

Do IMF programs help raise tax revenue?

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Abstract

This article investigates the links between policy conditionality in adjustment programs of the International Monetary Fund and the evolution of tax revenue. Using a rich dataset on IMF conditionality for all developing countries over the past three decades, the analysis reveals contradictory effects of various IMF policies related to different tax types. While there is no effect of IMF programs on total tax revenue, IMF programs promote goods and services taxes, they decrease the revenue collected from personal income tax and corporate income tax in the long term. Further analysis shows that these results are driven by the differential success of IMF programs to introduce relevant tax types: Countries are significantly more likely to introduce a goods and services tax in the wake of an IMF program, in contrast to other tax types.

Keywords: International Monetary Fund; IMF program; tax conditionality; tax policy; tax administration; state capacity;

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1. Introduction

In 1991, Rwanda turned to the International Monetary Fund (IMF)—an international financial institution (IFI) that provides loans to countries in economic trouble in exchange for policy reforms—and obtained a three-year structural adjustment loan over US\$ 20 million. Policy conditions that the government had to fulfill included a requirement to eliminate all remaining trade taxes/lower corporate taxes. At the same time, the Fund mandated introduction of a value-added tax (VAT)—a tax on consumption with broad tax base and disproportionate impacts on the poor, who spend most of their incomes on consumption goods. Hence, as IMF policy advice substituted one type of tax for another, it did not help Rwanda increase overall tax revenues (Figure 1). The case of Rwanda is not exceptional—a similar pattern can be observed for other developing countries.

[Figure 1 here]

Whatever the welfare implications of such IMF interventions as occurred in the case of the Rwanda, the IMF demonstrates that it has power to shape tax policies around the world. Its ability to converge economic policies on a global scale makes it one of the most controversial institutions. Advocates argue that the IMF is a hub of expertise on tax issues that helps build the capacity of weak states by disseminating best practices. To be sure, the IMF has been prioritizing assistance to developing countries for revenue mobilization in the realm of its surveillance, lending, and technical assistance (Cottarelli 2011)—its tax experts have advised on measures aimed at raising revenue, shifting toward appropriate revenue sources, building more effective tax administrations, and creating constructive state-society engagement (Fjeldstad and Moore 2008, 242–43). What is more, policy preferences between the Fund and its borrowing governments are relatively well-aligned when it comes to tax policy. For these reasons, tax policy is one of the areas in which IMF interventions should have the most positive impact relative to other areas of intervention.

For its critics, the IMF promotes undue ‘neoliberal policies’ that serve to undermine state institutions. They mourn that IMF recommendations—despite slight modifications toward more Keynesian fiscal policy in recent years—still have a general market-oriented thrust (Ban and Gallagher 2015). For example, the market-oriented policy prescriptions of the Fund entail privatization of public enterprises, the imposition of user fees, and the replacement of progressive taxation systems with value-added taxes (Babb 2013, 281). IMF tax advice often follows standard prescriptions—notably the introduction of VAT with low rates, broad base, and no exemptions (Tait 1989)—which may not be the adequate recipe for all countries and under all circumstances.

Against this background, we proceed with a simple research question: Do IMF programs help countries raise tax revenue? Consistent with previous literature, we find no average effect at all. We offer a theoretical explanation for this result, arguing that the IMF faces a tradeoff in its tax policy advice. On the one hand, increasing taxes holds promise to build fiscal capacity and resolve economic crises in its borrowing countries. On the other hand, increasing taxes makes countries less competitive in the global economy because taxes increase the cost of doing business. The IMF resolves this dilemma by targeting the composition of different taxes—promoting general sales taxes (and specifically the VAT) while discouraging corporate taxes.

We test this argument using a panel of up to 119 developing countries over the 1993-2013 period. Taking non-random selection into IMF programs into account, the analysis shows that IMF programs help governments increase goods and services taxes revenue while decreasing income taxes and corporate taxes. Our analysis also helps assess the validity of alternative explanations. For example, we show that conditionality exerts relatively little influence on tax revenues, except for decreasing trade tax revenue and increasing corporate taxes. However, other aspects of IMF assistance remain significant even in the presence of tax conditionality. To identify tax conditions, we employ computer-assisted coding of text from newly available conditionality data (Kentikelenis, Stubbs, and King 2016). In addition, we explore the moderating impact of recipient-country circumstances, confirming previous research showing that autocratic countries, presidential systems, and right-wing governments are more susceptible to IMF policy advice. In sum, our most robust finding is that IMF programs help rebalance tax revenues across different types of taxes, while failing to significantly affect total tax revenues.

Our findings contribute primarily to the literature on IMF programs and fiscal outcomes, which thus far has focused on the spending side (Bulir and Moon 2004; Hamm, King, and Stuckler 2012; Nooruddin and Simmons 2006) while paying less attention to the revenue side. The few studies relating to our research question are relatively limited in terms of scope, focusing on specific sub-questions, specific world regions, and non-lending activities of the Fund (Bastiaens and Rudra 2016; Crivelli 2013; Mahon 2004). The studies closest to our approach are prepared solely by IMF researchers. Our findings are broadly consistent with theirs, but we offer a more nuanced perspective on the impacts of IMF programs by showing that governments are able to increase their revenues only from IMF-favored tax types. In a bigger picture, these results lend support to critics arguing that the IMF serves to transform domestic political economies according to liberal market ideas (Babb and Kentikelenis 2017). Arguably, IMF-promoted tax reforms may be good for business interests, but also for the ruling elite which seeks to protect its own benefits and shift tax burdens onto the poor.

2. Determinants of fiscal capacity: the neglected role of the International Monetary Fund

Tax collection and state capacity

The ability to tax is one of the chief functions of the state (Cingolani, Thomsson, and de Crombrughe 2015; Mann 1986; Soifer 2008). In a historical perspective, the rise of the state is intricately related to its ability to extract revenue from the communities that the state meant to govern (Levi 1988). In the early modern period, European states began reforming medieval tax systems that relied on decentralized tax collection by the local nobility (D'Arcy and Nistotskaya 2017). While medieval states did not have the capacity to collect taxes directly without relying on local elites (Scott 1998), modern states invested into a centralized bureaucracy to collect relevant information on taxpayers and appropriate taxes to finance their military undertakings (Dincecco 2009). As a result, modern states were able to boost tax revenue, distribute tax burdens more equally across society, and establish direct contact to its citizens (D'Arcy and Nistotskaya 2017).

The sequencing of tax types reflects the fact that not all taxes are equally easy to administer. In particular, developing countries rely to a greater extent than developed countries on trade taxes (and seigniorage) relative to income taxes because such taxes are easier to collect (Besley and Persson 2011; Burgess and Stern 1993; Gordon and Li 2009; Tanzi 1992). In a historical view, trade taxes were first—albeit levied more often on exports rather than imports. Custom records from the medieval age show that England was a heavy exporter of wool, and hence levied an export duty on wool, to be followed by other products; the king justified this tax by the protection offered to salesmen (Mann 1986, 427). Until the Napoleonic wars, states still relied heavily on indirect taxes, such as customs and excise duties, and land and inheritance taxes (Daunton 2001).

In the early 19th century, governments began experimenting with income taxes. For example, Britain introduced its first income tax in 1799 to finance the war against France. While soon abolished, it was reinstated in 1842 through the Income Tax Act (Aidt and Jensen 2009). The institutional dynamic of the income tax rendered it a permanent institution in many countries. In fact, the income tax enjoys high extractive potential because its adoption required the creation of a sophisticated tax administration capable of verifying taxable income and ensuring compliance of taxpayers with their tax obligations. The income tax and its underlying bureaucratic apparatus hence helped states collect previously undetected revenues (Mares and Queralt 2015).

While the introduction of income taxes was a hallmark in the historical development of the state of the developed world, the administrative requirements of income taxes seem to have prevented their further diffusion to developing countries (Moore 2004). In contrast, the global spread of the value-added tax is remarkable. First introduced by France about 60 years ago, the VAT is nowadays applied in more than 130 countries, where it raises about 20 percent of all tax revenue (Keen and Lockwood 2010).¹ Because it is levied on all goods and services, it has potentially large revenue implications (Keen and Lockwood 2006). This also facilitated the move toward free trade by many governments, which hoped to compensate their lost customs duties through increased VAT revenue (Baunsgaard and Keen 2010; Fjeldstad and Moore 2008; Keen and Lockwood 2010).

Determinants of taxation

A vast literature examines the historical developments in taxation, state-building, and state-society relations in early modern times in Europe. Scholars broadly distinguish between external factors and domestic factors underlying the development of tax systems. Among external factors, inter-state war is widely seen as a driver of taxation. War created a revenue imperative that required the development of administrative structures to collect taxes (Besley and Persson 2011; Cárdenas and Tuzemen 2011). In the 16th century, new military technologies became available, which increased the threat of war that led to fiscal revenue mobilization (Brewer 1988; Downing 1992; Tilly 1990). Governments initially resorted to indirect taxes but then explored income taxes as additional sources of revenue in the early 19th century, when their revenue requirements further increased due to their investments in the development of infrastructure, the improvement of public health, and public education (Lindert 2004).

¹ Seelkopf, Lierse, and Schmitt (2016) count 150 countries in their updated data.

Trade liberalization and the pressures induced by globalization are another external factor. While globalization is seen to constrain policy-making flexibility on taxation (Baunsgaard and Keen 2010; Garrett and Mitchell 2001; Swank and Steinmo 2002), it also has revenue implications that require fundamental changes to tax systems. In particular, trade liberalization—if brought about by elimination of trade taxes—augments fiscal needs not only due to lost revenue but also additional demands for compensation from the losers of trade (Brambor and Lindvall 2014; Rodrik 1998; Walter 2010). This creates a strong incentive to develop alternative tax revenues. Indeed, Seelkopf, Lierse, and Schmitt (2016) find that governments adopted taxes on personal income, corporate income, and general sales during the first wave of trade liberalization until the beginning of World War I, while trade acceleration following World War II coincided with the introduction of the value-added tax. They refer to additional case analysis showing that Britain adopted the income tax through its Income Tax Act largely for free trade concerns (Morgan and Prasad 2009). Yet other contributions argue that taxes have spread within distinct regions due to learning (Aidt and Jensen 2009; Berry and Berry 1992; Keen and Lockwood 2010).

Scholars studying internal factors of tax development emphasize that existential threats to the state due to external war are not needed to trigger revenue-bargaining processes between the state and its citizens (Moore 2008, 53). In the contractual view of taxation, fiscal needs constantly arise because the state must meet the expectations of the governed to deliver public services (Moore 2014). These demands are mediated by domestic institutions, leading to complex interactions between economic structure, political institutions, and domestic preferences (Dincecco 2009; Karaman and Pamuk 2013; Mares and Queralt 2015). In their theoretical model, Besley and Persson (2011) consider tax revenue as the result of investments by an incumbent ruler into fiscal capacity. While tax revenues are limited by the pre-existing level of fiscal capacity, this capacity can change endogenously, notably through the creation of administrative structures.

Recent empirical contributions have scrutinized the domestic factors that account for the decisions of political elites to invest in the development of institutions of fiscal revenue extraction. Typically, these studies examine the historical introduction of specific taxes (rather than tax revenues). Mares and Queralt (2015) examine the rationales for early modern European leaders to introduce income taxes. They identify an economic rationale, whereby the ruling landowning elite considered the income tax a useful instrument to siphon the economic power of the rising manufacturing elite. Manufacturers succumbed to the tax because it enabled them to deprive low-income earners of their electoral rights given that voting rights were conditional on payment of direct taxes. Aidt and Jensen (2009) conduct an event-history study of the adoption of income taxes for 17 countries between 1815 and 1939. They find that spending pressures, reductions in tax collection costs, and to a lesser extent learning effects play a significant role for the adoption decision, while universal suffrage has a curvilinear effect. Finally, Scheve and Stasavage (2010) argue that mobilization for mass warfare led to demands for increased taxation of the wealthy to distribute the financial burden of warfare more equally. Their empirical analysis shows that mass mobilization for warfare has been associated with greater tax progression, even when taking into consideration the extension of suffrage and the rise of left-wing parties as two rival explanations for progressive taxation.

The neglected role of the International Monetary Fund

While macro-historical determinants of tax reforms have been studied extensively, policy pressures exerted by IFIs are a relatively overlooked factor. In the wake of World War II, these organizations have become powerful players affecting tax policies in a variety of ways. Particularly the IMF—with its broad membership and its unchallenged role as global lender of last resort—has shaped economic policies in significant ways (Babb 2013; Stone 2002; Woods 2006).

In general, the IMF can bring about policy change in its member countries in three different ways—competition, learning, and coercion (Dobbin, Simmons, and Garrett 2007). First, as an organization tasked with reviewing macroeconomic policies of its member states, the IMF promotes dissemination of ‘best practices’. In the context of competitive regulatory pressures (Swank 2016), IMF surveillance accelerates the adoption of ‘best practices’ across countries. Because IMF surveillance improves information, states need to fear increased punishment from global capital markets for deviating from orthodox policy prescriptions (Lombardi and Woods 2008). Second, the IMF provides technical assistance at the request of member states. This accelerates adoption of certain economic policies, as policy-makers are exposed to these policy ideas to a greater extent (Seabrooke and Nilsson 2015). Third, through its practice of ‘conditionality’, the Fund can compel far-reaching policy reform in its member countries because access to credit is contingent on commitment to such reforms (Vreeland 2007). Left with little alternative funding options, governments arguably are most susceptible to adopt IMF-favored policies when they are under economic trouble. We therefore investigate the impact of the Fund on tax revenues in the realm of its lending activities. This is not to say that non-lending activities are not important: In fact, a number of studies highlight the importance of technical assistance and spread of ideas through macroeconomic research in purveying liberal tax policies (Keen and Lockwood 2010; Kentikelenis and Seabrooke 2017; Mabugu and Simbanegavi 2015). However, governments will be more susceptible to such advice when they can expect capital infusions in exchange for market-conforming policy change (Swank 2016).

While we have established that the IMF has the power to shape tax policies in the developing world, our next step is to understand its tax policy preferences to derive expectations about its impacts on tax policies in borrowing countries.

IMF policy preferences on taxation

In the case of tax policy, we argue that the Fund faces a fundamental tradeoff. On the one hand, the Fund is chiefly interested in raising tax revenues. On the other hand, the Fund also wants to promote private-sector activity, which would imply lower taxes, especially for businesses. We argue the IMF resolves the ‘dilemma of taxation’—providing much-needed revenue for the state while at the same time minimizing the cost of business—by targeting the composition of tax revenues rather than its overall level. In other words, the Fund discourages corporate taxes (as they would only make businesses less competitive) while hoping to mitigate revenue loss by raising consumption taxes and enhancing efficiency of tax collection. Its official policy stance on taxation entails a general recommendation to raise revenue in the context of emergency measures as well as recommendations to expand general sales taxes and personal income taxes. At the same time, the Fund promotes supply-side tax reductions, removal of tax exemptions, and general rate equalization (Tait 1989, 7). As an indirect tax, the VAT is popular with the Fund because its implementation is relatively easy

and less prone to corruption than direct taxes. For the Fund, the benefits of a VAT are best achieved under a broad base, a low rate applicable to all products, and few exemptions. While the Fund puts a premium on efficient taxes—disregarding their distributional consequences—it assigns expenditure policies the role to remedy adverse distributional consequences (Fjeldstad and Moore 2008; Genschel and Seelkopf 2016; Tait 1989).

IMF preferences and domestic political economy

Substituting different sources of tax revenue—notably VAT revenue for customs revenue—is not an easy task. In many countries, the demise of trade taxes following trade liberalization has not been matched by equivalent increases in goods and services taxes (Bastiaens and Rudra 2016; Keen and Lockwood 2010; Mansour and Keen 2009). In fact, countries often liberalized at the behest of the Fund, which therefore made itself complicit in hollowing out the fiscal capacity of its borrowers. Countries also lag behind when it comes to the adoption of progressive income taxes and social security contributions (Genschel and Seelkopf 2016).

In general, two main lines of thought can explain underachievement on policy reform. First, the so-called ‘managerial school’ considers lack of capacity to play a key role (Chayes and Chayes 1993). In general, a well-functioning tax is not easy to set up—not even the VAT (Tait 1989). But the general difficulty of tax reform does not explain variation in country experience. Cho (2009) argues that developing countries lack efficient institutional frameworks for collecting tax and increasing their tax base. For a long time, the Fund has neglected the institutional aspects of reform underpinning the effective implementation of its policy conditions. Without a surprise, especially Sub-Saharan African countries are challenged to reform their tax systems. As Bird and Gendron (2007, 181) note, “unfortunately, many countries—including most in sub-Saharan Africa—began their ‘modern’ tax systems with an unpromising legacy of state-private relations, with almost no trained officials, and in a very difficult political and economic setting.”

Second, a political economy perspective shifts attention to the political-economic incentives of incumbent elites to reform tax systems. Governments may not be willing to boost tax collection, as doing so is generally unpopular or would touch upon the interests of core constituencies. In many developing countries, political leaders are closely aligned with business moguls that lobby against corporate taxes—if not being themselves rich entrepreneurs who would be harmed by income taxes. In contrast, consumption taxes affect broader segments of the population and are therefore less likely to face organized opposition, which underpins their popularity with governments wishing to raise revenue (). As a result, developing-country governments under fiscal pressure will prefer broad-based consumption taxes over other tax types, thereby matching the tax policy advice of the Fund. Hence, to the extent that government preferences are consistent with IMF advice, tax conditionality may not even be necessary to bring about policy change.

In summary, our theoretical discussion has some testable implications on the relationship between IMF programs and tax revenues. As an agent of business-friendly policies, the Fund is primarily interested in altering tax structures—reducing customs taxes, promoting consumption taxes, while avoiding corporate taxes. The governments that face this tax policy advice will have incentives to

comply because domestic political economy considerations lead governments to favor the same kind of taxes. We therefore expect IMF programs to affect precisely these types of taxes, while the impact of such programs on total taxes is indeterminate. Our argument also implies limited effectiveness of tax conditionality under most circumstances because IMF advice and government preferences on taxation are well-aligned.

3. Empirical evidence on IMF programs and tax revenues

A voluminous literature on IMF programs focus on the impact of these programs on the overall fiscal balance (Bulír and Moon 2004) and in particular the spending side of the budget (Conway 1994; Hamm, King, and Stuckler 2012; Nooruddin and Simmons 2006; Nooruddin and Vreeland 2010). These studies mostly conclude that participation in IMF programs improves fiscal outcomes (Atoyán and Conway 2006; Conway 1994; Dreher and Vaubel 2004; Easterly 2005).

Very few studies within this literature consider the revenue side—most of which being conducted by IMF staff. Bulír and Moon (2004) study fiscal outcomes in a short panel of 112 countries in the mid-1990s. While most countries improved their fiscal balance, they took different strategies depending on their relationship with the Fund. While countries without IMF programs reduced expenditures but maintained revenue, countries with IMF programs reduced both. In the latter countries, conditionality did not have a significant impact on fiscal positions. Cho (2009) reports similar findings, examining 93 developing countries during the 1951-2000 period using a difference specification with a lagged dependent variable and correcting for selection into assistance programs. He finds that IMF programs had no effect on revenue collections. Crivelli and Gupta (2016) do not find a significant effect of IMF programs on total tax revenue. Using a panel of 126 lower-income countries for 20 years, they show that only IMF programs with so-called ‘revenue conditionality’ boost tax revenue, particularly from goods and services. Acknowledging challenges to construct conditionality measures that are excludable with respect to tax revenue, they resort to system-GMM estimation using internal instruments.

Mahon (2004) studies the determinants of tax reform in Latin America. He finds that the Fund catalyzed VAT introduction in many countries, but its conditionality was less effective among democracies. Using pooled ordinary least squares on 15 countries for the 1977-1995 period, his analysis includes two binary variables—an IMF program indicator and a measure of tax conditionality—which allows for untangling the impact of tax conditionality and other aspects of IMF assistance. Brun, Chambas, and Laporte (2011) conclude that IMF programs had a negative impact on total revenues in Sub-Saharan Africa during the 1984-2007 period. However, IMF programs were effective at high levels of institutional quality, as measured by bureaucratic quality and the absence of corruption. Keen and Lockwood (2010) corroborate the pessimistic picture for Sub-Saharan Africa, establishing that IMF program participation boosts tax revenue only outside that world region. Examining the drivers of the rapid adoption of value added taxes around the world, they find that VAT adoption is driven entirely by non-crisis programs, as opposed to the crisis facilities of the Fund. Their analysis rests on a panel of 143 countries for 25 years. In an earlier article, Keen and Lockwood

(2006) assess the revenue implications of VAT introduction in OECD countries. In two-way fixed-effect panel estimates with lagged dependent variable, they find that the VAT increases revenues but also offsets revenue from other tax types. They interpret these results as evidence for the efficiency of the VAT.

Bastiaens and Rudra (2016) adopt a different research design by regressing three types of non-trade tax revenue on trade tax revenue (as proxy for trade liberalization), IFI assistance for tax systems, and their interaction effect for different regime types. In a sample of developing countries from 1990 to 2009, they find evidence for a positive impact of IFI assistance on domestic taxes in non-democracies after trade liberalization. Their research design differs from ours in two key aspects. First, motivated by their specific research question, they treat trade taxes as exogenous, thus neglecting the possibility that IFI assistance itself can lower such tax revenue.² Second, their measure of IFI assistance is not comparable to the one used in other studies (including ours) because it only includes concessional aid, thus ignoring the much bigger IFI lending and the attached policy conditions.³

While these studies have improved our understanding on the links between IMF programs and tax revenues, they suffer from several drawbacks. First, many studies have limited regional scope, typically focusing on a particular region, for example post-Soviet economies (Crivelli 2013), Latin America (Mahon 2004), and OECD countries (Keen and Lockwood 2006). Second, studies also face methodological challenges relating to short panels, pooling of observations, endogeneity bias, and use of non-transparent system-GMM estimation. Third, studies generally do not spend sufficient efforts to capture heterogeneity within IMF programs. Most studies distinguish crisis facilities from non-crisis facilities (Alavuotunki and Pirttila 2015; Keen and Lockwood 2010). While some studies indeed consider variation within IMF programs due to specific types of conditionality (Crivelli and Gupta 2016; Mahon 2004), they do not at the same time investigate country-specific factors even though local circumstances are potential moderators of program effectiveness. Finally, as most studies are authored by IMF staff, our study as an independent contribution to the issues at hand is a valuable contribution. In fact, Clist (2016) reports doubtful methodological choices, poor data quality, and lack of documentation, which prevented successful replication of published research on tax revenues.

4. Data and methods

For our empirical analysis, we exploit newly available datasets on tax revenue, tax adoption, and IMF conditionality. Our sample includes non-high income countries (tantamount to GDP per capita below 12,736 US\$ according to the World Bank definition) observed from 1993 to 2013. The choice of sample period primarily reflects concerns with data availability. In particular, tax data disaggregated by different taxes are available for more than 100 countries only for this time period. In addition, this choice also avoids the structural break due to the breakdown of the Soviet Union, thus ensuring

² Another problem is the obvious violation of the exogeneity assumption, which would require an instrumental variable technique.

³ In fact, not controlling for this important part of IFI assistance most likely generates omitted-variable bias.

measurement equivalence over a twenty-year horizon.⁴ Our choice notwithstanding, we replicate all estimations for the 1980-2013 period and comment on potential differences in our analysis.

Tax data comes from the Global Revenue Dataset (GRD) collected by the International Centre for Tax and Development (ICTD). The ICTD GRD data combine several sources to generate extensive time-series cross-section revenue data. Researchers from the ICTD have taken great efforts to ensure consistency of the data and document their data collection procedure in detail (Prichard, Cobham, and Goodall 2014). We use the following variables from the ICTD GRD data as dependent variables: total tax revenue, goods and services tax revenue, (personal) income tax revenue, and corporate (income) tax revenue. All variables are expressed as percentage of GDP.⁵

In further analyses, we also examine the introduction of specific taxes, notably the value-added tax. The dependent variable in related regressions is a binary variable indicating whether a country introduces the tax in a given year. Data are sourced from the Tax Introduction Database (Seelkopf and Lierse 2014). We include a binary for VAT introduction, which captures whether or not a given country had a permanent tax levied by the central or federal government on the value added of the sales of all (regular) goods and services.

Turning to explanatory variables, we leverage a new dataset on conditionality agreed within policy reform programs between the Fund and its borrowing countries over more than three decades (Kentikelenis, Stubbs, and King 2016). As this database includes the text of policy conditions, we are able to identify conditions related to taxation. We construct three indicators of tax conditionality. First, ANY CONDITION covers all conditions related to raising revenue from taxes, including tax policy and capacity building. and tax policies. About one fifth of all IMF programs include a tax condition that matches this definition. Second, SPECIFIC CONDITION refers to conditions on specific taxes—such as goods and services tax, value-added tax, income tax, corporate tax, and custom duties—that must be altered in specific ways (introducing a tax, altering their modalities, or abolishing a tax). Third, conditions on TAX ADMINISTRATION capture capacity-building reforms, such as the establishment of large-taxpayer offices. To aggregate these conditions to the country-year level, we create a dichotomous variable indicating the presence of a given tax condition. While this aggregation rule discards information on the number of conditions, it does not need to assume that each tax condition is equally important. Tax conditions are rather rare—a dichotomous measure therefore is more robust than a continuous one. Last but not least, previous research also uses binary indicators on rare conditions (Crivelli and Gupta 2016; Wei and Zhang 2010). The supplemental appendix details the coding procedure for these three measures.

⁴ Previous studies sometimes exclude former Soviet Union countries as robustness test (Keen and Lockwood 2010).

⁵ While some researchers use log-transformed tax revenues as dependent variable (Clist and Morrissey 2011; Morrissey, Prichard, and Torrance 2014; Morrissey and Torrance 2015), we follow others using untransformed tax revenues for ease of interpretation (Baunsgaard and Keen 2010; Besley and Persson 2008; Cárdenas and Tuzemen 2011; Crivelli 2013; Prichard 2014). Log-transformation is not necessary in our case—diagnostic plots do not indicate problems with skewness in the revenue variables. Our results are not sensitive to this transformation.

We include a number of time-varying control variables from the literature on taxation (Aidt and Jensen 2009; Baunsgaard and Keen 2010; Clist and Morrissey 2011; Prichard 2016). Most of these variables capture the tax base of a country. For example, we include the natural logarithm of GDP PER CAPITA because richer countries have more taxable income and are better able to collect taxes from their citizens (Clist and Morrissey 2011; Morrissey and Torrance 2015; Scheve and Stasavage 2010). We also include NON-TAX REVENUE (as a percentage of GDP)—available from the ICTD GRD data—to capture the lower revenue requirements in countries with alternative income sources (Prichard 2014). TRADE OPENNESS (as a percentage of GDP) is included because trade taxes are relatively easy to collect (Clist and Morrissey 2011). In contrast, tax collection is difficult in agrarian countries because agriculture primarily is a subsistence activity that is hard to tax in most developing countries. We therefore include AGRICULTURAL OUTPUT as a percentage of GDP. Finally, we include the percentage rate of GDP GROWTH, expecting a positive relationship as times of boost in the business cycle should facilitate tax revenue generation (Prichard 2014). Unless otherwise stated, we source all control variables from the World Development Indicators (World Bank 2015). We also include country-fixed effects that capture time-invariant determinants of tax revenue such as history of warfare, years of democratic experience, income inequality, and natural resource endowments (Besley and Persson 2010; Cárdenas and Tuzemen 2011; Morrissey and Torrance 2015). In addition, we include year-fixed effects to capture global factors that affect tax revenues equally in all countries.

We explore the impact of IMF programs (and IMF conditionality) on tax revenues by estimating equations of the following form:

$$T_{it} = \delta T_{it-1} + \beta_1 C_{it-1} + \beta_2 IMF_{it-1} + \zeta' X_{it-1} + \alpha_i + \mu_t + \varepsilon_{it}$$

The first regressor is the lagged dependent variable (LDV), the second is a binary indicator for tax conditionality (if it is included), the third indicates the presence of an IMF program, followed by a vector of control variables, country-fixed effects, year-fixed effects, and an idiosyncratic error term. While we are most interested in the one-year lag of our key regressors, we also examine deeper lags up to three years to allow for delayed realization of potential impact.

Inclusion of a LDV is warranted for two reasons—theoretically, since governments often target revenues based on realized revenue of the previous fiscal year; empirically, since diagnostic tests for autocorrelation confirm that tax revenue is a slow-moving variable and thus inclusion of a LDV can mitigate serial correlation in the errors. In the presence of fixed effects, however, inclusion of a LDV yields biased estimates (Nickell 1981)—even though the bias is concentrated in the coefficient on the LDV. Our baseline estimator hence is the bias-corrected Anderson-Hsiao instrumental-variable estimator for unbalanced dynamic panel data (Bruno 2005).

A well-known inferential challenge is non-random assignment of countries to IMF programs. For instance, countries with low revenue may need to request IMF credit, thereby implying a problem of reverse causality. We tackle this challenge by estimating a selection model for IMF programs using a well-established set of variables recommended by the literature. For example, we include PAST PROGRAMS, a count variable for the prior years of IMF exposure over a five-year horizon. Research shows that previous exposure is a reliable predictor of current participation (G. Bird, Hussain, and

Joyce 2004; Conway 1994; Crivelli and Gupta 2016). Program participation is also affected by the extent to which the Fund has resources available, which depends on the current number of program countries (Vreeland 2003). Hence, we include the contemporaneous count variable COUNTRIES UNDER PROGRAMS. In addition, as allies of big powers receive favorable treatment by IFIs (Dreher, Sturm, and Vreeland 2015; Thacker 1999), we measure the alignment of voting patterns between the borrowing country and the G7 countries in the United Nations General Assembly—UNGA VOTE ALIGNMENT (Strezhnev and Voeten 2013). Additional variables capture macroeconomic conditions—logged GDP PER CAPITA, GDP GROWTH, RESERVES in months of imports, EXTERNAL BALANCE (as percentage of GDP), and DEBT SERVICE (as percentage of GNI)—as well as political characteristics—democracy as measured by the (rescaled) FREEDOM HOUSE INDEX combining political rights and civil liberties and EXECUTIVE ELECTIONS—that have been previously found to affect program participation.⁶ We also include regional dummies and year dummies (while country-fixed effects cannot be included in a probit-type model).

Together with the outcome equation, the selection equation is part of a multi-equation model with correlated errors across equations, which can be consistently estimated through maximum likelihood (Roodman 2012). Inference from such models is more robust if there are variables that predict program participation but not tax revenue. UNGA voting alignment fulfills this criterion very well in our case, which increases our confidence in the inference from this approach. However, we acknowledge that endogeneity of tax conditions remains a challenge yet to be resolved, and return to this issue in the robustness tests.

In robustness tests, we also use system generalized method of moments (GMM) estimation—an estimation approach that takes the outcome equation in differences and levels as a system, using lagged changes as instruments in the latter, and lagged levels as instrument for changes in the former (Roodman 2009). System-GMM performs well in panel settings like ours with small T and large N (Crivelli and Gupta 2016). We present the usual diagnostics to insure against model misspecification (Roodman 2009).

5. Findings

Aggregate effect of IMF programs on tax revenues

We first assess the total effect of IMF programs on tax revenue. Figure 2 shows the evolution of tax revenues for countries that never had an IMF program (left panel) and countries that had at least one IMF program (right panel). The evolution of total tax revenue for these two groups of countries is not significantly different from each other. However, the different types of tax revenues—goods and services tax, trade tax, and income tax—evolve in fundamentally different ways in countries under IMF programs. While goods and services taxes increase steadily, trade taxes decline in these countries, particularly since the early 1990s. In contrast, tax revenues of countries without IMF

⁶ These variables are all lagged one period further than the lag of IMF PROGRAM.

exposure were stable across all tax types since the early 1990s. A suggestive interpretation of these results is that IMF exposure leads countries to adjust the relative importance of different tax types, without having any tangible effect on total tax revenue. In the following, we explore this possibility further using multivariate analysis.

[Figure 2 here]

Table 1 shows the results from bias-corrected fixed-effect dynamic panel regressions, in which the dependent variable is total tax revenue as percent of GDP and the key regressor is the dichotomous IMF program indicator. As shown in the column head, we apply different lags to the key regressor (and the control variables) to allow for a delayed response in tax revenue after IMF interventions.

[Table 1 here]

As IMF programs are not randomly assigned to countries, we present results from a selection model in which we augment the outcome equation with a selection equation for IMF programs, which is consistently estimated via maximum likelihood. For both modeling approaches, we find that IMF programs are not significantly related to total tax revenue. Small differences between the two approaches refer to the size of the coefficient on IMF programs and the lagged dependent variable and the statistical significance of two control variables—logged GDP PER CAPITA and AGRICULTURAL OUTPUT as percent of GDP.

[Table 2 here]

While these null findings on IMF programs are consistent with previous research (Crivelli and Gupta 2016), they beg the question of why IMF programs do not help raise total tax revenue—despite the considerable efforts the Fund expends to modernize tax administrations and to offer tax policy advice to its borrowing countries.

Our argument is that IMF programs serve primarily to alter the composition of taxes. In line with the market-liberal policy consensus of the Fund, we would expect corporate taxes to decline, and goods and services taxes to increase. Our evidence is consistent with the claim that the Fund promotes business-friendly tax policies. Table 3 shows coefficient estimates of IMF programs with respect to three types of taxes under different lags. Using dynamic panel regression without taking selection bias into account, we find that goods and service tax revenue increases after three years ($p < 0.05$), while corporate taxes decline after one year ($p < 0.10$). These findings are remarkable given that we would expect selection bias to work against finding significant results in our case.

[Table 3 here]

Table 4 also accounts for potential selection bias into IMF programs, with the result that we find goods and service taxes to increase ($p < 0.10$), but income tax ($p < 0.01$) and corporate tax ($p < 0.05$) to decline significantly after two years of IMF programs. In substantive terms, the average IMF program increases goods and services taxes increase tax revenue by 0.61 percent of GDP—around one tenth of its standard deviation; it also decreases income tax revenue by 0.7 percent of GDP and corporate tax

revenue by 0.43 percent of GDP—almost one fourth of the respective standard deviations of these variables. All coefficients are short-term effects, which accumulate to greater magnitude in the long run when taking the dynamic response of tax revenues into account. For example, the contemporaneous IMF program effect of 0.61 percent of GDP turns into at least 1.41 percent of GDP in the long run.⁷

While these results thus far strongly support the claim that IMF programs are most effective in altering the composition of taxes, they do not warrant the conclusion that the revenue gains in goods and service tax are insufficient to compensate for the losses in the other taxes.

[Table 4 here]

Tax conditionality and tax revenues

Another potential explanation for the inability of IMF programs as such to promote total tax revenue is that countries do not usually adopt the necessary policies to boost revenue unless facing explicit conditionality to do so. Non-adoption of tax policies can be due to lack of capacity, political will, or a combination of both. Tax conditionality—if designed in a very explicit manner—may get countries to embark on tax reform (Mahon 2004) because such conditionality can substitute for the lack of local expertise or help governments overcome political obstacles to tax reform (Seabrooke 2010).

To test whether conditionality makes a difference, we scrutinize three types of tax conditionality—conditions broadly related to raising tax revenue, conditions on specific taxes, and conditions on tax administration. Table 5 indicates that conditionality does not generally affect tax revenues in most cases. The only exceptions are conditions on specific taxes, which significantly promote total tax revenue. Furthermore, tax conditions also significantly reduce trade taxes, while income taxes tend to be negatively related to conditions on tax administration. Interestingly, goods and services taxes are not responsive to any type of tax condition. These results do not account for potential selection effects.

[Table 5 here]

When taking potential selection into IMF programs into account, results are similar but now tax conditionality is positively related to goods and services taxes (Table 6). Moreover, tax conditions and conditionality on specific taxes is significantly positively related to corporate tax income. In substantive terms, an IMF program with a specific tax condition relates to 0.31 percent of GDP higher total tax revenue as compared to an IMF program without such a condition ($p < 0.10$). Similarly, a specific condition is related to a net increase in corporate tax by 0.1 percent of GDP ($p < 0.01$). A similar (positive) effect magnitude is involved for any tax condition with respect to goods and services tax and corporate tax, while the (negative) effect on trade tax is more than double. To be sure, neither of these results can be interpreted causally as we have not instrumented tax

⁷ This can be computed as $\beta/(1-\alpha)$, where α is the coefficient on the lagged dependent variable (LDV) and β the short-term coefficient. Note that the true coefficient on the LDV may be bigger, as indicated by the bias-corrected dynamic panel estimates, and therefore the long-run effect even bigger.

conditionality. And yet, it is unlikely that these results merely reflect selection bias, given that the bias works against finding effects in the given direction. For example, if countries with low tax revenue from consumption would be more likely to obtain a tax condition in the first place, the latter variable should have a negative coefficient. In fact, it is positive. The only result that might reflect a reverse effect is the negative coefficient on tax administration conditions because these ones might more likely be mandated when the level of income taxation is low.

[Table 6 here]

In sum, these results suggest that IMF policy design can affect tax revenue, specifically when conditionality explicitly targets specific kinds of taxes. However, as the coefficients on IMF programs remain significant when adding variables for tax conditions to our models, the importance of such conditions for altering tax policy must be considered as rather marginal. This implies that other aspects of IMF assistance—technical assistance, policy dialogue, and informal consultations—may be more important than tax conditionality in bringing about tax policy change. In other words, not coercion—but learning or competition—seem to be the primary mechanisms by which the Fund alters tax policies in its borrowing countries. This should not come as a surprise to political economists. In fact, IMF policy advice on taxation and the preferences of politically opportunistic governments are rather well-aligned, implying that coercive conditionality is not necessary.

Recipient-country characteristics

While the previous section has tested whether the Fund can promote tax revenue by designing related conditionality, we now turn to recipient-country characteristics as another factor underlying tax policy performance. In line with the managerial view, we expect that countries with less capacity are less responsive to IMF advice. In line with a political economy perspective, we expect that the Fund is less likely to be effective in raising tax revenues in countries facing implementation obstacles at the domestic level.

Capacity is not easy to operationalize as it is most likely endogenous to tax revenue and other (potentially unobservable) variables. We use an indicator for Sub-Saharan Africa—a region marked by low capacity and neo-patrimonial politics (Bird and Gendron 2007, 181)—and expect the effect of IMF programs on tax collection to be weaker within that region (Brun, Chambas, and Laporte 2011). To measure domestic opportunity structures, we consider several measures. First, we create a binary indicator that divides countries according to their level of urbanization, taking the median of urbanization as cut-off point. IMF advice should be more effective in non-urban country contexts, in which industry interests are weaker and taxpayers are less well-organized. Second, democratic governments must fear electoral consequences when attempting to tax powerful constituencies; therefore, IMF programs should be less effective in relatively more democratic countries (Bastiaens and Rudra 2016). Third, IMF programs should also be less effective in non-presidential systems, because executive power-sharing increases the risk that veto players hold up tax reforms (Mahon 2004). In the same vein, governments of left-wing political ideology should be less responsive to IMF pressure (Doyle 2012), particularly with regard to business-friendly taxes.

Table 7 presents the results, using multiple-equation maximum-likelihood estimation that accounts for non-random selection into IMF programs. Comparing Sub-Saharan Africa with the rest of the world, we find that IMF programs are relatively more effective in increasing income taxes in African countries, but relatively less effective in reducing corporate taxes. Moreover, while IMF programs boost goods and service tax revenue significantly outside Africa ($p < 0.05$), they fail to do so in Africa.⁸ This corroborates earlier work arguing that the preconditions for boosting VAT revenue are almost never met in low-income countries, particularly Sub-Saharan Africa (Bird and Gendron 2007, 219). Turning to urbanization, we find that IMF programs help raise taxes on goods and services and personal income significantly within non-urban contexts, but not in urban settings ($p < 0.01$)—consistent with our prior expectation. In countries whose democracy levels is below the median, IMF programs are generally more effective, with respect to raising total taxes and income taxes, and reducing corporate taxes. More democratic countries are more likely to raise goods and services taxes in the wake of IMF programs, which is in line with their preference for such taxes as opposed to other tax types. Similar findings hold for presidential systems, in which total revenue, income tax, and corporate tax is significantly more responsive to IMF intervention ($p < 0.01$), while such intervention has a more beneficial effect on goods and services taxes in non-presidential regimes than in presidential regimes ($p < 0.01$). Finally, IMF programs have no effect on total tax revenue if administered by left-wing governments, while right-wing governments significantly increase total taxes by 1.48 percent of GDP ($p < 0.01$). Differences in all other tax types are not statistically significant across government ideology.

[Table 7 here]

The above findings show that domestic politics significantly moderate the effect of IMF programs on tax revenues. There hence is considerable country heterogeneity that may account for the overall pattern that IMF programs on average do not affect total tax revenue. As shown in the previous analysis, heterogeneity also applies to the different types of taxes. IMF programs generally help raise goods and services taxes but lead to lower corporate taxes. Least support in the data refers to program heterogeneity, notably the specific design of tax conditionality.

Additional analyses

To lend further credibility to our argument, we conduct a series of additional analyses in the supplemental appendices. We report briefly on the results of these analyses here. Appendix A scrutinizes the contribution of IMF programs to the likelihood of tax adoption. We focus on adoption of value-added taxes, given that this is the only tax type for which we find a consistent increase in revenues in the wake of IMF programs. Obviously, for countries to benefit from increased VAT revenue, they must introduce the VAT in the first place. The Fund is a strong advocate of this tax and has made VAT introduction part of its tax policy advice and related conditionality. This begs the question: Does participation in IMF programs raise the probability of VAT introduction?

⁸ As we use a split-sample approach, we cannot test whether this difference is statistically significant (the same caveat applies to all subsequent comparisons).

Before turning to multivariate analysis, we explore this question graphically. Indeed, we observe that countries that had been under at least one IMF program over the past three decades have a much faster rate of adoption compared to never-users of IMF credit. The adoption rate for other types of taxes is not significantly different across these two groups (Figure A1).

We then use multivariate analysis on a restricted sample of countries initially without a VAT and that leave the sample once they introduced a VAT. For simplicity, we use the same control variables as in our analysis of tax revenue, and add the log-transformed number of years of being without a VAT to capture the increasing hazard of adoption over time. Using a bivariate probit model of VAT adoption that simultaneously models selection into IMF programs using our previous set of program determinants, we find that IMF programs significantly increase the probability of VAT adoption until three years into an IMF program (Table A1).

We find no evidence that VAT adoption is predicted by specific types of tax conditionality (Table A2). Within the three-year period following IMF programs that we scrutinize here, tax conditionality is unrelated to the probability of VAT adoption. If at all, results suggest an indirect route via improved capacity of the tax administration, given that we find a weakly significant positive coefficient on tax administration conditionality after two years. This is a sensible result, as countries should introduce the VAT only when they are ready to do so to minimize efficiency losses (R. M. Bird and Gendron 2007). Overall, however, our results suggest that IMF programs help reform tax policy through their catalytic effect rather than their coercive capacity.

A caveat of our analysis is that we have not accounted for potential endogeneity of tax conditionality. In our case, reverse causality is less of a concern, given that selection bias usually works against us finding significant effects in the anticipated ways. However, endogeneity remains a concern—for example due to omitted variable bias or measurement error. As a first step, we attempt predicting the inclusion of tax conditions in IMF programs (Table B1). We find that such conditions have similar determinants as IMF programs more generally—such as national income, economic growth, and foreign reserves. Importantly, past tax revenue does not reliably predict tax conditionality, except the most general type of tax conditionality ($p < 0.10$).

Following recent advancements in aid allocation literature, we consider a compound instrument that interacts the time-invariant probability of a country to receive a given tax condition (calculated using the full time period under investigation) with the time-varying global probability of a tax condition being administered on any borrowing country. The first part is clearly not exogenous, but the second one is plausibly unrelated to the individual propensity of having a tax condition, which makes the compound instrument exogenous (Dreher and Langlotz 2015; Esarey 2015; Lang 2016). The identifying assumption is that the global probability of a tax condition affects country-specific tax revenue only through its impact on the propensity that a country obtains a tax condition, given observable control variables. This assumption is not implausible, given that international organizations such as the Fund often adopt a one-size-fits-all approach in their policy advice (Seabrooke 2010; Swank 2006). In fact, Fjeldstad and Moore (2007) speak of a ‘global wave of tax reform’—emphasizing the compelling force of global norms on national tax policies. Assuming the compound instrument is excludable, we can interpret our results causally. Consistent with the main

analysis, we find that tax conditions rarely affect tax revenues, including total taxes, goods and services taxes, and trade taxes. However, we find that all types of tax conditions reduce income tax after three years, while two types of tax conditions serve to increase corporate taxes. These results do not contradict our previous findings, especially when considering that coefficients on IMF programs remain significant (Table B2).

As external instruments for tax conditionality are hard to find, we also use internal instruments and estimate system GMM regressions (Roodman 2009). This approach is often considered to be inferior to alternatives though—as it lacks transparency and does not allow for associating specific instruments to specific variables. For a plausibility check, we estimate a system GMM model with a once-lagged IMF PROGRAM indicator, instrumented by second lags of all variables from the selection model in the difference equation and first difference of these variables in the level equation.⁹ As before, we find that IMF programs on average do not affect tax revenues within a one-year horizon (Table B3). When we split programs into those with tax conditionality and those without—assuming they can be both instrumented with the same variables—we find that IMF programs with tax conditionality increase revenue from goods and services taxes but lower corporate tax income (Table B4).

Finally, we are interested to see whether our results extend to a much longer time period. Supplemental appendix C replicates all estimations for the 1980-2013 period. We find that most results also hold for this extended time period, so we only report on the differences here. First, IMF programs have a more positive aggregate effect that sometimes becomes statistically significant—not only in the simple dynamic panel regression (Table C1) but also when accounting for selection (Table C2). Second, the more positive effect of IMF programs does not translate into more significant coefficients on tax conditionality (Tables C3-6). Third, the biggest changes occur in the domestic politics variables (Table C7). More differences than before across distinct groups of countries are significant now, including the difference in coefficients by urbanization level for corporate taxes, as well as the differences between left-wing governments and all other governments. Specifically, left-wing governments raise significantly more revenue from corporate taxes and trade taxes, but less revenue from income taxes. Some differences also vanish, for example the ones between presidential systems and non-presidential systems for some tax types (here income tax is now negatively significant for presidential systems, not positively significant), and the differences by democracy for income tax. Attempts to instrument tax conditionality yield a mixed picture. While the compound instrumentation strategy generates no significant results on conditionality whatsoever, coefficients in the system GMM estimations become more statistically significant—tax conditionality helps raise goods and services tax but lowers corporate tax revenue.

6. Conclusion

⁹ This approach follows Crivelli and Gupta (2016), but with more instruments, which has the result of our variables of interest being less significant.

In recent years, IFIs have declared the strengthening of fiscal capacity of low-income countries a key priority toward sustainable development. And yet, despite growing IFI efforts to build fiscal capacity, developing countries remain well below revenue levels of the developed countries (Besley and Persson 2011). In this article, we offer three complementary explanations for this empirical pattern.

Our favorite argument—which also obtains most support in the empirical analysis—is that the IMF—as an agent of liberal market policies—faces a tradeoff when advocating measures aimed at increasing tax revenue. While increased taxation holds promise to increase state capacity, it also increases the cost of business. Therefore, the IMF promotes taxes that affect broad segments of the population—such as a value-added tax—while discouraging corporate tax increases. As an avid promoter of trade liberalization, the IMF also advised countries to reduce customs duties. As a result, tax revenue is unlikely to increase in the realm of IMF programs—as opposed to the composition of different taxes, with potentially negative distributional consequences for the poor.

Alternatively, IMF assistance may be ineffective because countries lack the capacity or the political will to implement necessary tax reforms. Therefore, tax conditionality can be a solution as it forces countries to commit to certain tax policies (provided they wish to access loans). However, we find little systematic evidence of a significant contribution of tax conditionality to changes in tax revenues, especially when attempting to account for endogeneity of conditionality. Yet another view emphasizes domestic political economy constraints as a barrier for tax policy reform. While we find some evidence for the moderating impact of domestic politics, the key result on IMF-induced change in tax composition is unaffected.

In sum, our results caution against an overly optimistic view on the catalytic role of IFIs for building fiscal capacity. They show that the IMF is effective in altering the composition of taxes while failing to raise overall revenue. To the extent that it promotes more efficient taxes—such as the VAT—this is laudable, but the drawback of the VAT is its regressivity (Bräutigam 2008). Compensatory measures are therefore necessary to mitigate the related negative distributional consequences (Genschel and Seelkopf 2016).

What we leave for future research is a more holistic assessment of IMF interventions on tax revenues. In this article, we have only scrutinized tax conditionality; however, IMF conditionality with potential impacts on fiscal revenue extends well beyond taxes. For example, many countries liberalized trade—often at the behest of the IMF—with the result of lower revenue from trade taxes. Other taxes have not managed to fill the lost revenue since then (Bastiaens and Rudra 2016; Keen and Lockwood 2010; Mansour and Keen 2009). Moreover, IMF research shows a negative impact of privatization on tax in transition economies (Crivelli 2013). Taken together, these aspects call for a more careful design of IMF policies to minimize unintended consequences of economic reform programs.

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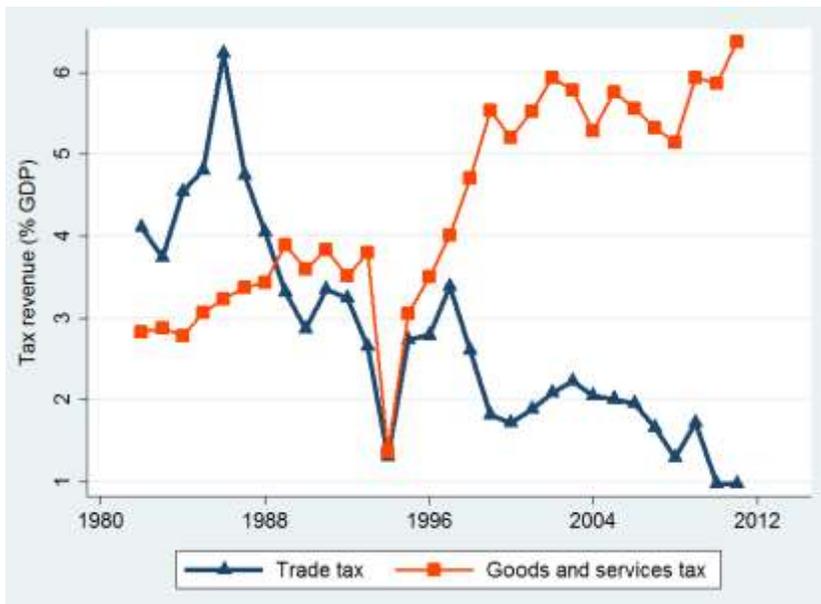
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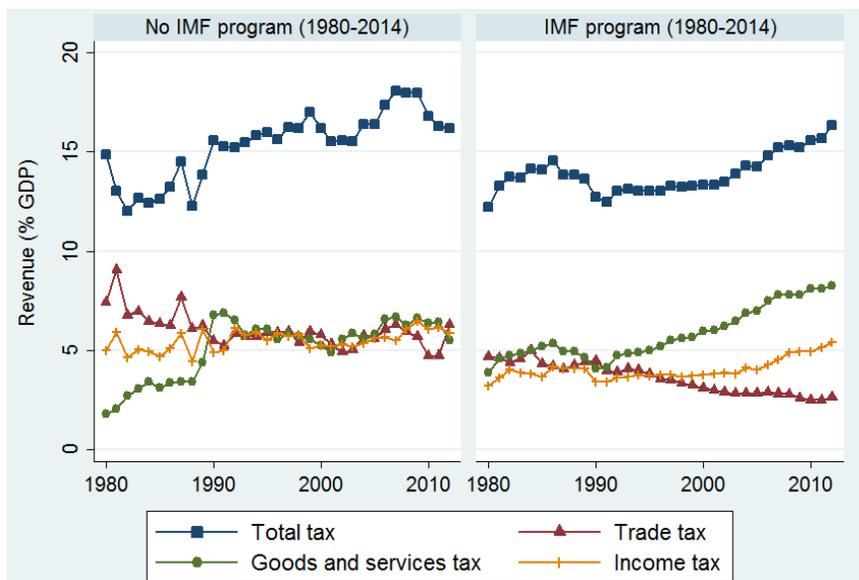
Figures

Figure 1: Evolution of tax revenues in Rwanda.



Data sources: ICTD GRD tax data (Prichard, Cobham, and Goodall 2014).

Figure 2: Evolution of tax revenues by IMF exposure.



Data sources: IMF conditionality database (Kentikelenis, Stubbs, and King 2016) and ICTD GRD tax data (Prichard, Cobham, and Goodall 2014).

Tables

Table 1: Total tax revenue and IMF programs without selection correction.

	t-1	t-2	t-3	t-4
L1IMFnn	0.052 (0.123)	0.152 (0.102)	0.074 (0.107)	0.189 (0.148)
L.tottax	0.799*** (0.025)	0.811*** (0.022)	0.803*** (0.025)	0.829*** (0.025)
L1lngdppc	0.678* (0.372)	0.244 (0.336)	-0.170 (0.370)	-0.057 (0.344)
L1totnontax	-0.011 (0.014)	-0.007 (0.015)	-0.017 (0.013)	-0.011 (0.015)
L1trade_WDI	-0.001 (0.003)	0.001 (0.003)	0.002 (0.002)	-0.002 (0.003)
L1va_agr_g~I	-0.014 (0.013)	-0.019* (0.011)	-0.016 (0.011)	-0.002 (0.012)
L1gdp_grow~I	0.014 (0.012)	0.007 (0.008)	0.011 (0.008)	0.004 (0.009)
Observations	2005	1957	1910	1861
Within-R2	0.581	0.587	0.593	0.597

Notes: Dependent variable is tax revenue (% GDP). All models include fixed effects on countries and years. Dynamic panel regression using the Anderson-Hsiao approach to mitigate Nickell bias. Standard errors bootstrapped using 50 replications. Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 2: Total tax revenue and IMF programs with selection correction.

	t-1	t-2	t-3	t-4
L.IMFnn	0.266 (0.355)	0.170 (0.232)	0.320 (0.478)	0.241 (0.335)
L.tottax	0.700*** (0.030)	0.698*** (0.031)	0.707*** (0.032)	0.718*** (0.031)
L1lngdppc	0.380 (0.376)	0.054 (0.366)	-0.069 (0.360)	-0.166 (0.412)
L1totnontax	-0.009 (0.014)	-0.020 (0.014)	-0.023 (0.016)	-0.017 (0.013)
L1trade_WDI	-0.002 (0.002)	0.000 (0.003)	0.002 (0.003)	-0.003 (0.003)
L1va_agr_g~I	-0.014 (0.014)	-0.025** (0.012)	-0.019* (0.010)	-0.005 (0.009)
L1gdp_grow~I	0.015 (0.010)	0.007 (0.011)	0.008 (0.009)	0.006 (0.007)
<hr/>				
11IMFnn				
L2IMFcum	0.309*** (0.023)	0.304*** (0.024)	0.301*** (0.026)	0.316*** (0.024)
L2nUnder	0.009 (0.007)	0.008 (0.007)	0.009 (0.007)	0.007 (0.007)
L2s_unga3g7	3.208*** (1.008)	3.167*** (1.062)	2.975*** (1.111)	3.537*** (1.260)
L2lngdppc	-0.394*** (0.078)	-0.406*** (0.082)	-0.413*** (0.087)	-0.400*** (0.092)
L2gdp_growth	-0.028*** (0.010)	-0.027*** (0.010)	-0.025** (0.010)	-0.022** (0.010)
L2reserves	-0.058** (0.024)	-0.061** (0.025)	-0.061** (0.026)	-0.057** (0.029)
L2extbal	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.001 (0.002)
L2debtser_~i	0.019* (0.011)	0.024* (0.012)	0.027** (0.013)	0.027** (0.012)
L2fhindex	-0.005 (0.024)	-0.003 (0.025)	0.000 (0.025)	-0.009 (0.024)
L2dpi_execec	0.005 (0.087)	0.075 (0.092)	0.116 (0.095)	0.146 (0.098)
<hr/>				
N1	2088	2031	1976	1922
N2	1727	1697	1663	1629
Within-R2	0.581	0.581	0.594	0.593
Pseudo-R2	0.322	0.323	0.323	0.320

Notes: Dependent variable is tax revenue (% GDP) in the outcome equation and IMF program in the selection equation. Both equations include year dummies, the outcome equation also includes country dummies, while the selection equation includes regional dummies. System of equations estimated via maximum likelihood. Standard errors clustered by country. Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 3: Tax revenues and IMF programs without selection correction.

	gs			Trade			income			corp		
	t-1	t-2	t-3	t-1	t-2	t-3	t-1	t-2	t-3	t-1	t-2	t-3
IMFnn	0.028 (0.071)	0.104 (0.068)	0.109** (0.055)	-0.019 (0.085)	-0.001 (0.063)	-0.077 (0.092)	0.006 (0.046)	-0.032 (0.056)	0.018 (0.051)	-0.091* (0.055)	-0.082 (0.051)	-0.015 (0.048)
LDV	0.888*** (0.028)	0.911*** (0.043)	0.880*** (0.028)	0.771*** (0.022)	0.774*** (0.026)	0.783*** (0.027)	0.862*** (0.019)	0.841*** (0.025)	0.864*** (0.025)	0.833*** (0.027)	0.78*** (0.029)	0.737*** (0.026)
Observations	1782	1747	1709	1776	1746	1713	1672	1643	1607	1237	1211	1179
Within-R2	0.727	0.737	0.733	0.527	0.527	0.526	0.643	0.647	0.659	0.577	0.581	0.586

Notes: Dependent variable is tax revenue (% GDP) for the type of tax indicated in the column head. All estimations include two-way fixed effects and control variables. To correct Nickell bias, we used the Anderson-Hsiao estimator. Standard errors bootstrapped using 50 observations. Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 4: Tax revenues and IMF programs with selection correction.

	gs			trade			income			corp		
	t-1	t-2	t-3	t-1	t-2	t-3	t-1	t-2	t-3	t-1	t-2	t-3
IMFnn	0.613* (0.317)	0.336* (0.174)	0.409* (0.227)	-0.016 (0.074)	-0.012 (0.090)	-0.076 (0.073)	0.569 (0.360)	-0.70*** (0.240)	0.468 (0.475)	-0.301 (0.236)	-0.430** (0.208)	-0.006 (0.228)
LDV	0.771*** (0.029)	0.78*** (0.026)	0.772*** (0.029)	0.673*** (0.07)	0.674*** (0.07)	0.682*** (0.072)	0.778*** (0.022)	0.75*** (0.025)	0.789*** (0.025)	0.696*** (0.031)	0.671*** (0.026)	0.658*** (0.04)
Observations	1849	1810	1767	1844	1811	1773	1740	1707	1667	1286	1256	1220
Within-R2	0.727	0.736	0.734	0.527	0.527	0.526	0.643	0.644	0.662	0.577	0.583	0.603
Pseudo-R2	0.322	0.322	0.323	0.322	0.322	0.323	0.322	0.322	0.323	0.322	0.322	0.323

Notes: Dependent variable is tax revenue (% GDP) as indicated by column head in the outcome equation and IMF program in the selection equation. All outcome models include two-way fixed effects and control variables. Selection models include year dummies and regional effects. System of equations estimated via maximum likelihood. Standard errors clustered by country. Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 5: Tax revenues and IMF conditionality without selection correction.

	taxany1			taxspec1			taxadm1		
	t-1	t-2	t-3	t-1	t-2	t-3	t-1	t-2	t-3
Total tax									
Condition	0.004 (0.123)	-0.133 (0.113)	0.057 (0.101)	0.047 (0.143)	-0.071 (0.193)	0.298** (0.144)	-0.15 (0.138)	-0.103 (0.16)	-0.001 (0.14)
IMFnn	0.050 (0.153)	0.222* (0.123)	0.042 (0.109)	0.045 (0.129)	0.163 (0.109)	0.033 (0.107)	0.083 (0.128)	0.170 (0.111)	0.075 (0.107)
LDV	0.799*** (0.025)	0.812*** (0.022)	0.803*** (0.025)	0.799*** (0.025)	0.811*** (0.023)	0.803*** (0.025)	0.8*** (0.025)	0.811*** (0.022)	0.803*** (0.026)
Goods and services tax									
Condition	0.077 (0.070)	0.094 (0.067)	0.056 (0.083)	0.105 (0.088)	0.056 (0.091)	0.057 (0.107)	-0.061 (0.08)	-0.010 (0.092)	-0.024 (0.106)
IMFnn	-0.012 (0.079)	0.057 (0.076)	0.082 (0.075)	0.013 (0.073)	0.097 (0.07)	0.101* (0.056)	0.040 (0.07)	0.106 (0.071)	0.113* (0.060)
LDV	0.887*** (0.031)	0.91*** (0.042)	0.879*** (0.028)	0.888*** (0.031)	0.911*** (0.043)	0.880*** (0.028)	0.889*** (0.031)	0.911*** (0.043)	0.880*** (0.028)
Trade tax									
Condition	-0.099 (0.107)	-0.226*** (0.084)	-0.061 (0.081)	0.027 (0.104)	-0.124 (0.119)	0.215 (0.132)	-0.122 (0.108)	-0.041 (0.104)	0.032 (0.124)
IMFnn	0.033 (0.102)	0.118 (0.082)	-0.052 (0.109)	-0.023 (0.084)	0.016 (0.067)	-0.108 (0.096)	0.007 (0.089)	0.006 (0.068)	-0.083 (0.099)
LDV	0.771*** (0.022)	0.773*** (0.026)	0.783*** (0.027)	0.771*** (0.022)	0.774*** (0.026)	0.783*** (0.027)	0.771*** (0.023)	0.774*** (0.026)	0.783*** (0.027)
Income tax									
Condition	0.012 (0.058)	-0.030 (0.064)	-0.029 (0.053)	-0.050 (0.087)	-0.029 (0.076)	0.017 (0.077)	0.013 (0.072)	0.070 (0.077)	-0.119* (0.069)
IMFnn	0.000 (0.052)	-0.018 (0.068)	0.034 (0.062)	0.013 (0.047)	-0.029 (0.057)	0.016 (0.053)	0.003 (0.044)	-0.046 (0.057)	0.040 (0.051)
LDV	0.862*** (0.019)	0.841*** (0.025)	0.865*** (0.025)	0.862*** (0.019)	0.841*** (0.025)	0.864*** (0.025)	0.862*** (0.019)	0.841*** (0.025)	0.865*** (0.025)
Corporate tax									
Condition	0.014	0.092	0.070	-0.087	-0.026	0.102	-0.012	0.063	-0.025

	(0.048)	(0.067)	(0.052)	(0.064)	(0.08)	(0.069)	(0.077)	(0.082)	(0.062)
IMFnn	-0.098*	-0.126*	-0.049	-0.079	-0.078	-0.029	-0.089*	-0.093*	-0.010
	(0.055)	(0.065)	(0.053)	(0.055)	(0.052)	(0.048)	(0.052)	(0.051)	(0.051)
LDV	0.832***	0.775***	0.735***	0.833***	0.78***	0.737***	0.833***	0.782***	0.737***
	(0.026)	(0.029)	(0.026)	(0.026)	(0.029)	(0.026)	(0.027)	(0.029)	(0.026)

Notes: Dependent variable is tax revenue (% GDP) for the indicated tax type. The binary variable *CONDITION* captures whether an IMF program contains any condition listed in the column head. All estimations include two-way fixed effects and control variables. To correct Nickell bias, we used the Anderson-Hsiao estimator. Standard errors bootstrapped using 50 observations. Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 6: Total tax revenue and IMF conditionality with selection correction.

	taxany1			taxspec1			taxadm1		
	t-1	t-2	t-3	t-1	t-2	t-3	t-1	t-2	t-3
Total tax									
Condition	0.037 (0.099)	-0.113 (0.116)	0.077 (0.102)	0.067 (0.125)	-0.055 (0.1)	0.306* (0.157)	-0.117 (0.112)	-0.080 (0.108)	0.025 (0.093)
IMFnn	0.250 (0.343)	0.220 (0.228)	0.287 (0.5)	0.260 (0.353)	0.177 (0.228)	0.281 (0.49)	0.280 (0.348)	0.177 (0.232)	0.317 (0.478)
LDV	0.700*** (0.030)	0.699*** (0.031)	0.707*** (0.032)	0.700*** (0.030)	0.698*** (0.031)	0.708*** (0.031)	0.700*** (0.030)	0.698*** (0.031)	0.707*** (0.032)
Goods and services tax									
Condition	0.112* (0.064)	0.102 (0.071)	0.073 (0.074)	0.135 (0.092)	0.053 (0.072)	0.063 (0.093)	-0.018 (0.074)	0.002 (0.089)	-0.003 (0.075)
IMFnn	0.569* (0.308)	0.289* (0.170)	0.378* (0.227)	0.613** (0.310)	0.330* (0.175)	0.402* (0.229)	0.615* (0.317)	0.336* (0.174)	0.409* (0.228)
LDV	0.77*** (0.029)	0.779*** (0.026)	0.771*** (0.029)	0.771*** (0.028)	0.780*** (0.026)	0.772*** (0.029)	0.771*** (0.029)	0.78*** (0.026)	0.772*** (0.029)
Trade tax									
Condition	-0.103 (0.068)	-0.232*** (0.093)	-0.069 (0.054)	0.032 (0.109)	-0.121 (0.079)	0.207* (0.119)	-0.118* (0.065)	-0.041 (0.117)	0.029 (0.049)
IMFnn	0.036 (0.079)	0.103 (0.114)	-0.044 (0.077)	-0.020 (0.074)	0.004 (0.094)	-0.104 (0.077)	0.005 (0.078)	-0.006 (0.099)	-0.080 (0.076)
LDV	0.673*** (0.069)	0.674*** (0.070)	0.681*** (0.072)	0.673*** (0.070)	0.674*** (0.071)	0.682*** (0.072)	0.673*** (0.069)	0.674*** (0.071)	0.682*** (0.072)
Income tax									
Condition	0.036 (0.058)	0.001 (0.050)	-0.007 (0.050)	-0.033 (0.060)	0.007 (0.053)	0.010 (0.063)	0.047 (0.06)	0.043 (0.062)	-0.105* (0.054)
IMFnn	0.552 (0.345)	-0.701*** (0.247)	0.472 (0.48)	0.573 (0.360)	-0.701*** (0.245)	0.466 (0.481)	0.565 (0.354)	-0.706*** (0.241)	0.490 (0.482)
LDV	0.778*** (0.023)	0.750*** (0.025)	0.789*** (0.025)	0.778*** (0.022)	0.75*** (0.025)	0.789*** (0.025)	0.779*** (0.022)	0.750*** (0.025)	0.789*** (0.025)

Corporate tax									
Condition	0.055 (0.043)	0.085* (0.044)	0.081** (0.041)	-0.059 (0.047)	-0.021 (0.041)	0.104*** (0.034)	-0.005 (0.045)	0.045 (0.054)	-0.019 (0.047)
IMFnn	-0.331 (0.242)	-0.472** (0.218)	-0.040 (0.239)	-0.291 (0.237)	-0.427** (0.21)	-0.025 (0.227)	-0.300 (0.235)	-0.436** (0.209)	-0.003 (0.23)
LDV	0.694*** (0.030)	0.668*** (0.026)	0.655*** (0.040)	0.697*** (0.031)	0.671*** (0.026)	0.658*** (0.040)	0.697*** (0.031)	0.671*** (0.026)	0.658*** (0.040)

Notes: Dependent variable is tax revenue (% GDP) for the indicated tax type in the outcome equation and IMF program in the selection equation. The binary variable CONDITION captures whether an IMF program contains any condition listed in the column head. All outcome-equation estimations include two-way fixed effects and control variables. Selection models include year dummies and regional effects. System of equations estimated via maximum likelihood. Standard errors clustered by country. Significance levels: * p<.1 ** p<.05 *** p<.01.

Table 7: Total tax revenue and IMF programs under different recipient-country circumstances.

	Sub-Saharan Africa (no/yes)		Urbanization (no/yes)		Democracy (no/yes)		Non-presidential system (no/yes)		Left-wing government (no/yes)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Total tax										
IMFnn	0.770 (0.608)	0.315 (0.326)	0.188 (0.420)	0.911 (0.714)	1.443** (0.694)	0.112 (0.229)	1.619*** (0.491)	-0.206 (0.265)	1.482*** (0.564)	0.002 (0.324)
LDV	0.747*** (0.031)	0.642*** (0.034)	0.666*** (0.035)	0.729*** (0.036)	0.686*** (0.048)	0.645*** (0.046)	0.700*** (0.035)	0.644*** (0.059)	0.707*** (0.031)	0.638*** (0.071)
Goods and services tax										
IMFnn	0.662** (0.338)	0.490 (0.451)	0.804*** (0.329)	0.476 (0.312)	0.322 (0.397)	0.805* (0.444)	0.355 (0.324)	0.858*** (0.350)	0.741* (0.399)	0.660** (0.302)
LDV	0.764*** (0.039)	0.772*** (0.171)	0.741*** (0.048)	0.769*** (0.034)	0.739*** (0.039)	0.75*** (0.047)	0.749*** (0.027)	0.765*** (0.059)	0.776*** (0.039)	0.689*** (0.045)
Trade tax										
IMFnn	-0.173 (0.996)	0.158 (0.118)	-0.026 (0.125)	-0.117 (0.266)	-0.004 (0.145)	-0.032 (0.125)	0.223 (0.230)	-0.166 (0.226)	-0.051 (0.132)	-0.043 (0.164)
LDV	0.743*** (0.052)	0.633*** (0.090)	0.596*** (0.081)	0.787*** (0.026)	0.692*** (0.022)	0.649*** (0.091)	0.675*** (0.021)	0.642*** (0.104)	0.752*** (0.034)	0.486*** (0.070)
Income tax										
IMFnn	-0.212 (0.233)	0.859** (0.369)	0.872*** (0.336)	0.248 (0.673)	0.813** (0.351)	-0.077 (0.284)	0.698** (0.319)	0.035 (0.419)	0.625* (0.366)	0.596** (0.275)
LDV	0.785*** (0.032)	0.677*** (0.056)	0.725*** (0.046)	0.793*** (0.042)	0.702*** (0.041)	0.78*** (0.037)	0.75*** (0.035)	0.737*** (0.044)	0.719*** (0.030)	0.847*** (0.053)
Corporate tax										
IMFnn	-0.551*** (0.200)	0.145 (0.204)	-0.072 (0.159)	-0.411 (0.265)	-0.555** (0.266)	-0.287 (0.265)	-0.634*** (0.232)	-0.058 (0.316)	0.213 (0.259)	-0.487 (0.384)
LDV	0.685*** (0.035)	0.675*** (0.042)	0.598*** (0.049)	0.710*** (0.042)	0.677*** (0.063)	0.668*** (0.035)	0.704*** (0.040)	0.684*** (0.046)	0.629*** (0.043)	0.606*** (0.081)
Diagnostics										
Total tax										
Observations	1316	772	1005	1083	853	1235	1309	779	1461	627
Within-R2	0.656	0.544	0.541	0.624	0.558	0.587	0.604	0.556	0.601	0.534
Goods and services tax										
Observations	1174	696	902	968	752	1118	1174	696	1309	561
Pseudo-R2	0.323	0.275	0.240	0.299	0.275	0.309	0.370	0.301	0.247	0.328
Trade tax										

Observations	1150	713	902	961	752	1111	1185	678	1320	543
Pseudo-R2	0.196	0.376	0.269	0.253	0.214	0.360	0.233	0.353	0.287	0.269
Income tax										
Observations	1128	643	846	925	685	1086	1114	657	1229	542
Pseudo-R2	0.365	0.344	0.316	0.374	0.282	0.400	0.376	0.354	0.302	0.423
Corporate tax										
Observations	840	505	651	694	494	851	826	519	964	381
Pseudo-R2	0.298	0.202	0.193	0.300	0.164	0.252	0.229	0.255	0.196	0.292

Notes: Dependent variable is tax revenue (% GDP) for the indicated tax type in the outcome equation and IMF program in the selection equation. All outcome-equation estimations include two-way fixed effects and control variables. Selection models include year dummies and regional effects. System of equations estimated via maximum likelihood. Standard errors clustered by country. Significance levels: * p<.1 ** p<.05 *** p<.01.