



WP-AD 2011-16

Visibility of social security contributions and employment

Iñigo Iturbe-Ormaetxe

Ivie

Working papers
Working papers
Working papers

Los documentos de trabajo del Ivie ofrecen un avance de los resultados de las investigaciones económicas en curso, con objeto de generar un proceso de discusión previo a su remisión a las revistas científicas. Al publicar este documento de trabajo, el Ivie no asume responsabilidad sobre su contenido.

Ivie working papers offer in advance the results of economic research under way in order to encourage a discussion process before sending them to scientific journals for their final publication. Ivie's decision to publish this working paper does not imply any responsibility for its content.

La Serie AD es continuadora de la labor iniciada por el Departamento de Fundamentos de Análisis Económico de la Universidad de Alicante en su colección "A DISCUSIÓN" y difunde trabajos de marcado contenido teórico. Esta serie es coordinada por Carmen Herrero.

The AD series, coordinated by Carmen Herrero, is a continuation of the work initiated by the Department of Economic Analysis of the Universidad de Alicante in its collection "A DISCUSIÓN", providing and distributing papers marked by their theoretical content.

Todos los documentos de trabajo están disponibles de forma gratuita en la web del Ivie <http://www.ivie.es>, así como las instrucciones para los autores que desean publicar en nuestras series.

Working papers can be downloaded free of charge from the Ivie website <http://www.ivie.es>, as well as the instructions for authors who are interested in publishing in our series.

Edita / Published by: Instituto Valenciano de Investigaciones Económicas, S.A.

Depósito Legal / Legal Deposit no.: V-2808-2011

Impreso en España (julio 2011) / Printed in Spain (July 2011)

Visibility of social security contributions and employment*

Iñigo Iturbe-Ormaetxe**

Abstract

Social security contributions in most countries are split between employers and employees. According to standard incidence analysis, social security contributions affect employment negatively, but it is irrelevant how they are divided between employers and employees. This paper considers the possibility that: (i) workers perceive a linkage between current contributions and future benefits and, (ii) they discount employers contributions more heavily, as they are less “visible”. Under these assumptions, I find that employer contributions have a stronger (negative) effect on employment than employee contributions. Furthermore, a change in how contributions are divided that reduces the share of employers is beneficial for employment. Finally, making employers contributions more visible to workers also has a positive effect on employment.

Keywords: Payroll tax, social security, tax incidence, tax visibility.

JEL classification: D03, H22, H55, J08.

*Iñigo Iturbe-Ormaetxe, Departamento de Fundamentos del Análisis Económico, Universidad de Alicante, E-03071, Alicante, Spain. E-mail: iturbe@merlin.fae.ua.es. I would like to thank Juan José Dolado and Miguel-Angel López García for their helpful comments and suggestions. Financial support from Instituto Valenciano de Investigaciones Económicas and Ministerio de Ciencia e Innovación and FEDER funds (project SEJ-2007-62656) are gratefully acknowledged.

1 Introduction

Tax incidence studies the effect of taxes on the distribution of welfare in a society. Its basic insight is that the person who really pays the tax may not be the person who has the legal obligation to make a tax payment (see Fullerton and Metcalf (2002)). For example, if government taxes capital, owners of capital can pass on some or even all of the tax to consumers through higher prices or to workers through lower wages. Economists distinguish between *statutory incidence*, i.e. who is legally responsible for the tax, and *economic incidence*, i.e. the change in the distribution of welfare induced by the tax. They differ in that individuals react to taxes by changing their behavior and, consequently, equilibrium prices may also change. As another example, think of payroll taxes. In the USA, the statutory burden of the payroll tax is the same for employers and employees. However, it is generally agreed that the economic burden is borne entirely by workers.¹ It is not surprising that economists mainly focus on economic incidence.

The textbook prediction of economic theory is that, when markets are competitive, the economic incidence of a tax will be determined by the elasticities of demand and supply, but not by statutory incidence.² In the context of the labor market, this implies that an increase of contributions paid by employers has the same negative effect on the employment level as an increase of the same size in contributions paid by employees. Moreover, any change in how contributions are split between employers and employees that keeps the total level of contribution fixed, has no effect either on the level of employment or on the total cost of labor.³ Quoting Salanié (2003, p. 16):

“Whether the employer “pays” 80 percent or 50 percent or 20 percent of

¹Fullerton and Metcalf (2002).

²Statutory incidence matters for real incidence when there is a (binding) minimum price.

³This result does not extend to non-competitive labor markets. See, for example, Pissarides (1998) and Koskela and Schöb (1999).

payroll taxes is immaterial to the equilibrium gross and net wages and to the determination of employment.”

I here challenge this view in a purely competitive labor market. I find that the particular way in which payroll taxes are split between employers and employees truly matters, both for gross and net wages and for employment. To obtain this result I depart from standard analysis by introducing two assumptions:

1. Workers may perceive these taxes paid as equivalent to deferred payments and, therefore, not as pure taxes.
2. Workers value contributions paid by themselves more than those paid by employers, the reason being that the latter are less “visible” to them.

The first assumption is fairly standard in the literature of public pensions.⁴ The government uses the revenue collected from payroll taxes to finance different public programs that benefit workers. Workers may perceive a linkage between taxes paid today and future benefits. Taken to the extreme, if workers perceive future benefits as actuarial, payroll taxes will have no distortionary effects.

Some authors have tried to calculate how contributions and future benefits are related for different individuals. For example, Feldstein and Samwick (1992) calculate net marginal tax rates as the difference between the payroll tax rate and the discounted value of the additional social security benefits per dollar of additional earnings for different individuals. Disney (2004) estimates measures of the tax component and the saving component of public pension systems across the OECD countries.

The second assumption deserves more discussion. I begin by noting that in most countries employers and employees share the statutory burden of

⁴See, for instance, Feldstein and Liebman (2002). Some earlier examples are Summers (1989) and Gruber (1997).

the payroll tax. In Figure A.1, I represent contributions paid by employers and employees in the OECD countries. Average contribution by employers is 15.2%, while it is 8.6% for employees. The ratio of the employer contribution to the sum of the employer and the employee contribution is likewise constructed. This ratio ranges from 0.05 (Denmark) to 1 (Australia) in the sample of OECD countries, with a mean of 0.6. Contrary to employees, employers should perceive their part of the payroll tax as a pure tax, as they do not get any future benefit from it and, as long as they can, they will try to shift the burden of the tax to their employees. Whether they will be successful or not will depend on the corresponding elasticities of supply and demand, as commented above.

Regarding employees, they may give some value to payroll taxes, but they may value taxes paid by the employer differently from taxes paid by themselves. One reason for this is that they may not be fully aware of taxes paid by the employer on their behalf, or they may not know the true size of those taxes. There is some evidence pointing out in this direction. In a very interesting paper, Boeri, Börsch-Supan and Tabellini (2001) survey the opinions of citizens in four European countries (France, Germany, Italy and Spain) on their welfare states and also on different possibilities of reform. When people are asked to report the fraction of their wages that both employers and employees pay as social security contributions, they tend to underestimate the true contribution rates. The most striking case is Spain. Half of individuals do not even answer the question. Of those who answer, more than two thirds choose a contribution rate far below the true value.⁵ One possible explanation for this underestimation is that workers are only fully aware of the contributions paid by themselves, but ignore or are not very sure about the size of contributions paid by employers. In Spain, for

⁵In another survey conducted by the same authors in Germany and Italy, only 20% of respondents know the overall (employer plus employee) contribution rate approximately. See Tabellini, Börsch-Supan and Boeri (2002).

instance, contributions paid by employers do not even appear in the payroll statements that employees receive every month with their wages. Their own contributions are, on the contrary, fully reflected. This is related to the literature on the “visibility” of taxes that goes back to Buchanan and Wagner (1977). In particular, different authors have studied whether or not the sharing of payroll taxes is irrelevant. Dušek (2002) finds that, contrary to his initial intuition, countries where employer’s share is large tend to have small pension programs. Mulligan, Gil, and Sala-i-Martin (2010) find that the employer’s share is slightly higher in democracies than in nondemocracies.⁶ They also find that the share paid by the employee has a positive effect on the size of the program, although this effect is rather small. Recently, Chetty, Looney and Kroft (2009) have coined the term “salience” to refer to those taxes that are less visible for consumers. They find that the salience of taxes affects consumers’ purchase decisions.⁷

The argument of this paper is this: workers may not fully consider contributions paid as taxes, since they acknowledge that these taxes give them the right to future benefits. Additionally, they behave myopically in the sense that they place a higher value on the contributions paid by themselves than in the contributions paid by the employers, because the latter are less salient.

In Section 2, I show that, provided workers value contributions, but employer contributions are less salient for them, the negative effect of taxes on employment is stronger for employer contributions than for employee contributions. Moreover, if contributions paid by the employer are reduced and, at the same time, contributions paid by the employee raised so that the level of total contribution remains unchanged, the equilibrium level of employment will unambiguously rise. Not only this, this policy change also increases tax revenue. In Section 3, I see that making employer contributions more visible

⁶See also Mulligan and Sala-i-Martin (1999).

⁷See also Chetty (2009), Finkelstein (2009), Goldin and Homonoff (2010), and Cabral and Hoxby (2011).

is always beneficial for employment. In Section 4 I present some empirical evidence for the OECD countries. Section 5 concludes. Finally, in the Appendix, I consider a right-to-manage model in which a trade union and a firm bargain over wages while the firm chooses the level of employment and I prove that the main result can be extended to this alternative set-up.

2 Partial equilibrium: the competitive case

To illustrate my argument I will use the simplest possible model of a competitive labor market. Labor demand is $D(w_F)$, where $w_F = w(1 + \tau_F)$ and $D'(\cdot) \leq 0$. Here w_F is total labor cost for the firm, w is the wage that the firm pays to workers, and τ_F is the payroll tax rate paid by the firm. Then, $\tau_F w$ is the value of social security contributions paid by the firm. I want to stress that what matters for firms is w_F , not w .

Workers receive a net wage $w_N = (1 - \tau_W)w$, where τ_W is the payroll tax rate paid by workers. The value of social security contributions paid by the worker is $\tau_W w$, and $\tau w = (\tau_F + \tau_W)w$ is total revenue of the social security administration. In a standard labor market model, labor supply would be $S(w_N)$, with $S'(\cdot) \geq 0$. As I said in the Introduction, I depart from this standard formulation in two directions. First, workers may perceive contributions as deferred payments, since those contributions are buying them some future benefits. These can be in the form of insurance (unemployment or health insurance) or of future benefits (pensions). Since these benefits will be collected in the future, workers discount them by a factor δ . This parameter δ captures the strength of the perceived linkage between contributions and benefits. It reflects not only pure discounting, but also institutional features of social security. For instance, how close to an actuarially fair scheme is the social security system. If benefits are strictly proportional to contributions, all workers will have similar values of δ . If social security is progressive, low-skilled workers may have a higher value of δ than high-skilled workers. The

case $\delta = 0$ corresponds to a situation in which social security contributions are perceived as pure taxes. In many countries this can be the case for young workers since their current earnings will not enter the formula used to calculate their future retirement benefits. This could likewise be the case of low-skilled workers who will qualify for a minimum pension.

Second, contributions paid by the worker and contributions paid by the firm may not be equally visible (“salient”, following the terminology in Chetty et al (2009)). Workers know better their own contributions, because they see every month the particular amounts paid in the income statement (pay slip) they receive. In some countries, on the contrary, they do not observe the amounts paid on their behalf by firms as social security contributions, or they do not observe it as easily as their own contributions. This happens, for instance, in Spain.⁸ It is not surprising, therefore, to find that when individuals are asked to report the total value of social security contributions they fail to give a correct answer. Boeri et al. (2001) found that workers tend to underestimate the total value of social security contributions. They surveyed 5,500 Europeans on the welfare state. The survey was conducted in 4 countries: France, Germany, Italy, and Spain. One question asked for an estimate of the combined employer and employee contribution. The question was: “*As you know, both employers and employees pay pension contributions. Which fraction of your gross monthly wage goes to public pensions? (Please take into account also your employer contributions).*” Several brackets were suggested. In Spain, the brackets were 0-21, 21-35, 35+. The correct answer is 21-35. Half of individuals did not answer the question. Among those who answered (49.2%), only 28% answered correctly while 68% chose the first bracket (0-21).

Recently, Fundación Edad y Vida questioned a sample of 1,200 individ-

⁸There are countries in which workers also receive information on contributions paid by their employers. In the USA workers get this information in their Social Security Statements. Unfortunately, the Social Security Administration has recently decided to stop mailing the statements due to budgetary restrictions.

uals about their knowledge of the welfare state in Spain and about different reform proposals. According to the answers, individuals seem to over-value worker contributions and under-value employer contributions. In particular, one question asks for an estimate of the contributions paid by the worker. Only 26% of respondents answer correctly. Interestingly, 30% choose a value above the correct one, while only 2.5% choose a value below the correct one. The remaining 41% do not answer the question. Another question asks for the combined employer and employee contribution. Most individuals do not answer (65%). Of those who answer (35%), only 44% choose the right answer, 34% choose a value below the correct one and 22% choose a value above the correct one.⁹

My reading of these surveys is that individuals seem to give more weight to worker contributions than to employer contributions. To model this asymmetry, I introduce a parameter θ that takes values between 0 and 1 and that multiplies contributions paid by the firm. This parameter captures how visible (“salient”) are employer contributions. The higher is θ , the more “visible” they are. When $\theta = 1$, they are equally visible for the worker as are worker’s contributions. When $\theta = 0$ they are not visible at all.

Summing up, I assume that labor supply is $S(w_W)$, where $w_W = (1 - \tau_W)w + \delta(\tau_W + \theta\tau_F)w$ and $S'(\cdot) \geq 0$. This formulation can be seen as a re-parametrization of Gruber (1997).¹⁰ Employee contributions are discounted by a factor δ , while employer contributions are discounted by $\theta\delta$. To save notation, I define $\alpha = (1 - \tau_W) + \delta(\tau_W + \theta\tau_F)$. Then, $w_W = \alpha w$. If $\delta = 0$, we are back to the standard model of labor supply.

⁹See Domínguez et al. (2010).

¹⁰Using my notation, Gruber (1997) defines labor supply as:

$$S = S((1 - a\tau_W)w + q\tau_F w),$$

where a and q reflect how workers discount their contributions relative to cash income and how they value employer contributions relative to cash income, respectively. I get my formulation by setting $a = 1 - \delta$, and $q = \delta\theta$.

At the market equilibrium $D(w(1 + \tau_F)) \equiv S(\alpha w)$. I consider changes in τ_F and τ_W and compare how they affect the equilibrium level of employment. I begin by studying the effect of a change in τ_F . I differentiate completely the equilibrium condition to get:

$$D'(dw(1 + \tau_F) + wd\tau_F) \equiv S'(dw\alpha + wd\alpha). \quad (1)$$

Since $d\alpha = \delta\theta d\tau_F$, I can write the above expression as:

$$D'\left(\frac{dw}{wd\tau_F}(1 + \tau_F) + 1\right) \equiv S'\left(\frac{dw}{wd\tau_F}\alpha + \delta\theta\right). \quad (2)$$

Given that $\frac{dw}{wd\tau_F} = \frac{d\ln w}{d\tau_F}$, I have:

$$\frac{d\ln w}{d\tau_F}(\alpha S' - (1 + \tau_F)D') \equiv D' - \delta\theta S'. \quad (3)$$

The wage elasticities of labor demand and supply (in absolute value) are $\varepsilon_D = -D'\frac{w}{D}$ and $\varepsilon_S = S'\frac{w}{S}$, respectively. Then:

$$\frac{d\ln w}{d\tau_F} = -\frac{\varepsilon_D + \delta\theta\varepsilon_S}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}. \quad (4)$$

Since $\frac{d\ln w_F}{d\tau_F} = \frac{d\ln w}{d\tau_F} + \frac{1}{1 + \tau_F}$, the effect on total labor costs is:

$$\frac{d\ln w_F}{d\tau_F} = \frac{(1 - \tau_W(1 - \delta) - \delta\theta)\varepsilon_S}{(1 + \tau_F)(\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D)}. \quad (5)$$

The effect of a change in τ_F on the equilibrium level of employment is:

$$\frac{d\ln L}{d\tau_F} = -\frac{\varepsilon_D\varepsilon_S}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}(1 - \tau_W(1 - \delta) - \delta\theta). \quad (6)$$

This derivative of (5) is positive and the derivative of (6) is negative.¹¹ This is not surprising, a rise in τ_F increases total labor costs and reduces employment.

¹¹To check this, note that we need $1 \geq \tau_W(1 - \delta) + \delta\theta$. The term on the right reaches a global maximum when $\delta = \theta = 1$, in which case its value is 1. In all other cases, its value is below 1.

I then study the effect of a change in employee contributions τ_W . In a similar way to the above, I obtain:

$$\frac{d \ln w_F}{d \tau_W} = \frac{d \ln w}{d \tau_W} = \frac{(1 - \delta)\varepsilon_S}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}, \quad (7)$$

which is positive. Finally, the effect on the level of employment is:

$$\frac{d \ln L}{d \tau_W} = -\frac{\varepsilon_D \varepsilon_S}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}(1 - \delta)(1 + \tau_F), \quad (8)$$

which has a negative sign, as $\frac{d \ln L}{d \tau_F}$. Again, a rise in τ_W increases labor costs and reduces employment.

I now move on to compare the effect of a change in τ_F on employment with a change of the same size in τ_W . That is, we compare $\frac{d \ln L}{d \tau_F}$ with $\frac{d \ln L}{d \tau_W}$. If all social security contributions are perceived as pure taxes, i.e. $\delta = 0$, these two effects are approximately the same, as long as both τ_F and τ_W are small.¹² This is the standard result saying that the effect of an increase in τ_F is equal to the effect of an increase in τ_W , since economic incidence is determined only by the elasticities of supply and demand.

The interesting case is when $\delta > 0$ and $\theta < 1$. Comparing $\frac{d \ln L}{d \tau_F}$ and $\frac{d \ln L}{d \tau_W}$, we find that the first one is always higher in absolute terms, as long as the parameter θ is below a certain threshold $\hat{\theta}$. In particular, the condition is:

$$\theta < \hat{\theta} = \frac{1 - (1 - \delta)(1 + \tau)}{\delta}. \quad (9)$$

Note that $\left| \frac{d \ln L}{d \tau_F} \right| > \left| \frac{d \ln L}{d \tau_W} \right|$ means that a 1% increase in τ_F is more detrimental to the level of employment than a 1% increase in τ_W . This same condition

¹²In particular, when $\delta = 0$, Expressions (6) and (8) become, respectively:

$$\frac{d \ln L}{d \tau_F} = -\frac{\varepsilon_D \varepsilon_S}{(1 - \tau_W)\varepsilon_S + (1 + \tau_F)\varepsilon_D}(1 - \tau_W),$$

and:

$$\frac{d \ln L}{d \tau_W} = -\frac{\varepsilon_D \varepsilon_S}{(1 - \tau_W)\varepsilon_S + (1 + \tau_F)\varepsilon_D}(1 + \tau_F).$$

guarantees that $\frac{d \ln w_F}{d \tau_F} > \frac{d \ln w_F}{d \tau_W}$: a 1% increase in τ_F raises more total labor costs w_F than a 1% increase in τ_W .

If $\theta = 1$ or $\delta < \frac{\tau}{1+\tau}$, Condition (9) cannot be satisfied.¹³ That is, two *necessary* conditions for the result are $\theta < 1$, employer contributions are less visible than employee contributions, and $\delta \geq \frac{\tau}{1+\tau}$, workers give some value to contributions paid by themselves. In Table 1 below I show the value of $\hat{\theta}$ for several combinations of τ and δ .

	$\delta = 0.25$	$\delta = 0.5$	$\delta = 0.75$
$\tau = 0.1$	0.7	0.9	0.97
$\tau = 0.2$	0.4	0.8	0.93
$\tau = 0.3$	0.1	0.7	0.9

Table 1: The threshold $\hat{\theta}$

Condition (9) is weaker the lower τ is and the higher δ is. Figure 1 represents combinations of parameters θ and δ that satisfy the condition. The two lines in the figure correspond to two different values τ and τ' , where $\tau' > \tau$. Once a value of τ is fixed, the region where the condition holds is the one to the left of the corresponding line. That is, for a fixed value of δ , the parameter θ cannot be too large. Note also that the standard case in which $\delta = 0$, corresponds to the segment in the horizontal axis, where the condition never holds. The case in which workers find equally visible employer and employee contributions corresponds to the vertical segment where $\theta = 1$. The condition does not hold yet again here.

To sum up, provided that Condition (9) holds, a reduction of τ_F has a more positive effect on employment than a comparable reduction of τ_W .

¹³If $\delta < \frac{\tau}{1+\tau}$, then $\hat{\theta} < 0$.

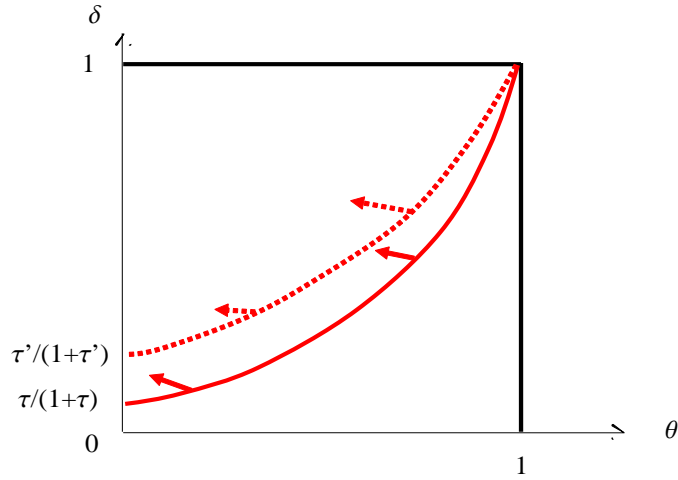


Figure 1: **Region where Condition (9) holds**

Interestingly, if social security is progressive, Condition (9) is more likely to hold for low-skilled workers than for high-skilled workers. The reason is that the former may have a higher value of δ , since the system is progressive, and a lower value of θ , as they may be more myopic than high-skilled workers.

An additional and very important implication of the analysis above is the following. Suppose we change the way in which contributions are split between the worker and the firm. In particular, consider that employer contributions are reduced and employee contributions are increased, with total contributions being kept constant. That is, I consider a policy change in which $d\tau_F = -d\tau_W < 0$, so that the total tax τ remains unchanged. I find that, if Condition (9) holds, this policy change reduces total labor costs for firms and has, therefore, a positive effect on employment.

Given that $\alpha = (1 - \tau_W) + \delta(\tau_W + \theta\tau_F)$, if $d\tau_F = -d\tau_W$ then $d\alpha = (1 - \delta + \delta\theta)d\tau_F$. Then:

$$\left. \frac{d \ln w}{d\tau_F} \right|_{d\tau_F = -d\tau_W} = -\frac{\varepsilon_D + \varepsilon_S(1 - \delta + \delta\theta)}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}. \quad (10)$$

The effect on total labor cost $w_F = w(1 + \tau_F)$ is:

$$\left. \frac{d \ln w_F}{d \tau_F} \right|_{d \tau_F = -d \tau_W} = \frac{\varepsilon_S}{\alpha \varepsilon_S + (1 + \tau_F) \varepsilon_D} \frac{(\delta(1 - \theta) - (1 - \delta) \tau)}{1 + \tau_F}. \quad (11)$$

Finally, the effect on employment is:

$$\left. \frac{d \ln L}{d \tau_F} \right|_{d \tau_F = -d \tau_W} = -\frac{\varepsilon_D \varepsilon_S}{\alpha \varepsilon_S + (1 + \tau_F) \varepsilon_D} \frac{(\delta(1 - \theta) - (1 - \delta) \tau)}{1 + \tau_F}. \quad (12)$$

In a standard model, all social security contributions are perceived as pure taxes, i.e. $\delta = 0$. Then:

$$\left. \frac{d \ln w}{d \tau_F} \right|_{d \tau_F = -d \tau_W} = -\frac{\varepsilon_D + \varepsilon_S}{(1 - \tau_W) \varepsilon_S + (1 + \tau_F) \varepsilon_D}. \quad (13)$$

This term is approximately -1, as long as τ_W and τ_F are not very large. This is the classical result of full shifting where the equilibrium wage depends only on the value of τ , and not on how this tax is split between employers and employees. Additionally, when $\delta = 0$ the remaining expressions above become, respectively:

$$\left. \frac{d \ln w_F}{d \tau_F} \right|_{d \tau_F = -d \tau_W} = -\frac{\tau}{1 + \tau_F} \frac{\varepsilon_S}{(1 - \tau_W) \varepsilon_S + (1 + \tau_F) \varepsilon_D},$$

and:

$$\left. \frac{d \ln L}{d \tau_F} \right|_{d \tau_F = -d \tau_W} = \frac{\tau}{1 + \tau_F} \frac{\varepsilon_D \varepsilon_S}{(1 - \tau_W) \varepsilon_S + (1 + \tau_F) \varepsilon_D}. \quad (14)$$

When τ is small, both terms are approximately zero. As long as total tax τ does not change, labor costs w_F and employment L are not affected by how contributions are split between worker and firm. It does not matter who bears the statutory burden of the tax.

If, however, the parameter δ is strictly positive, the signs of the derivatives in Equations (11) and (12) are determined by the sign of the term $\delta(1 - \theta) - (1 - \delta)\tau$. In particular, if this term is positive, the expression in Equation (11) is positive and the expression in Equation (12) is negative. That is, shifting some part of the contributions from employers to employees, while holding

fixed the total contribution rate, reduces total labor costs for the firm and, thus, has a positive effect on employment. Not surprisingly, Condition (9) is precisely the same as $\delta(1 - \theta) - (1 - \delta)\tau > 0$. Finally, when $\delta > 0$ I also find that the effect on w does not entail full shifting. In fact, the lower is θ , the smaller the term $\frac{d \ln w}{d \tau_F}$ will be (in absolute value).

Figure 2 illustrates the effect of shifting part of employer contributions to employees and can be used to see the intuition behind the result. Dotted lines $D(w)$ and $S(w)$ represent labor demand and supply in the absence of taxes. Bold lines $D(w(1 + \tau_F))$ and $S(\alpha w)$ represent the initial situation. I then reduce τ_F and raise τ_W , holding constant the sum $\tau = \tau_F + \tau_W$. Since contributions are perceived as pure taxes by firms, the reduction of τ_F to τ'_F has a positive effect on employment represented by the shift to the right of labor demand. The rise in worker contributions, from τ_W to τ'_W , is negative for employment and I represent this with the shift to the left of labor supply. In standard models these two effects cancel each other, and total employment remains unchanged. In my model, if Condition (9) holds, this change in the split raises the “visible” part of contributions, implying that the (negative) effect on supply is always smaller in size than the (positive) effect on demand. The overall effect on employment is positive. In the figure it goes from L to L' . We also observe the reduction in w_F and the rise in w_W .

The rise in w_W may seem counterintuitive. However, recall that w_W does not only represent the net wage that workers get, but also the value that workers give to their future benefits. In fact, the net wage w_N becomes lower with the above change in the split, .

Finally, a brief comment on the effect on tax revenue. Since tax collection is simply $(\tau_W + \tau_F)wL$, it is easy to see that the above change in the split has also a positive effect on tax collection. By definition, the sum $\tau_W + \tau_F$ remains constant, while w and L increase.

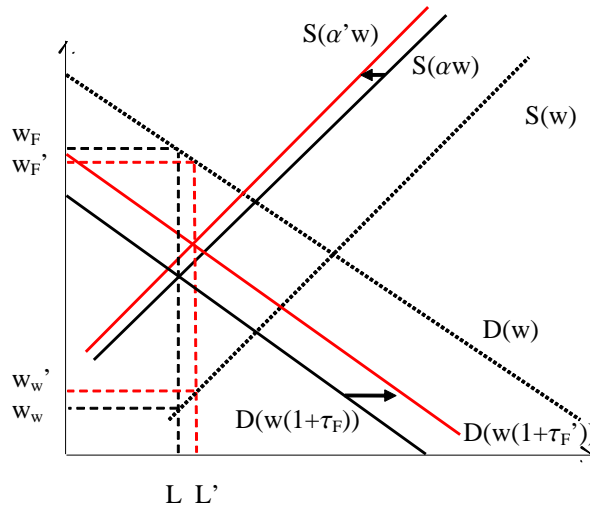


Figure 2: **A reduction on employer's contributions**

3 Making employer contributions more visible

I here explore the effect of a simple policy that consists in making employer contributions more visible to workers. One example in this line was the decision of the Social Security Administration in the USA to send the so-called Social Security Statement to all workers paying payroll taxes.¹⁴ The Social Security Statement of a fictional worker, called “Wanda Worker,” can be downloaded from the US Social Security website. It contains a detailed account of taxes paid both by the worker and by her employers throughout her full working career to present.

A similar idea could be easily implemented in other countries, such as Spain, at a low cost. Another possibility could be to include information about employer contributions in the monthly statements that workers receive. In terms of my simple model, this would amount to raise the value of θ . With

¹⁴See Mastrobuoni (2011).

a similar procedure to the one I have used above, I get:

$$\frac{d \ln w_F}{d\theta} = \frac{-\delta\tau_F(1 + \tau_F)\varepsilon_S}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}. \quad (15)$$

Using the fact that $\frac{d \ln L}{d\theta} = -\varepsilon_D \frac{d \ln w_F}{d\theta}$, I get:

$$\frac{d \ln L}{d\theta} = \frac{\delta\tau_F(1 + \tau_F)\varepsilon_S\varepsilon_D}{\alpha\varepsilon_S + (1 + \tau_F)\varepsilon_D}. \quad (16)$$

As long as the term $\delta\tau_F$ is positive, the expression in (15) is negative and the expression in (16) is positive. The intuition is straightforward. Making employer contributions more visible to workers has no effect on labor demand, but it has a positive effect on supply, as long as firms pay contributions ($\tau_F > 0$) and workers give them some value ($\delta > 0$). This will have a positive effect on employment, while at the same time reducing labor costs for firms. This effect is illustrated in Figure 3 below, where the effect of this measure is to move labor supply to the right. This is a policy measure that entails few costs and that can prove useful for increasing employment. In fact, this was one of the proposals in the report that the Swedish government commissioned to analyze the country's economic crisis in the Nineties. Quoting the report:

“42. Taxes should be made as visible as possible; they should also be called taxes and not fees; the gross wage, including payroll taxes, should be reported along with the wage payment.” (Lindbeck et al. (1994, p. 103))

4 Empirical evidence

In this section, I collect some cross country data to illustrate the results on previous sections using information of the OECD countries. Unfortunately, there is no available cross country information on the visibility of social security contributions. The survey made by Boeri, Börsch-Supan, and Tabellini (2001) has information only for four European countries. My results below, therefore, can be seen as an illustration corresponding to the case in which all countries share the same value of θ .

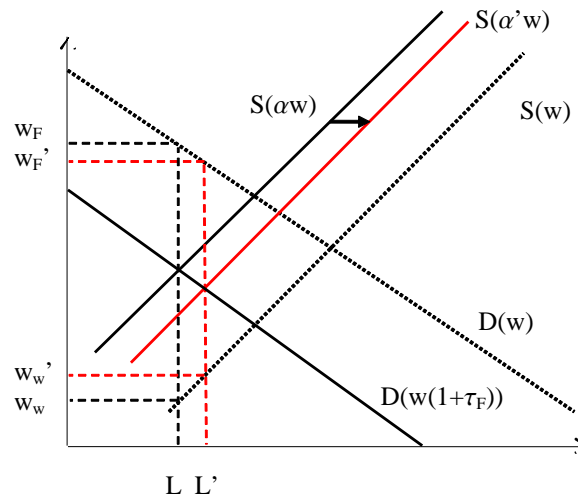


Figure 3: **Making employer contributions more visible**

Table 2 contains data on employer and employee contributions for 30 OECD countries, together with data on Employment Protection Legislation (EPL), net replacement rates, average income taxes and employment levels. The values for EPL are built by the OECD combining several sources. It takes values from 0 to 4. The higher the value, the more stringent employment protection is. The country with the highest value of EPL is Turkey (3.46) and the one with the lowest value is the US (0.85). The net replacement rate gives the individual pension entitlement divided by net pre-retirement earnings, taking into account the payment of income taxes and social security contributions by workers and pensioners. Employment rates are calculated as the ratio between the number of workers and the total number of individuals in working age. I disaggregate employment rates by gender.

Table 2: Summary Statistics, 30 OECD countries 2008

Variable	Min	Max	Mean	StDv
Employee contribution	0	18.13	8.65	4.85
Employer contribution	0	29.73	15.18	7.92
Income tax	3.31	30.14	13.57	6.27
EPL	0.85	3.46	2.23	0.71
Net replacement rate	0.29	1.14	0.72	0.26
Employment rate (male) ⁺	61.67	88.68	75.57	6.67
Employment rate (female) ⁺	24.93	79.90	61.48	11.56
Employment rate (total) ⁺	45.49	82.16	68.49	8.33

Source: OECD (+: Year 2009)

I run three simple regressions using the logarithms of employment rates as endogenous variables. Employer contributions, employee contributions, income taxes, net replacement rates and EPL are used as controls. Results are shown in Table 3. The corresponding standard deviations are shown in brackets.

Table 3: Endogenous variable is log of employment rate

	Male	Female	All
Employer cont.	−.0065*** (.0023)	.0011 (.0060)	−.0035 (.0034)
Employee cont.	.0001 (.0032)	.0011 (.0082)	.0006 (.0047)
Income tax	−.0011 (.0024)	.0118* (.0062)	.0046 (.0035)
EPL	.0129 (.0261)	−.1246* (.0675)	−.0418 (.0384)
Net repl. rate	−.0767 (.0735)	−.1180 (.1901)	−.0875 (.1081)
Constant	4.4602*** (.0677)	4.2735*** (.1750)	4.3611*** (.0995)
R^2	.418	.3941	.3942

Standard errors in brackets. *** and * denote significance at 1% and 10%.

We see that the coefficient of employer contributions is negative and highly significant in the first regression, where the endogenous variable is

male employment. With female employment, only income tax and EPL are significant at a 10% level. The first is positive, while the second is negative. Regarding the negative effect of employer contributions on male employment, this result holds even when I control for other factors that may affect employment, such as replacement rates and EPL. Regarding employee contributions, I do not find any significant effect on employment.

Clearly, this is a very rough approach, since we do not have information on visibility in different countries. However, I can use the results of the first regression to illustrate slightly further the effect found of employer contributions on male employment. The interpretation of the estimated value means that a reduction of one point in employer contributions, for example from $\tau_F = 15.18$ to $\tau'_F = 14.18$ raises male employment by approximately 0.65 points. This seems to be a sizable increase.

5 Conclusions

In this paper I find that, contrary to the prediction of standard economic theory, the way in which social security contributions are split between employers and employees affects the level of employment. In particular, I find that contributions paid by firms are more harmful for employment than contributions paid by workers. To obtain this result I need two conditions. First, workers must attach some value to social security contributions. Second, workers must value their own contributions more than those paid by employers. Additionally, under these conditions, a reduction of employer contributions that goes together with a corresponding increase of employee contributions, leaving unchanged total contributions, is always positive for employment. Finally, I also find that making the contributions paid by employers more visible is always beneficial for employment.

There are several potential drawbacks to my approach. One is that I am considering just one representative individual. In a model with hetero-

geneous individuals, the results could be potentially different, since different individuals may suffer from different degrees of myopia.

Another criticism is that I am assuming a competitive labor market and this does not seem very realistic for many countries, in particular for most European countries. However, in the Appendix of the paper I present a standard right-to-manage model in which a representative firm and a representative union bargain over wages, while the level of employment is fixed by the firm. I find that the results of Section 2 extend easily to this setup.

Appendix: A Right-to-manage model

Here I build a very simple right-to-manage model. This model was originally developed by Nickell and Andrews (1983).¹⁵ The main idea is that unions have market power and they bargain over wages with firms. Taking wages as given, firms choose optimally the amount of labor. Since wages are higher than in a competitive market, the employment level is lower and unemployment arises.

As is standard in the literature, I assume that the outcome of the model is the solution of a maximization problem corresponding to an asymmetric Nash bargaining problem as follows:

$$\max_w [u - \bar{u}]^\beta [\pi - \bar{\pi}]^{1-\beta}, \quad (17)$$

where u is the utility function that maximizes the union, π is the profit of the firm, β represents the relative bargaining power of the union, and $(\bar{u}, \bar{\pi})$ is the disagreement point. This point corresponds to the situation when the union and the firm do not reach an agreement. I then define the profit of the firm and the utility of the union.

There is one firm that uses labor as the unique input to produce. The output market is perfectly competitive and I normalize output price to 1.¹⁶ In particular, the production function is:

$$q(L) = \frac{\delta L^{1-\sigma}}{1-\sigma}, \quad (18)$$

where $\delta > 0$ and $0 < \sigma < 1$. The firm gets profits:

$$\pi(L) = \frac{\delta L^{1-\sigma}}{1-\sigma} - w(1 + \tau_F)L. \quad (19)$$

Since the firm chooses L , the demand of labor will be:

$$D(w) = \left[\frac{\delta}{w(1 + \tau_F)} \right]^{\frac{1}{\sigma}}. \quad (20)$$

¹⁵See also Layard, Nickell and Jackman (1991) and Boeri and Van Ours (2008).

¹⁶This can be easily generalized by introducing another parameter that captures output elasticity. Here I am implicitly assuming that this elasticity is $-\infty$.

Note that the elasticity of labor demand (in absolute value) is $\varepsilon_D = \frac{1}{\sigma}$. Normalizing total labor force to 1, the rate of unemployment is $U = 1 - L$. In case of disagreement I assume that the firm has no profit, then $\bar{\pi} = 0$.

Regarding the union, I assume that union members are risk neutral and their objective is to maximize the expected revenue of workers. In case of disagreement, they get b that can be seen as the wage workers earn in another sector or as the unemployment benefit. Utility is:

$$u(w, L) = \alpha w L + b U. \quad (21)$$

Here αw is as defined in Section 2. Since in case of disagreement workers get b , net utility for the union is:

$$u - \bar{u} = (\alpha w - b)L. \quad (22)$$

Collecting all terms, the solution to the model will be the solution of:

$$\max_w [(\alpha w - b)L]^\beta \left[\frac{\delta L^{1-\sigma}}{1-\sigma} - w(1 + \tau_F)L \right]^{1-\beta}, \quad (23)$$

under the restriction that $L = D(w)$. Solving this problem we obtain that the equilibrium wage is:

$$w^* = \frac{1 - \sigma + \beta\sigma}{(1 - \sigma)\alpha} b. \quad (24)$$

The equilibrium wage increases with β, σ , and b and falls with α . I get the level of employment by substituting w^* into the labor demand function:

$$L^* = \left(\frac{\alpha\delta(1 - \sigma)}{(1 + \tau_F)(1 - \sigma(1 - \beta))b} \right)^{1/\sigma}. \quad (25)$$

When β is 1, the union has all the bargaining power. The wage and the level of employment correspond to the monopoly union model. In particular, when $\beta = 1$ I get:

$$w^* = \frac{b}{(1 - \sigma)\alpha} \quad \text{and} \quad L^* = \left(\frac{\alpha\delta(1 - \sigma)}{(1 + \tau_F)b} \right)^{1/\sigma}. \quad (26)$$

In the other extreme case in which $\beta = 0$, I get:

$$w^* = \frac{b}{\alpha} \quad \text{and} \quad L^* = \left(\frac{\alpha\delta}{(1 + \tau_F)b} \right)^{1/\sigma}.$$

I am interested on the effect of the split of social security contributions between the firm and the worker. Using Equation (25) above and noting that $\tau_W = \tau - \tau_F$, I can write the equilibrium employment level as a function of τ_F only. Computing the derivative of L^* with respect to τ_F I get that this derivative is negative as long as the term $\delta(-1 + \theta - \tau) + \tau$ is negative. It can be immediately seen that this is exactly Condition (9) from Section 2.

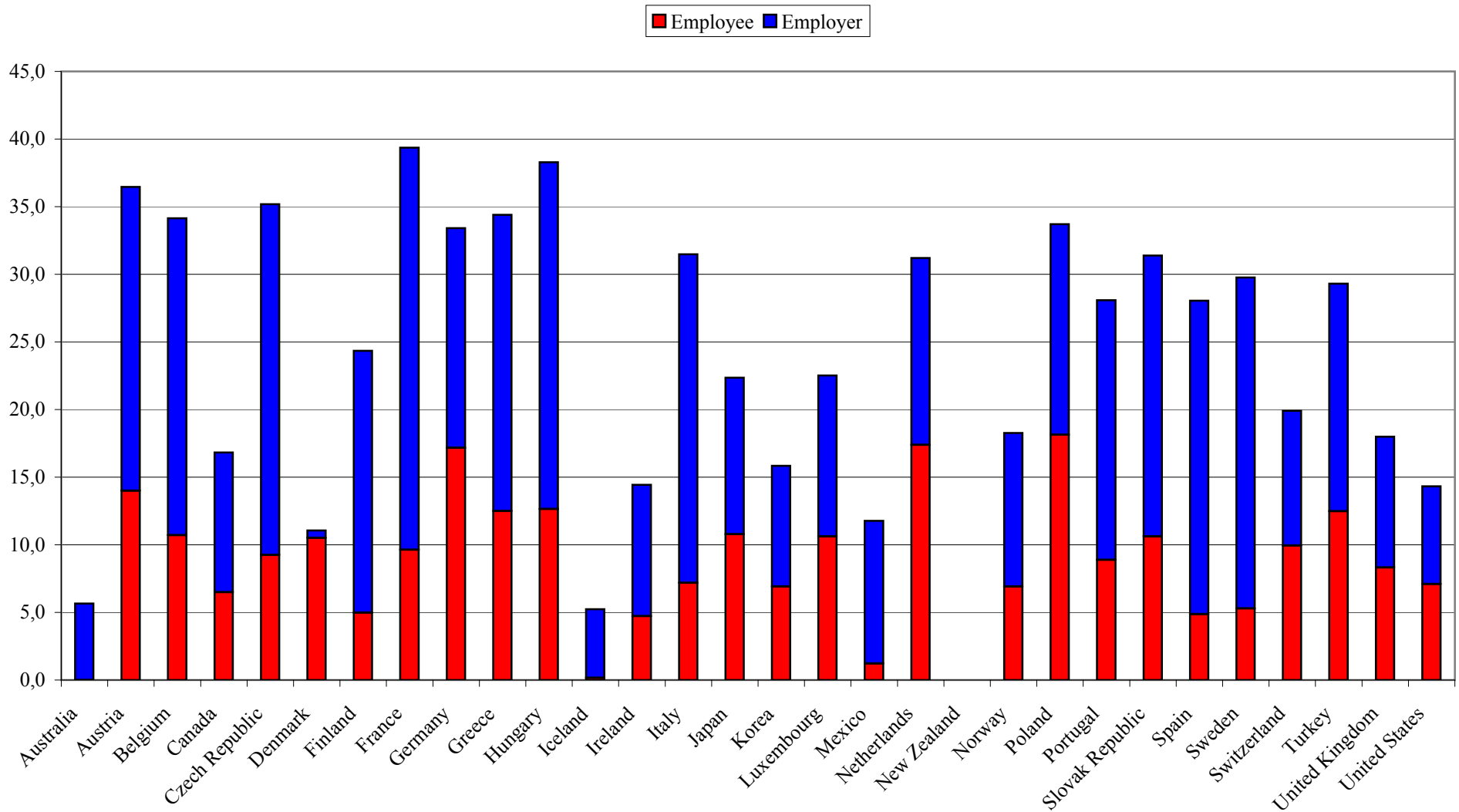
References

- [1] Boeri, T. and Van Ours, J. (2008): *The Economics of Imperfect Labor Markets*, Princeton University Press.
- [2] Boeri, T., A. Börsch-Supan and G. Tabellini (2001): “Would you like to shrink the welfare state? A survey of European citizens,” *Economic Policy* 16 (32), 7-50.
- [3] Buchanan, J., and R. Wagner (1977): *Democracy in Deficit*, Academic Press.
- [4] Cabral, M. and C. Hoxby (2011): “The Hated Property Tax: Salience, Tax Rates, and Tax Revolts,” Stanford University.
- [5] Chetty, R. (2009): “The simple economics of salience and taxation,” *NBER Working Papers* No. 15246.
- [6] Chetty, R., A. Looney and K. Kroft (2009): “Salience and Taxation: Theory and Evidence,” *American Economic Review* 99(4): 1145-1177.
- [7] Disney, R. (2004): “Pensions and employment,” *Economic Policy* 19 (39), 267-311.
- [8] Domínguez I., E. Devesa, M. Devesa, B. Encinas, R. Meneu, and A. Nagore (2010): “Encuesta para determinar el impacto de las reformas necesarias del sistema de pensiones español,” Fundación Edad y Vida (<http://www.edad-vida.org/fitxers/news/119Premio%20edad-y-vida2009.pdf>)
- [9] Dušek, L. (2002): “Visibility of Taxes and the Size of Government,” Working Paper.
- [10] Feldstein, M. and A. Samwick (1992): “Social Security Rules and Marginal Tax Rates,” *National Tax Journal* 45, 1-22.

- [11] Feldstein, M. and J.B. Liebman (2002): “Social Security,” Chapter 32 in *Handbook of Public Economics* (A. J. Auerbach and M. Feldstein, editors), Volume IV, 2245-2324, Elsevier.
- [12] Finkelstein, A. (2009): “E-Z Tax: Tax Saliency and Tax Rates,” *Quarterly Journal of Economics* 124 (3), 969–1010.
- [13] Fullerton, D. and G. Metcalf (2002): “Tax incidence,” Chapter 26 in *Handbook of Public Economics* (A. J. Auerbach and M. Feldstein, editors), Volume IV, 1787-1872, Elsevier.
- [14] Goldin, J. and T. Homonoff (2010): “Smoke Gets in Your Eyes: Cigarette Tax Saliency and Regressivity.” Working Paper #561 Princeton University, Industrial Relations Section.
- [15] Gruber, J. (1997): “The incidence of payroll taxation: evidence from Chile,” *Journal of Labor Economics* 15 (3, pt.2), s72-s101.
- [16] Koskela, E. and R. Schöb (1999): “Does the Composition of Wage and Payroll Taxes matter under Nash Bargaining?,” *Economics Letters* 64, 343-349.
- [17] Layard, R., S. Nickell, and R. Jackman (1991): *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford University Press.
- [18] Lindbeck, A., P. Molander, T. Persson, O. Petersson, A. Sandmo, B. Swedenborg, and N. Thygesen (1994): *Turning Sweden Around*, The MIT Press.
- [19] Mastrobuoni, G. (2011): “The Role of Information for Retirement Behavior: Evidence based on the Stepwise Introduction of the Social Security Statement,” *Journal of Public Economics* 95, 913-925.
- [20] Mulligan, C. and X. Sala-i-Martin (1999): “Gerontocracy, Retirement, and Social Security,” *NBER Working Papers* No. 7117.

- [21] Mulligan, C., R. Gil and X. Sala-i-Martin (2010): “Social Security and Democracy,” *The B.E. Journal of Economic Analysis and Policy* 10, 1, 1-44.
- [22] Nickell, S. and M. Andrews (1983): “Unions, Real Wage and Employment in Britain 1951-1979,” *Oxford Economic Papers* 35, 183-206.
- [23] Pissarides, C. (1998): “The Impact of Employment Tax Cuts on Unemployment and Wages: The Role of Unemployment Benefits and Tax Structure,” *European Economic Review* 42, 155-183.
- [24] Salanié, B. (2003): *The Economics of Taxation*, The MIT Press.
- [25] Summers, L. (1989): “Some simple economics of mandated benefits,” *American Economic Review* 79 (2), 177-183.
- [26] Tabellini, G., T. Boeri and A. Börsch-Supan (2002): “Pension reforms and the opinions of European citizens,” *American Economic Review* 92 (2), 396-401.

Figure A.1: Social security contributions, OECD countries 2008





Ivie

Guardia Civil, 22 - Esc. 2, 1º
46020 Valencia - Spain
Phone: +34 963 190 050
Fax: +34 963 190 055

**Department of Economics
University of Alicante**

Campus San Vicente del Raspeig
03071 Alicante - Spain
Phone: +34 965 903 563
Fax: +34 965 903 898

**Website: www.ivie.es
E-mail: publicaciones@ivie.es**