VAT and Wine Sector: a computable general equilibrium analysis

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In recent times, wine market becomes a quality oriented one, the elasticity of substitution among the different type of wine is not zero and depends on several factors. For this reasons to evaluate the interindustry interaction, it is necessary to use a CGE model which can manage variable elasticity of substitution. The aim of our paper is to analyse the effect of a change in VAT law. A change in this regime can have effects on composition and quality of wine.

Since in Italy a special regime of VAT is applied on agricultural producers, we focus our analysis on Marche Region data which we organise in a Social Accounting Matrix, using the CGE model to study different scenarios of VAT normative.

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1 Introduction

Present Italian regulations on the Value Added Tax (VAT) provide for the possibility, given to wine producers, to apply for a special procedure in the determination of the tax debt, applying the so-called Special Regime (IPSOA 2001). At the beginning of the solar year the producer has the possibility of opt either for the Special Regime (SR) or for the Ordinary Regime (OR). With the SR option, wine producers can take advantage of a special procedure in determining the allowances to be applied in the determination of the tax debt, which in determined through the application of special tax rates directly determined by the Ministry of the Economy.This procedure is motivated by the intention to favour some producing activities, among which agriculture is included. This facilitation is applied indirectly through the detection of special requirements which are requested to those who apply. One of the requisites necessary for admission to SR is the production of a set of goods determined by the law and the law provides the case of the agricultural producer who produces wine.

But the possibility let to producers to apply a special procedure in the determination of such tax, causes distortions in the working of the entire economic system. From this consideration comes the necessity of verifying which would be the effects, in terms of general equilibrium, in the case where wine producers were no more admitted to SR. The analysis of such a scenario can be made through a computable general equilibrium model (Fiorillo and Socci, 2003).

The model will be implemented on a numerical basis, denominated Flow Table (TFL) (Fossati, 1991), taken out of a SAM (Social Accounting Matrix) for the reference region. The matrix has to present a greater degree of detail for wine. In the production section, in fact we have to identify the various wine producers (wine industries) with the aim of isolating those who can be considered as agricultural and manufacturing producers, based

on Nace.Rev.1.[4] classification. Moreover a further distinction will be made within the two categories between white wine and red wine producers.

In the paper, after a brief introduction on the tax regulations, the data base (TFL) will be described rules and the calculation needed in order to build a numerical base for the evaluation of a VAT policy. In the following part a summary description of the CGE (Computable General Equilibrium) model will be given and the assumptions utilized.

Finally the results obtained will be presented under the scenario of modification of the VAT regulations. In particular, a simulation of the effects of the abolition of SR at national level. In this way we are able to evaluate the impact of such scenario on the major economic indicators and in particular on those tied to wine production.

2. VAT normative in Italy

The agricultural sector in Italy enjoys of the SR to Value added taxation. Such taxation varies according the typology and the volume of business of taxpayer. The SR is applied if there are the subjective condition (agriculture producer) and objective condition (sale of products that are included in a particular table) and it doesn't consider the juridical form of the subject that is submitted to such regime. In particular, this regime can be applied to individual or company subject. The principal feature of SR is the method used to determine the tax amount: The same taxation rates of OR are applied on sales of output while, for input purchases, their amount is put equal to output and the rates are those indicated in a appropriate ministerial table.

SR in agriculture is not compulsory and the agriculture producer can renounce to it applying the OR. Such waiver is convenient when the producer is in a situation of tax credit and asks for reimbursement since SR doesn't allow for reimbursements.

The VAT allowance on purchases (art.34 c. DPR 633/72) in the case of SR applied in agriculture, independently form the sales volume and unless OR option, provides for the

[4]The classification distinguishes beetween agriculture and manufacturing producers on the basis of grapes utilized in the production of wine. In the case where own grapes are used wine obtained is considered as an

determination of a lump sum equal to the amount determined applying the compensation rates determined by the Ministry (DM 12 maggio 1992 e DM 30 dicembre 1997) to the taxable base of agricultural output sales.

The difference between the ordinary rate and compensation rates represents the taxation rate of the producer. The "ministry" rate provides for a compensation rate for wine equal to 12,5 % for all wines except for those defined as "liqueur-like" and alcoholic, with alcoholic volume greater than 22%.

2 Data base for CGE model

The flow table (TFL) used as data base for the conmputational model is derived from a social accounting matrix for Marche regional for the year 1996. The original table has been modified in order to determine the VAT flows. In TFL columns refer to operators and columns to markets. Flows in this new table can be negatives when they represent a monetary revenue and positives when they stand for expenditures

The TFL, built according the flows of the SAM, has 7 industries 4 of which are related to wine product[5], 7 institutional sectors, capital formation, Rest of Italy, Rest of the World. Wine producers are separated according wine colour and source of grapes.

In the table we then find two activities that produce respectively white and red wine from own wine (WWA e RWA) and other two industries that produce white and red wine from purchased grapes (WWI e RWI).

Output generation is connected with value added distribution through the distinction among wages and salaries (dependent employee incomes) (LD), self employee incomes (*LA*), other incomes (OtherInc.) and indirect taxes (IIN). From these values VAT has been taken out in order to show the formation of deductible and non-deductible tax. IN the table we find the distinction between those producers in agriculture that has opted for the SR (s)

agricultural product while if purchased wine is used the product will be considered a munufacturing product.

[5]Agriculture, White Wine Agriculture, Red Wine Agriculture, Industry, Machine and Car, White Wine Industry, Red Wine Industry and Services.

and those who have chosen the OR in both cases separating debt VAT (d) from credit VAT (c). The table is evaluated in producers' prices which include VAT.

The rest of the table shows the income circular flow for the whole region, considering 5 subsectors for households(C_I, C_II, C_III, C_IV e C_V), enterprises(C_Imp) and government (PA). For each sector initial endowments (D) have been determined which are given by incomes and transfers (TrF and TrI). In the case of government transfers for direct taxes (IRAP, ID e AI) and social contributions (CS) are registered in a separate row.

The table closes with capital formation (FK) savings and net lending/borrowing with the rest of Italy (RDI) and with the rest of the world (RDM).[6]

4. Model and assumptions

The model proposed is of static general equilibrium-type. The region exhibits 7 industries operating in perfect competition on both the factors and the outputs market; one sector producing investment goods and 5 household consumption sectors ordered by income classes. It is constituted by an equation system based on a set of production functions, utility functions and income constraints[7]. The model is closed by a set of equations with the rest of the world.

Domestic output can be described as a two stage nested CES. In the first stage domestic intermediate consumption and total value added – dependent employee incomes (*LD*), self employee incomes (*LA*) and capital incomes (*K*) - are used as inputs. Elasticity of substitution between intermediate consumption and value added is zero. In the second stage, elasticity of substitution is kept equal to zero among all outputs except wine products. As to intermediate and final demand, elasticity of substitution among wine of the same colour is higher (100) with respect to wine of different colour (40). Finally elasticity of substitution for other goods is equal to zero.

[6]The flows from and to the rest of the world are net of import taxes.
[7]The presentation of various function follows the layout of module MPSGE for GAMS that divides the system in various blocks. The blocks are those of production, that of interregional commerce, the households demands, and government demand.

As to taxes VAT and net indirect taxes are calculated on the output price. The actual social benefits and IRAP – regional tax - are determined on the factors' price.

Total industry output value is then determined adding the value of imports to the domestic output value. Total output is calculated according the hypothesis by Armington of non perfect substitutability between domestic and imported goods. With reference to wine output the hypothesis was made of an higher elasticity of substitution between domestic output and imports for the rest of Italy (SI=100) and rest of the world (SE=10)

For what regard the welfare levels, we assume that the 5 households classes show a demand for the 7 industries, future consumption (savings); and decide the transfers amounts to firms and households.

Households endowments are given by labour compensation, untaxed capital incomes of companies[8], transfers from other sectors and external balance[9].

In order to define the behavioural functions of firms as to savings distributes dividends and taxes a similar procedure has been followed.

Incomes of firms are given by capital incomes and transfers. These incomes constitute profits which are splitted into non distributed profits transfers to households and transfers to other firms (dividends). On these transfers firms pay a tax IRPEG and other taxes[10].

Savings follow a kaldorian type of hypothesis: households have a savings propensity which is lower than firms and consume a share of their income; firm do not consume and either save or distribute dividends.

[8]In National accounts in fact small firms are included in the households sector.

[9]From the model implementation viewpoint, the consumers' utility function is treated as if it werw a production function of a composite good wealth whose inputs are private consumptions, savings and transfers. Such composite good is purchased using endowments.

[10]The firm sector is given by financial and non financial firms, that is companies (public and private), quasi-corporation, credit institution and insurances. Also in this case firms are seen as consumers of a composite good "profit" (V) generated by savings and distributed dividends, this composite good is purchased using capitsl and transfers received as endowments.

Government expenditure is given by collective consumption and transfers both to households and firms. It is financed through the taxes, operating surplus of government, public savings and transfers, including the rest of the world.

For what regards VAT in the model we have considered separately the debit and credit originating from it in both SR and OR.

The model is solved for relative prices and quantities, the price index has been chosen as numeraire so that all change can be interpreted as real changes.

5. Simulation and results

The model has been calibrated on the flow table previously shown. Simulation has been performed, in general, as percent changes with respect to the benchmark, given by the economy represent in the SAM. As usual in all CGE models data in benchmark are valued by a unit price vector. The general equilibrium solutions are then compared with the benchmark values[11].

The simulation presented considers the a scenario characterized by the abolition of the special VAT regime for the agriculture producers

From Table 1 we can observe the effect, in percent changes from the benchmark values, on the most relevant economic aggregates taken into consideration in the model. Under this scenario the demand for "agriculture produced" wine "agriculture produced" wine made by the five households sectors[12] (C) exhibits a slow down, both for "agriculture produced" white wine (WWA) and "agriculture produced" red wine (RWA).

This effect can be due to the increase in the prices of the two products (P) which determines a price change and a subsequent substitution effect. Moreover, a slow down in total output is also observed in the two industries (Q). The abolition of the SR is assumed

[11]Since we are determining a general economic equilibrium of the Walra type, market clòearing conditions are imposed (in the benchmark they are fullfilled since teh row sume of SAM is null), of zero profits and income constraints (zero column sums). Moreover we keep account of the behaviour of the agents (demand and production functions) according the description given in the previous section.
[12]Consumers are classified according income.

also in the rest of Italy where the higher tax rates imply higher price changes. We then observe import reductions of "agriculture produced" wine both from the rest of Italy and in a minor extent from the rest of the World.

For what regard "manufacture produced" wine an opposite sign effect can be observed, a possible substitution effect. Final demands for "manufacture produced" white and red wine (*WWI* and *RWI*) grows while an import increase is observed which is higher compared to the rest of Italy.

Table 1: Effects on principal aggregates in CGE model: different scenarios

	AGRICOL	WWA	RWA	INDUS	MACHINE	WWI	RWI	SERVICES
C_I	0,07%	-56,50%	-59,30%	0,07%	0,07%	45,80%	48,10%	0,07%
C_II	0,10%	-56,50%	-59,30%	0,10%	0,10%	45,90%	48,20%	0,10%
C_III	0,09%	-56,50%	-59,30%	0,09%	0,09%	45,80%	48,10%	0,09%
C_IV	0,03%	-56,50%	-59,40%	0,03%	0,03%	45,70%	48,00%	0,03%
C_V	-0,02%	-56,50%	-59,40%	-0,02%	-0,02%	45,60%	47,90%	-0,02%
PI	0,40%	1,30%	1,40%	0,02%	0,02%	0,10%	0,10%	-0,01%
QI	-0,08%	-14,30%	-12,50%	0,07%	0,06%	12,10%	12,00%	0,10%
MRDI	-0,40%	-77,00%	-74,50%	0,04%	0,05%	21,00%	22,80%	0,05%
MRDM	0,20%	-4,90%	-4,90%	-0,01%	-0,01%	12,60%	13,30%	0,02%
Q	-0,10%	-15,80%	-16,70%	0,05%	0,04%	12,40%	13,00%	0,10%
P	0,40%	1,30%	1,40%	0,03%	0,04%	0,10%	0,10%	0,00%

6. Conclusions

The VAT law in Italy allows producers in agriculture to adopt SR for the determination of the VAT tax which is also applicable to wine output.

This regulations generate a special fiscal advantage for those producers who have an high sales level and a realtively low input costs since deductible VAT can be determined on the

sales.

In many cases wine producers can be considered as manufactures which produce luxury goods, so that this benefif could be hardly justified. The abolition of the SR or the adoption of a targeting mechanism could be considered convenient in order to identify the outputs that could benefit from this regime.

The adoption of a maximum sales level represents a first step in this direction. The repeated prorogation of the preexisting regulations is in fact allowing advantages to producers that in fact have a producing organization which assimilates them to manufactures.

The simulation experiment shows the quantitative effects of the SR abolition in a general equilibrium framework. The substitution of "agriculture produced" between with "manufacture produced" wine is tied to the induced price change. Such substitution determines also an effect on imports which is more relevant for the rest of Italy.

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Table 2: Flows Table (TFL) for CGE model

	Agricol	WWA	RWA	indus	machine	WWI	RWI	services	FK	D_I	C_I	D_II	C_II	D_III	C_III	D_IV	C_IV	D_V	C_V	D_IMP	C_IMP	GT	PA	RDI	RDM
Agricol	-6688367	25387	16950	1518009	2656	49016	33704	79585	0	0	42621	0	91164	0	259536	0	161353	0	13111	0	0	0	0	4289057	106218
WWA	73	-342098	0	1153	0	4	0	96224	0	0	6961	0	14892	0	42402	0	26360	0	2134	0	0	0	0	151657	238
RWA	48	1	-228127	768	0	2	0	64165	0	0	4644	0	9933	0	28278	0	17581	0	1424	0	0	0	0	101137	146
indus	727739	61557	31894	-54623865	2667759	58237	25981	8429982	7029886	0	822431	0	2056595	0	7427058	0	4030238	0	249803	0	0	0	0	15446353	5558352
machine	37108	2383	1059	2540931	-15319853	1913	1294	964220	6249875	0	31459	0	246546	0	1652316	0	672050	0	8199	0	0	0	0	0	2910500
WWI	90	4	0	1410	0	-418118	1	117608	0	0	8506	0	18200	0	51823	0	32216	0	2608	0	0	0	0	185354	298
RWI	59	2	0	940	0	3	-278822	78425	0	0	5675	0	12139	0	34560	0	21486	0	1740	0	0	0	0	123608	185
services	396951	25493	11324	6129193	2236853	31163	13845	-45381028	0	0	1501492	0	3214286	0	9155165	0	5690854	0	460411	0	0	8530524	0	6908233	1075241
FK	2605100	2942	1962	0	0	3595	2398	533425	-13279761	-541762	0	-358528	0	0	1472335	0	4525842	0	1059508	0	2725605	0	0	3109131	-1861792
LD	190801	28665	19116	5053311	944628	26556	15111	9142691	0	-104170	0	-1567645	0	-8111635	0	-5469558	0	-284410	0	0	0	0	0	0	116539
LA	477728	84757	56519	1638276	153484	4841	3300	3465625	0	-300277	0	-359627	0	-2077141	0	-2697023	0	-450462	0	0	0	0	0	0	0
OtherInc	557899	98980	66004	5468111	518081	16159	11016	12634668	0	-217960	0	-349922	0	-2367306	0	-2968658	0	-970381	0	-12128380	0	0	-368311	0	0
C_I	0	0	0	0	0	0	0	0	0	2866492	-2866492	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C_II	0	0	0	0	0	0	0	0	0	0	0	6547183	-6547183	0	0	0	0	0	0	0	0	0	0	0	0
C_III	0	0	0	0	0	0	0	0	0	0	0	0	0	23209581	-23209581	0	0	0	0	0	0	0	0	0	0
C_IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17849068	-17849068	0	0	0	0	0	0	0	0
C_V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2562739	-2562739	0	0	0	0	0	0
TRF	0	0	0	0	0	0	0	0	0	-1702323	0	-3911461	0	-10653499	0	-6713829	0	-857486	0	0	9337435	0	14466540	20787	13836
TRI	0	0	0	0	0	0	0	0	0	0	40468	0	159843	0	553296	0	380463	0	12340	-12295353	3637352	0	5720393	0	1791198
C_IMP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24423733	-24423733	0	0	0	0
GT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8530524	8530524	0	0
IVA_ds	22382	5672	3792	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-31846	0	0
IVA_cs	-19942	-5054	-3379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28375	0	0
IVA_d	9971	2527	1689	17479490	1544235	76	51	16293106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-35331145	0	0
IVA_c	-11191	-2836	-1896	-16131351	-1431297	-170	-114	-14634331	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32213186	0	0
IIN	-259095	-31041	-20700	3083556	6799	201378	137286	66988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3185171	0	0
CS	149627	25386	16928	1667019	273563	7822	4587	3141008	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5285940	0	0
IRAP	22311	3785	2524	220041	36109	1032	605	414603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-701010	0	0
AI	934	-8	-8	1082	-9	-8	-8	-8	0	0	2458	0	6257	0	13659	0	9693	0	0	0	343606	0	-377640	0	0
IIM	44258	336	606	263707	149122	373	673	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-459075	0	0
RDM	558125	4226	7630	6995278	2669506	1471	2662	1773271	0	0	0	0	0	0	0	0	0	0	0	0	1857054	0	-4158264	0	-9710959
RDI	1177391	8934	16113	18692941	5548364	14655	26430	2719773	0	0	239203	0	242694	0	314144	0	355774	0	452829	0	4280916	0	-3754844	-30335317	0
ID	0	0	0	0	0	0	0	0	0	0	160574	0	474634	0	2205009	0	1925158	0	298632	0	2241765	0	-7305772	0	0