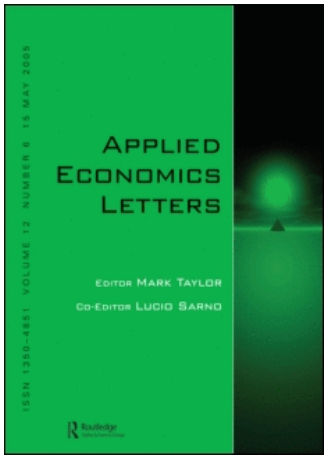

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Regional evaluation of a tax on the retail sales of certain fuels through a social accounting matrix

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The goal of this article is to calculate the cumulative impact of the tax on the retail sales of certain fuels (IVMH, in Spanish initials) and its effects on some fundamental economic variables, on the price indices and on remaining tax collections. The novel aspect of this work is to use as methodology a very simple price model applied to a regional Social Accounting Matrix (SAM) – instead of a input-output table – done for Andalusia where we introduce a new tax. The main results of this article show that the introduction of the IVMH in the regional economy may be provoke marginal variations on economy prices. There is also a global increase of tax collections of 0.057%.

I. Introduction

In 2001, a tax on the retail sales of certain fuels (IVMH) in Spain (24/2001 Act) was implemented. The IVMH and the special tax on fuels represent the total excise on fuels. The taxable income of the IVMH is mainly the retail sales of certain fuels and the taxpayers are the retailers or owners of these taxable products (certain fuels) upon those products' retail sale.

The goal of this article is to calculate the cumulative impact of the IVMH and its effects on some fundamental economic variables, on the price indices and on remaining tax collections. Following Rubio Sanz and Perdiz (2003) applications using a social accounting matrix (SAM), the novel aspect of this work is not to use a Computable General Equilibrium model (CGE) to analyse indirect taxes as Llop and Manresa (2004). We follow as methodology, a very simple price model applied to a regional SAM – instead of a input-output table – done for Andalusia (Cardenete and Sancho, 2003) where we introduce a new indirect tax, obtaining relevant results, in aggregate levels, to other similar studies done using, i.e. microsimulations (Romero and Sanz, 2003).

Section II describes the model and the database that we have used, explaining in detail the estimation in order to implement the new tax. Section III discusses the main results of the simulation and outlines our conclusions.

II. Model and Database

The theoretical formulation of the model is based on a linear general equilibrium model. We introduce the IVMH in the model, at the same level as the net production tax and it will only tax the taxable sector, which is the oil sector.

In the price formation rule we distinguish the formation of production prices in each productive sector that result from characteristics that describe

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the technology and the competitive behaviour of enterprises. The production price, p_j, is defined by:

$$p_j = (1 + \text{ivmh}_5)(1 + \tau j) \times \left(\sum_{i=1}^{25} q_j\, a_{ij} \; + \; (1 + s_j) wlj \; + \; rk_j + (1 + t_j) p_m a_{mj} \right) \tag{1}$$

where a_{ij}, l_j, k_j and a_{mj} are technical coefficients of the productive sector, labour factor, capital factor and foreign sector, respectively. If r is the unitary remuneration of capital services, then $r\ k_j$ is the payment for using the capital factor in the production of the good j. In addition, w is the salary rate, s_j is the enterprise social security payments for the sector j, t_j is the *ad valorem* tariff on imports of the sector j, τ_j is the *ad valorem* tax rate on net production and ivmh_5 is the tax rate of the new *ad valorem* tax. This will take different values for each sector. Finally, p_m represents an aggregate price index of imported products. The final price, q is the result of applying the indirect tax on added value (VAT) in the following way:

$$q_j = p_j(1 + \text{VAT}_j) \tag{2}$$

The structural (a_{ij}, a_{mj}, l_j, k_j) and the tax (s_j, VAT_j, t_j *y* τ_j) parameters are calibrated with the information given by the database. The database used in this article is the Social Accounting Matrix of Andalusia for 1995 (SAMAND95) which gives information for 37×37 sectors[1] and allows us to describe the flows of the economy of Andalusia in 1995.

The description of each tax collection of the indirect taxes can be seen in Cardenete and Sancho (2002). The new indirect tax introduced in this model, RIVMH, will be equal to:

$$\text{RIVMH} = \text{ivmh}_5(1 + \tau_5) \times \left(\sum_{i=1}^{25} a_{i5} q_5 + (1 + s_5) wl_5 + rk_5 + (1 + t_5) a_{m5} p_m \right) X_5 \tag{3}$$

The amount collected for each tax is endogenous and will depend on the specific tax rate for each tax, taxable income and prices. Production prices, final prices and the salary rate are determined endogenously in the model. The salary rate is introduced in the model as a weighted average of final prices, the weighting being the percentage of the total private consumption for each productive sector. So, the price of capital services and imported goods are exogenously determined in the analysis.

Following the original hypothesis, registered data in the SAM are replicated as a microeconomic equilibrium where all endogenously (or exogenously) determined prices have a unitary level at commencement. After this we introduce the new tax, IVMH, causing an exogenous shock to the price formation structure of the economy in our study. These changes can be evaluated by comparing the new equilibrium with the original situation.

Also, the model considers a representative consumer facing consumption of a basket of goods resulting from combining the 25 representative sectors. With the model assumptions, we can measure the profit and loss of consumer utility after introducing the new IVMH tax by calculating the variation in the consumer expenditure required.

As there is no direct information about the consumption of the taxable products subject to the special taxes (such as tax on Fuels), this estimation has to be done indirectly. To enable this, we have considered estimates of the Spanish Agency of Tax Administration.

As we know the Fuel and IVMH tax collections, it is possible to express the increase in the tax on fuels as a percentage increase of the Fuel tax. This percentage increase results from the proportion that the IVMH collection represents on the Fuel tax collection. Finally, the collection of both taxes is deflated to a 1995 base because the SAM of Andalusia was for 1995. In fact, the IVMH collection was 77421277 euros and the Fuel tax collection was 1351.024 million euros. After establishing this data, we then calculate the IVMH collection as a percentage of the total Fuel tax collection, which is 5.73%.[2]

[1] There are 25 productive sectors (Accounts 1 to 25), two productive factors Capital and Labour (Accounts 26 and 27), the account of savings/investment (Account 29), the institutional sectors: Public Administration (Account 36), a representative consumer (Account 28) and the various taxes: the indirect taxes (Employer's Social Security Payments, Net Production tax, Tariffs and VAT) and the direct taxes (Income tax and Employee's Social Security Payments) and finally, the Foreign sector (Account 37).

[2] We have to homogenize the collection figures of the IVMH and the Fuel Tax as IVMH collection data is from 2002 (the only available data), while the Fuel tax collection data is from 2001 (last available data). Accordingly, we calculate that IVMH collection data for 2001 is 89034469.2 euros (92595848/1.04). With this data, we obtain tax collection data for both taxes for 1995. For IVMH it is 77421277 euros (89034469/1.15) and for Fuel tax it is 1351.024 million euros (1553.678/1.15). Finally, the IVMH collection percentage of the Fuel tax is 5.73% (77421277/1351.024.35×100).

III. Empirical Results and Conclusions

Table 1 shows the effects that the tax shock causes to the prices of the 25 sectors of the Andalusia economy. Results from column (a) show that the tax reform is inflationary in all productive sectors, specially in Oils (sector 5) which increases in 0.132%. However, the inflationary effect is minimal as the price rise only 0.008% on average. Column (b) results show that the tax shock impact is also inflationary in all productive sectors. In absolute terms, the inflationary effect on production prices is marginal. On average, production prices increase by 0.01%, the Oil sector (5) and Transport and Communications sector (22), being the more inflationary sectors.

Table 2 shows tax reform collection effects. As a global result, Table 2 shows an increase of 0.057% in the total collection after introducing the IVMH. The final effect of the tax reform is determined by the increases in IVMH and VAT collection and, to a lesser extent, by the Social Security Payments. Additionally, the tax collection of the net production tax becomes more negative compared with the initial situation, 0.003%. Finally, the tax reform is Tariff neutral.

Table 3 shows the effect of the tax reform on the relative weighting that each indirect tax has on the total indirect tax collection. The results of Table 3 show that the introduction of the IVMH causes a minimal change in the relative weight of each indirect taxes' proportion of the total indirect tax collection. In this particular case, the introduction of IVMH reduces the relative weight of the net production tax by 0.054%, of the Social Security Payments by 0.051% and of the VAT by 0.049%. The relative weight of the Tariffs is the same.

The effects of the IVMH introduction on the private welfare index are negative. Model results show a loss of private welfare that can be measured at about 2.064 million euros. This amount is more than half of the estimated IVMH collection.

Table 1. Effects on consumption and production prices after the insertion of the IVMH

Productive sector	(a)	(b)
1. Agriculture.	0.003	0.00003
2. Farm and forestry.	0.004	0.00004
3. Fishing.	0.006	0.00006
4. Extractivas	0.001	0.00001
5. Oils.	0.132	0.00128
6. Electricity.	0.004	0.00004
7. Gas.	0.002	0.00002
8. Water.	0.004	0.00004
9. Mining & steel.	0.002	0.00002
10. Building materials.	0.004	0.00004
11. Chemistry.	0.002	0.00002
12. Metalic products.	0.002	0.00002
13. Machinery.	0	0.000004
14. Vehicles.	0.001	0.000007
15. Transport.	0.003	0.00003
16. Food.	0.003	0.00003
17. Textile and leather.	0.001	0.00001
18. Wood products.	0.002	0.00002
19. Other manufactures.	0.002	0.00002
20. Construction.	0.006	0.00005
21. Commerce.	0.003	0.00003
22. Transport & communications	0.011	0.00011
23. Other services.	0.004	0.00004
24. Services to sell.	0.002	0.00002
25. Services not to sell.	0.004	0.00004
Price index.	0.0083	0.0001

Source: own elaboration.
Column (a) shows the effect on consumer prices of all sectors.
Column (b) shows the impact on production prices for the twenty-five sectors.

Table 2. Collection effects after introducing the IVMH (millions of euros)

	(a)	(b)	(c)
Net production tax	−3127.372	−3127.466	0.003
Tariffs	587.147	587.147	0.000
Social security payments	6725.524	6725.892	0.005
IVMH	0	3.858	100.00
VAT	3590.903	3591.19195	0.008
Total collection	7776.201	7780.622	0.057

Source: SAMAND95.
Column (a) shows the collection data prior to the reform.
Column (b) shows tax collections after introducing the new tax.
Column (c) shows the percentage variation impact of the tax reform.

Table 3. Relative weight of the indirect tax on the total

	(a)	(b)
Net production tax	−40.22	−40.20
Tariffs	7.55	7.55
Social security payments	86.49	86.44
IVMH	0.00	0.05
VAT	46.18	46.16
Total collection	100.00	100.00

Source: SAMAND95.
Column (a) shows the weight of indirect taxes on the total before the tax reform.
Column (b) shows the results after introducing the IVMH.

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