

# FORECAST BIAS AND BUDGET CREDIBILITY IN RWANDA, SENEGAL AND UGANDA



***RESULTS FROM A NEW FISCAL DATABASE***



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### **List of Acronyms**

ATAF	African Tax Administration Forum
CABRI	Collaborative Africa Budget Reform Initiative
CPIA	Country Policy and Institutional Assessment
CUSUM	Cumulative Sum Test for Parameter Stability
DGB	Directorate General of budget (Senegal)
EAC	East African Community Customs Union
GFS	Government Finance Statistics
MAPE	Mean Absolute Percent Error
ME	Mean Error
MINECOFIN	Ministry of Finance and Economic Planning (Rwanda)
MPE	Mean Percentage Error
OBI	Open Budget Index
OBP	Open Budget Partnership
OECD	Organization for Economic Cooperation and Development
PEFA	Public Expenditure and Financial Accountability
PFM	Public Financial Management
PSE	Plan Senegal Emergent
RCF	Rapid Credit Facility
RPF	Rwanda Patriotic Front
VAT	Value Added Tax
WAEMU	Western African Economic and Monetary Union
WGI	World Governance Indicators

## **Executive Summary**

This report assesses the presence of revenue forecast bias as a key factor for undermining budget credibility in 3 African countries—Rwanda, Senegal, and Uganda—on the basis of a newly created database. Whereas earlier studies on budget credibility largely relied on information compiled on the basis of international classifications and diagnostics such as PEFA, this new database compares ex ante revenue forecasts underpinning budget expenditure appropriations and their ex post realization through original budget documents — the budget law as approved by the legislature and the final accounts submitted after the conclusion of the fiscal year. The final accounts tend to differ from the initial budget for a number of reasons including differences in forecasted macroeconomic developments, exogenous and unexpected events, and shifting priorities and needs. Budget credibility is thus defined in the literature as “difference between what was originally planned in terms of revenues, overall spending and composition of spending over a few years, and the actual outturn for each at the end of each year” (de Renzio and Cho, 2020). The political economy arguments that can undermine such a conceptualization are however less understood, as discussed in Cangiano and Pathak (2019). A significant body of budgeting literature has highlighted that differences between budgets and their realization are not random deviations and can have an inbuilt bias and reflect the preferences of policymakers. However, so far the empirical analysis has been significantly constrained by lack of data that tracks the budget proposals in a given year and matches them with outcomes that are reported at times even 2-3 years later. The shortage of data on this issue is particularly acute for developing economies in Africa, which this study seeks to address by creating a comprehensive dataset for the 2000-2020 period. Building on Cangiano and Pathak (2019) the main focus is on the revenue forecast bias, defined as a systematic and persistent over or under forecast, as one of the key factors undermining budget credibility. The main findings can be summarized as follows.

- While earlier studies on developing countries show a tendency to over-estimate revenue—and consequently expenditure—by approximately 10 percent (de Renzio et al., 2019), in the three countries analyzed in this report average errors in revenue are expenditures are significantly less than that, suggesting that these countries outperform the aggregate trends noticed for similar economies.
- Though the aggregate average errors are relatively low, there is significant variation across line items. On the revenue side, direct taxes tend to have the lowest errors as most of the errors arise from variations in non-tax revenue sources and external financing. The volatility in external grants is one of the main features of public finances of African economies, that may be one of the drivers of this trend.
- There appears to be different patterns across the two decades analyzed in this study (2000s and 2010s). In Senegal, for example, underestimation of revenues has become more common in recent years; in Uganda, the period after the Great Recession has been characterized by significant overestimation of revenues and expenditures; in Rwanda, the underestimation of revenues was more common before joining East African Community Customs Union in 2009.
- There is a strong positive relationship between expenditure and revenue errors across countries. A lower-than-expected revenue realization appears to prompt governments to scale back spending, particularly public investment projects and development spending.
- Development and capital expenditures show higher errors than more non-discretionary spending — at least in the very short term – categories such as recurrent expenditures. When faced with the need to make mid-year adjustments, governments tend to focus on cutting the expenses on categories that permit some administrative and political discretion.
- There also appears to be a strong relationship between errors in macroeconomic and fiscal forecast errors, although with some variations. For instance, the real GDP growth errors appear

to have a stronger relationship with fiscal forecast errors than variation in inflation expectations.

These patterns have been particularly true for years without any external shocks such as business cycle events or health emergencies like the Covid-19 pandemic.

- The three countries selected have undertaken significant institutional reforms during the last three decades based on their aggregate scores on key governance and public financial management indicators and international diagnostics. The outcome of these reforms resulting in improved government effectiveness is also found to be associated with a reduction in forecast errors.
- Occasional evaluation of forecasts, independent scrutiny of annual government forecasts, and transparency in the estimation methods deployed is essential to improve the credibility of the budget process. Some African countries have introduced reforms in this area, for example, the creation of parliamentary budget office in Uganda, however, the technical capacity to evaluate budget estimates is rather limited in most African countries.
- Governments have started publishing the budget documents and archives as part of recent transparency efforts –however, major gaps in the reporting and tracking of budget execution data persists across all African countries. Furthermore, the transparency efforts are rather limited to merely making the documents available – this data is often not in a usable format for researchers and analysts and that inhibits research on the effectiveness of budget practices and reforms.



## 1. Introduction

The last three decades have witnessed several waves of public financial management reforms, focusing on strengthening the budget process and enhancing transparency. The Open Budget Surveys by International Budget Partnership, PFM diagnostic assessments under the Public Expenditure and Financial Accountability (PEFA) program by a group of international development partners, and several programs facilitated by the IMF and World Bank are all efforts in this direction. Despite the centrality of budgets to international development planning and economic policymaking, limited research has examined how effective budgets are in anticipating the fiscal trajectories in the upcoming year or how credible are the economic and revenue estimates underpinning the expenditure appropriations. Some research has started to explore these issues empirically, but analyses of developing country contexts remain limited, primarily due to the paucity of relevant data.<sup>1</sup>

This report summarizes the results of an effort to create a new database to examine revenue and expenditure errors for three African countries – Rwanda, Senegal, and Uganda during the last two decades. These countries were selected as part of the pilot data collection phase based on their historical trajectory of PFM reforms, and other factors such as regional representation and Francophone, Anglo-Saxon, and mixed budget systems.<sup>2</sup> The primary focus of the study is understanding the presence of revenue forecasts bias, but we also examine variance in major expenditure categories. Furthermore, we examine the relationship between macroeconomic forecast errors and fiscal forecast errors within the context of each country and then in the combined context of the three countries

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<sup>1</sup> Most of the studies on this theme use data from United States, Western Europe, or OECD countries. Some recent studies have started to explore related issues in the comparative context of developing economies (Baldrich et al., 2018; Cangiano & Pathak, 2019; Chakraborty et al., 2020; Renzio & Cho, 2020).

<sup>2</sup> Senegal is Francophone country and Ugandan budget system has Anglo-Saxon origins. Both of them have retained many characteristics of these systems in their original form. Rwanda could be classified as mixed system and has gradually moved away from the Francophone system after the events of 1994. For more details on Rwanda's historical trajectory see the 2008 PEFA assessment for Rwanda (PEFA, 2008).

selected. Lastly, we briefly highlight the trajectory of governance reforms in these countries and their potential correlation with changing dynamics of budget execution.

Scholars often tend to use the concept of “budget credibility” to refer to different concepts and measures that compare forecasts to actual outcomes. For example, de Renzio et al. (2019) define budget credibility as “the degree to which governments execute budgets as planned – and as approved by the legislatures.”<sup>3</sup> For the purpose of this study, we use the umbrella term of budget credibility, but focus rather on revenue forecast bias following Cangiano and Pathak (2019). In this context, two major underlying concepts should be highlighted. First, *forecast accuracy* is the estimate of how much effective a forecast is in predicting actual outcomes and can be estimated using standard measures such as mean error or mean absolute percentage error (Hyndman & Athanasopoulos, 2018). Second, *forecast bias* indicates the existence of a consistent tendency to underestimate and overestimate a parameter – mean error is the most basic test of bias and some formal tests of unbiasedness could confirm the existence of systemic bias (Granger & Newbold, 1986; Holden & Peel, 1990).<sup>4</sup>

The report is divided into eight sections. Section 2 provides a background of the relatively limited research in this area and the rationale for this project. Section 3 provides the details of data collection, the challenges faced in creating a dataset of this kind, and outlines the methodology of forecast evaluation deployed for each country. The subsequent three sections (Sections 4, 5, and 6) assess revenue and expenditure forecast errors in Senegal, Uganda, Rwanda. Each of these sections provides (1) a historical trajectory of the budgetary appropriations and outturns across major line items, (2) an assessment of revenue and expenditure forecast errors across the 2000-20 period, (3) an overview of

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<sup>3</sup> This definition is also behind the PEFA Pillar 1 indicators of budget reliability. This definition is however rather crude as it misses the capacity of a budget to adapt to changed circumstances as well as its built-in flexibility reflecting the magnitude of automatic stabilizers. Credibility and reliability are thus more complex concepts that must also take into account the existence of transparent procedures for modifying and adapting the budget in the course of its execution.

<sup>4</sup> Another concept of *rationality of forecasts* examines whether the forecasts are using available information efficiently in making a forecast but we do not focus on that in this study.

errors at the line-item level and whether there is systemic bias in the estimation of certain revenue or expenditure items as assessed by relevant tests of forecast bias, (4) temporal patterns and relationship between aggregate revenue and expenditure errors, and (5) the relationship between fiscal forecast errors and macroeconomic forecast errors for the three countries. Section 7 provides the results of comparative analysis of the relationship between fiscal forecast errors and macroeconomic forecasts errors using fixed-effects models. The section also briefly highlights the trajectory of governance reforms as measured by selected composite indicators that are summarized in the Appendix. The last section concludes and identifies avenues for future data collection and research.

## 2. Previous Research

A substantial body of literature has examined the issue of revenue bias and credibility of budget forecasts in the context of the United States and European countries, examining accuracy, bias, and rationality of forecasts (Auerbach, 1999; Bretschneider & Schroeder, 1985; Feenberg et al., 1989; Gentry, 1989; Kamlet et al., 2018; Krol, 2014, 2014; McNab et al., 2007; Mocan & Azad, 1995; Williams & Onochie, 2014). Another set of studies within the same groups of countries have examined the political correlates of forecast evaluation parameters such as the impact of ideological affiliation, electoral cycles, political fragmentation, etc. (Benito et al., 2015; Boukari & Veiga, 2018; Boylan, 2008; Buettner & Kauder, 2015; Jochimsen & Lehmann, 2017; Kauder et al., 2017). However, only a handful of studies have examined the issues of budget credibility, forecast bias, and fiscal marksmanship in the context of developing countries (Baldrich et al., 2018; Cangiano & Pathak, 2019; Chakraborty et al., 2020; Danninger, 2005; Danninger et al., 2005; Gosolov & King, 2002). Cangiano and Pathak (2019) provide a detailed summary of this literature in the context of both high-income and developing economies. In some recent empirical studies, scholars have followed two key approaches to addressing the data challenges in the study of budget execution behavior – either relying on available on revenue and expenditure outturns through the multi-donors’ Public Expenditure Financial Accountability (PEFA) framework and diagnostics and the World Bank’s BOOST<sup>5</sup> (Addison, 2013; Cangiano & Pathak, 2019; de Renzio et al., 2019; Renzio & Cho, 2020; Sarr, 2015) or relying on aggregate indices of budget credibility from PEFA assessments (ElBerry & Goeminne, 2021; S. Mustapha, 2019).<sup>1</sup> The only exception is a working paper by Baldrich et al. (2018) that collects five years of original budget data from 30 Latin America and the Caribbean countries to examine the relationship between fiscal projection errors and reforms such as the adoption of Medium Term Expenditure Frameworks and Treasury Single Accounts.

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<sup>5</sup> This is a dataset of expenditures and analytical tools covering some 90 developing countries. See the BOOST open budget portal <https://www.worldbank.org/en/programs/boost-portal/about-boost>.

They find that improvements in these budgetary institutions are associated with a lower probability of having expenditure projection errors.

Most of these studies use limited information on revenue and expenditure outturns (typically three years of data) available in the PEFA assessments to expand their coverage to a large number of countries. One of the early studies using data from the PEFA assessments is Addison (2013), which compiled the data from 45 countries with 159 observations and examined various political correlates of budget deviations.<sup>6</sup> Out of the 45 governments in their sample, 14 are from Sub-Saharan Africa and the remaining represent Asian, Latin American, and European countries. They find a significant relationship between revenue and expenditure deviations and find that political variables that relate to common pool problems in governance are significantly associated with fiscal forecast errors. In a recent paper, de Renzio & Cho (2020) revisit some of the themes from Addison (2013) relying on PEFA assessments for 2 to 6 years from 94 countries to examine correlates of budget credibility in a cross-sectional setting. They find a strong positive relationship between the revenue and expenditure outturns and find associations between budget transparency and budget credibility. They do not find a significant association between income levels and budget credibility metrics in their data which some earlier studies such as Cangiano & Pathak (2019) find. Cangiano & Pathak (2019) use the same data from PEFA assessments to estimate revenue bias in a sample of 26 low and middle-income countries that completed PEFA assessments using the 2016 PEFA framework. They also find that many sample countries tend to overestimate revenues in the years covered. de Renzio et al. (2019) focus on the spending component and examine deviations in expenditures using available information for 35 countries from the BOOST portal during 2009-2017. They find that national budgets are being underspent by almost 10 percent in their sample countries or the budget tends to overestimate

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<sup>6</sup> This data is usually reported in the calculation the PI1 & PI2 indicators for expenditures and PI3 indicators for revenues. There is substantial variation across PEFA reports in reporting formats and level of details. However, most of the PEFA reports will include three years of data while calculating these indicators. For more details of this approach see Cangiano and Pathak (2019)

spending by 10 percent, on average. They find budget deviations are significantly larger for capital expenditures (-18%) than current expenditures (-4%) – the latter inclusive of a much less flexible component of *wages and salaries*. In their sample, the deviations, were significantly larger in low and lower-middle-income countries than in the upper-middle and high-income countries.

Some other studies have explored the relationship between budget credibility and variables such as fiscal transparency using the aggregate indices and the proxy measure of budget credibility. Sarr (2015) uses two-year data from year-end reports of 73 countries and examine the budget credibility of health and education expenditures and its relationship with Open Budget Index and finds a significant positive relationship between fiscal transparency and budget credibility. Along similar lines, ElBerry & Goeminne (2021) use the composite index of budget credibility in PEFA that includes, revenues and expenditure outturns as well as composition of spending, to find that measures of budget credibility are significantly associated with the fiscal transparency measures in 57 countries during the years covered by PEFA assessment. Mills (2018) provides an overview of data provided as part of PEFA aggregate indices and finds that budget expenditures' execution is slightly better than that of budgeted revenues. The aggregate budgets tend to be more accurate than expenditure composition. Mustapha (2019) also uses aggregate indices from PEFA assessment to examine the relationship between the quality of public financial management systems and budget credibility in fragile states and finds that fragility has a mixed impact on the functioning of the PFM systems.

A few important issues emerge from this literature on comparative study of budget execution and budget credibility. First, the most important constraints that researchers have faced are the lack of data availability — the difficulty of collecting such data that will be discussed in later sections of this article. Second, the limited data collected as part of PEFA assessments are also not available in a ready-to-use format. Therefore, researchers in this area often duplicate efforts – collecting the same data from

PEFA reports across years.<sup>7</sup> Third, given that researchers are working with only 2-6 years of data (depending on whether the country undertook one PEFA assessments or two) – it limits any analysis of temporal trends and does not provide us an insight into whether the reforms in budget preparation and public financial management that can easily take decades yielded any significant results. Fourth, inconsistency across years is also a problem, where a country that undertook PEFA assessment in a year that was influenced by external events (e.g., 2008-2009 recession, Ebola or Covid-19 outbreak, oil price volatility) or local events (e.g., tax reform, electoral cycle, local economic shocks) may come across as an underperformer which may or may not be an accurate description. Fifth, the nature of the data does not enable researchers to undertake any significant econometric analysis using techniques that control for time-invariant unobservables such as fixed-effects or GMM models. Lastly, PEFA data is also subject to considerable error since it uses best estimates available at the time of preparations of reports –in some instances, the PEFA has used estimates from revised budgets rather than original budgets and the actuals are sometimes reported on the basis of what is available from the Ministry of Finance officials rather than the estimate documented in the budget execution reports, audits, or budgets of subsequent years.

### **3. Data and Methods**

The existing sources of fiscal data for developing countries primarily provide information on historical actuals, but the budget estimates are not tracked for a majority of countries, particularly in the developing economies. The efforts to improve fiscal transparency have prompted the budget offices or relevant ministries to publish the budget documents for public access on their portals, and some efforts have been made to aggregate information. For example, the Collaborative Africa Budget Reform Initiative (CABRI) maintains the Budget Enquirer portal to gather budget documents and audits from

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<sup>7</sup> While the indicators are available to download from PEFA website, the outturn data needs to be compiled for individual PEFA reports. This shortcoming could be addressed without much effort by PEFA Secretariat.

most African countries. As noted, the World Bank has started the BOOST portal that has disaggregated expenditure information from about 90 countries on different aspects of their open budget efforts for selected years, but original budget estimates are not included for many countries. These initiatives do not enable researchers to systematically analyze budget credibility since the mere availability of information does not make it suitable for empirical analysis. In the absence of any comprehensive sources of budget information, we use the original budgets and financial documents of the three countries to construct an original database of ex-ante and ex-post realizations.

There are several challenges that researchers encounter in constructing data of this kind. First, the final results are unavailable until at times 2-3 years after the approval of the budget. Moreover, often budgets do not report disaggregated outturns for previous years. This makes comparing the ex-ante projections with ex-post realizations a problematic task. Second, international tracking and reporting (for example, under the IMF's Government Financial Statistics) focus on "actual" outcomes of either aggregate or selected fiscal categories based on standardized reporting frameworks whereby international comparability takes priority over in-country consistency. Furthermore, the revenue and expenditure estimates in data sources such as the IMF's GFS sometimes differ substantially from the actuals reported in the budget and audit reports. Third, frequent changes in budget formats and one-off adjustments such as changes in fiscal years or base years or discontinuation of certain budgetary reports pose problems for inter-temporal comparability. The same is true of macroeconomic forecasts, but organizations such as the IMF have been increasingly making their historical forecasts for selected indicators available to the public – for example, selected historical forecasts (growth, inflation, fiscal balance) from the World Economic Outlook database are now publicly available. In addition, the ministries, directorates, or government agencies that are responsible for different aspects of the budget process are sometimes reorganized and that influences data reporting and availability. In view of these challenges, we rely on several sources of financial information, including budget documents,



budget speeches, execution reports, audit reports, PEFA assessments, and archives of public expenditure reviews. Often different reports provide different numbers from those reported in the GFS and the *Government Revenue Dataset*<sup>8</sup>, which in turn may vary substantially from those in the national budget execution/audit reports.<sup>9</sup> In case of these discrepancies, we follow certain procedures to narrow down the gaps between the budget estimates and actuals. First, the in-country budget documents, execution reports, and audit reports are given primacy over any other secondary sources such as IMF, World Bank, PEFA, and such. Second, for the budget estimates – original budget documents, finance minister speeches, government gazettes are prioritized over any other estimates published later or in subsequent years to ensure that we are using the earliest possible estimate. On the other hand, the actuals are reported from audit reports (Senegal), execution reports (Rwanda), budget documents (Uganda) depending on varying reporting formats. In case of discrepancies, we use the actuals from the latest available reports since the actuals are sometimes subject to revisions.

We have avoided the use of proxy estimates as much as possible, but when the numbers for certain line items are not available, we use three primary approaches to address the gaps. First, we calculate estimates based on subtraction and addition of what is available. For instance, if total fiscal revenues and tax revenues are available for a given year and the non-tax revenue estimate is missing because of differences in reporting in tables, we calculate non-tax revenue as the difference between total revenue and tax revenue. If only the tax-to-GDP ratio is available and nominal GDP estimate is provided, we calculate the tax estimate manually. Second, we have avoided the use of revised estimates or budgetary projections as a substitute for original budget estimates. Only for some line items in the case of Rwanda in 2003 and 2004 we have used revised estimates as a proxy for original budget estimates since we

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<sup>8</sup> The Government Revenue Dataset was originally developed by the International Centre for Tax and Development and is now managed by UU-WIDER. More details available at <https://www.wider.unu.edu/about-grd>

<sup>9</sup> The differences between secondary sources such as GFS (IMF) or GRD (UNU-WIDER), and the final numbers from in-country reports are substantial, indicating limitations of survey-based data collection.

could not locate those budget documents or numbers anywhere. Finally, Rwanda switched its fiscal year in 2009 from the calendar year to July-June fiscal year consistent after becoming a member of the East African Community Customs Union (EAC) and passed a six-month mini-budget. We use the six-month mini-budget estimates as the proxy for 2009 estimations and treat it as a regular year in the analysis.

We also adopt several approaches to examine how the actual revenue and expenditures measure up against the budgetary projections. The forecast evaluation literature primarily focuses on three main concepts of *accuracy*, *unbiasedness*, and *rationality* to assess the quality of forecasts or projections –we focus on the former two concepts that were also briefly discussed in the previous section. The accuracy of forecasts measures how much is the forecast or budgeted amount close to the actual value.

Unbiasedness means that forecasts and realized values should average to zero over a sufficiently large period of time and forecast errors should be equal to zero, on average. In that sense, Mean Error (ME) is a simple measure of unbiasedness for a set of forecasts over time. Lastly, the efficiency or rationality of forecasts assesses whether the forecast uses all relevant available information at the time of forecast.

The common approach to assess forecast accuracy is to calculate indicators such as Mean Error (ME), Mean Absolute Percentage Error (MAPE), Root Mean Square Error and Theil's Inequality Coefficient. Each of these indicators offers a certain value in the assessment of forecast accuracy. In this study, we calculate two commonly used indicators of forecast accuracy and bias: Mean Percentage Error (MPE) and Mean Absolute Percentage Error (MAPE) as shown in equations 1 and 2 below. The parameter  $A_t$  represents the actuals in year  $t$  and the parameter  $F_t$  represents the corresponding fiscal year's published budget forecasts. MPE measures the size of the forecast errors in percentage terms over the years for which we have the data and averages them. While MPE provides some preliminary evidence of overestimation or underestimation, it is not a good measure of overall forecast accuracy since it averages both the negative and positive errors, which may sometimes have an offsetting effect – particularly in samples that have large forecast errors in both directions. Therefore, we also calculate the

Mean Absolute Percentage Error (MAPE) which is based on the absolute value of the error, so it gives a better picture of the overall size of the error to assess the accuracy of forecasts.

$$MPE_t = \frac{1}{T} \sum_{t=1}^T \frac{(A_t - F_t) * 100}{A_t} \quad \dots (1)$$

$$MAPE_t = \frac{1}{T} \sum_{t=1}^T \frac{|(A_t - F_t)| * 100}{|A_t|} \quad \dots (2)$$

ME or MPE also provide information about potential bias in the forecasts (general overestimation or underestimation), but it does not tell us if the errors are stable over time and whether the bias is statistically significant. To address the latter issue, we test the null hypothesis of no structural break or that errors are stable over time using the cumulative sum test for parameter stability (CUSUM). In the subsequent sections, we have reported these results for major revenue and expenditure categories using plots with 95 percent confidence bands.

For a formal test of unbiasedness, we use the Holden-Peel (1990) test that also examines the significance of forecast bias. This statistic has been commonly used in the evaluation of the economic growth and IMF macroeconomic forecasts (Ashiya, 2005; Dreher et al., 2008; Loungani, 2001), but has found limited use in the evaluation of fiscal forecast errors. To apply the test statistic, we calculate the Mean Error (ME) which is the linear transformation of MPE and then calculate the regression in equation 3 where the null that there is no bias  $H_0: \lambda = 0$  can be tested using a t-test. The bias coefficient  $\hat{\lambda}$  is identical to the Mean Error in magnitude but enables us to examine whether the overestimation or underestimation of revenue and expenditures are significant. A positive and significant  $\lambda$  suggests that budgets systematically over-predict revenue or expenditure items and vice versa with a negative and significant  $\lambda$ . The results of Holden-Peel tests for major line items are reported in the tables for each country.

$$F_t - A_t = \lambda + u_t \quad \dots \quad (3)$$

In addition to forecast evaluation for each country using these tests, we undertake an exploratory analysis of the relationship between fiscal forecast errors and macroeconomic projections using panel and fixed-effects regressions. The rationale is that inaccuracy in expenditure and revenue projections could also stem from errors in underlying macroeconomic forecasts of growth and inflation. Unfortunately, none of the countries in our sample maintain a data series of official macroeconomic forecasts that could be used for analyses of this kind. Therefore, we use the historical World Economic Outlook forecasts published by the International Monetary Fund. IMF country staff makes two projections each year during the spring and fall; we use the spring projection of the past fiscal year to proxy the changes in growth and inflation expectations when the budget process is underway and the last estimate of actual outcome. We aggregate these variables into panel data (with its many sample limitations) and run two sets of fixed-effects regressions. The first model takes the form of equation 4 below where  $REV\_ERROR_{it}$  represents errors in revenues in a country  $i$  in year  $t$ . The variable  $GDP\_ERROR_{it}$  represents errors in the WEO growth forecasts,  $CPI\_ERROR_{it}$  measures variations in inflation expectations,  $\alpha_i$  denotes the set of country fixed effects, and  $\varepsilon_{it}$  is the error term with  $E(\varepsilon_{it}) = 0$  for all  $i$  and  $t$ .

$$REV\_ERROR_{it} = \gamma GDP\_ERROR_{it} + \beta CPI\_ERROR_{it} + \alpha_i + \varepsilon_{it} \dots (4)$$

$$EXP\_ERROR_{it} = REV\_ERROR_{it} + \beta x_{it} + \alpha_i + \varepsilon_{it} \dots (5)$$

Following the same approach, we also examine the determinants of deviations in the expenditure with a modified version in the form of equation 5 where vector  $x_{it}$  represents the macroeconomic variables. The underlying expectation is that revenue shortfalls or surpluses are an additional factor that influences expenditure deviations. There are significant limitations of this analysis, however, since we do not have enough observations to draw robust conclusions, and there are concerns with endogeneity;

therefore, the results could only be interpreted as correlations between these variables. Future work with larger samples and more controls would be better placed to expand on these relationships.

Lastly, some additional data on governance parameters of these countries is reported in the Appendix tables (Table A1-A3). The main data sources for governance indicators include –Country Policy and Institutional Assessment (CPIA) reports from the World Bank, World Governance Indicators, Open Budget Index and ranks from the Open Budget Partnership, Corruption Indices from Transparency International, and Democracy Scores from Polity Data Series. These data are not consistently available across all years, except for WGI. One indicator from WGI – government effectiveness-- has clear implications for budget credibility; therefore, we have also reported scatterplots of government effectiveness against our revenue and expenditure error estimates in the Appendix (Figure A1). Appendix table A4 provides a concise political and institutional background of each country and lists major budget reforms that we refer to while examining patterns and trends in the data in the next three sections. The table draws from various government websites, reports, and the Budget Practices and Procedures Survey that is periodically conducted by CABRI and the OECD.

#### **4. Senegal**

During the last 20 years, Senegal's tax to GDP ratio has increased from around 12.6 percent in 2001 to about 16.6 percent in 2019 (OECD/ATAF, 2021a). During the same period, budgetary nominal revenue and expenditures have increased eight-fold from with some decline witnessed in the wake of the economic crisis posed by the Covid-19 pandemic. Figure 4.1 shows the trends in selected revenue and expenditure aggregates during the 2000-2020 period, including budgetary forecasts and realizations. In the aftermath of tumultuous events that led to the devaluation of CFA Franc in 1994, the WAEMU members, including Senegal, adopted a set of convergence goals and that could possibly explain improvements in Senegal's budget estimates in the early 2000s. The forecast and actuals for total

revenue and expenditure continued to have relatively low differences until about the 2008-2009 recession, but the differences have been more volatile in the subsequent decade. In 2015, the weak compliance with earlier convergence criteria prompted the WAEMU's head of states to adopt a revised surveillance framework and that along with other concurrent reforms such as the adoption of *Plan Senegal Emergent*, these factors may have prompted changes in the trajectory of budgetary forecasts during five years leading up to the Covid19 pandemic.<sup>10</sup>

It is also worth noting that Senegal has been in financial arrangements with the IMF with virtually no interruption between 1979 and 2010. From 2011 onward, Senegal did not have any such arrangements, excluding recent “rapid” and contingent arrangements at the onset of the pandemic in early 2020 that have not been drawn.<sup>11</sup> The point here is that revenue projections up to 2010 may have reflected inputs provided in negotiating IMF conditionality, combining thus the mixed characteristics of a “pure” forecast and program targets.<sup>12</sup> As discussed below, volatility in forecast errors appears to have increased over the last decade. The revenue budget estimates remained higher than the actuals for most years after the 2000-2001 recession, but this pattern changed in the years leading up to the 2020 economic slowdown.

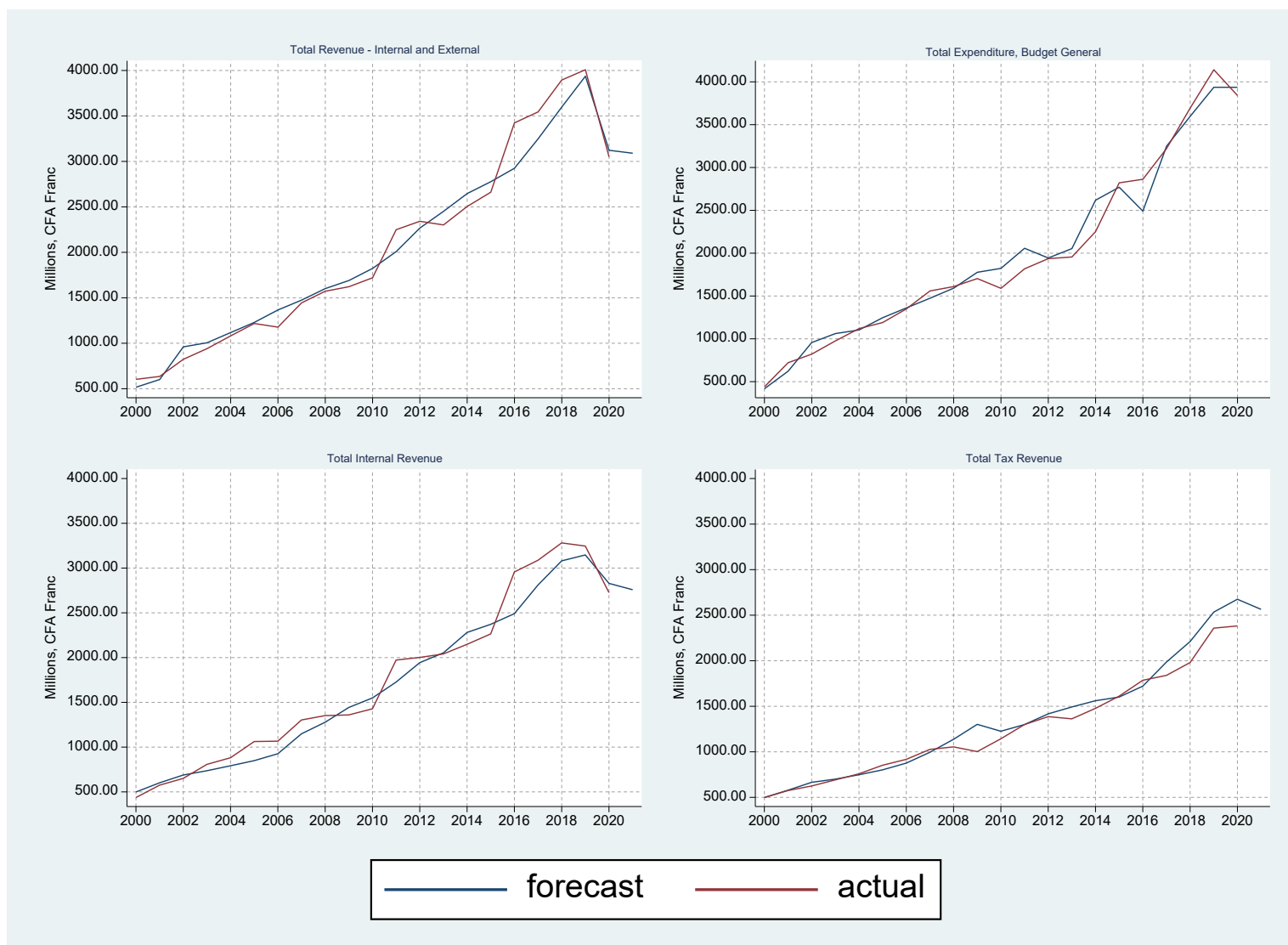
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<sup>10</sup> For details on WAEMU Convergence Goals, see Antonio C. David, Alexandre Nguyen-Duong and Hoda Selim (2022) Strengthening the WAEMU Regional Fiscal Framework, WP/22/49, International Monetary Fund, Washington DC.

<sup>11</sup> The Rapid Credit Facility (RCF) provides low-access, concessional financial assistance to Low-Income Countries (LICs) facing an urgent balance of payments need, without *ex post* conditionality. It can provide support in a wide variety of circumstances, including shocks, natural disasters, and emergencies resulting from fragility. The Rapid Financing Instrument (RFI) provides rapid and low-access financial assistance to member countries facing an urgent balance of payments need, without the need to have a full-fledged program in place.

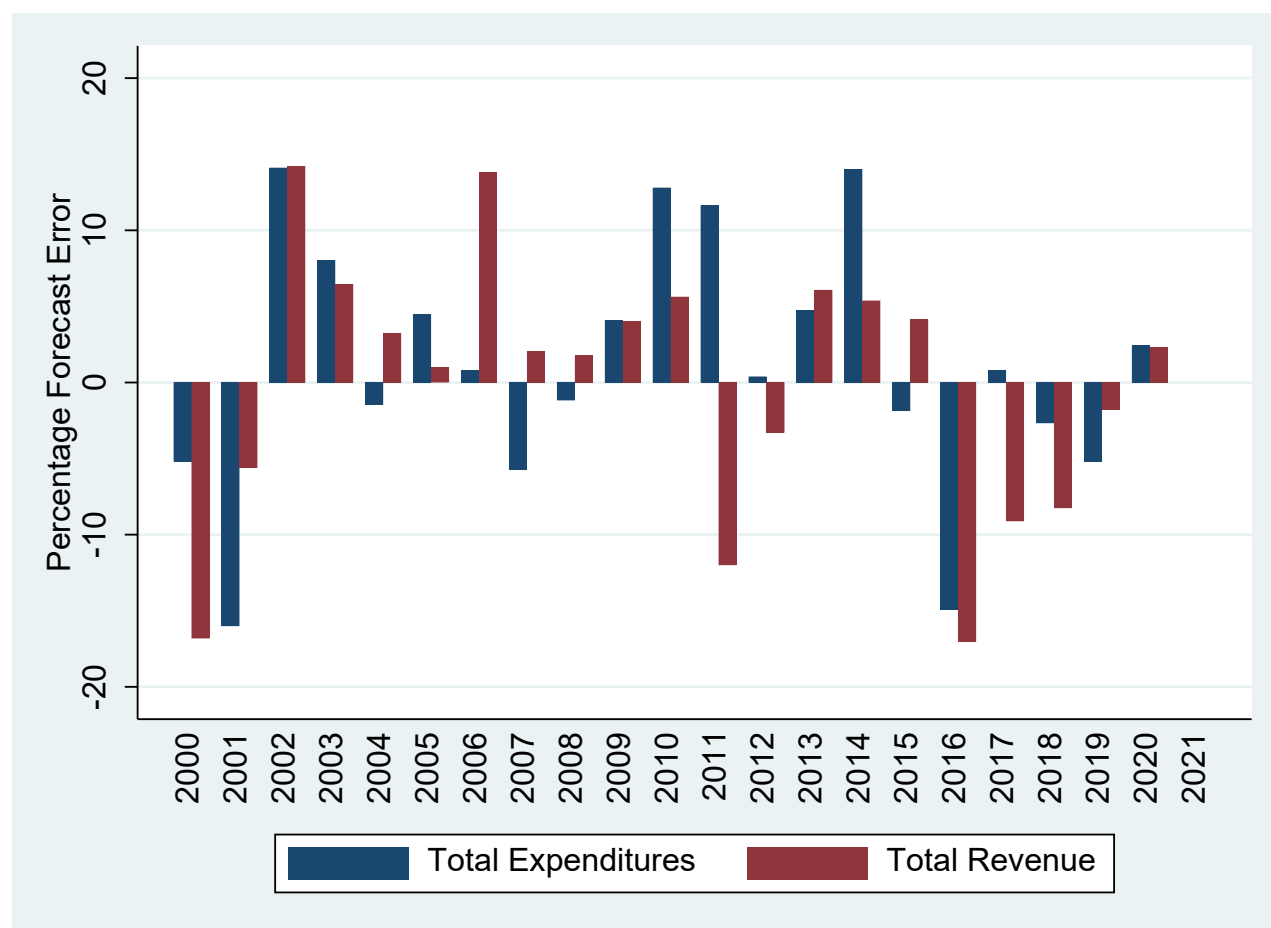
<sup>12</sup> Similar considerations apply to Rwanda and Uganda. Rwanda was under various financial arrangements with the IMF between 1991 through 2017, with the exception of the 1994-98 period, and until the recent Policy Coordination Instrument adopted in 2020—a non-financial arrangement aimed at signaling policy commitment to reforms. Uganda has been under a number of IMF financial arrangements between 1991 through 2006; in 2020 was granted a three-year Extended Credit Facility.

**Figure 4.1: Budget Forecasts and Ex-Post Realizations for Major Fiscal Outcomes, Senegal 2000-2020**



The patterns in total revenue and expenditures errors are presented in Figure 4.2, which plots the Percentage Forecast Error (budget—actual) for total revenue and expenditures. The general pattern is relatively similar for expenditure errors as well, with higher volatility. The years after the adoption of *Plan Senegal Emergent* (PSE) and revised WAEMU convergence goals are characterized by notable changes in budgeting with a higher tendency to underestimate revenues and expenditures.

**Figure 4.2: Percentage Forecast Errors in Total Revenue and Total Expenditures**



The error measures for most revenue line items in Senegal are reasonably small and with not very high forecast errors compared to some of the countries in Sub-Saharan Africa and the Western African Economic and Monetary Union (WAEMU). Gonguet et al. (2016) examined the forecast deviations in selected WAEMU countries during the 2010-2015 period and countries such as Cote d'Ivoire, Chad, Niger, Cameroon, and the Republic of Congo had substantially higher errors in total than



Senegal, which is consistent with the magnitude of errors we see in our sample. Table 4.1 provides a detailed overview of ME, MAPE, and results of the Holden-Peel test.

**Table 4.1: Forecast Evaluation for Major Revenue and Expenditure Categories in Senegal**

<b>Revenue Category</b>	<b>MPE</b>	<b>MAPE</b>	<b>ME/ <math>\hat{\lambda}</math></b>	<b>p-value</b>	<b>Obs</b>
Total Other Revenue (Total Autres Recettes)	-245.43	262.38	-95.64**	0.0204	21
Other Tax Revenue (Autres Recettes Fiscales)	-62.56	134.86	16.91	0.1397	20
Other Non-Tax Revenue (Autres Recettes Non Fiscales)	-58.85	128.03	2.91	0.1546	21
Total Non-Tax Revenue (Total Recettes Non Fiscales)	-12.07	25.85	0.41	0.8891	21
Total Internal Revenue (Total Ressources Internes)	-4.07	8.88	-66.80*	0.0643	21
Total Resources General Budget	-0.18	6.87	-21.49	0.5853	21
Taxes on Income and Capital Gains	0.19	15.50	0.72	0.9137	21
Total Direct Taxes (Total Impôts Directs)	<b>0.51</b>	<b>7.10</b>	9.20	0.2942	21
Total Tax and Non-Tax Revenue	2.85	6.12	64.30**	0.0201	21
Tax Revenues (Recettes Fiscales)	<b>3.65</b>	<b>5.57</b>	66.53**	0.0112	21
Total Indirect Taxes (Total Impôts Indirects)	<b>4.81</b>	<b>6.72</b>	57.60***	0.0064	21
Total External Revenue (Total Recettes Externes)	16.64	22.91	57.32**	0.0309	19
<b>Expenditure Category</b>					
Public Debt (Dette Publique)	-16.88	22.22	-22.97*	0.0855	21
Other Current Transfers (Autres Transferts Courants)	-10.74	30.58	9.47	0.7681	20
Capital Transfers	-6.49	13.40	-16.09	0.5129	13
Personnel Expenses	-0.90	3.15	-5.53	0.1341	21
Total Expenditures Budget General	1.15	6.32	22.07	0.5298	21
Functional Expenditures	5.61	15.25	121.24	0.2558	21
Capital Expenditures	10.67	15.06	79.62**	0.0145	21
Investments by Government	35.91	37.74	124.70***	0.0025	15

Note: The line items are sorted in decreasing order of mean percentage forecast error.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4.2: Decade-Wise Disaggregated Forecast Bias, Senegal**

<i>Revenue Category</i>	Period	ME/ $\hat{\lambda}$	p-value	Obs
Total Other Revenue (Total Autres Recettes)	2001-2010	-26.87	0.4680	10
	2011-2020	-		
Other Tax Revenue (Autres Recettes Fiscale)	2001-2010	172.36**	0.0263	10
	2011-2020	3.74	0.4792	10
Other Non-Tax Revenue (Autres Recettes Non Fiscales)	2001-2010	30.08	0.1872	10
	2011-2020	-1.42	0.5529	10
Total Non Tax Revenue (Total Recettes Non Fiscales)	2001-2010	7.53**	0.0271	10
	2011-2020	-3.59	0.2260	10
Total Internal Revenue (Total Ressources Internes)	2001-2010	6.59	0.1793	10
	2011-2020	-43.99	0.2504	10
Total Resources General Budget	2001-2010	-98.90	0.1468	10
	2011-2020	58.17**	0.0365	10
Taxes on Income and Capital Gains	2001-2010	-99.92	0.1934	10
	2011-2020	4.07	0.5942	10
Total Direct Taxes (Total Impôts Directs)	2001-2010	-2.30	0.8522	10
	2011-2020	7.83	0.4446	10
Total Tax and Non-Tax Revenue	2001-2010	12.41	0.4429	10
	2011-2020	25.72	0.4773	10
Tax Revenues (Recettes Fiscales)	2001-2010	111.08**	0.0141	10
	2011-2020	37.85	0.2765	10
Total Indirect Taxes (Total Impôts Indirect)	2001-2010	101.49**	0.0204	10
	2011-2020	30.01	0.2465	10
Total External Revenue (Total Recettes Externes)	2001-2010	89.06**	0.0146	10
	2011-2020	122.13**	0.0116	9
	2011-2020	-1.02	0.9578	10
<i>Expenditure Category</i>				
Dette Publique	2001-2010	-35.84**	0.0050	10
	2011-2020	-12.87	0.6176	10
Autres Transferts Courants	2001-2010	11.52	0.6829	10
	2011-2020	20.38	0.7364	10
Transferts en Capital	2001-2010	-22.25	0.3501	4
	2011-2020	-13.36	0.7056	9
Depenses Personnel	2001-2010	-0.24	0.9529	10
	2011-2020	-12.28*	0.0582	10
Total Depenses Budget General	2001-2010	45.24	0.1547	10
	2011-2020	11.06	0.8724	10
Depenses de Fonctionnement	2001-2010	46.03	0.4377	10
	2011-2020	218.96	0.3272	10
Depenses En Capital	2001-2010	97.33*	0.0820	10
	2011-2020	69.92	0.1085	10
Investments by Government	2001-2010	176.33**	0.0557	10
	2011-2020	90.28	0.0161	9

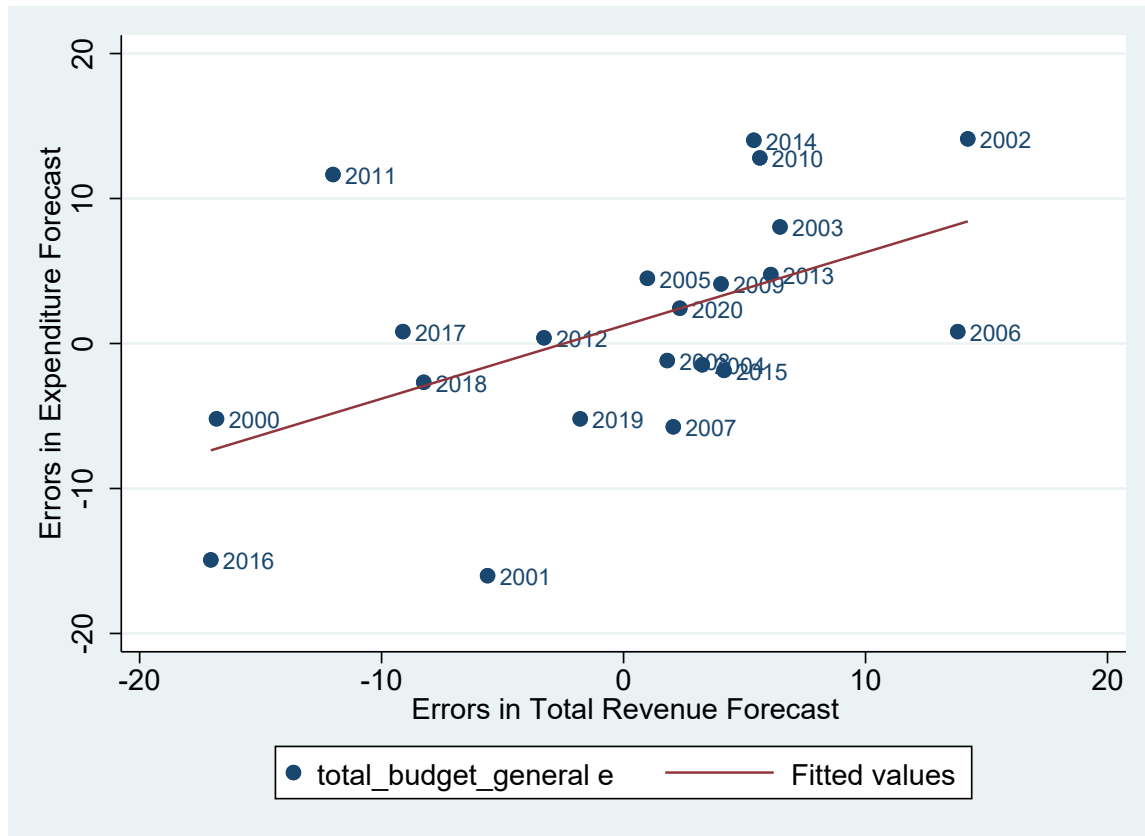
Note: The line items are sorted in decreasing order of full-sample MPFE.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

MPE for Total Resources Budget General is low for the entire 2000-2020 period at -0.18 and corresponding MAPE was 6.87 percent. Major tax revenue items such as Total Direct Taxes and Total Indirect Taxes stayed within the 5 percent threshold of MPE and low absolute errors during the study period. The analysis of bias parameters suggests that significant upward bias in domestic revenues was primarily driven by the overestimation of indirect taxes, including Value Added Tax –the largest tax revenue source for the government.

The forecast patterns for expenditures are also substantially reliable, with MPE for total budgetary expenditures at 1.15 percent and an absolute error of 6.32 percent during the last two decades. Most expenditure items do not suggest significant bias, except capital expenditures. Some earlier research (de Renzio et al., 2019) suggests that cuts in capital expenditures are one of the mechanisms governments deploy to balance budgets and address mid-year revenue shortfalls or expenditure increases – this could be a potential explanation for this pattern, but it requires closer scrutiny. We do find a strong correlation between revenue and expenditure errors (Figure 4.3) which is consistent with previous studies on the subject, such as Addison (2013) and de Renzio et al. (2019).

**Figure 4.3 Expenditure Errors vs. Revenue Errors, Senegal**

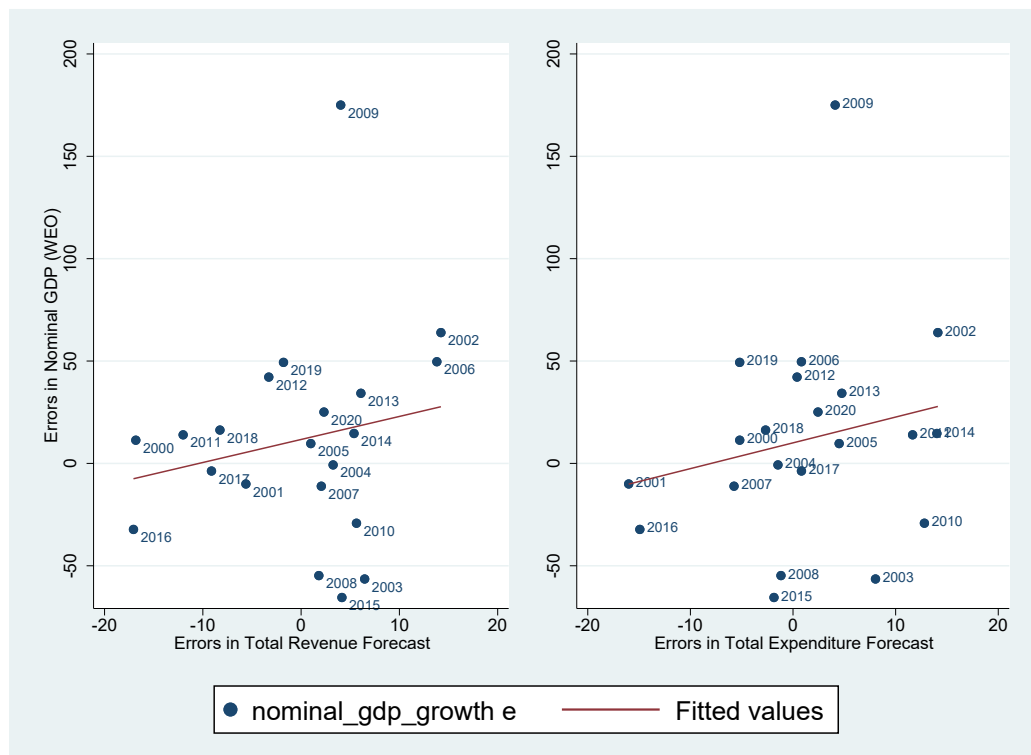


A closer look at decadal patterns suggests that systematic bias in overestimating capital expenditures was more prevalent in the 2001-2010 period than in recent years (Table 4.2). On the other hand, during the 2001-2010 period the government overestimated functional expenses by 46.03 million francs, but this increased four-fold in the subsequent decade when the government overestimated functional expenses by 218.96 million francs. During the same period, the government spent more on personnel expenses than it initially budgeted which could be one of the reasons for the reallocation of available resources across line items. To examine if there are significant shifts in the patterns of revenue and expenditure errors, Figure 4.4 reports the results of CUSUM test from which we can infer that despite some evidence of bias in revenue and error projections, there is no significant break in the patterns of errors during the twenty-year period.

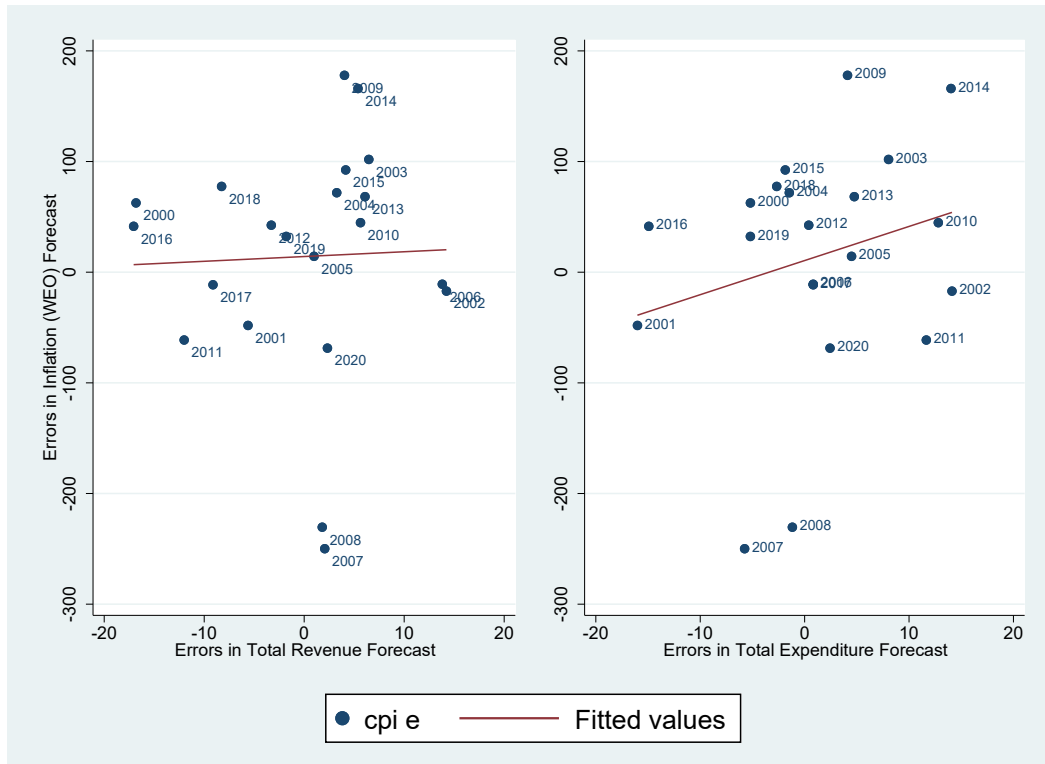
**Figure 4.4 Test for Structural Breaks in Revenue and Expenditure Errors, Senegal**



**Figure 4.5 Errors in Growth Forecast (Nominal) and Aggregate Fiscal Forecast, Senegal**



**Figure 4.6 Errors in Inflation Forecast and Aggregate Fiscal Forecast, Senegal**



The errors in fiscal and growth forecasts seem correlated, as shown in Figure 4.5. The years with substantial underestimation or overestimation of economic growth also appear to have corresponding changes in aggregate revenue and expenditures (with outliers of recession years).<sup>13</sup> In Senegal, the years that witnessed substantial deviations from sample averages included 2009 and 2002, we do not find very significant differences in 2020 – the year that was partially influenced by the Covid-19 pandemic. These patterns also hold true for inflation forecasts (Figure 4.6) but with a weaker correlation compared to growth forecasts.

## 5. Uganda

In 1995, Uganda adopted the current constitution – fourth one since gaining independence from UK in 1962. National Resistance Movement led by President Museveni has been in power since 1986. The government of Uganda has been involved in public financial reform since the resistance government came to power with stated goals of eradicating poverty, strengthening governance, and encouraging

<sup>13</sup> The IMF 2019 Fiscal Transparency Evaluation states that “real GDP growth forecasts underlying the proposed budgets of recent years do not seem to have any significant bias,” p. 37.

growth. Though revenue collection has expanded significantly in nominal terms in the last two decades, the increase in the tax-to-GDP ratio has been modest.<sup>14</sup> In 2001, Uganda’s tax-to-GDP ratio was 8.2 percent compared to 12.1 percent in 2019 (OECD/ATAF, 2021b), which is less than average of 30 African countries in the OECD/ATAF database. Uganda’s domestic revenue projections errors are relatively low, but with a general tendency for a small overestimation in most of the years.<sup>15</sup> On the other hand, grants are significantly overestimated in the budgets, as shown in Figure 5.1. The tax structure of Uganda includes direct taxes such as personal income tax, corporate income tax, rental income tax, and withholding tax; indirect/consumption taxes such as excise duties, value-added tax, and trade taxes (Uganda Ministry of Finance, 2019). In Fiscal Year 2018-2019, the largest percentage of revenues (16.6%) was a result of pay as you earn (PAYE) direct taxes, followed by the value-added tax on imports (15.7%). Trade taxes on petroleum represented the third-highest revenue collection category (12.0%).

On the expenditure side, the differences in budget projection and actuals are more prominent with overestimation of expenditures and for most of the years.<sup>16</sup> Figure 5.2 also shows the corresponding trend in development expenditures, current expenditures, and external development expenditure. Figure 5.3 plots the percentage forecast errors aggregate revenue and expenditures and time trend in forecast error shows that the last decade has been particularly worse compared to the 2000s and the projection errors have increased substantially during this period, which is also confirmed by more granular analysis reported in the tables.

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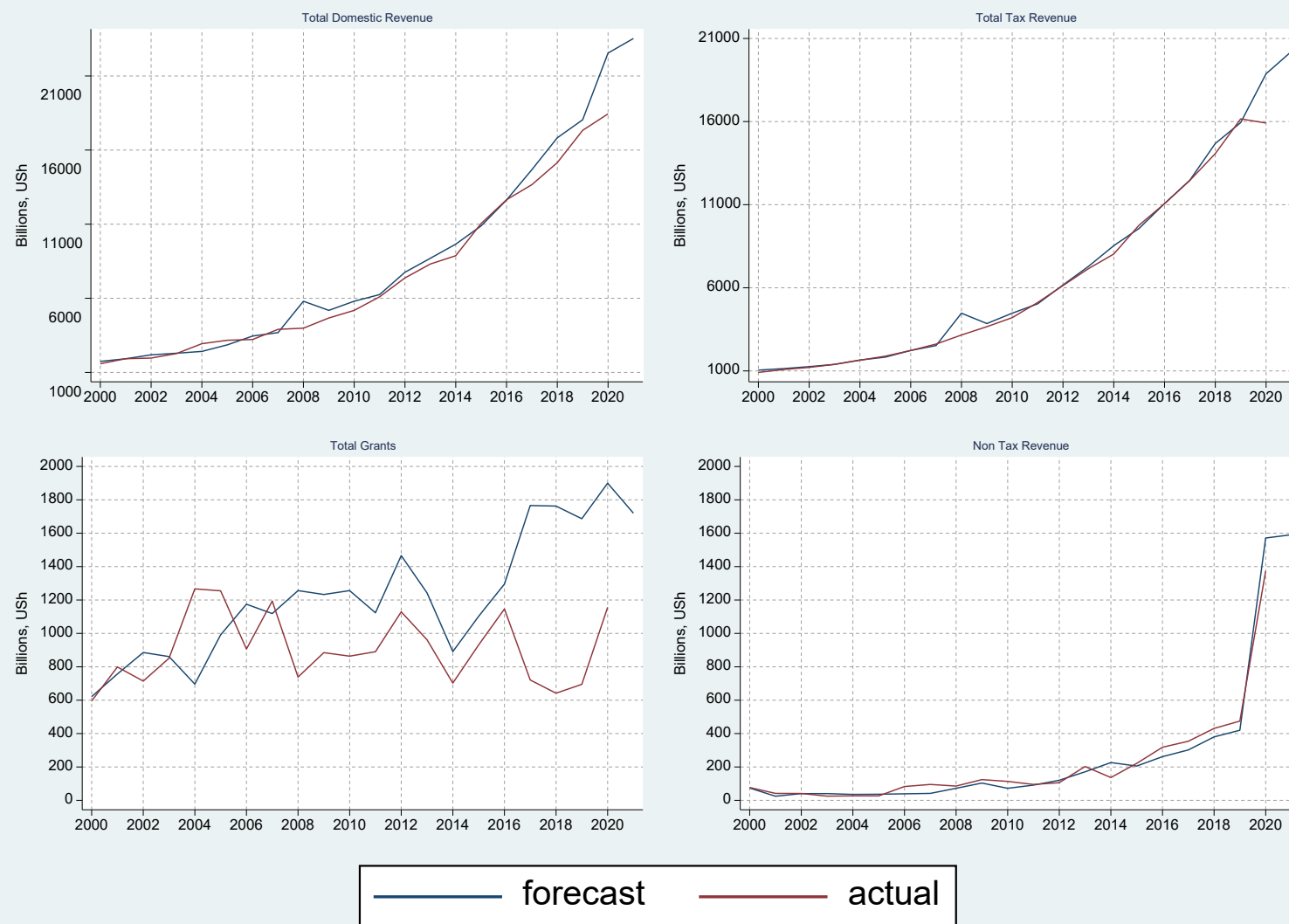
<sup>14</sup> In nominal terms, the total tax revenue collections were about 1 trillion Uganda shillings in 2001, and this increased to about 22 trillion Uganda shillings in 2020 (1 USD= approximately 3600 Uganda shillings in 2021-2022).

<sup>15</sup> According to the IMF 2017 *Fiscal transparency Evaluation*, Uganda’s revenue forecasts “have generally been cautious and the forecast errors were relatively low for the budget and the two outer years,” p. 29.

<sup>16</sup> This confirms the IMF earlier findings that “expenditure forecast errors reflect significant variations between multi-year projections and annual outturns. This amounts to 2.7, 9.4, and 10 percentage points for the budget and two outer years,” (IMF, 2017), p. 30.



**Figure 5.1 Forecasts and Ex-Post Realizations for Major Revenue Outcomes in Uganda, 2000-2020**



**Figure 5.2 Forecasts and Ex-Post Realizations for Major Expenditure Outcomes, 2000-2020**

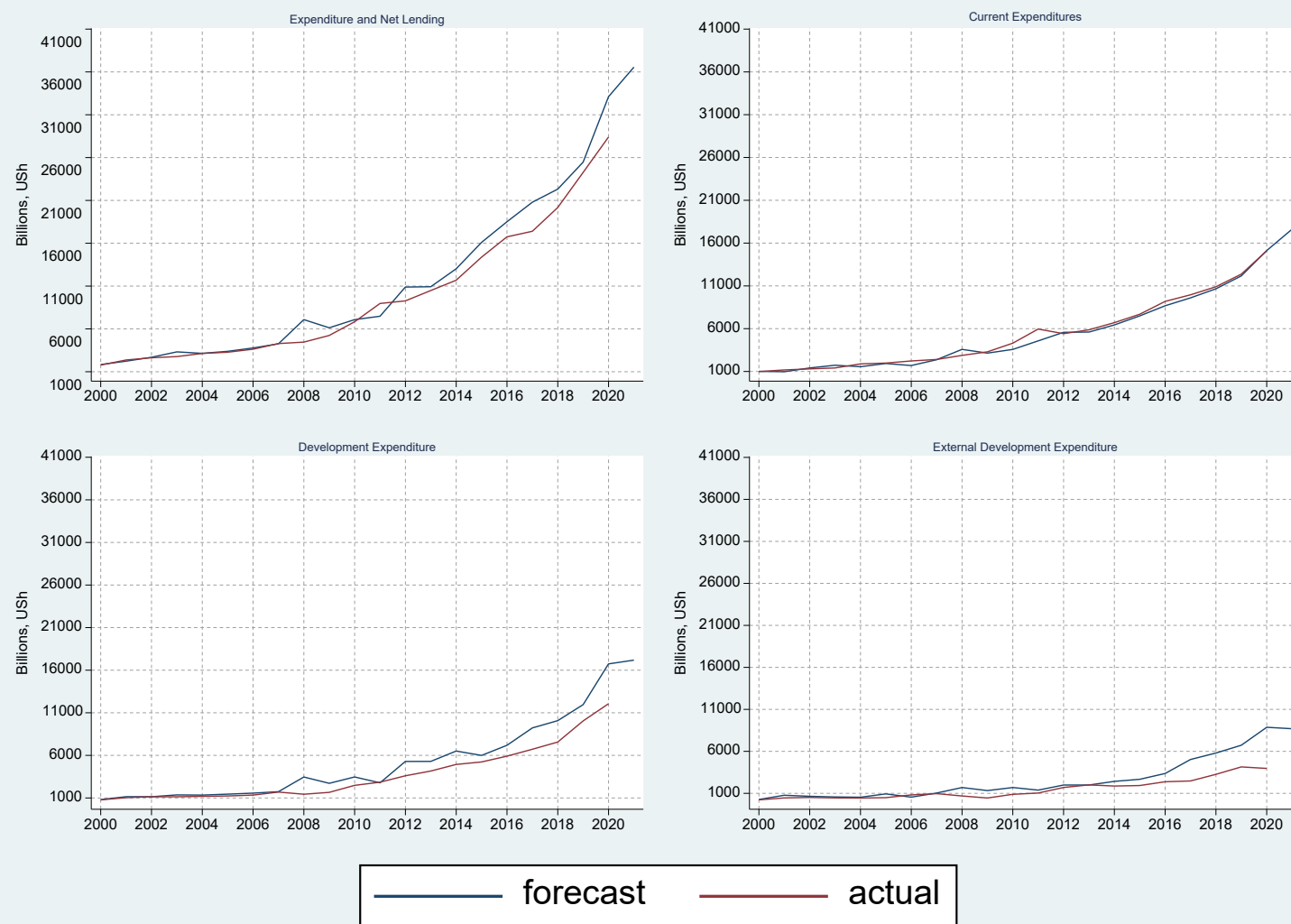


Table 5.1 and 5.2 provide an overview of the projection errors across major line items and the two decades. Uganda performs quite well on domestic revenue projections with MPE of only 3.41 for domestic revenue and MAPE of 5.13, which is comparable to the 5-percent standard used in many high-income countries. The errors in domestic revenue are primarily driven by errors in non-tax revenue being underestimated by 12 percent, but non-tax revenue constitutes a very small proportion of revenue collections. On the expenditure side, the mean percentage error for aggregate expenditures stands at 7.2 percent, marginally more than that of aggregate revenue at 5.39 percent. The errors in expenditures are primarily driven by development expenditures where the budgets tend to overestimate these line-items by an average of around 20 percent compared to actuals at the end of fiscal year. This could be explained by the general tendency to overestimate the external development grants from donors which often are not fulfilled or executed with some delays.

Table 5.1 also sheds light on systemic bias in the revenue and expenditure forecasts using the Holden-Peel test statistic. As noted earlier, the overestimation of grants is a significant feature of the budgeted revenue. We see the test statistic for total grants and project grants are significant at one percent level of significance. Similarly, on the expenditure side – overestimation of externally-funded development expenditure is the primary source of error in the development expenditures and total expenditures. A closer look at decadal patterns using Holden-Peel test statistics in Table 5.2 confirms that the 2011-2020 decade is the primary driver of significant errors in grants and development expenditures that influences the errors in aggregate outturns. The relationship between expenditure error and revenue errors is noteworthy in this regard and demonstrates how the shortfall in revenues or particularly grants in the case of Uganda influences mid-year cuts in the expenditure outlook. Figure 5.4 shows this strong positive correlation between revenue forecast and expenditure forecast across the two decades. Though there is evidence of forecast errors being more prominent in the last decade as

shown in Table 5.2, we do not find evidence of a significant structural break in any given year in CUSUM plots shown in Figure 5.5.

In Uganda, we also find evidence of a relationship between revenue and expenditure forecasts and macroeconomic forecasts of growth and inflation. Figures 5.6 and 5.7 show that under forecast or over forecast of economic growth is related to corresponding changes in revenues and expenditure forecast.<sup>17</sup> The recession years of 2002 and 2009 remain outliers where the growth forecast missed the target by large proportions, which could also be witnessed when the FY2020-2021 results are available. Uganda follows July 1-June 30 fiscal year and henceforth, the 2020 estimates were not significantly affected to that extent since Covid-19 influenced only the last quarter of that fiscal year. The relationship between the IMF's World Economic Outlook inflation forecast and revenue forecasts in Uganda is not very strong during the study period, but we do find a positive relationship between inflation estimates and expenditure forecasts. Section 7 approaches the relationships between inflation and fiscal forecasts more systematically in the context of three countries and elaborates on this issue in greater detail.

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<sup>17</sup> It is worth noting that real GDP growth appears to have been under forecast by an extent higher than in peer countries in the decade running through 2010 and over forecast in the successive decade. See IMF (2017), p. 28. This aspect is further discussed in section 7.

Figure 5.3 Percent Forecast Errors in Total Revenue and Total Expenditures

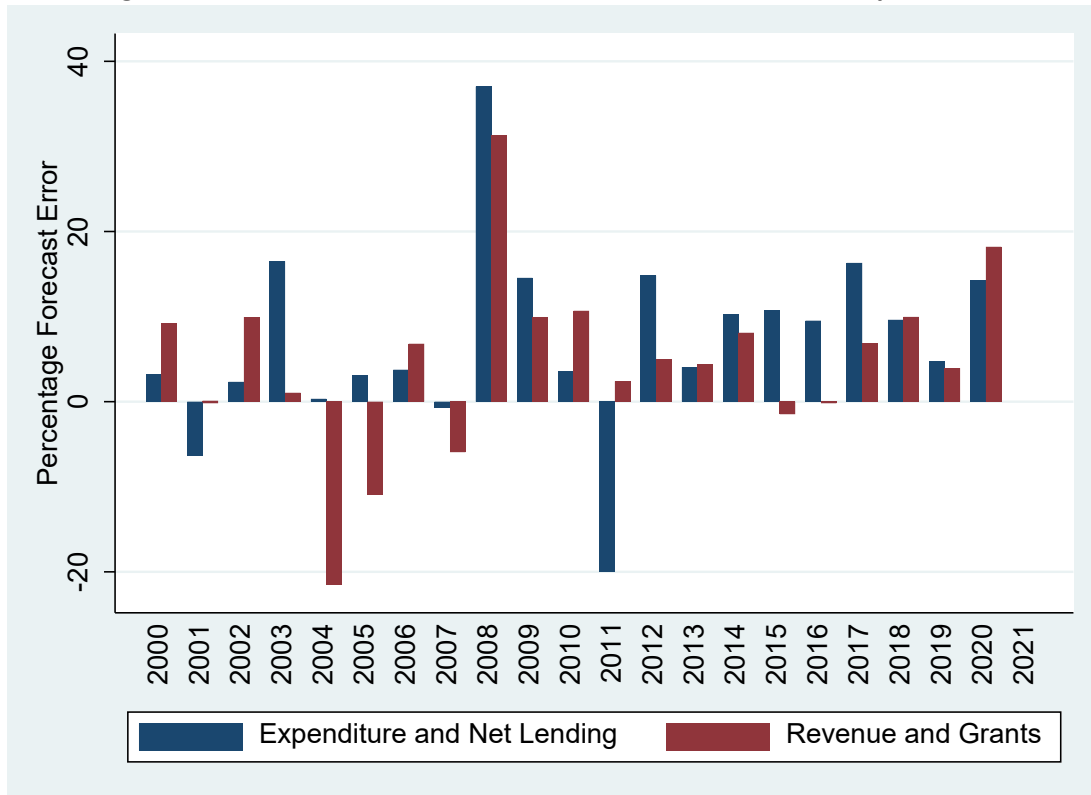
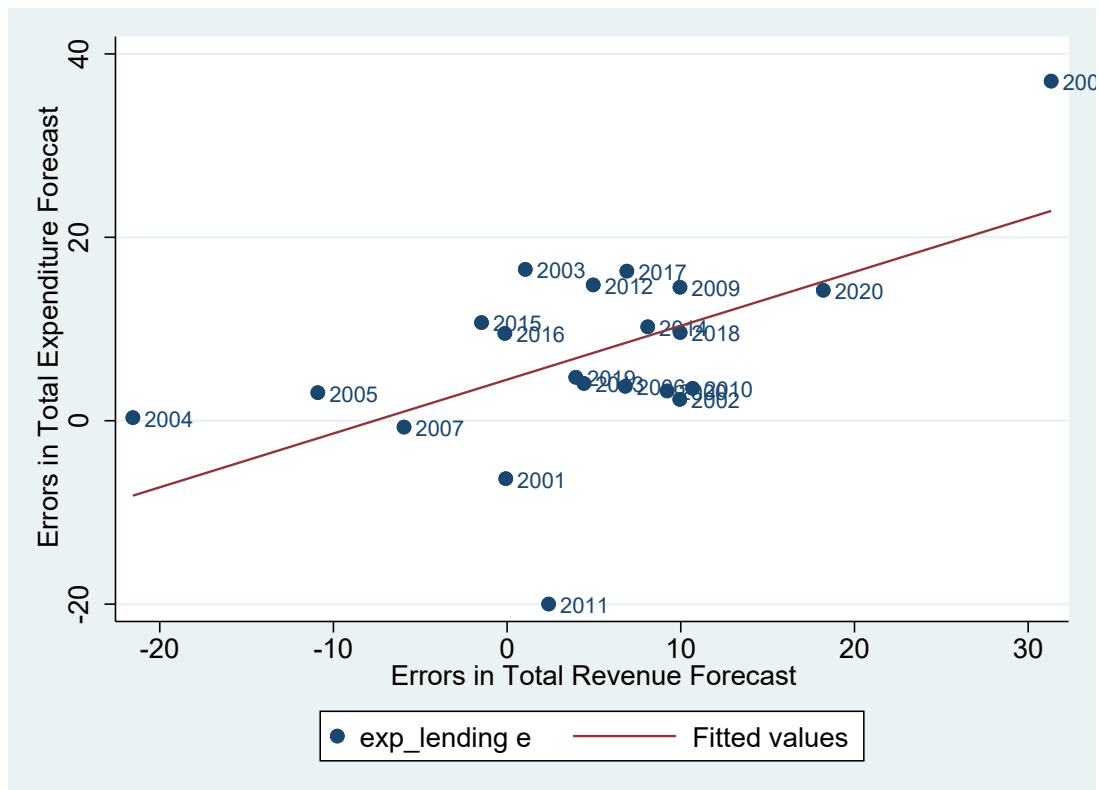


Figure 5.4 Expenditure Errors vs Revenue Errors, Uganda



**Table 5.1: Forecast Evaluation for Major Revenue and Expenditure Categories, Uganda**

	MPE	MAPE	ME/ $\hat{\lambda}$	p-value	Obs
Domestic Revenue	3.41	5.13	262.9695	0.1439	21
Tax Revenue	3.78	4.91	268.9348*	0.0948	21
Non-Tax Revenue	-12.06	27.32	-3.990983	0.7647	20
Grants	17.27	28.78	287.8387***	0.0051	21
Budget Support Grants	-20.30	57.77	1.088551	0.9780	21
Project Grants	21.92	34.76	290.8181***	0.0018	21
Total Revenue and Grants	5.39	7.94	566.7721**	0.0165	21
Expenditure and Net Lending	7.22	9.79	1016.75***	0.0033	21
Current Expenditures	-5.14	9.98	-196.3263	0.0409	21
Development Expenditures	19.10	19.34	1097.748***	0.0004	21
External Development	28.72	33.42	912.0084***	0.0032	21
Domestic Development	3.73	20.97	185.7405	0.1296	21

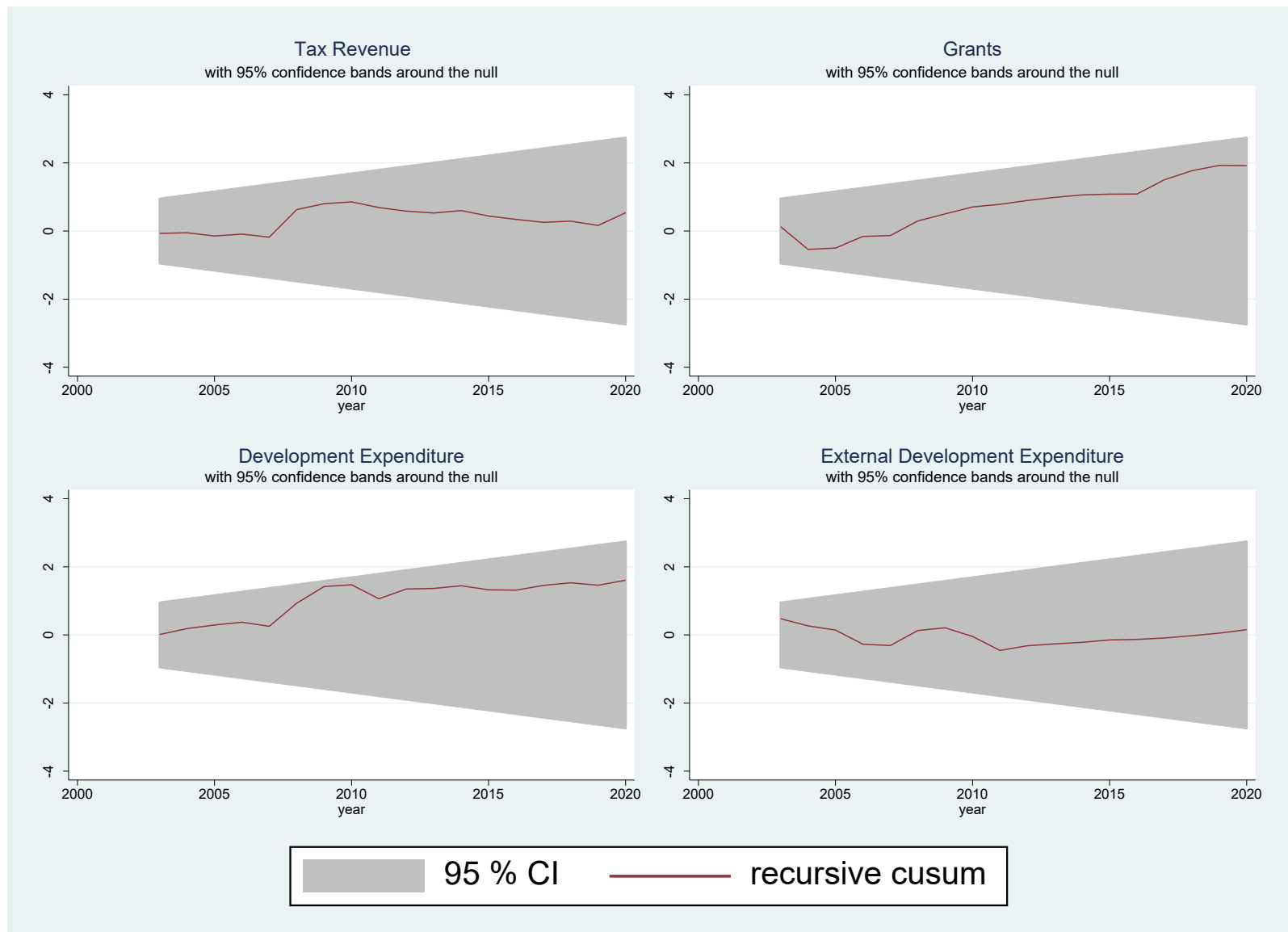
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5.2: Decade-Wise Disaggregated Forecast Bias, Uganda**

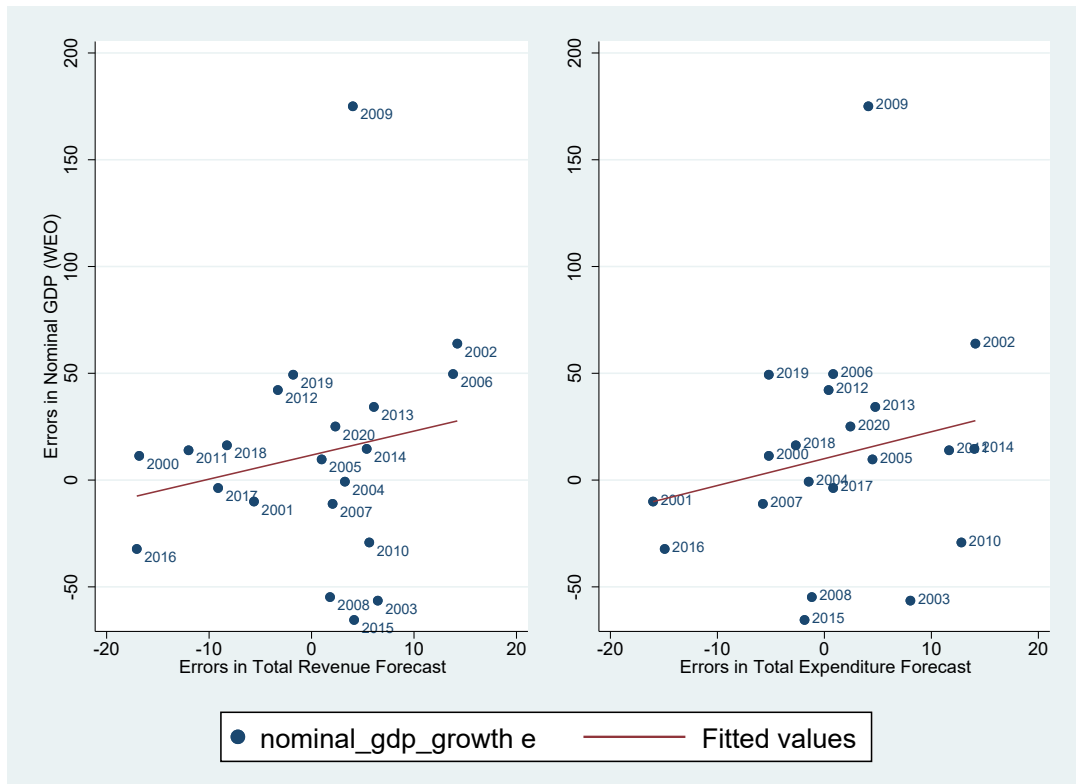
	Year	ME/ $\hat{\lambda}$	p-value	Obs
Domestic Revenue	2000-2010	162.0564	0.2463	10
	2011-2020	376.73	0.3045	10
Tax Revenue	2000-2010	173.761	0.2176	10
	2011-2020	377.252	0.2403	10
Non-Tax Revenue	2000-2010	-12.54396	0.1496	10
	2011-2020	3.607999	0.8919	10
Grants	2000-2010	75.747	0.4887	10
	2011-2020	526.1***	0.0025	10
Budget Support Grants	2000-2010	-24.55904	0.6703	10
	2011-2020	24.23	0.7041	10
Project Grants	2000-2010	108.948	0.1131	10
	2011-2020	501.77***	0.0041	10
Total Revenue and Grants	2000-2010	271.2974	0.2034	10
	2011-2020	902.86**	0.0478	10
Expenditure and Net Lending	2000-2010	445.898	0.1209	10
	2011-2020	1683.31**	0.0102	10
Current Expenditures	2000-2010	-91.299	0.5006	10
	2011-2020	-323.34**	0.0358	10
Development Expenditures	2000-2010	505.464**	0.0367	10
	2011-2020	1796.92***	0.0016	10
External Development	2000-2010	362.41**	0.0225	10
	2011-2020	1548.34**	0.0117	10
Domestic Development	2000-2010	143.025	0.2589	10
	2011-2020	248.61	0.2916	10

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

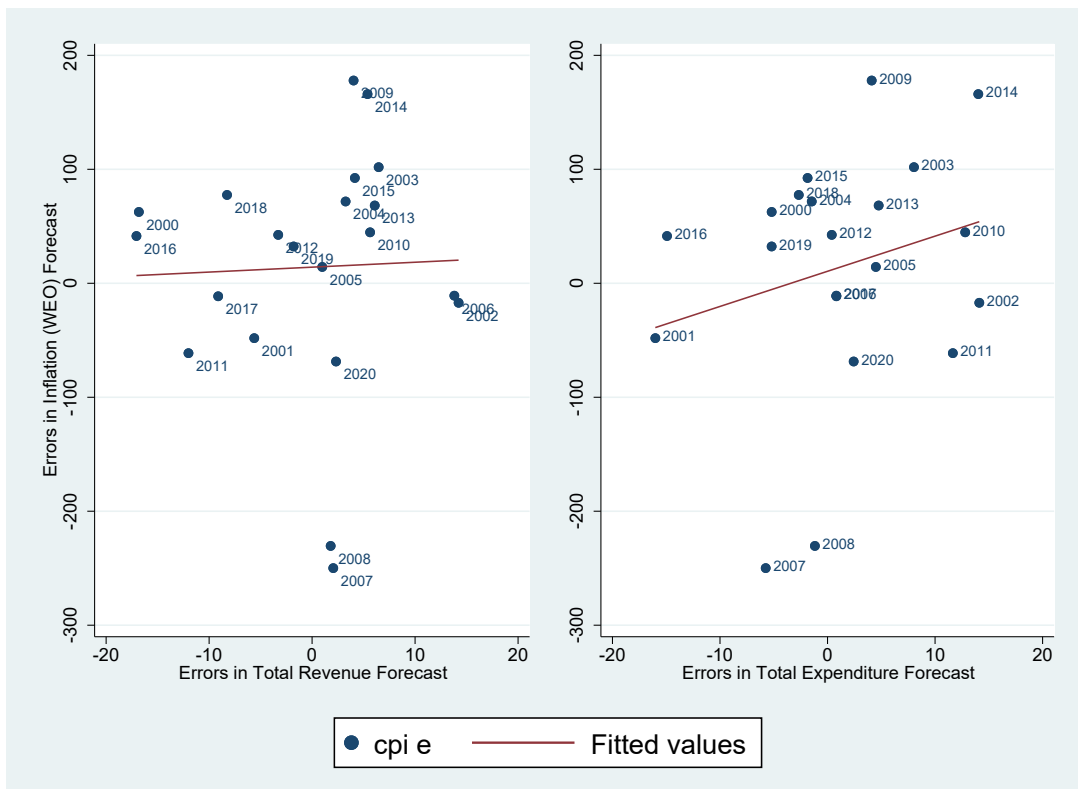
**Figure 5.5: CUSUM Plot of Error for Selected Fiscal Aggregates, Uganda**



**Figure 5.6: Errors in Growth Forecast (Nominal) and Aggregate Fiscal Forecast, Uganda**



**Figure 5.7: Errors in Inflation Forecast and Aggregate Fiscal Forecast, Uganda**



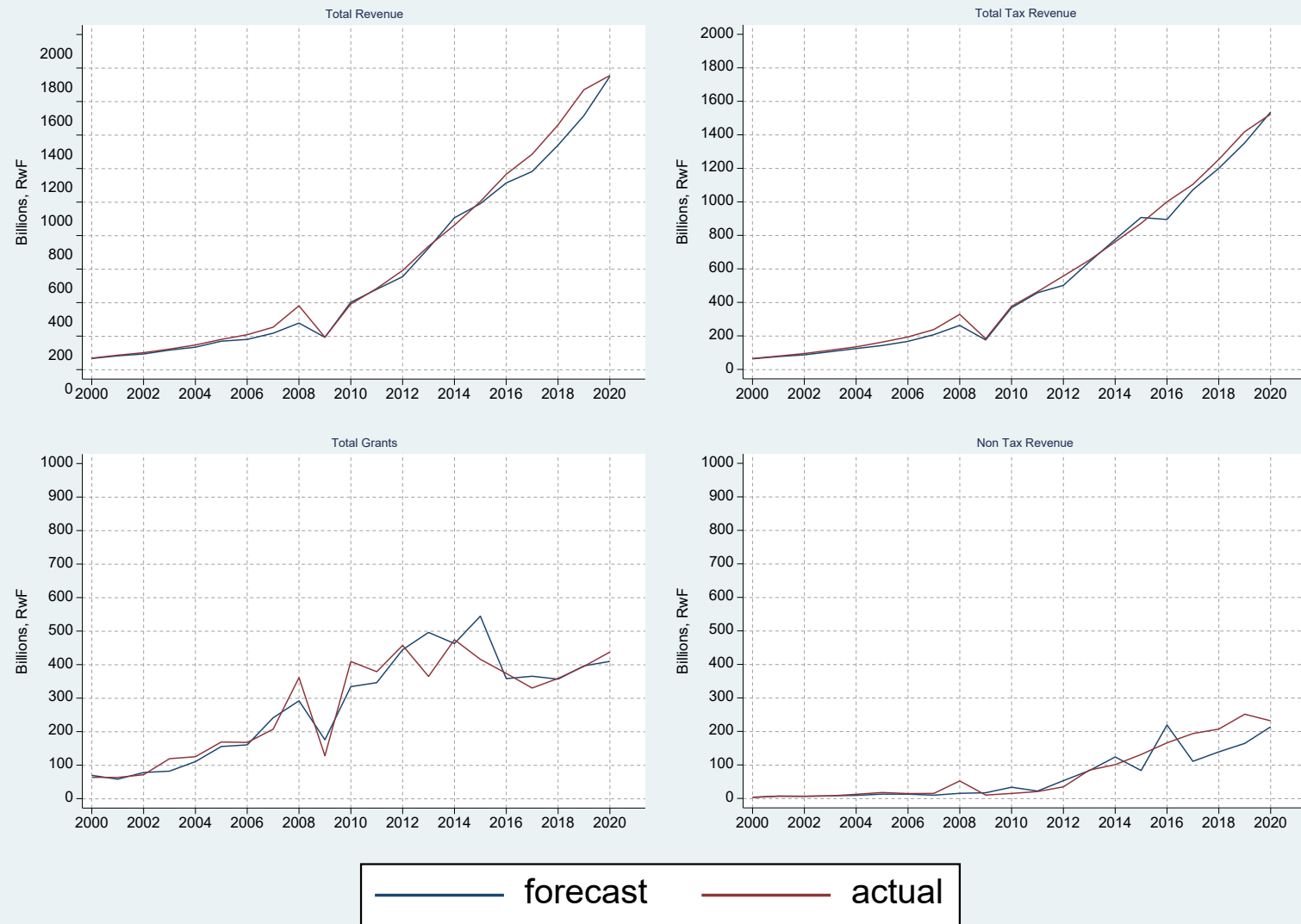


## 6. Rwanda

The economic and fiscal landscape of Rwanda has transformed significantly over the last two decades. As a result of the 1994 crisis, the economic output crashed by almost 50 percent and Rwanda's tax revenue collapsed by 40 percent from about \$225 million in 1990 to \$132 million in 1996 (Government of Rwanda, 2015; Schreiber, 2018). The new unity government led by the Rwandan Patriotic Front enacted a series of measures aimed at raising tax-to-GDP ratios – including the creation of Rwanda Revenue Authority in 1998, enacting VAT in 2001 to replace sales tax, modernization of income tax law in 2005, and further reforms in 2009 after joining the EAC. All of these initiatives yielded significant results with an increase in tax-to-GDP ratios and revenue collections. According to OECD/ATAF (2021), Rwanda's tax-to-GP ratio increased from 10.2 percent in 2000 to 17.7 percent in 2019, surpassing the average of 30 African countries in the Revenue Statistics in Africa. The total budgetary revenues increased from about 136 billion Rwandan Francs (1 US= approximately 1000 Rwandan Francs) to 2.0 trillion Rwandan Francs (Figure 6.1).

The general tendency in Rwanda has been to underestimate revenues and overestimate expenditures, with some variation across years. Figure 6.1 also shows the variation in tax revenue, grants, and non-tax revenue, the latter line-items being more volatile compared to tax revenues. The current expenditure has been overestimated through most of the last decade, and grant funding is less volatile than what we witness in Uganda (Figure 6.2). Figure 6.3 plots the annual percentage forecast errors for Rwanda; we notice significant changes in the budgetary patterns after Rwanda joined the EAC in 2009 and changed its fiscal year. From 2000-2008, the budget revenues were underestimated, and expenditures had the tendency of overestimation. The general pattern did not change significantly, but the magnitude of errors dropped sharply during the last decade.

**Figure 6.1: Budget Forecast and Ex-Post Realizations for Major Revenue Outcomes, Rwanda 2000-2020**



**Figure 6.2: Budget Forecasts and Ex-Post Realizations for Major Expenditures, Rwanda**

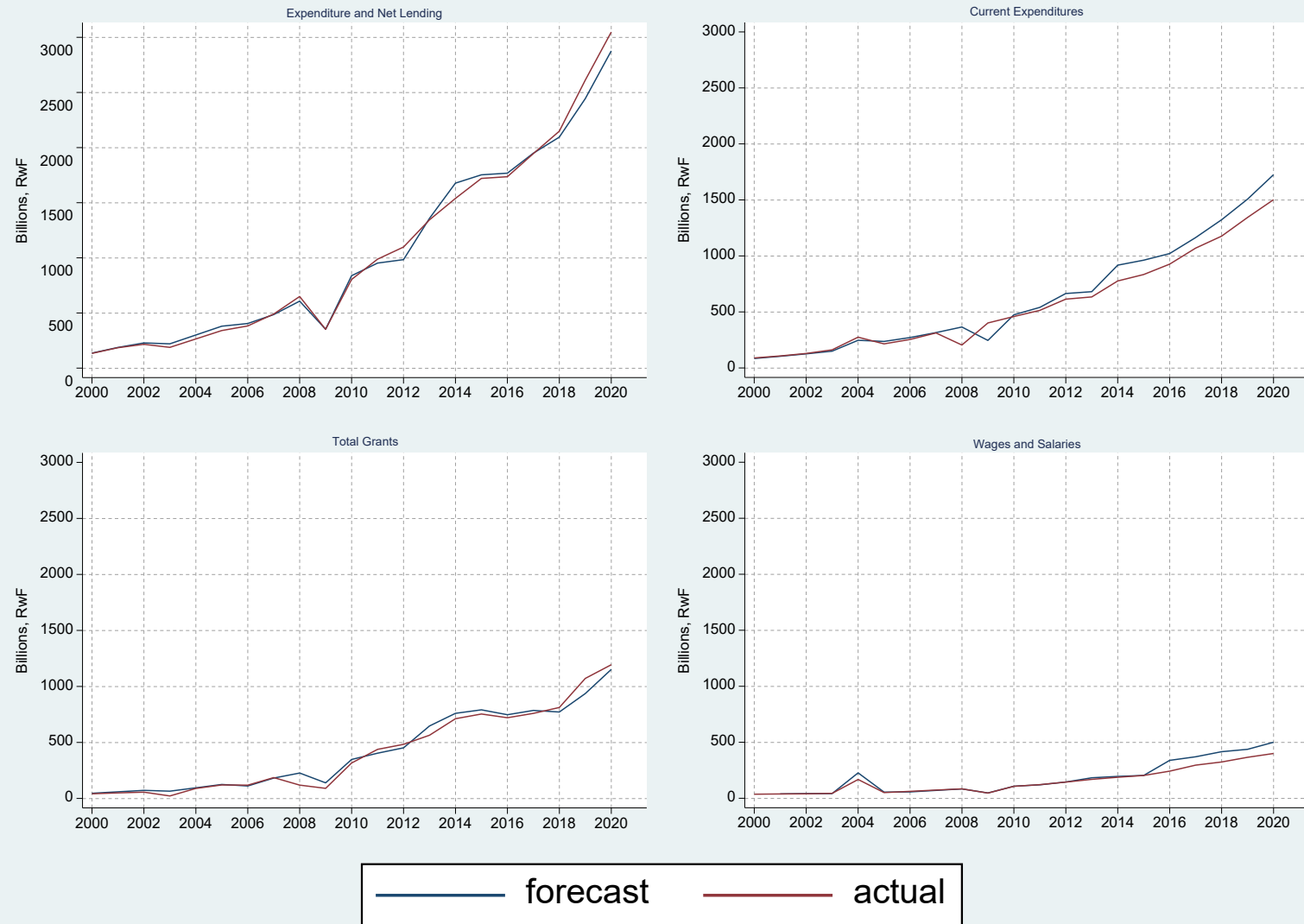


Figure 6.3: Forecast Errors in Total Revenue and Expenditures, Rwanda

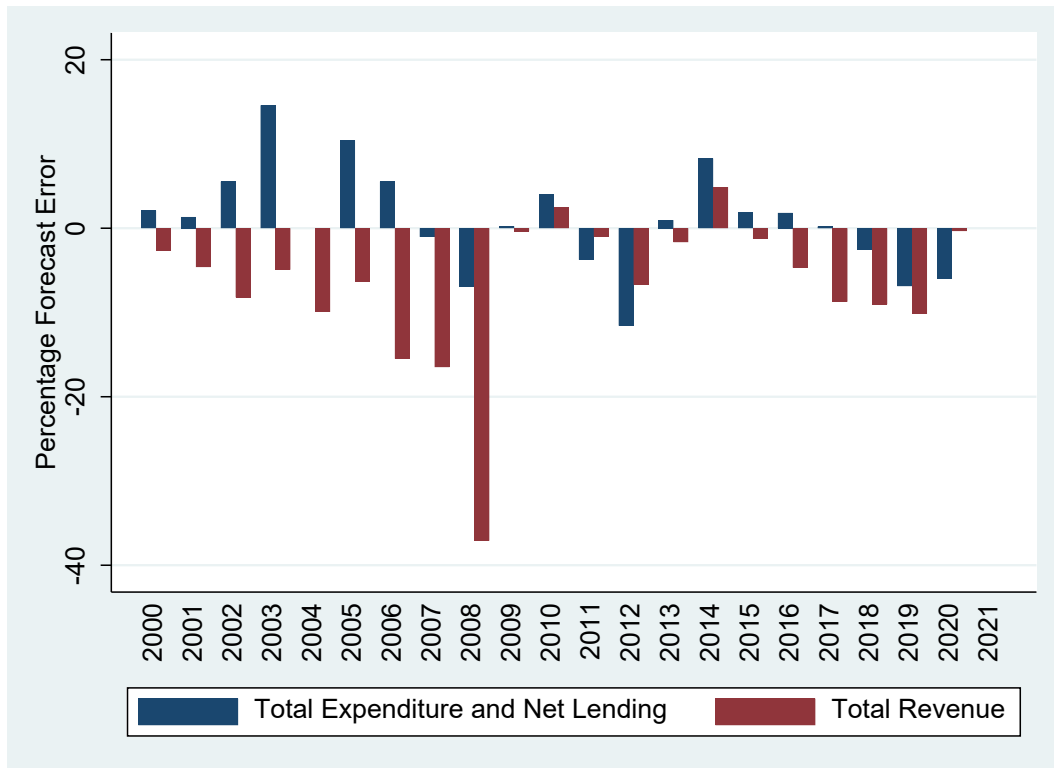
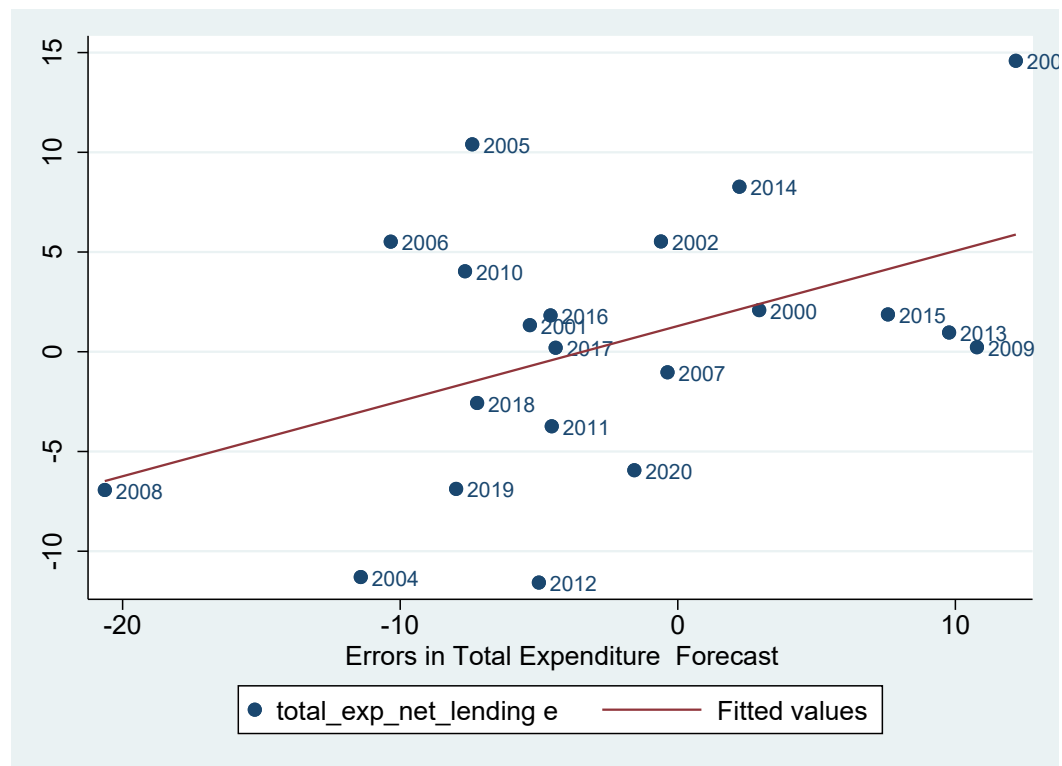


Figure 6.4: Expenditure Errors vs Revenue Errors, Rwanda



There is a positive correlation between expenditure errors and revenue errors (Figure 6.4), but trends in recent years primarily drive the pattern. Before the 2008 recession, revenue and expenditure errors moved in opposite directions across several years. The mean absolute percent error (MAPE) during the study period was around 7 percent, and MAPE for expenditures was around 4.5 percent (Table 6.1). The results for the Holden-Peel test indicate that underestimation of revenue in Rwanda is significant, but that is not true for central government spending. The revenue errors appear to be driven primarily by underestimation of direct tax revenue, which has MPE of 11.5 percent and MAPE of 14 percent. The underestimation of other revenue line items is also common but not significant. On the expenditure side, the overestimation of wages and salaries contributes to expenditures errors and contributes to errors in current expenditures. The spending on the purchase of goods and services and exceptional social expenditures (which includes spending on programs for victims of the 1994 genocide) tend to be underestimated. Despite the changes in the trend of MPE noted earlier, Table 6.2 does not establish a clear pattern of changes across two decades, and the CUSUM test also does not provide evidence of a structural break in any major fiscal series (Figure 6.5).

In Rwanda, we do find a relationship between revenue and expenditure forecasts and macroeconomic forecasts of growth and inflation, however, the strength of the relationship is weaker than in other countries, for instance, Uganda. Figures 6.6 and 6.7 show that the GDP growth forecast is related to corresponding changes in revenues and expenditure forecast. In Rwanda, 2008 and 2020 IMF Forecasts were significant outliers and are excluded from Figure 6.6. Figure 6.7 shows the relationship between errors in inflation expectations and fiscal forecasts where revenue errors are correlated with inflation errors, but the expenditures errors are not high in Rwanda, as we have noted earlier and show a weak correlation with expenditure errors. The next section discusses these relationships in greater detail for countries in our sample.

**Table 6.1: Forecast Evaluation for Major Revenue and Expenditures, Rwanda**

	MPE	MAPE	ME/ $\hat{\lambda}$	p-value	Obs
Total Revenue	-6.77	7.47	-31.388***	0.0081	21
Tax Revenue	-6.38	7.00	21.55461***	0.0066	21
Direct Taxes	-11.11	12.58	-15.5169***	0.0035	21
Taxes on Goods and Services	-12.40	14.64	-15.91654	0.1447	21
Taxes on International Trade	-3.94	24.94	10.27951	0.2983	21
Non-Tax Revenue	-21.17	39.40	-11.24021	0.1574	21
Total Grants	-1.67	12.94	3.161905	0.7813	21
Total Expenditure and Net Lending	-0.33	5.09	-11.89401	0.4502	21
Current Expenditures	5.08	12.99	57.66611***	0.0052	21
Wages and Salaries	5.09	8.23	22.35625**	0.0129	21
Purchases of Goods and Services	-12.88	51.52	65.3506***	0.0098	21
Exceptional Social Expenditure	-48.39	50.51	-22.856***	0.0029	21
Capital Expenditure	9.02	13.71	9.063693	0.4218	21

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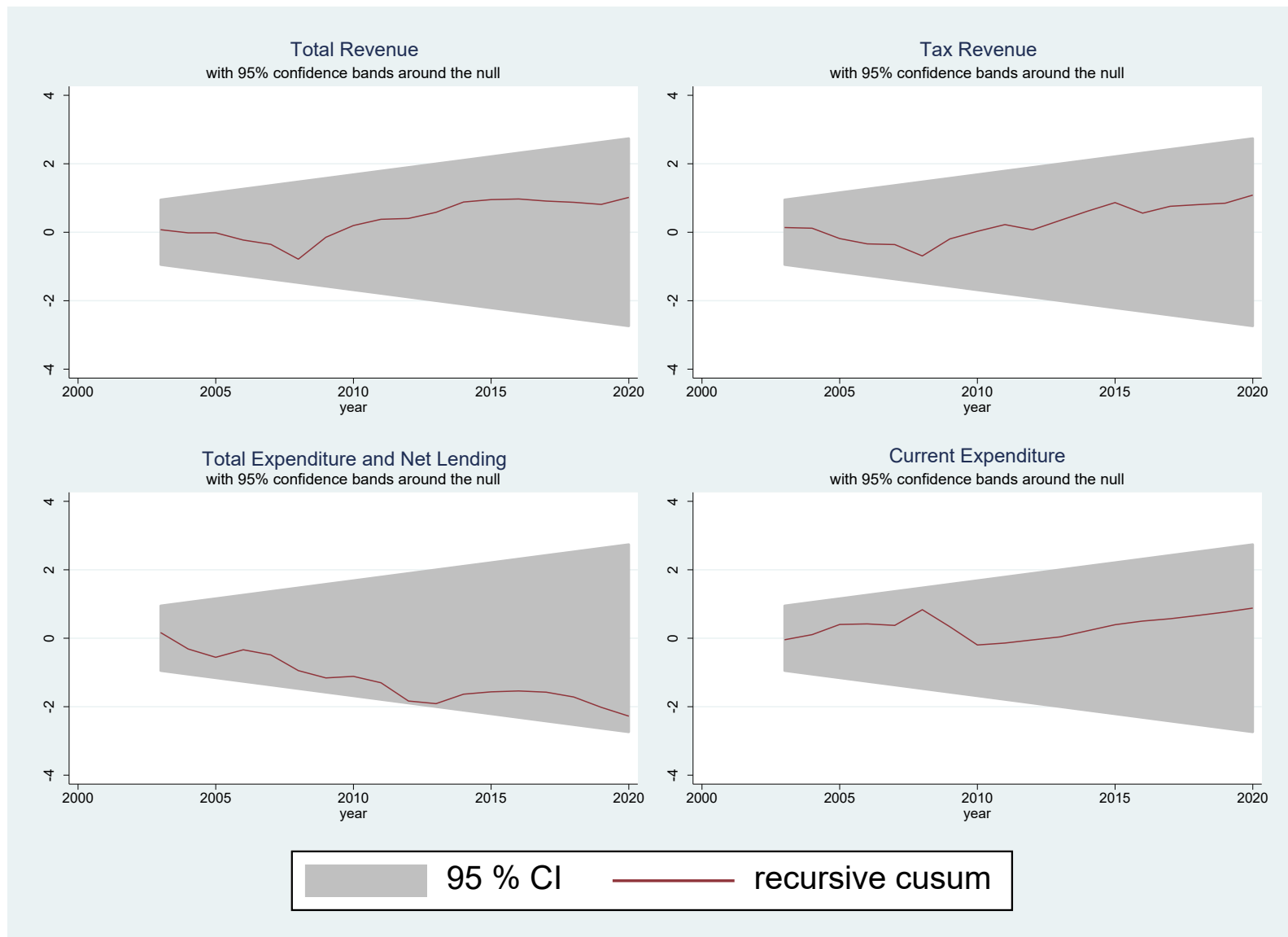
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6.2: Decade-Wise Disaggregated Forecast Bias, Rwanda**

	Year	ME/ $\hat{\lambda}$	p-value	Obs
Total Revenue	2001-2010	-19.8659*	0.0815	10
	2011-2020	-45.87**	0.0436	10
Tax Revenue	2001-2010	-18.1776**	0.0159	10
	2011-2020	-26.87709*	0.0828	10
Direct Taxes	2001-2010	-7.57762*	0.0789	10
	2011-2020	24.958**	0.0146	10
Taxes on Goods and Services	2001-2010	-10.8547**	0.0143	10
	2011-2020	-22.48	0.3365	10
Taxes on International Trade	2001-2010	.38698	0.7537	10
	2011-2020	21.27	0.3183	10
Non-Tax Revenue	2001-2010	-2.704442	0.5542	10
	2011-2020	-20.92	0.2045	10
<hr/>				
Total Grants	2001-2010	-13.4	0.3099	10
	2011-2020	19.44	0.3411	10
Total Expenditure and Net Lending	2001-2010	6.87797	0.4395	10
	2011-2020	-32.14	0.3251	10
Current Expenditures	2001-2010	10.20882	0.6857	10
	2011-2020	111.37***	0.0003	10
Wages and Salaries	2001-2010	-.8147	0.4022	10
	2011-2020	45.5272**	0.0104	10
Purchases of Goods and Services	2001-2010	-14.3324*	0.0664	10
	2011-2020	145.0336***	0.0011	10
Exceptional Social Expenditure	2001-2010	-3.430967	0.1318	10
	2011-2020	-40.3383***	0.0024	10
Capital Expenditure	2001-2010	24.75376*	0.0533	10
	2011-2020	-6.150001	0.7633	10

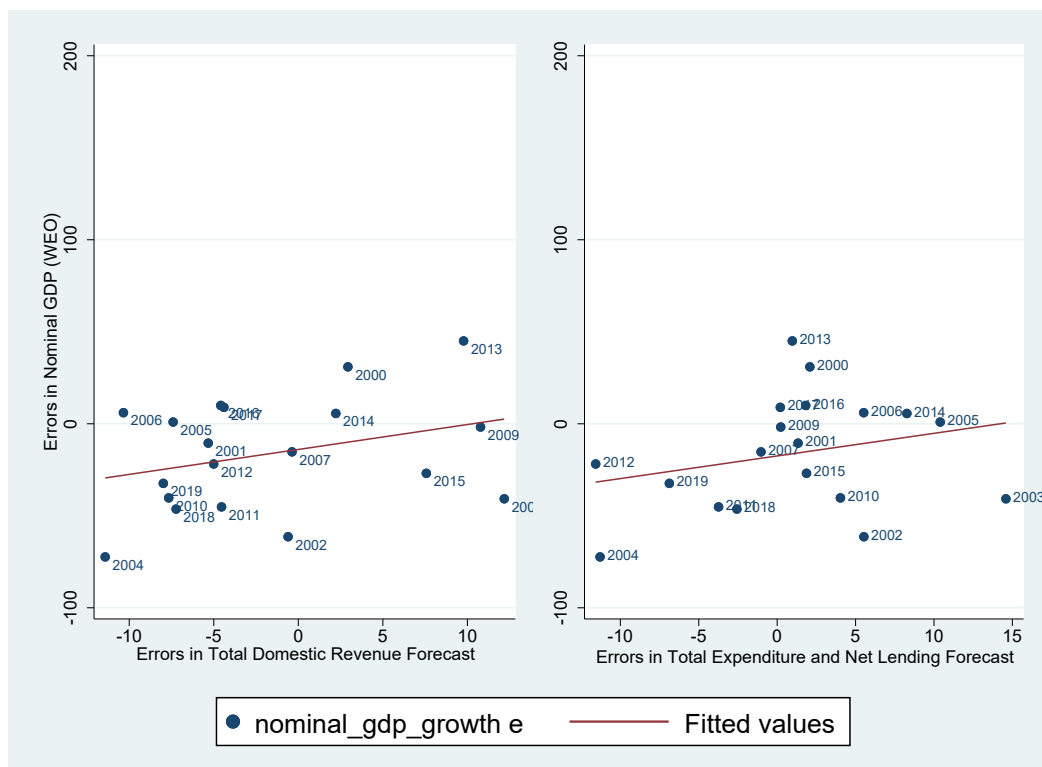
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Figure 6.5: Recursive CUSUM Plot of Error, Rwanda

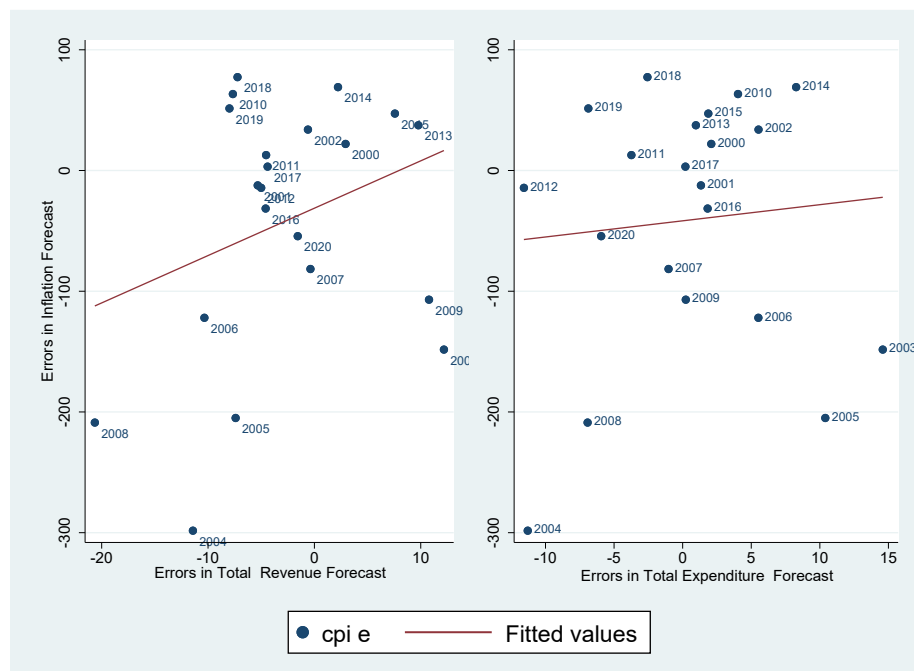




**Figure 6.6: Errors in Growth Forecast (Nominal) and Fiscal Forecasts, Rwanda (excludes 2008, 2020)**



**Figure 6.7: Errors in IMF Inflation Historical Forecast and Fiscal Forecasts, Rwanda (excludes 2008, 2020)**



## 7. Comparative Analysis of Macroeconomic and Fiscal Forecasts

In this section, we summarize the results of regressions in two sets of models that are summarized in Section 3. First, we examine the correlations between revenue errors and macroeconomic forecast errors, i.e., errors in the estimates of real gross domestic product (*GDP\_ERROR*) and errors in the inflation expectations based on consumer price index (*CPI\_ERROR*). Thereafter, we examine the correlates of expenditure error –the theoretical assumption being that a pessimistic revenue outlook would lead to a reduction in expenditures, in addition to the perceptions of weaker macroeconomic performance.

Table 7.1 provides the descriptive statistics for key variables used in the analysis for three countries and the variation in mean errors in the sample. Table 7.2 reports the results of the first set of models as we run three specifications for different subsamples of data. Column 1 reports the full sample of 2000-2020, Column 2 excludes 2020 given the impact of the Covid-19 pandemic, and Column 3 excluded 2008 and 2009 as well to account for significant macroeconomic forecast errors due to factors such as the Great Recession and volatility in the crude oil prices. Across all three models, we find a significant relationship between the GDP forecast errors and revenue errors – a one percentage point increase in GDP error associated with 0.06-0.07 percentage points in revenue errors after controlling for inflation. The relationship between inflation errors and revenue errors is significant only in the model from Column 3 of Table 7.2 that removes the outlier years of 2008, 2009, and 2020.

The expenditure models in Table 7.3 highlight a strong relationship between the revenue errors and expenditure errors, where one percentage point increase in revenue errors is associated with about half a percentage point increase in expenditure errors for models that did not exclude 2008 and 2009; and about 0.3 percentage points for a reduced sample. As has been noted in the earlier sections, previous studies such as Addison (2013) and de Renzio et al., (2019) also find this relationship. However, the

results of these models have significant limitations in terms of limited sample size and omitted variable bias and should be interpreted keeping that in mind.

Lastly, we also highlight the improvements in governance parameters in these countries through data reported in appendix tables A1-A3 for each of the countries. We do not include these variables in regressions since significant missing observations would further reduce available degrees of freedom. However, it is essential to note that improvements in the overall quality of governance may explain the temporal trends and patterns discussed in the earlier sections. The Open Budget Index for Senegal increased from 3 in 2008 to 46 in 2019; from 51 to 58 for Uganda, and from 1 to 39 for Rwanda. CPIA Indicators related to public financial management (*Quality of Budgetary and Financial Management* and *Efficiency of Revenue Mobilization*), however, do not show progress for Senegal; in Uganda, there is a minor increase in the score for revenue mobilization. Rwanda is the only country that has shown improvements on both indicators. This pattern is also reflected in a more consistent series of World Governance Indicators where if we look at parameters such as *Government Effectiveness* only Rwanda has demonstrated significant improvements. In appendix Figure A1, we plot the relationship between revenue and forecast errors and WGI's *Government Effectiveness* score and find evidence of some correlation between forecast errors and government effectiveness, which is particularly stronger for expenditure forecast errors in Senegal and Rwanda.

**Table 7.1 – Descriptive Statistics**

Country	Variable	N	Mean	Std. Dev.	Min	Max
FULL	CPI_ERROR	63	-17.52325	96.31333	-298.333	177.8928
	GDP_ERROR	63	7.840781	43.62365	-129.830	141.4448
	EXP_ERROR	63	2.899097	9.200951	-19.99171	37.02882
	REV_ERROR	63	.6407584	9.48353	-21.54744	-21.54744
SENEGAL	CPI_ERROR	21	14.082	106.6142	-249.90	177.893
	GDP_ERROR	21	16.648	33.8263	-34.044	79.960
	EXP_ERROR	21	1.152003	8.305526	-16.01379	14.11414
	REV_ERROR	21	-.1796958	8.674343	-17.05714	14.22504
UGANDA	CPI_ERROR	21	-25.41164	68.063	-184	56.33333
	GDP_ERROR	21	10.80869	37.75179	-67.993	113.4779
	EXP_ERROR	21	7.216867	10.91474	-19.99171	37.02882
	REV_ERROR	21	4.656013	10.488	-21.54744	31.32518
RWANDA	CPI_ERROR	21	-41.24031	105.1305	-298.33	77.33333
	GDP_ERROR	21	-3.934367	55.62079	-129.830	141.4448
	EXP_ERROR	21	.3284215	6.678764	-11.57285	14.58743
	REV_ERROR	21	-2.554042	8.075343	-20.6408	12.17824

**Table 7.2 - Revenue Errors and Macroeconomic Forecasts**

	(1)	(2)	(3)
	<i>REV_ERROR</i>	<i>REV_ERROR</i>	<i>REV_ERROR</i>
	(2000-2020)	(2000-2019)	(2000-2007) & (2010-2019)
<i>GDP_ERROR</i>	0.0604** (0.0261)	0.0666** (0.0324)	0.0712** (0.0341)
<i>CPI_ERROR</i>	0.0145 (0.0120)	0.0135 (0.0123)	0.0237* (0.0130)
Constant	0.421 (1.146)	0.409 (1.174)	-0.380 (1.078)
Country Fixed Effects	Yes	Yes	Yes
Observations	63	60	54
R-squared	0.105	0.090	0.120
Number of country	3	3	3

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.10

**Table 7.3 – Correlates of Expenditure Errors**

	(1)	(2)	(3)
	<i>EXP_ERROR</i>	<i>EXP_ERROR</i>	<i>EXP_ERROR</i>
	(2000-2020)	(2000-2019)	(2000-2007) & (2010-2019)
<i>REV_ERROR</i>	0.493*** (0.114)	0.479*** (0.118)	0.292** (0.134)
<i>GDP_ERROR</i>	0.00293 (0.0238)	0.0183 (0.0293)	0.0668* (0.0334)
<i>CPI_ERROR</i>	0.00699 (0.0105)	0.00713 (0.0108)	0.0189 (0.0126)
Constant	2.683*** (0.998)	2.767*** (1.024)	2.278** (1.014)
Country Fixed Effects	Yes	Yes	Yes
Observations	63	60	54
R-squared	0.283	0.283	0.240
Number of country	3	3	3

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.10

## 8. Conclusion

The first part of this report summarized limited research in this area, elaborated on available data, provided the rationale for creating a new database, and outlined the challenges associated with such an exercise. In the second part of the report, we summarize the key findings for sample countries, and lastly, we provided a comparative summary of relationships between fiscal errors, macroeconomic projections, and selected governance indicators. There are four main conclusions and recommendations that emerge from this study.

First, the study shows that the three countries selected have relatively robust fiscal forecasts, but with significant variation across time. We note gradual shifts during the last two decades with cycles of overestimation or underestimation of revenues and expenditures. For instance, the period after the Great Recession has been characterized by a significant overestimation of revenues and expenditures in Uganda whereas in Rwanda, the forecast errors have reduced after changing the fiscal year and joining the East African Community Customs Union in 2009. The relationship between revenue errors and expenditure errors is strong across the three countries, suggesting that revenue shortfalls prompt governments to reduce spending rather than changing their overall fiscal balance. We also find that development expenditures and capital expenditures have more variability in budget execution than current expenditures, indicating that discretionary expenditures are more prone to revision during in-year adjustments. Our preliminary results for comparative analysis indicate that changes in nominal growth outlook is one of the critical determinants of changes in revenue and expenditure. A broader database including more countries could help refine and qualify these findings.

Second, there appears to be a positive correlation between unbiased forecasts and institutional development, but more work remains to be done to verify a causality nexus. The countries we studied have undertaken significant institutional reforms in the public financial management area

over the last three decades. These have included, among others, the development of medium-term expenditure framework, the creation of semi-autonomous revenue authorities (e.g., Rwanda and Uganda), and the establishment of parliamentary budget offices (e.g., Uganda). Though the empirical evidence on the effectiveness of these reforms is mixed, earlier studies have primarily relied on output/outcome measures-based revenue mobilization (e.g., the tax-to-GDP ratio) or expenditure input (such as share of social spending) to examine the success or failure of these reforms. The study of the effectiveness of these reforms is far more complex and additional frameworks such as budget credibility could be deployed to study these questions.

Third, there is clearly the need for better data. The study of budget credibility and the existence of revenue forecast bias as one of its root causes in developing countries is constrained by the lack of a comparative database providing information on ex-ante revenue estimates and expenditure appropriations and ex-post realizations across a sufficiently large period of time. This report is the first step in addressing this gap by constructing for the three selected countries a database derived from original budget documents for the period 2000-20. That said, national budget documents remain by and large difficult to read and understand. They rely on national instead of internationally comparable standards reflecting historical developments if not traditions. The final accounts are even more esoteric and typically late to have a real influence in next year's budget. While publicly accessible, they continue to be seen as pertaining to the audit function, which is still widely perceived as an internal matter between the executive and the legislature, with this last one often having scarce influence. Hence, the recommendation is for more accessible budget documents based on international comparable standards—if not the bill subject to parliamentary approval, at least bridge tables translating national into international standards—which some of these countries have started to do. Similarly, the production of final accounts and related audit reports should be expedited, and parliamentary discussions brought forward so as to have ideally an impact on next

year's budget. A related recommendation that is fairly easy to execute is to make long-term budget archives available on a single web platform – often the reports are spread across different websites and are difficult to locate.

Finally, all forecasts should be subject to independent scrutiny.<sup>18</sup> Both macroeconomic and fiscal forecast are prone to errors. But this should be “honest”, in the sense that over a sufficiently long period they should be normally distributed. Whether induced by inadequate methodologies of political intrusiveness, if errors present persistent biases, they can severely undermine achieving set fiscal objectives and the credibility of the fiscal policy decision making framework.<sup>19</sup> Advocating an independent scrutiny however does not necessarily imply establishing an independent fiscal institution or council. In a low-income/capacity environment establishing such institutions may be detrimental to quintessential fiscal institutions such as ministries of finance or treasuries as the “best and the brightest” would be inevitably attracted or recruited by such independent councils.<sup>20</sup> Uganda has a parliamentary budget office that officially assists the legislature and reviews budget proposals – such institutions are a welcome step, but smaller research support programs for legislative committees and their capacity building could also improve the budget formulation and review process.

In the post-pandemic world, countries worldwide will need to reorient their budgets – responding to the need to invest in social protection architecture, health infrastructure deficiencies,

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<sup>18</sup> The independent evaluation of economic and fiscal forecast is one of the principles of the IMF 2014 *Fiscal Transparency Code* as part of its Pillar III on Fiscal Forecasting and Budgeting. It is worth noting however that similar function was also part of the original 1998 Code under its “Independent Assurances of Integrity” general principle.

<sup>19</sup> While we are not evaluating the accuracy of IMF Forecasts in this report, we do note that the magnitude of errors in World Economic Outlook forecasts are extremely large. Whether the errors in IMF macroeconomic forecasts and forecasts of domestic institutions have some convergence is a possible and useful line of inquiry for future research.

<sup>20</sup> This point is made by Hemming & Joyce (2013), where they argue that “...involving outsiders should be considered when and where it can make a more significant difference than other reforms. The precise response to the need for an outside view should also be tailored to country requirement and opportunities, and could fall well short of setting up a fiscal council.



and emerging education gaps. In this context, budgets should be able to outline social priorities and credibly execute them – and initiatives that may be improve research and practice to address the gaps should be promoted by national governments and international organizations.

## References

- Addison, D. (2013). *The Quality of Budget Execution and Its Correlates* (Working Paper No. 6657). World Bank. <https://doi.org/10.1596/1813-9450-6657>
- African Development Bank. (2003). *African Economic Outlook 2003*. [https://read.oecd-ilibrary.org/development/african-economic-outlook-2003\\_aeo-2003-en](https://read.oecd-ilibrary.org/development/african-economic-outlook-2003_aeo-2003-en)
- Ashiya, M. (2005). Twenty-two years of Japanese institutional forecasts. *Applied Financial Economics Letters*, 1(2), 79–84. <https://doi.org/10.1080/17446540500079968>
- Auerbach, A. J. (1999). On the Performance and Use of Government Revenue Forecasts. *National Tax Journal*, 52(4), 767–782.
- Baldrich, J., Fainboim, I., & Pessoa, M. (2018). *Determinants of Budget Projection Errors in Latin America and the Caribbean*. <https://ideas.repec.org/p/sad/wpaper/131.html>
- Benito, B., Guillamón, M. D., & Bastida, F. (2015). Budget Forecast Deviations in Municipal Governments: Determinants and Implications. *Australian Accounting Review*, 25(1), 45–70. <https://doi.org/10.1111/auar.12071>
- Boukari, M., & Veiga, F. J. (2018). Disentangling political and institutional determinants of budget forecast errors: A comparative approach. *Journal of Comparative Economics*. <https://doi.org/10.1016/j.jce.2018.03.002>
- Boylan, R. T. (2008). Political distortions in state forecasts. *Public Choice*, 136(3–4), 411–427.
- Bretschneider, S., & Schroeder, L. (1985). Revenue forecasting, budget setting and risk. *Socio-Economic Planning Sciences*, 19(6), 431–439. [https://doi.org/10.1016/0038-0121\(85\)90017-5](https://doi.org/10.1016/0038-0121(85)90017-5)
- Buettner, T., & Kauder, B. (2015). Political biases despite external expert participation? An empirical analysis of tax revenue forecasts in Germany. *Public Choice*, 164(3/4), 287–307.
- CABRI. (2008). *Budget Practices and Procedures Survey -Database*. Collaborative Africa Budget Reform Initiative and Organization for Economic Cooperation and Development.

- CABRI. (2015). *Budget Practices and Procedures Survey -Database*. Collaborative Africa Budget Reform Initiative and Organization for Economic Cooperation and Development.
- Cangiano, M., & Pathak, R. (2019). Revenue Forecasting in Low-Income and Developing Countries: Biases and Potential Remedies. In *The Palgrave Handbook of Government Budget Forecasting* (pp. 89–114). Palgrave Macmillan.
- Chakraborty, L., Chakraborty, P., & Shrestha, R. (2020). *Budget Credibility of Subnational Governments: Analyzing the Fiscal Forecasting Errors of 28 States in India*. Levy Economics Institute of Bard College. [https://www.levyinstitute.org/pubs/wp\\_964.pdf](https://www.levyinstitute.org/pubs/wp_964.pdf)
- Danninger, S. (2005). Revenue Forecasts as Performance Targets. *IMF Working Paper 5/14*. <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Revenue-Forecasts-as-Performance-Targets-17924>
- Danninger, S., Cangiano, M., & Kyobe, A. (2005). The Political Economy of Revenue-Forecasting Experience from Low-Income Countries. *IMF Working Paper 05/2*. <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/The-Political-Economy-of-Revenue-Forecasting-Experience-From-Low-Income-Countries-17918>
- de Renzio, P., Lakin, J., & Cho, C. (2019). *Budget Credibility Across Countries: How Deviations Affecting Spending on Social Priorities*. International Budget Partnership. <https://internationalbudget.org/wp-content/uploads/Budget-Credibility-Across-Countries.pdf>
- Dietl, S., Gubitzer, L., Kabonesa, C., & Klatzer, E. (2014). *The Budget Process in Uganda Entry Points for Gender and Gender Responsive Budgeting in the Budget Process in Uganda*. Austrian Development Corporation. <https://www.wu.ac.at/fileadmin/wu/d/i/vw3/workingpaper.pdf>
- Dreher, A., Sturm, J.-E., & Ursprung, H. W. (2008). The Impact of Globalization on the Composition of Government Expenditures: Evidence from Panel Data. *Public Choice*, 134(3/4), 263–292. <https://doi.org/10.1007/s11127-007-9223-4>
- ElBerry, N. A., & Goeminne, S. (2021). Fiscal transparency, fiscal forecasting and budget credibility in developing countries. *Journal of Forecasting*, 40(1), 144–161. <https://doi.org/10.1002/for.2695>

- Feenberg, D. R., Gentry, W., Gilroy, D., & Rosen, H. S. (1989). Testing the Rationality of State Revenue Forecasts. *Review of Economics & Statistics*, 71(2), 300–308. <https://doi.org/10.3386/w2628>
- Gentry, W. M. (1989). Do state revenue forecasters utilize available information? *National Tax Journal*, 42(4), 429–439. <https://doi.org/10.1086/NTJ41788812>
- Gonguet, F., Taiclet, B., Douglas, K., & Traore, M. (2016). *Assessing the credibility of fiscal forecasts in CEMAC and WAEMU countries*. Fiscal Affairs Department, International Monetary Fund. Internal Presentation
- Gosolov, M., & King, J. (2002). *Tax Revenue Forecasts in IMF Supported Programs* (Working Paper No. 02/236). International Monetary Fund, Washington DC.  
<https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Tax-Revenue-Forecasts-in-IMF-Supported-Programs-16234>
- Government of Rwanda. (2015). *Documentation of Rwanda's Good Practices in Aid Coordination and Mangement since 2004*.  
[http://www.devpartners.gov.rw/fileadmin/user\\_upload/Aid\\_Coord\\_Practices\\_Final\\_report.pdf](http://www.devpartners.gov.rw/fileadmin/user_upload/Aid_Coord_Practices_Final_report.pdf)
- Granger, C., & Newbold, P. (1986). *Forecasting Economic Time Series—2nd Edition*.  
<https://www.elsevier.com/books/forecasting-economic-time-series/granger/978-0-12-295183-1>
- Hemming, R., & Joyce, P. (2013). The Role of Fiscal councils in Promoting Fiscal Responsibility. In M. Cangiano, T. Curristine, & M. Lazare (Eds.), *Public Financial Management and Its Emerging Architecture*. International Monetary Fund.
- Holden, K., & Peel, D. A. (1990). On Testing for Unbiasedness and Efficiency of Forecasts\*. *The Manchester School*, 58(2), 120–127. <https://doi.org/10.1111/j.1467-9957.1990.tb00413.x>
- Hyndman, R., & Athanasopoulos, G. (2018). *Forecasting: Principles and Practice (2nd ed)*.  
<https://Otexts.com/fpp2/>
- IMF. (2017). *Uganda-Fiscal Transparency Evaluation*. International Monetary Fund.  
<https://www.imf.org/en/Publications/CR/Issues/2017/05/25/Uganda-Fiscal-Transparency-Evaluation-44935>

- IMF. (2019). *Fiscal Transparency Evaluation*. <https://www.imf.org/-/media/Files/Publications/CR/2019/cr1934-senegal-fiscal-transparency.ashx>
- Issoufu, S., Jewell, A., Kireyev, M. A. P., & Mpatswe, M. G. K. (2013). *Senegal: Achieving High and Inclusive Growth While Preserving Fiscal Sustainability*. International Monetary Fund. <https://www.imf.org/external/pubs/ft/dp/2013/afr1304.pdf>
- Jochimsen, B., & Lehmann, R. (2017). On the political economy of national tax revenue forecasts: Evidence from OECD countries. *Public Choice*, 170(3–4), 211–230. <https://doi.org/10.1007/s11127-016-0391-y>
- Kamlet, M. S., Mowery, D. C., & Su, T.-T. (2018). Whom do you trust? An analysis of executive and congressional economic forecasts. *Journal of Policy Analysis and Management*, 6(3), 365–384. <https://doi.org/10.2307/3324850>
- Kauder, B., Potrafke, N., & Schinke, C. (2017). Manipulating fiscal forecasts: Evidence from the German states. *FinanzArchiv*, 73(2), 213–236. <https://doi.org/10.1628/001522117X14877521353438>
- Krol, R. (2014). Forecast bias of government agencies. *Cato Journal*, 34(1), 99–112.
- Loungani, P. (2001). How accurate are private sector forecasts? Cross-country evidence from consensus forecasts of output growth. *International Journal of Forecasting*, 17(3), 419–432. [https://doi.org/10.1016/S0169-2070\(01\)00098-X](https://doi.org/10.1016/S0169-2070(01)00098-X)
- McNab, R. M., Rider, M., & Wall, K. D. (2007). Are Errors in Official U.S. Budget Receipts Forecasts Just Noise? *Andrew Young School of Policy Studies Research Paper No. 07-22*. <https://doi.org/10.2139/ssrn.989050>
- Mills, Z. (2018). *Budget Credibility: What Can We Learn from PEFA Reports?* International Budget Partnership. <https://www.internationalbudget.org/wp-content/uploads/budget-credibility-what-can-we-learn-from-pefa-reports-ibp-2018.pdf>
- Ministry of Finance, Planning and Economic Development. (2019). *Uganda Public Financial Management Reform Strategy | Ministry of Finance, Planning and Economic Development*. <https://www.finance.go.ug/publication/uganda-public-financial-management-reform-strategy>

- Mocan, H. N., & Azad, S. (1995). Accuracy and rationality of state General Fund Revenue forecasts: Evidence from panel data. *International Journal of Forecasting*, 11(3), 417–427.  
[https://doi.org/10.1016/0169-2070\(95\)00592-9](https://doi.org/10.1016/0169-2070(95)00592-9)
- Mustapha, S. (2019). Budget Credibility, Fiscal Outcomes, and PFM Performance in Fragile and NonFragile Countries. In *PEFA, Public Financial Management, and Good Governance*. World Bank Washington, DC.
- National Assembly of Senegal. (2012). *The African Parliamentary Index (API) 2012*.  
<https://aceproject.org/ero-en/regions/africa/SN/senegal-the-african-parliamentary-index-national>
- OECD/ATAF. (2021a). *Revenue Stastics in Africa 2021-Senegal*. <https://www.oecd.org/tax/tax-policy/revenue-statistics-africa-senegal.pdf>
- OECD/ATAF. (2021b). *Revenue Statistics in Africa 2021 -Uganda*. <https://www.oecd.org/ctp/tax-policy/revenue-statistics-africa-uganda.pdf>
- OECD/ATAF, A. (2021c). *Revenue Statistics of Africa—2021, Rwanda*. <https://www.oecd.org/ctp/tax-policy/revenue-statistics-africa-rwanda.pdf>
- Omollo, B. (2018). Public financial management reforms and fiscal policy-a qualitative content analysis of the impact of PFM reforms on country budget income in Sub-Sahara Africa: A case for Kenya and Rwanda. *OECD Journal on Budgeting*, 18(1), 167–201. <https://doi.org/10.1787/budget-18-5j8l804fvj8v>
- PEFA. (2008). *Public Financial Management Performance Report* (Public Expenditure and Financial Accountability Assessment). <https://www.pefa.org/sites/pefa/files/assessments/reports/RW-Jun08-PFM-PR-Public.pdf>
- Renzio, P., & Cho, C. (2020). *Exploring the Determinants of Budget Credibility—Publications*. International Budget Partnership. <https://internationalbudget.org/publications/exploring-the-determinants-of-budget-credibility/>

- Sarr, B. (2015). *Credibility and Reliability of Government Budgets: Does Fiscal Transparency Matter?* International Budget Partnership. <https://internationalbudget.org/wp-content/uploads/Credibility-and-Reliability-of-Government-Budgets-Working-Papers.pdf>
- Schreiber, L. (2018). *A Foundation for Reconstruction: Building the Rwanda Revenue Authority, 2001-2017* (Innovation for Successful Societies). Princeton University. [https://successfulsocieties.princeton.edu/sites/successfulsocieties/files/LS\\_Rwanda\\_Tax\\_Formatted\\_5.29.18jgToU962018.pdf](https://successfulsocieties.princeton.edu/sites/successfulsocieties/files/LS_Rwanda_Tax_Formatted_5.29.18jgToU962018.pdf)
- Uganda Ministry of Finance. (2019). *Domestic Revenue Mobilisation Strategy 2019/20—2023/24*. (pp. 10–37). [https://www.finance.go.ug/sites/default/files/Publications/NEW%20DOMESTIC%20REVENUE%20MOBILISATION%20STRATEGY\\_FEB%202020\\_0.pdf](https://www.finance.go.ug/sites/default/files/Publications/NEW%20DOMESTIC%20REVENUE%20MOBILISATION%20STRATEGY_FEB%202020_0.pdf)
- Williams, D., & Onochie, J. (2014). *State Revenue Forecasting Accuracy*. International Symposium on Forecasting, Rotterdam. [https://forecasters.org/wp-content/uploads/gravity\\_forms/7-2a51b93047891f1ec3608bdbd77ca58d/2014/07/Williams\\_Daniel\\_\\_Ononchie\\_Joseph\\_ISF2014.pdf](https://forecasters.org/wp-content/uploads/gravity_forms/7-2a51b93047891f1ec3608bdbd77ca58d/2014/07/Williams_Daniel__Ononchie_Joseph_ISF2014.pdf)

**Table A1: Selected Governance and Institutional Indicators for Senegal**

Sub-indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OBP-Open Budget Index									3		3		10			43		51		46		
OBP-Open Budget Rank									70		85		88			61		44		59		
CPIA-Public Sector Management and Institutions cluster average						3.6	3.6	3.5	3.4	3.4	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5	
CPIA-Policies & Institutions for Environment Sustainability						3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
CPIA-Quality of Budgetary & Financial Management						3.5	3.5	3.5	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
CPIA-Efficiency of Revenue Mobilization						4.5	4.5	4	4	4	4	4	4	4	4	4	3.5	3.5	3.5	3.5	3.5	
CPIA Quality of Public Administration						3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
CPIA-Transparency, Accountability & Corruption in Public Sector						3	3	3	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
CPIA Structural policies cluster average						3.83	3.67	3.83	3.8	3.83	3.83	4	4	4	4	4	3.83	3.83	3.67	3.83	3.83	
CPIA-Overall CPIA Score														3.8	3.8	3.8	3.8	3.8	3.7	3.7		
WGI-Voice and Accountability	54.7	N/A	59.7	56.7	56.3	53.4	48.6	40.9	40.9	38.9	37.4	40.4	49.3	51.6	58.1	57.6	57.6	57.1	54.6	54.1	55.6	
WGI-Political Stability and Absence of violence/Terrorism	27.5	N/A	36	37.2	46.6	39.8	37.2	37.2	39.4	38.4	31.8	37.9	40.8	43.6	37.1	41.9	37.6	43.8	42	49.1	46.7	
WGI-Government Effectiveness	52.8	N/A	57.7	48	51.7	47.6	45.4	37.9	50	38.3	34.5	38.9	39.3	40.8	40.4	38.9	36.5	40.9	41.4	51	53.9	
WGI-Regulatory Quality	50.3	N/A	46.9	48	46.3	47.1	44.6	40.3	44.7	44	42.6	45.5	50.7	52.6	46.2	49.5	49	49	50.5	50	42.8	
WGI-Rule of Law	53.5	N/A	56.4	51	52.2	54.6	48.3	47.4	47.1	43.6	41.7	40.4	46.5	47.4	53.9	51.9	51	50.5	47.6	47.1	44.2	
WGI-Control of Corruption	55.8	N/A	61.6	54.6	54.6	55.6	41	36.9	37.4	37.8	30.5	38.4	50.2	53.6	58.2	58.7	58.2	53.9	57.2	57.7	57.2	
TI-Corruption Perceptions Index Score (100)													36	41	43	44	45	45	45	45	45	
TI-Corruption Perceptions Index Rank (180)													94	77	69	61	64	66	67	66	67	73



POL-Democracy Score (0-low to 10-high)

8 8 8 8 8 8 8 8 7 7 7 7 7 7 7 7 7 7 7

Sources: Open Budget Partnership (OBP); Country Policy and Institutional Assessment – The World Bank (CPIA); World Governance Indicators (WGI); Transparency

International (TI); Polity Data Series (POL)

**Table A2: Selected Governance and Institutional Indicators for Uganda**

Sub-indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OBP-Open Budget Index									51		55		65			62		60		58		
OBP-Open Budget Rank									30		32		18			24		29		36		
CPIA-Public Sector Management and Institutions cluster average						3.3	3.3	3.3	3.4	3.3	3.2	3.2	3	3	3.1	3.1	3	3	3.2	3.2	3.2	
CPIA-Policies & Institutions for Environment Sustainability						4	4	4	4	4	4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
CPIA-Quality of Budgetary & Financial Management						4	4	4	4	4	3.5	3.5	3	3	3.5	3.5	3	3	3.5	3.5	3.5	
CPIA-Efficiency of Revenue Mobilization						3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
CPIA Quality of Public Administration						3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
CPIA-Transparency, Accountability & Corruption in Public Sector						3	3	3	3	2.5	2.5	2.5	2	2	2	2	2	2	2.5	2.5	2.5	
CPIA Structural policies cluster average						3.83	3.83	3.83	3.8	3.83	3.83	4	4	4	4	4	4	3.83	3.83	3.66	3.66	
CPIA-Overall CPIA Score														3.7	3.7	3.7	3.6	3.6	3.7	3.7		
WGI-Voice and Accountability	19.4		21.9	27.4	26	29.3	32.7	33.2	31.3	30.8	30.8	31	31.9	29.6	30.1	29.1	28.6	31	28.5	29.5	29	
WGI-Political Stability and Absence of violence/Terrorism	12.7		12.2	6.53	12.6	9.71	14.5	18.4	17.8	16.6	16.1	18	20.4	19.9	15.2	21	21.4	26.2	21.2	22.6	19.3	
WGI-Government Effectiveness	42.1		38.8	43.4	43.8	34.8	34.6	40.8	34.5	32.5	37.3	37.9	32.7	32.7	32.7	36.5	32.7	31.7	29.8	31.3	30.3	

WGI-Regulatory Quality	56	53	54	54	46	46	48	47	47	47	47	44	45	46	45	46	45	42	38	36.	
	.4	.6	.6	.7	.1	.6	.5	.1	.9	.4	.9	.6	.5	.6	.7	.2	.7	.8			
WGI-Rule of Law	26	33	37		34		44	42	41	42	44	45	45	40	40	45	42	43	43	42.	
	.7	.7	.6	33	.5	45	.5	.3	.7	.2	.1	.5	.1	.4	.9	.2	.3	.3	.8	8	
WGI-Control of Corruption	22	20	23	24	21	23	20	20	20	18	19	17	13	13	13	13	13	14	11	15.	
	.3	.7	.7	.4	.5	.9	.4	.4	.1	.6		.1	.3		.5		.9	.4	.5	4	
TI-Corruption Perceptions Index Score (100)												29	26	26	25	25	26	26	28	27	27
TI-Corruption Perceptions Index Rank (180)												13	14	14	13	15	15	14	13	14	14
												0	0	2	9	1	1	9	7	2	4
POL-Democracy Score (0-low to 10-high)	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1			

Sources: Open Budget Partnership (OBP); Country Policy and Institutional Assessment – The World Bank (CPIA); World Governance Indicators (WGI); Transparency

International (TI); Polity Data Series (POL)

**Table A3: Selected Governance and Institutional Indicators for Rwanda**

Sub-indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
OBP-Open Budget Index									1		11		8			36		22		39		
OBP-Open Budget Rank									73		80		90			76		88		73		
CPIA-Public Sector Management and Institutions cluster average						3.3	3.4	3.5	3.5	3.5	3.7	3.6	3.6	3.6	3.6	3.7	3.7	3.7	3.8	3.8	3.8	
CPIA-Policies & Institutions for Environment Sustainability						3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4.5	4.5	
CPIA-Quality of Budgetary & Financial Management						3.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
CPIA-Efficiency of Revenue Mobilization						3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	
CPIA Quality of Public Administration						3.5	3.5	3.5	3.5	3.5	4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	

CPIA-Transparency, Accountability & Corruption in Public Sector																				
		3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
CPIA Structural policies cluster average																				
		3.5	3.5	3.5	3.5	3	3	3	3	7	7	7	7	7	7	7	7	7	7	7
CPIA-Overall CPIA Score																				
		3.9	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
WGI-Voice and Accountability	6.9	7.4	10.	8.6	13.	13.	11.	12.	11.	11.	11.	13.	15.	17.	17.	15.	16.	16.	18.	17.
	7	6	45	5	46	46	06	02	85	85	74	62	02	73	24	76	75	43	36	87
WGI-Political Stability and Absence of violence/Terrorism	6.3	5.8	17.	14.	17.	25.	32.	33.	28.	36.	39.	38.	42.	35.	45.	44.		52.		48.
	5	2	09	56	96	6	37	17	44	02	81	39	18	24	71	76	50	83	50	11
WGI-Government Effectiveness	28.	16.	26.	34.	20.	46.	50.	50.	49.	52.	57.	53.	55.	54.	51.	56.	64.	61.	60.	64.
	72	84	02	98	59	83	49	97	76	15	82	55	45	81	44	73	42	54	58	42
WGI-Regulatory Quality	13.	22.	23.	25.	18.	25.	26.	34.	42.	46.	48.	49.	53.	61.	61.	57.	60.	58.	58.	58.
	85	96	47	12	14	49	7	47	11	41	34	76	55	06	54	69	58	65	17	17
WGI-Rule of Law	11.	22.	24.	22.	20.	29.	34.	37.	37.	45.	46.	46.	50.	60.	58.	57.	59.	58.	56.	56.
	39	77	75	97	57	67	93	98	91	5	01	95	7	58	17	21	13	17	73	73
WGI-Control of Corruption	31.	41.	39.	39.	31.	50.	57.	60.	60.	68.	68.	72.	72.	75.	72.	72.	72.	71.	70.	69.
	98	92	9	02	71	24	77	19	77	1	25	04	04	48	6	6	12	15	19	71
TI-Corruption Perceptions Index Score (100)																				
		53	53	49	54	54	55	56	53	54	53	53								
TI-Corruption Perceptions Index Rank (180)																				
		50	49	55	43	50	48	48	51	49	52	52								
POL-Democracy Score (0-low to 10-high)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sources: Open Budget Partnership (OBP); Country Policy and Institutional Assessment – The World Bank (CPIA); World Governance Indicators (WGI); Transparency

International (TI); Polity Data Series (POL)

**Table A4: Key Institutional and Budgetary Features**

Senegal	Uganda	Rwanda
<ul style="list-style-type: none"> <li>- Multi-Party Presidential System has been politically stable with regular elections and peaceful transition of power. President Macky Sall has been in office since 2012.</li> <li>- Privatization efforts started in 1980s and continued in 1990s. CFA Franc was devalued in 1994 and prices, labor, and foreign trade were liberalized.</li> <li>- A period of high growth between 1995-2005 and then the growth slowed down. Growth has gained momentum after the adoption of <i>Plan Senegal Emergent</i> (PSE) in 2014.</li> <li>- The budget process involves executive and two chambers of the parliament (National Assembly).</li> <li>- Senegal follows calendar year as the fiscal year.</li> <li>- Directorate General of Budget (DGB) is responsible for preparing the Original Finance Law and steering budget reforms and developing multi-annual public finance strategies.</li> </ul>	<ul style="list-style-type: none"> <li>- Uganda is unitary state with national government and four levels of subnational government. Local Government Finance Commission advises government on issues of fiscal decentralization and managing intergovernmental fiscal relations.</li> <li>- Significant economic growth and poverty reduction in the last two decades, but a period of unstable inflation during 2010s.</li> <li>- Uganda follows a July 1 to June 30 fiscal year.</li> <li>- Ministry of Finance, Planning and Economic Development (MoFPED) leads the budget process – it was created under 1995 Constitution, merging Ministry of Finance and Ministry of Planning and Economic Development. The revenue forecasts are estimated by the Uganda Revenue Authority.</li> <li>- Budget Act of 2001 was a key development that established Parliamentary Budget Committee and Parliament Budget Office. Public Finance Act was adopted in 2003 and</li> </ul>	<ul style="list-style-type: none"> <li>- The 1994 genocide decimated country's fragile economic base, external investment, and pushed population into extreme poverty. GDP fell by 50 percent in one year in 1994 and revenues declined by 40 percent.</li> <li>- Most of the budgetary reforms in Rwanda could be located within the reconstruction efforts following the 1994 civil conflict that culminated in Vision 2020 plan aimed at governance reforms, adopted around the turn of millennium.</li> <li>- The Poverty Reduction Strategy Paper (PRSP) and aid associated to it facilitated the creation of early monitoring and evaluation framework in Rwanda.</li> <li>- Rwanda used calendar year as fiscal year until FY2008. In 2009, Rwanda joined the East African Community Customs Union (EAC) that led to many reforms. Rwanda also shifted to July 1-June 30 fiscal year from FY2010. In FY2009, it passed a six-month mini budget (January 2009-June 2009) during the transition period.</li> </ul>

<ul style="list-style-type: none"> <li>- Directorate General of Public Accounting and Treasury, Directorate General of Taxes and Domains, and Directorate General of Customs are other institutions that are involved in various revenue and expenditure functions.</li> <li>- Budget preparation starts in February, revenue forecasts are created in June-July, followed by deliberations. Initial finance law drafted in September or October submitted to National Assembly.</li> <li>- The legislature gets 60 days to examine the finance act and has authority to amend it, however, stringent conditions make this difficult. The budget approved by the parliament is signed by president and published in <i>Journal Officiel</i>.</li> <li>- The budget orientation debate is conducted within the Committee of Economy, Finances, Planning, and Economic Cooperation of the two houses. The parliament also exercises control during the N-2 budget regulation, and during the analysis of documents supporting the finance bill.</li> <li>- Under clause 3 of Article 34, the parliament can also monitor budget execution. The clause stipulates, “a temporary mission for the evaluation</li> </ul>	<p>Public Finance Management (Amendment) Act was adopted in 2015.</p> <ul style="list-style-type: none"> <li>- Budget framework paper is published in February and submitted for approval of Cabinet by March 15. This is followed by publication of background the budget and draft budget estimates in April. The finance minister presents the budget to the parliament in June followed by adoption. The legislature may change the allocation of spending, without changing total spending. The executive still has the authority to veto specific appropriations approved by the legislature.</li> <li>- Uganda has been preparing an Annual Budget Performance Report (ABPR) since the last two decades. ABPR is expected within three months of the end of fiscal year and Audited Financials within six months.</li> <li>- In the Budget Practices and Procedures survey, the government reports that major factors requiring revision of revenue estimates include – changing economic forecasts, ad hoc emergency needs, and new policy initiatives.</li> <li>- The government reports that it undertakes a comprehensive fiscal sensitivity analysis to estimate the effects of alternative macro-economic assumptions. This sensitivity analysis is</li> </ul>	<ul style="list-style-type: none"> <li>- Rwanda has a bicameral legislature but only the lower house is involved in the budget process. There is no research unit attached to the legislature.</li> <li>- The legislature may amend the executive budget, but without changing the proposed deficit/surplus. The executive cannot veto the approved budget.</li> <li>- The independent office of Auditor General of State Finances was established in 1998 deviating from the francophone <i>Cour de Comptes</i> model and it became the Supreme Audit Institution (SAI) in 2003.</li> <li>- Rwanda Revenue Authority was also created in 1998. Value Added Tax was adopted as a replacement of sales tax in 2001, and income tax law was updated in 2005.</li> <li>- Rwanda adopted the Medium Term Expenditure Framework in 2006 that further paved way for improving expenditure predictability.</li> <li>- The National Budget Department/Unit within the Ministry of Finance and Economic Planning (MINECOFIN) is responsible for budget preparation. The department constitutes of two directorates –Fiscal Decentralization</li> </ul>
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<p>and control of budget execution can be established within the public accounts committee.”</p> <ul style="list-style-type: none"> <li>- Court of Accounts audits the government accounts and prepares a budget execution report for the National Assembly. The Budget Execution Law (<i>Loi de Règlement</i>) is adopted by the legislature that provides an overview of budget execution.</li> <li>- The budget draft is also within the framework of convergence criteria laid down by WAEMU and the Economic Community of West African States</li> </ul> <p>Sources: African Development Bank, 2003; IMF, 2019; Issoufu et al., 2013; National Assembly of Senegal, 2012)</p>	<p>part of budget documents submitted to the legislature.</p> <ul style="list-style-type: none"> <li>- Development Assistance and Regional Cooperation (DARC) unit within the Department of Debt Management is responsible for mobilization of external resources for government programs –it also maintains a database of aid flows.</li> <li>- Uganda has a Parliamentary Budget Office that supports the members to scrutinize budgets. It was set up under the 2001 Budget Act to enhance technical capacity. One of the very few institutions within the budget making landscape of developing countries.</li> </ul> <p>Sources: (CABRI, 2008, 2015; Dietl et al., 2014; Ministry of Finance, IMF, 2018, Planning and Economic Development, 2019)</p>	<p>Directorate and Budget Management and Reporting Directorate.</p> <ul style="list-style-type: none"> <li>- In the 2008, Budget Practices and Procedures Survey, Rwanda reported that the economic assumptions behind the budget are not independent reviewed formally and there is no sensitivity analysis of economic assumptions.</li> <li>- The annual budget documentation submitted to the legislature contains three-year estimates at the line-item level. These estimates are updated twice every year.</li> </ul> <p>Sources: (CABRI, 2008; Government of Rwanda, 2015; Omollo, 2018)</p>
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**Figure A1: Government Effectiveness (World Governance Indicators) and Absolute Forecast Errors**

