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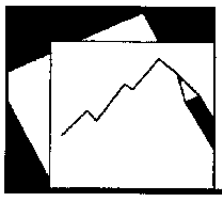

IMF Working Paper

A Quest for Revenue and Tax Incidence in Uganda

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A Quest for Revenue and Tax Incidence in Uganda

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Abstract

This paper examines tax policy and tax reforms in Uganda. Using household survey evidence, the paper identifies which taxes are progressive and investigates whether tax reforms have made the poor better or worse off. Household survey analysis reveals that some of the tax reforms implemented in the 1990s were generally pro-poor. The paper also examines business taxation and the actual tax burden on firms' capital investment. The analysis demonstrates that, even when the country's level of public revenue is low at the macroeconomic level, rapidly increasing taxation may pose a constraint to private investment at the microeconomic level.

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I. INTRODUCTION

One of the main accomplishments of the Ugandan government in the 1990s was the removal of massive implicit taxation on exports. In this context, it is interesting to assess how tax policy evolved following the elimination of export taxation; how the government was able to meet its revenue needs in a less predatory fashion; and how these policies impacted households and firms. This paper sets out to answer these questions.

Due to the past predatory taxation and prolonged conflict, Uganda began its economic recovery in 1986 at a very low level of government revenue, merely 5 percent of GDP. At the same time, needs for public spending on social services and infrastructure were massive in order to support impoverished households' efforts to increase their production, consumption, and welfare as well as to encourage enterprises to invest and diversify. These circumstances led policymakers to pursue a rapid increase in domestic revenue and a corresponding increase in public services; indeed, the rebuilding of government's revenue base has been one of the key features of Uganda's economic recovery. Institution building for tax administration resulted in a semi-autonomous Uganda Revenue Authority (URA), established in 1991. As a result, domestic revenue more than doubled in real terms during the first half of the 1990s and was 11.3 percent of GDP by 1996 (Table 1).

The policy of rapidly increasing public revenue presented a tradeoff for the economic liberalization program. In particular, it curtailed the scope for trade reform. The coffee export tax was abolished early on but tariffs and other import taxes were retained, initially at a fairly high level, because of the quest for revenue. Even by 1996 import taxes (including petroleum) still accounted for over one-half of total revenue.

For most of the 1990s the government had an explicit target of increasing revenue by one percentage point of GDP each year. This target was not, however, backed by a concrete strategy on policy and administrative measures to encourage such growth. Over time *ad hoc* increases in tax rates, particularly taxes on fuel, were increasingly relied upon to achieve the revenue target, with little attention paid to the supply-side effects. While import tariffs provided protection to the producers oriented toward the local market, high tax rates generally encouraged seeking and granting of firm-specific exemptions and tax holidays, with an adverse effect on competition.

This paper first takes a closer look at the policy of rapidly increasing revenue and recent tax reforms. It then uses household survey evidence (see Appendix A for details) to identify which taxes are progressive and whether tax reforms have made the poor better or worse off. Similarly, it examines business taxation to answer three questions: What is the actual tax burden on firms' capital investment and the overall cost of production across various industries? How does this burden compare to the neighboring countries, Kenya and Tanzania, which compete for the same foreign investment? How does poor compliance and tax administration affect tax incidence on the enterprise sector?

The paper is organized as follows: Section II describes the methods and data used for tax incidence analysis; Section III discuses the main results; and, lastly is the conclusion.

II. Method and Data for Tax Incidence Analysis

A. Household Incidence Analysis

In examining the impact of tax reforms on households, particularly whether tax reforms have made the poor better or worse off, this paper applies the welfare dominance analysis (see Appendix for details). The method is based on the "concentration curves" which measure the fraction of total expenditure on a commodity ascribed to different income groups when they are ordered according to the level of their income (in practice consumption expenditure is used).[2] In this analysis, concentration curves plot households from poorest to wealthiest on the horizontal axis against the cumulative proportion of taxes paid by all households (Charts 1 and 2). The conditions for welfare dominance are satisfied whenever the concentration curves for two commodities do not intersect. In this case, the more a concentration curve moves away from the 45-degree straight line, the more progressive is the tax. For one tax to dominate the other, the difference in their concentration curves must be nonnegative over the whole range of incomes. When the Gini coefficient for a given tax is greater than the Gini coefficient of per capita expenditure, then the tax is considered to be progressive. Similarly, the comparison of Gini coefficients before and after the tax reforms indicate how progressivity of taxation has changed over time (Tables 7 and 8).[3]

A number of assumptions are adopted. For direct taxes, the factors that produce the incomes are assumed to pay the associated taxes. For indirect taxes, households that consume the taxed items are assumed to pay the associated taxes. Thus, smokers pay taxes on tobacco, and households that use paraffin pay the taxes on paraffin. Import duties are more difficult to capture from a household survey, given that there is no differentiation between domestically produced or imported consumer goods. The prices of all goods for which imports are a large share of the market are assumed to go up by the amount of the tariff when it is levied. Finally, most of the analysis relies on statutory tax rates rather than any estimates of taxes actually paid.

The data on household expenditures are obtained from the 1992/93 integrated household survey. Table 6 shows the various commodities and their corresponding tax rates before and after reforms. As shown in the table, most import duties on commodities were reduced considerably by 1995. This table also shows the various rates of the 1992 sales tax, which was replaced by a uniform (17 percent) VAT rate in 1996. However, a number of

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[2] The concentration curve is similar to the Lorenz curve which is a graphical presentation of inequality. Household expenditures are arranged in ascending order, and the cumulative share of total expenditures are plotted against the cumulative share of population. For complete equality the Lorenz curve would be a straight line; it becomes more curved when inequality rises. The Gini coefficient is the ratio of the area between the straight line and the Lorenz curve to the total area under the straight line.

[3] The Gini coefficient is equal to one in the case of full equity, and zero in the opposite case.

commodities are zero-rated in order to take into account equity concerns. Note that Uganda uses a different import tariff regime for regional and external trade. Although it would be possible to identify the different tax rates on different commodities depending on where they are imported from, it would be difficult to identify the source of the commodity consumed by a particular household. Therefore, no attempt is made to calculate import duties based on the countries where they were imported from.

B. Firm Incidence Analysis

For the tax incidence on firms, the marginal effective tax rate (METR) on investment and production costs is chosen as the quantitative indicator. The key assumption underlying the METR concept is that a profit maximizing firm invests (or produces) as long as the after-tax marginal revenue from its investment (production) exceeds the marginal cost. While the marginal revenue is not easily observable in practice, data on the marginal cost can be obtained. For example, when estimating the METR on capital, the marginal cost is the sum of the financing cost of investment and the economic depreciation rate, adjusted for all relevant taxes and tax allowances. Hence, the marginal effective tax rate measures the impact of a tax system on an incremental unit of capital investment or business activity.[4]

The METR incorporates the effects of both statutory tax rates and related tax incentives (tax depreciation, tax credit, tax deductibility, tax holidays, etc.,) as well as various industry-specific and economy wide factors interacting with these taxes (financial costs, inflation, capital structure, etc.,). Due to this interaction, the effective tax rate can vary by industry or tax jurisdictions under the same tax regime. The difference in the METR across various investors or sectors quantifies the tax bias at the margin and indicates, other things being equal, how tax policy is likely to affect investment decisions.

As mentioned earlier, in a low-income country where the tax administration is relatively weak, a key issue is how much the actual tax incidence differs from that of the formal tax structure. While the analysis can relatively easily be extended to the comparison of impact of the formal tax structure across industries or jurisdictions, obtaining adequate information about actual administrative practices as well as detailed industrial parameters is more difficult. Although the analysis presented in this paper is based on Uganda's formal tax system, it uses actual firm-level data for key nontax parameters. For example, the debt-to-assets ratio is obtained from the 1998 firm survey. The URA taxpayer database was used to obtain the capital structure by industry, while the 1992 input-output tables were used to estimate the cost structure by industry (Republic of Uganda 1995). Firm survey evidence is also used to explore the impact of compliance and tax administration on the METR.

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[4] For example, if the gross-of-tax rate of return to capital is 15 percent and the net-of-tax rate of return is 12 percent, then the marginal effective tax rate on capital is 25 percent, if the after-tax return is used as denominator, or 20 percent if the before-tax return is the denominator. This study uses the former convention, given that it is more convenient when calculating the METR on the cost of production.

III. Results

A. Tax Incidence on Households

This section presents the tax incidence analysis on households both before and after tax reforms took place. It first explores the extent to which the overall tax system is progressive or regressive. In order to answer this question, all the taxes paid by the household are aggregated and the (extended) Gini coefficients of the aggregate taxes are compared to those of total household expenditure. The results presented in Table 7 indicate that, by and large, the Ugandan tax structure was progressive prior to reforms. Concentration curves for the main tax categories shown in Chart 1 confirm this result. Most individual tax categories were also found to be progressive prior to reforms, with the exception of the excise tax and the graduated personal tax. In particular, the excise tax on paraffin, which is one of the commodities heavily consumed by the poor especially in rural areas, was highly regressive. By attaching a higher weight to commodities consumed by the poor, excise taxes on paraffin became even more regressive. Pay-as-you-earn was the most progressive tax. This tax is levied on formal sector employees and hence tends to be concentrated among the better off. Since the minimum threshold to be liable for this tax is relatively high, it exempts the lowest income groups. Import taxes were the second most progressive category, followed by the sales tax.

The incidence analysis shows that after reforms, the overall tax system remained progressive (Table 8). The results are consistent with findings of similar studies on Ghana and Madagascar (Younger 1996; Younger and others 1999). The Gini coefficients before and after confirm that substitution of the VAT for the sales tax does not necessarily worsen the welfare of the poor (Tables 7 and 8).[5] The pay-as-you-earn tax remains the most progressive tax after reforms. However, it is not possible to determine conclusively which of the other taxes (VAT, import tax and excise tax) dominates after the reforms.

There are some important changes in the Gini coefficients after the tax reforms (Table 8). For instance, the coefficient of the aggregate excise taxes clearly shows that these taxes were made more progressive by the reform. Import duties, however, became more regressive. The Gini coefficient of the coffee stabilization tax is considerably below that of other taxes, implying that an export tax on a primary commodity can be highly regressive. The burden lies heavily on rural producers as exporters shift the tax on to producers. As confirmed by the test statistic (Table 10), the coffee stabilization tax dominates all other types of taxes.

In an effort to raise public revenue, petroleum products have been heavily relied on, given that their demand is considered inelastic. By applying the statutory tax rates directly on petroleum consumption, petroleum taxes (apart from that on paraffin) are found to be very

[5] While the results show that VAT is a progressive tax, its inconclusive from the welfare dominance test whether VAT is much more progressive than a sales tax (Tables 4 and 5).

progressive. Note that this the incidence analysis ignores the indirect or intermediate effects of petroleum taxation on the other sectors. These indirect price effects of petroleum taxes can be obtained from the input-output table, and can be assigned to the corresponding commodities in the household survey (Republic of Uganda 1995). Two types of taxes are considered here. First, import duties levied on petroleum products are imputed on all other sectors. Second, the excise tax has a strong effect on prices in the transport sector. When these effects are taken into account, petroleum taxes are no longer as progressive as in the initial analysis.[6]

B. Marginal Effective Tax Rate for Domestic Firms

In this section, the marginal effective tax rate (METR) on capital and cost of production is estimated for Ugandan firms operating in the following industries: commercial agriculture, agro processing, manufacturing, construction, transportation, communication, and tourism.[7] For the METR on capital, four types of assets (buildings, machinery, inventories, and land), two different tax regimes (the pre- and post-1997 tax system), and three tax codes (regular taxable, tax-holiday, and small firms) are included. A number of policy options will also be simulated.[8] The METR estimation on the cost of production includes three key inputs: capital, labor and fuel.

The estimation of the METR is not only sensitive to tax policy but also to the choice of nontax parameters, that is, macroeconomic indicators and industry-specific parameters, such as inflation rate, interest rate, debt-to-assets ratio, economic depreciation rate, capital structure, and cost structure (Table 12). While inflation and the interest rate are usually the same for all industries within an economy, the other parameters vary by sector. For example, depreciable assets used by different industries have a different useful life and replacement cost, which results in a different economic depreciation rate. Capital structures also vary by industry. For example, compared to tourism, the capital structure in manufacturing is more intensive in machinery and inventories and less intensive in buildings.[9]

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[6] While excise tax on petrol without taking into account indirect effects on other sectors gives very progressive Gini coefficients in the range of 0.899 to 0.992 (for $v = 2, 4, 6, 8, 10$), taking into account their indirect effects on other sectors less progressive results in the range of 0.436 to 0.726 for the same values of v are obtained. Note that the higher the value of the parameter v, the higher weight is attached to commodities consumed by the poor.

[7] For simplicity, the analysis covers only firms located in the main industrial centers. Considering that a higher initial allowance is available for investment in machinery and plant elsewhere in Uganda, their effective tax rates will be generally lower.

[8] Overall, the discussion here focuses on large and medium-sized firms (that is, firms that have more than 20 employees); the incidence of small firms is discussed as a special case.

[9] Chen and Reinikka 1999 provide a discussion on nontax parameters as well as sensitivity analyses for the base case assumptions.

METR on Capital

Capital investment generally involves two categories of capital, that is, depreciable and nondepreciable assets.[10] These two categories can be further divided into buildings and machinery (depreciable), and inventory and land (nondepreciable). As mentioned earlier, capital investment by asset type varies by industry. Consequently, even if a certain type of asset incurs the same METR, the different capital structure by industry will result in a different aggregate METR on capital across industries. The cost structure by input varies also by industry; the larger the share of an asset, the higher is the METR on capital in that industry.

Asset type. The base case is the 1997 regular taxable firm. As Table 2 shows, machinery is the lowest taxed asset in Uganda. This is mainly because of the very generous initial allowance (50 percent), along with the annual depreciation allowance, starting from the first year. In fact, the METR on machinery is found to be negative in a number of industries which indicates a tax subsidy.[11] The transportation sector, however, incurs a relatively high METR on machinery (17 percent). This is mainly because vehicles are not eligible for the initial allowance.

Inventories are the highest taxed asset (a METR of 45 percent). This is mainly due to the first-in-first-out (FIFO) accounting method, which most Ugandan firms use, combined with a positive inflation rate. Buildings, except those used by commercial agriculture, are taxed the second highest (a METR of over 40 percent), mainly because of the local property tax on buildings, combined with less generous tax depreciation allowances. Due to a more generous depreciation allowance for farm works, buildings used in commercial agriculture bear a low tax burden (a METR of 12 percent). Structures used by the construction industry incurred a higher METR than other sectors, mainly because of a higher economic depreciation rate. Finally, nonfarm land is also subject to the local property tax, resulting in a relatively high METR (42 percent), while farmland incurs a significantly lower METR (28 percent).

As shown in Table 2, while nondepreciable assets, such as inventories and land, are taxed at the same level across industries (except land for commercial agriculture), depreciable assets, such as buildings and machinery, are taxed unevenly. The main reason is that depreciable assets used by different industries have different useful lives and different

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[10] The combined tax depreciation rate for machinery by industry is estimated as a weighted average of tax allowances by class for each industry based on the actual capital structure based on URA data.

[11] As a firm is taxed as a whole rather than by asset type or at the margin, this tax subsidy on machinery can be thought of as reducing the tax on income generated by other type of investment.

tax depreciation allowances. For a given depreciable asset, the wider the gap between the economic and tax depreciation rate, the higher the METR on this asset.

Industries. The aggregate METR for each industry is simply a proportional difference between the weighted average of the before-tax and after-tax rate of return by asset, based on the industry-specific capital structure. Obviously, the larger the share of the assets that are highly taxed, the higher is the industry's aggregate METR. As shown in Table 2, tourism incurs the highest METR (39 percent) in the base case. This is mainly a result of its very high capital weight in buildings (71 percent), which is the second highest taxed asset. Manufacturing incurs the second highest METR (33 percent), mainly because the sector invests about two thirds of its total capital in the two highest taxed assets, inventories and buildings.

In contrast, transportation enjoys the lowest METR on capital of all sectors (21 percent). The primary reason is its heavy capital weight in machinery (84 percent), particularly vehicles which have a relatively high annual depreciation allowance (30 percent). For the same reason, agro processing and construction (capital share of machinery is 48 percent) incur a relatively low METR (23 and 24 percent, respectively). The METR on capital for commercial agriculture and the communications industry are somewhere in-between (a METR of 26 and 31 percent, respectively). The primary contributor to the former is its rather high capital share in inventories (33 percent). The main factor for the latter is its high capital share in buildings (57 percent).

Small firms. As described above, small firms do not pay regular income taxes, unless they opt to do so, but are instead levied a presumptive tax up to 1 percent of their gross turnover. In this section small firms refer to those firms qualifying for and choosing to pay the presumptive tax. Since the presumptive tax is imposed on the gross receipts without any adjustments, small firms are neither entitled to the generous initial allowance for investment in machinery nor subject to any restrictions regarding writing off business expenditure. As a result, the METR for small firms is found to be lower than that for large and medium-sized regular taxable firms on all other assets but machinery (Table 13). However, except for those engaged in commercial agriculture, small firms still pay municipal property taxes. Therefore, buildings and land are taxed higher than investment in machinery and inventory by small firms. As depreciable assets wear off at a different pace from industry to industry, buildings and machinery incur a different METR across industries even though they are subject to the same presumptive tax rate and have no differentiated sector-specific tax allowances. Compared to the base case (regular taxable firm) by industry, small firms are taxed significantly less as measured by the aggregate METR on capital. The gap ranges from 15 percentage points in agro processing to over 24 percentage points in manufacturing. Furthermore, the interindustry dispersion is smaller than in the base case of the regular taxable firm.

Impact of Tax Reform

This section examines the impact of income tax reforms on regular taxable firms and compares them to the firms that had been granted tax holidays.

Regular taxable firms. As shown in Table 2, the tax burden incurred by large and medium-sized regular taxable firms was significantly reduced following the 1997 income tax reform. The difference in the aggregate METR between the two systems ranges from 5 to 15 percentage points. The most striking change is the difference in the METR on machinery, ranging from 9 percentage points for transportation to 34 percentage points for the communications sector. This is mainly because of the generous initial allowance for investment in machinery and equipment (except vehicles) available to all tax-paying firms under the new system. The other contributor is the zero-rated import duty for imported machinery.

Following the reform, the METR on buildings declined about 3 percentage points. This is mainly due to the slightly higher annual depreciation allowance (increased from 4 to 5 percent). The wider gap (about 19 percentage points) for commercial agriculture reflects the effect of a higher annual allowance for farm works. There was no change in the METR for inventory and land.

Regular taxable versus tax-holiday firm. Corporate tax holidays were abolished in 1997 and replaced mainly by an initial investment allowance for machinery. As a result, the METR on machinery was significantly reduced (around 25 percentage points lower across industries, except for the transport sector). This indicates that, given the generous allowances, profitable firms that invest heavily in machinery can benefit from opting out from the tax holiday status.[12]

For all other assets, however, the METR was lower under the tax-holiday regime. First, as the annual depreciation allowance for buildings is relatively low, there is still a large balance left (76 percent of the total cost) to take advantage of the tax depreciation allowance even when the tax holiday has expired. Obviously, the longer the tax holiday, the less is the unclaimed balance worth in the present value terms. Second, the significantly lower METR on inventories is due to the fact that tax-holiday firms are able to avoid the tax penalty caused by inflation when using the FIFO accounting method. Third, by investing in land, the only tax benefit a tax-holiday firm may lose is the interest deduction. When the debt-to-assets ratio is low (25 percent or less in Uganda), this loss is insignificant compared to the benefit gained from the tax holiday.

As can be seen from Table 2, interindustry tax distortion actually increased following the tax reform. A further analysis shows that the main contributor is the difference in the METR between commercial agriculture and all other sectors. As farm works are entitled to a fast write-off, and properties used for commercial agriculture are exempted from municipal property tax, buildings and land are taxed much less than in the other sectors.

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[12] This holds provided that firms are not allowed to defer their depreciation allowance until after the holiday has expired.

To summarize, industries investing heavily in machinery gained most from the tax reform, reflecting the policymakers' desire to provide incentives for acquisition of new technologies. The most evident example is the transportation industry where the advantage measured by the METR for regular taxable firms is 6 percentage points compared to their tax-holiday counterpart. However, the METR for the regular taxable firms in the tourism sector is significantly higher (13 percentage points) than their tax-holiday counterpart, due to the high capital share in structures. Similarly, commercial agriculture and manufacturing incur a higher METR under the new system (11 percentage points) as these industries invest more in nondepreciable assets, particularly inventories for which the tax holiday regime was more advantageous. Despite a relatively high capital share in machinery, the construction industry also lost slightly (3 percentage points) because of the opposite effect from large inventories.[13]

METR on Cost Production

The METR on cost of production is used to evaluate the impact of all business taxes, including capital, payroll and indirect taxes on overall business activities. It is estimated as an integration of the METR on various inputs, using the augmented Cobb-Douglas production function. Given that the fuel tax is an important revenue source in Uganda, motor fuel along with capital and labor is included as an input for production.[14] As shown in Table 3, the cost structure varies across industries. Capital accounts for the largest share, which probably reflects the very low labor costs in Uganda. Furthermore, as agro processing requires a higher share of transportation services than commercial agriculture, the share of fuel in its total cost is nine percent, while it is only one percent in commercial agriculture. Table 3 summarizes the METR on each of the three inputs as well as on the overall cost of production by industry. For the METR on capital we use the base case (regular taxable firm under the 1997 tax system), while the METR on labor is simply the statutory payroll tax rate of 10 percent, and the METR on fuel is estimated at 174 percent (Table 11).[15] As the METR on fuel is significantly higher than that on capital, industries with a higher share of fuel incur a higher METR on production cost than on capital. Agro processing and transportation, which have the lowest METR on capital, fall in that category. In other words, the high fuel tax may

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[13] Chen and Reinikka (1999) provide policy simulations and sensitivity analyses for nontax parameters, including choice of the accounting method, initial allowance for buildings, municipal property tax on small firms, inflation rate, debt-to-assets ratio, and economic depreciation rate.

[14] The combined fuel tax rate for Uganda is the ad valorem rate on the "total CIF destination warehouse cost", including all handling charges. The weighted-average rate is based on data provided by the URA on fuel sales by product in 1997.

[15] As the payroll tax in Uganda is imposed on the total payroll without ceilings, the statutory payroll tax rate can be seen as the marginal rate. By ignoring the shift effect, we also assume the employer's share of payroll tax is fully borne by the employer.

actually negate some of the benefits of the tax reform which strongly encourages investment in machinery and equipment in agro processing and the transportation sector as the two sectors are the most fuel-intensive in terms of their cost structure. In contrast, all other industries incur a METR on cost that is lower than their METR on capital, mainly due to the low METR on labor and their small share of fuel in the total cost. On cost of production, tourism and manufacturing are still the highest taxed industries in Uganda, while construction becomes now the lowest taxed industry instead of transportation.

C. Cross Border Comparison for Foreign Firms

This section compares the impact of taxation on foreign direct investment in Kenya, Tanzania and Uganda. It attempts to answer the following question: Which of the three countries is in the best position to attract foreign investors, if tax cost were the only factor in their investment decisions? We focus on manufacturing and tourism, as they are key areas for foreign direct investment in Eastern Africa. For simplicity, tax provisions and economic parameters for foreign firms are based on the United Kingdom's tax system, as it accounts for the largest share (about 25 percent) of the total actual foreign investment in Uganda.

Tax rates and provisions for Kenya and Tanzania are summarized in Table 14. In order to focus the cross-country comparison exclusively on the burden of taxation, Uganda's nontax parameters and capital structure are applied to Kenya and Tanzania as well.[16] With these assumptions, we find that Uganda has a tax disadvantage compared to Kenya in both manufacturing and tourism, mainly due to Kenya's preferential tax treatment targeted to these two sectors (Table 4). In tourism, Uganda is also less competitive than Tanzania in terms of taxation, mainly due to its local property tax on buildings, which accounts for 71 percent of capital in the tourism sector.

There are a number of factors contributing to this outcome. First, there is no property tax on structures in Kenya and Tanzania. As a result, even without taking into account the initial investment allowances available in Kenya, buildings are taxed significantly less in Kenya and Tanzania than in Uganda.[17] A slightly more generous tax depreciation rate for buildings in the tourism sector (6 versus 5 percent) also contributes to a lower METR on buildings in Tanzania. Second, Kenya provides an initial investment allowance of 60 percent for both buildings and machinery for manufacturing and tourism. Despite its slightly higher corporate income tax rate, buildings in Kenya are therefore taxed much more lightly than in Uganda and Tanzania. Third, a nonzero import duty on most machinery imported to Kenya and Tanzania is the main contributor to their higher METRs on machinery compared to

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[16] A simulation using country-specific parameters is also carried out in Chen and Reinikka (1999).

[17] Should buildings also be exempted from the municipal property tax in Uganda, Uganda could gain a tax advantage over Kenya and Tanzania in manufacturing and over Tanzania in tourism.

Uganda. Fourth, the higher corporate income tax rate in Kenya results in a higher METR on inventory through inflated taxable income under FIFO. In the case of Tanzania, a higher dividend withholding tax rate induces a higher financing cost that contributes to a higher METR on inventory compared to Uganda. Finally, the different property tax rates on land play a major role on the variation in the METR on land. As a result, the highest METR on land is in Tanzania (39 percent), followed by Uganda and Kenya (33 and 28 percent, respectively).

Again, in order to isolate the impact of taxation, Uganda's nontax parameters, including the cost structure, are applied to Kenya and Tanzania. As before, the METR on labor is the average payroll tax payable by employers, and the METR on fuel is the effective average tax rate on motor fuels. As shown in Table 5, Kenya has the lowest METR on labor, followed by Tanzania (0.1 and 4 percent respectively, compared to 10 percent in Uganda). Tanzania has the lowest METR on fuel, followed by Kenya (26 and 64 percent, respectively, compared to 174 percent in Uganda).[18] As a result, measured on cost of production Uganda becomes the highest taxed country in both manufacturing and tourism. Tanzania's tax competitiveness in tourism becomes more evident, while its manufacturing sector has now a lower tax burden than its counterpart in Uganda. Kenya has an even greater tax advantage over Uganda in both sectors.

D. Compliance and Tax Administration: Impact on the METR

A typical tax incidence analysis provides an assessment of the tax structure without dealing with administrative realities. Administration can, however, create major distortions no matter how well designed a tax system if it is not managed efficiently and fairly. This section examines key features of taxpayer compliance and tax administration, based on firm survey evidence. The purpose is to isolate factors likely to make the true tax burden on firms different from that indicated by the formal system and the METR analysis.

Tax Compliance

Taxpayer compliance depends on economic incentives embedded in the tax structure and the effectiveness in detecting and penalizing noncompliance (Das-Gupta and Mookherjee, 1998). At the margin, people engage in tax evasion when the expected benefits (lower taxes) are equal to the expected costs (bribes, punishment, etc.). According to the 1998 firm survey, one-third of Ugandan firms were in a tax loss position in 1997, that is, they neither paid the corporate income tax nor had a tax holiday (Table 15). While it may appear high, this ratio is not out of line with international experience. For example, the Canadian statistics show that, on average, over 40 percent of active nonfinancial firms are in the tax loss position. Twenty-six percent of Ugandan firms did not pay the VAT in 1997, which is

[18] For Kenya and Tanzania, the fuel tax rate by product is estimated based on the tax and the price per liter, while Uganda's shares of various products in total sales were used as weights to estimate the combined fuel tax rate.

not surprising since many smaller firms may not be registered for the VAT. Commercial agriculture has the largest share of non-VAT paying firms. This is broadly consistent with the design of the VAT system (i.e., foods are zero-rated in general). Eight percent of Ugandan firms with five or more employees do not pay taxes.

Whether or not firms are content with their own level of taxes, they clearly feel disadvantaged when they see their competitors escaping taxation. In the 1994 survey of Ugandan firms, respondents identified competitors' evasion of taxes as a major constraint (World Bank 1994). Some 60 percent of firms reported that they faced unfair competition. Furthermore, firms estimated the informal economy (part of the economy evading taxes, duties or laws and regulations) to be substantial, with estimates centering around 43 percent. In 1998 this perception remains, with tax evasion being the leading constraint from unfair competition. However, the numerical constraint scores for competitors evading taxes, or smuggling have declined, with the most marked apparent change in the latter.

Despite some improvement in perceptions, the legacy of a predatory state, coupled with little improvement in service delivery, continues to have an adverse effect on tax compliance in Uganda. In the 1998 survey, firms in manufacturing, which is the second highest taxed sector measured by the METR, estimated that one half of their competitors gain an advantage through tax evasion. In construction and agro processing the reported share was about 40 percent. In tourism, which is the highest taxed sector as measured by the METR, firms reported that one-third of their competitors engage in tax evasion, while in commercial agriculture, where the share of tax paying firms is the lowest, only 5 percent of competitors were perceived to evade taxes.

Tax Administration

A prominent feature of the Ugandan tax administration is frequent tax audits, which are either desk or field operations, or a mixture of both. Predetermined criteria do not exist for conducting an audit but factors, such as compliance record, quality of returns submitted, and the size of the firm are said to be important. Sixty-eight percent of all firms were audited either for the corporate income tax, VAT or both during 1995–97. Forty-one percent of firms reported that they were audited for the corporate income tax, while as many as 60 percent of all firms were audited for the VAT. The latter is equivalent to three-quarters of the VAT paying firms. In the international comparison, Uganda's audit figures are very high. For example, in Canada all large corporations (about 1,000) are audited, while for the rest (about 13,000) face audit rates of 5 percent or less. The high auditing frequency indicates a serious lack of voluntary compliance and a low level of mutual trust between the tax authority and the taxpayer.

The URA routinely "assesses" tax returns submitted by taxpayers. These assessments are typically desk reviews of self-declarations and supporting documents. The tax officer may accept the taxpayer's declaration as is, or "assess" an additional tax to be paid. A tax audit may also be involved which may lead to a demand for any additional taxes to be paid in the form of an "assessment." As shown in Table 15, as many as 51 percent of Ugandan firms had a disagreement with the URA on their assessment during 1995–97. Sixty-eight percent of

these cases were resolved through negotiation between the firm and the URA officers, while 10 percent appealed to a third party. None of the disputes were taken to court. The rest remained unsettled at the time of the survey. At the end, roughly one-third of the resolved disputes ended with a result closer to the taxpayer's own assessment, one-third closer to the URA's assessment, and the rest between the two assessments. Depreciation allowances appear to be one of the main causes for disputes in the corporate income tax assessments. The firm survey also indicates that most tax-holiday firms have little or no involvement with the tax authority, which may be an additional incentive for initially acquiring the tax holiday status.

The Impact on the METR

The firm survey reveals three important differences between the formal tax system and actual practice, which can affect the METR results presented in this paper. First, according to the Ugandan income tax law, firms that enjoy a tax holiday are subject to mandatory tax depreciation. In other words, they are required to write off their depreciable assets annually during the tax holiday period, and should not be able to claim tax depreciation on the full cost of capital invested in the beginning of or during the holiday period. Typically, the mandatory depreciation is incorporated into the METR model as it is part of the formal tax system. However, if the practice is that tax-holiday firms do not file their income tax returns at all and hence manage to claim for the full tax depreciation allowance after the tax holiday ends, then their real effective tax burden can be much lower than predicted by the standard model.

Second, among the firms that were audited, at least every third one had to pay additional taxes, while every fourth firm incurred additional costs, such as bribes. Note that all firms whose tax assessment differed by 100 percent or more "always" (5 on the scale 1–5) had to pay bribes to the URA officials, while on average all survey firms reported that bribes were "seldom" required (2 on the scale 1–5). Payment of bribes may affect the effective tax burden in two ways. On the one hand, despite being a cost, bribes can reduce the tax burden (measured by the METR) if they provide an opportunity to tax evasion. On the other hand, the extra costs may increase the tax burden when used, say, to avoid a lengthy appeal and settlement process (which in itself would increase the burden but is not captured by the METR based on the formal tax system).

Third, as the VAT is a consumption tax and therefore should not have any impact on capital investment and taxable business activities, it is generally ignored in the METR model. However, if the input tax credit under the VAT system is not refunded in a timely way, or not refunded at all, then VAT can cause an additional tax burden on the business sector.[19] As the

[19] When the input tax credit is not refunded at all, the VAT could be modeled as a sales tax on capital or any other taxable input. In the case where the refund period is abnormally long and no interest is paid by the revenue authority, the interest cost could be modeled as an increment on the cost of financing.

VAT was introduced to Uganda only in 1996, implementation problems can be expected to arise. In 1998 the main complaint from the business sector concerns refunding of the input VAT credit. As Table 15 shows, 81 percent of firms purchase inputs from VAT-registered suppliers but only 56 percent of these firms claim for input tax credits. It is somewhat unclear whether this results from the VAT credit and liability offset procedure.[20] Another potential reason is that firms with excess input tax credits simply decline to claim for refunds, for example, due to higher compliance costs. This could be tempting for firms that can pass on the input VAT cost to consumers but less so for the firms that have to absorb the cost themselves. In the former case, it would result in the VAT cascading so as to increase tax revenue in a short term but at the cost of consumer welfare in the long run. In the latter case, firms may incur a profit loss that can, in turn, affect the corporate income tax revenue.

Fifty-two percent of the firms that claimed an input tax refund received their expected amount in 1998. However, a significant portion (18 percent) of firms that claimed the input tax credit did not receive any refund, while the rest (40 percent) received a partial refund. Furthermore, the waiting period for even a partial refund of the input VAT credit can be lengthy. For example, among the firms that received at least a portion of refund, over one-half waited for more than six weeks, while 10 percent waited for more than half a year. The lengthy process for input VAT refund is likely to curb compliance as well as increase the cost of doing business, tying up a considerable portion of working capital that has a high opportunity cost, considering a current bank lending rate of over 20 percent.

There are mainly two reasons for the delay in the VAT refunds: a lack of sufficient funds on the refund account, and a lack of sufficient human resources to perform a full audit on all claims within the stipulated one-month time limit. These problems are not uncommon in countries that do not have an established tax culture and that have introduced the VAT only recently. A functional VAT system, however, would require adequate funds for the refund process and limiting the full audit only to those claims with greatest revenue risk.

Hence, two types of factors emerge from the survey evidence that could alter the METR results. These factors operate in opposite directions. First, tax evasion in general and avoidance of the mandatory depreciation during the tax holiday in particular would reduce the actual METRs compared to the formal tax system. Because compliance is firm specific and tax administration also tends to treat firms differently, this impact is not the same across the industries or even within a particular sector. Second, delays in the VAT refunds and in some cases payment of bribes could have the opposite effect of increasing the tax burden compared to the formal tax system. The net effect is ambiguous. Finally, the impact of frequent tax audits and assessments on the METR is also ambiguous, depending on whether they simply contribute to enforcement of the formal rules, or cause an extra cost to firms over and above the METR

[20] It appears that when offset procedures are being used, no supporting documentation is required and the approval is granted after a desk review, subject to an audit at some later date. However, such a loose arrangement can lead to major difficulties at the audit stage.

IV. Conclusion

Household survey analysis reveals that some of the tax reforms implemented in the 1990s did not necessarily affect the poor. First, given the zero-rating of commodities consumed by the poor, the reform of replacing the sales tax with the VAT did not lead to the poor being worse-off. Second, comparing the two tax regimes (before and after reforms), import taxation remained progressive although less so than before. In aggregate, excise taxes became more progressive. However, increased taxation on paraffin is highly regressive, while taxes on other petroleum products are progressive. Also, given the liberalized market, export taxes on coffee used during commodity booms tend to have an adverse effect on the poor.

The marginal effective tax rate (METR) analysis demonstrates that, even when the country's level of public revenue is low at the macroeconomic level, rapidly increasing taxation may pose a constraint to private investment at the microeconomic level. There are two reasons for this. First, the formal enterprise sector in these economies typically represents a small share of output but a high proportion of the effective tax base. Second, access to credit is limited and interest rates are often high, particularly for smaller firms, and hence most private investment is financed by profits and personal savings. As a result, taxation reduces both the expected revenue from a given investment project and the availability of investment finance.

From the perspective of foreign investors, Uganda appears to be a more highly taxed environment compared with its neighboring countries, particularly Kenya. Interestingly, at the microeconomic level the Kenyan tax system appears to place the lowest burden on firms investing in manufacturing and tourism, while at the macroeconomic level Kenya's share of tax revenue in GDP is the highest of the three countries (22.7 percent in 1997/98 compared to 11.2 percent in Tanzania and 10.3 in Uganda). Uganda's tax disadvantage results mainly from its property tax on buildings, which does not exist in Kenya and Tanzania, and its significantly higher fuel taxation.

To level the playing field, discretionary corporate tax holidays were abolished in 1997 in Uganda and replaced by an initial investment allowance for machinery for all firms. As a result, the METR on machinery was significantly reduced. The analysis indicates that profitable firms that invest heavily in machinery clearly benefited from this policy change. However, for all other assets the METR was lower under the tax-holiday regime. The interindustry tax distortion was also slightly increased in 1997 due to the introduction of a generous depreciation allowance exclusively for farm works.

The METR estimates tell mostly a story of the formal tax structure. Tax administration, if not fair and efficient, can distort the best intentions of policymakers and produce a very different outcome in terms of the actual tax burden faced by firms. Using firm survey evidence, several factors that can alter the METR results were identified. First, there are factors that are likely to reduce the METRs, including widespread tax evasion, evasion of mandatory depreciation during the tax holiday period, and firm-specific exemptions which, despite efforts to curb them in recent years, show up strongly in the 1997 data. Second,

delays in the VAT refunds and in some cases payment of bribes are likely to have the opposite effect of increasing the METR compared to the formal tax system. The net effect is ambiguous.

Table 1. Central Government Revenues

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
				In millions of Ugandan Shillings				
Taxes on income and profits	23,600	40,900	53,000	77,200	82,600	102,200	124,750	170,040
Excise taxes	15,000	18,800	40,500	50,600	217,000	301,500	304,050	322,870
Petroleum products	..	..	..	..	149,900	197,500	188,270	193,210
Other	..	..	..	..	67,100	104,000	115,780	129,660
Taxes on goods and services	55,500	75,100	92,800	153,000	188,700	209,600	247,200	298,600
Value added tax	..	..	..	..	..	209,600	247,200	298,600
Sales tax	43,400	62,900	75,300	128,700	162,300	..	..	..
Commercial transaction levy	5,400	9,600	15,300	22,300	25,600	..	..	..
Other	6,700	2,600	2,200	2,000	800	..	..	..
Taxes on international trade	78,600	124,230	152,500	205,500	100,500	74,800	78,400	96,530
Import duties	76,600	124,230	152,500	176,700	75,900	72,300	78,050	96,480
Export duties (coffee)	2,000	0	0	28,800	24,600	2,500	350	50
Total tax revenue	172,700	259,030	338,800	486,300	588,800	688,100	754,400	888,040
Total nontax revenue (fees and licenses)	13,295	22,404	25,063	40,400	38,400	43,300	47,060	62,700
Total revenue	185,995	281,434	363,863	526,700	627,200	731,400	801,460	950,740
CPI, annual average	194.9	253.4	270.1	286.6	308.0	332.3	351.6	351.0
Real domestic revenue	95,415	111,075	134,725	183,795	203,612	220,098	227,974	270,866
GDP at factor cost	2,588,800	3,625,938	4,069,439	4,922,397	5,565,388	6,022,953	7,104,303	7,887,246
GDP at market prices	2,745,491	3,870,388	4,400,270	5,367,456	6,122,089	6,663,235	7,791,426	8,647,425
Monetary GDP at factor cost	1,794,145	2,481,870	2,890,811	3,619,057	4,213,995	4,717,950	5,467,267	6,119,562
				(Percentage share of total domestic revenue)				
Taxes on income and profits	12.7	14.5	14.6	14.7	13.2	14.0	15.6	17.9
Excise taxes	8.1	6.7	11.1	9.6	34.6	41.2	37.9	34.0
Petroleum products	..	..	..	..	23.9	27.0	23.5	20.3
Other	..	..	..	..	10.7	14.2	14.4	13.6
Taxes on goods and services	29.8	26.7	25.5	29.0	30.1	28.7	30.8	31.4
Value added tax	..	..	..	..	..	28.7	30.8	31.4
Sales tax	23.3	22.3	20.7	24.4	25.9	..	..	..
Commercial transaction levy	2.9	3.4	4.2	4.2	4.1	..	..	..
Other	3.6	0.9	0.6	0.4	0.1	..	..	..
Taxes on international trade	42.3	44.1	41.9	39.0	16.0	10.2	9.8	10.2
Import duties	41.2	44.1	41.9	33.5	12.1	9.9	9.7	10.1
Export duties (coffee)	1.1	0.0	0.0	5.5	3.9	0.3	0.1	0.0
Total tax revenue	92.9	92.0	93.1	92.3	93.9	94.1	94.1	93.4
Total nontax revenue (fees and licenses)	7.1	8.0	6.9	7.7	6.1	5.9	5.9	6.6
Total revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Real change in total revenue	(4.5)	16.4	21.3	36.4	10.8	8.1	3.6	18.8
Total revenue as share of GDP at factor cost	7.2	7.8	8.9	10.7	11.3	12.1	11.3	12.1
Total revenue as share of GDP at market prices	6.8	7.3	8.3	9.8	10.2	11.0	10.3	11.0
Total revenue as share of monetary GDP at factor cost	10.4	11.3	12.6	14.6	14.9	15.5	14.7	15.5

Source: Ministry of Finance, Planning and Economic Development.

.. Not applicable. CPI = consumer price index.

Table 2. Marginal Effective Tax Rate on Capital for Ugandan Firms

(In percent)

	Commercial agriculture	Agro processing	Manufacturing	Construction	Transportation	Communications	Tourism
Regular taxable case, 1997							
Buildings	11.7	43.4	44.3	48.4	42.7	44.9	43.0
Machinery	–0.3	0.6	1.4	–0.4	16.6	–1.1	2.9
Inventory	45.2	45.2	45.2	45.2	45.2	45.2	45.2
Land	27.5	41.7	41.7	41.7	41.7	41.7	41.7
Aggregate	26.2	23.2	32.9	23.5	20.9	31.0	39.2
Interindustry dispersion: 3.9							
Regular taxable case, pre-1997							
Buildings	30.4	46.5	47.6	51.9	45.9	48.2	46.2
Machinery	20.4	29.9	32.9	21.0	25.5	32.6	30.4
Inventory	45.2	45.2	45.2	45.2	45.2	45.2	45.2
Land	27.5	41.7	41.7	41.7	41.7	41.7	41.7
Aggregate	32.3	38.1	42.5	34.1	28.7	42.8	43.9
Interindustry dispersion: 3.4							
Difference from the 1997 regular taxable case	6.1	14.9	9.6	10.6	7.8	11.9	4.7
Tax-holiday case, pre-1997							
Buildings	15.8	28.5	29.0	31.1	28.2	32.1	28.4
Machinery	26.7	25.3	26.6	25.6	27.6	31.5	28.7
Inventory	15.3	12.8	12.8	12.8	12.8	15.3	12.8
Land	8.0	18.2	18.2	18.2	18.2	20.0	18.2
Aggregate	15.0	23.6	22.3	21.0	26.9	30.2	26.3
Interindustry Dispersion: 2.4							
Difference from the 1997 regular taxable case	–11.2	0.4	–10.6	–2.5	6.0	–0.7	–12.9

Source: Authors' calculations based on data provided by the Ministry of Finance, Planning and Economic Development and the Uganda Revenue Authority.

Table 3. Marginal Effective Tax Rate on Cost of Production for Ugandan Firms

(In percent)

	Commercial agriculture	*Agro processing*	*Manufacturing*	*Construction*	*Transportation*	*Communications*	*Tourism*
METR[1]							
Capital	26.2	23.2	32.9	23.5	20.9	31.0	39.2
Labor	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Fuel	174.0	174.0	174.0	174.0	174.0	174.0	174.0
Aggregate	25.8	26.7	30.6	21.1	24.3	25.5	34.2
Cost structure[2]							
Capital	89.2	52.2	66.8	50.2	67.1	60.4	68.8
Labor	9.5	38.8	28.2	45.6	26.4	36.7	27.2
Fuel	1.3	9.0	5.0	4.2	6.4	2.9	4.0

Source: Authors' calculations based on data provided by the Ministry of Finance, Planning and Economic Development and the Uganda Revenue Authority; Republic of Uganda (1995) for cost structure.

[1] METR by input and on overall cost of production.
[2] Input share in total cost of production (excluding other inputs).

Table 4. Marginal Effective Tax Rate on Capital for Foreign Firms

	Uganda	*Kenya*	*Tanzania*
Manufacturing			
Buildings	38.9	1.9	25.6
Machinery	–3.9	12.3	31.0
Inventory	59.0	69.0	61.9
Land	32.8	27.5	39.0
Aggregate	33.8	28.8	40.0
Tourism			
Buildings	36.5	0.9	15.9
Machinery	–1.8	10.0	28.5
Inventory	59.0	69.0	61.9
Land	32.8	27.5	39.0
Aggregate	32.6	7.5	21.9

Source: Author's calculations based on data provided by the Uganda Revenue Authority; Ministry of Finance, Planning and Economic Development; Bureau of Statistics; Uganda Investment Authority; and the World Bank.

Note: Uganda's nontax parameters are applied to Kenya and Tanzania.

Table 5. Marginal Effective Tax Rate on Cost of Production for Foreign Firms

(In percent)

	Uganda	*Kenya*	*Tanzania*
Manufacturing			
Capital	33.8	28.8	40.0
Labor	10.0	0.1	4.0
Fuel	174.0	62.0	25.4
Overall	30.7	21.5	28.8
Tourism			
Capital	32.6	7.5	21.9
Labor	10.0	0.1	4.0
Fuel	174.0	62	25.4
Overall	29.9	7.2	17.0

Source: Author's calculations based on data provided by the Uganda Revenue Authority; Ministry of Finance, Planning and Economic Development; Bureau of Statistics; Uganda Investment Authority; and the World Bank.

Note: Uganda's nontax parameters are applied to Kenya and Tanzania.

Table 6. Integrated Household Survey Commodities and Corresponding Tax Rates

(In percent)

Commodity	*1992 import duties*	*Sales tax/CTL*	*1995 import duties*	*VAT*
Matooke, potatoes, maize, cassava	0	0	0	0
Rice	30	30	20;4	0
Bread, macaroni, spaghetti	30	30	20;6	17
Meat, poultry and fish	0	0	0	0
Milk fresh (liquid)	0	10	0	0
Milk (powdered)	30	10	10;2	0
Other dairy products	30	10	0	0
Butter	10	20	20;6	17
Ghee	10	20	10;2	17
Hydrogenated Oil	10	30	10;2	17
Margarine	10	30	20;4	17
Refined cooking oil and other oils	10	20	10;2	17
Fruits, beans, lentils and nuts	0	0	0	0
Sugar (Uganda)	0	10	0	17
Sugar (imported)	20	10	20;6	17
Cocoa	30	30	20;6	17
Salt	10	10	10;2	17
Soda (all brands)	0	40	20;12	17
Passion fruit/orange juice	0	20	206	17
Other nonalcoholic drinks	0	40	20;12	17
Beer	350	70	20;12	17
Uganda waragi-refined	0	50	20;12	17
Other alcoholic beverages	100	50	20;12	17
Cigarettes (all)	100	50	30;12	17
Expenditure in restaurants/cafes	0	10	0	0
Matches	40	20	20;6	17
Soap, detergents, toothpaste	30	50	20;6	17
Cosmetics	50	70	20;6	17
Shaving equipment, insecticide, and shoe polish	30	30	20;6	17
Clothing, footwear, household furnishings	30	10	20;4	17
Bags	30	30	20;6	17
Tapes and Records	30	50	20;6	17
Rent (including imputed)	0	0	0	0
Water charges	0	10	0	17
Electricity	0	10	0	17
Paraffin	0	30	0	0
Other fuel and power	20	30	0	0
Plastic utensils	30	10	20;4	17
Enamel and metal utensils	20	10	10;2	17
Porcelain, glass, chinaware	30	30	20;4	17
Cutlery and kitchen tools	30	30	10;2	17
Bulbs, switches, plugs, cables	20	30	10;2	17
Tires, tubes, and other parts and tools for transport	20	30	10;2	17
Petrol, diesel, oil, greases	75	30	0	0
Stamps, aerogrammes, telephones	0	10	20;4	17
Expenditures on sports and theatres	0	10	0	0
Hotels and other touring	0	10	0	0
Beds, sofas, chairs, other furniture	0	30	20;6	17
Carpets, mats, decoration articles	30	30	20;6	17
Personal cars and vehicles	30	20	20;6	17
Bicycles	20	10	20;6	17
Television sets	10	30	20;6	17
Cassette players and musical systems	40	20	20;6	17
Video decks, cameras, musical instruments	30	50	20;6	17
Jewelry	50	10	20;6	17
Watches	30	30	20;6	17

Source: Authors' calculations based on the 1992/93 Integrated Household Survey; Ministry of Finance, Planning and Economic Development; and the Uganda Revenue Authority.

Note: For the 1995 import duty column, figures after the semicolon represents the import duties charged on commodities under the preferential trade area (PTA) and/or customs union (COMESA).

Table 7. Extended Gini Coefficients of Taxes Before Reforms, 1992

V	*Excise taxes*	*Import duties and tariffs*	*Sales Tax*	*PAYE tax*	*Graduated tax*	*Petroleum tax*	*Paraffin Tax*	*Beverage excise taxes*	*Alcoholic drinks excise taxes*	*Tobacco excise taxes*	*Aggregate taxes paid*	*Total expenditures*
2	0.452	0.540	0.521	0.904	0.303	0.889	0.334	0.746	0.649	0.515	0.557	0.426
4	0.620	0.717	0.699	0.971	0.489	0.981	0.522	0.905	0.786	0.705	0.722	0.626
6	0.685	0.775	0.759	0.986	0.569	0.989	0.602	0.934	0.833	0.769	0.777	0.699
8	0.723	0.805	0.791	0.991	0.616	0.991	0.649	0.945	0.858	0.805	0.807	0.739
10	0.748	0.825	0.811	0.992	0.646	0.992	0.681	0.949	0.875	0.828	0.825	0.764

Source: Authors' calculations based on the 1992/93 Integrated Household Survey; and data provided by the Ministry of Finance, Planning and Economic Development.

Note: PAYE = Pay-as-you-earn.

Table 8. Extended Gini Coefficients of Taxes After Reforms, 1995–96

V	*Excise taxes*	*Import duties and tariffs*	*VAT*	*PAYE tax*	*Coffee stabilization tax*	*Petroleum tax*	*Paraffin tax*	*Beverage excise taxes*	*Alcoholic drinks excise taxes*	*Tobacco excise taxes*	*Aggregate taxes paid*	*Total expenditures*
2	0.537	0.504	0.525	0.904	0.209	0.889	0.334	0.746	0.690	0.515	0.538	0.426
4	0.692	0.691	0.712	0.971	0.407	0.981	0.522	0.905	0.820	0.705	0.712	0.626
6	0.746	0.753	0.772	0.986	0.488	0.989	0.602	0.934	0.861	0.769	0.769	0.699
8	0.777	0.787	0.803	0.991	0.529	0.991	0.649	0.945	0.883	0.805	0.801	0.739
10	0.798	0.808	0.823	0.992	0.555	0.992	0.681	0.949	0.897	0.828	0.820	0.764

Source: Authors' calculations based on the 1992/93 Integrated Household Survey; and data provided by the Ministry of Finance, Planning and Economic Development.

Note: PAYE = Pay-as-you-earn.

Table 9. Summary of Welfare Dominance Test Statistics, 1992*

	Paraffin	*Expenditure (total)*	*Import duties*	*Sales tax*	*Excise tax*	*PAYE*	*Graduated tax*	*Alcoholic drinks excise taxes*	*Beverage excise duties*	*Tobacco excise*	*Petroleum excise*
Paraffin	0	1	1	1	1	1	0	1	1	1	1
Expenditure (total)	0	0	1	1	–1	1	0	1	1	1	1
Imports	0	0	0	0	0	1	0	1	1	0	1
Sales tax	0	0	1	0	0	1	0	1	1	0	1
Excise tax	1	–1	1	1	0	1	0	1	1	0	1
PAYE	0	0	0	0	0	0	0	0	0	0	0
Graduated tax	1	1	1	1	1	1	0	1	1	1	1
Alcoholic excise	0	0	0	0	0	1	0	0	0	0	1
Beverage excise	0	0	0	0	0	1	0	0	0	0	1
Tobacco excise	0	0	0	0	0	1	0	0	1	0	1
Petroleum tax	0	0	0	0	0	0	0	0	0	0	0

* 1 in rows implies that tax is dominated (or more regressive), 0 in rows implies that the tax dominates other taxes, –1 represents that the tax is neither dominant or dominated (indecisive).

Source: Authors' calculations based on the 1992/93 Integrated Household Survey; and data provided by the Ministry of Finance, Planning and Economic Development.

Table 10. Summary of Welfare Dominance Test Statistics, 1995–96*

	Paraffin	*Expenditure (total)*	*Import duties*	VAT	*Excise tax*	*PAYE*	*Coffee tax*	*Alcoholic drinks excise duties*	*Beverage excise duties*	*Tobacco excise*	*Petroleum excise*
Paraffin	0	1	1	1	1	1	0	1	1	1	1
Expenditure (total)	0	0	1	1	1	1	0	1	1	1	1
Imports	0	0	0	1	–1	1	0	1	1	0	1
VAT	0	0	0	0	–1	1	0	1	1	0	1
Excise tax	0	0	–1	–1	0	1	0	1	1	0	1
PAYE	0	0	0	0	0	0	0	0	0	0	0
Coffee tax	1	1	1	1	1	1	0	1	1	1	1
Alcoholic excise	0	0	0	0	0	1	0	0	0	0	1
Beverage excise	0	0	0	0	0	1	0	0	0	0	1
Tobacco excise	0	0	0	0	0	1	0	0	1	0	1
Petroleum tax	0	0	0	0	0	0	0	0	0	0	0

* 1 in rows implies that tax is dominated (or more regressive), 0 in rows implies that the tax dominates other taxes, –1 represents that the tax is neither dominant or dominated.

Source: Authors' calculations based on the 1992/93 Integrated Household Survey; and data provided by the Ministry of Finance, Planning and Economic Development.

Table 11. Business Taxes in Uganda

(In percent)

	1997 system	*Pre–1997 system*
Capital taxes		
Company income tax	30	30 (resident) 35 (nonresident)
Tax holidays	–	3–6 years
Investment allowance		
Structures	–	"Approved business" only
Machinery	50 – 75	"Approved business" only
Tax depreciation rate		
Industrial buildings[1]	5	4
Machinery[2]		
Class 1	40	50
Class 2	35	40
Class 3	30	20
Class 4	20	–
Inventory accounting	FIFO/LIFO	FIFO/LIFO
Loss carry-over	Forward indefinitely	Forward indefinitely
Personal tax on investment income		
Withholding tax on interests	15	15
Withholding tax on dividends	15	15
Presumptive tax on small firms	1 on turnover	–
Property tax	10	10
Indirect taxes on business		
Import duty on capital goods	–	5+
Average fuel tax	174	[Not calculated]
Payroll taxes	10	10

Source: Ministry of Finance, Planning and Economic Development; Uganda Revenue Authority.

– Not applicable.

[1] Straight line method.

[2] Declining balance. It should be noticed that the classification of machinery and equipment for tax depreciation allowance varies significantly between the 1997 and pre-1997 systems. For example, computers belonged to Class 3 under the pre-1997 tax system but Class 1 under the 1997 system. Refer to Chen and Reinikka (1999), footnote 16, for details.

Table 12. Nontax Parameters for Uganda

(In percent)

	Commercial agriculture	*Agro processing*	*Manufacturing*	*Construction*	*Transportation*	*Communications*	*Tourism*
Expected inflation rate	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Expected interest rate	21.4	21.4	21.4	21.4	21.4	21.4	21.4
Debt to assets ratio	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Economic depreciation rate[1]							
Buildings	4.1	3.7	4.0	5.3	3.5	4.2	3.6
Machinery	14.2	16.5	18.7	18.9	22.7	21.2	23.9
Tax depreciation allowance[2]							
Buildings	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Machinery	30.0	30.0	30.0	35.0	30.0	39.0	30.0
Capital structure by asset type							
Buildings	10.6	28.7	33.5	10.2	9.9	57.2	71.1
Machinery	20.0	47.8	26.9	47.9	83.8	29.6	9.0
Inventory	33.4	17.7	33.7	37.3	3.2	2.1	1.2
Land	36.0	5.8	5.9	4.6	3.1	11.1	18.7
Cost structure by input for production							
Capital	96.6	54.1	72.9	66.0	74.0	60.6	69.3
Labor	3.0	37.2	23.0	31.1	20.9	36.5	26.7
Motor fuel	0.4	8.7	4.1	2.8	5.1	2.9	4.0

Source: Ministry of Finance, Planning and Economic Development; Uganda Revenue Authority; IMF International Financial Statistics; and World Bank.

[1] Based on Canadian data.
[2] As a reference.

Table 13. Marginal Effective Tax Rate on Capital for Small Ugandan Firms

(In percent)

	Commercial agriculture	*Agro-processing*	*Manufacturing*	*Construction*	*Transportation*	*Communications*	*Tourism*
Buildings	4.5	18.9	19.2	20.4	18.7	19.4	18.8
Machinery	2.0	2.1	2.3	2.3	2.5	2.4	2.6
Inventory	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Land	1.0	12.4	12.4	12.4	12.4	12.4	12.4
Aggregate	2.4	7.8	8.9	5.1	4.4	13.2	15.9
Interindustry METR dispersion: 2.2							
Difference from the 1997 regular taxable case	–23.8	–15.4	–23.9	–18.5	–16.5	–17.7	–23.3

Source: Authors' calculations based on data provided by the Ministry of Finance, Planning and Economic Development and the Uganda Revenue Authority.

Table 14. Business Tax Provisions Applicable to Manufacturing and Tourism in Uganda, Kenya and Tanzania, 1998

(In percent)

	Uganda	*Kenya*	*Tanzania*
Capital taxes			
Corporate income tax	30	32.5	30
Investment allowance			
Buildings	–	60	–
Machinery	50 – 75	60	–
Tax depreciation rate			
Buildings			
Manufacturing	5 SL	2.5 SL	4 SL
Tourism	5 SL	2.5 SL	6 SL
Machinery			
Manufacturing	30 DB	14.2 DB	14.2 SL
Tourism	31 DB	22.3 DB	19.5 SL
Inventory accounting	FIFO/LIFO	FIFO/LIFO	FIFO/LIFO
Loss carry-over	Forward indefinitely	Forward indefinitely	Forward indefinitely
Withholding tax on dividends	15	7.5	15
Property tax			
Structure	10	–	–
Land	10	8	11.5 – 12.5
Payroll tax	10	5 up to 80Ksh/mo	4
Indirect taxes			
Import duty on capital goods	0	5	0 – 5
Import duty on raw materials	7	15	10 – 20
Taxes on fuel (average)	174	64	26

Source: Ministry of Finance, Planning and Economic Development; Uganda Revenue Authority; World Bank.

– Not applicable.

SL = Straight line method; DB = Based on declining balance; FIFO = first-in-first-out; LIFO = last-in-last-out.

Table 15. Summary of Firm Survey-Tax Administration

(In percent)

	Commercial agriculture	*Agro* processing	*Manufacturing*	Construction	*Tourism*	*Total*
Tax-paying firms, 1997						
Corporate income	29	46	41	80	54	46
VAT	19	80	80	96	79	74
Paid no taxes	7	11	8	4	7	8
Tax-holiday firms)						
1995	13	51	36	5	33	32
1996	15	50	37	13	26	31
1997	18	48	42	12	26	35
Disagreed with assessment	37	51	51	64	57	51
Resolution						
Negotiations	73	65	71	69	63	68
Court	–	–	–	–	–	–
Appeal	9	4	12	6	12	10
Unresolved cases	18	31	17	25	25	22
Total	100	100	100	100	100	100
Firms audited	41	69	71	80	71	68
Corporate income	26	46	35	72	43	41
VAT	30	59	66	68	64	60
Audit resulted in						
Additional taxes	20	31	30	30	50	32
Other costs	20	29	25	10	30	24
Firms with inputs VAT credit	87	79	76	100	76	81
Filed for refund	22	54	49	60	22	45
Received expected refund	4	11	29	20	18	19
Received less or equal 50	7	19	10	20	0	12
Received more than 50	7	12	2	12	0	6
Received no refund	4	12	8	8	4	8
Waiting period for VAT refund						
Up to 1 week	0	6	21	26	35	18
2–5 weeks	0	21	37	31	35	30
6–13 weeks	78	31	29	26	15	30
14–26 weeks	22	27	10	0	0	12
Over 26 weeks	0	15	3	17	15	10
Total	100	100	100	100	100	100

Source: Authors' calculations based on the 1998 Uganda Enterprises Survey.

Note: Figures are a percentage of the total number of responses in each question.

Chart 1. Main Taxes Before Reforms

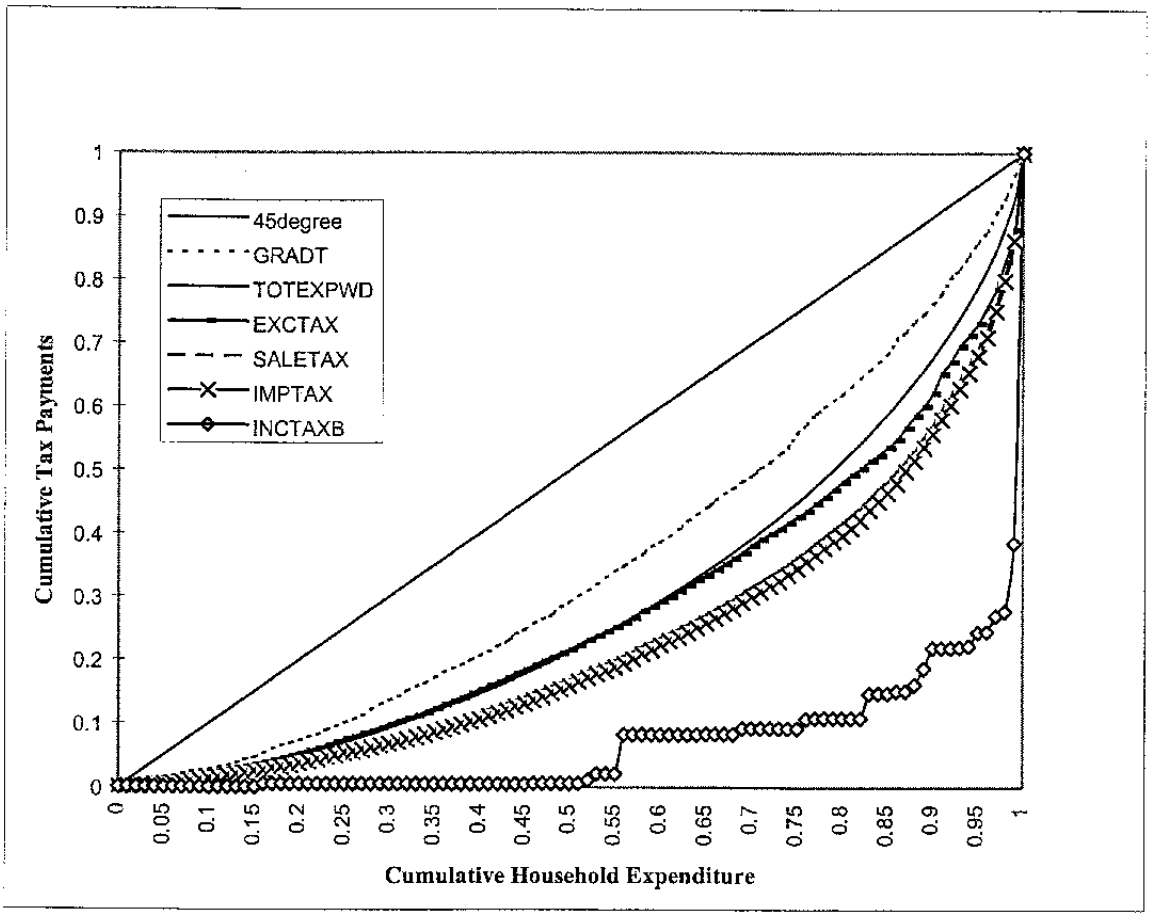
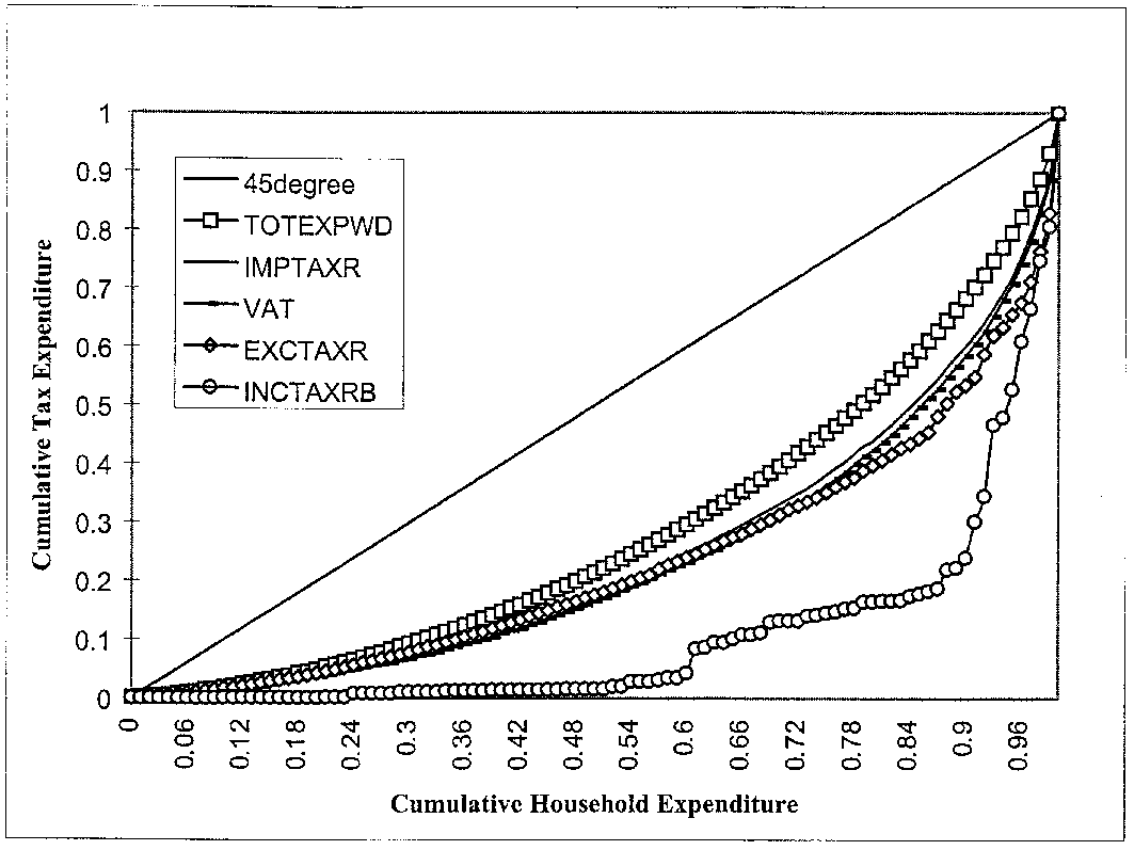


Chart 2. Main Taxes After Reforms



Source: Authors' calculations based on the 1992/93 Integrated Household Survey and data provided by the Ministry of Finance, Planning and Economic Development.

Household Incidence Analysis and the Concept of Welfare Dominance

The theoretical model used in this paper for the incidence analysis of tax reforms relies on the work of Yitzhaki and Slemrod (1991). In this model, for any social welfare function favoring equitable distribution of income, a marginal reduction in taxes on, say, good x_s and a marginal increase in taxes on, say, good x_t, which keep the tax revenues constant, will improve social welfare if the x_s's concentration curve is everywhere below x_t's curve.

Formally, let the social welfare function be given by:

$$\varpi = \sum_h \mu_h \upsilon_h (y_h, p_1, ..., p_n) \tag{A1}$$

where υ_h is the indirect utility of household h, y_h is the income of household h, p_i are commodity prices (with $i=1,...n$) and μ_h is the social weight for each households h's indirect utility. Suppose the government considers a tax reform involving only two commodities, x_s and x_t. It considers to marginally increase the tax on commodity x_t and to marginally decrease that on commodity x_s so as to leave total revenue constant (i.e. a revenue neutral change). If we denote with x_i^h the consumption of commodity i by household h and with X_i the total consumption of commodity i by all households, then the tax reform keeps total tax revenues R unchanged, with

$$R = \sum_k \tau_k X_k \tag{A2}$$

where k are the taxed commodities, with $k \leq n$, and τ_k is the tax rate on commodity k. Under these assumptions, it can be shown that the welfare of a household h is not worsened by the proposed tax reform if and only if

$$\left[\frac{x_s}{X_s} - \alpha_{st} \frac{x_t}{X_t} \right] > 0 \tag{A3}$$

where α_{st} is defined by Wildasin (1984) and Mayshar (1988) as the marginal social cost of raising one dollar of revenue by taxing the t-th commodity. This may be generalized to consider all households h with $h=1,...,m$,

$$\left[\frac{\sum_{h=1}^{m} x_s^h}{X_s} - \alpha_{st} \frac{\sum_{h=1}^{m} x_t^h}{X_t} \right] > 0 \tag{A4}$$

The expression (A4) can be seen as the difference between the height of the relative concentration curve of commodity x_s and the height of the relative concentration curve of commodity x_t multiplied by a constant. These concentration curves are similar to the familiar Lorenz curve with the difference that instead of having total income they consider the

fraction of total expenditure on a commodity attributable to different income groups. As a result, for any additive social welfare function, a tax change increases social welfare if and only if the concentration curve of commodity x_s is not as high as the concentration curve of commodity x_t (multiplied by a constant) along the entire income distribution. This method is generally referred to as 'welfare dominance'.

The dominance test may often be inconclusive because of the requirement that each concentration curve must be above the other everywhere along the income distribution. In this case, conclusions can be only drawn by specifying the weights attached to each household in the social welfare function. Yitzhaki (1983), for example, provides a framework for analyzing welfare dominance by using extended Gini coefficients; these allow for adjustments in the social weights given to various households, and provide a clearer notion of how alternative social welfare functions differ with tax regimes. Specifically, the extended Gini coefficient is a weighted integral of the area between the Lorenz curve and the 45-degree line as a fraction of 0.5 (which is the total area under the 45-degree line) and is given by

$$G(\nu) = -\nu COV[e(1-F(e))^{\nu-1}] \tag{A5}$$

where ν is a parameter which affects the weighing of the points on the concentration curve, $F(e)$ is cumulative tax payment, and e measures the household's tax payment. When $\nu=2$, $G(2)$ yields the traditional Gini coefficient, while higher values of ν would give more weight to commodities consumed by the poorest households. Using (A5), it can be then shown that a revenue neutral decrease in the tax on commodity x_s, financed by an increase in commodity x_t, decreases the extended Gini index, if

$$\int_0^1 [\Phi_s(F) - \alpha_{st}\Phi_t(F)](1-F)^{\nu-2}\,dF > 0 \tag{A6}$$

where $\Phi_i(F)$ for $[i=s,t]$ is the concentration curve. Both concepts of welfare dominance and of extended Gini coefficient are used in this paper to examine the welfare implications of tax reforms.

In practice, all welfare dominance techniques tends to be difficult to use as concentration curves tend to cross each other, especially towards the end of the distribution. A solution to this problem is that developed by Davidson and Duclos (1997). They propose a set of variance estimators to test the hypothesis that two concentration curves are statistically different from one another.

Marginal Effective Tax Rate

The marginal effective tax rate (METR) on capital calculated in this study is the effective corporate tax rate on capital, while the marginal effective tax rate on cost of production is an integration of the METRs on all inputs, using the augmented Cobb-Douglas production function. The METR is estimated for both domestic and foreign firms. Unless

otherwise specified, all estimates are based on the 1997 tax regime and recent economic indicators. The METR calculation is based on the assumption that profit-maximizing firms base their investment or business decisions on the foreseeable incremental net revenue at the present value. Taxes reduce the profits accruing to the firm, while tax allowances mitigate such a reduction. Due to the interaction between statutory tax provisions and actual economic and industrial conditions, the effective tax rate can vary by industry under the same tax regime. Furthermore, for a cross-jurisdiction comparison, the effect of taxation can be singled out by applying the same set of economic and industrial conditions to different tax regimes.

The method used to estimate the METR has been extensively documented, including Broadway, Bruce, and Mintz (1984), Chen and Mintz (1993), McKenzie, Mintz and Scharf (1992), and Mintz (1990). Other useful references include Dunn and Pellechio (1990) and Shah (1995).

METR on Capitals

As described above, the marginal effective tax rate on a given type of *real* capital investment is defined as the proportional difference between the gross-of-tax rate of return (r^G) and the net-of-tax rate of return (r^N) required by financial investors. r^G is the marginal revenue product, or user cost of capital, net of economic depreciation. The net-of-tax rate of return is the weighted-average of the return to debt and equity securities held by the financial investor. Thus, the effective tax rate (t) is defined as

$$t = (r^G - r^N)/r^G \quad \text{or} \quad t = (r^G - r^N)/r^N. \tag{B1}$$

The latter definition is used in this study.

Real Cost of Financing

For domestic firms, the real cost of financing (r^f) is defined by

$$r^f = \beta i(1 - U) + (1 - \beta)\rho - \pi \tag{B2}$$

with β = debt-to-assets ratio, i = cost of debt, U = the statutory corporate income tax rate, ρ = cost of equity, and π = inflation rate. While interest costs are deductible for the income tax purpose, cost of equity is not. That is, the cost of financing for a domestic firm is the weighted-average cost of financing, net of inflation rate. For foreign firms, the real cost of financing (r^f) is defined by

$$r^f = [\beta\ i\ (1 - U) + (1 - \beta\ )\rho\ ]*(1 - \gamma)/(1 - x) + \gamma*[i(1 - U) - \pi + \pi\ ] - \pi \tag{B2 }$$

with β = debt-to-assets ratio in home country, i = cost of debt in home country, U = the statutory corporate income tax rate in home country, ρ = cost of equity in home country, γ = the ratio of debt raised in host country to total investment fund, x = weighted average withholding tax rate in host country, i = cost of debt in host country, U = statutory corporate

income tax rate in host country, π^* = inflation rate in home country, and π = inflation rate in host country.

According to the above formula, the cost of financing to a foreign firm is the weighted average of cost of its investment funds taken from home country and debt raised in host country. The former is the weighted average of cost of financing at home net of withholding tax payable in host country, and the latter is the cost of debt in host country adjusted for income tax deductibility and the difference in inflation rates between home and host country.

Net of Tax Rate of Return on Capital

For domestic financial investors, the net-of-tax rate of return on capital is defined by the formula

$$r^N = \beta i + (1-\beta)\rho - \pi. \qquad \text{(B3)}$$

This is the rate of return on capital required by the financial investor, or the supplier of investment funds. For foreign investors, the formula is

$$r^N = [\beta\, i\,(1-U) + (1-\beta)\rho^* - \pi^*](1-\gamma) + \gamma(i-\pi). \qquad \text{(B3*)}$$

This is the net-of-tax rate of return on capital required by fund suppliers, including foreign financial investors in host country. Applying (B3) and (B3*) to equation (B1), respectively, yields us the effective corporate tax rate on capital for domestic and foreign firms.

Gross of Tax Rate of Return on Capital

For domestic firms, the formula is

$$r^G = (1+tm)(r^f+\delta)(1-k)[1-A+\tau(1-U)/(\alpha+r^f+\pi)]/[(1-U)(1-tp-tg)] - \delta \qquad \text{(B4)}$$

with tm = tax on transfer of property, or transaction tax (e.g., import duty) on capital goods where is applicable, δ = economic depreciation rate, k = investment tax credit rate, A = present tax value of the accumulated capital cost allowance, τ = capital tax rate, α = tax depreciation rate, tp = property tax rate, and tg = gross receipts tax rate, or presumptive tax. For international firms, the formula is

$$r^{G*} = (1+tm)(r^{f*}+\delta)(1-k)[1-A+\tau(1-U)/(\alpha r^{f*}+\pi^*)]/[(1-U)(1-tp-tg)] - \delta. \qquad \text{(B4*)}$$

Inventory

For domestic firms, the formula is

$$r^G = (1+tm)(r^f+U\pi\zeta)/[(1-U)(1-tg)] + \tau \qquad \text{(B5)}$$

with tm = sales tax on inventory where it is applicable, and $\zeta = 1$ for FIFO accounting method and 0 for LIFO. For international firms, the formula is the same except that the financing cost should be the one relevant to the international firms, that is, r^f should be replaced by r^f .

Land

For domestic firms, the formula is

$$r^G = r^f(1+tm)[1+\tau(1-U)/r^f+\pi)]/[(1-U)(1-tp-tg)] \quad \text{(B6)}$$

For international firms, the formula is the same except that the financing cost should be the one relevant to the international investors, that is, r^f should be replaced by r^f.

Aggregation

The effective tax rate for a given industry is the proportional difference between the weighted average of before-tax rate of return by asset type and the after-tax rate of return which is the same across asset type within the industry. That is, the marginal effective tax rate t_i for industry i is calculated as

$$t_i = (\sum_j r_{ij}^G w_{ij} - r_i^N)/r_i^N \quad \text{(B7)}$$

where j denotes asset type (i.e., investments in buildings, machinery, inventories, and land), w_{ij} denotes the weight of asset type j in industry i. The above are general formats of the formulas used in this study. Due to the variance among different sectors or jurisdictions, some variables can be zero for some sectors or jurisdictions. For example, in all three countries under this study, there are no taxes based on capital and hence $\tau = 0$ in equation (B4) – (B6).

METR Disperson

METR dispersion, or the weighted standard deviation, is used to measure the tax distortion. There are three measures of dispersions: overall, interindustry, and interassets dispersion. Only interindustry dispersion is estimated in this study. Let w_i, w_j, and w_{ij} denote the capital weights for the i^{th} industry and the j^{th} type of asset, respectively. The interindustry METR dispersion σ_I is calculated as the weighted standard deviation:

$$\sigma_1 = \sum_j w_j\{\sum w_{ij}(t_{ij}-t_j)^2\}^{1/2} \quad \text{(B8)}$$

The expression t_j is the average effective tax rate for the asset j across industries, and t_{ij} is the effective tax rate for the j^{th} asset type in the i^{th} industry.

METR in Other Inputs and Cost of Production

METR on labor. This study assumes that only payroll taxes paid by employers are effective labor taxes borne by employers. Another assumption is that the marginal unit of labor input is an average worker. Therefore, the METR on labor is the total payroll taxes paid by employers on average labor costs. Since the payroll taxes in Uganda and Tanzania are imposed on total payrolls, the statutory tax rate itself can be seen as the effective tax rate on labor. In the case of Kenya, the ceiling of taxable payroll is K Sh 80 per month, which is well below the monthly payroll. As a result, the METR on labor in Kenya is estimated as low as 0.1 percent. According to 1997 ILO Yearbook of Labor Statistics, the average monthly payroll in Kenya was K Sh 3,324 for manufacturing industry and tourism (1991 figure).

METR on other inputs. The METR on other inputs for production is the transaction taxes firms have to pay on these inputs. Motor fuel is the only other input included apart from capital and labor. The average transaction tax rate, i.e., the fuel tax rate is used as the METR.

METR on cost of production. By using the augmented Cobb-Douglas production function, the METR on cost of production T can be estimated as

$$T = \Pi(1+t_i)_i^{\alpha} - 1 \qquad \text{(B9)}$$

In the formula, i indicates an input, i.e., capital, labor, and fuel, t_i = the METR on each input i, and α_i = share of total cost for input i. The detailed derivation may be found in McKenzie, Mintz, and Scharf (1992).

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