The Economic Effects of Social Security Contributions under Alternative Tax Incidence Assumptions: A General Equilibrium Analysis for Catalonia*

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In recent years, the high level of social security taxes in Spain has provoked the discussion about the advisability of a reduction in this taxation. The arguments have always been focused on the positive impacts of this tax reduction on unemployment as well as on production prices. This paper deals with the economic effects of social security tax rates in the Catalan economy, using an applied general equilibrium model. A novel aspect of our analysis is the introduction of tax incidence hypothesis on both the employers and the employees. Additionally, the paper discusses alternative scenarios in the labour market, by assuming a different sensitivity of labour supply to real wage. We simulate a 30% reduction in social security tax rates so as to analyse the effects on the relevant variables. We also introduce a tax substitution that consists in a 10% cut in the social security taxes and a rise in the consumption taxes in order to maintain the level of public revenues. The results of a social security tax reduction are sensitive to the incidence assumption. In particular, we show in this paper that the effects on regional unemployment, income distribution and relative prices of factors can be very different depending on the tax incidence hypothesis assumed. This evidence highlights the importance of the agents who bear the tax burden.

1. Introduction

During the last decades, the high level of social security contributions in Spain has provoked the discussion about the advisability of a reduction in this taxation. The arguments have always been focused on the idea that a social tax cut could reduce Spanish unemployment, which is one of the highest in the European Union.

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In particular, the consequences of a reform in social security taxes would materialise in economic aspects such as relative prices of goods, services and factors, levels of activity, unemployment rate, public revenues or public deficit. In this sense, the general equilibrium analysis is a useful framework to reflect the amount of effects provoked by new economic scenarios, since this analysis may capture the interdependence relationships of the economy[1].

At the empirical level, some studies have discussed the ability of deflecting the imposition of social security contributions. If taxation is deflected on the employees, through reductions of wages, employers do not exclusively bear the burden. Escobedo (1991) and Argimón and González-Páramo (1987) have studied all these aspects of the Spanish economy. All these authors conclude that we cannot reject the hypothesis that Spanish workers bear the entire burden.

Additionally, Polo and Sancho (1990) researched the effects of social imposition on the Spanish economy, by means of a general equilibrium model, which is very similar to the model we are presenting in this paper. Gómez (1999) also presents an applied general equilibrium model for the Spanish economy and evaluates the effects of the 1995 tax reform, consisting in a reduction of the social security taxes together with an increase in the consumption taxes of one point.

In the European context, Dewatripont et alia (1991) present a general equilibrium model for the Belgian economy. This model is used to simulate a social security tax cut and, at the same time, the compensation of public revenues with several possibilities of fiscal policy.

The purpose of this paper is to analyse, by means of a computable general equilibrium model for the Catalan economy, the impact of social security imposition on the economic variables. The novel aspect of our analysis, respecting all the above mentioned, is the introduction of tax incidence assumptions of the firm's social contributions under both the employers

[1] See, for example, Shoven and Whalley (1992).

and the employees. Specifically, we introduce different possible scenarios with regard to the repercussion of the taxation among employers and/or workers[2].

Firstly, we simulate a 30% cut in social tax rates and, secondly, a 10% cut combined with an increase in consumption taxes, in order to maintain public revenues at the original level. Our results show that the incidence assumption is a significant aspect in the analysis of social security taxes, particularly relevant on income distribution, unemployment and relative prices of factors.

The paper is organised as follows. In the next section we present the general equilibrium model that constitutes the framework of our analysis, and then section 3 contains the main results of the simulations. Finally, we point out some concluding remarks at the end of the paper.

2. The model

The general equilibrium model for the Catalan economy includes four types of agents: producers, consumers, the government and the foreign sector. We distinguish 12 production sectors, 13 categories of consumers, one public agent and three foreign sectors (the rest of Spain, the European Union and the rest of the world).

The model contains 27 different goods: 12 production goods, 4 non-consumption goods (investment and commerce with the rest of Spain, the European Union and the rest of the world), 9 final consumption goods and 2 primary factors (labour and capital).

[2] The obligation to collect the social security taxes falls on the employers, that is why this taxation is always represented as an element of the productive cost. However, there can be a tax burden borne in part or completely by the employee, by means of a reduction in the wages paid by the employer. In this situation, the conventional incidence hypothesis could be inadequate to capture the effects of the social taxation.

2.1. Production

Each productive sector, *j=1,..,12*, obtains a homogeneous good using a constant-returns-to-scale technology, which is represented by a nested function. The total production of *j* (Q_j) combines domestic production (X_{Dj}), imports from the rest of Spain (X_{Sj}), imports from the European Union (X_{EUj}), and imports from the rest of the world (X_{Rj}). We use a Cobb-Douglas production function:

$$Q_j = \delta_j X_{Dj}^{\gamma_{Cj}} X_{Sj}^{\gamma_{Sj}} X_{EUj}^{\gamma_{EUj}} X_{Rj}^{\gamma_{Rj}} \; ; \qquad \gamma_{Dj} + \gamma_{Sj} + \gamma_{EUj} + \gamma_{Rj} = 1, \qquad [1]$$

where δ_j is a scale parameter. This representation of the total production is known as the Armington specification (Armington, 1969), in which sectorial imports are partially substitutes of domestic production. The domestic output is obtained through a fixed proportions technology:

$$X_{Dj} = min\left[\frac{X_{1j}}{a_{1j}}, \ldots, \frac{X_{12j}}{a_{12j}}, \frac{VA_j}{v_j}\right], \qquad [2]$$

where X_{kj} is the quantity of k used in domestic production of *j*, and a_{kj} are nonnegative input-output technical coefficients. In expression [2], VA_j is the value added of *j*, and v_j is the coefficient of value added per unit of domestic production. Finally, the value added of *j* is defined as:

$$VA_j = \beta_j L_j^{1-\alpha_j} K_j^{\alpha_j}, \qquad [3]$$

where β_j is a scale parameter and L_j, K_j are, respectively, the quantities of labour and capital used by *j*.

Producers are perfect competitors in the input and output markets and their objective is to minimise the production cost subject to a level of production. With a constant-returns-to-scale technology, profits must be zero at the optimum solution of the firms.

2.2. Households

The model includes 13 representative consumers who are classified according to the labour situation and the levels of income[3]. The disaggregation by labour situation allows us to separate the homes with an employable head of household (less than 65 years old) from those with an unemployable head of household (equal or more than 65 years old). The active households are divided into deciles of income, and the inactive are divided into three categories of income (30%-40%-30% of the amount of disposable income in the inactive households).

The consumption demand is materialised in 9 consumption goods, which are different from the produced goods. The transformation of produced goods into consumption goods is accomplished by a fixed-coefficients matrix or conversion matrix.

Consumer preferences in each group, *l =1,...,13*, are described by a Cobb-Douglas utility function:

$$U_l = \sum_{h=1}^{9} \gamma_{hl} \ln c_{hl} + \gamma_{sl} \ln c_{sl}\,; \quad \gamma_{hl}, \gamma_{sl} > 0; \quad \sum_{h=1}^{9} \gamma_{hl} + \gamma_{sl} = 1, \quad [4]$$

[3] The data to implement this classification is in Calonge and Manresa (2001).

where *h = 1,...,9*, are the consumption goods, c_{hl} represents the consumption of *h* in group *l* and c_{sl} is the corresponding saving.

The disposable income of consumer *l* is defined as follows:

$$\sum_{h=1}^{9} P_h(1+t_h)c_{hl} + P_I c_{sl} \leq (wL_l(1-u)(1-ct_l) + rK_l + PT_l cpi + UB_l + \sum_{F=EU,R} TE_{Fl} P_F)(1-\tau_l)\,. \qquad [5]$$

The left part of [5] shows the final consumption: t_h is the consumption tax rate of the good *h* and P_h is the associated price. Additionally, we are including the private saving, valued at the investment price: P_I. The disposable income appears on the right side of expression [5]. As a fraction *u* of households is unemployed, $wL_l(1-u)$ stands for the factor income accruing from sales of labour services (*w* is the wage and L_l is the endowment of labour in *l*). The labour income has to incorporate the social security taxes borne by employees (ct_l is the effective tax of household *l*). Also on the right side of [5], *r* and K_l are respectively the price and the endowment of capital services; then, rK_l represents the factor income accruing from sales of capital services in category *l*. The income $PT_l ipc$ represents public transferences (retirement pensions and social transferences), which are valued at the consumption prices index: *cpi*; and $\sum_{F=EU,R} TE_{Fl} P_F$ are the net transfers to the residents from the European Union and the rest of the world. Additionally,

$$UB_l = b_l uwL_l\,, \qquad [6]$$

reflects unemployment benefits. In expression [6], b_l is the proportion of income that workers would obtain if they were employed. Finally, τ_l is the effective tax rate of the household income.

Every representative consumer decides the demand of consumption and saving, as a result of maximising his utility subject to the budget constraint. This procedure allows us to obtain the consumption and saving demands in every category. The aggregation of individual demands is then equal to the market demands.

2.3. Government

We assume that the government acts both as a producer and as a consumer. As a producer, the government supplies a public good that is produced by the public services sector. This agent, in the role of consumer (public consumption), buys the output of this sector and also demands investment goods (public investment). In order to finance all these activities, the government collects taxes and borrows from households by using bonds that are perfect substitutes for investment goods of the economy.

Public utility is derived from a fixed coefficients function:

$$U^G = min\left[C_{12}^G, \gamma^G C_I^G\right], \qquad [7]$$

where C_{12}^G is public consumption (in the model, sector 12 represents the public goods production) and C_I^G is public investment. The parameter γ^G > 0 captures a fixed proportion between the consumption and the investment decisions of the government. The public budget constraint can be written as:

$$P_{12}C_{12}^G + P_I C_I^G \leq T^G + \omega_I^G P_I . \qquad [8]$$

In the expression above, ω_I^G is the amount of debt that the government can emit in case of deficit and T^G is the amount of taxes collected, which is equal to:

$$T^G = CT + IT + DPT + FSST + WSST + TT - GT. \qquad [9]$$

The first component of [9], *CT*, is the total collection accruing from consumption taxes, and is equal to:

$$CT = \sum_{l=1}^{13}\sum_{h=1}^{9} P_h t_h c_{hl} .$$

Revenues accruing from private income taxes (*IT*) are defined as follows:

$$IT = \sum_{l=1}^{13}(wL_l(1-u)(1-ct_l) + rK_l + PT_l cpi + UB_l + \sum_{F=EU,R} TE_{Fl} P_F)\tau_l .$$

Additionally, the government taxes the value of domestic production with a sectorial tax s_j:

$$DPT = \sum_{j=1}^{12} s_j \left(\frac{P_{Dj} X_{Dj}}{(1+s_j)}\right).$$

Revenue collected from social security taxation borne by employers (*FSST*) is equal to[4]:

[4] The new incidence assumptions consist in replacing the employer's contributions by employees' contributions. Specifically, we have assigned the firm tax among households reproducing the same proportions that reflect the employees' contributions.

$$FSST = \sum_{j=1}^{12} ss_j wL_j^D \ ,$$

where ss_j is the effective tax rate and L^D_j is the input demand of labour services in sector j. The labour services also bear the burden of social security contributions of workers:

$$WSST = \sum_{l=1}^{13} wL_l (1-u) ct_l \ .$$

The imports from the rest of the world are subject to a sectorial tariff rate ar_j:

$$TT = \sum_{j=1}^{12} ar_j P_R X_{Rj} \ .$$

In order to conclude with the components of equation [9], we must define the government transferences (GT) to consumers. In our model this variable is endogenously determined, as it depends on the prices and the unemployment rate:

$$GT = \sum_{l=1}^{13} \left(PT_l cpi + b_l uwL_l \right).$$

The Government decides the amount of public consumption and public investment as a result of maximising the utility function [7], subject to the budget constraint [8].

2.4. Labour Market

The model permits the existence of equilibrium with positive unemployment. In order to reflect this situation, we are introducing the assumption that the amount of labour supply depends on the aggregated decisions of workers. In this sense, households offer labour in response to a certain sensitivity to the real wage of the economy, and this labour supply does not adjust sufficiently to get the full employment in the equilibrium situation.

In analytic form, the labour supply satisfies the following condition:

$$\frac{w}{cpi} = \left(\frac{1-u}{1-\bar{u}}\right)^{\frac{1}{\beta}}; \qquad 0 \leq \beta \leq \infty . \qquad [10]$$

The left side of expression [10] represents the real wage. On the right side, the variable *u* is the unemployment rate, $\bar{u}$ is the unemployment rate in the reference equilibrium and β is a parameter that captures the sensitivity of labour supply (*1-u*) to real wage.

The possible values of β reflect different scenarios in the labour market. If β = *0*, the real wage modifies its value in the necessary quantity to get the unemployment rate (or the employment) constant; in this case prices are flexible and quantities are fixed. In the opposite situation, $\beta = \infty$, the real wage is constant and the unemployment is variable. In other words, the adaptation in the labour market is now produced by quantities, while the real wage is fixed. Between these two extreme situations, there is a set of intermediate possibilities. So, the lower the value of parameter β, the more rigid labour supply will be.

2.5. Foreign Sector

As we have commented before, the rest of Spain, the European union and the rest of the world are three distinct agents in the model. Each foreign region produces a good that can be imported and the trade balances are the net saving of these three agents.

Additionally, goods produced in the foreign markets are imperfect substitutes of equivalent commodities produced in the Catalan economy (Armington specification). The Cobb-Douglas indicator of expression [1] implements the mix between domestic output and imports.

2.5. Savings and Investment

The investment good is produced through a fixed coefficients technology, in which inputs correspond to the sales of productive sectors to the investment sector.

The treatment of investment in our model consists in preserving the equilibrium between all the saving sources and the amount of investment. The model defines the total saving by the aggregation of private saving, public saving and trade balances with foreign markets.

2.6. Equilibrium and Database

The equilibrium notion follows the Walrasian one, which assumes cleared markets (offered quantities equal to demanded quantities). The exception to this rule is the labour market in which, as we have described above, there might be a situation of unemployment or excess of supply.

The closure rules consist in keeping the trade balances at the level of reference, so that we permit the variation of the activity levels of foreign

agents (export levels). On the other hand, the public deficit is considered variable, whereas the level of public activity is fixed.

The database used in our empirical application is a social accounting matrix for the Catalan economy with 1990 data[5]. We can obtain all the parameters related to the functional forms of the model by means of calibration procedure.

In the benchmark equilibrium, the measurement units are readjusted to reflect unitary prices and unitary activity levels, so that the model in the base year reproduces the numerical values of the social accounting matrix. It is possible then to perform static comparative exercises by introducing new values for the exogenous parameters. This simulation practice reflects new equilibrium situations that we can immediately compare with the reference situation.

3. Results

In this section we present the main results of the simulations. Specifically, we are interested in reflecting the changes on relative prices of labour and capital, and also in reflecting the effects on income distribution as well as the effects on regional macroeconomic variables.

As we have commented above, the model incorporates different scenarios in the labour market. Specifically, we consider the two extreme situations of sensitivity of labour supply to real wage (β = 0 and β = ∞), and we introduce an intermediate situation (β = 1,5).

The model also incorporates different incidence assumptions of the employer's social contributions. The results show three distinct situations. The first one corresponds to an incidence borne exclusively by the employer, which is the traditional assumption, and we also include two

[5] Llop and Manresa (1999) include a description about the structure of this social accounting matrix.

new hypotheses: an incidence shared by employers and workers in equal proportions and an incidence completely sustained by workers.

3.1. Tax reduction (30%) of employer's social security contributions

The first simulation consists in a 30% cut in the employer tax rates. This fiscal reform may appear unrealistic because it would reduce the public revenues to a large extent, but it permits us to evaluate the effects caused by the social tax on the regional economic variables[6].

Table 1 displays the percentage of changes in the main prices reported by the model: labour and capital price, real wage and consumption prices index (*cpi*).

Table 1. Reduction (30%) of employer's social security contributions. Variation (%) in prices.

	100% employer			**50% employer 50% employee**			**100% employee**		
	β=0	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**
Labour (*w*)	3,06	1,71	0,07	1,06	0,59	0,03	-0,86	-0,46	0,00
Capital (*r*)	-3,17	-1,78	-0,08	-1,10	-0,61	-0,03	0,89	0,48	0,00
Real wage (*w/cpi*)	6,38	3,55	0,00	2,14	1,17	0,00	-1,75	-0,94	0,00
cpi	-3,12	-1,70	0,07	-1,06	-0,57	0,03	0,91	0,49	0,00
$0{,}509w + 0{,}491r = 1$									

If employers effectively sustain the burden, the tax reduction generates a significant increase in the price of labour relative to capital. In this incidence assumption, the social tax cut reduces the labour costs and labour demand increases. Logically, the price of labour relative to capital also increases. However, when we consider the shifting of the entire tax burden to the employees, the model shows a decrease in wage relative to capital price.

[6] If the employees completely or partially bear the tax, the simulation consists in reducing a 30% of the tax tranferred from employers to employees.

In table 1 we can also observe that real wage is sensitive to the incidence hypothesis. In the conventional case, a social tax cut generates a large increase in this variable, whereas the opposite situation of incidence displays a reduction on real wage.

The consumption prices index appears at the bottom of table 1, whose evolution depends on the incidence assumption. In the conventional hypothesis, a social tax reduction is associated with a reduction in productive costs and, consequently, a significant reduction in productive prices, which is then reflected on the final consumption prices. But if workers bear the tax burden, table 1 shows an increase in final prices. The social tax reduction is now associated with a larger disposable income, which increases the consumption demand and also increases the final prices.

Table 2 summarises the values of macroeconomic variables. An interesting result of this table is the unemployment rate; in the traditional incidence hypothesis, unemployment decreases substantially when the labour supply is sensitive to real wage (from 12,6% to 2,4%). Therefore, a social tax reduction generates a positive effect on employment if the laboral context is characterised by wage austerity. Our results concerning the unemployment decrease are fairly similar to those obtained by Polo and Sancho (1990) for the Spanish economy.

However, if we introduce changes in the incidence assumption, the model offers other results. Specifically, the shifting of the tax burden to workers reflects an increase on unemployment rate when the labour is sensitive to real wage (from 12,6% to 15,4%). So, the traditional message about the positive effects on unemployment when social taxes are reduced changes significantly when the tax burden is switched to the employees. In fact, a social tax cut generates an increase in unemployment in this incidence situation if the labour supply is flexible.

Table 2. Reduction (30%) of employer's social security contributions. Macroeconomic variables (percentages).

	Bench-mark	100% employer			50% employer			100% employee		
		β=0	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**
Unemployment	0.126	0,126	0,081	0,024	0,126	0,111	0,090	0,126	0,139	0,154
Public Deficit/GDP	0	2,60	0,82	-1,06	2,83	2,22	1,41	3,02	3,53	4,15
Consumption/GDP	61.12	62,85	61,77	60,45	63,12	62,77	62,34	63,38	63,67	64,01
Investment/GDP	24.41	23,06	24,19	25,58	22,88	23,25	23,71	22,70	22,40	22,04
Public Consumption/GDP	10.85	10,79	10,52	10,20	10,76	10,67	10,56	10,73	10,81	10,90
Public revenues/GDP	30.04	27,74	27,67	27,54	27,32	27,30	27,28	26,93	26,93	26,93

There is an increase in the proportion of private consumption in relation to GDP, mainly when the salaries bear the tax. In practically all the scenarios, the proportion of investment decreases and this evidence, together with the rise on public deficit, reflects an expulsion effect from the public activity to the private investment. The public consumption is approximately equal to the benchmark value in all the incidence assumptions because of the closure rule, which is a fixed public activity. On the other hand, the last row in table 2 shows a reduction in the level of public revenues, which is larger when the employee bears the tax incidence.

Table 3 contains a measurement of private welfare: the variation on the real disposable income of consumers. This table shows ten active categories (A) and three inactive categories (I); both are ordered by increasing levels of income.

The conventional incidence hypothesis together with a fixed labour supply displays a general increase in the real disposable income, mainly on the medium income categories. However, when the value of β increases, the unemployment rate also increases and that provokes a lower disposable income on the poorest households (which depend on the unemployment benefits to a greater extent). Additionally, wages decrease in relation to capital prices as the value of β goes up, and therefore, the poorest groups suffer from a reduction in welfare when $\beta = \infty$.

Table 3. Reduction (30%) of employer's social security contributions. Percentage of variation of real disposable income.

	100% employer			50% employer 50% employee			100% employee		
	β=0	β=1,5	β=∞	β=0	β=1,5	β=∞	β=0	β=1,5	β=∞
A1	2,40%	-8,26%	-20,7%	2,46%	-1,02%	-5,13%	2,53%	5,30%	8,61%
A2	3,14%	-0,39%	-4,57%	3,68%	2,54%	1,17%	4,19%	5,10%	6,18%
A3	2,29%	1,15%	-0,23%	3,18%	2,82%	2,38%	4,02%	4,30%	4,64%
A4	2,72%	1,87%	0,83%	3,41%	3,14%	2,81%	4,05%	4,27%	4,52%
A5	2,60%	1,44%	0,02%	3,35%	2,98%	2,53%	4,05%	4,35%	4,70%
A6	2,78%	2,47%	2,05%	3,49%	3,40%	3,28%	4,16%	4,24%	4,32%
A7	3,28%	2,42%	1,36%	3,60%	3,33%	2,99%	3,91%	4,13%	4,39%
A8	3,00%	2,36%	1,57%	3,35%	3,15%	2,90%	3,69%	3,85%	4,04%
A9	2,38%	2,89%	3,44%	2,76%	2,93%	3,12%	3,11%	2,97%	2,81%
A10	2,49%	3,09%	3,73%	2,24%	2,43%	2,65%	2,01%	1,87%	1,68%
I1	0,33%	-1,98%	-4,65%	0,13%	-0,59%	-1,48%	-0,03%	0,57%	1,28%
I2	0,22%	-0,67%	-1,72%	0,19%	-0,10%	-0,44%	0,17%	0,40%	0,67%
I3	1,04%	1,36%	1,71%	1,32%	1,43%	1,55%	1,58%	1,50%	1,39%

If the tax burden is shifted to worker revenues, a social security tax cut increases the disposable income in a greater percentage than in the conventional hypothesis. Notice that this effect is more relevant if the labour supply becomes more elastic, mainly in the case of the poorest households. This new evidence is consequence of combining two different effects. Firstly, if the employee bears the tax burden, a tax cut especially benefits those groups who depend on salary to a greater extent. Secondly, the increase in unemployment also generates an increase in unemployment benefits, which are received in a greater proportion by the poorest categories.

3.2. Tax reduction (10%) of employer's social security contributions and increase in consumption taxes

In this section we present the results of substituting part of the social security taxes for consumption taxes, with the aim of maintaining the

public revenues at the original level[7]. Specifically, we incorporate a reduction of 10% in social taxes and permit a linear increase on consumption rate in order to maintain the benchmark public revenues[8].

Table 4. Reduction (10%) of employer's social security contributions and increase in consumption taxes. Variation (%) in prices.

	100% employer			50% employer 50% employee			100% employee		
	β=0	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**
Labour (*w*)	2,05	1,29	0,46	1,37	1,01	0,62	0,69	0,74	0,80
Capital (*r*)	-2,13	-1,34	-0,48	-1,42	-1,04	-0,65	-0,72	-0,77	-0,83
Real wage (*w/cpi*)	2,52	1,31	0,00	1,16	0,60	0,00	-0,17	-0,09	0,00
cpi	-0,46	-0,02	0,46	0,20	0,41	0,62	0,86	0,83	0,80
$0{,}509w + 0{,}491\, r = 1$									

Table 4 contains the changes in prices. Notice that the real wage is sensitive to the incidence assumption, and presents a substantial increase in the traditional case as well as a reduction when the labour revenues bear the tax burden.

Except for two scenarios, the consumption prices index rises with respect to the benchmark value, as a result of the increase in consumption tax rates.

Table 5 contains the macroeconomic variables. Again, the regional unemployment shows an evolution depending on the incidence scenario; if the employer effectively bears the social contributions, the tax substitution generates a reduction in unemployment when the labour supply is flexible (from 12,6% to 9,1%). However, unemployment is fairly invariable in the opposite incidence hypothesis in comparison with its benchmark value.

[7] If the employee partially or completely bears the tax burden, we apply a reduction of 10% to the fraction of employees' taxes, which corresponds to the switching of employer's social security contributions.

[8] Similarly, this fiscal reform is applied to the Spanish economy in Polo and Sancho (1991), and is also applied to the Belgian economy in Dewatripont et alia (1991).

Table 5. Reduction (10%) of employer's social security contributions and increase in consumption taxes. Macroeconomic variables (percentages).

	Bench-mark	100% employer			50% employer			100% employee		
		β=0	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**	**β=0**	**β=1,5**	**β=∞**
Unemployment	0.126	0,126	0,110	0,091	0,126	0,119	0,111	0,126	0,128	0,129
Consumption tax scale	1.000	1,223	1,173	1,120	1,215	1,191	1,166	1,208	1,212	1,215
Deficit/GDP	0	-0,06	-0,49	-0,93	0,07	-0,12	-0,33	0,20	0,23	0,26
Consumption/GDP	61.12	61,11	60,81	60,49	61,22	61,09	60,95	61,34	61,36	61,38
Investment/GDP	24.41	24,36	24,72	25,11	24,28	24,44	24,62	24,20	24,18	24,15
Public Consumption/GDP	10.85	10,83	10,73	10,61	10,82	10,77	10,72	10,81	10,82	10,83
Public revenues/GDP	30.04	30,13	29,91	29,68	29,94	29,84	29,74	29,76	29,77	29,78

The components of aggregate expenditure (private consumption, investment and public expenditure) show proportions of the GDP which are very similar to those of the reference equilibrium. On the other hand, public revenue also presents a similar proportion to GDP, since this simulation implies a fixed variable in its benchmark absolute value.

The second row of table 5 contains the linear increase in the consumption tax rates that keeps the public revenues constant. When the salary is rigid ($\beta = \infty$) the tax scale leads to a different magnitude, which depends on the incidence assumption assumed.

Table 6 shows the percentage of variation in real disposable income. In general, the values of this table reflect a greater disposable income in those groups that compose the active population, whereas inactive groups display negative impacts in practically all the scenarios. This evidence is clearly seen throughout the whole incidence hypothesis, especially if labour supply is rigid ($\beta = 0$).

Table 6. Reduction (10%) of employer's social security contributions and increase in consumption taxes. Percentage of variation of real disposable income.

	100% employer			50% employer 50% employee			100% employee		
	β=0	β=1,5	β=∞	β=0	β=1,5	β=∞	β=0	β=1,5	β=∞
A1	0,43%	-3,43%	-7,59%	0,49%	-1,27%	-3,11%	0,53%	0,78%	1,03%
A2	0,56%	-0,66%	-1,97%	0,78%	0,23%	-0,35%	0,99%	1,07%	1,15%
A3	0,04%	-0,24%	-0,54%	0,38%	0,25%	0,13%	0,70%	0,72%	0,74%
A4	0,23%	0,05%	-0,16%	0,51%	0,42%	0,34%	0,76%	0,78%	0,79%
A5	0,11%	-0,17%	-0,48%	0,41%	0,28%	0,15%	0,69%	0,71%	0,72%
A6	0,26%	0,26%	0,27%	0,54%	0,54%	0,55%	0,80%	0,80%	0,80%
A7	0,59%	0,35%	0,10%	0,74%	0,63%	0,52%	0,88%	0,89%	0,91%
A8	0,37%	0,25%	0,12%	0,54%	0,48%	0,42%	0,69%	0,69%	0,70%
A9	0,01%	0,35%	0,71%	0,18%	0,33%	0,50%	0,33%	0,32%	0,29%
A10	0,05%	0,42%	0,81%	0,02%	0,18%	0,36%	-0,03%	-0,05%	-0,07%
I1	0,08%	-0,79%	-1,69%	0,01%	-0,35%	-0,75%	-0,04%	0,02%	0,07%
I2	-0,33%	-0,57%	-0,83%	-0,32%	-0,44%	-0,54%	-0,32%	-0,31%	-0,29%
I3	-0,12%	0,09%	0,32%	0,00%	0,09%	0,20%	0,11%	0,09%	0,08%

As in the previous simulation, the effects on welfare are very different when there is some flexibility in the labour market (as long as the parameter β increases). In this case, the conventional incidence assumption is associated with lower welfare in poorer households, whereas if employees bear the tax burden, lower income groups increase their welfare to a greater extent.

4. Concluding Remarks

In this paper we present an applied general equilibrium model to analyse the economic impact of social security contributions in the Catalan economy. The results involve different incidence scenarios of employer's social contributions. We also incorporate different sensitivities of the aggregated labour supply to real wage.

In the same way as the existing contributions, a reduction in social taxes causes positive effects on the labour market if the laboral context is characterised by austerity. However, some applied contributions point out that employers shift the tax burden to the salaries. Taking this possibility into account, the traditional message about the positive effects on unemployment is not reproduced if we deflect the incidence to employees.

On the other hand, the changes in relative prices of factors differ completely from the different incidence assumptions assumed. Also the effects on the consumer's welfare are relevant. In particular, the conclusions about the changes in private income depend on the incidence assumption, mainly when the labour supply is sensitive to real wage.

Finally, it is also remarkable that a different definition of a tax in a general equilibrium model may substantially change the message reported by the model. Specifically, our analysis of social security contributions demonstrates that the evolution of the economic variables depends to a great extent, on the effective incidence between employers and/or employees. In view of all these results, it seems that incidence is a crucial aspect in the study of social security taxes.

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