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ABSTRACT

Incidence of a "Social VAT" Reform: A French Scenario*

This paper studies the fiscal incidence of a fiscal reform consisting of a reduction in employers' social insurance contributions financed by a tax based on the value added. In a closed economy with two sectors calibrated thanks to the French National Accounts, a "social VAT" leads to a rise in labor incomes which is usually higher than the rise of capital incomes. In case of perfect intersector mobility of production factors, a reduction in 1 percentage point of the social contributions leads to a rise in net labor incomes which is 0:51 to 0:66 percentage point higher than the rise of the interest rate. For a low intersector mobility the gains of workers, even though unequally distributed, remain higher than that of capitalists. In an open economy when the international capital mobility is sufficiently high, workers are more inclined to suffer from the reform.

JEL Classification: J38, H22, H61

Keywords: fiscal incidence, social contribution, payroll tax, tax on value added, social VAT

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1 Introduction

The so-called "social VAT reform" consists of a reduction in employers' social insurance contributions, *i.e.* payroll taxes used to finance social security programs, financed by an increase in a tax on the value added, the VAT. The motivation for such a reform originates in the recent increasing need for more international competitiveness. Shifting the tax burden from labour to consumption leads to a reduction in labor costs which would lower producer prices and improve labor demand, while the increase of the tax on the value added would raise import prices without bearing on exports inducing a relative fall in export prices. Finally the reform would tend to stimulate growth, competitiveness, and employment.

Such a fiscal policy has already been implemented in some countries. The pioneer was Denmark in 1987 which implemented an abolition of all specific employer's contributions to social schemes financed by a 2% increase in the value added tax. More recently, Germany in 2007 enforced a reduction in 1.8% in employer social security contributions associated with a 3% increase in the standard VAT rate (from 16% to 19%). Finally, in 2009 Hungary decided a simultaneous 5% reduction in employer social security contributions and a 5% increase in VAT. As for France, the reform has been debated for the past five years and was finally approved in early 2012 but was immediately canceled by the newly elected government a few months later before being implemented. The policy should have consisted in an increase in the standard VAT of 1.6 percentage points (19.6% to 21.2%) associated with a partial removal of social security contributions. The newly elected government nevertheless brought the idea back on the table by discussing the implementation of a rise in the standard VAT rate (from 19.6% to 20%), a rise in the intermediate VAT rate (from 7% to 10%), a reduction in the reduced VAT rate (5.5% to 5%), associated with a tax credit of 20 billons of euros on labor costs. The latter being targeted to low and average wages and based on the number of workers in the firm.

The reform is estimated to be broadly revenue-neutral *ex ante*. The sum of all incomes over the life cycle being equal to that of all expenditures, the tax shift from labour to consumption should not have any economic impact since taxing income is equivalent to taxing consumption (McLure 1975). However the tax base of consumption is broader than the tax base of employer's contributions, the reform may therefore have an impact. In order to keep a revenue-neutral tax reform, the increase of the tax on the value added should be accompanied by a larger decrease in the tax on labour hence reducing the tax wedge (Gauthier 2009).

As for us, we concentrate on the distribution of gains and losses that the reform would cause. We study the fiscal incidence[1] of the substitution of a tax based on the value added to a labor-based tax. The aim is to evaluate whom from the workers (those who make the most of their revenues out of labor) or the capitalists (those who make the most of their revenues out of capital) are more likely to benefit from such a reform in relative terms.

Assuming that the reform would be implemented in the overall economy it is more

[1]See Kotlikoff and Summers (1987) for a characterization of tax incidence studies.

likely that a reduction in employer's contributions financed by a rise in the VAT would lead to workers being more advantaged relative to capitalists. On the one hand labor costs would be reduced implying a rise in labor demand and wages, on the other hand, through the VAT rise, both labor and capital would contribute to financing the mesure. Thus the cost of labor should decrease relative to the cost of capital.

We could also hypothesize that only some activity sectors of the economy, as it was the case for the countries previously cited, are considered for the reform. The reform could be concentrated on activities which pay the most of VAT (Value Added Tax), or the reduction of employer's contributions could focus on several institutional sectors such as the trade sector. Consumption prices would therefore increase more in some sectors of the economy. The labor cost reduction would also be different depending on sectors.

As shown by Harberger (1962) the indirect effects of the modification of the relative prices of final goods and of production factors are difficult to predict. The real beneficiaries of the measure may not be those who seemed to benefit from the measure at first. The reduction in the cost of labor within a sector induced a substitution effect through which the demand for production factors is in favor of labor, and a volume effect which can possibly favor capital. The reason for this is that the reduction in production costs in a sector is associated with a cut in the relative price of the final good produced in the sector so that the demand for this final good increases. Assume that the good is relatively more intensive in capital, the net demand for capital would increase and the net demand for labor would decrease, thus benefitting capitalists. The financing of the tax relief can also reinforce this impact if the tax is put on the value added of a sector that is relatively intensive in capital. For this reason there exists cases under which workers would be relatively penalized by a tax based on the value added.

We consider several variants of the Harberger (1962) model applied to the case of an employers' contributions relief which is financed by a tax based on the value added. The economy is composed of two sectors calibrated thanks to the French National Accounts 2008. The calibration varies according to the composition of sectors with activities benefiting from the tax relief and of activities which would be more likely to bear the cost of the tax policy applied to the value added.

In the case of a closed economy with perfect intersectoral mobility of production factors we show that a social VAT reform would benefit workers: a reduction in 1 percentage point of employer's contributions leads at medium term to a rise in net wages which is 0.51 to 0.66 percentage point higher than the rise in capital incomes. When the assumption on intersectoral mobility is relaxed or in case of an open economy, workers' gains become weaker and capitalists are more likely to benefit from the reform.

The paper is organized as follows: Section 2 presents the model framework, and section 3 models the incidence of the social VAT reform. Section 4 shows the calibration based on the French economy in 2008 and evaluates the incidence of the reform. Section 5 studies several variants including the relaxing of the assumption on production factor mobility. Finally section 6 concludes.

2 Framework

There are two production sectors, X and Y. The sector X (respectively Y) produces a good X (Y) using both capital K_X (K_Y) and labor L_X (L_Y) thanks to a constant return to scale (CRTS) production technology. We assume that capital and labor are available in exogenous quantity $\bar{K}$ and $\bar{L}$. This assumption can be interpreted as a mid-term prediction model. The price of X (Y) is denoted by p_X (p_Y). The consumption in the X (Y) good can be taxed at rate t_X (t_Y). The price of capital, the interest rate, is r. The price for labor, the net labor income w can be taxed at rate t_{LX} (t_{LY}) in sector X (Y).

2.1 Firms' behavior

There is one representative firm by sector which behave competitively. The CRTS technology implies that the production cost of goods X and Y can be written $c_X(r,(1+t_{LX})w)X$ and $c_Y(r,(1+t_{LY})w)Y$. The Shephard lemme gives the demand for each production factor K and L:

$$K_X = c_{KX}(r,(1+t_{LX})w)X, \quad L_X = c_{LX}(r,(1+t_{LX})w)X \tag{1}$$

$$K_Y = c_{KY}(r,(1+t_{LY})w)Y, \quad L_Y = c_{LY}(r,(1+t_{LY})w)Y \tag{2}$$

where $c_{KX}(\cdot)$, $c_{KY}(\cdot)$, $c_{LX}(\cdot)$, and $c_{LY}(\cdot)$ are the derivatives of the unitary cost functions c_X and c_Y with respect to the cost of capital and the cost of labor. The production of X and of Y is positive and finite if and only if the following two equalities are respected:

$$p_X = c_X(r,(1+t_{LX})w) \tag{3}$$

$$p_Y = c_Y(r,(1+t_{LY})w) \tag{4}$$

2.2 Households' behavior

Households have identical and homothetic preferences but differ in their incomes. The aggregate demand function for the goods X and Y can be written as:

$$X = \phi_X((1+t_X)p_X,(1+t_Y)p_Y)M \tag{5}$$

$$Y = \phi_Y((1+t_X)p_X,(1+t_Y)p_Y)M \tag{6}$$

where

$$M = r\bar{K} + w\bar{L} + T \tag{7}$$

is the aggregate income composed of capital incomes and labor incomes. The overall tax is given by:

$$T = t_X p_X X + t_Y p_Y Y + t_{LX} w L_X + t_{LY} w L_Y \tag{8}$$

2.3 Equilibrium

There are four markets: one for each final good, and one for each production factor. The equilibrium is a vector $(X, Y, K_X, K_Y, L_X, L_Y, w, r, M, T)$ such that:

1. The firm supply for each good is equal to the household demand: equations (5) and (6) are satisfied, with the overall income being defined by (7) and (8).
2. The supply for each factor of production equalizes its demand: the demands are given by equations (1) et (2) whereas the supply for each factor is given exogenously.
3. No positive profit opportunity remains so that (3) and (4) are satisfied.

There are 10 unknown endogenous variables and 10 equations (1) to (8). By the Walras law, one of them is redundant.

3 The Social VAT

The tax base of the VAT is not the full value added *per se*. It is composed in majority of the final consumption of household and excludes the Gross fixed capital formation (GFCF). In the current model, though, the value added coincides with the final household consumption. Hence the taxes t_X and t_Y can be interpreted equally as VAT rates or taxes based on the value added. The late interpretation is however prefered as taxing the consumption of a final good is indeed taxing the entire value added of the sector which produces the good.

If the tax rates are initially arbitrarily small and that we assume that the fiscal reform does not affect the total deduction of tax, we have:

$$p_X X t_X + p_Y Y t_Y + w L_X t_{LX} + w L_Y t_{LY} = 0, \tag{9}$$

where the tax rates are evaluated after the reform is implemented.

3.1 Relative impact of the reform

We can study the repartition of gains and losses of welfare that a fiscal reform satisfying the budget constraint (9) would cause. By assumption, households are the only ones affected by the reform. As preferences are homothetic, the indirect asset value of a household i with total income M_i is $V((1+t_X)p_X, (1+t_Y)p_Y)M_i$. This household would therefore be more penalized by the reform than the household j if its total income increases less (or lowers more) than that of j. As $M_i = r\bar{K}_i + w\bar{L}_i$ (where $\bar{K}_i$ and $\bar{L}_i$ are the exogenous dotations in capital and labor of agent i), we say that the workers would be penalized compared with the capitalists if the labor income w is reduced compared to the capital income r: $\hat{w} - \hat{r} < 0$, with $\hat{w} = dw/w$ and $\hat{r} = dr/r$.

In order to link the difference $\hat{w} - \hat{r}$ with the fiscal policy $(t_X, t_Y, t_{LX}, t_{LY})$, one proceeds in 3 steps (see Jones 1965).

Step 1. The condition for zero profit in sector X implies that we can write:

$$\hat{p}_X = \theta_{KX}\hat{r} + \theta_{LX}\hat{w} + \theta_{LX}t_{LX}$$

where $\theta_{KX} = rK_X/p_XX$ and $\theta_{LX} = wL_X/p_XX$ are the share of capital and labor income in the value added. The same equation is obtained for sector Y. We deduce the following equation:

$$\hat{p}_X - \hat{p}_Y = \theta^*(\hat{w} - \hat{r}) + \theta_{LX}t_{LX} - \theta_{LY}t_{LY} \tag{10}$$

where $\theta^* = (\theta_{LX} - \theta_{LY})$. When $\theta^* > 0$, sector X is relatively more labor intensive than sector Y. Equation (10) shows that the growth rate of the price of X is higher than that of Y when the growth rate of the labor income is higher than the growth rate of the capital income.

Step 2. The equilibrium condition of the labor market $c_{LX}X + c_{LY}Y = \bar{L}$, implies that:

$$\lambda_{LX}(\hat{X} + \hat{c}_{LX}) + \lambda_{LY}(\hat{Y} + \hat{c}_{LY}) = 0$$

where $\lambda_{LX} = L_X/\bar{L}$ is the share of labor used by sector X (and $\hat{c}_{LX} = dc_{LX}/c_{LX}$ and $\hat{c}_{LY} = dc_{LY}/c_{LY}$). Following this, the equilibrium condition of the capital market leads to:

$$\lambda_{KX}(\hat{X} + \hat{c}_{KX}) + \lambda_{KY}(\hat{Y} + \hat{c}_{KY}) = 0$$

Noting σ_X and σ_Y the elasticity of substitution between capital and labor in sectors X and Y respectively, we have:

$$\lambda^*(\hat{X} - \hat{Y}) = (a_X\sigma_X + a_Y\sigma_Y)(\hat{w} - \hat{r}) + a_X\sigma_X t_{LX} + a_Y\sigma_Y t_{LY} \tag{11}$$

with $\lambda^* = \lambda_{LX} - \lambda_{KX}$, $a_X = \lambda_{LX}\theta_{KX} + \lambda_{KX}\theta_{LX}$, $a_Y = \lambda_{LY}\theta_{KY} + \lambda_{KY}\theta_{LY}$. We can easily verify that $\lambda^* > 0 \Leftrightarrow \theta^* > 0 : \lambda^* > 0$ is sector X is relatively more labor intensive than sector Y. If $\lambda^* > 0$, equation (11) shows that the labor income rises faster than the capital income ($\hat{w} - \hat{r} > 0$) when the growth rate of production in sector X is more important than that in sector Y ($\hat{X} - \hat{Y} > 0$).

Step 3. From equations (5) and (6), one can show that:

$$\hat{X} - \hat{Y} = -\sigma_D(\hat{p}_X - \hat{p}_Y) - \sigma_D(t_X - t_Y), \tag{12}$$

where σ_D ($\sigma_D \geq 0$) is the elasticity of substitution between the consumption of X and the consumption of Y.

Equations (10), (11) and (12) lead to the following proposition.

Proposition 1. *The incidence of the fiscal reform is given by*

$$\begin{aligned} D(\hat{w} - \hat{r}) = \quad & -(a_X\sigma_X + \lambda^*\theta_{LX}\sigma_D)t_{LX} \\ & -(a_Y\sigma_Y - \lambda^*\theta_{LY}\sigma_D)t_{LY} - \lambda^*\sigma_D(t_X - t_Y) \end{aligned} \tag{13}$$

with $D = a_X\sigma_X + a_Y\sigma_Y + \lambda^*\theta^*\sigma_D > 0$.

When the reduction of employers' social contributions is uniformly financed by an increase in the tax on the value added of the two goods ($t_X = t_Y$), the relative impact of the reduction is independent of its financing mode. The reason for this is that the relative price of the final goods is not affected by the reform. However when the financing is not uniform ($t_X \neq t_Y$) the incidence remains unclear. In order to have a precise idea of the incidence, one has to specify the economic activities belonging to sectors X and Y.

On the one hand, if we concentrate on the reduction in employers' social contributions, one can think about isolating the business sector as it is the sector most concerned with payroll tax reduction. On the other hand, if we concentrate on the VAT, it seems natural to concentrate on activity sectors which are concerned with a regular VAT rate as they are more likely to be exposed to an increase in the VAT rate.

We can actually note that these two possibilities of considering the reform almost cover each other: sectors which are more likely to be concerned by a reduction in payroll taxes are also the ones which are more likely to be concerned by the increase of VAT rate. For this reason, we concentrate on the case of a decrease in employers' social contributions in a sector financed by a rise in the VAT rate in the same sector.

3.2 Incidence of the "Social VAT"

3.2.1 Reduction in payroll taxes

Let us assume that payroll taxes are reduced in sector X For $t_{LY} = t_X = t_Y = 0$, equation (13) becomes

$$D(\hat{w} - \hat{r}) = -a_X\sigma_X t_{LX} - \lambda^*\theta_{LX}\sigma_D t_{LX} \tag{14}$$

Using Mieszkovski (1967) we distinguish in equation (14) between a substitution effect and a volume effect.

The substitution effect is obtained by assuming $\sigma_D = 0$ on the right hand side of equation (14). The labor cost of sector X decreases with respect to the capital cost. This prompts the firms belonging to sector X to substitute labor for capital (for $\sigma_X > 0$). The aggregate demand for labor increases whereas the aggregate demand for capital is reduced. It leads to a rise in wages and a reduction in the interest rate. We have $\hat{w} - \hat{r} > 0$.

The volume effect is given for $\sigma_X = 0$ on the right hand side of equation (14). The unitary cost of production of X increases, and with it the relative price of X. This leads to a rise in the demand for the good X and a reduction in the demand for the good Y. When X is relatively labor intensive compared with Y ($\lambda^* > 0$), we have a net demand for labor and a net supply for capital. The labor income tends to increase more than the capital income: $\hat{w} - \hat{r} > 0$. On the contrary, if X is relatively capital intensive, we have $\lambda^* < 0$ and the labor income tends to increase less than the capital income, leading to $\hat{w} - \hat{r} < 0$.

The two effects (substitution and volume) strengthen each other when $\lambda^* > 0$, and oppose each other otherwise. Empirically, a calibration of the model shows that λ^* is positive

but weak. Therefore the volume effect which is proportional to λ^* remains contained.

3.2.2 Rise in the tax on the value added

The impact of a rise in the VAT in sector X is given by $t_{LX} = t_{LY} = t_Y = 0$. Equation (13) becomes:

$$D(\hat{w} - \hat{r}) = -\lambda^* \sigma_D t_X$$

A rise in the VAT rate presents only a volume effect through a rise in the consumer price of the good X.

3.2.3 Overall incidence

The incidence of a reduction in employers' social contributions in sector X financed by the increase of the VAT rate of this sector is given by the budget constraint (9) which can be written as

$$t_X = -\theta_{LX} t_{LX} \tag{15}$$

The incidence of this reform should be threefold. It shows a substitution effect and two volume effects. The first one is associated with a reduction in social contributions whereas the second is associated with a rise in the VAT. Equations (13) and (15) lead to:

$$D(\hat{w} - \hat{r}) = -a_X \sigma_X t_{LX} \tag{16}$$

This equation shows that the two volume effects compensate each other so that the substitution effect is the only one remaining. As a consequence, a social VAT concentrated on one sector will always be more favorable to workers relative to capitalists.

4 Calibration

This section presents two different sectoral classifications. The first one isolates activity sectors that pay the most VAT. These sectors belong to sector X whereas other activities belong to sector Y. The second classification distinguishes between non-tradable activities and tradable activities for which a reduction in employers' social contributions would be more likely.

4.1 Sectors liable for VAT

The VAT paid by each activity is not straightforward as, on the one hand some accounting operations can be deducted, and on the other hand the VAT on imported intermediate goods cannot be deducted. One solution that would work to evaluate the VAT actually paid by an activity consists in calculating the average VAT rate paid by products from the final uses for each activity. The classification of activities for France is given by the Input-Output table (TES) for 2008 updated by the National Institute of Statistics and Economic Studies (INSEE). For convenience in this article, the classification of economic

activities is a mix between the standard intermediate SNA/ISIC aggregation A.38 known as the ISIC Rev.4 or the NACE Rev.2. and the high-level aggregation A.10. Knowing that exportations are free of VAT, the estimated mean of VAT rate is, for each final production of each activity, the ratio of the paid VAT to the total of final uses, exportations deducted.

Table 1: Estimated VAT for each sector

		Exportations	Total final uses	VAT	Sector	average VAT rate
A	Agriculture, forestry and fishing	13.9	47.4	1.7	Y	5.10
B	Mining and quarrying	3.0	3.9	0.03	Y	3.38
CA	Manufacture of food products, beverages and tobacco products	36.2	194.2	12.0	X	7.57
CB	Manufacture of textiles, apparel, leather and related products	17.1	68.2	8.1	X	15.91
CC	Manufacture of wood and paper products, and printing	9.0	16.1	1.7	X	24.25
CD	Manufacture of coke, and refined petroleum products	16.9	70.5	10.3	X	19.21
CE	Manufacture of chemicals and chemical products	48.8	70.0	3.6	X	16.75
CF	Manufacture of pharmaceuticals, medicinal chemical and botanical products	23.8	60.2	1.4	Y	3.84
CG	Manufacture of rubber and plastics products, and other non-metallic mineral products	17.7	29.6	2.0	X	16.45
CH	Manufacture of basic metals and fabricated metal products, except machinery and equipment	36.5	50.8	1.1	X	7.99
CI	Manufacture of computer, electronic and optical products	27.0	60.1	4.5	X	13.50
CJ	Manufacture of electrical equipment	19.7	35.4	1.9	X	12.30
CK	Manufacture of machinery and equipment n.e.c.	37.3	63.6	0.7	Y	2.67
CL	Manufacture of transport equipment	83.7	180.9	12.1	X	12.44
CM	Other manufacturing, and repair and installation of machinery and equipment	12.9	73.8	6.8	X	11.19
D	Electricity, gas, steam and air-conditioning supply	3.5	33.7	5.5	X	18.17
E	Water supply, sewerage, waste management and remediation	4.5	16.9	0.9	X	7.23
F	Construction	0.0	237.4	22.3	X	9.39
G,H,I	Wholesale and retail trade, transportation and storage, accommodation and food service activities	32.5	158.6	10.0	X	7.91
J	Information and communication	6.9	95.4	9.3	X	10.56
K	Financial and insurance activities	4.8	64.4	3.1	Y	5.26
L	Real estate activities	0.0	213.8	2.8	Y	1.32
MA	Legal, accounting, management, architecture, engineering, technical testing and analysis activities	9.3	54.6	4.4	X	9.82

MB	Scientific research and development	3.1	11.7	0.4	Y	5.04
MC	Other professional, scientific and technical activities	0.8	4.6	1.2	X	32.90
N	Administrative and support service activities	10.8	21.1	5.9	X	57.62
O,P,Q	Public administration, defence, education, human health and social work activities	0.75	450.6	1.3	Y	0.29
R,S,T	Other services	1.8	79.0	2.5	Y	3.20
	TOTAL	**521.0**	**2494.9**	**137.7**		**6.98**

Note: exportations, final uses, and VAT are given in billions of current euros, extracted from TES 2008; the estimated mean of VAT rate is calculated by products and expressed in percentage.

Table 1 shows that most of manufacturing activities, trade and services pay the majority of VAT. For convenience, we assume that sector Y regroups all activities for whom the average VAT rate is lower than the French reduced VAT rate of 5.5% in 2008, the regular VAT rate being 19.9%. Sector Y is therefore composed of agriculture, manufacture of pharmaceuticals, machinery and equipment n.e.c., financial intermediation, real estate activities, scientific R&D, and non tradable services such as public administration, education, health and social work, as well as other service activities. This sector represents about 46% of the total value added in 2008 but only about 10% of the overall VAT.

The value added (VA) of each sector X and Y is obtained from the TES 2008 table. The value added presented in the National Accounts is composed of the labor income, the capital income and taxes and subsidies on production. We choose to present the value added at factor costs[2] so that it directly shows the repartition between labor and capital costs. The labor and capital costs before the reform are assumed to be those that are observed empirically (taxes included). The direct cost of labor in sector X corresponds to the gross salaries presented in the 2008 National Accounts, whereas the indirect cost of labor is associated with the employers' social insurance contributions, also given by the 2008 National Accounts. The cost of capital can also be obtained by subtracting the value added at factor costs from the total cost of labor, or by adding the gross operating surplus with the mixed incomes of sole proprietorships.

Table 2 shows the value added at factor costs and the repartition of factor costs.

Table 2: Factor costs for the taxed sector X versus non-taxed sector Y

	VA at factor cost	labor cost	capital cost
Sector X	899.8	585.8	313.9
Sector Y	776.0	421.5	354.6

Note: values are given in billions of current euros.

One can obtain the calibrated parameters. For example $\lambda_{LY} = 421.5/(585.8+421.5) \approx 0.4184$ and $\theta_{LY} = 421.5/776.0 \approx 0.5431$. This leads to the following table calibration:

[2]The Value Added at factor cost is the gross income from operating activities after subtracting for indirect taxes net of operating subsidies.

Table 3: Calibration for the taxed sector X versus non-taxed sector Y

θ_{LX}	0.6511	λ_{LX}	0.5816	a_X	0.5086
θ_{KX}	0.3489	λ_{KX}	0.4696		
θ_{LY}	0.5431	λ_{LY}	0.4184	a_Y	0.4793
θ_{KY}	0.4569	λ_{KY}	0.5304		
θ^*	0.1080	λ^*	0.1120		

We assume the production fonction is a Cobb-Douglas, hence the capital-labor substitution elasticities σ_X and σ_Y, as well as the final consumption elasticity σ_D are equal to 1.

4.2 Tradable versus non-tradable sector

In the second classification sector X is composed of non-financial companies (S.11), financial companies (S.12), and non-financial sole proprietors (S.14AA). Sector Y is therefore composed of the general government (S.13), of pure households (S.14 minus S.14AA) and of non-profit institutions serving households (S.15). The classification corresponds approximately to the distinction: tradable sector versus non-tradable sector.

Table 4: Income of factors by institutional sector

	S11	S12	S13	S14AA	S14-S14AA	S15
(1) Gross wages	490.2	34.7	167.7	16.2	16.8	17.5
(2) Employers' social contributions	155.5	13.9	79.3	4.7	4.9	5.9
(3) Gross operating surplus	313.2	14.3	52.5	0	161.1	3.2
(4) Gross mixed incomes	0	0	0	118.5	5.8	0
(4a) *allocated to labor incomes*	0	0	0	*79.0*	*3.9*	0
(4b) *allocated to capital incomes*	0	0	0	*39.5*	*1.9*	0
Labor incomes (1)+(2)+(4a)	**645.7**	**48.6**	**247.0**	**99.8**	**25.6**	**23.4**
Capital incomes (3)+(4b)	**313.2**	**14.3**	**52.5**	**39.5**	**163.1**	**3.2**

Table 4 is obtained from the 2008 National Accounts. It shows that non-financial companies and public administration pay the most of employers' social contributions with respectively about 60% and 30%.

Once again labor incomes are associated with labor costs which are the direct (gross wages) and indirect (employer's social contributions) costs of labor. Capital incomes are the sum of the gross operating surplus and the mixed revenues. Following Krueger (2000), we allocate 2/3 of the mixed revenues of sole proprietors to labor incomes. According to Askenazy (2003) this procedure is likely to slightly underestimate labor incomes of sole proprietors. Table 5 shows the factor incomes of the classification.

Tables 4 and 5 show that the structure of production factor incomes are close for both classifications. The classification of some activities differs. Manufacture of machinery, equipment, pharmaceuticals, financial and insurance activities, real estate activities, scientific research and development, and other services are likely to benefit from a reduction

Table 5: Factor incomes, tradable versus non-tradable activities

	Labor income	Capital income	Total income
Secteur X (S11, S12, S14AA)	794.2	366.9	1161.1
Secteur Y (S13, S14-S14AA, S15)	296.0	218.7	514.7
Factor income	1090.2	585.6	1675.8

Table 6: Calibration for the tradable versus non-tradable sector

θ_{LX}	0.6840	λ_{LX}	0.7285	a_X	0.6588
θ_{KX}	0.3160	λ_{KX}	0.6265		
θ_{LY}	0.5751	λ_{LY}	0.2715	a_Y	0.3301
θ_{KY}	0.4249	λ_{KY}	0.3735		
θ^*	0.1089	λ^*	0.1020		

in employer's social contributions but are not really concerned by the increase in VAT. Nevertheless the value taken by λ^* is positive and weak in the two classifications. The volume effect will therefore be limited. For this reason a policy which will not be targeted to a single sector would have a similar incidence to the following section.

4.3 Results

With parameter values from table 3, equation (16) becomes $\hat{w} - \hat{r} = -0.5086 \times t_{LX}$. In a closed economy, with perfect intersectoral mobility of production factors, a transfer of employer's social contribution toward a tax based on the value added would massively benefit workers relative to capitalists. A 1 percentage point decrease in employers' contributions would lead to a wages growth rate rise of about 0.51 point higher than that of the interest rate. This speard is even higher when taking into account table 6 where the value climbs to about 0.66 point.

5 Different scenarios

5.1 Intersectoral labor immobility

As public administration constitutes a large part of sector Y it is interesting to consider the opposite scenario in which there is no interesectoral labor mobility. Hence $\hat{L}_X = \hat{L}_Y = 0$. In this specific case labor income variations are different in each sector. If we concentrate on the sector X, the equilibrium can be defined by the following equations:

$$\hat{X} - \hat{Y} = -\sigma_D(\hat{p}_X + t_X - \hat{p}_Y) \tag{17}$$

$$\hat{K}_X = \sigma_X(\hat{w}_X + t_{LX} - \hat{r}) \tag{18}$$

$$\hat{K}_Y = \sigma_Y(\hat{w}_Y - \hat{r}) \tag{19}$$

$$\hat{p}_X = \theta_{LX}(\hat{w}_X + t_{LX}) + \theta_{KX}\hat{r} \tag{20}$$

$$\hat{p}_Y = \theta_{LY}\hat{w}_Y + \theta_{KY}\hat{r} \tag{21}$$

$$\hat{X} = \theta_{KX}\hat{K}_X \tag{22}$$

$$\hat{Y} = \theta_{KY}\hat{K}_Y \tag{23}$$

$$K_X\hat{K}_X + K_Y\hat{K}_Y = 0 \tag{24}$$

Equation (17) is the aggregate demand equation, equations (18) and (19) are the elasticity of substitution between capital and labor, equations (20) and (21) are the frontiers of the factors' price, equations (22) and (23) are the production functions, and equation (24) give the equilibrium on the capital market.

Let us define δ_X and δ_X such as:

$$\delta_X = (\theta_{KX}\sigma_X + \sigma_D\theta_{LX}) + (\theta_{KY}\sigma_Y + \sigma_D\theta_{LY})\frac{\lambda_{KX}\sigma_X}{\lambda_{KY}\sigma_Y} \geq 0$$

$$\delta_Y = \frac{\lambda_{KY}\sigma_Y}{\lambda_{KX}\sigma_X}\delta_X \geq 0$$

Using equation (15), we can solve the system composed of equations (17) to (24). This leads to the following incidence equations:

$$\hat{w}_X - \hat{r} = \left(\theta_{LX}\frac{\sigma_D}{\delta_X} - 1\right)t_{LX} \geq 0 \tag{25}$$

and

$$\hat{w}_Y - \hat{r} = -\theta_{LX}\frac{\sigma_D}{\delta_Y}t_{LX} \geq 0 \tag{26}$$

Once again workers benefit from the reform but the gains are unequally allocated between sectors. With the calibration of table 3, equations (25) and (26) give $\hat{w}_X - \hat{r} \simeq 0.65$ and $\hat{w}_Y - \hat{r} \simeq 0.3$. This spread can also be observed with values from table 6 where $\hat{w}_X - \hat{r} \simeq 0.43$ and $\hat{w}_Y - \hat{r} \simeq 0.74$. The sector benefiting from the reduction of employer's social contributions is naturally the one concerned at medium term with the highest rise in net wages relative to capital income.

5.2 International capital mobility

As the fiscal policy taxes the value added and thus the capital, one should observe an outflow of capital towards the rest of the world. Considering section 5.1 but assuming that capital is internationally mobile, the equilibrium is defined by equations (17), (23), and by

$$\lambda_{KX}\hat{K}_X + \lambda_{KY}\hat{K}_Y = \hat{K} \tag{27}$$

with

$$\hat{K} = -\sigma_K \hat{r} \tag{28}$$

where $\hat{K}$ is the variation rate of the aggregated capital supply. Equation (28) describes how the aggregated capital supply responds to the spread between the national interest rate and the outside interest rate which is assumed to be fixed. $\sigma_K \geq 0$ thus measures the sensitivness of the aggregate capital supply to the national interest rate. We have:

$$\hat{w}_X - \hat{r} = -t_{LX} - \frac{\sigma_D}{\delta_X} t_X - \frac{\theta_{KY}\sigma_Y + \sigma_D \theta_{LY}}{\delta_X \lambda_{KY} \sigma_Y} \sigma_K \hat{r}$$

and

$$\hat{w}_Y - \hat{r} = \frac{\sigma_D}{\delta_Y} t_X - \frac{\theta_{KX}\sigma_X + \sigma_D \theta_{LX}}{\delta_Y \lambda_{KX} \sigma_X} \sigma_K \hat{r}$$

An outflow of capital is associated, through (28), with a rise in the national interest rate. The reduction of the capital/labor ratio should be accompanied by a cut in wages. Let us consider the particular case in which $\sigma_X = \sigma_Y = 1$ and let us assume that $\theta_{KX} = \theta_{KY} = \theta_K$ (which is an approximately satisfying condition for the two calibrations), using (15) leads to the following equation:

$$\hat{w}_X - \hat{w}_Y = \left(\frac{\sigma_D}{\theta_K + \sigma_D \theta_L} \theta_{LX} - 1 \right) t_{LX}$$

This equation is independent of the capital mobility σ_K, hence the wage inequality between the two sectors remains the same as that observed in a closed economy.

6 Conclusion

This article studies the incidence of a fiscal shift from payroll taxes to the value added. When the economy is closed our results suggest that this type of reform is more likely to favor individuals who get most of their income from labor. The gains would be more important in activity sectors benefiting from the reduction of employer's social contributions. As expected, in an open economy framework, the capital outflow tends to penalize labor income relative to capital income. The wage inequalities between sectors would however remain unchanged compared with the closed economy senario. A full specification of the open economy senario is the purpose of further research.

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