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Global minimum corporate income tax rate

Challenges and prospects for Uganda

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Abstract: This paper simulates the impact of the global minimum corporate tax rate (GMCTR) in Uganda by estimating the difference between the mechanical and the behavioural changes in tax revenue. Overall, implementation of GMCTR will increase tax revenue, and the revenue increase is inversely proportional to the behavioural response. The differences in elasticities may introduce tax competition. In addition, the revenue gain is positive but quantitatively small. There are also sectoral differences in revenue gain resulting from the GMCTR. The agriculture, forestry, and fishing; finance and insurance; manufacturing; and real estate sectors have the highest revenue gain, but may also face the highest risk of divestment due to extremely high changes in average effective tax rate (AETR) resulting from implementation of the GMCTR. The results also suggest that the GMCTR may curtail base erosion and profit shifting of MNCs that are thinly capitalized, for the revenue gain from thinly capitalized MNCs is higher than that from their counterparts who are not. Lastly, smaller and younger cash-constrained firms, which contribute marginal revenue, face lower changes in AETR. The paper recommends acknowledgement of local macroeconomic, demographic, and institutional features and tax capacity during the setting of the tax rate. This requires coordination (regional cooperation) to minimize tax competition presented by differentials in elasticities and calls for the segmentation or recognition of sectoral and firm size differences.

Key words: global minimum corporate tax rate, average effective tax rate, tax revenue, tax competition, tax capacity, tax administration, base erosion and profit shifting

JEL classification: F23, F42, H25, H26

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1 Introduction

Uganda charges a corporate income tax (CIT) rate of 30 per cent on companies whose turnover exceeds UGX150 million. However, over time CIT collection has been consistently below 1 per cent of GDP (URA 2022). An estimation by Lakuma (2019) suggests that the average effective tax rate (AETR) is between 4 and 5 per cent, regardless of the mode of investment financing. Similarly, multi-national corporations (MNCs) in Uganda pay approximately 20 percentage points lower effective tax rates on their reported profits than their large domestic counterparts because of tax treaties and other benefits (Koivisto et al. 2021). MNCs in Uganda are also more likely to report losses than their domestic counterparts (Koivisto et al. 2021). This is likely due to profit shifting, as evidenced by the matched lower tax rate in the country of the global owner (Koivisto et al. 2021).

Evidence of profit shifting by MNCs has also been found in developed countries such as the United Kingdom, as documented by Bilicka (2019). Therefore, Uganda has a significant need for stronger CIT reforms. This calls for closing the gap in legal, policy, and administration of CIT by reviewing the corporate tax structure, investment tax incentives, and anti-avoidance rule (IMF 2023). An ambitious reform, agreed upon by 138 jurisdictions, proposes a global minimum corporate tax rate (GMCTR) (IMF 2023). Under Pillar 2 of the inclusive framework, the GMCTR (also referred to elsewhere as the tax/policy change) proposes to eliminate tax incentives—thereby reducing tax competition—by setting a tax rate of 15 per cent on the global income of MNCs (Deloitte 2021). The threshold identified by pillar 2 is that GMCTR is applicable only to MNCs with global incomes exceeding €750 million. In Europe, old European Union (EU) members have called for minimum CIT to mitigate 'fiscal dumping' and unfair tax competition from new EU members (de Mooij 2004).

Despite overwhelming support for such proposals, relatively little empirical work has been able to directly estimate the effects of setting the tax rate on the global income of MNCs at 15 per cent; or to determine whether this framework should be expanded to smaller businesses without an international presence. In addition, the GMCTR has important implications for different countries (Deloitte 2021). While the IMF (2023) suggests that the revenue effects of the GMCTR could be large as incentives are eliminated, country-specific effects are hard to gauge. Some estimates suggest that the GMCTR on outbound investment can offer partial protection against profit shifting and tax competition and generate positive spillovers for jurisdictions with high CIT rates (IMF 2019). Conversely, the GMCTR on inbound investment is attractive to jurisdictions with low taxes but may be hard to administer and may jeopardize investment (IMF 2019). Yet, most low tax jurisdictions firmly expect to be losers from the adoption of the GMCTR (Hebous and Keen 2021). Therefore, there is a need to examine whether the GMCTR does or does not affect tax collection. In addition, the justification for the reform could differ from country to country, given the difference in revenue gains and the heterogeneity in revenue needs for development. While the GMCTR has advantages over current arrangements, it is not clear that it alone will be sustainable (Hebous and Keen 2021).

For countries with a low AETR like Uganda, the GMCTR is expected to raise the AETR of MNCs. This may provide opportunities for tax evasion and avoidance that will increase elasticities of taxable income, implying lower revenues (Klemm et al. 2018). A significant number of papers have used elasticities as a measure of the marginal excess burden of tax rate changes. Devereux et al. (2014) use elasticities to find tax evasion by firms after a tax rate change. Conversely, Krapf and Staubli (2020) find that, over a time span of four years, an increase in CIT by 1 per cent results in an increase in tax collection by 3.5 per cent. Despite the mixed results, what stands out is the effect

of a tax rate change on the behaviour of MNCs. Previous studies suggest that MNCs are sensitive to a tax rate change, but there has as yet been little attempt to analyse the elasticity of tax revenue in relation to the GMCTR in developing countries, particularly Uganda.

Therefore, the main objective of this paper is to examine whether the GMCTR offers a solution[1] that increases the rate, for those who pay a lower rate, without affecting the breadth of the corporate tax base in Uganda. The paper estimates the mechanical revenue gain from moving from current effective tax rates by MNCs to a 15 per cent minimum tax rate for those with an AETR below 15 per cent. The paper reviews the international literature on how elastic corporate income tax bases or investments are to changes in tax rates. Thereafter, we use the elasticity estimates and the changes in the tax rate to estimate the likely reduction in tax base as a reaction to the increase in effective CIT rate. The total change is then calculated as the mechanical gain minus the behavioural reaction—a methodology used by Devereux et al. (2014). Considered narrowly, this is the first known study to use administrative data. Considered broadly, by providing estimates of how MNCs respond to a tax rate change, this paper not only adds to knowledge of the reaction of businesses to corporate taxation, but also enhances efforts to add theoretical and empirical knowledge in this area.

The potential weakness of this paper is that it examines only incomes on MNCs taxed in Uganda. Yet, the idea is that 15 per cent will be applicable to global incomes. The Uganda Revenue Authority (URA) firm panel does not contain information on global incomes. However, given that risks associated with base erosion are stronger in developing countries, this paper is a good place to start identifying knowledge gaps as efforts to make data on the global incomes of MNCs available continue.

Overall, results suggest that the implementation of the GMCTR would increase tax revenues. However, the revenue gain is marginal and this is likely because the number of firms that exceed the threshold is less than 20 in each of the years examined. The results also suggest that the increase is inversely proportional to the elasticity. The higher the elasticity, the lower the revenue gain. The differences in elasticities may introduce tax competition. In addition, the revenue gain is higher than the revenue reported by the URA. There are also sectoral differences in the revenue gain from the GMCTR. Similarly, smaller and younger cash-constrained firms contribute marginal revenue and face lower changes (also referred to as increases) in AETR. Perhaps most significantly, the GMCTR is able to limit base erosion and profit shifting among thinly capitalized MNCs.

The rest of the paper is organized as follows: Section 2 presents the theoretical model; Section 3 discusses the empirical methodology; Section 4 presents the data used in the analyses; Section 5 discusses the results; and, finally, Section 6 offers conclusions and policy recommendations.

2 Theoretical model

This study adopts and modifies a theoretical framework laid out by Devereux et al. (2014) and considers the revenue implication of taxes levied on the profits of MNCs, in a closed economy framework, by assuming that MNCs declare all income as profit and face corporation tax levied on taxable profit.

[1] By 'solution' we mean whether the GMCTR reduces MNCs' sensitivity to a tax rate increase.

This can be formally stated as in Equation (1):

$$\pi = y - c(y) - T \quad (1)$$

where y is the aggregate output of an MNC and c(y) is the cost of producing y.[2] Here, T represents the corporate income tax liability of the MNC[3]:

$$T = t_c (B_c) \quad (2)$$

where t_c represents the marginal tax rate and B_c is the corporate tax base. The corporate tax base, B_c, is nonnegative and is formally presented as:

$$B_c = y - \alpha c(y) \quad (3)$$

where $0 \leq \alpha \leq 1$ is the tax-deductible fraction of costs incurred to realize y. The cost includes tax-deductible items such as wages, salaries, and cost of investment; and non-deductible items such as effort. In cases where c is entirely composed of effort, then it is assumed to be forgone consumption.

The company maximizes π subject to y. The first-order condition is expressed as:

$$c'(y) = \frac{1-t_c}{1-\alpha t_c} \quad (4)$$

Equation (4) is the marginal rate of substitution, i.e. the maximum point of maximizing output, where the marginal value of output is equal to its marginal cost. If tax rate t is zero, the value of the marginal rate of substitution is 1. In the presence of tax, the marginal rate of substitution is certainly less than 1 and depends on the parameters of the tax regime.

To discern the impact of corporation tax, $1 - t_c$, on total welfare, we aggregate private consumption plus tax revenue, $W = \pi + T$.[4] We abstract from any indirect effects of the change in $1 - t_c$ on π through y, by applying the envelope theorem.[5] Meanwhile, the direct effects of a change $1 - t_c$ on tax liability cancel out because, while $1 - t_c$ reduces π, it increases T.[6] The overall effect on welfare is therefore:

$$dW = t_c \frac{\partial B_c}{\partial(1-t_c)} d(1 - t_c) = \frac{t_c e B_c}{(1-t_c)} d(1 - t_c) \quad (5)$$

where e is the elasticity of the corporate tax base, B_c, with respect to a change in the corporate tax $1 - t_c$.

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[2] The price of Y is normalized to one. Also, firm-level characteristics such as the expertise of the owners and managers influence the cost of production. Therefore, there are variations in output outcomes among MNCs.

[3] To keep the model simple, we assume that MNCs pay only corporation taxes.

[4] For simplicity the model assumes that companies are owned only by residents. Therefore, an increase in the tax rate results in a welfare gain.

[5] Company/ies choose y optimally.

[6] We ignore the existence of tax schedules in deriving the expression for welfare in the analysis. Therefore, we assume only one adjustable tax rate.

Note that

$$\mathrm{dBc} = (1 - \alpha\ c'(\mathrm{y}))\ \mathrm{dy} = \frac{1-\alpha}{1-\alpha t_c}\,\mathrm{dy} \tag{6}$$

While a rise in $1 - t_c$ increases output y, the impact of a tax rate change on Bc depends on the proportion of cost deductible from tax.[7] Holding y constant, the mechanical change in revenue is:

$$\mathrm{dM} = -(\mathrm{Bc} - \mathrm{Ac})\mathrm{d}(1 - \mathrm{t_c}) \tag{7}$$

and hence:

$$\mathrm{dW} = -\frac{\mathrm{Bc}}{(\mathrm{Bc} - \mathrm{Ac})}\ \frac{t_c \mathrm{e}}{(1-t_c)}\mathrm{dM} \tag{8}$$

To simplify the analysis, we assume that tax rate $1 - t_c$ is homogeneous across different firm sizes. Thereafter, in a procedure similar to that used by Saez et al. (2012), we evaluate the welfare effect impacts of a change in the tax rate by aggregating over companies. The study denotes Bc as the aggregated corporate tax base and e as the aggregated elasticity of the tax base with respect to the homogeneous tax rate, $1 - t_c$. This turns out to be the average of individual elasticities weighted by individual taxable income. Ratio α can be defined as $= \frac{\mathrm{Bc}}{(\mathrm{B\ c} - \mathrm{Ac})}$.[8] In aggregate, this is similar to the formula used by Devereux et al. (2014) for estimating the behavioural response of the tax base to an increase in the corporate tax rate.

$$\frac{\mathrm{dW}}{\mathrm{dM}} = -\frac{\alpha t_c \mathrm{e}}{(1-t_c)} \tag{9}$$

The difference between Equation (7) (the mechanical) and Equation (9) (the behavioural) yields the total change. We use this approach to estimate the total response of firms to a change in the corporation tax rate.

3 Empirical methodology

In the first step, our study creates a distinction between domestic companies (DCs) and MNCs because the GMCTR affects only the latter group of firms. MNCs are identified using the methodology specified in Koivisto et al. (2021). These authors identify an MNC by matching data sets from the URA's Large Tax Payer Office (LTO) and the Orbis database, using a yardstick that includes a firm having a holding company and a firm having a foreign subsidiary. We could not identify whether the worldwide turnover of the MNEs exceeds the USD750m threshold.

In the second step, we calculate firm-level AETR. The AETR is obtained by dividing the provisions made for taxes by profit before taxes as in Bachas et al. (2023). In this stage, we also raise the AETR of MNCs where this is below 15 per cent to 15 per cent and cap it where it is above 30 per cent at 30 per cent, letting AETRs between 15 per cent and 30 per cent vary.

[7] Normally, costs are not deductible on personal tax. Therefore, $\alpha = 0$ and dBc = dy. In the margins, if costs are deductible, then $\alpha = 1$ and dBc = 0. This is because in the extreme case c'(y) = 1 and the marginal addition to output is equal to the marginal addition to costs. This has zero effect on the tax base. In the standard case, $0 < \alpha < 1$, dBc < dy: the rise in the tax rate has less effect on the tax base than on output.

[8] If the distribution of Bc is welfare-increasing, then α is the shape parameter of the welfare-increasing distribution.

However, note that the study is mainly interested in the first group (those with an AETR below 15 per cent), since they are the ones affected by the GMCTR.

In the third step, a review of the international literature is conducted to compile indices of semi-elasticities. Semi-elasticities measure the percentage change in the corporate income tax base in response to an absolute change in the corporate income tax rate. We use three approaches to obtain elasticities. First, we take the studies synthesized by Heckemeyer and Overesch (2017). Second, we add 10 studies reviewed by Beer et al. (2018), who extended the work of Heckemeyer and Overesch (2017). Third, given that the 37 studies in the previous two approaches are mostly on developed countries, we looked for CIT elasticities for developing countries and Africa by conducting a comprehensive search of the Google Scholar and ResearchGate databases, economic journals, and working paper platforms, such as SSRN, using the keywords 'corporate income', 'elasticities', and 'tax avoidance'. The reality is that studies on elasticities associated with CIT rates are sparse for developing countries. Nevertheless, this search yielded a study on South Africa by Lediga et al. (2019), which estimates the elasticity of taxable income to be approximately 0.3, and unpublished estimates for Uganda by the World Bank (2023), which suggest that elasticity of taxable income is higher (1.85). These studies do not take into account the potential impact of the global tax agreement on tax competition and profit shifting. If the agreement is successful in reducing profit shifting, the actual behavioural changes will be smaller, perhaps even positive. That is why our main interest in this paper is on the mechanical impact on revenues.

A combination of Heckemeyer and Overesch (2017) and Beer et al. (2018) yielded 402 average semi-elasticities, of which 37 were given in both sources (Table A1). These elasticities were added to those from South Africa and Uganda to make a total of 39. Thereafter, we ordered the semi-elasticities (numeric values) in descending order and picked the median semi-elasticity (1.13) as the baseline case; the 25th percentile (0.81) and the 75th percentile (2.02) for sensitivity analysis. These semi-elasticities fall well within the two extreme cases estimated for a country in Africa. Therefore, we are confident that our results are also within the range of the two extreme cases estimated for a country in Africa, as mentioned earlier.

In the fourth step, we estimate the mechanical revenue gain to MNCs of moving from the current AETR to a 15 per cent minimum tax rate. The mechanical gain in taxes is estimated by multiplying the adjusted AETR of MNCs by the tax base. The tax base is adjusted for the carve-out, which is a relief from the GMCTR. The Global anti-Base Erosion (GloBE) rules value the carve-out at 5 per cent of the value of tangible assets and payroll. However, during an initial five-year transition period, the carve-out rate would be 7.5 per cent.[9] This study utilizes the latter transitional value. The adjustment for carve-out yielded a negative tax base (profits before tax) for a significant number of MNCs. This group of MNCs was excluded from the analysis.

Thereafter, we obtain the product of three items: elasticities, the change in AETR of MNCs, and profits before taxes. This product is the estimate of the likely reduction in tax base as a behavioural reaction to the increase in effective CIT rate to 15 per cent. The total change is then calculated as the mechanical gain minus the behavioural reaction. For illustration, we denote tax revenues by

$$R = tB \tag{10}$$

where t is the tax rate and B the tax base.

[9] https://mnetax.com/global-minimum-tax-negotiations-focus-on-carve-outs-eu-consensus-closing-deal-45828

Now the change in revenues when the tax rate increases is:

$$\frac{dR}{dt} = dt * B + tdB \quad (11)$$ [10]

The estimates from the fourth step are plotted, by percentile, on a graph and, where possible, compared with the actual revenue reported by the URA.

In the fifth step, we calculate these effects across ISIC level 4 sectors and 5 asset classes (size bin). This is to gauge whether there are any variations in the total response across sectors and firm sizes. Meanwhile, asset classes are obtained by reclassifying total assets into quintiles.[11] Total assets are a combination of fixed assets (plant, machinery, equipment, and buildings) and current assets (debt and equity).

In addition, we compare the effect of the GMCTR on two sets of firms: those whose interest payment is above the interest deduction threshold of 30 per cent of equity, as set out in the Base Erosion and Profit Shifting (BEPS) framework; and those whose interest deduction is below the threshold. Interest deduction, which is a source of base erosion, is capped at 30 per cent of equity in Uganda.

Finally, we compare the real and the reported changes. The latter analyses the impact, on revenue, of the introduction of the GMCTR, while the former reviews the possible change in investment due to the policy change. To do this, we compare the AETR before and after the introduction of the GMCTR.

4 Data

Table 1 presents the data used in the conduct of the study. As mentioned earlier, the data were obtained from a Ugandan firm panel curated by the URA and UNU-WIDER and documented in McNabb et al. (2022). The data were compiled over a period of eight years, from financial year (FY) 2013/14 to FY 2020/21. All variables are analysed at firm level and then aggregated for presentational purposes. Specifically, the variable provision for income taxes is used to estimate the annual amount of taxes paid. The ratio between provision for income taxes and profit after

[10] For example, if the increase in dt were 5 percentage points and the tax base (the mean revenue for affected MNEs) were UGX850 million per firm, this would amount to (with the median semi-elasticity of 1.13):

$\frac{dR}{dt} = 0.05 * 850 - 0.1 * 850 * 0.0565 = 42.5 - 4.9 = 37.7$ per firm.

Here, 42.5 is the mechanical gain and 4.8 the behavioural loss. The latter is calculated as follows: the tax base is 850. For each % increase, the tax base shrinks by 1.13% (the median semi-elasticity). Because the tax increase was thought to be 5 percentage points, the overall loss is 0.05*1.13*850. This is then valued at the baseline CIT rate of 10% (0.1)—assuming that the firms now pay 10% and their rate is raised to 15%. The economy-wide revenue impact would then be the mean impact per firm multiplied by the number of MNEs in the scope of the change.

[11] Asset classes

1. <=UGX241m
2. >UGX241m and <=UGX5.05 bn
3. >UGX5.05 bn <=UGX43.2 bn
4. >UGX43.2 bn and <= UGX246 bn
5. >UGX246 bn

taxes produces the AETR. The AETR is the average rate at which corporate income is taxed. Meanwhile, 'MNCs' is a binary variable with a value of 1 for multinational companies and 0 for domestic companies (DCs). Only about 2 per cent of firms in the URA data are multinationals.

Sectors are presented at ISIC level 4. As mentioned earlier, 'total assets' is a combination of fixed and current assets, which are mainly used to construct asset classes. 'Interest payments' is an aggregate interest accruing to debt owed by each of the firms in the dataset. 'Gross profit' is a proxy for aggregated equity. To calculate the debt-to-equity ratio, which demonstrates the extent to which a firm leverages debt to reduce taxable income, we divide interest payment by gross profit. The study analyses two debt-to-equity ratios (less than and equal to 30 per cent; and greater than 30 per cent), as prescribed by the BEPS framework of the Organisation for Economic Co-operation and Development (OECD).

The carve-out has lower observations because it applies only to both qualifying and unqualifying MNCs. The number of both qualifying and unqualifying MNCs is 1,435 for all the years under observation.

Table 1: Descriptive statistics of variables used in the study

			UGX millions		
Variable	**Obs**	**Mean**	**Std. dev.**	**Min.**	**Max.**
Provision for tax	46,910	12	189	-431	20,400
Profit before tax	41,452	843	15,700	0	2,400,000
Total asset	45,602	6,060	122,000	-43,200	15,500,000
Gross profit	47,276	1,830	26,800	-27,700	1,860,000
Carve-out	1,435	7,440	24,800	0	293,000
AETR*	50,791	0.26	0.08	0.00	0.30
MNCs*	50,791	0.03	0.17	0	1
Sectors*	75	6.52	2.72	1.	11

Note: * not in millions but actual count value or binary variable.

Source: authors' construction using data from URA firm panel.

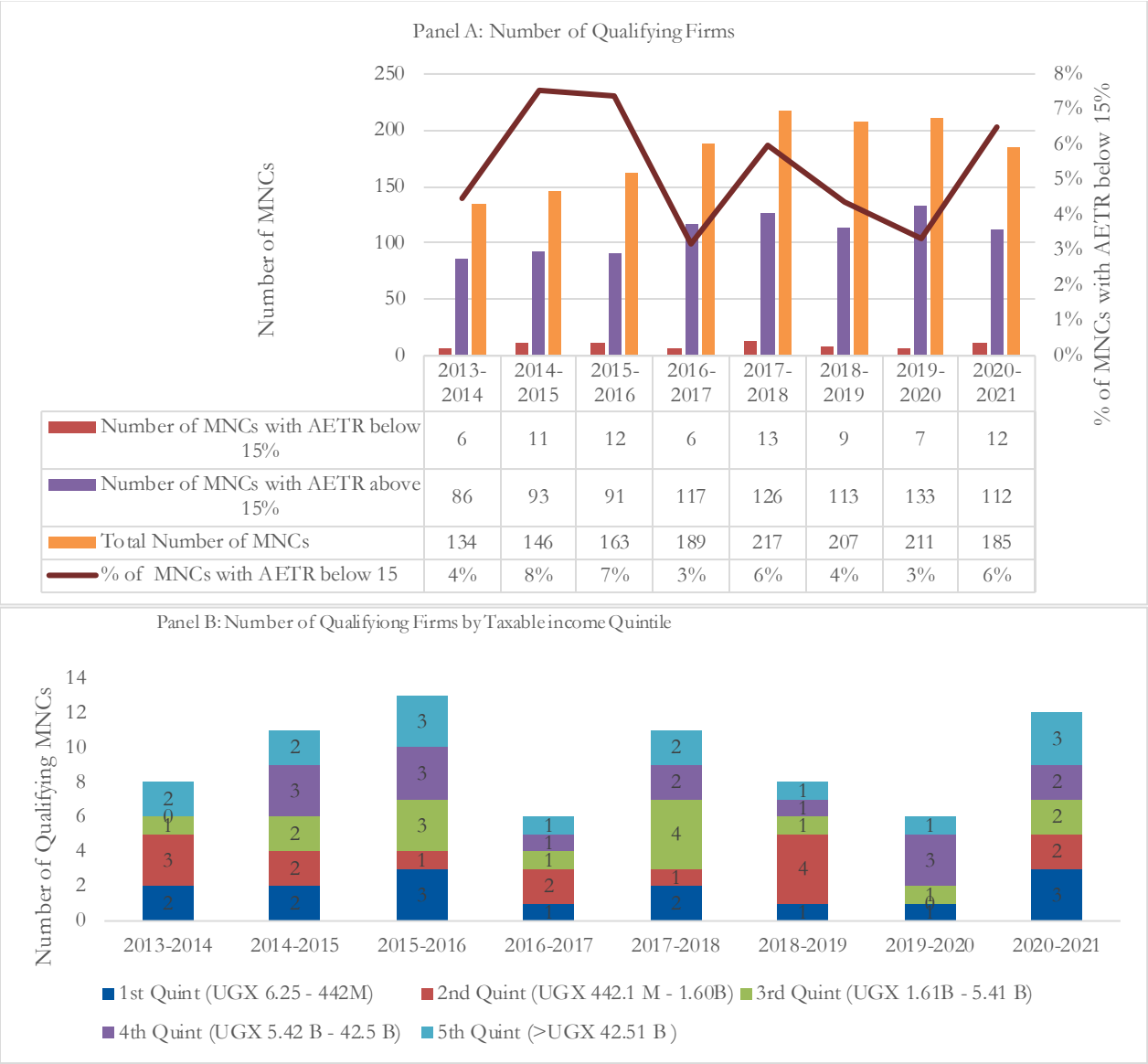
5 Results

5.1 Distribution of qualifying firms

In the years under observation, Figure 1 suggests that less than 10 per cent of MNCs in Uganda have an AETR below the GMCTR (15 per cent) and therefore qualify for their AETR to be adjusted to 15 per cent. This result also points to the fact that over 90 per cent of MNCs either do not meet the €750 million global income threshold or already have an AETR above the GMCTR. This suggests that the revenue effects of the adjustment may be marginal. For example, in FY 2020/21, in which there were 185 MNCs, only 12 firms qualified for adjustment; 112 firms were above the threshold and therefore did not qualify for adjustment, while another 61 firms did not qualify for various other reasons.

The distribution of qualifying MNCs by taxable income suggests that not more than three MNCs in the highest taxable income quintile (<UGX42.51 billion) were likely to be subject to the GMCTR in any of the years under review (Figure 1, Panel B).

Figure 1: Distribution of qualifying MNC



Source: authors' construction using data from URA firm panel.

The distribution of qualifying MNCs by sector is dominated by MNCs in the financial and insurance activities (27 MNCs), wholesale and retail (10 MNCs), agriculture (8 MNCs), and professional and scientific activities (8 MNCs) sectors (Table 2). Some sectors, such as mining and quarrying (2 MNCs), are underrepresented and appear in the distribution only in the later years (2019/20 and 2020/21).

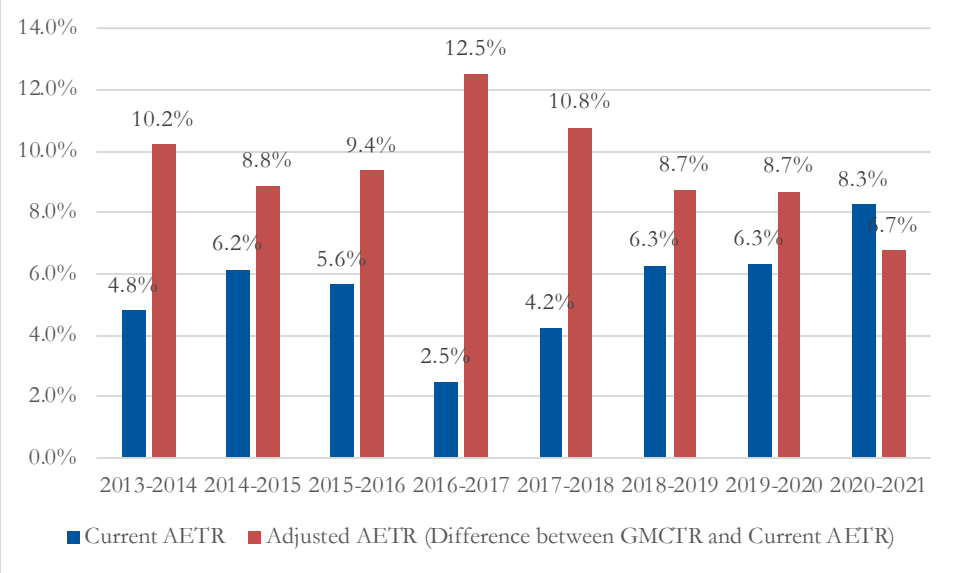
Broadly, the adjusted AETR, which is the difference between the GMCTR and the current AETR, is higher than the current AETR in the years under the review (Figure 2). However, there are differences in magnitude across the years. For example, in FY 2020/21, the adjusted AETR is 1.6 percentage points higher than the current AETR. Yet, in some years (e.g., 2013/14, 2016/17, and 2017/18) the adjusted AETR yields a change that is more than twice the current AETR, which could be an indicator of high profitability in those years.

Table 2: Distribution of qualifying MNCs by sector

Activity	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	Total
Agriculture, forestry and fishing	1	0	2	1	1	1	0	2	8
Mining and quarrying	0	0	0	0	0	0	1	1	2
Manufacturing	1	0	0	0	0	0	0	2	3
Electricity, gas, etc.	0	0	1	0	2	0	0	0	3
Construction	0	1	0	2	1	0	0	0	4
Wholesale and retail	0	3	3	1	1	1	1	0	10
Information and com.	0	1	1	0	1	1	1	1	6
Financial and insurance	4	3	2	2	4	5	3	4	27
Real estate activities	0	1	1	0	0	1	0	0	3
Professional services	0	1	2	0	2	0	1	2	8
Other service activities	0	0	0	0	1	0	0	0	1
Total	6	10	12	6	13	9	7	12	75

Source: authors' construction using data from URA firm panel.

Figure 2: Current AETR and adjusted AETR for qualifying MNCs, averages

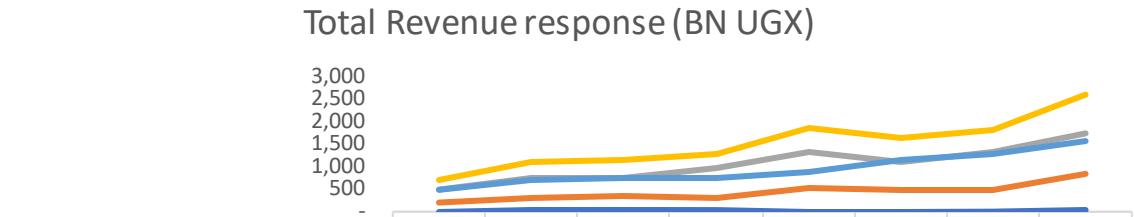


Source: authors' construction using data from URA firm panel.

5.2 Overall revenue effects of the GMCTR

Figure 3 compares the revenue stream of qualifying MNCs under the GMCTR rule (using the median elasticity) with that of MNCs that do not qualify for GMCTR and DCs. The total revenue gain is a combination of revenue from MNCs (both qualifying and unqualifying) and domestic companies that do not qualify for the policy change. We make this comparison because the URA report combines revenue from all firms without distinguishing whether it is from an MNC or a DC. Therefore, in Figure 3 we show the revenue from the 75 MNCs that qualify for GMCTR, the revenue from DCs, the revenue from MNCs that do not qualify for the GMCTR, the sum of all the above revenue sources, and, for comparison, the revenue from URA reports.

Figure 3: Overall revenue gain of the introduction of GMCTR by median elasticity (UGX billions)



	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Revenue from MNCs that qualify for GMCTR	10	18	21	36	12	11	2	19
Revenue from DCs	203	319	344	291	532	484	477	840
Revenue from MNCs that do not qualify for GMCTR	490	770	768	965	1,306	1,121	1,332	1,738
Total revenue response	704	1,107	1,133	1,293	1,851	1,616	1,811	2,597
Revenue from URA reports	487	715	732	764	885	1,168	1,302	1,568

Source: authors' construction using data from URA firm panel.

Figure 3 suggests the following: first, overall, implementation of the GMCTR would increase tax revenue. This experience parallels estimates by Krapf and Staubli (2020), who find positive elasticities in Switzerland. Nevertheless, the revenue impacts are unexpectedly small. This suggests that there is scope for improvement in the extent to which the GMCTR may curb MNCs' response to the tax structure, which creates an incentive to either shift profits to a lower tax jurisdiction or hide output (tax evasion). Bilicka (2019) suggests that MNCs pay only half of what is paid by DCs because a higher proportion of their subsidiaries report zero taxable profits. The greatest intensity of losses has been found to occur in developing countries, especially sub-Saharan Africa (Cobham and Jansky 2018).

Second, the revenue gain is higher than that reported by the URA, as shown by the difference between the total revenue response and the current collection as reported by the URA (2022). For example, in FY 2017/18 the total revenue gain is more than twice that reported by the URA. Yet, the contribution made by adjusting the AETR to the GMCTR is marginal (UGX12 billion). While this could be attributed to the small number of qualifying firms, as earlier suggested, there seems to be a significant amount of uncollected revenue among unqualifying MNCs in the current structure, which is clear evidence of tax evasion/avoidance and/or administrative weakness and leakage. The contribution by qualifying MNCs is marginal; yet the revenue gain is almost double what is reported by the URA.

In spite of administrative weaknesses, MNCs that do not qualify contribute much more revenue than those that do because there are many more unqualifying MNCs than qualifying MNCs. This brings to fore the debate on specificities in predicted maximum taxation in an economy, given its macroeconomic, demographic, and institutional features (IMF 2023). Indeed, the marginal contribution made by the GMCTR is important in the discussion of what rate to set in the context of tax capacity.

Table 3 shows the revenue impacts of qualifying MNCs by quintile. A comparison between Figure 3 and Table 3 suggests that most of the revenue impact resulting from the GMCTR is a result of the contribution made by the top 40 per cent of qualifying MNCs. A juxtaposition with the results in Figure 1 panel B suggests that this represents no more than 5 MNCs, while the remaining 10 qualifying MNCs (with lower taxable income) contribute marginally to additional revenue relating to the proposed GMCTR reform.

Table 3: Revenue impacts of qualifying MNCs by quintile, UGX billions

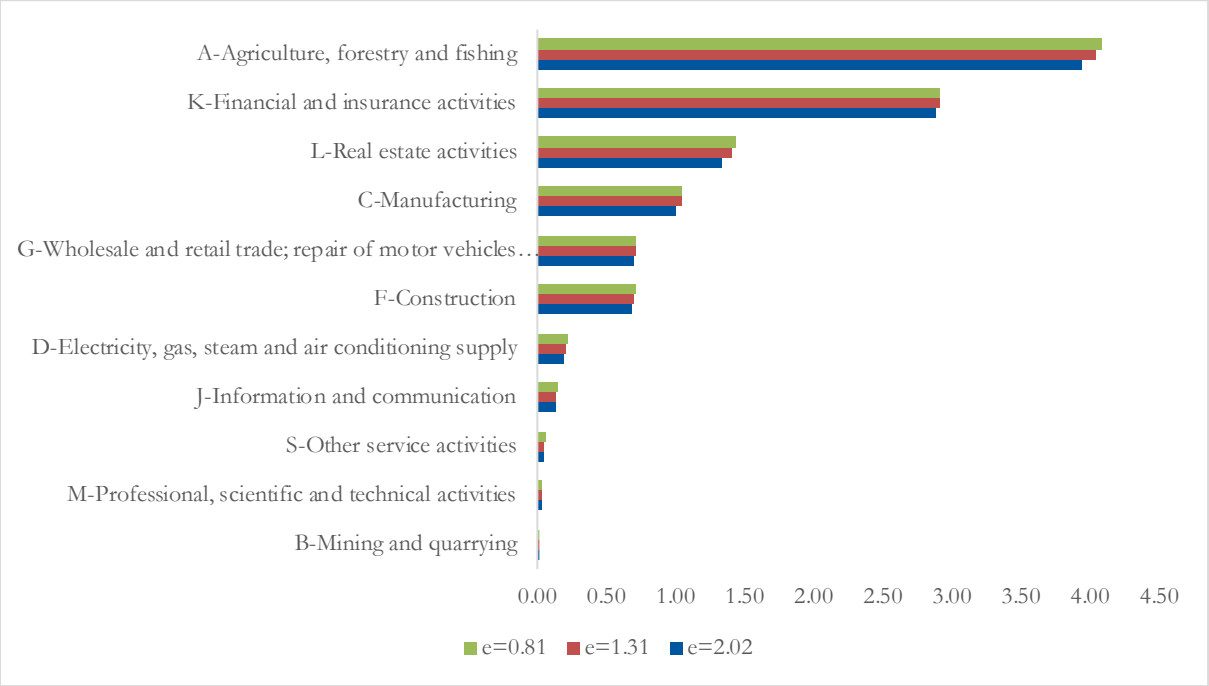
FY	Revenue effect by top 20%	Revenue effect by top 40%	Revenue effect by top 60%	Revenue effect by top 80%
2013/14	7	10	10	10
2014/15	17	17	18	18
2015/16	18	20	21	21
2016/17	29	36	36	36
2017/18	11	12	12	12
2018/19	5	10	11	11
2019/20	2	2	2	2
2020/21	18	19	19	19

Source: authors' construction using data from URA firm panel.

5.3 Sectoral response to GMCTR

Figure 4 shows the response to the GMCTR by sector/industry categories. The sectoral response to an increase in tax is inversely related to the above-mentioned elasticities.[12] The higher the elasticity, the lower the revenue. The agriculture, forestry and fishing (UGX4.02 billion), financial and insurance activities (UGX2.09 billion), real estate activities (UGX1.39 billion), and manufacturing (UGX 1.03 billion) sectors have the highest average revenue gains. The individual average revenue gain from the sectors other than those listed above is less than UGX1 billion. The revenue gain could be related to the distribution presented in Table 2, where some sectors are disproportionately represented.

Figure 4: Average (FY 2013/14–2021/22) revenue gain of the introduction of GMCTR by sector and elasticity (UGX billions)



Note: e = elasticity.

Source: authors' construction using data from URA firm panel.

[12] Elasticities are measures of behavioural response.

Again, and as mentioned earlier, the revenue gains are marginal. This could relate to the limited number of qualifying firms. However, our findings are similar to those of Beer et al. (2018), which suggests that higher CIT rates are associated with lower profitability and lower revenue in some sectors. This brings to fore the discussion on safe harbours highlighted in IMF (2023). For Uganda's case, and in the context of implementing the GMCTR, there is scope for simplifying the taxation of sectors that are highly sensitive to high tax rates, such as information and communications. Evidence from other jurisdictions suggests that the retention of traditional transfer pricing practices may be appropriate for some sectors. However, this calls for the mainstreaming of country context and an evaluation of sector-specific efficiency losses associated with simplified approaches (Schatan 2021). This speaks to implementation of the GMCTR in jurisdictions with a lower administrative capacity, such as Uganda and many other developing countries. Indeed, the GMCTR will confront tax administrators, especially in developing countries, not only with revenue loss risk, but also with practical challenges and conceptual uncertainties (Schatan 2021).

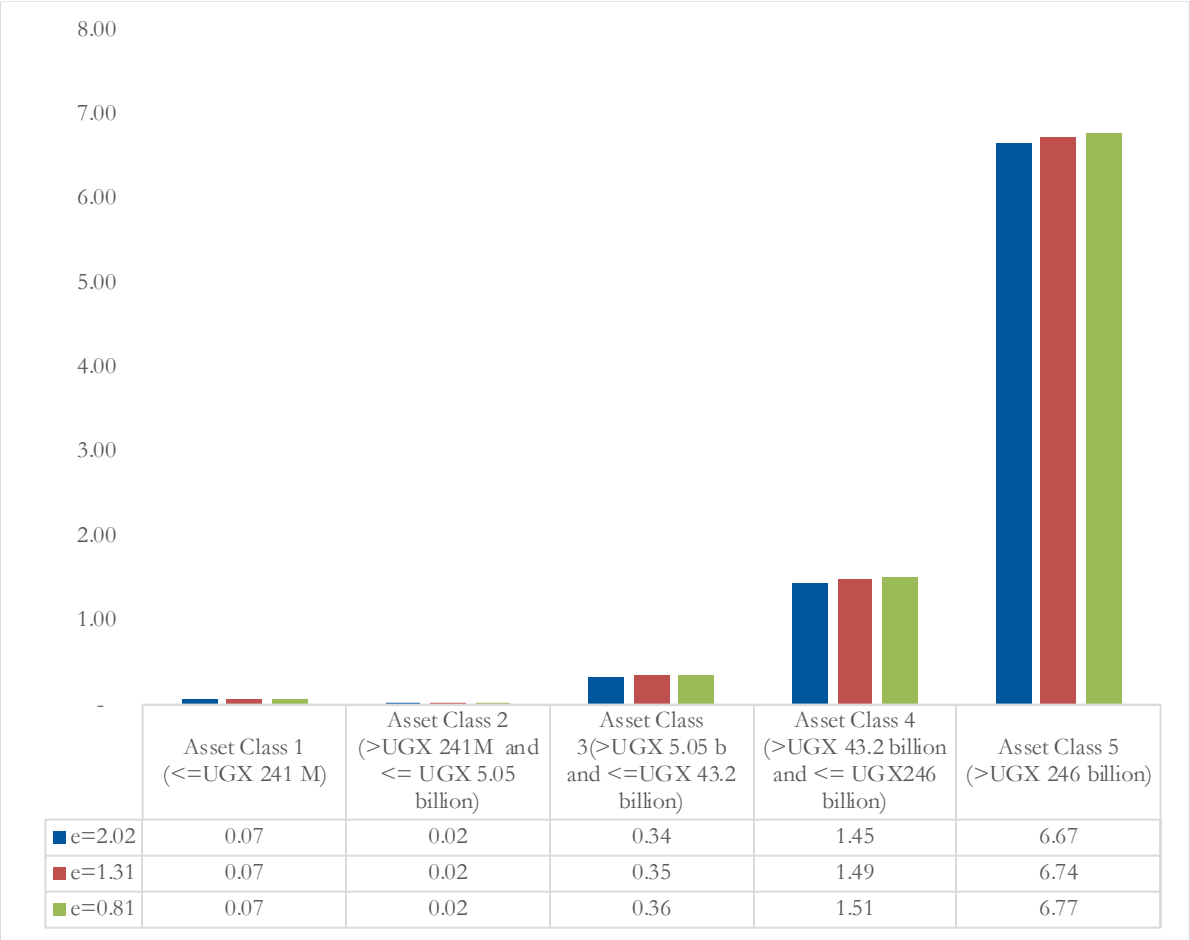
5.4 Size/asset classes response to GMCTR

Figure 5 analyses the average revenue response to the GMCTR of qualifying MNCs by size. Asset classes are used as a proxy for firm size. As mentioned earlier, we focus on five asset classes. For the higher asset classes (4 and 5), Figure 5 suggest that the revenue response is inversely related to the elasticity. The higher the elasticity, the lower the revenue. For example, the average revenue gain, for the 5th asset class, is highest for the elasticity on the 25th percentile (0.81) and lowest for the elasticity on the 75th percentile (2.02). However, it is difficult to distinguish the revenue response, by elasticity, for the lower asset classes.

More importantly, the revenue gain among qualifying MNCs in the lower asset classes is negligible. This evidence is consistent with that of Harju et al. (2022), who find that smaller and younger cash-constrained firms are more flexible in their adjustment of investments to corporate tax changes. Also, tax revenues from small firms in remote and non-central locations have been found to be inversely proportional to increases in corporate income tax in Switzerland (Krapf and Staubli 2020). In addition, Devereux et al. (2014) find a higher elasticity for companies with very low income. This may explain the relatively lower revenue gain and could point to profit shifting among smaller MNCs.

These estimates need to be interpreted with great caution, however, because profit shifting depends on many factors other than firm size and the tax rate. Institutional and legislative factors such as anti-avoidance rules, double-taxation treaties, and cultural and language ties with low-tax jurisdictions may influence the extent of profit shifting (IMF 2023). This, however, lends credence to those who argue that there is a scope for adjusting the GMCTR of smaller MNCs for debt, allowance for depreciation, adjustment for inflation, and other liabilities (Aslam and Coelho 2021). The application of minimum taxation rates elsewhere suggests that various bases have been used to allow for embedding deductions. For example, Argentina and Mexico have used gross assets as a base; while Peru, Ecuador, Colombia, and Guatemala have used assets net of debt and other liabilities, which have technically transformed the minimum tax to a tax on equity (Aslam and Coelho 2021).

Figure 5: Average (FY 2013/14–2021/22) revenue gain by asset classes, UGX billions



	Asset Class 1 (<=UGX 241 M)	Asset Class 2 (>UGX 241M and <= UGX 5.05 billion)	Asset Class 3(>UGX 5.05 b and <=UGX 43.2 billion)	Asset Class 4 (>UGX 43.2 billion and <= UGX246 billion)	Asset Class 5 (>UGX 246 billion)
e=2.02	0.07	0.02	0.34	1.45	6.67
e=1.31	0.07	0.02	0.35	1.49	6.74
e=0.81	0.07	0.02	0.36	1.51	6.77

Note: e = elasticity.

Source: authors' construction using data from URA firm panel.

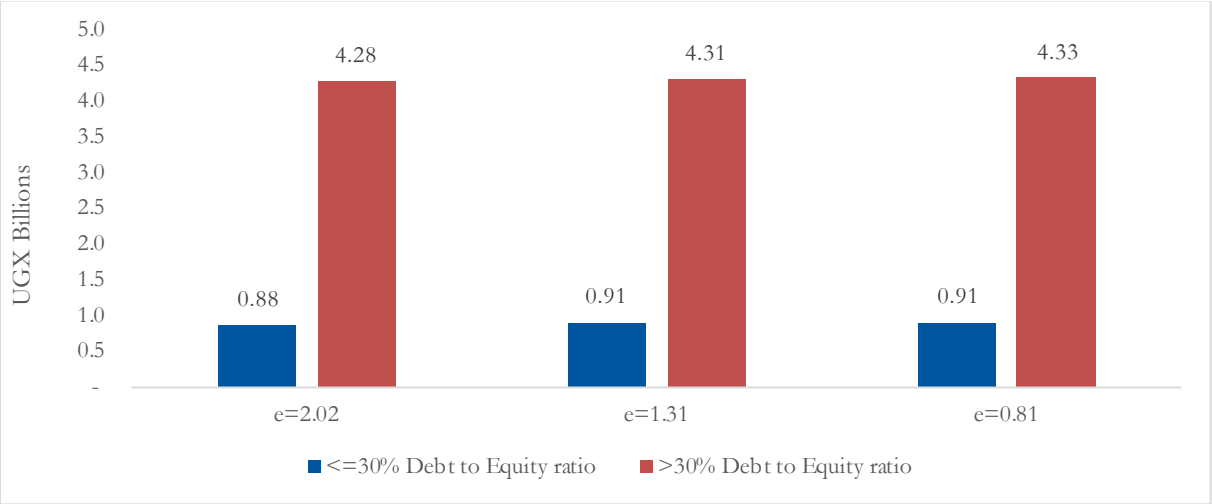
5.5 Capitalization response to GMCTR

The study also computes the average revenue gain associated with limitations on deductible interest payments, as laid out in the BEPS framework. The arrangement limits deductible interest to 30 per cent of investments. Figure 6 compares the total revenue effect of thinly capitalized qualifying MNCs with a debt-to-equity ratio above 30 per cent with those below the 30 per cent threshold.

Figure 6 suggests that the GMCTR limit effectively raises the AETR, limiting opportunities for tax evasion among thinly capitalized qualifying MNCs. The average revenue gained from thinly capitalized qualifying MNCs is 4-fold higher than that from their counterparts with a debt-to-equity ratio below 30 per cent. Otherwise, there is risk of more than envisaged profit shifting if there are jurisdictional corporate tax rate differentials. Becker and Fuest (2012) suggest that an uncoordinated GMCTR can prompt tax competition.

The revenue gain is inversely proportional to the elasticity. The higher the elasticity, the lower the revenue gain. However, the average revenue gain is marginal—close to UGX5 billion a year for thinly capitalized qualifying MNCs and less than UGX1 billion for their counterparts with a debt-to-equity ratio of below 30 per cent. However, these results assume coordination.

Figure 6: Average (FY 2013/14–2021/22) revenue gain related to capitalization, UGX billions



Note: e = elasticity.

Source: authors' construction using data from URA firm panel.

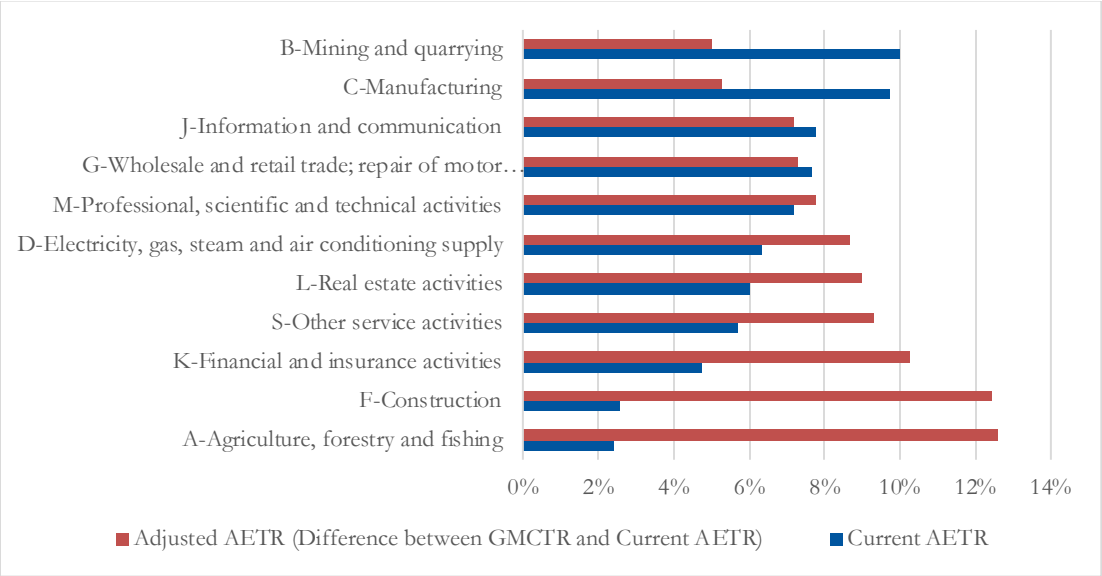
5.6 Reported sectoral change

Like Figure 2, Figure 7 compares the adjusted AETR and the current AETR. However, the indices on Figure 7 are disaggregated by sector and are adjusted for the median elasticity. A number of sectors reflect an adjusted AETR that is more than twice the current AETR (Figure 7). For example, the agriculture, forestry, and fishing sector has an adjusted GMCTR that is more than 6-fold (13%/2%) higher than the current AETR. Other sectors with a high adjusted AETR relative to the current AETR are construction (4-fold) and financial and insurance activities (2-fold). Such sectors suggest that revenue gain is conditional on the size of the elasticity of policy change. However, a high revenue gain could also be accompanied by a reduction in investment in those sectors over time owing to the burden of tax.

Most sectors, nevertheless, suggest an adjusted AETR that is smaller than the current AETR. Examples of these sectors are mining and quarrying (0.5 times), manufacturing (0.5 times), and information and communication (0.9 times).[13] These suggest a lower revenue gain even in the presence of a lower elasticity. This also points to a greater likelihood of tax evasion in such sectors than in sectors with a relatively high adjusted AETR. This speaks not only to the fairness of the tax system, but also to the long-run efficiency of the sector. This adds credence to the debate on the importance of the choice of base and rate, as well as that on the segmentation or recognition of sectoral differences. Evidence suggests that some countries that are implementing a minimum tax rate have carried out segmentation. Argentina and Colombia, for example, seem to have given the financial sector preferential treatment—Argentina in the past and Colombia currently (Aslam and Coelho 2021). This study notes, however, that differentiation of tax rates can introduce policy and administrative complexity. It should also be noted that mining and quarrying (2 qualifying MNCs), manufacturing (3 qualifying MNCs), and information and communication (6 qualifying MNCs) are underrepresented in the sample of qualifying firms presented in Table 2. Therefore, the low revenue response could be a consequence of the low number of qualifying MNCs in that segment.

[13] Mining and quarrying (5%/10%), manufacturing (5%/10%) and information and communication (7%/8%).

Figure 7: Average (FY 2013/14–2021/22) adjusted AETR and current AETR (median elasticity case) by sector



Source: authors' construction using data from URA firm panel.

6 Conclusions and policy recommendations

This study examines whether implementing the GMCTR offers a solution that increases the rate for those who pay a lower rate without affecting the breadth of the corporate tax base in Uganda. The study estimates the mechanical revenue gain from moving from the current effective tax rates to a 15 per cent minimum tax rate for MNCs with an AETR below 15 per cent. Thereafter, the paper uses elasticity estimates and changes in the tax rate to estimate the likely reduction in the tax base as a reaction to the increase in effective CIT rates. The total change is then calculated as the mechanical gain minus the behavioural reaction. However, it should be noted that the data do not allow us to identify, with certainty, the largest MNCs (in terms of pillar 2). In addition, the behavioural impacts may turn out to be lower than past literature suggests, which would amplify the revenue gain estimated herein.

Results suggest that overall, implementation of the GMCTR would increase tax revenue and the revenue gain is inversely proportional to elasticities. The differences in elasticities may introduce tax competition. This calls for coordination (regional cooperation) of implementation of the GMCTR to minimize tax competition. The study also notes that the revenue gain is marginal, although this could be as a result of the small number of MNCs with an AETR below the 15 per cent threshold. Estimates suggest that fewer than 20 Ugandan firms qualify.

Although the gain is higher than the current structure collection, MNCs that do not exceed the threshold contribute more revenue than those that do. This calls for local context—i.e. macroeconomic, demographic, and institutional features and tax capacity—to be taken into account during the setting of tax rates to be adopted as the GMCTR.

The results also suggest that the GMCTR can curtail base erosion and profit shifting by MNCs that are thinly capitalized, and that the revenue gain from thinly capitalized MNCs is higher than that from their counterparts who are not. However, these results should be interpreted in the light of the distribution of MNCs with an AETR below 15 per cent in each of the two categories.

There are also sectoral differences in revenue gains resulting from the GMCTR. Agriculture, forestry, and fishing; financial and insurance; and real estate have the highest revenue gains. However, such sectors could also face divestment due to their high levels of change in the AETR from their current rates.

There are also size differences, whereby smaller and younger cash-constrained firms contribute less revenue after a tax increase. This could point to a rather counter-intuitive case where tax evasion happens more among smaller MNCs. This brings to fore the discussion on safe harbours by simplification of the taxation of sensitive sectors and firm sizes in the context of tax administration capacities and an evaluation of sector-specific efficiency losses associated with simplified approaches. This also calls for segmentation or recognition of sectoral and size differences.

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Appendix

Table A1: Sources of average semi-elasticities used in the study

Authors	Semi-elasticities
Azemar (2010)	2.54
Barrios and d'Andria (2016)	0.49
Becker and Riedel (2012)	0.76
Beer and Loeprick (2015)	0.85
Beer and Loeprick (2017)	1.77
Beuselinck et. al (2016)	3.6
Blouin et al. (2012)	0.54
Castillo and Lopez (2016)	2.08
Clausing (2009)	3.76
Clausing (2016)	2.92
Collins et al. (1998)	0.32
Crivelli et al. (2016)	2.02
De Simone (2015)	0.83
De Simone et al. (2014)	1
Dharmapala and Riedel (2013)	1.13
Dischinger (2010)	1.6
Dischinger and Riedel (2011)	3.2
Dischinger et al. (2014)	0.91
Dowd et al. (2017)	0.81
Grubert (2003)	0.75
Grubert (2012)	1.31
Hines and Rice (1994)	5.16
Huizinga and Laeven (2008)	1.25
Johannessen et al. (2017)	0.69
Klassen and Laplante (2012a)	0.6
Klassen and Laplante (2012b)	0.91
Loretz and Mokkas (2015)	-0.07
Maffini and Mokkas (2011)	1.21
Markle (2016)	0.95
McDonald (2008)	1.26
Merz and Overesch (2017)	2.05
Mills and Newberry (2004)	1.94
Riedel et al. (2015)	0.71
Rousslang (1997)	4.74
Saunder-Scott (2016)	0.87
Schwarz (2009)	1.78
Weichenrieder (2009)	0.94

Source: authors' construction based on Heckemeyer and Overesch (2017) and Beer et al. (2018), which provide reference details.