

Visibility of social security contributions and employment

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Abstract

In most countries employers and employees share the burden of social security contributions. According to standard incidence analysis, social security contributions affect negatively employment, but it is irrelevant how they are divided between employers and employees. Here I consider the possibility that: (i) workers perceive a linkage between current contributions and future benefits and, (ii) they discount more heavily employers contributions, because they are less “visible.” Under these assumptions, I find that employers contributions have a stronger (negative) effect on employment than employees 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 has also a positive effect on employment.

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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 some or even all of the tax to consumers through higher prices or to workers through lower wages. Economists distinguish between *statutory incidence*, who is legally responsible for the tax, and *economic incidence*, the change in the distribution of welfare induced by the tax. In general they differ because 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 care mainly for 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, and 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 divided between employers and employees that keeps fixed the total level of contribution, has no effect either on the level of employment or on the total cost of labor.³

However, the revenue that government collects from payroll taxes is gen-

¹Fullerton and Metcalf (2002).

²Statutory incidence matters for real incidence when there is a (binding) minimum wage. See Salanié (2003).

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

erally used to finance public programs, such as pensions or health care that benefit workers. Employees may perceive these taxes paid as equivalent to deferred payments and, therefore, not as pure taxes. In other words, workers may perceive a linkage between taxes paid today and future benefits.⁴ Taken to the extreme, if workers perceive future benefits as actuarial, payroll taxes may have few 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.

An additional complication arises because in most countries employers and employees share the statutory burden of 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. I also construct the ratio of the employer contribution to the sum of the employer and the employee contribution. This ratio goes 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, because 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 the payroll taxes paid, but it may happen that they value differently taxes paid by the employer than taxes paid by themselves. One reason for this is that they may not be fully

⁴See, for example, Summers (1989) and Gruber (1997).

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) about their welfare states and also about 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 individuals are only fully aware of the contributions paid by themselves, but are not so sure about the size of contributions paid by employers. In Spain, for instance, contributions paid by employers do not even appear in the income statements 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 affect

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).

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

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 employers contributions are less salient for them, the negative effect of taxes on employment is stronger for employers contributions than for employee contributions. Moreover, if we reduce contributions paid by the employer and, at the same time, we rise contributions paid by the employee 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 more visible employers contributions 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

Consider the following description 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.

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

⁷See also Chetty (2009).

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 $S'(\cdot) \geq 0$. I depart from this standard formulation in two directions. First, social security contributions are used to finance different public programs. 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 pensions. In other words, workers perceive the existence of a link between social security contributions paid today and benefits they will receive in the future. That is, they do not necessarily consider contributions as pure taxes (see Summers (1989)). Since pensions will be received in the future, workers discount these benefits 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, whether the social security system is close to an actuarially fair scheme or not. 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 Spain, for instance, this would be the case for young workers since their current earnings will not enter the formula that is used to calculate their future retirement benefits. Also this could be the case of low-skilled workers who will qualify for the 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. 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 underestimate the total value of social security contributions.⁸ Moreover, in a recent survey made in Spain by Fundación Edad y Vida, individuals clearly over-value workers contributions and under-value employers contributions.⁹ My reading of these surveys is that individuals tend to give more weight to workers' contributions than to employers' 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's 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 is similar to that in Gruber (1997), the difference being the asymmetric treatment of employer and employee contributions. Workers discount them differently. Employee contributions are discounted by a factor δ , while employer contributions are discounted by $\theta\delta$. If $\theta = 1$, we are back in Gruber's approach. For simplicity,

⁸They survey 5500 Europeans about the welfare state. The survey was conducted in 4 countries: France, Germany, Italy, and Spain. One question asked for an estimate of the combined employers' and employees' 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. Of those who answered (49.2%), only 28% answered correctly while 68% chose the first bracket (0-21).

⁹This survey asks 1,200 individuals about their knowledge of the welfare state in Spain and about different reform proposals. The first question asks for an estimate of the contribution 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 rest, 41%, do not answer the question. Question number 2 asks for the combined employers' and employees' 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. See Domínguez et al. (2010).

I call $\alpha = (1 - \tau_W) + \delta(\tau_W + \theta\tau_F)$. Then, $w_W = \alpha w$. If $\delta = 0$, we are back to the standard model of labor supply.

At the market equilibrium $D(w(1 + \tau_F)) \equiv S(\alpha w)$. I consider changes in τ_F and τ_W and I 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 $\frac{d\ln w_F}{d\tau_F} = \frac{d\ln w}{d\tau_F} + \frac{1}{1 + \tau_F}$, we obtain the effect on total labor costs:

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

This derivative has a positive sign.¹⁰

Now I study the effect of a change in τ_F on the equilibrium level of employment:

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

¹⁰To check this, note that we need $1 \geq \tau_W(1 - \delta) + \delta\theta$. The term on the right reaches its maximum when $\delta = \theta = 1$, in which case its value is 1. In all other cases, its value is below 1.

This derivative has a negative sign. That is, not surprisingly, a rise in τ_F increases total labor costs and reduces the employment level.

Next I study the effect of a change in employee's contributions τ_W . Similarly to what I have done 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.

Now I turn to compare the effect on employment of a change in τ_F with a change of the same size in τ_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.¹¹ This is the standard result that says 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.

Next, I focus on the case in which workers perceive a linkage between contributions and benefits, i.e. $\delta > 0$, and I also assume that, for workers, employer's contributions are less visible than their own contributions, i.e. $\theta < 1$. If we compare the two expressions above, $\frac{d \ln L}{d \tau_F}$ and $\frac{d \ln L}{d \tau_W}$, we find that the negative effect on employment of an increase in τ_F is stronger than the effect of an increase of the same size in τ_W , as long as θ is below a certain

¹¹In 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:

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

threshold $\hat{\theta}$. In particular, the condition is:

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

This condition is *sufficient* for the result. That is, as long as $\theta < \hat{\theta}$, a 1% increase (respectively, reduction) in τ_F has a more negative (respectively, positive) effect on the level of employment than a 1% increase in τ_W . If $\theta = 1$ or $\delta < \frac{\tau}{1+\tau}$, Condition (9) cannot be satisfied.¹² That is, two *necessary* conditions are $\theta < 1$, employer's contributions are less visible than employee's 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 different 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 in Equation (9) is weaker the lower is τ and the higher is δ . I represent in Figure 1 the 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 I fix a value of τ , the region where the condition holds is 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 employers' and employees' contributions corresponds to the vertical segment where $\theta = 1$. Again, here the condition does not hold.

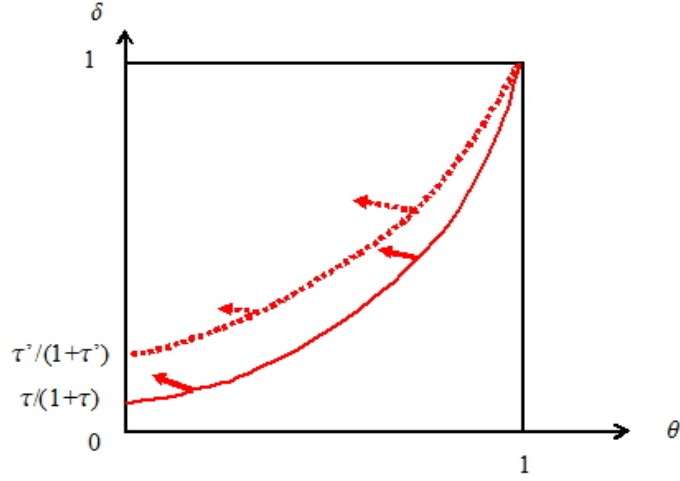


Figure 1: **Region where Condition (9) holds**

The conclusion is that, provided Condition (9) holds, a reduction of τ_F has a more positive effect on employment than a comparable reduction of τ_W . 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 , because 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 employers contributions are reduced and employees contributions are increased, keeping constant total contributions. That is, I am thinking of the case 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 change has a positive effect on employment and it also reduces labor costs for firms.

¹²If $\delta < \frac{\tau}{1+\tau}$, then $\hat{\theta} < 0$.

Given that $\alpha = (1 - \tau_W) + \delta(\tau_W + \theta\tau_F)$, 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 is split between employers and the 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, 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, I get $\frac{d \ln w_F}{d \tau_F} > 0$ and $\frac{d \ln L}{d \tau_F} < 0$. That is, shifting some part of the contributions from employers towards employees, while holding fixed the total contribution rate, reduces 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 will be (in absolute value) the term $\frac{d \ln w}{d \tau_F}$. Figure 2 illustrates the effect of shifting part of employers 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. Now we 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 workers 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 of smaller 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, it is immediate to see that with the above change in the split, the net wage w_N gets lower.

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 a positive effect also on tax collection. By definition, the sum $\tau_W + \tau_F$ remains constant, while w and L increase.

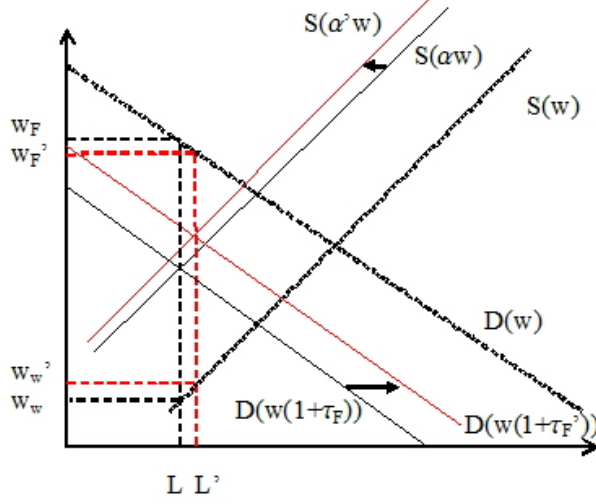


Figure 2: **A reduction on employer's contributions**

3 Making more visible employer's contributions

In principle, we could think that governments could try to make employer's contributions more visible, if this has a positive effect on employment. This could be done, for example, by making it explicit in the information that workers receive every month with their income statements. With a similar procedure to the one I have used above, I get:

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

Using the fact that $\frac{d \ln L}{d \theta} = -\varepsilon_D(1 + \tau_F) \frac{d \ln w}{d \theta}$, I obtain:

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

As long as the term $\delta \tau_F$ is positive, this derivative has a positive sign. The intuition is straightforward. Making employer's contributions more visible for 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

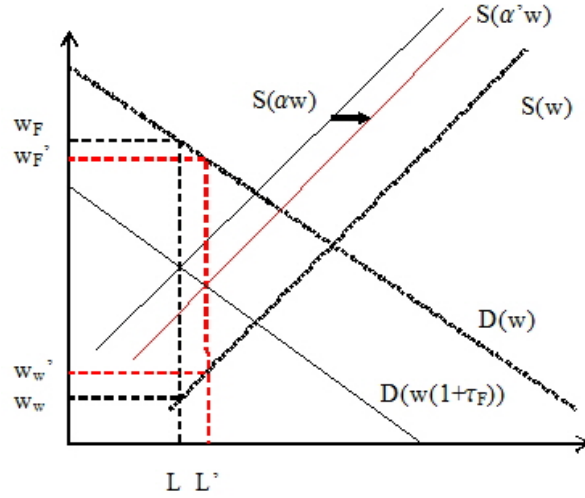


Figure 3: **Making more visible employer's contributions**

some value ($\delta > 0$). This will have a positive effect on employment, while at the same time will reduce 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 little costs and that can prove useful for increasing employment. In fact, this was one of the proposals in the report that the Swedish government appointed 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. My results below, therefore, can be seen as an illustration

corresponding to the case in which all countries share the same value of θ .

In Table 2 I show data on employers and employees contributions for 30 OECD countries, together with data on (EPL) Employment Protection Legislation, 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 highest the value, the more stringent is employment protection. 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 regressions using as endogenous variables the logarithms of employment rates. I use as controls employer contributions, employee contributions, income taxes, net replacement rates and EPL. Results are shown in Table 3. I show in brackets the corresponding standard deviations.

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%.

I find that the coefficient of employers 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 employers contributions on male employment, this result holds even when I control for other factors that may affect employment, as replacement rates and EPL. Regarding employees contributions, I do not find any 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 a bit further the effect I find of employers contributions on male employment. The interpretation of the estimated value means that a reduction of one point in employers 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 em-

ployers 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 more their own contributions than those paid by employers. Additionally, under these conditions, a reduction of employers' contributions that goes together with a corresponding increase of employees' contributions, leaving unchanged total contributions, is also positive for employment. Finally, I also find that making more visible the contributions paid by employers is always beneficial for employment.

There are several potential drawbacks of my approach. One is that I am considering just one representative individual. In a model with heterogeneous 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 an 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 result of Section 2 extends 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).¹³ The main idea is that unions have market power and they bargain over wages with firms. Taken 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. Next I 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 1.¹⁴ 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:

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

¹³See also Layard, Nickell and Jackman (1991) and Boeri and Van Ours (2008).

¹⁴This 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 is immediate to check that this is exactly Condition (9) from Section 2.

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

