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TAX STRUCTURE AND REVENUE INSTABILITY UNDER EXTERNAL SHOCKS: SOME GENERAL EQUILIBRIUM CALCULATIONS FOR COTE D'IVOIRE

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**TAX STRUCTURE AND REVENUE INSTABILITY
UNDER EXTERNAL SHOCKS:
SOME GENERAL EQUILIBRIUM CALCULATIONS
FOR COTE D'IVOIRE¹**

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IRIS Summary

The paper presents some general equilibrium calculations for Cote d'Ivoire which explore the significance of tax structure for the relationship between external shocks and revenue instability. The motivation for our analysis is that what literature there is on revenue instability, and the role it plays in wider economic and macro dislocation in developing countries, tends to focus on econometric analyses which run regressions to isolate the role of country and other characteristics on different revenue instability patterns. Tax structure, *per se*, does not explicitly enter such analyses. We use the numerical general equilibrium model of Cote d'Ivoire developed by Chia, Wahba, and Whalley (1992) and calibrated to a 1986 benchmark data set, and shock the model by changing externally set world prices for key commodity exports (coffee and cocoa).

Model results suggest that aggregate revenue impacts from global commodity price declines can differ substantially under alternative tax regimes. Tax structure affects the sectoral composition of the economy and thus matters for the propagation of external shocks onto revenues. In particular, the existing tax structure with high trade taxes outperforms a broadly based VAT. The key reason is the high reliance on trade taxes under the existing regime which implies that a move to a VAT will expand the traded goods sector. Hence, the extent to which any external sector shock in the form of reduced external sector prices maps through into reduced revenues depends on the tax

structure. The results suggest that a low rate broadly based VAT, as advocated by the World Bank in its structural adjustment lending, may be a poor revenue stabilizer compared to existing trade-based tax regimes used in many lower income commodity exporting countries. Another factor entering the play here is the portion of income spent on lightly taxed products. Because the existing tax system is concentrated on fairly narrow tax bases, large tax changes also result in progressively smaller adjustments, and for changes of a given size the existing tax system outperforms the VAT-based system less dramatically. Thus, under some tax structures, falls in world commodity prices can depress incomes of particular groups and have smaller revenue impacts than would be true under a broadly based VAT which would tax all of their expenditures.

We suggest that improved performance of the existing structure relative to a VAT in terms of its relative revenue stability properties provides a rationale against its introduction in lower income commodity-exporting developing countries and contrasts with those traditionally offered on efficiency grounds. We also analyze the size and nature of the shocks involved to see if they affect stability properties, performing a number of sensitivity analysis with the model. All indicate the importance of model structure and parameter specification for the precise revenue stability performance, while leaving unchanged the central result of revenue stability superiority of the existing tax regime over the VAT.

1. INTRODUCTION

This paper presents some general equilibrium calculations for Côte d'Ivoire which explore the significance of tax structure for the relationship between external shocks and revenue instability, an issue until recently little explored in the literature, either for Côte d'Ivoire or other developing countries¹. Available literature (such as Bleaney *et al.* (1992)) uses econometric techniques to analyze the relative contribution of external and other shocks as sources of aggregate revenue instability, rather than explicitly using the economy-wide modelling techniques that we apply here. Tax structure, *per se*, does not explicitly enter such analyses. We use the numerical general equilibrium model of Côte d'Ivoire developed by Chia, Wahba, and Whalley (1992) and calibrated to a 1986 benchmark data set, and shock the model by changing externally set world prices for key commodity exports (coffee and cocoa).

Model results suggest that aggregate revenue impacts from global commodity price declines can differ substantially under alternative tax regimes. Tax structure affects the sectoral composition of the economy and thus matters for the propagation of external shocks onto revenues. In particular, the existing tax structure with high trade taxes outperforms a broadly based VAT. With high trade taxes, the external sector is smaller, and external sector shocks generate less revenue instability under existing arrangements compared to a broadly based yield neutral alternative, such as a VAT. These results thus suggest that a low rate broadly based VAT, as advocated by the World Bank in its structural adjustment lending, may be a poor revenue stabilizer compared to existing trade-based tax regimes used in many lower income

¹An IDRC supported project subsequent to this work has further explored these issues including in the Ivorian case, in Enoh (1994) and Enoh and Koffi (1994).

commodity exporting countries. Other factors also come into play, such as whether household groups that bear the burden of particular taxes spend large or small fractions of their income on lightly taxed (usually traditional agricultural) products. Thus, under some tax structures, falls in world commodity prices can depress incomes of particular groups and have smaller revenue impacts than would be true under a broadly based VAT which would tax all of their expenditures.

These considerations also raise a number of further questions concerning the tax structure-revenue instability relationship. Which tax systems best insulate revenues from external shocks? What changes in revenues are implied by differing size changes in commodity prices? Is the relationship approximately linear across both large and small changes, or is it significantly non-linear? Our results also shed light on these for the Ivorian case.

2. ASSESSING REVENUE INSTABILITY USING A GENERAL EQUILIBRIUM MODEL OF CÔTE D'IVOIRE

After strong growth in Côte d'Ivoire in the first two decades following independence in 1961, world prices for key exports (coffee and cocoa), which have historically accounted for well over 50 percent of Ivorian export earnings, began to fall sharply in the early 1980s. A decade of negative growth followed and with it, major internal dislocation. Some estimates suggest that real income *per capita* may have fallen by as much as 25 percent between 1985 and 1990. Many of the ensuing adjustment problems fell into the fiscal domain with sharp falls in revenues leading to pressures on the expenditure side. By 1990, the public-sector deficit, which was inconsequential in the early 1980s, was approaching 10 percent of GDP.

Here, we use a numerical general equilibrium model of Côte d'Ivoire to analyze how tax structure affects the extent to which external shocks over this period may have been translated into revenue instability. The model, due to Chia, Wahba and Whalley (1992), is a numerical open economy general equilibrium model in the tradition of the computable equilibrium models deriving from Shoven and Whalley (1972) and (1984). It captures the main features of the Ivorian economy: production sectors, household sectors, the government sector (which includes public enterprises) and the rest of the world, along with the key elements of the tax system (trade taxes, corporate and personal income taxes, production and excise taxes). Other elements of fiscal structure such as the Stabilization Fund, a tax transfer scheme aiming to stabilize domestic producer prices (and represented here in *ad valorem* equivalent form), enter the model along with interhousehold and government-household transfers. The model is calibrated to a

1986 Benchmark Equilibrium Data Set for Côte d'Ivoire, and uses Cobb-Douglas and CES functions and literature-based elasticity estimates.

Production

The production side of the model includes 7 tradable and 8 non-tradable sectors. Tradable sectors include: a food crop sector, a traditional export sector, a non-traditional export sector, a food processing sector and manufacturing sectors. Non-tradable sectors include: gas and electricity, construction, transport, financial services, government services and other services. Given the importance of agriculture in Côte d'Ivoire (46 percent of GDP, and 91 percent of exports in 1986), more detail appears in the model for the agricultural sector, through a separate specification of the food crop sector, the traditional export sector (coffee, cocoa, cotton), and the non-traditional sector (sugar, palm oil, rubber). Although not central to the model analysis undertaken here, the model also includes separate representations of formal and informal sectors in the Ivorian economy; the informal sector reflecting activities underrepresented in the annual financial survey of enterprises. These typically neither pay taxes nor receive subsidies (Chia *et al.* (1991)).

Production in each sector is represented by nested functions; the top level nest being Leontief in intermediate demands and value added. Intermediate demands are a CES function of domestically produced and imported goods, with value-added a nested CES function of capital and labour (the latter being further disaggregated into labour types). The tradable goods sector produces exports and domestically consumed goods according to a CET function. Firms determine factor demands and output supplies by maximizing profits. All sectors are assumed

to be competitive. Capital and labour are assumed to be internationally immobile. Factor mobility between sectors is constrained by the presence of sector-specific factors.

Factor Markets

The model structure includes a more detailed treatment of the labour market than in many other numerical general equilibrium models. Labour is disaggregated into three types: agricultural, skilled and unskilled. Skilled and unskilled labour move freely across sectors, while agricultural labour is sector-specific. In the agricultural sector, unskilled labour, skilled and agricultural labour enter a CES aggregation function. In the non-agricultural formal sectors, labour is a nested CES function of skilled and unskilled labour. The informal sector only uses unskilled labour². With unskilled and skilled labour mobile across sectors, this treatment of the labour markets captures movements between formal and informal sectors, as well as migration between agricultural and non-agricultural sectors (i.e., rural-urban migration).

Four types of capital appear in the model: food crop capital, traditional export sector capital, capital used in the non-traditional export sector and non-specific sector capital. Each of the first three of these are sector-specific capital, the only capital employed in that sector, and the stocks of each type of capital are fixed. More than half of the capital in the economy is treated as fixed and is split between the three agricultural sectors. This has implications both for the incidence of taxes and the extent of revenue instability.

²For a more detailed discussion of the structure of these value-added functions, see Chia *et al.* (1992).

Households

Households maximize nested utility functions subject to budget constraints. The top nest is a Cobb-Douglas function defined over goods; the lower nest is a CES function defined over domestic and imported goods. Each household consumes the 15 (tradable and non-tradable) consumer goods identified in the model, is endowed with an exogenous and fixed amount of both mobile (labour and capital) and sector-specific factors, and preferences (which differ by household group). Given the static nature of the model, household shares of consumption and savings in post-tax income are assumed constant, with all household savings treated as paid into a savings pool from which domestic investment is financed.

Besides income from endowments, households also receive transfers from the government, from abroad, and from other households. Households engaged in independent trades and the inactive households both receive net subsidies from the government. Unlike in developed countries, interhousehold transfers play a major role in the economy and reflect a strong rural urban linkage in income transfers. These are also captured in the model.

Households in the model are represented by 7 socioeconomic groups: export households, food crop households, households in the Savannah region, households who are administrative government employees, households in the formal sector, households engaged in independent trades or in the informal sector, and inactive households.³ Classifying households in this manner allows us to identify the impacts of external price shocks on different segments of the economy.

³See Chia *et al.* (1991) for a more detailed discussion of this household classification.

External Sector

The treatment of the external sector in the model reflects the widely used Armington (1969) assumption which models domestic and foreign products as imperfect substitutes. With imperfect substitution on the import side we avoid problems with complete specialization and cross-hauling which have traditionally kept numerical modellers away from a homogeneous goods treatment for tradables. Tariffs apply to imported products, and domestic import composites enter both intermediate demands and household final demands. On the export side, the extent to which world commodity shocks are fully and instantaneously transmitted to the domestic economy depends on the substitution elasticities assumed between comparable domestic and foreign goods.

The model treatment thus departs from the "price taker" on imports and "price maker" on exports assumption used by Dervis, de Melo and Robinson (1982), and others, and discussed at some length in Whalley and Yeung (1984). We assume small open price taking behaviour for both imports and exports; but with imperfect substitutability between domestic and foreign products on both import and export sides. These elements of model structure have implications for the questions we address, since with insulation from the world economy, world prices will no longer directly determine domestic factor prices and production which in turn affects the tax base. Here both exported and imported products are imperfect substitutes across domestic and foreign sources, with the degree of substitutability determining the extent of transmission of price disturbance.

Government Sector and Tax Structure

The tax structure in the base-case specification of the model encompasses production taxes in all the formal sectors of the economy, as well as export taxes levied on the traditional export and processed food sectors. Imports of manufactured goods, rice, processed foods and food crops are subject to import duties. The activities of the Caisse de Péréquation (Marketing Board for rice) and the Caisse de Stabilization (Marketing Board for cocoa, coffee) are modelled as *ad valorem* taxes or subsidies on output, depending upon whether or not revenues are raised by the fund on a net basis. Finally, the government collects income taxes from each household and corporate taxes from firms.

In the model the government also provides various services, such as public administration, economic and social planning, and defence and security services to the public either free or with a small user fee. Goods and services used by government to provide public services enter government demands, and public sector transfers to households for education and other objectives also enter the model. All of these activities are financed by a number of *ad valorem* taxes, with the level of provision of government services decided upon through government utility maximization defined over inputs (mainly labour) used to provide these services. No mechanism exists in the model whereby households directly articulate demands for public goods.

The relative importance of these various government revenue sources in the 1986 base-case data used in the model is shown in Table 1. Trade taxes, and particularly taxes on the traditional export sector, dominate taxes on other exports. Taxes on goods for domestic consumption (including excises) are the major category source, with income taxes more minor.

Table 1 Percent Contribution of Component Taxes to Government Tax Revenues in the 1986 Base-Case Data used in the Côte d'Ivoire Model	
Traditional sector exports (coffee, cocoa, cotton)	22
All other exports	7
Imports	29
Domestic production (all formal sectors)	37
Income taxes from households	5
<i>Note:</i> Taxes on the export sectors include export duties as well as <i>ad valorem</i> production taxes on exported goods.	

Calibration and model solution

The model is calibrated to a 1986 base period micro-consistent data set for Côte d'Ivoire. These data are drawn from a Social Accounting Matrix (SAM) constructed for Côte d'Ivoire for 1986; sources for and methods of construction being documented in Chia, Enoh and Wahba (1991). The basic input data are from the National Accounts (République de Côte d'Ivoire, 1991) and related sources such as the Balance of Payments from the Banque de Données Financières, Household Survey data, and Tax data.

The SAM provides a consistent accounting of the circular flow of incomes and expenditures in the Ivorian economy for 1986, and serves as a base-period model-admissible equilibrium data set for calibration. Constructed so as to be micro-consistent, it satisfies all the equilibrium conditions of the model: markets clear for all goods and factors; all 15 sectors earn zero profit; budget balance holds for all 7 household groups and the government; and the aggregate supply of each good equals aggregate demand. Aggregate supply includes both

domestic production and imports, while aggregate demand includes intermediate and final demands. Private consumption expenditures, government expenditures, capital formation and exports are components of final demand. Zero profit conditions imply that industries earn normal economic profits, and hence total receipts from sales in each sector equal total expenditures. Total sales include payments for intermediate demands, final demands and net trades, while total costs of production include costs of intermediate inputs, payments to primary factors, net payments to the Caisse de Stabilisation, Caisse de Péréquation, and taxes. Taxes paid by production sectors in the model include production taxes, import duties and export taxes.

Calibration of the model to the 1986 SAM produces parameter values for the various behavioural functions in the model such that the model reproduces the benchmark data as an equilibrium solution, if no changes in policies or other model characteristics occur.⁴ Calibration of Cobb-Douglas functions is relatively straightforward since share parameters in Cobb-Douglas functions can be determined simply from the input shares of factors or expenditure shares. Procedures used to determine share and other parameters in the CES/CET functions we use here through calibration are slightly more complex, insofar as elasticities of substitution must first be set.

In implementing our calibration procedures, we follow Harberger (1962) in adopting a unit's convention to separate benchmark equilibrium value data into separate price and quantity observations. Thus, assuming the net-of-tax price of mobile labour to be one, the quantity of labour used in sector i in the benchmark equilibrium is determined from the value-added data

⁴See also the discussion of calibration in Michel and Noël (1984), and especially the modèle de prévision macro-économique used by the planning department in Côte d'Ivoire. See also Benjamin and Devarajan (1985).

showing the returns paid to labour in sector *i*. With this separation complete, model calibration is implemented in the ways described in Mansur and Whalley (1984), using elasticity parameters from related literature for the CES components of calibration.⁵ The key elasticity parameters used in the model on the production side for capital-labour and qualified-nonqualified labour substitution are set out in Chia, Wahba and Whalley (1991). MPS/GE, a software package developed by Rutherford (Rutherford (1989)), is used to solve the model for counterfactual equilibria; these typically reflect commodity price shocks of varying severity.

3. MODEL RESULTS ON THE ROLE OF TAX STRUCTURE IN REVENUE INSTABILITY

We have used the model described in earlier sections to analyze the effects of external shocks on revenue instability in Côte d'Ivoire in the presence of alternative tax structures. We use a number of model specifications and analyze a variety of shocks. The model revenue instability results jointly project several key themes that stand in contrast to received wisdom on what constitutes an appropriate tax structure in a developing country.

In Table 2, we present results from the base-case model variant and a case where the pre-existing tax system is replaced by a broadly based VAT before the exogenously specified shock affects the economy. In first of these cases we calculate the percentage changes in real revenues under the existing tax system, given different percentage falls in world prices of traditional

⁵Scale parameters in the Cobb-Douglas function are determined from the input shares of factors.

Table 2**Base-Case Model Evaluation of Revenue Instability
(Under Alternative Tax Structures)**

% Fall in prices of traditional exports (coffee, cocoa)	% Change in real revenues under the existing tax system¹	% Change in real revenues under a VAT-based system²
0	0.00	0.00
5	-0.13	-0.19
10	-0.26	-0.38
15	-0.40	-0.58
20	-0.54	-0.79
25	-0.70	-1.00
30	-0.86	-1.23
35	-1.02	-1.46
40	-1.20	-1.69
45	-1.39	-1.94
50	-1.58	-2.20
55	-1.79	-2.47
60	-2.01	-2.75
65	-2.25	-3.04
70	-2.51	-3.35

¹ Using 1986 benchmark equilibrium data as a base or reference.

² Using equilibria generated by the replacement of the existing tax system by a VAT as a reference point.

exports (coffee and cocoa). We use 1986 benchmark equilibrium data as our reference point. In further computations we first replace the existing tax structure with a yield-neutral equivalent VAT on all consumption, including imports, and then compute the percentage change in real revenues generated by the model for the same shocks as those we impose on the existing tax structure.

The striking feature of the model results reported in Table 2 is the sharply elevated revenue instability under the VAT compared to the existing tax system. This feature primarily reflects the importance of high trade taxes in the existing system in insulating the economy from external shocks. The existing tax system is concentrated on a narrow revenue base from which adjustments have already taken place, so that as price changes increase, little further adjustment is possible, and revenues are relatively stable. With a prior move to a VAT, the traded goods sector is enlarged, and the propagation of external shocks through the rest of the economy, and therefore onto revenues, is also larger than under the existing tax structure. We conclude from this that in being concentrated on narrow bases and in particular being linked through high trade taxes to smaller trade volumes in the economy, the existing tax system generates lower degrees of revenue instability than a VAT-based system. The implications of this are that a VAT-based tax system provides less revenue stability for the types of price shocks to which the Ivorian economy is typically subjected over an average cycle than the current tax system. In contrast to traditional efficiency arguments that argue for the implementation VAT, the revenue instability properties of a VAT compared to existing tax systems may be a drawback to its implementation.

Table 3 displays the effects of the same shocks on revenues under a number of model variants. We once again compute the percentage changes in real tax revenues under the existing tax structure and under a VAT-based system, but in this case for three model variants. In the first of these, we assume mobile capital between sectors. In the second, productivity shocks affect the food crop sector and change relative prices of domestic products. In this case, the shocks on the external sector affect an economy where production functions in the food crop sectors have lower efficiency parameters. Finally, we use different substitution elasticities in the import demand functions for Côte d'Ivoire; these affect the numerical specifications of the CES functions defined over domestic and foreign products.

With a change in the model treatment towards more capital mobility, the behaviour of the revenue change in columns 1 and 4 becomes highly non-linear. Initial adjustments take place as mobile capital leaves the tax sectors, with large adjustments taking place for relatively modest shocks. Once most of the capital has left the sector, subsequent shocks result in relatively little further adjustment, and revenue impacts become progressively smaller. Hence, with more factor mobility the extent of revenue instability as reported in Table 3 tends to be accentuated for smaller price shocks because of the heightened mobility of factors out of sectors subject to shocks.

Table 3

Revenue Instability Under Model and Parameter Sensitivity

% Fall in prices of traditional exports (coffee, cocoa)	% Change in revenues under the existing tax system ¹			% Change in revenues under a VAT-based system ²		
	Model Variation 1	Model Variation 2	Model Variation 3	Model Variation 1	Model Variation 2	Model Variation 3
0	0.00	0.00	0.00	0.00	00.0	00.0
5	-0.35	-0.17	-0.04	-0.38	-0.23	-0.15
10	-0.72	-0.35	-0.09	-0.78	-0.46	-0.31
15	-1.08	-0.54	-0.14	-1.18	-0.70	-0.47
20	-1.28	-0.73	-0.20	-1.57	-0.95	-0.64
25	-1.29	-0.93	-0.26	-1.95	-1.21	-0.83
30	-1.29	-1.14	-0.34	-2.25	-1.47	-1.02
35	-1.28	-1.36	-0.42	-2.31	-1.75	-1.22
40	-1.28	-1.58	-0.51	-1.88	-2.03	-1.42
45	-1.27	-1.81	-0.61	-1.83	-2.33	-1.65
50	-1.27	-2.06	-0.72	-1.81	-2.64	-1.88
55	-1.27	-2.31	-0.84	-1.80	-2.96	-2.12
60	-1.26	-2.58	-0.97	-1.80	-3.30	-2.38
65	-1.26	-2.86	-1.12	-1.79	-3.65	-2.66
70	-1.26	-3.17	-1.29	-1.79	-4.02	-2.95

Model variation 1: mobile capital between all sectors.

Model variation 2: decreased productivity in the food crop sector.

Model variation 3: Unitary import CES substitution elasticity between domestic and foreign goods.

¹ as footnote 1, Table 2.

² as footnote 2, Table 2.

The second set of results show that with different productivity parameters in the food crop sector, results compared to Table 2 remain largely the same insofar as the existing tax structure still provides more stability than a VAT; in this case because the food crop sector is lightly taxed. While the evaluation of the relative stability properties of alternative taxes is a function of both the type and size of shock involved, in this case the stability superiority of the existing tax structure over a VAT is preserved under different parametric specification.

Changing import substitution elasticities in columns 3 and 6 also has relatively little impact on reported revenue instability results, because import prices remain unchanged as a result of the external shock and the effects operating through the trade sector on the import side are largely income rather than price effects. These income effects have significant revenue instability implications because of the impact on trade taxes, but changes in the elasticity of substitution between domestic and foreign products have little impact on revenue instability.

In Table 4, we further analyze the earlier revenue instability results under alternative model parameterizations, concentrating on elasticities between domestic and export production which affect the supply elasticities of sectors subject to shocks. With zero substitution elasticities in production between domestic and export products in the constant elasticity of transformation function assumed in the model, results for the existing tax system and a VAT are sharply different; the differences narrowing as the elasticity increases. The substitution elasticity in technology thus emerges as a key parameter affecting model behaviour. This is because the price shock affects domestic products and the elasticity value assumed between domestic and foreign products, particularly in agricultural food crop sectors, controls the substitution effects

Table 4

Model Sensitivity to Changes in the Elasticity Between Domestic and Export Production

		% Change in Revenue Under the Existing System					% Change in Revenue Under a VAT-Based System						
		0.00	0.5	1.0	1.5	2.0	5.0	0.0	0.5	1.0	1.5	2.0	5.0
elasticity of transformation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% decrease in world price of traditional exports													
0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10		-0.31	-0.27	-0.26	-0.26	-0.25	-0.27	-0.55	-0.41	-0.38	-0.36	-0.34	-0.29
20		-0.65	-0.56	-0.54	-0.53	-0.53	-0.55	-1.13	-0.85	-0.79	-0.74	-0.71	-0.59
30		-1.03	-0.88	-0.85	-0.83	-0.83	-0.85	-1.75	-1.33	-1.23	-1.15	-1.09	-0.91
40		-1.44	-1.24	-1.19	-1.16	-1.15	-1.16	-2.39	-1.85	-1.69	-1.58	-1.50	-1.25
50		-1.90	-1.64	-1.56	-1.52	-1.50	-1.50	-3.08	-2.41	-2.20	-2.05	-1.94	-1.61
60		-2.42	-2.09	-1.97	-1.91	-1.88	-1.87	-3.84	-3.04	-2.75	-2.55	-2.41	-2.00
70		-2.99	-2.61	-2.45	-2.36	-2.31	-2.27	-4.67	-3.73	-3.35	-3.10	-2.91	-2.41

out of the products whose prices have been sharply lowered. With a zero rather than unity elasticity as in the base case, the revenue instability functions once again change.

The conclusion from these results, therefore, is that while changes in model structure affect both the pattern and form of revenue instability, particularly where assumptions on factor mobility or variations in key substitution elasticities related to the portion of the economy on which the external shock is most directly felt are concerned; the superiority of the existing tax system to the VAT on revenue stability grounds however, persists through all the cases.

4. CONCLUSIONS

In this paper we analyze the effects of tax structure on revenue instability in Côte d'Ivoire. We use a general equilibrium model which has been constructed for the analysis of Ivorian social programs, and adapt it here to analyze revenue instability issues. The motivation for our analysis is that what literature there is on revenue instability, and the role it plays in wider economic and macro dislocation in developing countries, tends to focus on econometric analyses which run regressions to isolate the role of country and other characteristics on different revenue instability patterns. Relatively little micro-based analysis of revenue instability in developing countries exists.

For the external shocks which we consider as the revenue instability source for Côte d'Ivoire, our results suggest that the existing tax structure tends to outperform a broadly based VAT on revenue stability grounds. The key reason is the high reliance on trade taxes under the existing regime which implies that a move to a VAT will expand the traded goods sector. Hence, the extent to which any external sector shock in the form of reduced external sector prices maps through into reduced revenues depends on the tax structure. Because the existing tax system is concentrated on fairly narrow tax bases, large tax changes also result in progressively smaller adjustments, and for changes of a given size the existing tax system outperforms the VAT-based system less dramatically.

We suggest that improved performance of the existing structure relative to a VAT in terms of its relative revenue stability properties provides a rationale against its introduction in lower income commodity-exporting developing countries and contrasts with those traditionally offered on efficiency grounds. We also analyze the size and nature of the shocks involved to

see if they affect stability properties, performing a number of sensitivity analyses with the model. All indicate the importance of model structure and parameter specification for the precise revenue stability performance, while leaving unchanged the central result of revenue stability superiority of the existing tax regime over the VAT.

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