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Rwanda: Selected Issues

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RWANDA

SELECTED ISSUES

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December 1, 2023

Approved By
African Department

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TAX REFORMS IN RWANDA—COMPREHENSIVENESS OVER SELECTIVITY

Summary: In this Selected Issues Paper (SIP), we revisit Rwanda's options to create fiscal space to meet long-term development challenges. We examine strategies and options for a credible and comprehensive domestic revenue mobilization. We analyze the driving factors of past reform successes and use an original dataset to highlight the benefits of implementing comprehensive tax reforms over selective reforms. The SIP concludes that selective measures tend to yield protracted loss of revenue while measures implemented comprehensively lead to increases in revenue in the medium term. This stresses the need for an integrated approach to fiscal policy reform coordination to maximize long-term revenue benefits. For Rwanda, a comprehensive strategy for increasing tax revenues by adjusting rates, broadening the domestic tax base, improving tax compliance, and curbing tax evasion is the way forward.

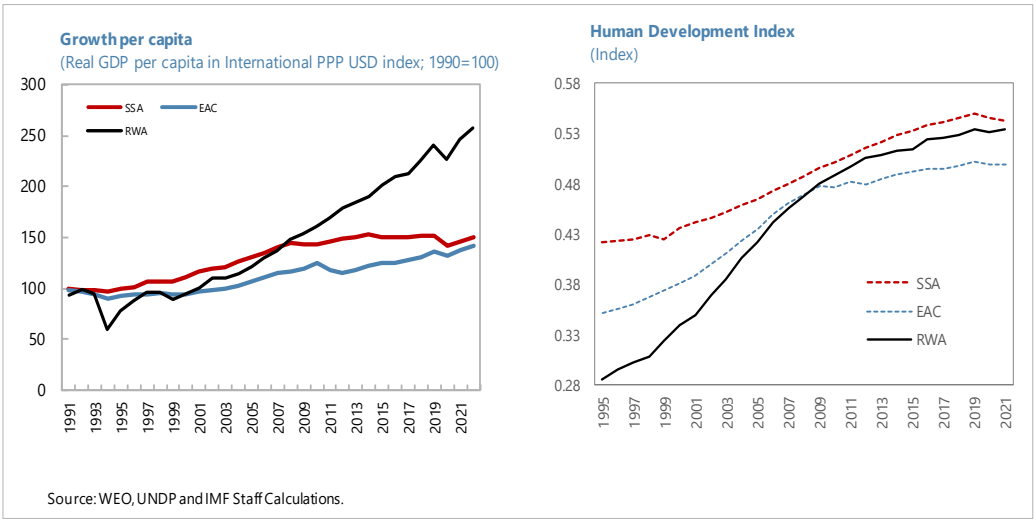
1. In three decades, the Rwandan economy has undergone a remarkable transformation, becoming one of the fastest-growing economies in Africa. Thanks to bold reforms and continued donor support, growth accelerated in the late-1990s and stayed steady averaging 8.5 percent a year over the 1995–2022 period (Figure 1). This growth has been accompanied by significant improvements in living standards for Rwandans, including reductions in poverty, hunger, and child mortality.[1] Despite these socio-economic strides, development needs remain large and financing gaps sizable with living standards remain below regional average (Figure 2). For instance, past studies (IMF SDNs 2019 and 2021) suggest that the financing gap to achieve the Sustainable Development Goals (SDGs) by 2030 ranges between 18.7 and 21.3 percent of GDP. In addition, estimates suggest that Rwanda will need an additional 8.8 percent of GDP in spending each year to meet Climate goals by 2050 (Figure 3). To finance the gap, Rwanda has three main sources of financing of the long-term development goal: concessional financing, external borrowing and domestic revenue mobilization. In recent years, external financing options are limited or constrained (Figure 4).

2. Domestic revenue mobilization will be key to help address the development gaps. To meet its developmental challenges, Rwanda will need to raise its revenue effort significantly. The tax potential remains sizeable and is an opportunity to embark on a comprehensive reform a strategy. In this SIP, we revisit Rwanda's options to create fiscal space with a stress on past successes and tax potential. We also explore the pros and cons for a comprehensive implementation of reforms over selective reforms. We use a panel data of 1,845 reform measures (from Crispolti 2023, forthcoming) for the EAC countries over the 1988-2022 period, allowing the distinction between announced package and non-package tax measures. Estimates show that isolated tax measures tend to yield

[1] Life expectancy has increased from 40.6 years in 1996 to 66.1 years in 2021. Infant mortality rate decreased by two-thirds. The under-five mortality rate has fallen from 131.1 deaths per 1,000 live births in 1996 to 29.7 deaths per 1,000 live births in 2021. Education has also improved significantly. Adult literacy rate has increased from 57.8 percent in 1991 to 75.9 percent in 2021 with primary school enrollment has increased from 31.9 percent in 1996 to 91 percent in 2023. Gross National Income per capita has increased from US$ 833.3 in 1996 to US$ 2427 in 2022.

protracted loss of revenue while tax measures implemented as a package are revenue neutral in the near term and thereafter (beyond 3 years) lead to significant increases in revenue. Comprehensive reforms are designed to lead to net positive revenue gains when fully implemented. Revenue loss arises when parts of the package are deployed without accounting for the revenue losing aspects of the reforms. This stresses the need for an integrated approach to fiscal policy reform coordination to maximize long-term revenue benefits.

Figure 1. Rwanda: Socioeconomic Progress, 1996–2022



Source: WEO, UNDP and IMF Staff Calculations.

3. The remainder of the SIP is organized as follows. Section II reviews lessons from past reforms. Section III analyzes the revenue impact of comprehensive and selective tax measures implementation over no measure implementation. Section IV summarizes key policy messages, discusses key policy recommendations and concludes.

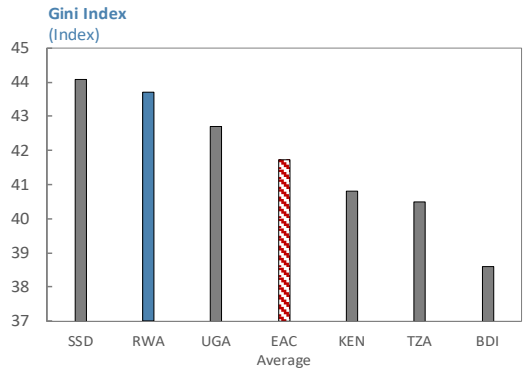
A. Progress in Domestic Revenue Mobilization

Lesson From Past Reforms

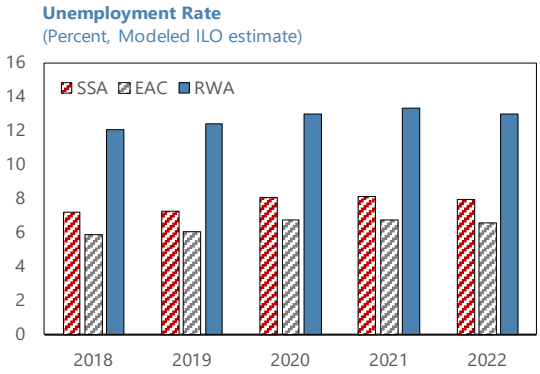
4. Rwanda achieved a steady and sustained increase in tax collection over the past three decades. As result of a larger public sector and governance and anti-corruption reforms, Rwanda's tax revenue ratio increased from just under 8 percent of GDP to over 16 percent of GDP between 1992 and 2020. Rwanda undertook tax administration reforms, with significant improvements in collection efforts, auditing procedures, and scrutiny of large taxpayers. Direct taxation contributed around 5 percent of GDP of this increase driven by personal income tax. Goods and services taxation added over 4.5 percent of GDP to the increase (through excise increases in the late 1990s and the introduction of a VAT in 2001). Trade taxes fell as a share of GDP. The period from 2010–15 saw revenues increase by 3¾ percent of GDP due to sustained reforms to improve DRM by widening the tax base through tax incentives rationalization, improving the progressivity of personal income taxes, and enforcing tax compliance.

Figure 2. Rwanda Socioeconomic Overview

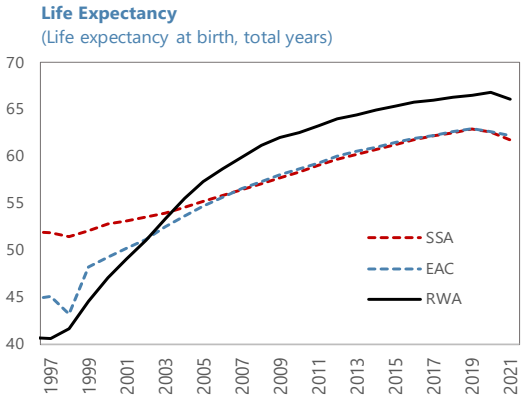
Inequality in Rwanda is high compared to peers.



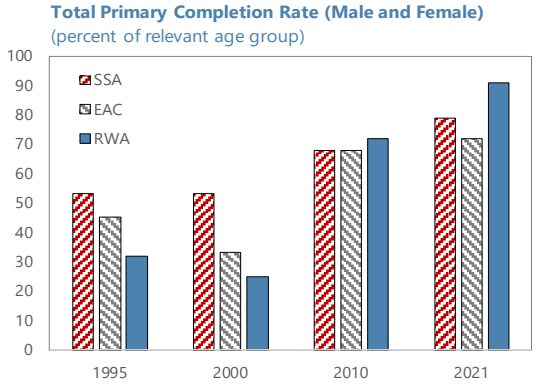
Unemployment remains high and persistent.



On the other hand, life expectancy has improved significantly supassing regional peers…



…and primary education completion rate reached more than 90 percent.



Source: OWID, WEO, UNDP, ILO, Rwanda Authorities and IMF Staff Calculations.

5. The Rwanda Revenue Authority was formed in 1997, with MINECOFIN responsible for tax policy. The last two decades has seen continual reform in the following areas:

- Direct taxation: In the late 1990s and early 2000s, the initial focus was to target large companies, then legislative changes were later introduced to support personal income taxation. In 2005, simplified PIT rates were introduced, with nominal income brackets set, and remained unchanged contributing to progressivity. In the 2000s, a turnover tax was introduced for small traders, and presumptive income tax on commercial vehicle owners. Also, in the early 2000s the base was expanded for personal income tax, while corporate tax rates were reduced. An electronic platform for tax administration was implemented in 2003, with support in audit, financial management and HR from development partners. Electronic filing was introduced in 2010, and a new system for electronic tax administration was implemented in 2016.
- Indirect taxes: Since the 2000s, the focus was broadening the tax base and improving the RRA. The VAT was introduced in 2001 at rate of 15 percent then increased to 18 percent in

2003. Exemptions were removed in 2010/11. Quarterly filing was introduced to improve compliance, along with electronic payments of tax liabilities. Other supporting administrative reforms were introduced to support compliance including electronic land records systems, use of banking and city data. A value-based scale for mining royalties was introduced and more attention was given to transfer pricing.

Figure 3. Rwanda: Estimates Financing Needs for SDGs Attainment by 2030
(Percent of GDP)

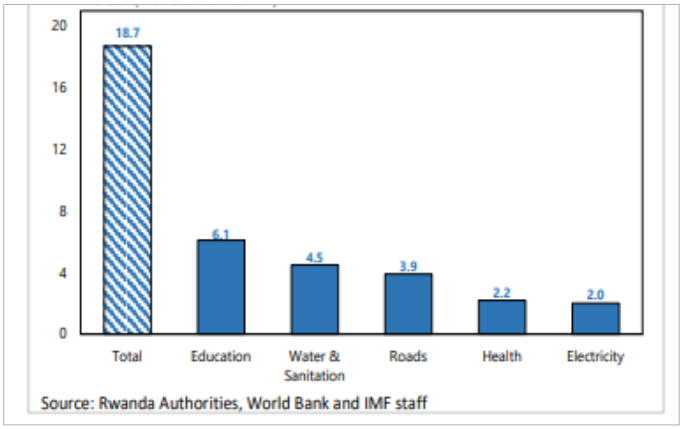
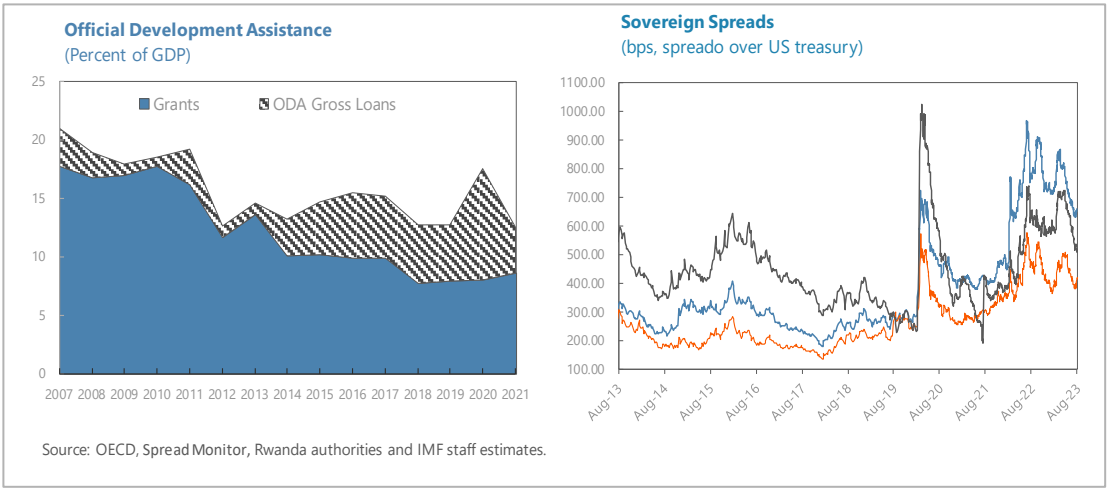


Figure 4. Rwanda: Financing Options, 1996–2022



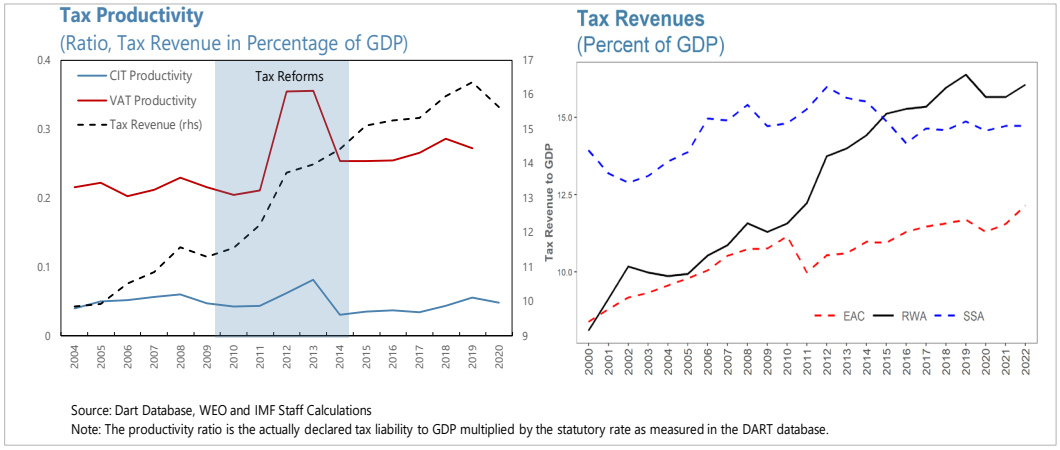
- Trade taxes: Trade taxes as a share of GDP have declined over the last two decades after custom duties were reduced for large industries and after Rwanda joined the EAC customs union in 2009.

6. The authorities also reformed tax exemptions. They revised the investment tax code to streamline several tax exemptions. Incentives granting VAT exemptions on imports for investment certificate holders were also removed, which broadened the existing narrow tax base.

7. Tax administration measures, aimed at improving compliance by better utilizing risk management and automation systems, were also implemented. Especially, new electronic filing and payment systems were introduced during 2010–11, with the implementation of electronic tax registration. Also, basic risk management approaches and direct bank payment of tax was introduced to reduce leakages. The tax and business registration processes were integrated to ease cost of doing business. Furthermore, they automated tax and custom operations and implemented a customs Single Window for trade facilitation. The RRA enforced VAT compliance by introducing electronic transactions device (ETD) and withholding VAT at source by government departments, and increased collection of tax arrears.

8. These comprehensive reforms as part of a broader public sector and governance and anti-corruption reforms, proved to be supportive. Learning from these past successes, comprehensive reforms will be needed to support Rwanda's ambitious development and climate. The existence of a large tax gap is an opportunity. A comprehensive strategy for increasing tax revenues by broadening the domestic tax base, improving tax compliance, and curbing tax evasion should be prioritized by the authorities. The strategy should shift higher tax burdens from low-income households to higher income wealth cohorts with the view to advancing distributional fairness against growing inequality. Reforms will need to focus on tax policy, as improved compliance has diminishing returns (see section IV).

Figure 5. Rwanda: Past Tax Revenue Performance in Recent Years



Source: Dart Database, WEO and IMF Staff Calculations
Note: The productivity ratio is the actually declared tax liability to GDP multiplied by the statutory rate as measured in the DART database.

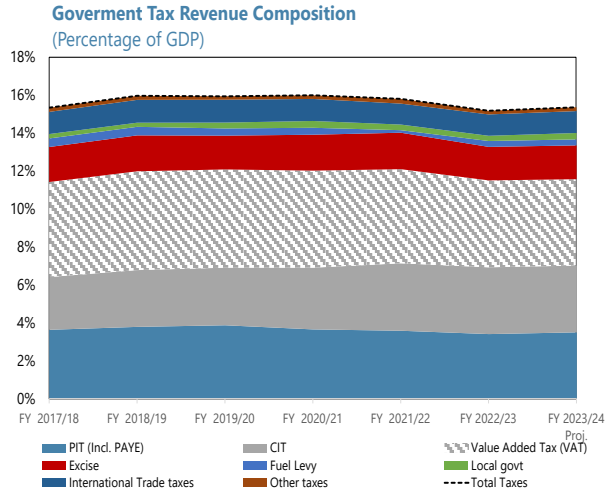
Recent Developments

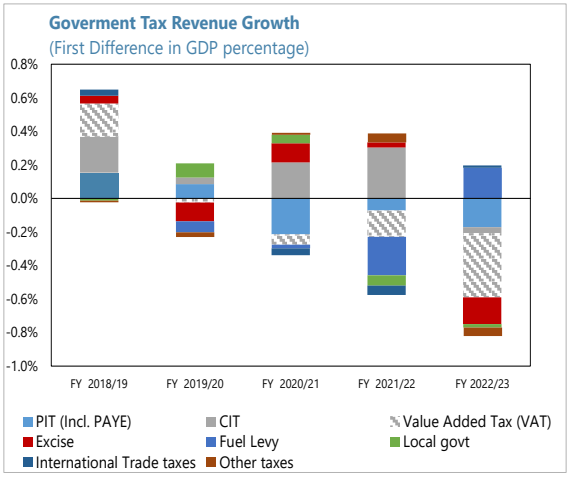
9. In recent years domestic resource mobilization efforts in Rwanda have stalled. The tax-to-GDP ratio has fallen from 15.8 percent of GDP in FY20/21 to 15 percent of GDP by the end of FY22/23. Ratio peaked at 16.1 percent of GDP in FY2018/19. These falls have been observed across all tax types, although more pronounced for indirect taxes which have fallen from 7.8 percent of GDP in FY18/19 to 6.7 percent of GDP in FY22/23. Indirect taxes are made up of Value Added Taxes (VAT), excises, and fuel levies. The falls in indirect taxation in recent years have been driven by value

added taxes, but also smaller taxes such as the fuel levy. Solid performance on corporate income taxes (CIT), have been offset by falls in personal income taxation.

10. The setbacks in recent years have been partly due to policy decisions. Several policies were introduced during the COVID-19 pandemic to support the economic recovery, at the expense of tax revenues. The Manufacturing Build to Recovery Program (MBRP) was introduced in 2021 that exempt approved projects from VAT and import duties on construction materials. The MBRP was recently extended until the end of 2024. In response to soaring prices of international oil, the authorities between 2021 and 2023 adjusted the fuel levy and excises downward which also reduced revenues. VAT exemptions were also introduced on electric vehicles. PAYE thresholds were adjusted in downward. The latest tax expenditure report published by the authorities indicate that tax expenditures were 3.7 percent of GDP in FY21/22 and increase from around 3 percent of GDP in 2018-19. VAT represents almost half all-tax expenditures. The two largest VAT tax expenditures are from exemptions on the financial services and agriculture sectors.

Figure 6. Rwanda: Tax Revenue Performance in Recent Years





Source: Authorities and IMF staff calculations

11. The setbacks in FY22/23 can also be partly explained by the narrow tax base not growing in line with the rest of the economy. 2022 and 2023 saw high inflation in the agricultural and food manufacturing sectors due to climate-related shocks, and high fertilizer prices. While agricultural production was stagnant, the nominal share of agriculture and food manufacturing increased from 26 to 30 percent of total GDP. Both these sectors are untaxed. Excluding both the agriculture and food manufacturing sector from GDP and using this to calculate the tax ratio suggests that all the fall in the tax to GDP ratio in FY22/23 can be attributed to the changing composition of nominal GDP vis-à-vis the tax base. This underscores the need to have a wide-tax base that can benefit from changing structures of the economy.

12. Comprehensive tax reform is also becoming increasingly difficult. In mid-2022 the Rwanda Cabinet approved a medium-term revenue strategy (MTRS) that was anticipated to raise the

Tax to GDP ratio by 1 percent of GDP over the course of the MTRS. The MTRS was design to be implemented as a package, which included some tax losing reforms (adjustment to PIT thresholds and reductions in CIT rates) as offset by revenue from excise increases and the introduction of a minimum alternative tax. To date, only loss-making tax measures have been adopted by the authorities, while core revenue enhancements have not yet been adopted but planned.

13. Despite the setbacks on the tax policy side, Rwanda has made improvements in revenue administration, preventing a sharper decline in the tax to GDP ratio. The Rwanda Revenue Authority (RRA) has continued to implement measures aimed at (i) taxing the shadow economy, (ii) improving voluntary compliance through better taxpayer services, and (iii) promoting compliance improvement plans (CIPs) targeted at the manufacturing sector, large businesses, customs, and to combat tax evasion by individuals.

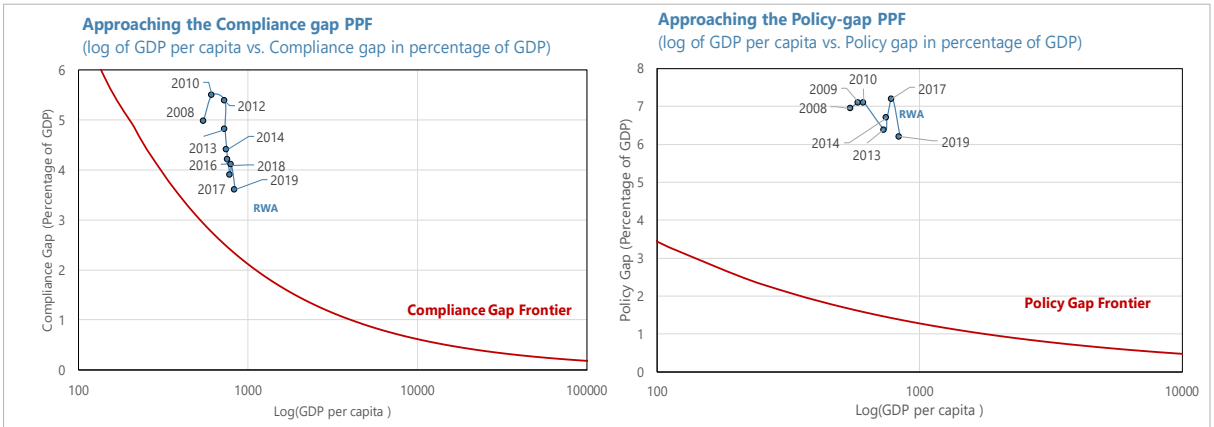
14. Rwanda has opportunities to mobilize revenues. The tax effort of Rwanda continues to perform consistently below its tax potential resulting in a significant tax gap. The tax gap for a year is the difference between the potential revenues that could have been collected given the economic structure during that year and the revenues collected (tax effort) for that year. The most recent estimates available from the IMF regular assessment suggest Rwanda's tax gap in 2019 was [9.7] percent of GDP (DART database). Given tax revenues have fallen around a percentage point of GDP since this period for the reasons discussed, and Rwanda's tax potential has increased, the size of Rwanda's tax gap by the end of FY22/23 is higher.

15. The tax gap is made up of a policy gap and a compliance gap. Estimating the tax gap is helpful to understand the factors affecting tax revenue performance. Measuring the compliance gap gives an indication of the potential for revenue mobilization if the effectiveness of the revenue administration is improved. Measuring the policy gap provides an indication of the amount of revenue being foregone due to tax policy design. The two numbers together provide context for each value, while it can be difficult to tell the relative magnitude of either value on its own. In Rwanda, there has been substantial improvements in the tax compliance gap since 2010 (Figure 7). In contrast, the policy gap remains significant reflecting the inability of Rwanda to address the multiple rate structure and a plethora of exemptions. Figure 7 underscores the diminishing effectiveness of administration reforms over time and reinforces the need for caution against overly relying on these reforms for short-term revenue gains.

16. Domestic resource mobilization will need to be led by tax policy reforms. While the gains from revenue administration have been continuous over the last decade, they face diminishing returns. For instance, early in the development of countries' tax administration, increasing staffing and resources may have a significant impact on revenue collections through enforcement and audit for instance. Once a threshold is reached, these returns may be more limited. Figure 7 also shows this relationship.[2] Gains from tax administration may also take several years to impact revenues and should not be relied upon for short-term revenue gains.

[2] The recent digitalization trend in Rwanda could have also shifted out the frontier of more potential gains from the administration side.

Figure 7. Rwanda: Compliance and Policy Gaps



Source: DART database with IMF Staff Calculations

Note: The frontier charts allow the comparison of Rwanda's efforts in closing the policy gaps relative to the optimal frontier (countries with top performers in the database). The closer to the frontier, the more effective is the gap closure.

B. Empirical Analysis

17. In this section, we examine options to create fiscal space to meet long-term development challenges. Using a novel dataset for the EAC countries over the 1988–2022 period and the local projections technique, we estimate the revenue yield from the implementation of a comprehensive tax measures as opposed to implementing selective tax measures.

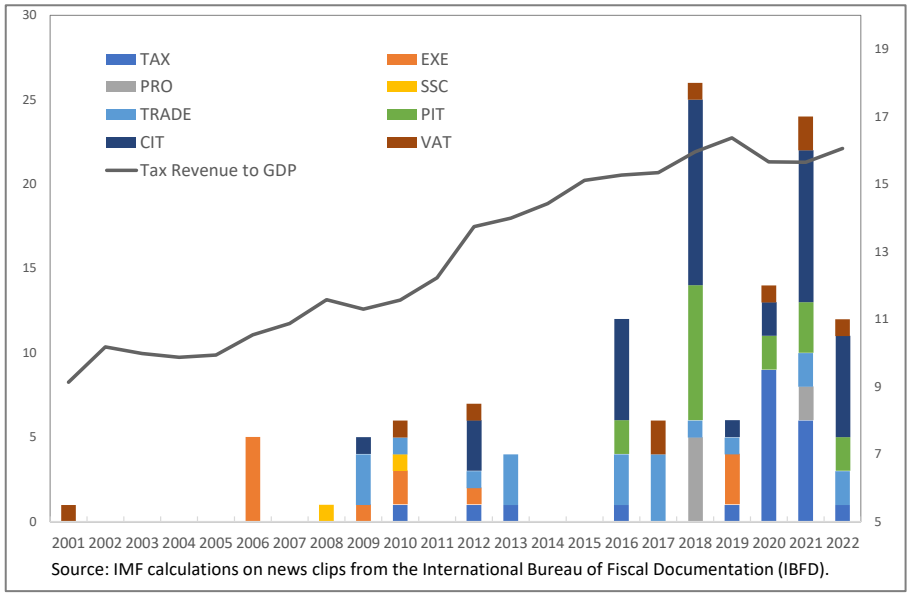
Data

18. The dataset is a novel compilation of tax policy and administrative changes in the East African Community (EAC) economies. It encompasses 1,845 tax measures implemented in the EAC countries during the period spanning from 1988 to 2022. The database provides granular information on different dimensions of tax policy and administrative changes announced and adopted in EAC economies over the period 1988–2022. The source of information is the news clips prepared by tax experts from the International Bureau of Fiscal Documentation.[3] The innovation of the database is that it systematically documents the direction of changes (i.e., INCREASE /DECREASE) in the tax policy (RATE, BASE) and administrative practices (ADMIN) of seven different taxes—personal income tax (PIT), corporate income tax (CIT), value added and sale taxes (VAT), social security contributions and payroll taxes (SSC), excise (EXE), trade taxes (TRADE), and property taxes (PRO).On the interest of the present note, the dataset makes a distinction between comprehensive and selective tax measures, which is primarily based on the nature of their announcement and their intended directions.

[3] The news clips are available to all IBFD subscribers and can be accessed through the IBFD website: https://research.ibfd.org/#/.

19. Specifically, a comprehensive tax measure is characterized by a joint announcement of tax changes, which may include alterations in policy, rate, or administrative measures. Comprehensive measures are coordinated, clearly communicated, and typically implemented during events such as budget approvals addressing several taxes or tax characteristics as opposed to piecemeal tax measure announcements. Most tax changes were announced as part of a broad package of measures that typically include both tax policy and administrative changes. For each tax change, the database also provides information on the timing of the change (announcement and implementation dates, i.e., MM/DD/YYYY), the type of change (i.e., tax rate, tax base, administrative practice), the category of each type of change (e.g.; top rate, exemption, tax compliance), and whether the tax change is announced as part of a broader package of tax policy and administrative measures.

Figure 8. Rwanda: Tax Measures and Revenues
(Count, lhs; percent of GDP)



Source: IMF calculations on news clips from the International Bureau of Fiscal Documentation (IBFD).

20. The database is complemented with the reported tax revenue in terms of GDP for the years and countries in the database. Based on the data and in Figure 8, Rwanda shows an impressive increase in tax revenue in percent of GDP moving from 9.1 percent of GDP tax revenue in 2001 to 16.1 in 2022. Rwanda also shows a strong implementation of tax measures after 2016. While there was a strong implementation of measures, several measures after 2019 were revenue losing (see discussion on recent experience).

21. For the EAC, tax measures typically aimed at narrowing the tax base (e.g., exemptions, deductions) with a share of about 24.9 percent of total measures (Text Table 1). Strengthening tax administrative practices (e.g., electronic payments, tax compliance strategy) represent about 28.5 percent of all the measures taken in EAC. For Rwanda, 21.7 percent of the reforms were aimed at reducing the base while 28.7 of the reforms strengthen the administrative conditions.

22. During 1988–2022, EAC countries announced all tax changes (94 percent of total) as part of a broad package of tax measures (Figure 9)—mostly around the submission of the Budget Law to Parliament. In Rwanda, the proportion of comprehensive measures was lower with only 82.9 percent of all measures being comprehensive and 17.1 percent selective.

Methodology

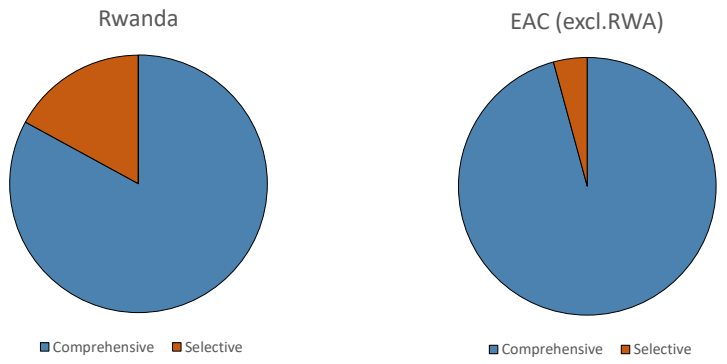
23. Local projections framework. To analyze the impact of fiscal policy, we use the local projections (LP) framework, building upon methodologies outlined in David, Guajardo, and Yepez (2019) that expanded upon in other referenced papers (Auerbach and Gorodnichenko 2013; Jordà and Taylor 2016, Ramey and Zubairy 2018, as well as Born, Müller, and Pfeifer 2019). The primary advantage of using the LP framework is the flexibility in addressing challenges posed by non-linearities and state dependencies.

Text Table 1. Rwanda: Composition of Tax Policy and Administrative Measures

	Type of change	*Frequency*			*Share of Country/Region*		
		Decrease/ Loosen	Increase/ Strengthen	Total	Decrease/ Loosen	Increase/ Strengthen	Total
Rwanda	Administrative	18	37	54	14.0	28.7	41.9
	Base	28	18	46	21.7	14.0	35.7
	Rate	15	13	28	11.6	10.1	21.7
	Total	61	68	129	47.3	52.7	100
EAC	Administrative	131	525	656	7.1	28.5	35.6
	Base	460	328	788	24.9	17.8	42.7
	Rate	202	199	401	10.9	10.8	21.7
	Total	793	1052	1845	43.0	57.0	100

Source: IMF calculations on news clips from the International Bureau of Fiscal Documentation (IBFD).

Figure 9. Rwanda: Share of Tax Measures in a Package



Source: IMF calculations on news clips from the International Bureau of Fiscal Documentation (IBFD).

24. Modelling. The LP econometric model is designed to estimate impulse response functions by directly regressing future outcomes on specific shocks. A significant benefit of the LP model is that it minimizes sampling requirements, thereby reducing the potential cost of misspecification due to limited sample sizes. In our analysis, we take the dependent variable (DV) lag and juxtapose it against the DV measurement lead. As we progress, the number of lags within the period window is adjusted to generate an impulse response function (IRF), focusing on the coefficient of the shock

variable, which in this case is a tax measure. Our approach centers on a 7-year window post the announcement of the measures to examine the effect of various specifications. We control for other variables as shown in Equation (1).

$$r_{i,t+h} - r_{t,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_{1,h} D_{i,t} + \beta_{2,h} P_{i,t} + \varepsilon_{i,t+h} \quad (1)$$

The variable r represents the government tax revenue as a percentage of the GDP. The symbol α represents the country fixed effects. Similarly, γ represents the time fixed effects, capturing variations across different time periods. D is a dummy variable capturing the presence of one or more selective tax measures, while P does the same for comprehensive tax measures. The error term ε is used to account for residual terms in the model. In the context of this study, i signifies a specific country, h represents the forecasting or observation horizon, and t indicates the period under consideration.

We also study the effect of comprehensive and selective measures on tax revenue in GDP percentage controlling for whether those measures were aimed at strengthening or loosening the characteristics of the tax (admin, base or rate). Variables represent the same as in equation (1) replacing D by CI, CD, SI, SD representing dummy of one or more measures for comprehensive strengthening measures, comprehensive loosening measures, selective strengthening measures, and selective loosening measures, respectively.

$$r_{i,t+h} - r_{t,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_{1,h} CI_{i,t} + \beta_{2,h} CD_{i,t} + \beta_{3,h} SI_{i,t} + \beta_{4,h} SD_{i,t} + \varepsilon_{i,t+h} \quad (2)$$

In the next subsection, we discuss the impulse function responses.

Results

25. Comprehensive measures are associated with revenue increases in the medium term (Figure 8). Based on estimates from Equation (1), we find that selective measures tend to yield protracted loss of revenue while measures implemented comprehensively are revenue neutral in the near term and thereafter lead to increases in revenue beyond 3 years.

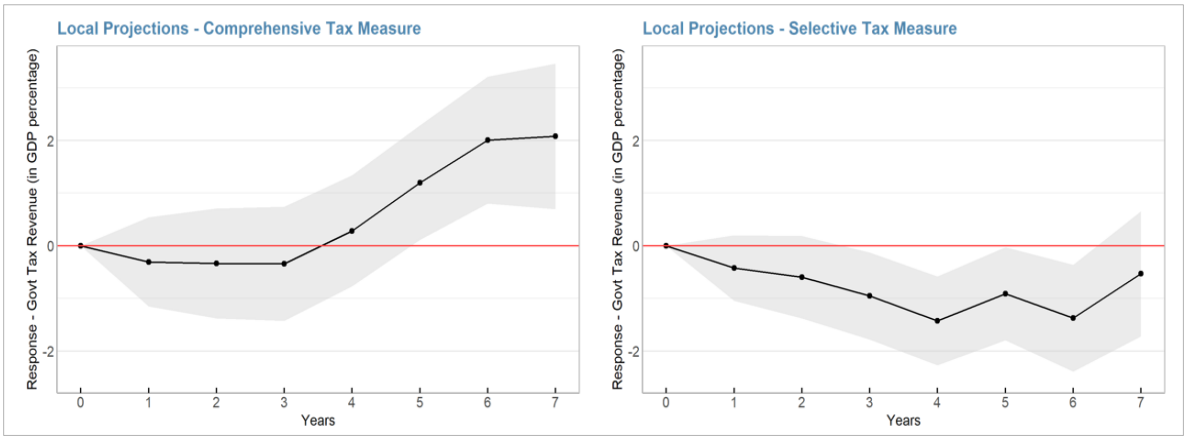
26. The effects of adopting comprehensive measures are sizeable. In Equation (1), when we account for the intensity of measures, we find that having "one or more" comprehensive fiscal measures within the observation period yields a 2 percent on average increase in tax to GDP percentage by year 6 while having one selective reform tends to yield around 1 percent losses in tax revenue to GDP.

27. When accounting for the intention (reducing revenue versus strengthening revenue), we find even more sizeable effects.[4] In Equation (2), we find that when controlling for the

[4] We consider the tax measure increasing if it increases the base of the tax, the rate of the tax and/or the administrative conditions to produce compliance. We consider the tax measure decreasing if it decreases the base of the tax, the rate of the tax and/or the administrative conditions to produce compliance. This categorization is specific to the tax measure and given when it is defined therefore ex ante of its impact on revenue after implementation.

objective of measures, comprehensive measures aimed at strengthening taxes lead to a significant revenue increase, by about 2.9 percent of GDP on average. When comprehensive measures are judged to be revenue loosing, decline in tax-to-GDP ratio is contained and almost neutral. Selective measures aimed at strengthening taxes generate losses of a about 1.4 percent of tax revenue to GDP. These losses are amplified to 1.9 percent of GDP when selective measures are assessed as "revenue losing."[5]

Figure 10. Rwanda: Impulse Response Functions for Comprehensive/Selective Measures



Source: IMF staff calculations.

Note: This shows the response of having one or more tax measures (comprehensive left, selective right) on tax revenue to GDP during a that year and not the response of a singular measure.

28. When accounting for the intention (reducing revenue versus strengthening revenue), we find even more sizeable effects.[6] In Equation (2), we find that when controlling for the objective of measures, comprehensive measures aimed at strengthening taxes lead to a significant revenue increase, by about 2.9 percent of GDP on average. When comprehensive measures are judged to be revenue loosing, decline in tax-to-GDP ratio is contained and almost neutral. Selective measures aimed at strengthening taxes generate losses of a about 1.4 percent of tax revenue to GDP. These losses are amplified to 1.9 percent of GDP when selective measures are assessed as "revenue losing."[7]

[5] Selective tax measures often result in lower revenue as they can distort market dynamics, leading to inefficiencies in the taxed sector, or facilitate consumers ability of altering their habits to avoid the tax.

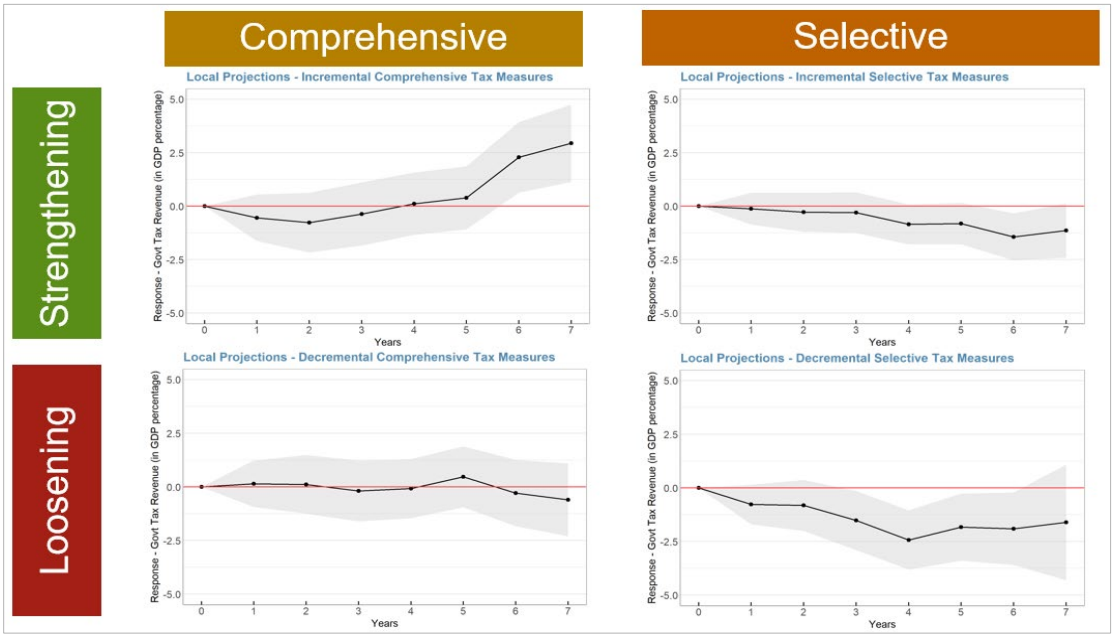
[6] We consider the tax measure increasing if it increases the base of the tax, the rate of the tax and/or the administrative conditions to produce compliance. We consider the tax measure decreasing if it decreases the base of the tax, the rate of the tax and/or the administrative conditions to produce compliance. This categorization is specific to the tax measure and given when it is defined therefore ex ante of its impact on revenue after implementation.

[7] Selective tax measures often result in lower revenue as they can distort market dynamics, leading to inefficiencies in the taxed sector, or facilitate consumers ability of altering their habits to avoid the tax.

C. Concluding Remarks

29. Efforts to raise revenue in recent years have stalled, despite significant tax potential. Rwanda's tax effort has fallen by around one percentage point to be around 15 percent of GDP in FY22/23 due to a narrow taxbase not benefiting from structural changes in the economy as well as increased tax expenditures. Rwanda could look to past episodes of reform which saw substantial increases in revenues due to a combination of revenue administration and tax policy implemented as comprehensive package. The empirical work outlined in this paper also supports this approach, where comprehensive reforms are found to lead to net positive revenue gains when fully implemented. Rwanda's tax gap suggests that tax policy will need to spearhead reforms going forward, while returns from revenue administration will contribute less.

Figure 11. Rwanda: Impulse Response Functions for Comprehensive/Selective Measures Controlling for Strengthening/Loosening



Source: IMF staff calculations.

Note: This shows the response of having one or more measures (comprehensive left, selective right, Strengthening top and Loosening bottom) on tax revenue to GDP during a that year and not the response of a singular measure.

30. A comprehensive strategy for increasing revenues tax revenues by adjusting rates, broadening the domestic tax base, improving compliance, and curbing tax evasion is a way forward. The strategy should shift higher tax burden from low-income households to higher income wealth cohorts with the view to advancing distributional fairness against growing inequality. Tax measures and reforms will need to focus on tax policy, as improved compliance has diminishing returns. The IMF conducted a comprehensive review of the Rwanda tax system in a 2021 technical assistance mission and found that an integrate package of reforms could raise 7.2 percent of GDP in revenues, with 4.9 percent of GDP in the short to medium-term, and another 2.3 percent of GDP

over the longer-term. Consistent with the empirical findings of this paper, the technical assistance findings stressed that the effectiveness of the package of recommendations would be seriously diminished if individual measures were selectively accepted or rejected and reforms continue in a piece-meal manner. Rather, the success of any reforms depends on measures being implemented as an integrated package.

31. Value Added Taxes (VAT) have the greatest revenue potential in Rwanda. An estimated 2.9 percent of GDP could be levied through reforms to the VAT. Rwanda's VAT capacity (feasible VAT revenues) was estimated to be 10 percent of consumption expenditures. Its average VAT effort is 50.7, meaning Rwanda collects 50.7 percent of feasible VAT revenues. Rwanda's VAT effort ranks 55 out of 70 countries. Rwanda should pursue policies that standard-rate certain good that are zero-rated or exempt from VAT. For instance, standard-rating a zero-rated domestic good will reduce the policy gap and lower VAT refunds claims. Also, removing exemptions will reduce the number of input VAT allocations, which requires sufficient capacity to audit and firms may misreport to increase input tax deductions. Base-broadening will, reduce the policy gap, but also the compliance gap by making the VAT easier to administer and lowering compliance costs. Additional revenues used by these reforms can be used to compensate poor households through direct transfers. Any impacts on low-income households should be dealt with by targeted expenditure.

32. Corporate Income taxes (CIT) could be made more business friendly to expand the role of the private sector. The CIT structure is distorted with a bias for debt financing, transfer pricing, and gold plating of revenue expenses. The problem is further aggravated by a plethora of tax holidays and sector specific reduced rates. International experience suggests that these incentives are seldom effective in promoting overall investments. The redundancy ratio for Rwanda was estimated to be 0.98, meaning that 98 percent of the investment would have taken place had the incentive not been in place. IMF technical assistance found that around 0.8 percent of GDP could be levied by addressing these issues through the following policy changes in the medium term: (i) reduction in corporate tax rate to 20 percent; (ii) elimination/grandfathering of all tax incentives; (iii) full expensing for capital expenditure; (iv) indefinite carry forward of losses; (vi) introduction of gross asset-based minimum alternative tax (MAT).

33. Personal Income Taxation could be made more progressive. PIT suffers from important structural weaknesses that hamper its progressivity and increase opportunities for tax avoidance and evasion. PAYE registered taxpayers account for only about 24 percent of the estimated labor force, even though about 70 percent of the adult labor force is estimated to be employed outside of subsistence agriculture. This challenge is exacerbated by a high labor tax wedge for the average formal salaried employee, including both PIT and social security contributions. Measures should focus on improving equity, transitioning to global income tax system in long run (in short run, harmonize withholding rates across capital taxation), and introducing a wealth tax.

34. Excises taxes could be reformed through ad valorem taxation combined with indexation. All of Rwanda's excises are ad valorem except for fuel and a partial specific excise on cigarettes. Excise revenues have decreased in recent years, potentially due to not indexing the specific excises. Another reason may be the use of ad valorem rather than specific excises. IMF TA

recommends changing to (only) specific excises on alcohol, tobacco and sugar beverages combined with indexation to adjust to inflation. To incentivize the purchase of fuel-efficient vehicles, IMF technical assistance also recommends the introduction of a higher excise on old vehicles, a reduction in the motor vehicle fee, and introducing higher taxes on fuels.

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CHALLENGES AND POLICY OPTIONS TO FINANCING RWANDA'S CLIMATE AGENDA

Summary: In this Selected Issue Paper, we illustrate macroeconomic impacts of planned climate-focused projects and reforms and discuss sustainable financing strategies. Simulations using the IMF's Debt-Investment-Growth-Natural-Disasters (DIGNAD) model suggest that full NDC implementation has sizeable fiscal costs but could improve Rwanda's macroeconomic stability if accompanied by proper policy and financing mix. Domestic Revenue Mobilization (DRM) and spending rationalization are key to increasing fiscal space and safeguarding debt sustainability. Furthermore, advancing reforms under the Resilience and Sustainability Facility (RSF) would increase public investment efficiency and help catalyzing additional climate financing, thereby addressing the risk of crowding out other development spending.

1. Rwanda is vulnerable to climate shocks, with still large adaptation gaps. Rwanda has experienced repeated natural disaster events and the associated cumulative cost in percent of GDP is significant in Sub-Saharan Africa (SSA). According to Notre Dame Global Adaptation Initiative (DND-GAIN) index, Rwanda is more *vulnerable* to climate disasters than SSA and Low Income and Developing Countries (LIDC) averages.[1] Similar to other East African Community (EAC) countries, Rwanda's **exposure** to climate-related or climate-exacerbated hazards is high due to climate risks associated with cereal production and vector-borne diseases. Rwanda's **sensitivity** to the impacts of the hazard is higher than EAC peers as the ecosystem depends more on natural capital. Rwanda's **adaptive capacity** to cope or adapt to hazard impacts increased rapidly over last few decades, but there are still large gaps.

2. Implementing Rwanda's ambitious climate agenda could risk weakening debt sustainability and crowding out other developmental investments. To address its climate challenges, Rwanda put forward an ambitious climate agenda, formulated around the country's Nationally Determined Contributions (NDCs), which aim to reduce Green-House Gas (GHG) emissions by 38 percent during the 2020–30 period.[2, 3] The overall cost of implementing the NDCs is estimated at US$11 billion, which would imply investments amounting to 7 percent of GDP each year during the ten-year period. Such sizeable climate-related investment needs raise two major policy questions. First, given the envisaged fiscal consolidation path in the coming years, which assumes public investment spending to gradually decline as share of GDP, it is a major challenge how climate objectives can be achieved without crowding out investments in other priority development areas, such as education, health, and social protection. Second, the ongoing tightening

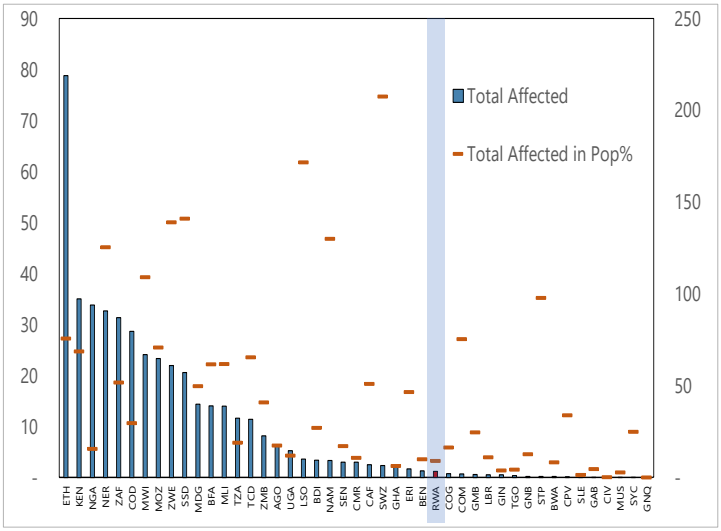
[1] Based on the IMF-adapted ND-GAIN index, an adaptation of the original index adjusted by IMF staff to replace the Doing Business (DB) Index used as source data in the original ND-GAIN.

[2] While the pledged reduction is 16 percent unconditional on external support and funding and an additional 22 percent condition on this support and financing, the authorities aim to achieve 38 percent reduction.

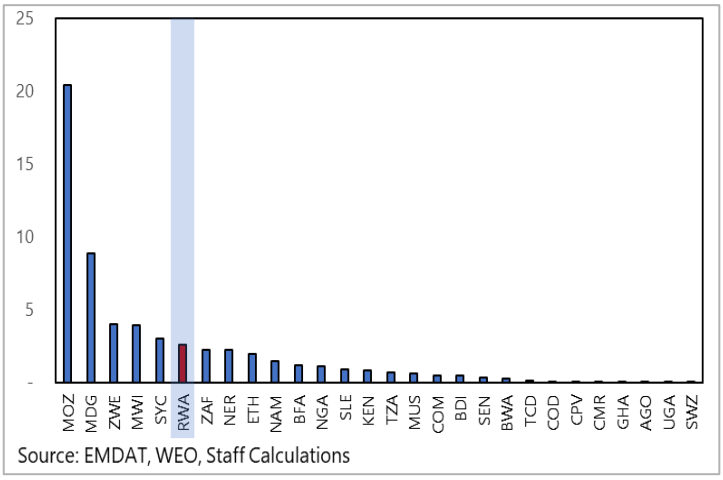
[3] Rwanda's NDCs do not include land-use change, despite land-use change being the largest source of emission in the country.

of external financing conditions and the increasing difficulty in accessing grants and concessional loans going forward also raise the question how such sizeable climate investment can be financed, and whether relying on other resources could provide an alternative.

Rwanda: Cumulative Population Affected (2000–23)
(Millions of Affected, lhs; Percent of 2022 Population, rhs)



Rwanda: Cumulative Cost of Natural Disasters (2000–23)
(Percent of 2022 GDP)



Source: EMDAT, WEO, Staff Calculations

3. Increasing the fiscal space, advancing reforms under the Resilience and Sustainability Facility (RSF), more fully utilizing synergies between development objectives, and further efforts to mobilize private climate financing would help advance development objectives and safeguard macroeconomic balances. Domestic revenue mobilization and spending rationalization will be necessary to provide additional sources of financing to supplement reduced concessional resources, while at the same time ensure continued debt stabilization. RSF reforms are expected to enhance efficiency and transparency of green public spending and mobilize additional climate financing. The authorities' proposed programmatic approach to climate investment should help identifying synergies across various development goals, strengthen coordination, and further improve investment efficiency. Mobilizing private climate financing would also increase the authorities' room to maneuver, while safeguarding debt sustainability.

A. Rwanda's NDC Implementation Framework

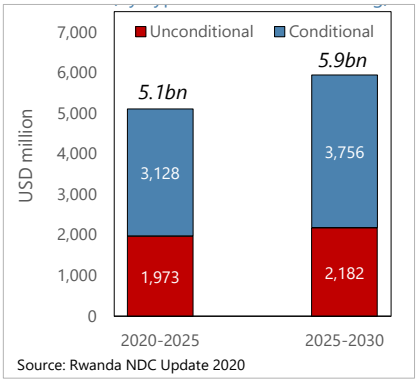
4. To address its climate challenges, Rwanda started to implement an ambitious climate agenda, formulated around its NDCs. In 2015, Rwanda submitted its initial NDC under the Paris Agreement to the UN Framework Convention on Climate Change (UNFCCC). In May 2020, Rwanda became the first country in Africa to update its NDC. The updated NDC aims to reduce Rwanda's greenhouse gas (GHG) emissions by 38 percent relative to a business-as-usual baseline by 2030. The updated NDC has a projected cost of US$11 billion of which 40 percent is expected to be internally

mobilized (budget resources or "unconditional" resources) while 60 percent is to come from external support ("conditional" resources) (Text Chart 1). The NDC framework contains both mitigation and adaptation measures (Table 1).[4]

Table 1. Rwanda: NDC Financing Needs
(by Type of Climate Action)

	Unconditional	*Conditional*	*Total*
Mitigation (USD million)			
2020-2025	1,057	1,754	2,811
2025-2030	953	1,912	2,865
Mitigation total	2,010	3,666	5,676
Adaptation (USD million)			
2020-2025	916	1,374	2,290
2025-2030	1,229	1,844	3,073
Adaptation total	2,145	3,218	5,363
Total	**4,155**	**6,884**	**11,039**

Text Chart 1: Rwanda: NDC Financing Needs
(by Type of Source of Financing)



Source: Rwanda NDC Update 2020

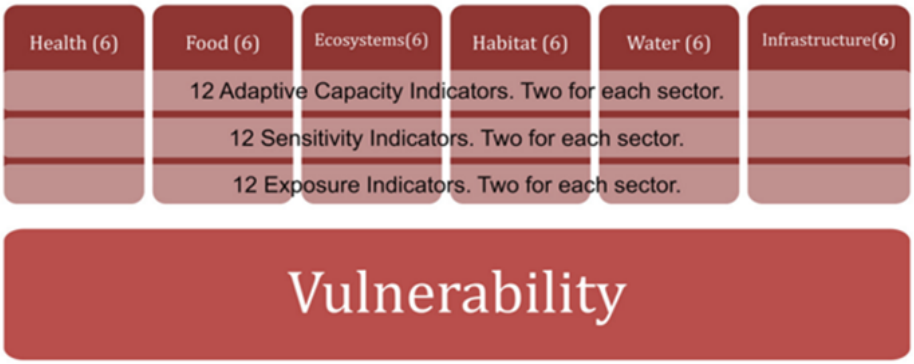
5. Rwanda has a detailed pipeline of projects, which supports its NDC implementation strategy. To facilitate a coordinated approach, in 2021, Rwanda developed an "NDC Implementation Framework" to identify the priorities for climate actions related to the 2020 updated NDCs. The NDC Implementation Framework is composed of 15 outcomes with a corresponding list of 56 outputs, and 91 key performance indicators (including 41 KPIs for adaptation, 45 for mitigation, and 5 for cross-cutting) (see Annex I). At the project level, it identifies 566 projects and, for those that are fully conceptualized, their respective financing. From the 566 projects, about half of those in terms of value are ongoing projects, one-third of them are planned projects (have been approved yet to start), and a small share is indicative projects (those that are in the phase of conceptualization) or projects that are still without financing (Table 2). Majority of projects are in the energy (47 percent), transport (25 percent), and water and sanitation (15 percent) sectors, while agriculture and water and sanitation, which account for almost 3/4th of total emissions, only represents 5 and 15 percent of the total project value, respectively. The implementing agencies of the projects is the central and local governments (83 and 15 percent, respectively), and the funding comes mostly from grants and budget resources (89 percent) (Text Chart 2).

6. According to the authorities' NDC implementation framework, financing has been secured to cover most implementation costs for the 2020–25 period. The total value of the 566 projects amounts to US$7 billion, out of which ongoing and planned projects amount to US$5.9 billion. When the projects that started before 2020 are deducted from the pool of ongoing and planned projects, the total value drops to US$4.5 billion (Table 3). This means that the financing gap for the 2020–25 period (calculated as the portion of the NDC financing needs which is not covered by the ongoing and planned projects) is US$0.6 billion. Given that no projects are identified yet for the second leg of the NDC implementation period (2025–30), the overall financing gap is estimated at US$ 6.5 billion for the 2020-30 period, which is the authorities' official estimate of the NDC implementation financing gap.

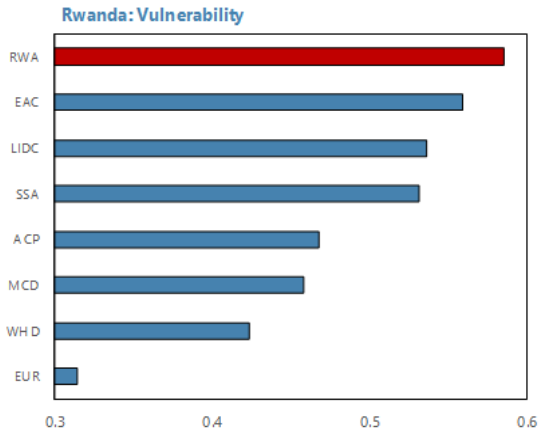
[4] IMF staff's estimates of adaptation investment needs in Rwanda up to 2030 equal to about US$10 million per year (Aligishiev, Bello, and Massetti (2022) compared to the authorities estimates of CCA. US$500 million per year. This significant deviation is most likely due to the inclusion of development spending in NDC adaptation spending needs. For example, improving access to clean cooking fuels (e.g., LPG) can improve health, reduce emissions from deforestation, and improve adaptation.

Figure 1. Rwanda: Exposure and Sensitivity to Climate Change

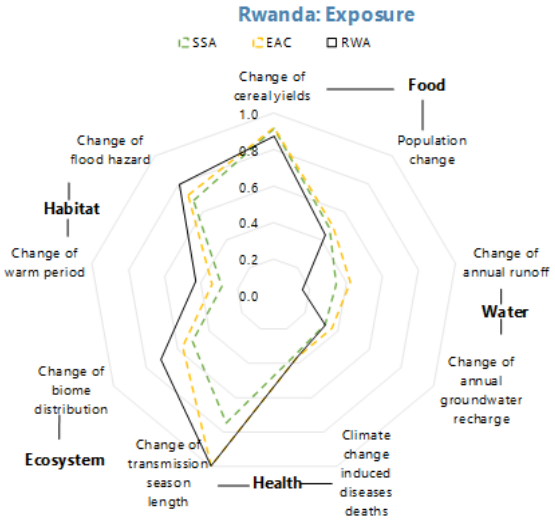
The Notre Dame-Global Adaptation Index (ND-GAIN) Country Index shows a country's current vulnerability to climate disruptions.



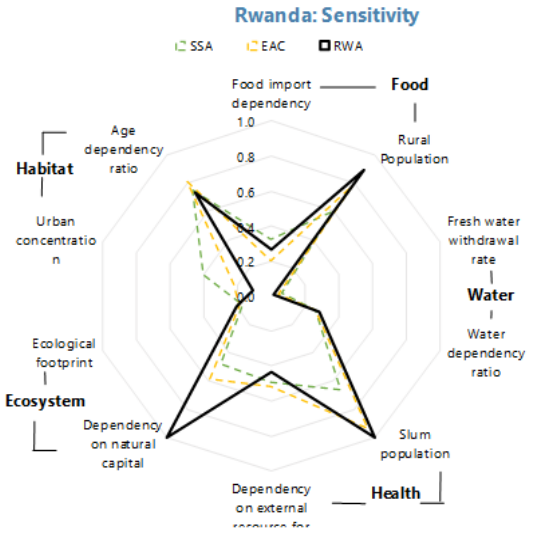
Rwanda has higher comparative vulnerability



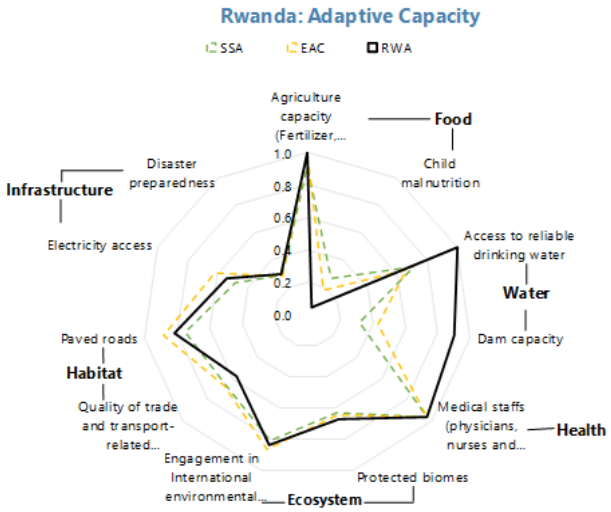
Broadly similar exposure to climate change, …



… but significantly higher sensitivity to adverse climate events



Adaptive capacity in Rwanda is higher in water and health

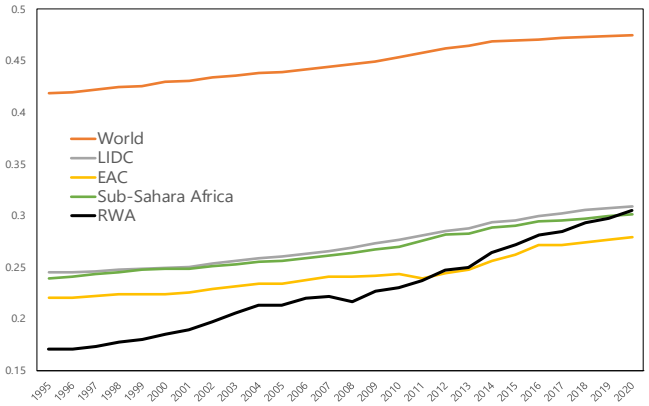


Source ND-Gain index and IMF Staff Calculations

Figure 2. Rwanda: The State of Climate Adaptation

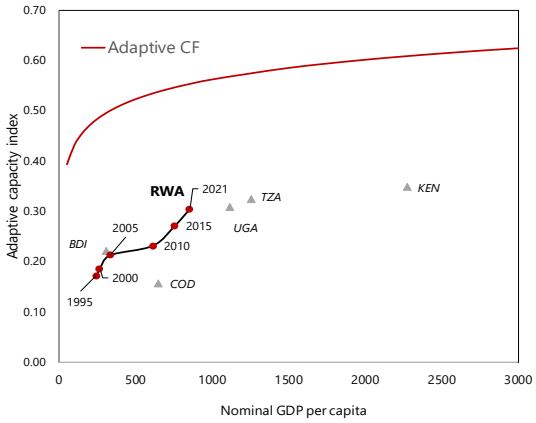
Rwanda's adaptive capacity has increased and reached to the SSA average

Rwanda: Adaptative Capacity: Country Groups



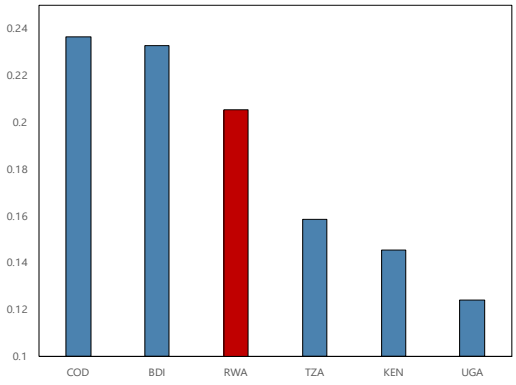
But large adaptation gap remains…

Rwanda: Adaptative Capacity Frontier in EAC



… Similar to other EAC countries.

Distance To Adaptive Capacity Frontier



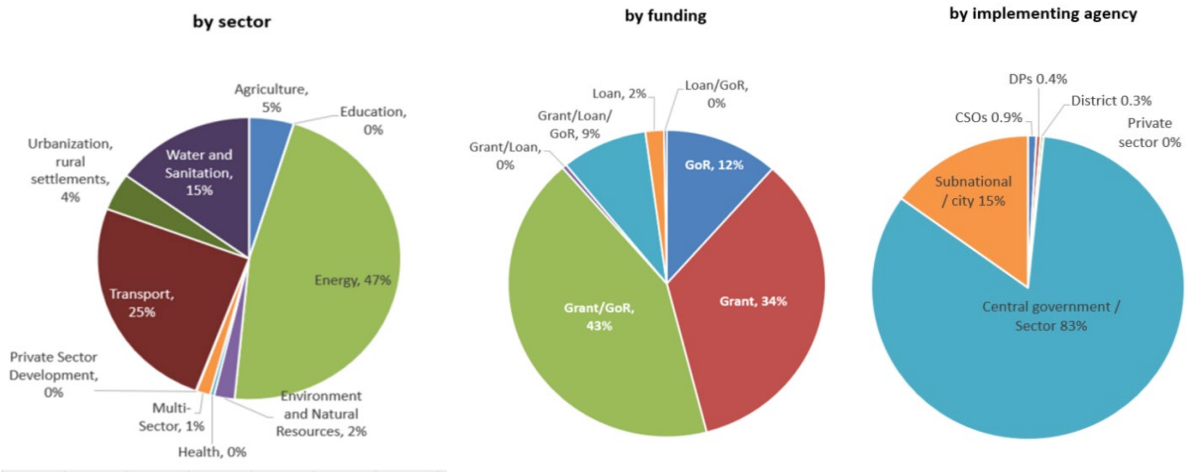
Source: Notre Dame Global Adaptation Initiative, WEO, Staff calculations.
Note: Adaptive Capacity of Rwanda (1995-2021), EAC and Frontier (2021).

Table 2. Rwanda: Climate Investment Projects by Status, 2021 NDC Implementation Framework

Status	Definition	Number of projects	Project value (USD million)
Ongoing	Projects that are already under implementation	190	3,662.5
Planned	Projects that have already been approved, but yet to start	88	2,333.9
Without support	Projects that are ready for imlementation, but need financing	216	0.0
Indicative	Projects that need further conceptualization from the sectors	48	1,192.2
To be determined	To be determined	24	0.0
Total		**566**	**7188.7**
Ongoing + planned		**278**	**5996.4**

Source: Rwanda NDC Implementation Framework 2021

Figure 3. Rwanda: Projects by Sector, Funding, and Implementation Agency



Source: Rwanda NDC Implementation Framework 2021

Table 3. Rwanda: The Estimated Cost of Implementing Rwanda's NDCs, 2020–30

		2020-25	2025-2030	Total
(1)	NDC financing need	5,101	5,939	11,040
(2)	Ongoig and planned projects, gross	5,996	0	5,996
(3)	Projects started before 2020	1,481	0	1,481
(4)=(2)-(3)	Ongoig and planned projects, net	4,515	0	4,515
(5)=(1)-(4)	NDC financing gap	-586	-5,939	-6,525

Source: The authorities' estimates based on the Rwanda NDC Implementation Framework 2021

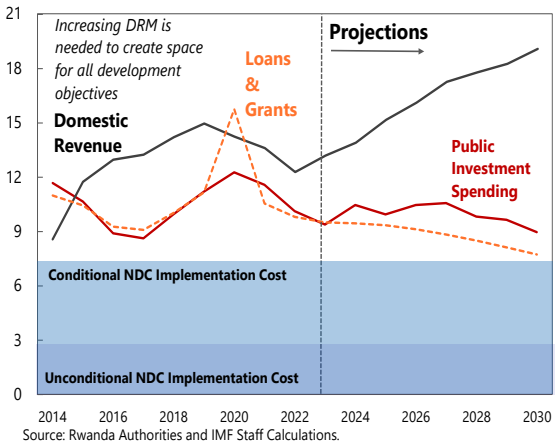
7. Actual realization of climate investments has fallen short of the ambitious goals of the 2021 NDC Implementation Framework. A more in-depth analysis of the 13 largest ongoing and planned projects reveals that four major projects, with a total project value of US$1.9 billion, have not been appropriated in the FY20/21–FY22/23 budgets, despite three of them defined as ongoing (Table 4). Furthermore, spending related to those projects that have been identified in the last four budgets was much lower than planned: only 12 percent of the total spending expected for the 2020–25 period has been realized in the first three fiscal years. While investment projects are often backloaded, this sizeable shortfall in realization suggests that the NDC implementation has fallen behind the initial timeline. On the other hand, new projects, which were initially not planned at the time of the compilation of the NDC framework pipeline, will help lower the existing financing gap. These new projects will need to be transparently appraised and selected as recommended by the 2022 C-PIMA exercise and as committed by the authorities under the RSF.

8. Rwanda's limited fiscal space and the tight global financing conditions are major challenges to the full implementation of the NDC objectives. The overall cost of NDC implementation amounts to close to 70 percent of public investment for most of the 2020–30 period and leaves little room for investment in other development areas (Text Chart 3). Achieving

Rwanda's Sustainability and Development Goals (SDGs) has an estimated cost of 18.7 percent of GDP. As climate objectives likely overlap with other development objectives in the areas of roads or electricity, simply adding up SDG costs likely overestimate the total financing need. Still, if the climate strategy is fully implemented, it would crowd out other development investment. The other challenge is the limited availability of concessional financing. The externally financed (conditional) NDC component would amount to half of the total loans and grants projected by the end of the 2020–30 period. This would require the authorities to rely on other financing resources to ensure the financing of varying development objectives. For example, under assumption of an ambitious MRTS-2 strategy the tax to GDP ratio is expected to increase from the current 15 percent to close to 20 percent by 2030. This would create substantial fiscal space and allow advancing multiple SDG objectives simultaneously. Mobilizing private climate financing would also increase the authorities' room to maneuver, while safeguarding debt sustainability.

9. The scaling up of private climate investment will be gradual. Ireme Invest, Rwanda's new Green Private Investment Facility, was established with the objective to mobilize additional green financing, both public and private.[5] Ireme was launched at COP27 with pledges from bilateral development partners and the Green Climate Partnership Fund (GCPF) of US$104 million. During the 2023 June Paris Climate Summit, further commitments were made in the amount of EUR 150 million. So far, only a small portion of the committed resources has been secured and made available for the facility (Table 5). Till the end of this year, only the US$20 million by *Agence Française de Développement* (AFD) is expected to be disbursed, while another US$20 million by the European Investment Bank's (EIB) will be available next year. Overall, considering the Rwanda Development Board's own resources, and the assumed 30 percent of own private resources, the facility is expected to mobilize US$21 million this year and about US$245 million in the 2024–30 period. Ireme's project pipeline consists of a hydro power project in 2023, and green city Kigali, and e-buses projects for 2024, with a total project value of US$145 million. Overall, Ireme Invest is off to a good start, although its lending operations are likely to be scaled up only gradually. Going forward, the expectation is that Ireme Invest would mobilize private sector financing by issuing sustainability linked bonds (SLBs) and green bonds and blend these market-based resources with additional concessional financing.[6] However, even in case of a sizeable SLB/green bond issuance, it is unlikely that private sector green financing would be able to significantly reduce Rwanda's climate financing gap in the next couple of years.

Figure 4. Rwanda: Financing Sources for NDC Implementation
(Percentage of GDP)



Source: Rwanda Authorities and IMF Staff Calculations.

[5] At this point, the private sector participation is limited to the company own resources (30 percent of project value as in Table 5), and all other sources of external financing are public.

[6] In October 2023, the Development Bank of Rwanda (BRD) issued an innovative sustainability-linked bond (RWF 30 billion), which was partially credit-enhanced via a World Bank IDA-financing operation.

Table 4. Rwanda: Actual Versus Planned Spending on NDC Implementation Projects

(13 largest projects)

	Name of the project	Focus	Sector	Status	Support type	Funding Type	Funding Source	Timeline	Budget Consolidated (USD million)	Planned spending in 2020-25 (USD million)	Spending till end-FY22/23 (budget data) (USD million)	Share of actual vs planned spending
	Ongoing and planned SMALL projects (<100 million)								**$1,611**	$4,746		
	Ongoing and planned LARGE projects (>100 million)								**$4,385**	**$3,135**	**$387.2**	**12%**
1	Second Rwanda Urban Development Project (RUDPII)	Adaptation	Urbanization, rural settlements	Ongoing	Project	Grant/GoR	Wolrd Bank/GoR	2020 - 2025	**$175.4**	$175.4	$47.8	27%
2	43.5MW Nyabarongo II Hydro Power Plant	Mitigation	Energy	Ongoing	Project	Grant/GoR	CHINA/GoR	2019 - 2024	**$157.7**	$157.7	$20.0	13%
3	Electricity Access Rollout Program (EARP) (New Households connected to the Grid (MV and LV lines included)	Mitigation	Energy	Ongoing	Project	Grant/GoR	AfDB, WB, SAUDI, BELGIUM / GoR	2010 - 2024	**$202.8**	$202.8	$28.3	14%
4	Rwanda Energy Access and Quality Improvement Project	Mitigation	Energy	Planned	Project	Grant/GoR	Energy Access and Quality Improvement Project	2021 -2030	**$135.3**	$67.7	$19.8	29%
5	Rwanda Universal Energy Access Program	Mitigation	Energy	Planned	Project	Grant/GoR	AfDB	2021 -2030	**$395.4**	$197.7	$59.7	30%
6	Rwanda Universal Energy Access Program	Mitigation	Energy	Planned	Project	Grant/GoR	EIB	2021 - 2030	**$169.2**	$84.6	$26.6	31%
7	Rwanda Universal Energy Access Program (RUEAP)	Mitigation	Energy	Planned	Project	Grant/GoR	WB / IDA, AfDB, EIB, OFID, SAUDI. EDCF. AFD	2020 - 2025	**$532.0**	$532.0	$16.7	3%
8	National Electrification Programme	Mitigation	Energy	Planned	Project	Grant/Loan/GoR		till 2030	**$300.0**	$150.0	x	
9	National Electrification Programme with the support of financial support instruments established in the Rwanda Energy Access and Quality Improvement Project (REAQIP) for off-grid solar under programme 5 hosted at the Development Bank of Rwanda.	Mitigation	Energy	Ongoing	Project	Grant/Loan/GoR	Wolrd Bank/GoR	till 2024	**$225.0**	$225.0	$108.2	48%
10	Development of climate resilient transport infrastructure	Adaptation	Transport	Ongoing	Technical Assistance	Grant	Development partners	2020-2030	**$600.0**	$300.0	x	
11	Introduction of electric vehicles in Rwanda	Mitigation	Transport	Ongoing	Project	Grant	Development partners	2020 -2030	**$900.0**	$450.0	x	
12	Construction of Kigali Centralised Sewerages system	Mitigation	Water and Sanitation	Ongoing	Project	Loan	AfDB and EIB	till 2024	**$112.8**	$112.8	x	
13	Rwanda Sustainable Water Supply and Sanitation Program	Adaptation	Water and Sanitation	Ongoing	Project	Grant	AfDB	2017 - 2025	**$479.6**	$479.6	$60.1	13%
	Projects intiated before 2020								**$1,481**			
	Total								**$4,515**			

Source: Staff's calculations based on the Rwanda NDC Implementation Framework 2021, and FY20/21-FY22/23 budget documents.

Table 5. Rwanda: Ireme Invest Credit Enhancement Facility, Financing, and Pipeline

	Name of the project	Focus	Sector	Status	Support type	Funding Type	Funding Source	Timeline	Budget Consolidated (USD million)	Planned spending in 2020-25 (USD million)	Spending till end-FY22/23 (budget data) (USD million)	Share of actual vs planned spending
	Ongoing and planned SMALL projects (<100 million)								**$1,611**	$4,746		
	Ongoing and planned LARGE projects (>100 million)								**$4,385**	**$3,135**	**$387.2**	**12%**
1	Second Rwanda Urban Development Project (RUDPII)	Adaptation	Urbanization, rural settlements	Ongoing	Project	Grant/GoR	Wolrd Bank/GoR	2020 - 2025	**$175.4**	$175.4	$47.8	27%
2	43.5MW Nyabarongo II Hydro Power Plant	Mitigation	Energy	Ongoing	Project	Grant/GoR	CHINA/GoR	2019 - 2024	**$157.7**	$157.7	$20.0	13%
3	Electricity Access Rollout Program (EARP) (New Households connected to the Grid (MV and LV lines included)	Mitigation	Energy	Ongoing	Project	Grant/GoR	AfDB, WB, SAUDI, BELGIUM / GoR	2010 - 2024	**$202.8**	$202.8	$28.3	14%
4	Rwanda Energy Access and Quality Improvement Project	Mitigation	Energy	Planned	Project	Grant/GoR	Energy Access and Quality Improvement Project	2021 -2030	**$135.3**	$67.7	$19.8	29%
5	Rwanda Universal Energy Access Program	Mitigation	Energy	Planned	Project	Grant/GoR	AfDB	2021 -2030	**$395.4**	$197.7	$59.7	30%
6	Rwanda Universal Energy Access Program	Mitigation	Energy	Planned	Project	Grant/GoR	EIB	2021 - 2030	**$169.2**	$84.6	$26.6	31%
7	Rwanda Universal Energy Access Program (RUEAP)	Mitigation	Energy	Planned	Project	Grant/GoR	WB / IDA, AfDB, EIB, OFID, SAUDI, EDCF, AFD	2020 - 2025	**$532.0**	$532.0	$16.7	3%
8	National Electrification Programme	Mitigation	Energy	Planned	Project	Grant/Loan/GoR		till 2030	**$300.0**	$150.0	x	
9	National Electrification Programme with the support of financial support instruments established in the Rwanda Energy Access and Quality Improvement Project (REAQIP) for off-grid solar under programme 5 hosted at the Development Bank of Rwanda.	Mitigation	Energy	Ongoing	Project	Grant/Loan/GoR	Wolrd Bank/GoR	till 2024	**$225.0**	$225.0	$108.2	48%
10	Development of climate resilient transport infrastructure	Adaptation	Transport	Ongoing	Technical Assistance	Grant	Development partners	2020-2030	**$600.0**	$300.0	x	
11	Introduction of electric vehicles in Rwanda	Mitigation	Transport	Ongoing	Project	Grant	Development partners	2020 -2030	**$900.0**	$450.0	x	
12	Construction of Kigali Centralised Sewerages system	Mitigation	Water and Sanitation	Ongoing	Project	Loan	AfDB and EIB	till 2024	**$112.8**	$112.8	x	
13	Rwanda Sustainable Water Supply and Sanitation Program	Adaptation	Water and Sanitation	Ongoing	Project	Grant	AfDB	2017 - 2025	**$479.6**	$479.6	$60.1	13%
	Projects intiated before 2020								**$1,481**			
	Total								**$4,515**			

Source: Staff's calculations based on the Rwanda NDC Implementation Framework 2021, and FY20/21-FY22/23 budget documents.

B. Challenges and Policy Options to Financing Rwanda's Climate Agenda: Policy Simulations

10. This section uses the Debt-Investment-Growth-Natural-Disasters (DIGNAD) model to simulate the macroeconomic impacts of climate adaptation investment and various financing scenarios. DIGNAD has become a workhorse model in the IMF to study the effects of climate risk due to natural disasters and how investments in adaptation infrastructure can help mitigate these risks. The model by Marto, Papageorgiou, and Klyuev (2018) extended the DIG[7] framework of a two-sector small open economy model with traded and non-traded goods sectors by introducing natural disasters and allowing the government to invest in both standard infrastructure (e.g., roads) and adaptation capital (e.g., seawalls or climate-proof roads) as well as building financial buffers. In addition to permanent damages to public and private capital, natural disasters cause temporary

[7] The Debt-Investment-Growth (DIG) model was developed to study the macroeconomic impact of public investment in emerging and developing economies. It is a general equilibrium growth model which captures the macroeconomic impacts of scaling up public investment, as well as implications for debt. For more information see Buffie et al. (2012).

losses of productivity, inefficiencies during the reconstruction process, and damages to the sovereign's creditworthiness. Although investment in adaptation infrastructure could be costlier than investment in standard infrastructure, adaptation infrastructure mitigates damages and losses inflicted by a natural disaster and moreover, resilient infrastructure depreciates at a lower rate. Previous applications of the model also have shown that investing in adaptation infrastructure is raising the marginal product of other capital, by withstanding the impact of natural disasters, and crowds in private investment. The model captures the challenges of closing infrastructure gaps in developing countries that frequently face natural disasters and puts together several channels helping to capture the linkages between public investment, growth, and debt, such as the investment-growth nexus, the fiscal adjustment, the private sector response.

11. The model was calibrated to Rwanda using country-specific macroeconomic indicators to match features of the Rwanda economy, while parameters that determine the standard and resilient infrastructure are in line with literature. The calibration of initial values and parameters, where possible, is based on historical averages to capture the Rwanda's steady state in the data. The average return on standard infrastructure is set at 5 percentage points lower than that of adaptation infrastructure. In addition, we assume the adaptation capital depreciates at a lower rate than standard infrastructure, implying that the former is more resilient (Buffie et al., 2012; Marto, Papageorgiou, and Klyuev, 2018, Aligishiev et al., 2023). While the simulation findings are influenced by the assumptions made under different scenarios, the model provides a framework for thinking through the macroeconomic effects of natural disasters under various scenarios. The results are robust within a reasonable range of values for the relevant parameters. The model also allows users to calibrate the size and timing of natural disaster, as well as recovery.

12. The natural disaster shock is calibrated to mimic once-in-100-years magnitude of flooding as considered in DSA's tailored stress test, presented in Box 2 in IMF Country Report No. 22/381. The natural disaster shock is modelled to hit the economy in 2027. According to the EM-DAT international disaster database, Rwanda was affected by disasters almost every year, with floods being the most prevalent type of disasters. However, low probability but high impact shocks, like the natural disaster calibrated in this simulation, may increase in frequency under a changing climate going forward. These simulations show that climate adaptation investment mitigates the GDP losses due to a natural disaster shock, but if financed by concessional debt, it will increase debt levels, the fiscal and the current account deficit.

Simulation 1: Full NDC Implementation

13. In the first simulation, we compare the *baseline scenario*, which assumes "no climate adaptation investment," with *scenario 1*, "the NDC full implementation scenario". Under scenario 1, we calibrate the climate adaptation investment based on the authorities' estimates of the conditional adaptation financing need of the NDC implementation, which is 2.1 percent of GDP per year over the next 5-year horizon (Table 1).[8] The climate adaptation investment is assumed to be

[8] 2.1 percent of GDP per year is all adaptation financing need in the NDC and corresponds to the cumulative USD 5.3 billion in Table 1.

financed by a combination of external concessional financing and grants, according to their historical ratios (2:1).

14. Building resilient infrastructure prior to the natural disaster shock will reduce damages to the economy, but if financed by borrowing, will undermine fiscal and external sustainability. In the "*no climate adaptation*" scenario without ex-ante climate adaptation investment, the natural disaster shock results in a decline in real GDP by 4 percent as infrastructure is destructed because of the climate disaster. After the shock, there is a need of sizeable reconstruction investment, implying a 4 percentage points increase in the public investment to GDP ratio. As a result, the fiscal deficit widens, but the fiscal rule in the model ensures a quick correction of the fiscal stance by reduction in expenditures and increase in the consumption tax. The debt-to-GDP ratio increases slightly (by 2 percentage points), while the current account impact, mirroring the fiscal deficit path, indicates only minor deviation from the steady-state. On the other hand, under the "full NDC implementation" scenario, with an upfront adaptation investment of 2 percent of GDP per annum in the five-year-period preceding the disaster shock, the damage is less than in the "no climate adaptation" scenario. GDP drops by only 1 percentage points, and the reconstruction investment needs are limited to 1.5 percent of GDP. Under this scenario, the upfront climate adaptation investment is assumed to be financed by concessional loans and grants, and the former contribute to a significant 6 percentage points increase in the debt-to-GDP ratio. The fiscal deficit increases by 1.5 percentage points in the period of additional climate spending, resulting in a simultaneous widening of the current account deficit.

Table 6. Rwanda: Simulation "NDC Full Implementation" Assumptions

	Baseline	Scenario 1
	No climate action	Full NDC
Adaptation conditional overall	0%	2.1%
External concessional	0%	1.4%
Grants	0%	0.7%
DRM	-	-
Spending rationalization	-	-
Public investment efficiency	+0ppts	+0ppts

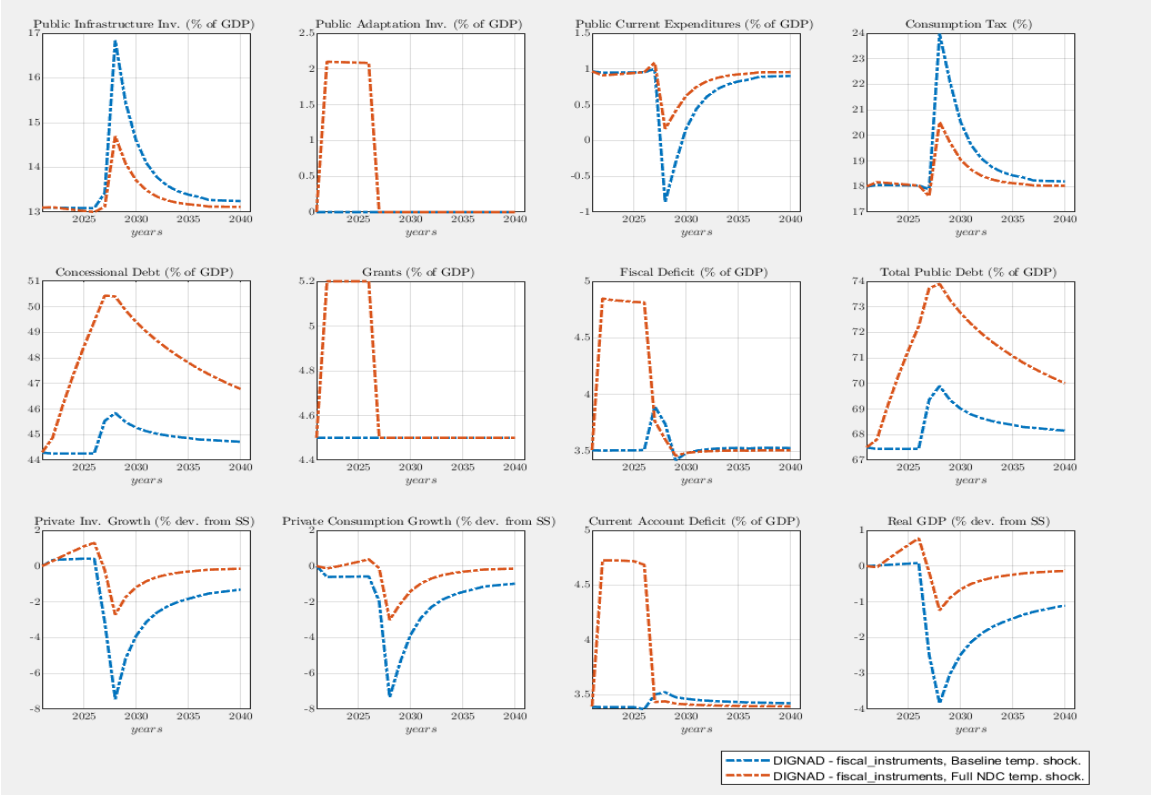
Table 7. Rwanda: Simulation "Funding Squeeze" Assumptions

	Scenario 1	Scenario 2	Scenario 3
	Full NDC	Funding squeeze w. No policy adjustment	Funding squeeze w. Policy adjustment
Adaptation conditional overall	2.1%	2.9%	3.9%
External concessional	1.4%	0.8%	0.8%
Grants	0.7%	2.1%	2.1%
DRM	-	-	0.5%
Spending rationalization	-	-	0.5%
Public investment efficiency	+0ppts	+0ppts	+0ppts
Full NDC implementation	yes	no	yes

Simulation 2: Funding Squeeze

15. In the second simulation, we will look at scenarios when concessional and grant financing is limited and cannot fully finance the NDC implementation cost. Our assumption is that concessional financing and grants are limited to 1.1 percent of GDP, which is the half of the one assumed under "the full NDC implementation" scenario during the previous simulation. Under *scenario 2,* "funding squeeze without policy adjustment", the NDC is only partially implemented. Under *scenario 3,* "funding squeeze with policy adjustment", fiscal space is created to finance the full NDC implementation by raising taxes and cutting back expenditures. As a result, lower external financing is fully offset with a 0.5 percent of GDP increase in tax revenues (VAT) and 0.5 percent of GDP savings from spending cuts.

Figure 5. Rwanda: Simulation "NDC Full Implementation" Results



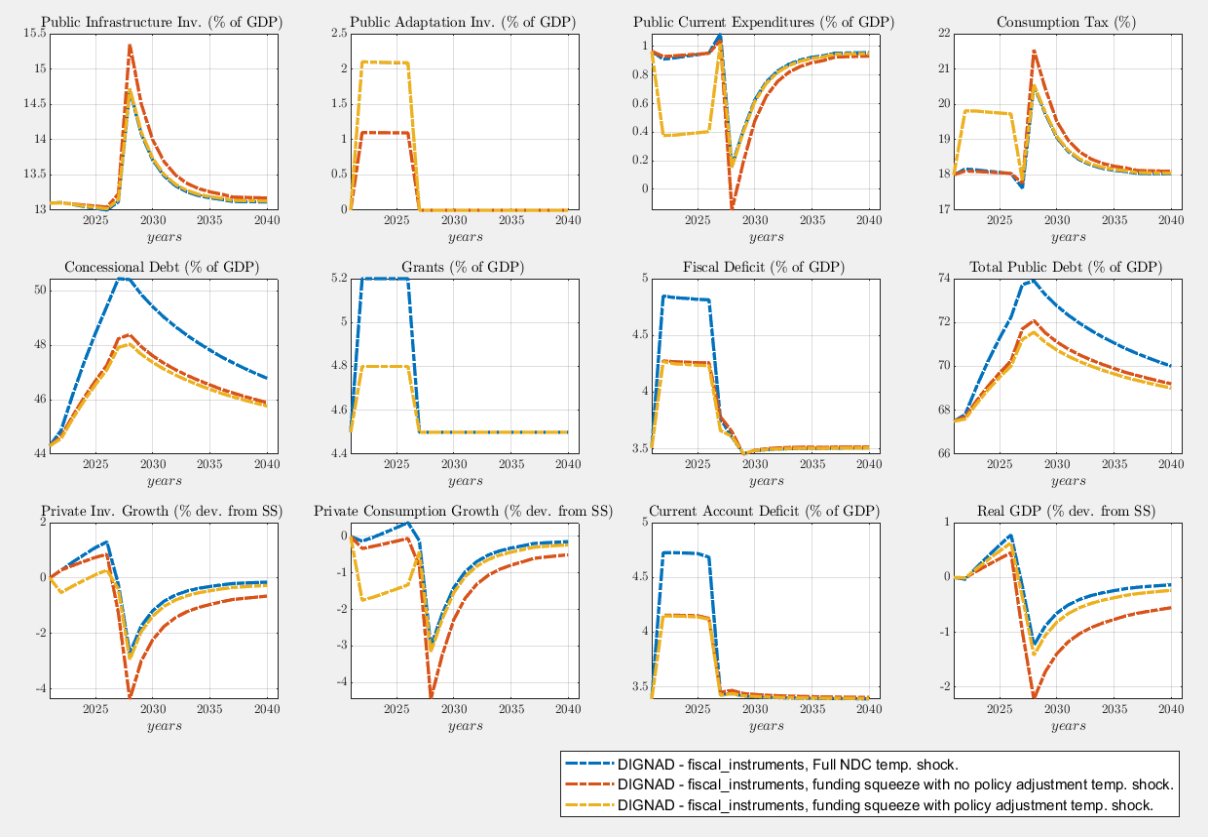
Source: Staff's calculations

Simulation 3: Funding Squeeze with Policy Adjustment

16. When full NDC implementation is partially financed by domestic revenue mobilization and spending rationalization, it can help containing the output loss following a natural disaster, while also better safeguard fiscal and external sustainability. Under scenario 3, higher consumption tax and the cut in public current expenditures have negative impact on consumption and thus growth, however, this adverse impact is contained. The decline in GDP is only slightly more

pronounced compared to when NDC implementation is financed by concessional loans and grants in full (scenario 1), and much smaller compared to when NDC is only partially implemented (scenario 2). Moreover, under scenario 3, the increase in debt, fiscal deficit, and current account deficit is more muted than scenario 1, and the lower debt financing and current account deficit help offset some of the adverse GDP impacts created by the tighter fiscal stance. Overall, based on the model simulation results, full NDC implementation when financed by DRM and spending rationalization has more favorable outcomes in terms of macroeconomic imbalances than the alternative scenario when more debt is used to finance climate adaptation.

Figure 6. Rwanda: Simulation "Funding Squeeze" Results



Source: Staff's calculations

Simulation 4: Funding Squeeze with Policy Adjustment and Full RSF Implementation

17. In the last simulation, we will look at how full implementation of reforms under the IMF's Resilience and Sustainability Facility (RSF) can improve policy outcomes further. In this simulation, we compare NDC full implementation financed by concessional loans and grants (scenario 1), NDC full implementation financed partly by concessional loans and grants and partly by DRM and spending rationalization (scenario 3), and a new scenario which assumes full RSF implementation on top of scenario 3. Full RSF implementation has two distinct features in this simulation exercise: it improves public investment efficiency by 20 percentage points through

reforms including those related to climate Public Investment Management Assessment (PIMA) and green public financial management (PFM) and expected to have a catalytic role in mobilizing additional private financing, which allows higher climate adaptation investment.[9]

Table 8. Rwanda: Simulation "RSF Implementation" Assumptions

	Scenario 1	Scenario 3	Scenario 4
	Full NDC	Funding squeeze w. Policy adjustment	Funding squeeze w. Policy adjustment + full RSF implementation
adaptation conditional overall	2.1%	3.9%	4.3%
External concessional	1.4%	0.8%	0.8%
grants / private	0.7%	2.1%	2.5%
DRM	-	0.005	0.5%
spending rationalization	-	0.005	0.5%
public investment efficiency	+0ppts	+0ppts	+20bps

18. Full RSF implementation would result in most positive macroeconomic outcomes because of higher public spending efficiency and mobilization of more private resources. Under scenario 4, due to more climate resilient investment, the natural disaster shock would result in less impact on economic activity. Higher public investment efficiency also means that less spending on public investment is needed to achieve the same outcome, which means less crowding out of private investment. This also helps to increase GDP in the medium to long-run. The overall higher GDP and unchanged debt levels result in a lower debt to GDP ratio. Because additional financing is in the form of private financing, fiscal deficit and current account deficit are the same as under scenario 3.

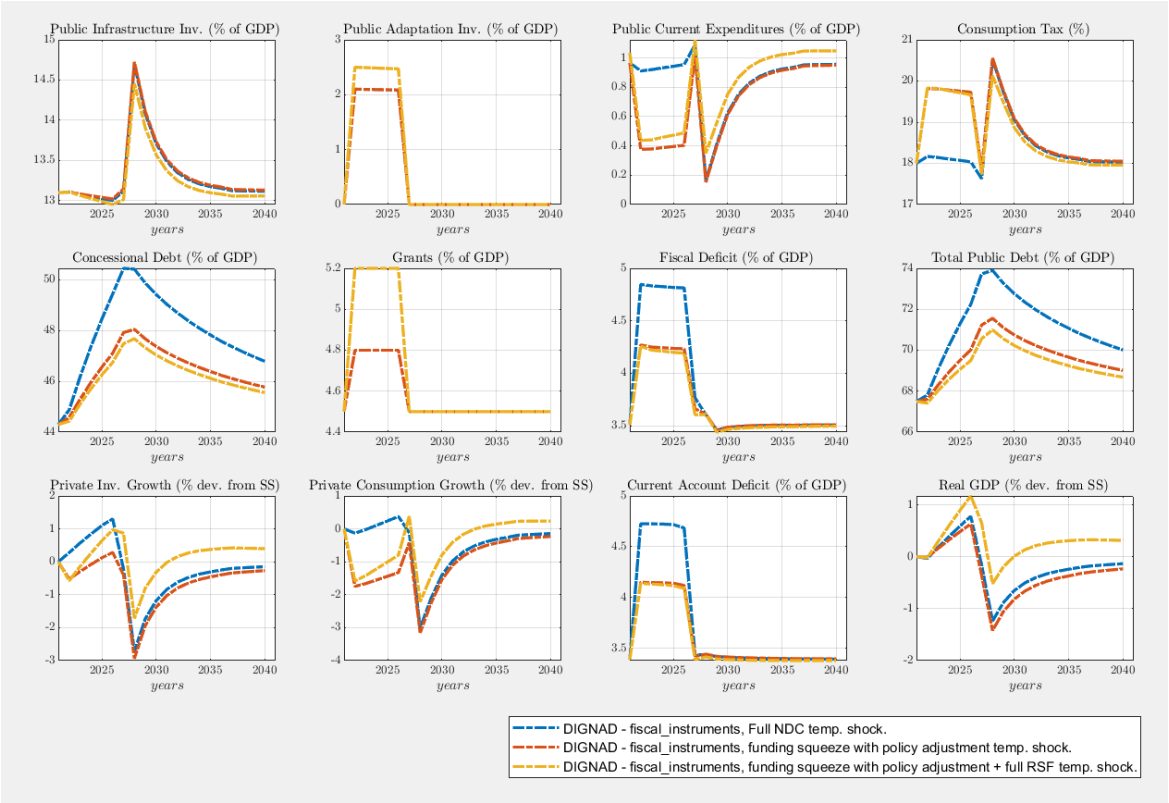
C. Conclusion

19. Rwanda has a very comprehensive pipeline of projects that support its NDC implementation strategy, which would improve the country's macro stability if accompanied with proper policy and financing mix. DIGNAD simulations show that full NDC implementation, if debt financed, will undermine fiscal and external sustainability. However, with proper policy and financing mix these adverse macro-impacts can be mitigated: supplementing financing gap with DRM and spending rationalization reforms can help limiting output loss while safeguarding debt sustainability. Furthermore, full implementation of RSF reforms would improve macroeconomic outcomes by increasing public investment efficiency and by catalyzing additional climate financing. Increasing the efficiency of public investment leads to more efficient construction and post-disaster reconstruction of public infrastructure, which in turn increases the productivity of private capital and crowds in private investment. Investing in climate resilient infrastructure can also instill greater confidence in the long-term prospects of the economy, which can go a long way in attracting

[9] More specifically, the reform measures under the RSF will improve public investment efficiency (e.g., by improving the appraisal and selection of public investments), better manage fiscal risks related to climate change (by improving long term fiscal sustainability analysis and SOE and PPP risks) and help identify and monitor climate related expenditure in the budget (climate budget tagging). All these efforts will strengthen the transparency and efficiency of public climate spending and should help attract additional public and private green financing.

private investment and contributing to potential growth. Therefore, policy mix should ensure increasing fiscal space through DRM, spending rationalization, and enhancement of public investment efficiency to address the crowding out of other development spending. Additionally, utilizing synergies between various development objectives (i.e., programmatic approach) would further enhance returns on climate investment and lower the pressure on other development spending. In the meantime, efforts to mobilize private climate investment should continue.

Figure 7. Rwanda: Simulation "RSF Implementation" Results



Source: Staff's calculations

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IMF Country Report No. 22/381.

MONETARY POLICY TRANSMISSION IN RWANDA: DOES IT WORK?

Summary: Despite the announced transition to the interest rate-based framework in 2019 and the primary monetary policy objective to maintain price stability, inflation in Rwanda has been quite volatile while the policy rate has remained stable. Weak monetary policy transmission could affect the credibility of the central bank's monetary policy. This paper investigates the National Bank of Rwanda's (NBR) monetary policy transmission through various channels and examines the role of Rwanda's country characteristics (such as financial market development and institutional policy frameworks) that affect the transmission. It also provides some preliminary policy lessons for Rwanda on factors that can make monetary policy transmission more effective.

A. NBR's Monetary Policy Framework and Foreign Exchange Intervention (FXI)

1. The NBR's interest based-monetary policy framework is still at an early stage of development. The NBR announced its formal transition to an interest rate-based operational framework, as of January 1, 2019.[1] Under the new monetary policy framework, the NBR's daily operations endeavor to steer the 7-day interbank rate close to the central bank rate (i.e., the policy rate) set by the Monetary Policy Committee (MPC). Prior to the transition, the NBR was implementing its monetary policy under a quantity-based monetary targeting regime using reserve money as the operational target, broad money as the intermediate target, and price stability as the ultimate objective. The transition was necessary as the NBR faced difficulty managing liquidity with structural excess bank reserves and the central bank intervention repo rate stayed well below policy and market rates, partly because of the underdeveloped domestic financial market. This transition was intended to help in meeting the price stability objective by improving the monetary policy transmission. While the policy rate is set to be the main instrument to achieve its primary objective of price stability, the NBR's broader policy mix also includes FXI to avoid excessive FX volatility.[2]

2. The NBR is committed to its price stability objective and developed strategy in line with best practices for inflation targeting regimes. The NBR's inflation benchmark is set to be in a range of 5±3 percent, which is also in line with the East African Community (EAC) countries inflation ceiling of 8.0 percent. To improve communication, the NBR published its Monetary Policy Strategy (MPS) on the NBR's website in February 2023. In the MPS, the primary monetary policy

[1] Box 5 of June 2019 Staff Report.

[2] The IMF's Integrated Surveillance Decision (ISD, paragraph 21, see IMF, 2012b), specifies one condition in which FXI should be used: "*A member should intervene in the exchange market if necessary to counter disorderly conditions (DMCs), which may be characterized inter alia by disruptive short-term movements in the exchange rate of its currency*" (principle B). Nevertheless, a more recent IMF policy paper (2020) notes that intervention could also be an appropriate part of a country's policy toolkit outside of narrowly defined DMCs, while cautioning that analysis and advice on intervention policies should be tailored to country characteristics and the nature of shocks, taking into account possible domestic side effects, cross-border spillovers, and interaction with other policies.

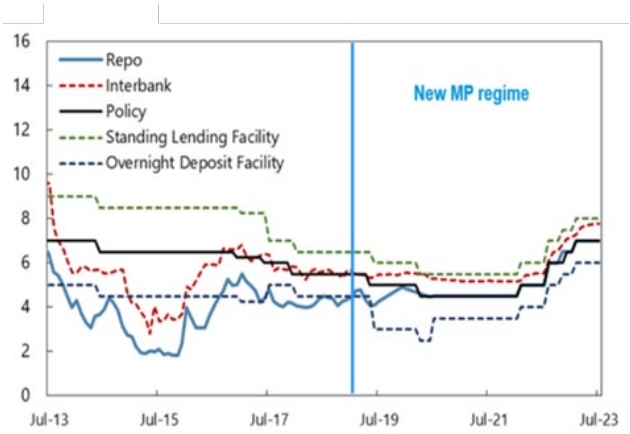
objective is explicitly stated as to "maintain price stability by keeping headline consumer price inflation within the band of 2 to 8 percent, with a focus of having it close to 5 percent in the medium term" and that "the NBR will set the Central Bank Rate (CBR) to stabilize inflation in the medium term" with a "forward looking" monetary policy framework.

3. Under the current framework, the NBR uses various instruments for its monetary policy implementation, including open market operations (OMO), refinancing facilities, and changes in the reserve requirement (RR) ratio. The main goals of OMO are to ensure that the banking system's demand for liquidity (reserves) is satisfied and keep the 7-day interbank rate within the money market rates corridor of ±1 percent around the central bank rate. These goals are achieved by using multiple instruments:

- *Repo operation* is a transaction whereby the NBR mops up liquidity from monetary policy counterparties for a period from one to 7 days, while during reverse repos the NBR injects liquidity in the system for the same period.
- *A Central Bank Bill* is a transaction whereby the NBR mops up liquidity from monetary policy counterparties for a period of 28 days, 91 days, 182 days, and 364 days.
- *Overnight deposits facility* is an instrument available to monetary policy counterparties for investing their excess liquidity overnight for remuneration.
- *Standing lending facility* is an overnight facility available to monetary policy counterparties to borrow from the NBR, while the *refinancing facility* is a borrowing facility for the period up to 30 days.[3]

4. Reserve requirements (RR) serve as another tool available to the NBR to adjust the liquidity conditions in the banking system.[4] Depository institutions (commercial banks) are obliged to hold minimum reserves against their liabilities, in the form of balances at the central bank. Changes in reserve requirements affect the liquidity of the banking system and its capacity to create loans.

Rwanda: CB Policy Rate and Short-Term Rates
(Percent)



Source: Rwanda authorities and IMF staff calculations.

[3] The overnight deposits facility and the standing lending facility were introduced in June 2012, while the refinancing facility (formally called discount window facility) was introduced in May 1995. The current set up of open market operations started in August 2008.

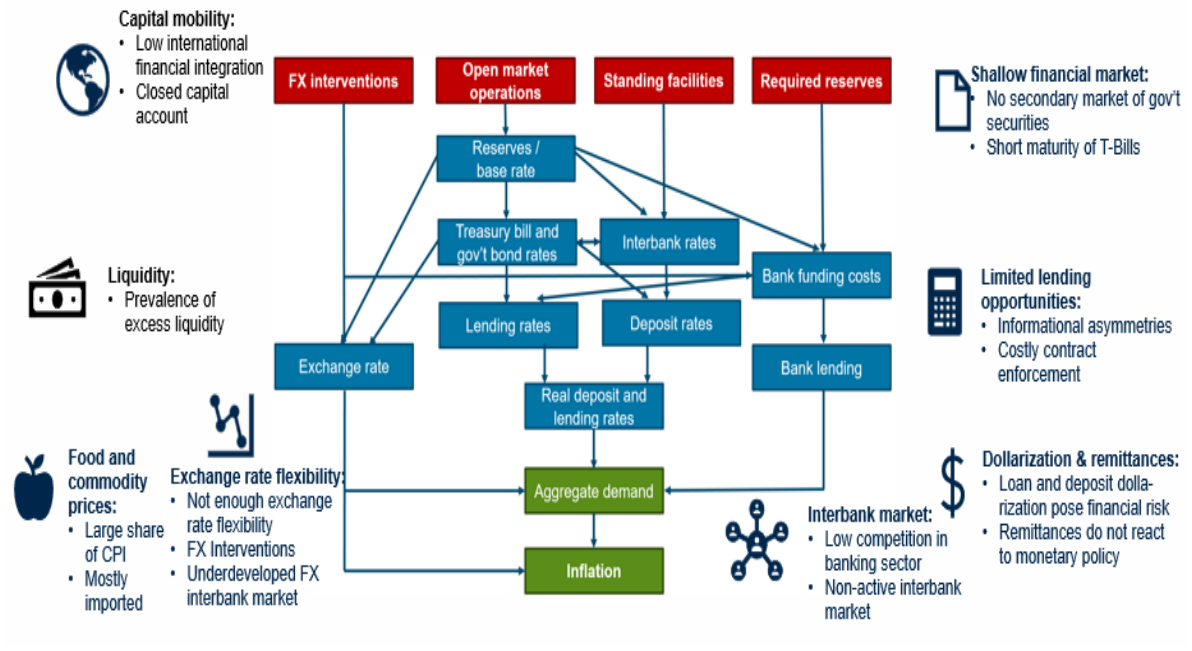
[4] The base for calculation of reserve requirements are all bank liabilities up to one year excluding interbank transactions. For reserve requirement compliance, the NBR considers reserve balances of banks at the central bank over a maintenance period. Averaging of the reserve requirement over a maintenance period has been allowed since March 2005 and the maintenance period has lengthened overtime but is currently two months. Excess reserves are not remunerated.

5. The NBR sells USD to domestic banks in regular bilateral FXI under a de facto crawl-like exchange rate arrangement. The NBR intervenes directly with commercial banks at the preannounced intervention rate based on historical official exchange rate data. Currently, the FXI takes place almost weekly, with USD sale amount being derived from the NBR's available USD supply based on a macro framework and the banks' perceived USD needs based on self-reporting. The IMF's upcoming 2023 Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) classifies Rwanda as having a de facto crawl-like exchange rate arrangement, while the de jure exchange rate arrangement is floating.

B. Frictions and Impediments of Effective Monetary Transmission Mechanism in Low-Income and Lower-Middle-Income Countries

6. The effectiveness of the monetary transmission mechanism (MTM) in low-income and lower-middle-income countries (LLMICs) is affected by several frictions and impediments. Traditionally, monetary policy transmits through various channels to deliver price stability, including through asset prices, expectations, exchange rate, interest rate, and credit channels, but Mishra, Montiel, and Spilimbergo (2010) argue that the typically weak financial market development in LLMICs reduces the effectiveness of the asset channel, while often ineffective central bank communication and a high degree of financial illiteracy impede the expectation channel. As a result, in LLMICs, policy rate changes can only be expected to transmit to inflation through the interest rate channel, the credit channel, and the exchange rate channel.

Text Figure. Low-Income Countries (LICs): Frictions in Monetary Transmission



7. In addition, there are also LLMIC-specific structural factors that reduce the effectiveness of MP transmission. Underdeveloped securities and interbank markets weaken the policy rate transmission to market rates. Weak institutional environment (e.g., poorly defined property rights, inefficient legal systems, poor legal protection of creditors, and weak accounting and disclosure standards) and a limited pool of viable borrowers weaken policy transmission through the bank lending channel (P. Mishra, P. Montiel, et al. 2014). The exchange rate channel can be effective for LICs if the country has a flexible exchange rate with open capital mobility.[5] However, LLMICs are often characterized by extensive central bank intervention in foreign exchange markets, which weakens the exchange rate channel (Davoodi, Dixit, and Pinter 2013).

8. Despite some frictions, earlier studies on EAC countries found that there is a statistically significant relationship between monetary policy and inflation, output, and credit. For example, Davoodi, Dixit and Pinter (2013) analyzed data from 2000 to 2010 for five EAC countries—Burundi, Kenya, Rwanda, Tanzania, and Uganda—and found that the monetary transmission mechanism tends to be somewhat strong when using a non-standard inference method. For Rwanda in particular, they found the credit channel to play an important role in monetary transmission. A shock to private sector credit has a significant effect on output and the price level, while the banks' lending rates tend to be sticky and not responsive to changes in the policy rate. Taking a narrative approach centering on a significant tightening of monetary policy in four EAC countries (Kenya, Uganda, Tanzania, and Rwanda) in 2011, Berg et al. (2013) found evidence of the working transmission mechanism. However, where countries targeted money (Tanzania and Rwanda), changes of short rates were less likely to be informative or to move long rates. More recently, IMF's selected issues paper on Tanzania (2023) presents evidence that money, interest rate, and credit channels of the monetary policy transmission mechanism are active in Tanzania as the country has made progress towards implementing an interest-rate based monetary policy framework.

9. The NBR has carried out several studies on the MTM in Rwanda. The general conclusion is that MTM transmission operates through the interest rate and credit channels as well as the exchange rate channel. Citing an in-house research result, the NBR's annual report (2017–18) shows that the transmission from the policy rate to money market rates has been improving over recent years, but transmission from money market rates to lending rates was not yet statistically evident. These results suggest that the interest rate channel has likely remained weak in Rwanda. On the other hand, Kwizeraa and Ndarihoranye (2022) provided an evidence of an operational bank lending channel in Rwanda. Forthcoming NBR research investigated the exchange rate channel in Rwanda, and their empirical analysis using quarterly data from 2006 to 2022 suggests that monetary policy transmission via the exchange rate channel exists. In the next section, we will examine the challenges for Rwanda's monetary policy transmission and the implications for the Central Bank's monetary policy actions. We will also discuss options to improve the efficiency of the monetary policy

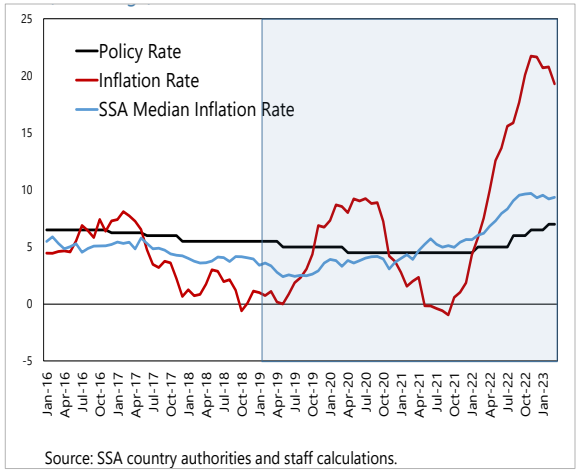
[5] For example, Carriere-Swallow, Koumtingue, and Weber (2023) found that in Guinea, monetary shocks have significant effects on inflation through their impact on the exchange rate. Guinea adopted a rule-based FX intervention policy in November 2020, reducing its role in the FX market, so when in 2021-2022 they tightened MP, the tightening led to a significant reduction in inflation.

transmission by enhancing a forward-looking monetary policy framework, a clear communication of data-driven monetary policy decisions, and greater exchange rate flexibility.

C. Recent Experience and Challenges for Rwanda

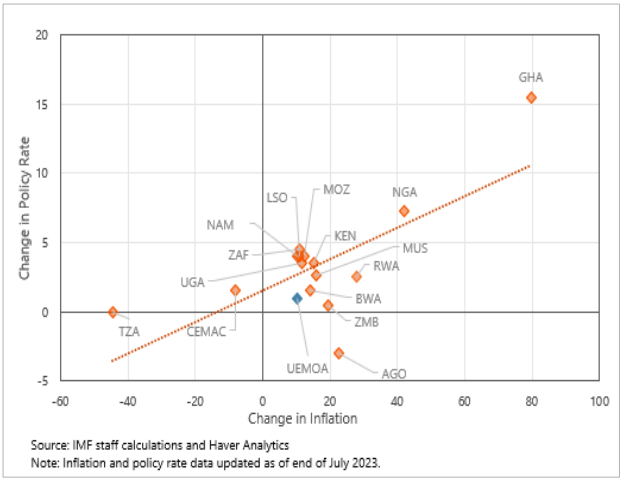
10. Inflation has been quite volatile in Rwanda while the policy rate remained stable compared to other countries in the EAC. As shown in the chart below, inflation in Rwanda is more volatile than the SSA median even during the period after the transition to the interest-rate based MPF. Inflationary pressures continue despite the 300-bps cumulative hike between February 2022 and August 2023. Cross-country analysis for SSA in the right-side chart below shows that Rwanda's policy tightening since December 2021 is still small compared to other SSA countries, given its large increase in inflation.

Rwanda: Policy Rate and Inflation
(Percentage)



Source: SSA country authorities and staff calculations.

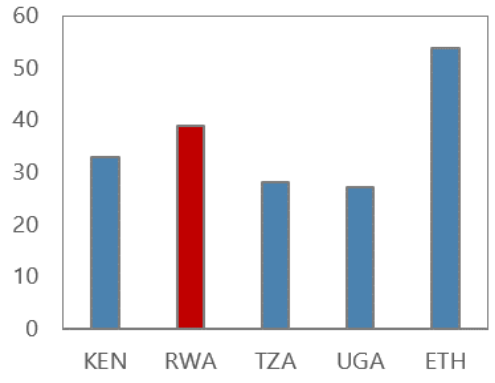
Rwanda: Change in Monetary Policy Rate and Inflation Since December 2021
(Percentage points)



Source: IMF staff calculations and Haver Analytics
Note: Inflation and policy rate data updated as of end of July 2023.

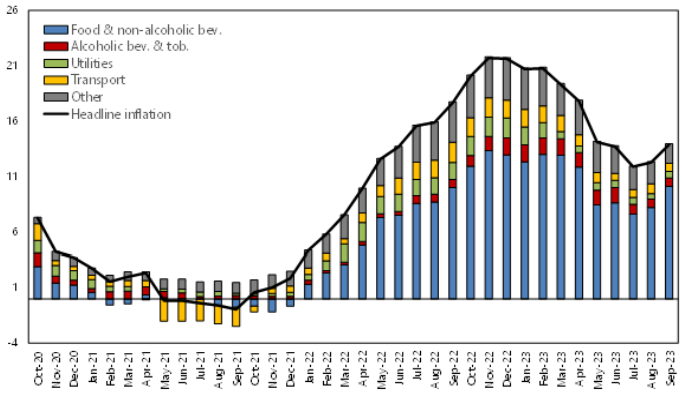
11. One additional challenge facing Rwanda to maintain price stability is the high weight of food in the CPI basket. The high share of food weight in the CPI basket is a common phenomenon in the EAC region, and it makes inflation highly sensitive to weather-related supply shocks. As the Rwandan agricultural sector is mainly rain-fed, weather conditions are the largest factor determining agricultural production and food supply. High inflation since 2022 was largely driven by food inflation because of the two consecutive years of low domestic agricultural production due to unfavorable weather conditions, and higher international food, fuel, and fertilizer prices. While its impact on domestic food supply and prices are constrained, monetary policy has an active role to play in containing the second-round effects. While the high volatility in food prices tends to mask the underlying pressures, the second-round effects are evident as the price of non-food items also contributed to high inflation during this period. A recent example of materialization of the second-round effects is that as food prices increase, construction workers demand for higher wages, resulting in increased price pressure in the real estate sectors. In this setting, monetary policy could contain aggregate demand which could slow the spiral of inflation.

Rwanda and Selected EAC: CPI Food
(Weight)



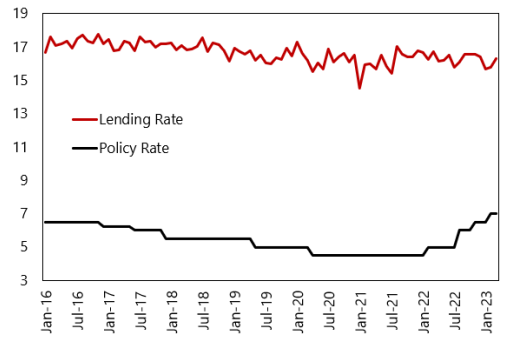
Source: Haver and IMF staff calculations.

Rwanda Drivers of y/y Headline Inflation: Sectors
(Percentage)



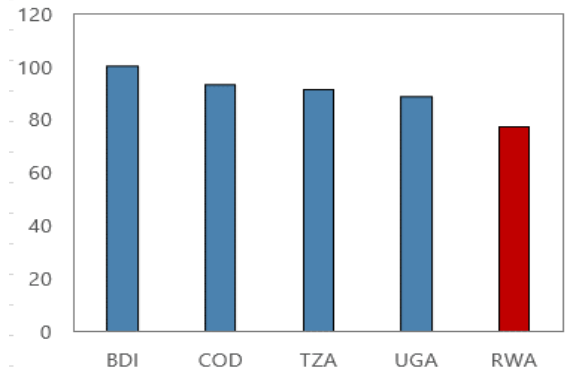
Source: Rwanda authorities and IMF staff calculations.

Rwanda: Lending and Policy Rate
(Percentage)



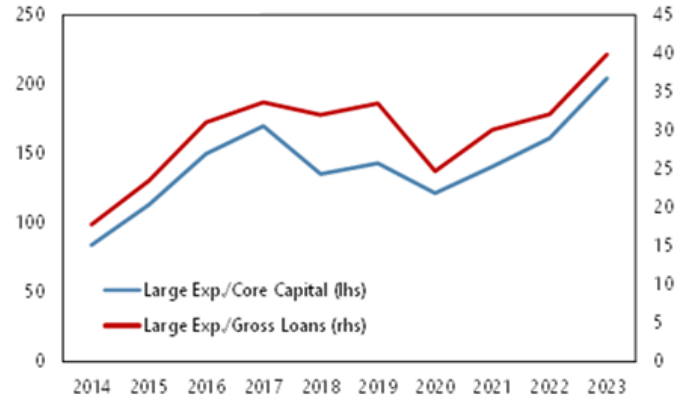
Source: Rwandan authorities and IMF staff

EAC Countries: Bank Asset Concentration in 2021
(Percent)



Source: Rwandan authorities and IMF staff

Rwanda: Banking System—Lagre Exposures
(Percentage)



Source: Rwandan authorities and IMF staff calculations.

12. Loan concentration prevents lending rates from increasing along with the policy rate. The limited pass-through from the policy rate to lending rates weakens the credit channel of the

monetary policy transmission. The average lending rate seems to be flat over January 2016-May 2023, the period data is available. This is in part due to aggregate nature of the lending rate variable—if the share of short-term loans with relatively lower interest rates increases the average lending rate will decrease, everything else equal. Data to disentangle rates on short-term loans from and rates on long-term loans are currently not available. On the other hand, there are structural frictions that impair the interest rate pass-through. Bank concentration is high in Rwanda, which is common in the region, but bank concentration likely increased further with the recent bank mergers.[6] The literature suggests that in oligopolistic banking markets, pass-through from policy rates to lending/deposit rates might be low. On the borrower side, the market is dominated by a small number of large borrowers which are well-capitalized and have significant collateral. In less developed markets, extending lending to the marginal borrower beyond this set is costly and that higher financial intermediation cost reduces the interest rate pass-through. Such dynamics might be at play in Rwanda impairing the bank lending channel. More detailed analysis in this area, such as analysis using the credit registry data, similar to the analysis by Minori et al. (2015) for Uganda, is warranted.

13. The monetary policy framework has improved since the transition to the interest-rate based monetary policy in January 2019. Under the new interest based-monetary policy framework, the NBR aims to seek a better balance between supply and demand in the market for bank reserves and allow the repo rate to be in line with the policy rate and other market rates. As envisaged, since 2019, interest rate corridors have narrowed, repo rate has converged to the policy rate, and the interbank rate has been steered to stay within the corridor. While those are welcome developments, there remains a challenge in policy implementation. Rwanda is a country that has operational QPM (quarterly projection macroeconomic model) developed as a core of the central bank's Forecasting and Policy Analysis Systems (FPAS), benefitted by extensive Technical Assistance from the IMF. However, actual policy decisions often deviate from the NBR's core model recommendation, especially in the recent tightening cycle since February 2022. Strengthening internal organization of the NBR to integrate model analysis in the policy making and MPC process would be essential.

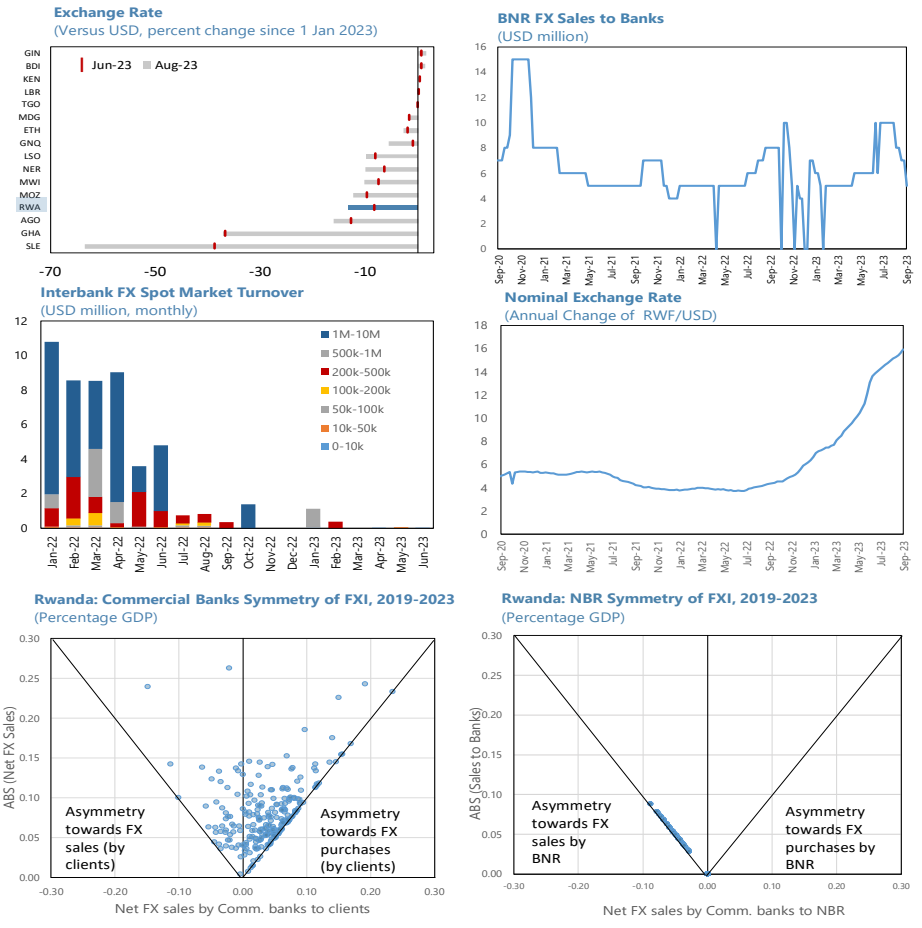
14. The limited adjustment in the exchange rate impairs the exchange rate channel of monetary policy transmission. While Rwanda started allowing greater exchange rate adjustment in the beginning of 2023 compared to the past, Rwanda's exchange rate adjustment is still relatively small compared with other SSA countries. The country faces structural foreign exchange shortages, as the current account is persistently in deficit, but anecdotal evidence suggests the shortage of foreign exchange has intensified more recently as foreign exchange flows from donor financing declined. Interbank FX trading activity became more muted since late last year as the shortage of FX intensified while the NBR is regularly intervening to supply FX to banks. FX transactions between

[6] There are two large bank mergers. (1) BPR was acquired by KCB (HQ Kenya), but they retained the BPR name. The acquisition was in Aug 2021 but the full merger to "BPR Bank Rwanda Plc" happened in May 2022. (2) Equity Bank (HQ Kenya) acquired Cogebank. The acquisition was announced in June 2023, and it was completed on July 28, 2023. The stakes were acquired from the government of Rwanda, Rwanda Social Security Board (RSSB), and other investors.

commercial banks and their clients also suggest disequilibrium in the market as FX demand by bank clients is higher than supply. The FX trade activities between the central bank and commercial banks indicate that the NBR interventions are fully one-sided, with the central bank only selling FX to banks to fill in the shortage of foreign currency.

15. Overly active central bank participation in the FX market can lead to moral hazard and inhibit the development of the market's risk awareness and risk management capacity. While FX intervention may be advisable under certain conditions (see footnote 4), systemic interventions in FX markets even where the change in the exchange rate is small could confuse market participants who may perceive the intervention as signaling a shift towards a nominal anchor[7] other than inflation, reducing the effectiveness of the NBR's monetary policy. The IMF's recent TA on FX market diagnosis provided number of recommendations to allow more FX flexibility while also addressing those structural issues to improve FX market functioning (Box 1).

Figure 1. Rwanda: Monetary Evolution Overview



Source: Rwanda Authorities and IMF staff calculations.

[7] Standard intermediate targets considered as nominal anchors are exchange rate for exchange rate targeting regimes, inflation forecast for inflation targeting regimes, and monetary aggregates for monetary targeting regimes.

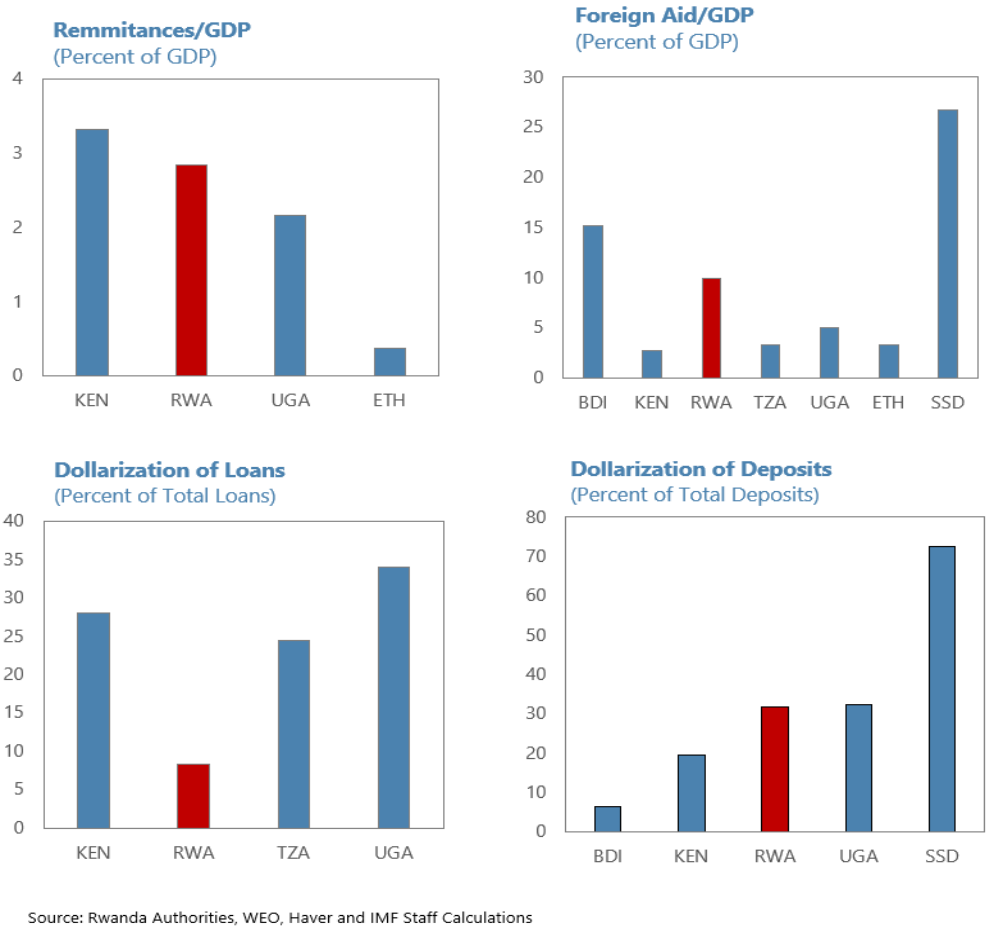
Box 1. Structural Issues on the FX Market and Policies to Strengthen the Monetary Policy Transmission Mechanism

Rwanda typically runs trade deficits while capital inflows are mainly not sensitive to interest rates. The share of remittances and foreign aid to GDP are high in Rwanda while foreign direct investment and portfolio inflows remain marginal. As the government converts its external concessional funding from USD to RWF at the central bank, the NBR has become an intermediator in the FX market.

Dollarization on the deposit reduces the impact of monetary policy transmission to deposit rates. A self-sustaining cycle of gradual depreciation expectations and USD hoarding resulted in relatively high deposit dollarization.

An IMF TA team conducted an FX market diagnostic in September 2023 and suggested FX market-related reform options, which should also help the exchange rate channel of monetary policy. The mission noted that the structural USD backlog is behind the demand-supply mismatch and USD shortage that is causing the steady Rwandan franc depreciation. Policies should address those issues before the NBR could start reducing interventions.

Monetary policy goes hand in hand with the policies to develop the FX market. A stronger interest rate transmission channel may also reduce the exchange rate's importance as a tacit nominal anchor. Exchange rate flexibility is important to allow monetary policy to play an independent role.



Source: Rwanda Authorities, WEO, Haver and IMF Staff Calculations

16. In the next section, we will provide evidence of several frictions that are likely to disrupt the monetary policy transmission mechanism in Rwanda. This empirical analysis updates the previous literature by including the period since Rwanda has started transitioning to an interest-based monetary policy framework.

D. Transmission Channels in Rwanda—Empirical Analysis

17. The empirical analysis will focus on the interest rate, credit, and exchange rate channels, while the expectations channel could also be potentially important. The asset channel is less relevant for Rwanda because of the underdeveloped securities markets. The expectations channel is difficult to quantify because of the lack of market-determined or a survey-based measure of inflation expectations.[8] However, there is a room to improve the expectations channel through better communication. Other central banks use forward guidance to indicate future direction of short-term rates, which helps to move the yield curve (not only the short-term end), shorter-term government securities, and ultimately deposit and lending rates, thus influencing inflation. However, the expectations channel could even work in the opposite direction if the public is not well informed. There is anecdotal evidence in Rwanda that the public is confused about the monetary policy decisions, sometimes thinking that a policy rate hike translates into higher consumer goods prices, feeding into inflation expectations. This shows the importance of sensitizing the public on the mechanisms of the monetary policy transmission and its expected effects.

Overall Transmission

18. This study investigates the channels of overall monetary policy transmission in Rwanda. The literature on investigating monetary transmission in low-income countries (LICs) has largely utilized the estimation of impulse response functions (IRFs) and variance decompositions based on vector autoregressions (VARs) with a small number of macro variables (Mishra, Montiel, & Spilimbergo, 2010). Below, we will follow the common specification in the earlier studies.

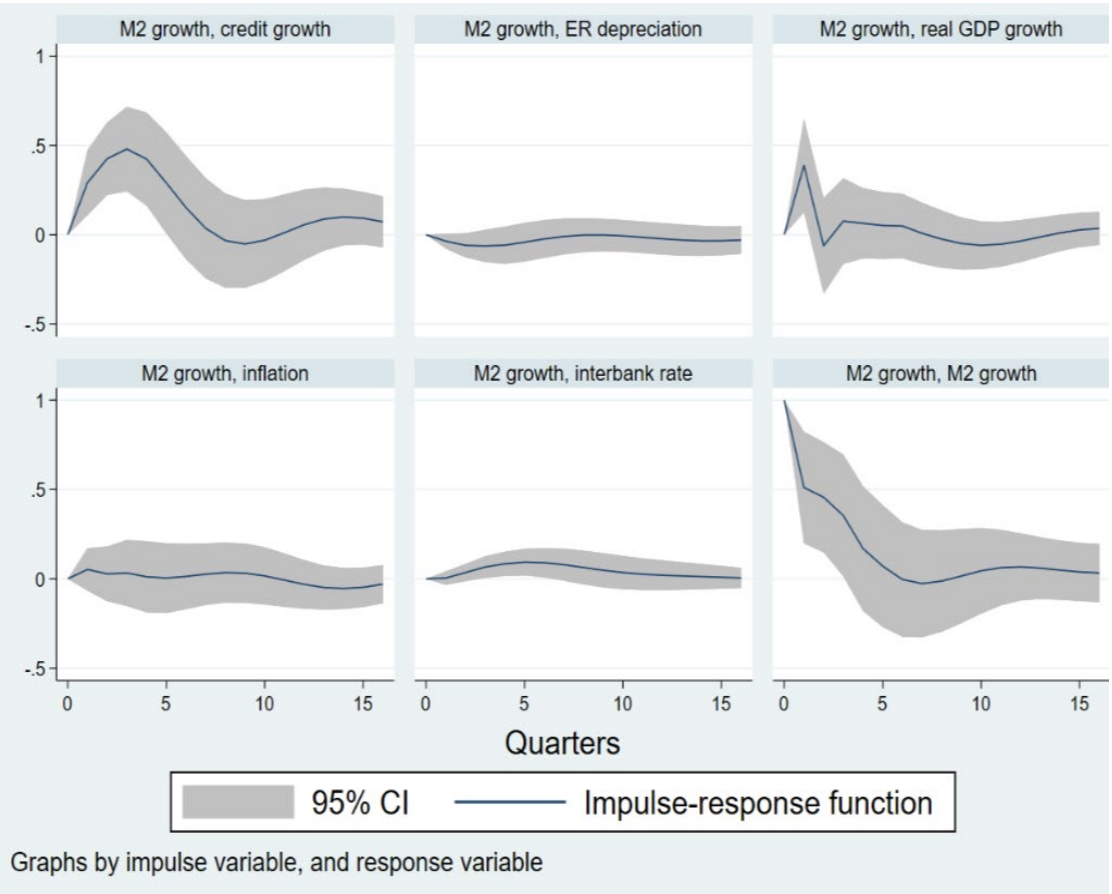
19. The VAR analysis using quarterly data shows the evidence of operational credit and interest rate channels, while the exchange rate channel is found to be weak. While the longer time series data are preferred for the VAR analyses, the sample period (Q4 2010–Q1 2023) is chosen based on data availability. The assumption is that the shocks on the monetary aggregate (captured as growth of M2) affects in the following order: the nominal ER depreciation rate, interbank rate, private credit growth, inflation, and GDP growth. The results show that relationship between main economic variables is broadly in the expected direction. The credit growth and the interbank rate increase as a response to an increase in M2 growth, suggesting the operational credit channel and interest rate channel. This is in line with the recent observations by the NBR's studies (Kwizeraa and Ndarihoranye, 2022). On the other hand, exchange rate response to the M2 shock is not statistically different from zero, indicating the exchange rate channel is weak. One important caveat is that the structural break in policy frameworks in Rwanda made the analysis challenging as it is often the case

[8] The NBR is developing an inflation expectation survey and is expected to launch it in 2024.

for many other LICs in Africa. The limited sample size and structural breaks potentially undermine the precision of estimated impulse responses to monetary policy shocks, leading to statistically insignificant results even when the underlying transmission mechanism is strong (Li et al. 2019). Due to limited sample size, analysis of before and after the transition to the interest-rate based monetary policy framework did not produce robust results. On the other hand, the alternative specification replacing M2 with the central bank rate showed similar results from our baseline model—key macro variables are moving in the expected direction after a shock on the central bank rate, although the responses were statistically insignificant.[9] The selection between M3 and M2 as a measurement of monetary policy had little impact on the results.

Text Figure. Rwanda: Impulse Response Function

(Percentage points)



[9] While the use of the central bank rate might be problematic due to the transition of the monetary policy frameworks, it could be useful to check the robustness of the results due to the possible endogeneity in the baseline model when both M2 (liability side) and bank credit (asset side) are included in the VAR analysis.

Interest Rate/Credit Rate Channel

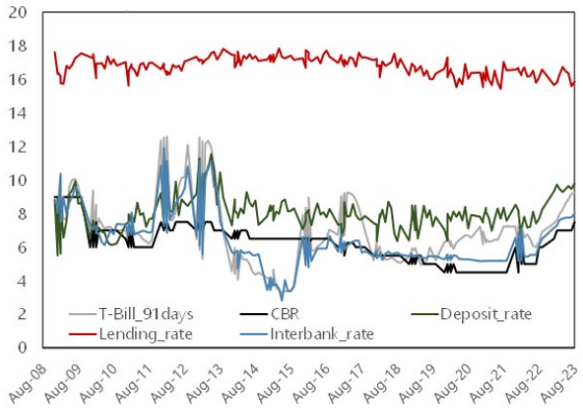
20. To complement the VAR analyses discussed above, the analysis of the direction of causality also investigates the interest rate channel. The Granger causality analysis is conducted to check the direction of causation among various interest rates between January 2009 and August 2023. The interbank rate used here is the average 7-day interbank rates, which is the operational target under the current monetary policy framework. While T-bill rates for various maturities are available including for 28-days, 91-days, 182-days, and 364-days, here the 91-day T-bill rate is selected because it offers the longest time series data. The deposit rate and the lending rate are both simple average across loans with various maturities. As discussed above, this is because breakdowns between short-term and long-term are not available. The results show that the policy rate granger-causes interbank rate (7-day) and lending rate (average) but not the other way around, suggesting that the central bank rate successfully drives those market rates. On the other hand, the results show weak policy rate pass- through to the T-bill rate and the deposit rate.

Rwanda: Pairwise Granger Causality Tests
(Monthly data 2009M1-2023M8)

Null Hypothesis:	Probability
CBR does not Granger Cause ...	
Interbank rate	0.032
T-bill rate (91 days)	0.082
Deposit rate	0.092
Lending rate	0.005
Interbank rate does not Granger Cause CBR	0.130
T-bill rate does not Granger Cause CBR	0.239
Deposit rate does not Granger Cause CBR	0.407
Lending rate does not Granger Cause CBR	0.311

Source: IMF staff calculations.

Rwanda: Interest Rates
(Percent)



Source: Rwandan authorities and IMF staff calculations.

21. The interest rate channel has strengthened after the monetary policy framework transition. We split the sample into two sub-periods: before the monetary policy framework transition in January 2019 and after the transition. The results show that the interest channel was weaker under the old monetary policy framework as we fail to reject the hypothesis that central bank rate does not Granger cause market rates for all rates except for the lending rate. Even though the after period has a much shorter time series, under the new regime, the interest rate pass-through from central bank rate to interbank rate and T-bill rate seems to have strengthened. As discussed above, the magnitude of the lending rate adjustment due to the changes in the central bank rate seems to be still limited, but the results show the encouraging development that the central bank rate does affect the lending rate.

Rwanda: Pairwise Granger Causality Tests
(Monthly data 2009M1-2018M12)

Null Hypothesis:	Probability
CBR does not Granger Cause ...	
Interbank rate	0.198
T-bill rate (91 days)	0.489
Deposit rate	0.107
Lending rate	0.039

Source: IMF staff calculations.

Rwanda: Pairwise Granger Causality Tests
(Monthly data 2019M1-2023M8)

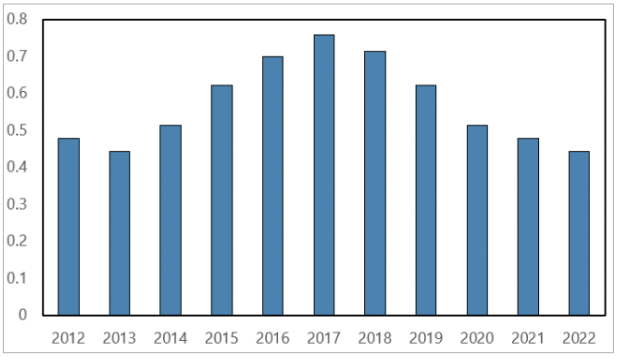
Null Hypothesis:	Probability
CBR does not Granger Cause ...	
Interbank rate	0.000
T-bill rate (91 days)	0.013
Deposit rate	0.708
Lending rate	0.048

Source: IMF staff calculations.

Exchange Rate Channel

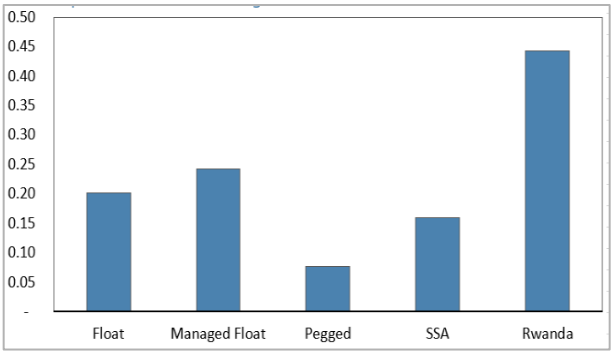
22. The exchange rate pass-through (ERPT) to inflation is strong in Rwanda. As seen above, the first stage of transmission through the exchange rate channel, that is from monetary policy shock to exchange rate, is weak, as Rwanda has a de facto crawl-like exchange rate regime. However, this section presents evidence that suggests the second stage of transmission, or the pass-through from the exchange rate to inflation, is high in Rwanda. A recent study by Kemoe et al. (Forthcoming) found that Sub-Saharan Africa (SSA), on average, has higher ERPT than other regions but Rwanda's ERPT is even higher than the SSA average, despite a notable decline since 2017. Looking at the 12-month horizon, the cumulative response of inflation to a 1 percent depreciation in the bilateral exchange rate against the US dollar is around 0.4 percent for Rwanda, almost double the SSA average. Kemoe et al. also suggests ERPT varies across exchange rate regimes in SSA, with conventional pegs and with fully floating exchange rate regimes having lower exchange rate pass-through on average than countries with a managed float, including Rwanda.[10]

Rwanda: Average Exchange Rate Pass-Through
(in percent, cumulative response of CPI one year after a 1 percent depreciation of bilateral ER against USD)



Note: Estimates based on the rolling samples of 10 years, starting in 2012.
Source: Kemoe, et al. (Forthcoming)

Rwanda: Average Exchange Rate Pass-Through by Exchange Rate Regime
(2022, in percent, cumulative response of CPI one year after a 1 percent depreciation of bilateral ER against USD)



Source: Kemoe, et al. (Forthcoming)

[10] Exchange rate pass-through in pegged countries is more sensitive to movements in the NEER than the US dollar as trade is mostly invoiced in peg currency. Exchange rate pass-through is higher in pegged countries than in non-pegged countries, in sub-Saharan Africa, when considering shock on NEER.

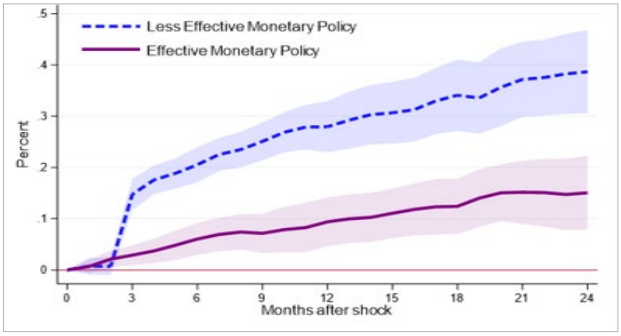
23. Strengthening monetary policy effectiveness is key to maintain price stability particularly during periods of exchange rate depreciation. Kemoe et al. (Forthcoming) also found that exchange rate pass-through is higher in countries with historically high inflation, compared to countries with a good track record of low inflation. This shows how effective monetary policy limits the second-round effects of exchange rate depreciation to domestic inflation. In the current environment with external imbalances, for Rwanda, the exchange rate should be the main shock absorber to external shocks. In this context, strengthening effectiveness of monetary policy through improvement in the various transmission channels is likely to help contain inflation pressure resulting from exchange rate depreciation.

Recent Policy Efforts

24. The NBR continues its efforts to strengthen monetary policy transmission. In addition to efforts to improve monetary policy transmission and monetary policy efficiency highlighted above, the NBR has introduced various measures to improve communication, financial inclusion, and financial education that would be expected to improve expectations channel, while efforts to develop capital markets also continue. Recent examples include:

- Development of a guideline for women's financial inclusion for the financial sector.
- Introduction of a mobile app called "GERERANYA" that allows consumers of financial services to compare costs of different services from financial service providers.
- Implementation of several initiatives and awareness programs to support the development and inclusion of the financial sector, including the NBR quiz challenge, university monetary policy challenges, savings week, insurance week, global money week, and Financial Consumer Protection Law awareness campaign.
- Quarterly meetings of the Chief Economist with bank treasurers, economic cluster and taskforce market analysis to discuss the Monetary Policy outcomes.
- Efforts to develop bond market continue. During the first half of 2023, NBR successfully issued three new bonds and reopened four existing ones. The average subscription rate was 117.1 percent, up from 109.4 percent in the corresponding period year, partly due to the rising awareness of the benefits of investing in government securities among economic agents.

Rwanda: Price Response to Shock in Bilateral Exchange Rate
(Against USD)



Source : Kemoe, et al. (forthcoming)

E. Concluding Remarks

25. While some structural factors are difficult or take time to change, there are policy choices that can improve monetary policy transmission. Rwanda faces frictions which impair effective monetary policy transmission, such as vulnerability to climate shocks, less developed financial markets, incomplete integration of the forecasting and policy analysis system into policy making, structural shortage of foreign exchange, and continued need for exchange rate flexibility. On the other hand, Rwanda's monetary policy transmission mechanism has improved since the transition of the monetary policy framework with short-term rates broadly tracking the policy rate and the interest rate channel is generally operational.

26. Effective monetary policy and exchange rate flexibility are key to achieving lower exchange rate pass-through to inflation. First, the literature suggests that countries using interest rates as the policy tool have more effective monetary policy transmission than those using monetary aggregates. While Rwanda's transition to the interest-rate based monetary policy framework in 2019 is a step in the right direction, the use of the policy rate should be more proactive. Second, monetary policy decisions should be data driven and forward-looking. Further improvement in the NBR's forecasting and policy analysis capacities and full incorporation of the system into the policy making is important. Third, the NBR should allow more exchange rate flexibility. The exchange rate channel is a crucial channel for monetary policy transmission in low income and lower-middle income countries. A more flexible exchange rate, coupled with more effective monetary policy, would shield domestic prices from exchange rate depreciation and help maintain price stability.

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