 (1.447)	−2.898* (0.967)
lnPop					0.206 (0.203)	0.198 (0.218)	0.165 (0.184)
RegFiring						−0.0360 (0.0230)	0.0240 (0.0199)
RegHiring						−0.0112 (0.0147)	−0.0086 (0.0122)
CostFiring						0.0253 (0.0166)	0.0002 (0.0182)
lnTaxWedge							−0.871 (2.144)
Constant	14.06*** (1.168)	−21.81*** (4.997)	−4.148 (10.56)	20.70 (15.77)	17.34 (14.92)	15.42 (13.32)	8.912 (20.73)
adj. R ²	0.040	0.546	0.588	0.671	0.666	0.722	0.796
N	33	33	33	33	33	33	18

Heteroskedasticity-robust standard errors in parentheses.

* $p < 0.10$ * $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

average hours worked, the size of government, the log tax wedge, the size of the population, and several other regulation indicators. Hours regulation prevails as the only significant predictor throughout all specifications. This strong and robust cross-country evidence supports the theoretical specification of regulation that my models proposes: regulation pushes individuals towards a target labor supply; thus, for heterogeneous hours preferences, regulation decreases the variation in hours worked. Conversely, if the government takes into account social welfare and sets regulation, then greater heterogeneity in the population will lead to greater disutility from regulation, and thus to lower regulation.

6. Conclusion

This paper highlights the complementarity between the policy instruments of quantity regulation and taxation. The mechanism acts through the attenuated elasticities. Conventional tax models assume that elasticities of factor supply and choice variables are derived from primitives like preferences, technologies or other given parameters. However, in reality, governments also regulate. By quantity-regulating economic activities, governments introduce regulation-driven incentives along with tax-driven incentives to, for example, the labor market. The central claim of this paper is that quantity regulation – even if set for purposes other than facilitating taxation – provides incentives for the actor to align his supply with a target and thereby decreases the elasticity of the taxed activity. This means that taxation after regulation is less distortionary, and higher tax rates become optimal.

I find robust evidence that countries that regulate labor heavily also tax it highly. Furthermore, the empirical analysis supports an ancillary prediction of the model of regulation, by showing that hours regulation is robustly associated with compressed labor supply distributions. The French, Swedish and German economies are highly regulated and highly taxed; my paper explains this phenomenon with their regulatory policies that reduce the distortion of such high taxes. This mechanism predicts economic policies to come in exactly such “institutional packages” of high(low)-regulation/high(low)-taxation equilibria.

The theoretical complementarity between regulation and taxation provides one mechanism to explain how governments can overcome the Laffer curve of tax collection and thereby provide more public goods or greater redistribution. There are two facets of the complementarity between regulation and taxation. First, regulating governments will find it easier to provide public goods and redistribution. Second, big government in regulation breeds big government in taxation.

Acknowledgments

I am especially indebted to Andrei Shleifer for countless discussions and crucial advice. I thank Alberto Alesina, Khaled Alrabe, Anne Brett, Raj Chetty, Spring Greeney, Adam Guren, James Hines, Loukas Karabarounis, Jeffrey Liebman, Emmanuel Saez, Frank Schilbach, Stan Veuger and Danny Yagan for helpful comments.

References

- Alesina, Alberto, Glaeser, Edward, Sacerdote, Bruce, 2005. Work and Leisure in the US and Europe: why so different? NBER Macroeconomic Annual 20, 1–64.
- Atkinson, Anthony, Stiglitz, Joseph, 1984. Lectures on Public Economics. McGraw-Hill Inc., New York.
- Auerbach, Alan, Hines, James, 2002. Taxation and economic efficiency. In: Auerbach, Alan, Feldstein, Martin (Eds.), first ed., Handbook of Public Economics, vol. 3. Elsevier, pp. 1347–1421 (Chapter 21).
- Botero, Juan, Djankov, Simeon, La Porta, Rafael, Lopez-de-Silanes, Florencio, Shleifer, Andrei, 2004. The regulation of labor. Quarterly Journal of Economics 119, 1339–1382.
- Chetty, Raj, Friedman, John, Olsen, Tore, Pistaferri, Luigi, 2009. Adjustment Costs, Firm Responses, and Labor Supply Elasticities: Evidence from Danish Tax Records. NBER Working Paper 15617.
- Diamond, Peter, 1998. Optimal income taxation: an example with a U-shaped pattern of optimal marginal tax rates. American Economic Review 88, 83–95.
- Diamond, Peter, 1980. Income taxation with fixed hours of work. Journal of Public Economics 13, 101–110.
- Glaeser, Edward, Shleifer, Andrei, 2001. Legal origins. Quarterly Journal of Economics 117, 1193–1229.
- Hausman, Jerry, 1981. Labor Supply. In: Aaron, Henry, Pechman, Joseph (Eds.), How Taxes Affect Economic Behavior. Brookings Institution, Washington, DC, pp. 27–83.
- Kaplow, Louis, Shavell, Steven, 2002. On the superiority of corrective taxes to quantity regulation. American Law and Economics Review 1, 1–17.
- Lee, Sangheon, 2007. Working Time Around the World: Trends in Working Hours, Laws, and Policies in a Global Comparative Perspective. Routledge, New York.
- Manikw, Gregory, Yagan, Danny, Weinzierl, Matthew, 2009. Optimal taxation in theory and practice. Journal of Economic Perspectives 23, 147–174.
- Merrill, Peter R., Rousso, Ada S., 1991. Federal environmental taxation. In: Proceedings of the National Tax Association Annual Conference, 1991, pp. 191–98.
- Mirrlees, James, 1971. An exploration in the theory of optimal income taxation. Review of Economic Studies 38, 175–208.
- Ramsey, Frank, 1927. A contribution to the theory of taxation. Economic Journal 37, 47–61.
- Saez, Emmanuel, 2001. Using elasticities to derive optimal income tax rates. Review of Economic Studies 68, 205–229.
- Saez, Emmanuel, 2002. Optimal income transfer programs: intensive versus extensive labor supply responses. Quarterly Journal of Economics 117, 1039–1073.
- Shleifer, Andrei, 2005. Understanding regulation. European Financial Management 11, 439–451.
- Slemrod, Joel, Kopczuk, Wojciech, 2002. The optimal elasticity of taxable income. Journal of Public Economics 84, 91–112.
- Spence, Michael, 1977. Nonlinear prices and welfare. Journal of Public Economics 8, 1–18.
- Summers, Lawrence, Gruber, Jonathan, Vergara, Rodrigo, 1993. Taxation and the structure of labor markets: the case of corporatism. Quarterly Journal of Economics 108, 385–411.
- Weitzman, Martin, 1974. Prices vs. quantities. Review of Economic Studies 41, 477–491.