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VAT Incidence, Tax on Exports and the Measurement of Tax Burden on Tradable Goods: the Agricultural Sector Case

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Abstract

This paper analyzes conceptual issues dealing with the measurement of “sector tax burden”, specifically the methodological treatment of the Value Added Tax (VAT) and Tax on Exports, with particular reference to the Agricultural Sector. First, notions of tax impact (statutory or legal incidence), tax burden shifting and economic incidence of VAT applied to domestic goods are considered; second, the case of commercial (tradable) goods or commodities, which is the relevant case for Agricultural Sector. In this last case, Tax on Exports is also taken into account. Conclusions lead to recommend changes to the usual estimation of sector tax burden, which is considered wrong or at least incomplete in its treatment.

Key words: VAT, Tax on Exports, Tax Incidence, Sector Tax Burden, Agricultural Sector.

JEL Code: H2, Q1.

Resumen

En la presente nota se analizan aspectos conceptuales sobre la medición de la “presión tributaria sectorial”, específicamente referida al tratamiento metodológico del Impuesto al Valor Agregado (IVA) y las Retenciones que gravan las exportaciones, con particular referencia al Sector Agropecuario. En primer lugar, se repasan las nociones de percusión, traslación e incidencia tributaria en el caso del IVA aplicado sobre bienes domésticos, es decir, no sujetos al comercio internacional, para luego plantear el caso sin duda relevante para el sector agropecuario, de los bienes comerciables o exportables. En este segundo caso, se contemplan junto al IVA la existencia de las Retenciones. La conclusión alerta sobre la necesidad de modificar el cálculo usual o tradicional de la presión tributaria sectorial, que en base a lo que en la nota se analiza, se interpreta como erróneo o en todo caso incompleto en su tratamiento.

Palabras clave: IVA, Retenciones, Incidencia Tributaria, Presión Tributaria Sectorial. Sector Agropecuario

Código JEL: H2, Q1.

VAT Incidence, Tax on Exports and the Measurement of Tax Burden on Tradable Goods: the Agricultural Sector Case*

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Introduction

This paper analyzes conceptual issues dealing with the measurement of “sector tax burden” (STB), specifically the methodological treatment of the Value Added Tax (VAT) and Tax on Exports, with particular reference to the Agricultural Sector. Through numerical examples, diagrams and the analytical Appendix will be possible to review conceptual definitions of tax impact (statutory or legal incidence), tax burden shifting and economic incidence of VAT; first, applied to domestic goods, and afterward considering the relevant case for the Agricultural Sector of commercial or tradable goods (commodities). Finally, the derivation of this analysis for the measurement of STB.

The review of the less common case for the Agricultural Sector of domestic (not tradable goods) is directed to readers not familiarized with the technical procedure of the Fiscal Credit or Invoice type of VAT - which is the VAT modality applied in most countries including Argentina – and to introduce them to the corresponding tax burden estimation. Afterwards, taking VAT and Tax on Exports jointly, the tradable goods case is analyzed, which is indeed the relevant case for the Agricultural Sector.

The main conclusion leading this conceptual review is to suggest the necessity of modifying the methodology of sector tax burden measurement as it is usually found in the technical literature applied to the Agricultural Sector, which is considered wrong or at least incomplete from the economic point of view.

1) VAT: The initial assumption of sales directed to the domestic market only, constant costs curve (supply with infinite price-elasticity) and normal downward demand curve (negative price-elasticity)

Tables and figures shown below give an easy example of how VAT works in the production chain, assuming two goods (corn and meat) and three production stages¹. The three first examples have the usual assumption of forward tax burden shifting, as a consequence of supply and demand curve shapes mentioned in the title². It is a special example to consider, because usually VAT is excluded from the calculus of the tax burden

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¹ The example is purely illustrative, designed only to understand the calculus; it is an extraordinary simplification of the Agricultural Sector reality, with arbitrary figures and omitting a great deal of inter-industrial relationships, including those belonging to different activities within the sector.

² Additional simulations are presented later – corresponding to the consolidated Agricultural Sector– where such assumptions are modified.

on the Agricultural Sector³. Beside, in these three cases is assumed absence of sales directed abroad (international trade), so goods must be only sold in the internal market. Three stages are defined:

STAGE I: includes all activities linked to land labors – corn production, agricultural activities for cattle feeding and care – as the use of fertilizers, disease vaccines, gasoline, etc.

STAGE II: including corn recollection or cattle reproduction and animal feeding, depending on the good.

STAGE III: trading, for intermediate demands (wholesalers) and retail sales to consumers (retailers).

First, the example of Corn is presented (**Case 1**); second, the Meat case (**Case 2**), and, finally, the consolidated of both activities (**Case 3**) that represents a simplified version of the Agricultural Sector. Tables show the following columns:

PV: production value (equivalent to sale values in both versions, with and without VAT).

IC: input values (or intermediate consumption).

VA: value added.

T: tax revenue, with tax rate (**t**) levied uniformly in all stages, except for Stage I. That is:

Stage I: IC: $t = 20\%$; **PV:** $t = 10\%$. **Stage II and Stage III:** $t = 10\%$.⁴

TB: tax burden on value added.

Details about the calculus are shown in foot notes of Table 1, details that will be not repeated in next tables. In all tables can be observed the calculus of the “Addition VAT” modality - defined as the tax that levies the gross value added produced in each stage and assigned to factor of production employed in each stage - and the “Invoice” or “Fiscal Credit” VAT system, applied in Argentina and in most VAT legislations of the rest of the world, that levies the total value added accumulated in each stage (fiscal liability) allowing the deduction of the VAT charged in input invoices (fiscal credit). Finally, as it is systematically repeated at the bottom of each table, figures were simplified not considering decimals, except in few situations referred to tax burden coefficients (**TB**).

As can be seen in the example of **Case 1 (Corn)**, TB – that result from simulation in all production stages is 10%, except in Stage I (8%). The final result is 9%. In the table it is included two columns for PV; one corresponding to sale price with VAT included (column [1a]) and the other with VAT excluded (column [1b]). The first one identifies the final sale price that consumers or households pay including the VAT accumulated in all stages, and also including the VAT corresponding to input purchases. The second column corresponds to the production values excluding the VAT, that is all VA accumulated at each stage.

³ See for example the methodology used in tax burden estimations by product and by region in AACREA (2005) and the study of Prosap-Banco Mundial (2004), following recommendations of national accounting methodology.

⁴ Tax rates used here are close to tax rates fixed by the Argentine VAT law for the Agricultural Sector (21% in certain inputs of Stage I and 10,5% in sector sales) and were chosen just for simplification.

Case 1: Corn production sold to domestic demand only

STAGE	CORN								
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System			
	VAT inc [1a]	VAT exc [1b]				Liability [5]	F. Crédit [6]	T (Net) [7]	TB [8]
STAGE I: Land labors	77 ⁽⁵⁾	70	10+2 ⁽⁶⁾	60	6	7 ⁽⁷⁾	2 ⁽⁸⁾	5 ⁽⁹⁾	8%
STAGE II: Harvest labors	110	100 ⁽¹⁰⁾	70	30	3	10 ⁽¹¹⁾	7	3 ⁽¹²⁾	10%
STAGE III: Trading	121	110 ⁽¹³⁾	100	10	1	11 ⁽¹⁴⁾	10	1 ⁽¹⁵⁾	10%
				100	TB = 10%	28	19	9	9%

Note: decimals are omitted; little differences are due to calculus simplifications.

⁵ It is assumed that land labors are levied with tax rate $t = 10\%$. VAT liability – that levies the accumulated VA in this first stage - results 7; that is, $70 * 0,10 = 7$. Sale price in this stage *with VAT included* is estimated as $(10+60) * 1,10 = 77$.

⁶ The final production value of inputs - like fertilizers, agro-chemicals, etc. - *with VAT included*, is equal to 12, composed by a value added of 10 and the VAT that is assumed levying inputs with the general tax rate 20% ($10 * 0,2 = 2$).

⁷ Notice that 7 is the **fiscal liability** resulting from levying sales or production of Stage I with tax rate $t = 10\%$, *excluding the VAT that burdens it* and indicated in the column [1b], that is: $70 * 0,10 = 7$. That result could also be estimated using the tax rate $t' = 9\%$ levying the Production Value **including the VAT paid by this stage** ($70 + 7$; or $77 * 0,09 = 7$); because, $t' = t / (1 + t) = 0,10/1,10 = 0,09$. (Take into account previous warning about calculus simplifications).

⁸ This is the fiscal credit of Stage I due to the VAT incorporated in input invoices, and levied with the general tax rate 20% ($10 * 0,20 = 2$) already mentioned.

⁹ Correspond to the net VAT that results from the difference between the fiscal liability and the fiscal credit of this stage, which is lower than the one resulting from levying the VAT tax rate 10% the Value Added in the “Addition” VAT modality, as it was defined before ($60 * 0,10 = 6$) and indicated in column [4]. This makes possible to realize that calculus result applying Addition VAT is different to the one resulting from the Invoice System due to the incidence of the higher fiscal credit of the previous stage, where the tax rate is twice the one levying the sector chain.

¹⁰ The production value 70 of Stage I (column [1b]) is the intermediate consumption of Stage II, which production value without VAT results 100 after adding the value added 30 corresponding to the stage.

¹¹ Once again, fiscal liability of 10 could be obtain levying with the tax rate 10% (that is assumed burdening the harvest) the production value of Stage II *excluding the VAT that burdens it* – indicated in column [1b] – that is, $100 * 0,10 = 10$; or, using the tax rate $t' = 0,09$ levying the production value of Stage II including VAT that burdens the stage, that is, $110 * 0,09 = 10$.

¹² In this stage the equalization between both VAT systems (addition and invoice) is verified, due to similar treatment of the accumulated value added of the two stages (see column [4]).

¹³ Production value 100 of Stage II (column [1b]), is the intermediate consumption of Stage III; which production value without VAT is 110; that is, summing that intermediate consumption to the value added 10 corresponding to the stage. Notice that 110 is also the accumulated value added of inputs of Stage I plus value added of Stages I, II y III, that is, $10+60+30+10 = 110$.

¹⁴ Once again, fiscal liability 11 can be obtained levying the tax rate 10%, that burdens the trading activity for final consumption the production value of Stage II *excluding the VAT that burdens it* - indicated in column [1b] – that is $110 * 0,10 = 11$; or, levying with the tax rate $t' = 0,09$ the production value of Stage III with VAT included, that is, $134 * 0,09 = 11$.

¹⁵ Like in the previous stage, similar result is obtained from the Addition and the Invoice VAT Systems (see column [4]).

The final production value with VAT includes values added in the production of inputs and in the three stages of the sector ($10+60+30+10 = 110$), and the VAT of 11, that arises from summing all VAT paid due to inputs of Stage I and due to the corresponding production stages of the sector ($2+5+3+1 = 11$). That's why the final price for consumers or households results 121 ($= 110+11$). From the "accounting" point of view, in the "legal taxpayer" situation, with final sale of Stage III liabilities and fiscal credits compensate each other. For this reason is usually argued (wrongly) that VAT is finally paid by consumers or households. Actually, this tax incidence on households' welfare is the logic consequence of the forward tax burden transfer assumption (supply curve with infinity price-elasticity and demand curve with normal-negative slope) used to elaborate these examples, but not due to the accounting compensation between liabilities and fiscal credits¹⁶.

In **Case 2 (Meat)** you should notice the negative Net VAT of Stage I and the consequent difference between the Addition VAT and the Invoice VAT Systems, because in the former fiscal credits are not allowed (relative to the VAT charged on input invoices of Stage I). Under the assumption of devolution of the net fiscal credit in favor of the taxpayer, TB results 8%, though the legal tax rate that determines fiscal liability is 10%. The negative plus of Net VAT, or difference in favor of taxpayers, is very common in the Agricultural Sector, due to the different fiscal treatment (higher or "general" tax rate) of many inputs used in the production process relative to sector's sales (lower or "differential" tax rate). Many taxpayers complain for this reason, because VAT law doesn't allow the devolution of that difference, neither its compensation with others fiscal liabilities, while considering those net fiscal credits as "*saldos técnicos*" (technical differences), meaning that they are only accountable for liabilities derived from liabilities of the same tax¹⁷.

Case 2: Meat production sold to domestic demand only

STAGE	MEAT								
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System			
	VAT inc [1a]	VAT exc [1a]				Liability [5]	F. Crédit [6]	T (Net) [7]	TB [8]
STAGE I: Land labors	40 (9+1)	35	25+5	10	1	4	5	-1 (+1)	-10%(10%)
STAGE II: Cattle feeding	116 (115+1)	105	35	70	7	11	4	7	10%
STAGE III: Trading	139 (138+1)	125	105	20	2	13	11	2	10%
Final Result with revenue devolution of "technical difference" ("saldo técnico")				100	TB=10/100 =10%	28	20	8	8%
Final Result without devolution of "saldo técnico"								10	10%

Note: decimals are omitted; little differences are due to calculus simplifications.

¹⁶ We will go back to this point while considering the Destination VAT in case of tradable goods (exports).

¹⁷ Though in the future taxpayer could be allowed to compensate the difference with other tax liabilities, they will anyway suffer the financial cost of the advance payment that wouldn't be rebated.

In a *steady state* scenario that structure of net fiscal credit in favor of the taxpayer will subsist – as figures of the example indicate - so TB results higher. It's 10%. Final production value with VAT included is 139; it represents all values added from input production and production of the three sector stages (25+10+70+20 = 125), and the Net VAT of 14, that belongs to the Net VAT paid by input suppliers of Stage I and producers of each sector stages (5+1+7+2 = 14).¹⁸ That's why the final sales value to consumers or households results 139 (=125+14). Once again, this result comes from the forward tax burden shifting assumption, and not by the accounting of liabilities and fiscal credits.

The following example (**Case 3**) shows the consolidated of both goods, that is, the Agricultural Sector restrictively defined; that is, represented by the two analyzed activities (corn and meat). TB on Agricultural Sector with the Invoice System results a little higher than the TB calculated by the Addition VAT method, which doesn't take into account fiscal credits of VAT paid in inputs production. TB of 8,5% estimated by the Invoice System with revenue devolution of the "technical difference", represent a simple average of the two goods' TB (corn and meat), that is, 9% for Case 1 (Corn) and 8% for Case 2 (Meat); or 9,5% without that devolution. The difference between both goods depends on the different vertical value added structure and the incidence of intermediate consumption in each stage coming from sectors not belonging to the Agricultural Sector or due to different fiscal treatments.

Case 3: Agricultural Sector production sold to domestic demand only

STAGE	AGRICULTURAL SECTOR (CORN AND MEAT)								
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System			
	VAT inc [1a]	VAT exc [1a]				Liability [5]	F. Credit [6]	T (Net) [7]	TB [8]
STAGE I: Land labors	117	105	35+7	70	7	11	7	4 (5)	6% (7%)
STAGE II: Harvest labors and Cattle feeding	225	205	105	100	10	21	11	10	10%
STAGE III: Trading	260	235	205	30	3	24	21	3	10%
				200	$TB=20/200=$ $= 10\%$	56	39	17	
Final Result with revenue devolution of "technical difference" ("saldo técnico")									8,5 %
Final Result without devolution of "saldo técnico"								18	9 %

Note: decimals are omitted except in TB; little differences are due to calculus simplifications.

Final production value with VAT included is 260 - equal to the sum of both PV with VAT included, Corn (121) and Meat (139) – that accounts for all value added of input production

¹⁸ Without devolution of the "saldo técnico", the final price is higher in 1. With devolution, the final price would be 138.

and sector production ($35+70+100+30 = 235$), and the net VAT of 25 coming from the net VAT paid by inputs offstage I (7) and by each sector stages (18), ($= 7+5+10+3 = 25$). So final sale value to consumers or households results 260 ($= 235+25$). Once again, this result is due to the forward tax burden incidence assumption and not by the zero net accountable liability for sector taxpayers.

Now, dealing with the measurement of tax burden, it should be emphasized that in Stage I the Agricultural Sector “paid” to the Tax Revenue Administration an amount of 5 by the net VAT liability; in Stage II “paid” 10; and Stage III “paid” 3. All firms producing corn and meat paid a total of 18.

Actually, the incidence of the tax burden can't be observe in any of the numerical examples, because to know it the relevant question to be answered is what would have been the values added or the final prices of goods and factor of production services if VAT would not exist. If VAT would not exist, final prices (for consumers or households purchases) or the net values added in all stages would be very probably different to the ones indicated in the examples. They would depend on the tax burden shifting phenomenon, forward or backwards, that is, depending on demand and supply price-elasticity. Actually, this incidence does not matter at all in a usual study of sector tax burden; because the amount of 18 is tax revenue that certainly engrosses the Public Treasury just due to sector firms' activities, which produce and sale corn and meat, allowing the government to obtain those 18¹⁹.

Essentially, all three previous examples have an introductory aim to review the invoice (liabilities - fiscal credits) VAT mechanism. However, they belong exclusively to those assumptions indicated in the title of this section 1). **Figure N° 1** shows the rationale of them²⁰. Under the assumption of a domestic good sold only in the internal market, supply price-elasticity equal to infinite and demand curve of normal slope (negative), before VAT production - consumption level and price are indicated by sub-index **0**. That is, production - consumption level of **Q₀** and price **P₀**. Introducing VAT levying the value added in the production of the good, the new supply curve (including the tax) determines the new equilibrium indicated by sub-index **1**²¹, that is, **Q₁** y **P₁**. The tax reduces quantities (produced and consumed) in **Q₀Q₁**, rising price in **P₀P₁**. Government tax revenue is equal

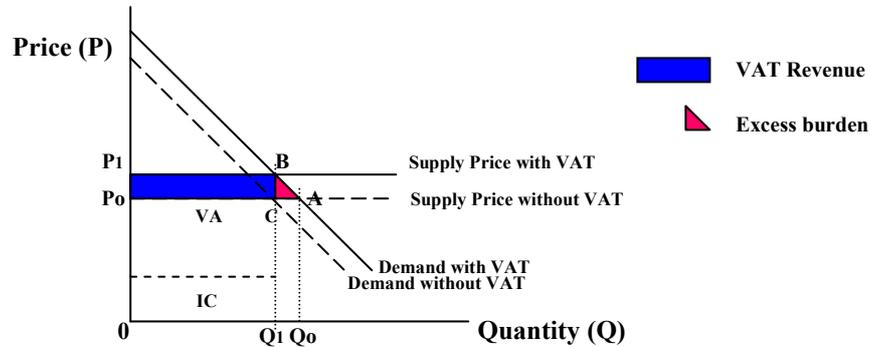
¹⁹ Tax incidence is an important issue in the study of income distribution. In that case it won't be irrelevant whether factor owners or final consumers suffer the tax burden and so how individual's welfare will be affected (depending on income functional and personal classification). It will depend on factors property structure and consumption by deciles. But in this case the point is the measurement of the consolidate macro-sector tax statutory impact. However, it is highly probable that welfare of those that work or live on sector activities will be affected by the tax. At least by modifying markets dimension – no matter the possibility or not of tax burden shifting forward and backward opened to firms – in some way factor owners' welfare belonging to those factors of production employed in the Agricultural Sector will be affected.

²⁰ For a complete partial analysis approach of tax incidence depending on demand and supply price-elasticity in case of domestic goods and in case of tradable or commercial goods (importable and exportable goods or commodities), see Piffano (1983).

²¹ As is drawn in the figure the tax effect could also be indicated by moving the demand curve to the left and backward, like a “consumption tax”, due to the equivalence between both type of taxes (on consumption or on production) in case of a domestic good, as it was explained in foot note of table belonging to Case 1, that is: $t' = t / (1+t)$, where t is the tax rate levying the cost of production and t' the tax rate levying the sale price (that includes the tax). However, as the VAT law assigns to the vendor or registered agent the tax payment responsibility (legal taxpayer), following the steps suggested by public finance theory (statutory incidence, burden shifting and, finally, economic incidence) all cases analyzed in this note will begin with the impact or statutory incidence of the tax. Reader should remember this while reviewing future examples.

to the rectangle P_1BCP_0 . This tax burden is completely shifted forward to the consumer, because the difference between the price paid before and the price paid after the tax by the consumer coincides exactly with the indicated price increase P_0P_1 . Producer or vendor, by the contrary, goes on receiving the original price P_0 .

Figure N° 1



Besides, in the figure can be observed that purchasers suffer an “excess burden” produce by the tax, equal to the triangle **ABC**. This type of welfare cost is usually subject to measurement in the studies of tax incidence and/or estimations of the marginal cost of revenues for the government, but it is not subject to calculus in the usual estimation of sector tax burden. What is measured as accountable to the sector is the rectangle P_1BCP_0 obtained by the government, under the premise that no matter who finally suffer the tax burden, who paid it are firms belonging to the Agricultural Sector.

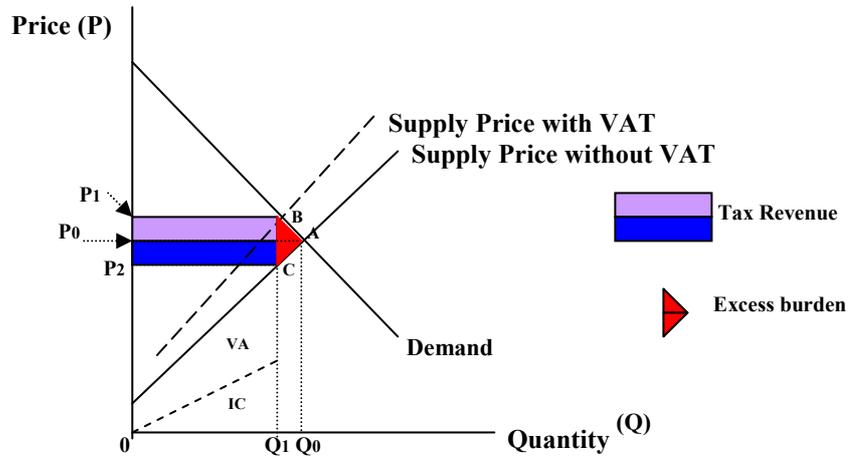
Finally, the interpretation that measurement of tax burden should be assigned to the Agricultural Sector no matter who will suffer the tax burden at the end of Stage III, could be understood to violate the accounting version of compensation between liabilities and fiscal credits when at the last stage the sector receives the whole price from consumers. However, firms belonging to each stage of production should face the payment of the corresponding net tax liability to the tax administration agency²², while some firms could also be burdened by fiscal credits higher than liabilities, differences that are not rebate by the government.

2) VAT: Agricultural Sector production sold to domestic market only, demand curve with normal decreasing slope (negative price-elasticity) and supply curve with normal increasing cost (positive price-elasticity)

Case 4 simulates the “normal” case of any domestic good (not international tradable good), that shows demand and supply curves with decreasing and increasing slope, respectively, as the title indicates. **Figure N° 2** illustrates the case.

²² Actually this is the usual cited advantage of VAT in comparison with the Retail Sale Tax – in addition to the “vendor-purchaser’s conflict of interests” that improves the enforcement of the tax – because the government will obtain something up stream in case of evasion at the retail level (that would be equivalent to give a “tax exemption” treatment at final stage).

Figure N° 2



As figure shows, introducing VAT appears a price-gap between the price paid by purchasers (P_1) and the price received by vendors (P_2). The tax burden supported by consumers is indicated by trapezoid P_1BAP_0 , and trapezoid P_0ACP_2 corresponds to vendors. Both trapezoids represent the tax revenue obtained by the government. Figure also shows the excess burden of the tax (the upper triangle affecting purchasers and the bottom one affecting vendors). However, according with the methodology used for the measurement of sector tax burden, total rectangle P_1BCP_2 should be assigned to legal taxpayers; that is, to vendors.

Table of **Case 4** illustrates a numerical example that assumes a partial forward tax burden transfer of 50%. Starting from data contained in Table of Case 3 - where the complete forward tax burden shifting results in a final price of 260 - assuming a partial forward shifting of 50% the final price with VAT included results 230 $[(60/2)+200]$. That implies a value added reduction in all the production chain of 11,5% $[= 1 - (230/260)]$.

TB is similar to the one of Case 3, but the absorption of it is now partially supported by the Agricultural Sector whose value added is reduced 11,5%; as an obvious consequence, this implies a reduction in factors of production prices employed in the Agricultural Sector.

Case 4: Agricultural Sector production sold to domestic market only, facing demand and supply normal curves (price-elasticity negative and positive, respectively)

STAGE	AGRICULTURAL SECTOR (CORN AND MEAT)								
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System			
	VAT inc [1a]	VAT exc [1a]				Liabilty [5]	F. Crédit [6]	T (Net) [7]	TB [8]
STAGE I: Land labors	102	93	31+6	62	6	10	6	4+1	8%
STAGE II: Harvest labors and Cattle feeding	200	182	93	89	9	18	10	8	9%
STAGE III: Trading	230	209	182	27	3	21	18	3	11%
Final Result				178	18	49	34	16	TB=16/178 = 9%
					TB=18/178= = 10%				

Note: decimals are omitted except in TB; little differences are due to calculus simplifications.

3) VAT: Agricultural Sector production sold totally and partially abroad, with Tax on Exports

When the case of tradable goods (more specifically exportable goods) is considered, it is possible to understand the more real scenario for analyzing tax burden measurement and tax incidence when VAT levies the production of goods and at the same time exports of those goods are levied by a Tax on Exports. In this case it is necessary to introduce the assumption of infinite price-elasticity of demand, the usual assumption for small countries – price takers – that will be the relevant demand to determining the domestic supply level.

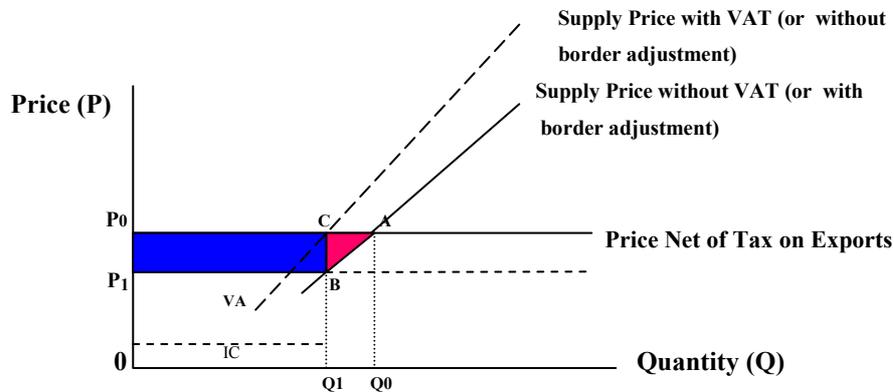
In order to organize with certain systematization the logic of this more complex and real scenario, two cases will be analyzed. First, **Case 5:** Agricultural Sector production destined **totally** to exports with border adjustment (VAT rebate for exports or “zero-tax rate” treatment). Second, **Case 6:** Agricultural Sector production destined **partially** to exports with border adjustment, which is the more relevant scenario for the Agricultural Sector.²³ **Figure N° 3** describes **Case 5**.

In case of VAT levying exports, **without border adjustment**, clearly the Agricultural Sector would support the total tax burden indicated by the rectangle P_0CBP_1 , together with the excess burden indicated by the triangle **ABC**, since the effective net price for the sector would be P_1 . This is due to the fact that price P_0 implies the infinite elastic demand

²³ Border adjustment for exports (VAT rebate) is the modality of “Destination-VAT”, which is the VAT modality adopted by most countries, compatible with WTO agreement.

curve that supply faces. That price already takes into account the existence of the Tax on Export, which was omitted in the figure for simplicity.

Figure N° 3



But now **introducing border adjustment** that implies the rebate of tax revenue levied on goods that are later export, the Agricultural Sector faces back the original price P_0 . The direct effect of VAT (dealing with the tax revenue on exports) disappears and also the excess burden supported by producers does. Table corresponding to **Case 5** shows a simple simulation, which maintains the original assumptions of Case 3.

Case 5: Agricultural Sector production sold totally abroad with border adjustment (rebate of VAT for exports)

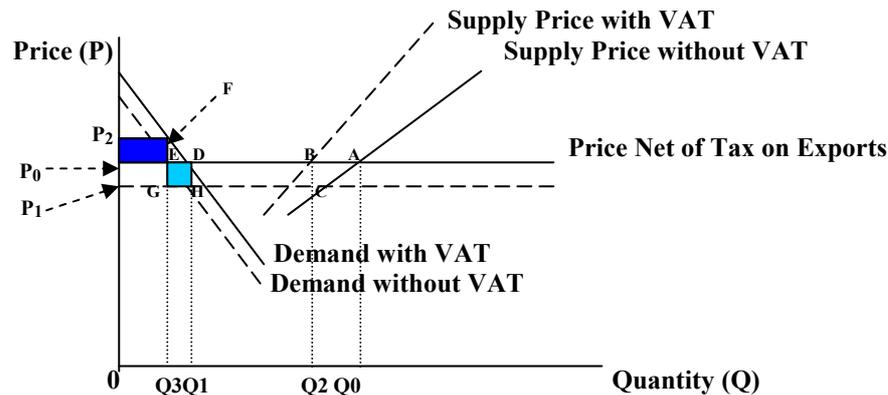
STAGE	AGRICULTURAL SECTOR (CORN AND MEAT)								
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System			
	VAT inc [1a]	VAT exc [1a]				Liability [5]	F. Credit [6]	T (Net) [7]	TB [8]
STAGE I: Land labors	117	105	35+7	70	7	11	7	4+1	7%
STAGE II: Harvest labors and Cattle feeding	226	205	105	100	10	21	11	10	10%
STAGE III: Trading	260	235	205	30	3	24	21	3	10%
Result with “saldo técnico” included				200	20	56	39	18	
Adjustment in Frontier (Rebate of VAT)								-17	
Final Result without devolution of “saldo técnico”								1	TB=1/200= = 0,5 %

Note: decimals are omitted except in TB; little differences are due to calculus simplifications.

Though rebate of all VAT levied on exports TB on sector value added is positive in 0,5%, as a consequence of the “no rebate” of the “*saldo técnico*” (technical difference) assumed in the original Case 2 (Meat).

Case 6 dealing with Agricultural Sector production destined partially to exports with adjustment in frontier is shown in **Figure N° 4**.

Figure N° 4



The only possibility that consumers do not support the tax burden is that government does not levy imports with the VAT. In such a case, the external demand curve (price net of tax on exports) would represent the infinite-price-elastic demand curve and the infinite-price-elastic supply curve at the same time, which means no tax burden shifting forward or backwards, because all sales would face the price P_0 . But in that case the Agricultural Sector would export all production (avoiding paying the tax) and the domestic demand would import all consumption (avoiding also paying the tax). Government wouldn't collect any VAT revenue, which means the same result of extending the “zero-tax rate” treatment to all sector's sales.

Simulation of **Case 6** assumes Agricultural Sector exporting only 30% of its production and, consequently, only that portion has “zero-rate” treatment. The rest 70% purchased domestically is levied by the tax.

Now TB is 6%, one third lower than TB of Case 3 (8,5%); due to the reduced 70% of internal purchases (omitting decimals: $8,5\% \times 0,70 = 6\%$). This is the measurement of sector tax burden in the traditional methodology, no matter what the incidence of the tax could be.

Case 6: Agricultural Sector production sold partially abroad with border adjustment (rebate of VAT for exports)

STAGE	AGRICULTURAL SECTOR (CORN AND MEAT)								
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System			
	VAT inc [1a]	VAT exc [1a]				Liability [5]	F. Credit [6]	T (Net) [7]	TB [8]
STAGE I: Land labors	117	105	35+7	70	7	11	7	4 (+1)	6%
STAGE II: Harvest labors ... Cattle feeding	226	205	105	100	10	21	11	10	10%
STAGE III: Trading	260	235	205	30	3	24	21	3	10%
				200	20	56	39	17 (18)	
Adjustment in Frontier (Rebate of VAT) (30% * 17, that is, without accounting 1 due to “saldo técnico” = - 5)				200	TB = 12/200 = 6,5 %			12	6%
Final Result without devolution of “saldo técnico”				200	TB = 13/200 = 6,5 %			13	6,5%

Note: decimals are omitted except in TB; little differences are due to calculus simplifications.

4) Additional comments on VAT and Tax on Exports Incidence

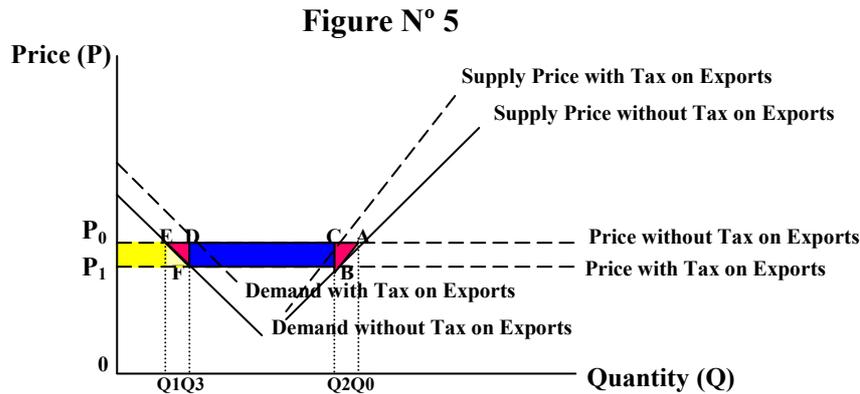
Through all cases analyzed before was possible to demonstrate that depending on price-elasticity of demand and supply, different results will arise in tax revenue and tax burden shifting forward and backward and economic incidence of the tax. Those results are obviously different in case of domestic (or non-tradable) goods and in case of tradable goods (commodities). But it should be emphasized that in all cases the Agricultural Sector is the legal taxpayer, so the measurement of tax burden should assign revenues paid by the sector, no matter whether tax burden could be finally shifted forward or backwards through market mechanisms.

Anyhow, for further understanding of the point, it is useful to analyze the effect of others “equivalent public policies” that governments usually implement as substitute of fiscal-tax policy.²⁴ The instrument more relevant and well known by exporters and commodities’ producers is Tax or Quota on Exports.

Figure N° 5 shows the Agricultural Sector producing with an upward or positive sloping cost curve (supply curve with “normal” sloping), facing an also “normal” decreasing or

²⁴ “Equivalent public policies” are defined as the implementation of alternatives policy instruments or a combination of policy instruments that have similar fiscal or quasi-fiscal results in government finance and equal economic effects (economic incidence) in the private sector.

negative sloping domestic demand curve and a constant-international infinite-price-elasticity demand curve.



Dealing with a tradable good (*commodity*), domestic price is the one prevailing in the international market. So, in a small country – price taker - , neither domestic vendors nor purchasers can modify prices. In that scenario it is interesting to see what happens with tax incidence when goods are levied by the VAT and by Tax on Exports at the same time. One important assumption is the usual treatment of the “Destination VAT” - adopted in most legislation in the world, including Argentina - levying import goods, including all tradable good (as foreign competitive exportable goods), as the one of Case 6 saw before²⁵. Figure N° 5 shows that without VAT and Tax on Exports, producer faces the international price P_0 (international price by the corresponding rate of exchange), that is an international infinite price-elastic demand curve at price P_0 . Price P_0 allows producer to offer the quantity Q_0 . A portion of that product is consumed internally – the quantity Q_1 – and the rest ($Q_0 - Q_1$) are exports.

If the government introduces a Tax on Exports, the burden implies a reduction of the domestic price to P_1 . This new price and the existence of decreasing costs, lead to the lower sector production Q_2 . On the contrary, the lower domestic price leads to an increase in the domestic demand (Q_3). As a joint effect of less production and more domestic consumption, exports decrease to ($Q_2 - Q_3$). Government obtains the Custom revenue equivalent to exports ($Q_2 - Q_3$) by the tax rate ($P_0 - P_1$), that is, the area **DCBF**.

Effects of the Tax on Exports on the welfare of factor owners employed in the Agricultural Sector (landlords, entrepreneurs, and rural workers) are obviously negative. But the reduction in monetary terms of sector welfare due to tax on exports is higher than the amount of revenues obtained by the government; the loss is equivalent to trapezoid **P_0ABP_1** . This loss in welfare can be divided into four areas: **DCBF** – corresponding to the tax revenue obtain by the government -; the area **P_0EFP_1** – corresponding to the implicit transfer and consequent welfare improvement of domestic consumers -; and, the two triangles **EDF** and **ABC** - representing the excess burden of the tax -.

Following the traditional methodology of sector tax burden measurement only the area corresponding to tax revenue obtain by the government is taken into account. However,

²⁵ Conceptually, to levy imports with the VAT, is equivalent to levy imports with a custom duty with similar tax rate. Actually, the value added of the good produced in a foreign country is the tax base of any custom duty.

Price P_1 in **Figure N° 6**, performs the roll of price P_0 of **Figure N° 4**. VAT levying internal purchases is supported by the domestic demand, but due to the increase of Tax on Exports or the quota on exports, the tax burden is shifted to the Agricultural Sector, compensating the incidence of VAT. Exports are reduced to $Q_5Q_6 = JI$. Final price to producers has been reduced to P_3 ; sector production falls once again – due to this new negative incentive - from Q_2 to Q_6 .

Conclusion that can be arrived from this analysis is: since the tax revenue obtain by Tax on Exports do not take into account the total cost produced by the price reduction, to account the VAT revenue in the tax burden corrects that under-estimation of tax incidence. In the example, 10% of tax rate in VAT compensates the amount not taken into account of the effects of the 10% corresponding to Tax on Export. But actually both tax burden should be accounted while calculating the STB.

The numerical example can be observed in table of **Case 7**. The example assumes equal tax rates (10%) for VAT and Tax on Exports. Since final price to consumers with VAT included was 260 in Case 3, it is reduced to 90% as a consequence of Tax on Exports (rate 10%). From that new price should be estimated the impact of VAT along (upstream) the chain. Values added in each stage are reduced in 10%. In the example once again is assumed backward shifting of the tax on exports` burden, so the value added of the input supplier of Stage I is also proportionally reduced. Exports are supposed to represent 30% of total production.

Summing up results: “total impact” or “total statutory burden” on added value of the Agricultural Sector identified as “Extended estimation” (TB1) is equal to the sum of the net VAT tax burden (6%), plus “tax on production” (14%) due to Tax on Exports (total 20%). The “Restricted estimation 1” (TB3) does not compute VAT and maintains the imputation of the “tax on production” (14%). The “Restricted estimation 2” (TB4) computes VAT and Tax on Exports (6% + 4% = 10%). Finally, the “Usual estimation” (TB2) considers 0% for VAT – due to liabilities-fiscal credits compensation - and only takes into account Tax on Exports $[(259 \times 0,30 \times 0,10) / 180 = 4\%]$. Consequently, in comparison with the “Extended estimation” (TB1), the “Usual estimation” (TB2) implies an underestimation of 80%; the “Restricted estimation 1” (TB3) 30%; and, the “Restricted estimation 2” (TB4) 50%. The application of a “strict statutory burden approach” corresponds to TB1 that computes all tax payments – explicit or implicit – made by the sector, including: VAT (“net liability-fiscal credit balances” of each stage and “technical negative balances” or VAT net fiscal credits not rebated to taxpayers) and the impact (omitted in public accounting) of the tax on production caused by the Tax on Exports (that finances the subsidy to domestic demand).

Finally, in a more realistic economic model in which interindustrial relationships between firms belonging to the own sector were taken into account (transactions between firms belonging to the same Agricultural Sector)²⁸, the tax on production effect of tax on exports should be reduced in proportion to that self-input-production²⁹. Only the production directed to final demand (consumers or households) and intermediate demand belonging to others sectors should be computed. The effect of that portion of self-input-production

²⁸ For example, if activity “Meat” requires inputs of activity “Corn” for cattle feeding.

²⁹ A *computable general equilibrium* model applied to the estimation of the agro-industrial chain’s tax contribution in Argentina, where these relationships are taken into account, can be found in Porto, Piffano and Di Gresia (2007).

would be similar to the traditional concept of tax expenditures, that is, a tax and a consequent subsidy not computed or not registered affecting to the same sector.

Case 7: Agricultural Sector production sold partially abroad, with infinite-price-elasticity of external demand, domestic demand with normal negative slope (negative price-elasticity), levied by Tax on Exports and VAT (with rebate of VAT for exports)

STAGE	AGRICULTURAL SECTOR (CORN AND MEAT)													
	PV		IC [2]	VA [3]	T (Addition VAT) [4]	Invoice System								
	VAT inc [1a]	VAT exc [1a]				Liability [5]	F. Credit [6]	T (Net) [7]	TB [8]					
STAGE I: Land labors	106	95	32+6	63	6	10	6	4+1	8%					
STAGE II: Harvest labors and	205	185	95	90	9	19	10	9	10%					
STAGE III: Trading	234	212	185	27	3	21	19	2	7%					
				180	18	50	35	16						
<ul style="list-style-type: none"> • Net VAT with “saldo técnico” included (column [7]) • VAT Rebate for Exports [15 x 0,30] without “saldo técnico” • VAT Net of Rebate • Tax Burden Net VAT • Tax on Exports (= 260x0,30x0,10) • Total impact of Tax on Exports³⁰ [260 x 0,10] 					16 - 5 11 (= 16 - 5) 6,1% (=11/180) 8 26									
Final Result – Alternatives estimations														
<ul style="list-style-type: none"> • Result 1 (VAT + Total impact of Tax on Exports) • Result 2 (Tax on Exports) • Result 3 (Total impact of Tax on Exports) • Result 4 (VAT + Tax on Exports) 					37 8 26 19					TB ₁ (Extended estimation) = 37/180 = 20,5 % TB ₂ (Usual estimation) = 8/180 = 4,4 % TB ₃ (Restricted estimation 1) = 26/180 = 14,4% TB ₄ (Restricted estimation 2) = 19/180 = 10,5%				
Notes: <ul style="list-style-type: none"> Extended estimation = VAT + Tax on Production = 6,1% + 14,4% = 20,5% Usual estimation = Tax on Exports (without VAT) = 4% Restricted estimation 1 = Tax on Production (without VAT) = 14,4% Restricted estimation 2 = VAT + Tax on Exports = 6,1% + 4,4% = 10,5% 														

Note: decimals are omitted except in TB; little differences are due to calculus simplifications.

5) Final remarks

This note explains formal and practical concepts dealing with the measurement methodology of sector tax burden, with especial reference to the cases of VAT and Tax on Exports in the Agricultural Sector. The election of VAT in examining the estimation of sector tax burden has indeed a particular reason. It is a tax usually excluded in the estimation of the STB. The argument suggested for that exclusion is the particularity of the

³⁰ Implicit value of the “tax on production” due to Tax on Exports.

liability-fiscal credit mechanism of the tax that implies the cancellation of both flows (liabilities and fiscal credits) at the producer level once the good is purchased by consumers, and the assumption link to this argument of total forward translation of the tax burden along the production chain. So final payment of the gross liability incorporated in the invoice extended to final consumers or households would close the chain with zero producers' net tax burden.

However, forward shifting assumption depends on market circumstances. It is different in case of domestic goods and in those of commodities or tradable goods. The consequences on tax revenue for the government and the effect on welfare of people involved in market transactions depend on supplies and demands price-elasticity.

The aim of any study on sector tax burden is to measure what the Government collects in taxes paid by the activity performed by the sector subject to measurement (in this case the Agricultural Sector), without trying to investigate who finally supports the burden of taxes. That means that sector estimation of tax burden follows the approach suggested by the national accounting methodology that defined that burden estimation at the moment of the "impact or statutory burden" of the tax.

Seeking that objective in case of domestic goods - not tradable - the results of VAT statutory incidence and economic incidence have been explained using an imaginary example for the Agricultural Sector - defined as composed by the production of two goods or activities: corn and meat – and identifying four cases that contain different assumptions. The first four examples are devoted to non-tradable goods; three cases (1, 2 and 3) measure the tax burden in the good "Corn", in the good "Meat" and the consolidated (Agricultural Sector), using the usual tax burden forward shifting assumption. The fourth example (Case 4) assumes partial forward tax burden shifting.

Though in case of VAT tax burden could be assigned to households by the reason already explained of economic incidence, it is clear that who pays the tax to the Government is the Agricultural Sector as legal or registered taxpayer, so methodology should be applied strictly the "impact or statutory incidence" criterion, assigning the tax burden to the sector.

In case of tradable goods there is a particular situation. Dealing with this type of goods, the remaining three cases have been dedicated to them and simulated. In these situations the presence of Tax on Exports and VAT were analyzed. The intention of this combination, obviously deliberated, is to identify what is considered a usual failure of estimation of sector tax burden. While VAT is excluded from the estimation, it is usually computed the Tax on Exports revenue collected by the Customs Administration. However, this procedure doesn't contemplate the well-known fact that Tax on Exports implies a "tax on production", because the reduction of the internal price is similar to introduce an equivalent additional cost in production. Tax Administration accounting, however, registers only a part of the value subtracted to the sector by that reduction of the price – the one collected by the Custom Administration in concept of Tax on Exports – while the rest of that "tax on production" doesn't appear in the calculus. Actually, that part of the tax finances a transfer or subsidy to the domestic demand. Following similar criteria of public accounting technique dealing with the concept "tax expenditure", all impact of the tax and the corresponding subsidy (not only the net result or the difference) should be registered.

Observing the necessary coherence in the imputation of sector tax burden on tradable goods, that is, maintaining the logic of the "statutory incidence" approach applied in case

of domestic goods, the correct method should be the “Extended estimation” alternative (TB1).

In case of tradable goods adopting the “economic incidence approach” of VAT – which implies null imputation of this tax to sector tax burden under the questionable assumption of forwarding tax shifting – a basic principle of coherence would suggest not to omit computing the Tax on Exports incidence (using the “Restricted estimation 1), so taking into account the “tax on production” implicit in the effect of Tax on Exports, and destined not only to generate revenues to the government but particularly to finance the subsidy to domestic demand³¹.

The “Restricted estimation 2” pretends to be a “commitment-agreement methodology”, as long as it could be assimilated to a percussion approach that hides or neglects the lack of registration of the tax on production and the subsidy to the domestic demand caused by the tax on exports while imputing VAT revenue.

Finally, if the “Usual estimation” or the “Restricted estimation 1” were adopted, for an elementary reason of consistency, it should not be imputed to the sector the total VAT revenue, that is, excluding also VAT levying domestic goods.

Appendix

“On Sector Tax Burden Measurement and the Concept of Tax Expenditure: Something Important is Missing” (*)

Introduction

The traditional concept or the old version of Public Finance formulated a definitive and clear cut differentiation among three dimensions of any government budget:

- a) Expenditures, essentially referred to services categorized as "public goods" and/or "mixed goods" (general administration, defense, security, justice, general education, public health) representing the purchase of goods and services dedicated to compliment such functions;
- b) Taxation, as the genuine source of public expenditure financing;
- c) Public Debt or the Use of Public Credit, as an extraordinary resource to finance capital expenditure and very exceptionally to cover government's operative deficits.³²

In federal governments, it was assumed the existence of “autonomous sub-national level of governments”, governing their own fiscal equation (expenditure and resources) with independence of others government levels, seeking for their financial sustainability in the long term. Very exceptionally, sub-national levels of governments could obtain contributions from the central or national government, to overcome financial shocks or

* From Piffano (2004a).

³¹ Actually, the usual justification for levying taxes on exports or quotas to exports has not been the “fiscal aim”, but to regulate internal or domestic commodities’ prices.

³² The possibility of deficits under recession periods of the economic cycle was popularized by the Keynesian vision on the roll of public finance (Musgrave, 1959). Further contribution, like the “ricardian equivalence principle” suggested that deficits mean future taxes, and that public debt do not affect consumer behavior in the long term.

fiscal emergencies. Each level of government being responsible for the provision of public goods constitutionally assigned or justified for regional or economic reasons – depending on the spillover of benefits (externalities) produced by such public goods –.

The modern concept of Public Finance has changed such clear-cut definitions, due to several factors, most of them bound to the evolution of government's objectives and, in many cases, due to changes of the strategic attitudes of policy makers in the administration of public money. A non exhaustive list is:

- 1) The appearance and development of “transfer expenditure” (“negative taxes”), bound to redistributive goals (of growing magnitude since World War II);
- 2) Government regulations that are equivalent to fix taxes and subsidies, like labor regulation, the used of “clean technologies” on behalf of certain industries, quantitative restrictions, and other equivalents policies;
- 3) Tax expenditures, like exemptions, special tax deductions, tax rates differentiation, and other taxation advantages granted to certain taxpayers changing the amount of the liability according with the tax law. This is equivalent to force the payment of the tax and at the same time to subsidize such taxpayer with a transfer included in the public budget.
- 4) The appearance and increasing modalities of public debt: transitory loans and money emission by central banking to finance the Treasury; open market operations to regulate the price of the public bonds; subsidies or loans with negative effective interest rates from central banking to the banking sector; and rate of exchange insurances covering exchange risks of the private sector and government's entities, essentially aiming to facilitate the entry of foreign currencies and foreign direct investments to the country. These are measures equivalent in their economic effects to the establishment of taxes and subsidies, but through administrative mechanism outside government budgets.
- 5) “Contingent debts” and “unfunded mandates or unfunded liabilities”, a sort of “not registered debt”: credit operations of public entities guaranteed by the national government with high probability of default of these entities, regulations of pension systems that generate “induced debt” when its cash flow design violate the appropriate actuarial equation; labor and commercial operations of government's entities with the private sector, generating judicial demands against the government with high probability of success. This policy measures equivalent to fix operative expenditures and explicit subsidies for such concepts in the government's budget.
- 6) The creation of “fiduciary funds” that are financed with “financial applications” of supposed governments' surplus, with low probability of money recovering, and whose management eludes normal budgetary controls.
- 7) The so called “creative accounting”, registering operations as surplus applications, while subsidizing public entities, national or sub-nationals, instead of exposing that expenditures as “primary expenditure” (“above the line”) of the budget.

In case of federations like Argentina, important changes have been also introduced in the conception of Public Finance relative to fiscal federalism:

- 1) The existence in the central government's budget of “national expenditures” that imply “local public goods”, which should be primarily financed by sub-national governments;
- 2) The creation of “common funds” (common pools) through tax sharing or revenue sharing systems in substitution of local or provincial own taxes, according to constitutional design of taxing power assignment between level of governments.

- 3) The growing use of discretionary federal subsidies (in Argentina the “ATN” or “*Aportes del Tesoro Nacional*”) to sub-national governments, not always justified by asymmetric shocks in provincial fiscal situation;
- 4) The “tax expenditure” bound to fiscal incentives granted to activities with certain specific regional localization (in Argentina: “*regímenes de promoción regional*”), based on the argument of the economic recovery of poor areas.

The intention of this Appendix is to review some issues dealing with the economic effects of this new conception of Public Finance, particularly the tax expenditure concept, and those policy instruments relevant for the methodology of sector tax burden measurement.³³

The “Tax expenditure” concept

Tax expenditure is a concept introduced by Stanley Surrey³⁴, Fiscal Administrator, Professor of Law at the Harvard Law School and former president of the National Tax Association (USA). In 1968 Surrey observed that many dispositions of the American Tax Code granting preferential advantages to certain people or activities were essentially similar to levy with the tax to such people or activities and to use the corresponding revenue to subsidize such taxpayer or activities, so treating the decision as an expenditure of the public budget. Surrey suggested that contrary to the rest of fiscal decisions included in the public budget, these assignments were treated with no similar legal control, or received little attention for the fiscal analysis, like the one corresponding to explicit expenses included in the budget. So as Secretary of the Treasury Surrey produced the first “budget” of tax expenditure, listing a series of articles of the tax code. This practice was then incorporate as a formal obligation since 1974 by the “Budget Control and Impoundment Act”. From that moment on, many American states and other countries adopted this modality of budget accounting.

In USA the Federal Government carries out Reports on Tax Expenditure in the case of the Income Tax (Individuals and Corporations). On the other hand, the states cover a wider range of taxes, including the Retail Sales Tax and Excise Taxes, and in some states the Real Estate Tax. The first state that applied the tax expenditure report was California, with the budget of Fiscal Year 1976.

The expectations generated by the concept were big. It was not simply seen as an improvement in budget accounting, but rather a better control mechanism over fiscal policy making, probably inducing changes or reforms in the tax code, by informing about the existence of such subsidies, and political inducing its substitution by specific expenditure programs, subject to cost-benefit analysis as the rest of government’s programs. This would imply, finally, a better control of fiscal policy.

Helen F. Ladd³⁵ analyzed the evolution of the use of the concept. Using her paper as source of this arguments-historical revision, some issues of the technical discussion are reviewed next.

³³ Regional aspects of this question were analyzed in Piffano (2004a and 2005).

³⁴ Surrey (1973); Surrey and McDaniel (1985).

³⁵ Ladd (1999).

1) *The budget accounting problem*

The USA 1974 Budget Act defines “Tax expenditure” to “those revenue losses attributable to provisions of the Federal tax law which allow a special exclusion, exemption or deduction from gross income or which provide a special credit, a preferential rate of tax or a deferral of tax liability”. Though this clear definition, the practice or use of the concept arises some important methodological problems.

1^o) in order to identify the special exclusion or special deduction it should be first necessary to define certain basic tax structure (the benchmark or “the baseline tax structure”). And here different approaches or criteria appear. For example, if the VAT law does not levy investments, should this exclusion be computed as tax expenditure? It depends of how VAT is defined in the baseline system. If VAT is defined as a “Consumption VAT”, that exclusion should not be considered as tax expenditure. On the other hand, if some activity is exempt or levied with a preferential rate, it should be. But, in those activities not levied by the general rate like food or pharmacy (drugs), the revenue lost by tax rate differentials is really tax expenditure?

Other cases, some of them cited by Ladd as the one corresponding to the state of Minnesota where 60 categories are contemplated in the Real Estate Tax, the problem is how should defined the normal case of those 60 categories. In case of the Income Tax, the exclusion of capital earnings from the tax base should be considered tax expenditure? The economic benefit of using own housing should be computed as tax expenditure? The adoption of the standard Haig-Simon criterion – comprehensive approach for the Income Tax – has not been the one adopted in most countries. For example, the Treasury of USA certainly did not adopt it, and the benchmark in such a case like also in Argentina is referred to the Income Tax as usually is legislated in both countries, computing only the monetary flows perceived by the exercise of a permanent activity, not levying capital earnings, and computing as tax expenditure certain special exclusions contemplated in the tax law. But criteria followed by federal and state governments are not always similar; Ladd cites that the list of tax expenditure of the states in USA varies between 150 and 300 articles. The Federal Government contemplates 135 articles.

This is the most important technical challenge to the concept: to define the baseline tax system (the benchmark) on which to define what is tax expenditure to compute the differences or the apartments of the specific tax legislation.

2^o) A technical problem arise when trying “to add” estimations of singular tax expenditures to estimate the total tax expenditure, for categories or general. To know or estimate which revenue had been lost by the government due to certain tax expenditure decision is not a simple task, because either previous data on revenue linked to the article do not exist - being the rest invariable - or many things have changed (changes in other articles of the tax in question, other policy measures and the economic scenario) influencing each other in their effects.

Revenue loss estimations will also be influenced by changes in marginal tax rates, changes in the economy, or growths in costs of certain services (as health in USA, for example). A modification in a tax law can also influences the revenue of other taxes, through modifying economic incentives of the affected sectors linked each other according to industrial interrelations. Naturally, each of those indirect effects depends on the pertinent crossed price-elasticity of demand and supply between goods. So, although the

definition of tax expenditure is clear, its application leaves wide margins of computation to estimate its economic impact, which should at least be analyzed through a *Computable General Equilibrium* model³⁶.

2) *The use of the concept as budget control*

To measure a tax not collected has obvious difficulties, but for what reason its calculation is it needed? In a representative democracy, when taxpayers pay their taxes is politically important for constituency to know what does government do with that money. This control objective has been essential in the designs of public budget accounting systems and control reports of budget execution. But if a tax exemption avoids taxpayer paying a tax there is no money to trace out; that is, no public expenditure to control; therefore, on behalf of constituency there is nothing to control relative to the destination of their funds.

Now, if the objective of the budgetary accounting is wider and includes the function of documenting the impact of public sector in the economy, and on this aspect in particular the effect of different public policies equivalent to explicit fiscal decisions, then to compute tax expenditures is as important as any budget expenditure destined to specific programs. Tax expenditure could be considered a specific program that registers the subsidy directed to the activity or taxpayer who was exempted from taxation.

The point has modern gravitation because as it was explained at the beginning, older division between expenditure and taxes (expenditures basically linked to the provision of public or mixed goods through the purchase of goods and services), is no more so clear. With budgets containing important amounts of “transfers” (negative taxes), higher than purchases of goods and services, many categorical programs focused toward certain segments of society, and “tax expenditures”, such division becomes confused or weak.

Therefore, the enormous symmetry of many transfer systems and taxation pursuing distributive or redistributive objectives, clamors for a combined treatment of both policies, demanding governments to inform constituency in the same way. On this line of suggestions about budget control, according to Ladd, the following four categories should be contemplated:

- (1) The tax revenue collection.
- (2) The purchase of goods and services.
- (3) The pecuniary transfers and the provision of merit goods, with redistributive aims.
- (4) The provision of economic incentives that modify relative prices.

Categories (3) and (4) should include direct expenditures and tax expenditures; so tax expenditure could be divided into those two categories and they could be assimilated to programs of direct expenditures in both areas.

However, some problems of interpretation could arise here. For example, should a subsidy to the industry be computed as an incentive to maintain the activity and employment levels in the industry or as a direct transfer to industrial owners?

³⁶ See Cicowiez y Di Gresia (2004) for technical explanations and papers' references (in Spanish).

But the previous classification should be enlarged to include certain regulations and unfunded mandates or unfunded liabilities. For example, to force an industry to buy clean technology (non pollutant) is similar to levy a tax on the pollutant production (pigouian tax or green tax) seeking pollution control.

3) *The tax expenditure control to induce tax reform*

Surrey had the idea that the tax expenditure concept could be a tool to induce tax reform. To support this opinion, Ladd cites the following Surrey's suggestions from his book of 1973:

- *"Although many tax provisions function like expending programs, they are not subject to the same scrutiny as direct spending programs"*
- *"Most tax expenditures are inherently unfair because they typically generate more benefits to higher income than lower income households"*
- *"Direct spending programs are almost always preferable to tax expenditures"*
- *"Most tax expenditures should be eliminated or replaced with more effective spending programs"*

Surrey not even thought about the usual recommendation that in any event the use of tax expenditure should be evaluated; just to demonstrate if the cost-benefit analysis indicates a more convenient solution than an alternative program of direct spending. He directly wanted a reform of the tax system of wide base without exemptions, which in case of the Income Tax would bring the tax design to a Haig-Simon concept of comprehensive income.

However, Surrey's aspiration was not only uncompleted, but rather misleading. Evidence indicates that since the first Tax Expenditure Records (1974) on, the list of tax expenditure grew significantly. On the contrary to Surrey aspirations, budgeting tax expenditures generated an inverse effect. While making public benefits received by some sectors, other sectors previously excluded of that benefits were successful in their claims to be included. Legislators generally have few arguments to refuse new similar claims for advantages agreed previously to others. California is an example. The Department of Finance asked in 1984 to eliminate the list of tax expenditure that had been reported during 10 years, because the legislature had neglected 90% of the recommendations of the Department for annulling many of them, while at the same time many sectors or groups of interest have been successful in getting new tax expenditures. The popularization of the reports on tax expenditures had stimulated the demand for more tax expenditures.

In Canada things went on still farther when certain deductions to worker salaries inside the computation of tax expenditure were accepted as "fiscal credit". According to Richard Bird (1988) it was an error to take these deductions as tax expenditure, because they should be considered as being part of the basic structure of the tax (that is, being part of the benchmark), and therefore, to be maintained as normal deductions and not as tax expenditures.

Ladd considers that the future of the concept is not promissory due to:

a) The academic and technical discussion about the optimal tax structure is not conclusive. Recent tendency has been to abandon the idea of burden income (under the concept of Haig-Simon) and instead to levy taxes on consumption. So the standard

normative structure against which the apartments should be evaluated had no consent in the past and nowadays registers an evolution toward different forms of tax system design.

b) Ladd is right while suggesting that under the political perspective, the tax system can be considered the result or balance of the political process (Nash equilibrium). It is probable that many articles of the tax law on tax expenditure will stay in spite of their popularization, because there are few incentives for the elimination. Many tax expenditures benefit to middle class sectors, with vote power or representing the medium voter's preferences.

c) The substitution of tax expenditures by programs of direct spending would affect different political actors inside the government bureaucracy. The modifications imply redistributions of power among policy makers belonging to different committees, ministries or government bodies.

d) Under certain circumstances tax expenditure can be a more effective policy to achieve the pursued objective than a program of direct spending. It can be less costly from the angle of the bureaucracy required to operate the program.

e) Ladd also cited King (1984), who suggested that tax expenditure is a good trade off among liberals or democrats (Democratic Party) and conservatives (Republican Party); the first one wanting government "to make something" and the second wanting "markets solving things" and therefore "public spending be small".

4) The concept of tax expenditure as a tool of budget control for the definition of alternative fiscal policies

An argument in favor of the concept "tax expenditure" has been the advantage that a government have when it can face not only explicit options of direct spending but also of tax expenditure solutions when having to decide a budget reduction due to the deficit. However, modifications in tax laws are usually more difficult than those of expenditures. The first ones demand the inevitably participation of the Congress; the seconds can be decided at the executive's level. In USA special majorities (2/3 of votes) are also required to reduce exemptions or tax expenditures, as long as direct spending is solved by simple majority.

5) Some concluding remarks on the issue

From the previous analysis it is possible to conclude that tax expenditure concept is a useful tool for governments and constituency to understand policy alternatives in fiscal politics. It improves transparency and makes more effective the civic control of government actions. But it is not exempt of problems. In synthesis, it is interesting advance the following questions to be answered:

- 1) Can or should tax policy be separated from spending policy?
- 2) Which is the tax policy objective, to collect revenues and be neutral (the "strictly fiscal aim") or must fulfill others policy's objectives?
- 3) Is it possible to define the optimum or the good tax system (the baseline system or benchmark) or are there different opinions to make such definition?
- 4) Which is the list of government institutions that should participate in the discussion and definition of the tax structure and in which way the technique of budget accounting could help and at the same time could affect the use of the concept tax expenditure?

What is absent in the analysis of Ladd - surprisingly for who dedicates the book to fiscal federalism issues - is precisely to link the topic of tax expenditure with the regional question. To know and control where taxing power and spending are exercised, is important for the measurement of territorial cost and benefits of government action; an outstanding issue in fiscal federalism studies and discussions. Knowledge of tax expenditure can facilitate a bigger budget control of governments and improve transparency for voters of the federation. Testing fiscal correspondence principle and regional transfer systems among governments are a central question in fiscal federalism.

To federalize decisions on tax expenditure can constitute an institutional mechanism to generate incentives for a bigger control of their growth. For example, in case of the national government, federal concessions of tax expenditures that benefit certain sectors, will impact on the regional distribution of tax revenues when revenues of taxes that admit those tax expenditures decisions are part of a tax revenue sharing system. In turn, those concessions modify the relative prices of goods and services among regions, inducing reassignments of factors that naturally separate solutions from relative cost of regional economies, encouraging relocations of productive activities. They also generate justified political reactions from regions that contribute to the common pool of resources in benefit of the regions promoted, affecting horizontal tax fairness.³⁷ Policy decisions on tax expenditure can also induce sub-national taxation growth or, on the contrary, they can generate harmful tax competition (tax wars) among states that should be necessary to avoid or minimize, so transparency and calculation of sub-national tax expenditure are also important. Tax harmonization should be necessary for an efficient performance of the federative common market.³⁸

The "Tax Burden" concept

Tax Burden (**TB**) is the coefficient that relates total revenue collected by Government (**T**) with national income (**NY**). In the usual calculation of this coefficient, the numerator includes the whole taxes that engross the National Treasury - in the version referred to the National level of government - or all revenues collected by the three levels of governments (National, Provinces/States and Municipalities) - in its Global version -. Such measurements do not compute the value of revenue lost by decisions on tax expenditures, as long as government tax administrations and budget accounting offices only register the effective inflows of money to treasuries. As it was analyzed before, when money does not come to the treasury there is no reason to worry about dealing to legal control, because if the objective were the control of destination of the money paid by taxpayers, there is no money to trace out. Also it could be interpreted that from the macroeconomic point of view neither would be important if the objective were the control of economic impacts of fiscal policy. This vision derives to the neutral effect of tax expenditure at global level, because there is no impact to measure for the not collected revenues.

That is, without Tax Expenditure (**TE**), Tax Burden (**TB**) is:

³⁷ These regional aspects of efficiency and fairness is treated in Piffano (2004a and 2005), op. cit.

³⁸ The Brazilian experience with the ICMS (the sub-national VAT) and other indirect taxes levy by states and municipalities are instructive about tax war between states with great distortion effects on internal relative prices. Read "harmful tax competition" or "distortion-bias tax competition" not "Tiebout-beneficial tax competition" (see Piffano, 2004b)

$$\mathbf{TB} = \mathbf{T} / \mathbf{NY}$$

Introducing tax expenditures, by definition what is not collected due to tax benefits (**TE**) is equal to the subsidy generated to the taxpayer (**TS**), then **TE = TS**. So adding **TE** to **T** and subtracting **TS**:

$$\mathbf{TB} = (\mathbf{T} + \mathbf{TE} - \mathbf{TS}) / \mathbf{NY} = \mathbf{T} / \mathbf{NY}$$

That is, the final effect on **TB** is neutral. The neutrality is perfect at global level, but **TE** does not benefit to everybody, consequently, the sector and regional impacts will modify relative prices and the distribution of income among sectors, regions and individuals.

This point is analyzed next with the objective of introducing new arguments that will support the suggestion for modifying the measurement methodology of **TB** - in its sector version (**STB**) – leading to take into account concepts neglected by the usual methodology of **TB** calculus.

“Equivalent Public Policies” and the Measurement of “Sector Tax Burden”

TE current methodology measures the revenue not collected and the corresponding subsidy not registered in the budget accounting referred to the same subsidized-taxpayer. However, there are alternatives of public policies equivalent to the establishment of taxes and subsidies whose particularity is to burden the income of certain economic agents and to subsidize others. So the estimation of **STB** – the same as in the regional case – is modified.

Explanations that follow demonstrate that something quite important is missing in public accounting that distort the estimates of the economic impact of certain public policies, like **STB**, with consequences of quasi-fiscal nature. Though the topic does not present something novel, it is opportune to analyze it and disclose it due to conceptual errors that usually register the literature on sector tax burden estimations. Those errors surprisingly are detected in papers and reports written by sector’s experts that are supposed to defend with their studies the interests for necessities of information of the sector affected by this policy measures.

The topic that is analyzed in the first place is that of the “Commercial – Foreign Trade - Policies”, that is, the use of Tax on Exports (**TX**), Duty Customs (**TM**) and Quotas (**C_X**; **C_M**). Second, the equivalent case of rate of exchange policies (**Π**). As it is known, commercial policies instruments generate distortions in commodities domestic prices relative to international relative prices. The domestic relative prices of tradable goods - **M** (import) and **X** (export) - are modified with respect to international prices. Let’s see both cases.

Tax on Exports

P_{iM} is the international price of the import good and **P_{iX}** the international price of the export good. **P_{dM}** is the domestic price of the import good while **P_{dX}** the domestic price of the export good. Before **TX**, **TM** and/or **C_X**; **C_M**, given a certain exchange rate in equilibrium (**Π***), the internal relative price is:

$$(1) (\mathbf{P}_{iM} / \mathbf{P}_{iX}) \mathbf{\Pi}^* = \mathbf{P}_{dM} / \mathbf{P}_{dX}$$

After **TX** and **TM**, domestic relative price is modified:

$$(2) P_{dM} (1 + t_m) / P_{dX} (1 - t_x)$$

where t_m is the tax rate on imports and t_x the tax rate on exports.

Which is the importance of this change for the estimation of **STB**? Let's see first the case of Tax on Exports. In the usual estimation of Tax Burden on the exportable goods sector (**STB_X**) - for example the Agricultural Sector - manual of national accounting assigned all tax revenues that entering to the Treasury must be registered as impacting on the sector. Now, if:

TX₀: is the revenue of other taxes different to Tax on Exports paid by the sector

TX: is the Tax on Exports revenue

X: is the volume of exported goods

P_{dX}: is the domestic unitary price of exported goods

VAS_X: is the value added by the sector of exportable goods

the usual calculation (**STB_{X1}**) is:

$$STB_{X1} = (TX_0 + TX) / VAS_X$$

that is,

$$(3) STB_{X1} = [TX_0 + (t_x \cdot P_{dX} \cdot X)] / VAS_X$$

However, the Tax on Exports operates as a "Tax on Production", because modifying the domestic price according to expression (2), the reduction of the value of the exported good operates over all the produced volume, not only on the exported portion of that production. So what is collected by Customs in concept of tax on exports represents only a part of the tax burden supported by the sector. The remaining part is a non registered tax due to not entering into the Treasury and, consequently, it is not computed in the estimation of **STB_{X1}**. This portion of no computed liability is destined to finance the subsidy generated to the domestic demand of the exportable good, because the internal demanders pay a lower price after tax.³⁹

The effect of tax on exports seems to be a phenomenon similar to the one announced by the tax expenditure literature, but with the important difference that in that case the exempted taxpayer is the same subsidized agent. Nobody pays any obligation to finance this subsidy; the government simply does not register the no-payment of the tax and at the same time does not register the no-spending of the equivalent subsidy referred to the same person or firm. In the case of Tax on Exports, the equivalent cost of a tax on

³⁹ A numerical example may result useful to clear up concepts. Assume that an Argentine exporter sector produce 100 unities of a good which international market price is one dollar. Half of the production is consumed domestically and the other half is exported. The nominal exchange rate is 3 pesos per dollar. With this exchange rate, sector gross income would be 300 pesos. If government fixes a Tax on Export with rate of 33% the net price will be 2 pesos, and sector gross income – with similar level of production – would be 200 pesos. The difference of 100 pesos is distributed between the government (receiving 50 pesos due to exports of 50 unities, each one levied with 1 peso) and consumers (getting a subsidy of 50 pesos because pay 1 peso less by each consumed unity).

production for goods destined to the domestic market is not registered neither is registered the subsidy cause to domestic demanders for lowering the price of that production, but economic agents (persons or firms; producers and consumers) are not the same.

The new estimation of **STB** that contemplates all cost derived from tax on exports can be expressed in the following way:

$$(4) \text{PTS}_{X2} = [\text{TX}_0 + (t_x \cdot \text{Pd}_x \cdot \text{Q}_x)] / \text{VAS}_x$$

where Q_x is the total volume produced of the exportable good. The difference between (4) and (3) is:

$$(5) [t_x \cdot \text{Pd}_x \cdot (\text{Q}_x - X)] / \text{VA} ; \text{but,}$$

$$(6) \text{Q}_x - X = \text{D}_{dx}$$

That is, the difference between the produced level and exports is the domestic demand (D_{dx}). Therefore, the new measurement of STB_x can be expressed as:

$$(7) \text{STB}_{X2} = [\text{TX}_0 + (t_x \cdot \text{Pd}_x \cdot \text{D}_{dx}) + (t_x \cdot \text{Pd}_x \cdot X)] / \text{VAS}_x > \text{STB}_{X1}$$

Customs Duty (Tax on Imports)

A treatment conceptually symmetrical but with inverse results can be applied to the sector producing an importable good (“substitute industry” of the importable good).

The traditional measurement of Tax Burden on the substitute producing sector of an importable good (STB_M) is:

$$(8) \text{STB}_{M1} = \text{TM}_0 / \text{VAS}_M$$

Where TM_0 computes other taxes revenue paid by the sector, different to the Tax on Imports or Customs Duty, as long as the collected revenue ($\text{TM} = t_m \cdot \text{Pd}_m \cdot M$) is paid by demanders or consumers of the importable good.

But after TM the price of the importable good has been increased, as indicates expression (2), so TM has acted as a Tax on Consumption of the importable good which burden can be break down in two parts: the one already received by the government through the Customs Administration ($t_m \cdot \text{Pd}_m \cdot M$) and the other part destined to finance the subsidy directed to the producer of the importable good [$t_m \cdot \text{Pd}_m \cdot (\text{Dd}_m - M)$]. The first one is the portion registered by the public accounting, because money passes to the Treasury through the Customs Administration; as long as the second portion implies a negative tax or subsidy to the producer of the importable good that from the sector point of view is not computed.⁴⁰

⁴⁰ Once again a numerical example can be useful to clear up concepts. Assume that an Argentine domestic consumer purchases 100 unities of an importable good which international market price is one dollar. Half of that consume is supplied by the domestic sector producer of the importable good (substitutive industry of the importable good) and the other half is imported. The nominal dollar exchange rate is 3 pesos por dollar. At this exchange rate consumer’s total spending is 300 pesos. If government fixes a Custom Duty rate of 30% the final price will be 3,90 pesos, consumer’s spending – assuming similar quantity demanded – would be 390 pesos. The difference of 90 pesos is distributed between the government (receiving 45 pesos from the Custom Administration due to imports of 50 unities levied each one with 90 cents) and the substitute industry of the

Therefore, the new measurement of Sector Tax Burden (STB_{M2}), is:

$$(9) STB_{M2} = TM_0 - [t_m \cdot Pd_m \cdot (Dd_m - M)] / VAS_M < PTS_{M1}$$

Finally, as always the point of interests in the economic field is not the absolute levels of prices but their relative levels. So comparing the Sector Tax Burden estimated by the two approaches:

a) In the traditional version (sub-index 1):

$$(10) STB_{M1} / STB_{X1} = (TM_0 / VAS_M) / [TX_0 + (t_x \cdot Pd_x \cdot X)] / VAS_X$$

b) In the new-correct version (sub-index 2):

$$(11) STB_{M2} / STB_{X2} = \{TM_0 - [t_m \cdot Pd_m \cdot (Dd_m - M)] / VAS_M\} / [TX_0 + (t_x \cdot Pd_x \cdot Dd_x) + (t_x \cdot Pd_x \cdot X)] / VAS_X$$

and, from (7) and (9) result:

$$(12) STB_{M2} / STB_{X2} < STB_{M1} / STB_{X1}$$

It should be notice that distortion in relative prices in favor of sector producing importable goods or against sector producing exportable goods is achieved fixing Custom Duties and Tax on Exports at the same time, or indistinctly fixing only Tax on Imports and eliminating Tax on Exports, or vice versa. The equivalence policy is achieved graduating differently the level of tax rates; so, if Tax on Exports rates and Tax on Imports rates were similar, for example 25%, the same distortion would be achieved eliminating Tax on Exports and elevating Tax on Import rates to 50%, or fixing a Tax on Export rates of 50% with zero tax rates on Imports.

Multiple exchange rates

Finally, the differentiation of relative prices between exportable and importable goods can be pursued by the equivalent public policy of a multiple exchange rate system. That is:

$$(13) Pd_x = Pi_x \cdot \Pi^*$$

$$(14) Pd_m = Pi_m \cdot \Pi^*$$

where Pi_x is the international price in dollar terms of the exportable good, and Pi_m is the international price in dollar terms of the importable good. If Π^* is the dollar-peso exchange rate in equilibrium, relative prices can be differentiated by a multiple exchange rates system:

$$(15) \Pi_x = \Pi^* (1 - t_x)$$

$$(16) \Pi_m = \Pi^* (1 + t_m)$$

that is,

importable good (that receives a total subsidy of 45 pesos, because the raise of the domestic price implies a subsidy of 90 cents by each unity sold, that is, $50 \times 0,9 = 45$).

$$(17) \Pi_M \cdot \Pi^* (1 + t_m) / \Pi_X (1 - t_x) \cdot \Pi^* = \Pi_M \cdot (1 + t_m) / \Pi_X (1 - t_x)$$

Final remarks

STB calculus differs from the estimation of **Global TB**, because **STB** should contemplate transfers produced by public policies such as tax expenditure, duties and tax on exports. At global level such transfers cancel each other, but at sectorial level, they don't. That's why **Global TB** can't be obtained through summing all **STB**, which would be higher than unity. The aggregation of more sectors to the calculation of the Tax Burden will reduce or cancel more of those effects, for finally, with the inclusion of all sectors and Households, nulls them, obtaining the **Global TB**. The final conclusion of this Appendix is not simply to highlight expression (12) or (17), which actually corresponds to a topic studied in all basic course of Public Finance, but in highlighting the technical error that in spite of this elementary notion is usually detected in the studies applied to estimate sector tax burden. In author opinion, public accounting should satisfy this information need, because from the technical point of view usual estimates are conceptually wrong. Certainly in the usual measurement of sector tax burden and tax expenditure "something important is missing".

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