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## Regulation and taxation: A complementarity

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## ABSTRACT

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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.

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## 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

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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.<sup>1</sup> 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

<sup>1</sup> 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.

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