Project Finance Loans and Taxes: Predecessor's Splurge and Successor's Debt

By

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Abstract

Do tax rates increase as countries secure Global Project Finance loans? Over the years, there has been a significant increase in the use of Global Project Finance loans (PF loans) as a source of finance for capital-intensive development projects. Governments invest a considerable amount of time and resources to try and secure PF loans. Later on, more resources are set aside to ensure the project enjoys optimum conditions from its construction to the eventual operation. However, despite this, little is known about whether PF loans alter fiscal decisions of a country. This study investigates whether countries are likely to increase tax rates as they receive PF loans. Considering differences in checks and balance mechanisms as well as economic development in countries, this study further tests how this trend differs across political regimes. Given that PF loans is not a continuous source of revenue, securing PF loans could potentially alter the decisions and policies a leader adopts and at the same time, debt incurred from PF loans could influence future actions of policymakers. This study argues that, countries that receive PF loans are likely to experience a hike in tax rates. But this increase in tax rates varies by the level of economic development and democracy. Using a two-way fixed effects regression model, this study finds that tax rates significantly increase with PF loans. However, this is less likely in countries with high levels of democracy and a higher GDP per capita.

Keywords: Global Project Finance Loans, Tax Rates, Windfall, State Capacity, Regimes

Project Finance Loans: Predecessor's Splurge, Successor's Debt

Global Project Finance Loans (PF loans) have become an important source of revenue for financing capital-intensive development projects. However, little is known about the impact of PF loans on the fiscal decisions of a country. This study tries to investigate this by, first, proposing a positive relationship exists between tax rates and PF loans and that; this relationship could potentially explain the frequent tax hike protests around the world. The results, at a glance, indicate that tax rates are more likely to increase with receipt of PF loans. Moreover, there is suggestive evidence that this effect is less pronounced in countries that are more democratic and economically developed.

PF loans is one of the large-scale infrastructure project funding mechanisms that has been gaining prominence in the construction of capital-intensive infrastructure projects. Hoffman (2007) describes PF loans as a technique of financing capital-intensive assets whereby the loan is serviced by the flow of revenue from the completed asset or project rather than the credit or assets of the creditors (Hoffman, 2007). There has been a steady rise in the demand for PF loans as a form of capital for development projects (Hong et al. 2023). Reports of developing countries trying to secure PF loans to fund infrastructure projects are now commonplace (Hong et al. 2023; Hoffman, 2007).

However, with the increase in popularity and use of PF loans, there have been protests linking sudden hikes in tax rates to PF loans. In 2021, citizens of Colombia took to the streets to protest a tax increase on public services (Suarez & Garcia Cano, 2021), in 2022, protests erupted in Colombo, Sri Lanka, in response to an increase in income taxes (Krishan, 2023). In 2023 and early 2024, Kenya came to a standstill as citizens protested against tax increases. The protesters claimed that the tax increase had precipitated a surge in the price of basic commodities (Kahinju & Mukoya, 2023). Such protests, more often than not, have the potential to cause endearing political instability, (see, e.g., The lessons of Africa, 2024) resulting in stagnating economies (Kahinju & Mukoya, 2023; Krishan, 2023; Suarez & Garcia Cano, 2021,The lessons of Africa,2024).

Recent events suggest that the failure of PF loan-funded projects can be detrimental to

developing countries. The China Bridge and Railway Initiative (BRI) is among the higher-value PF loans. Through the BRI partnership, Kenya secured a $5.3 billion loan disbursed in three instalments (Kell, 2023). Kenya hoped the railway would enhance its existing infrastructure and draw in more revenue by connecting it to its East African neighbours by rail. However, on completion of the project, it emerged that the railroad failed to meet its projected value, leaving the nation with an enormous debt (Kell, 2023; Vines et al., 2022). In Asia, Sri Lanka, is a notable beneficiary of BRI loans. Through BRI loans, Sri Lanka initiated the construction of the Hambantota Port project. The project was initially appraised at $36 billion. China, through the BRI, footed about a third of the expenses. The project, however, failed to meet its projected revenue stream leaving Sri Lanka in a pit of debt that led the Sri Lankan government to cede control of the port to China (Hillman, 2018; Kell, 2023; Stacey, 2017; Vines et al., 2022).

PF loans as a source of finance is not limited to government-led projects or BRI loans in developing countries. In 2022 and 2024, the South Korean government stepped in to address liquidity shortage issues in both public and private projects. In 2022, Iwon Jeil Cha company faced a liquidity shortage, prompting the South Korean government to intervene through the Financial Services Commission (FSC) (Park, 2022). Fast-forwarding to 2024, a parallel scenario unfolded with Taeyoung Engineering & Construction, where stalled real estate projects triggered government action to avert potential financial market consequences (Flynn et al., 2024; Kwon, 2024). These instances underscore the diverse nature of PF loans, extending beyond conventional public and private distinctions in developing countries to other transactions in developed countries (Flynn et al., 2024; Kwon, 2024; Park, 2022).

Despite the volatility of PF loans, as typified by the cases in Kenya (Africa Defense Forum (ADF), 2023) and South Korea (Korea Broadcasting System (KBS), 2022), there is no common framework or regulation in place. Projects funded through PF loans range from dams and rural electrification projects to real estate construction. This makes it impractical for governments worldwide to adapt a standard regulatory framework (Ferrari et al., 2016). Consequently, when high capital-

intensive infrastructure project either experience cost overruns or fail to meet the anticipated revenue flow, the economic impact on the host country is devastating (ADF, 2023; Ferrari et al., 2016; KBS, 2022).

Offsetting of accumulated sovereign debt by increasing taxes is an endearing truism in public finance. It is, however, unclear whether there exists a positive relationship between tax rate increases and PF loans and if this relationship is conditioned on the level of economic development and polity of a country. Existing literature on PF loans, (Beidleman et al. 1990 and Esty, 2004), indicate that projects funded using the PF loans mechanism sometimes face challenges from a lengthy initial framework agreement to the eventual operation attracting high costs from the onset. It is also emerging that some projects do not live up to their projected value or, the expected returns were overestimated altogether during the initial negotiation phase. Given the scale of infrastructure projects funded using PF loans, governmental intervention becomes imperative when projects either stall, experience cost overruns or, fail to meet the estimated revenue flow (Beidleman et al., 1990 & Esty, 2004).

Early research on tax rate determinants focus on economic and political determinants. In some studies, (see, e.g., Baskran and Bigsten, 2013, Castañeda Rodríguez, 2018 and Torgler, 2008) political determinants such as political institutions were observed to determine tax rates. Other studies, (Castañeda Rodríguez, 2018, V. M. 2018), show that economic factors such as agriculture share in the GDP of a country is cited as a determinant of tax rates. A thorough scrutiny of the literature shows that there has been a spike in the use of PF loans to fund capital-intensive public infrastructure around the world. However, from the literature available, there is no record of PF loans as a major determinant of tax rates despite the potential impact on the fiscal policies of a country. Therefore, this study forwards PF loans as a critical determinant of tax rates (Baskaran & Bigsten, 2013; Castañeda Rodríguez, 2018; Hong et al., 2023).

To empirically investigate the relationship between tax rates and PF loans, this paper uses renown global tax data from the United Nations University World Institute for Development Economics Research (UNU-WIDER) as well as revenue return data from World Development Index

(WDI) of the world bank. UNU-WIDER data is a revenue record of countries from 1980 to 2022. These datasets were merged with PF loan data from the Loan Pricing Corporation, Dealscan. The PF loans data contains a record of PF commitment and disbursement between countries and private entities from 1981 to 2018. The datasets were merged to form an original dataset containing 176 countries[1].

Each country has unique invariant characteristics that if not considered causes bias in empirical test results. This study uses a two-way fixed regressions model to make for the inherent temporal and country specific differences. The unique data set used in this study is an observation of different countries over a long period of time. The fixed-effects model control for factors unique to a country or a period of time that can distort the estimation results if not controlled. In addition, the independent variable is an interaction term between the PF loan variable and variables for economic development (GDP per capita) and level of polity (polyarchy) (Imai & Kim, 2021).

The results of the estimations reveal that there is a positive and significant relationship between PF loans and tax rates. However, this effect is more pronounced in countries with low economic development. In countries with mid-levels of economic development, the effect of PF loans on taxes is observed to be less pronounced as is in low levels of development measured by GDP per capita. At high levels of development, there is little or no effect of PF loans on tax rates. In summary, the positive association of PF loans on tax rates is most pronounced at low levels of development. At mid-levels of development, it is observed that the positive relationship between PF loans and tax rates starts to reduce.

The positive relationship between PF loans and tax rates is consistent at low levels of development and all levels of polity. At mid-levels of GDP per capita and all levels of polity, tax rates are observed to remain the same. At high levels of GDP across different levels of polity, the positive association between PF loans and tax rates is seen to significantly reduce. In summary, this study establishes that, the more democratic and economically developed a country is the lesser the effect of

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[1] The Global Project Finance loan data is from Loan Pricing Corporation's database originally accessed through the Havard Business school database, Dealscan. I am grateful to Prof. Hong who provided their data on PF loans from their previous pioneering study on PF loans and political institutions (Hong et al., 2023).

PF loans on the tax rates.

The level of polity and economic development are important factors when predicting tax rates. The positive effect of PF loans on tax rates is more pronounced in authoritarian countries with low economic growth. This study provides suggestive evidence that democratic countries have mechanisms, checks and balances, to prevent abrupt increases in tax rates as compared to developing countries with low levels of polity. Based on literature on the China BRI and windfall it can be inferred that happen rent creation or misappropriation are a likely cause of PF loan project failure especially in developing countries. At the same time, the results show that countries with higher GDP per capita are less likely to increase tax rates as the loans are either less likely to fail or as was in the case of South Korea, (Kim,2024) the government has robust mechanisms to prevent a ripple effect of a PF loans project failure on the economy (Kim, 2024).

This study provides a new angle to the already existing vast knowledge on PF loans and tax rates. First, it introduces PF loans as a form of windfall. From the result of the empirical analysis, PF loans are seen to have more effect on tax rates in countries that are less democratic and with low levels of economic development. This suggests that as a leader in a developing non-democratic country secures PF loans, they gain a new source of revenue, this allows the leader to generate rent without fear of scrutiny from citizens. As highlighted by Paler (2013) and Ross (2012), an increased dependence on windfalls, including PF loans, can reduce a leader's incentives for accountability to citizens, leading to governance challenges and, in the case of PF loans, unsuccessful projects. Second, it shows the implication of PF loans on state capacity. Increased tax rates in low-income countries push registered taxpayers into the underground economy outstretching public service provision because of reduced government revenue from a narrower tax base. Third, using the time consistency theory, PF loans could explain why policymakers sometimes renege on commitments. As in the case of windfalls, PF loans are a way around for leaders from public scrutiny. Policymakers are incentivised to renege on commitment because citizens are less inclined to monitor usage of PF loans. That is if it is considered as *free money* on the first receipt. Policymakers may use PF loans to consolidate their support base by creating rents.

Finally, using a two-way fixed effect model with interactions, this study captures the effect of PF loans on tax rates while considering both the level of democracy and economic development contributing to the vast literature on tax rate determinants (Paler, 2013; Ross, 2012).

The next section of this study provides a theoretical framework of this study. This section provides a background of both PF loans and tax rates and the main theory of this study. This is followed by a section introducing the data used in the study. The data section contains a brief introduction to the data set used in this study. In the data analysis section, there is data estimation and estimation interpretation of the results. This is followed by a section discussing the findings of this study giving meaning and importance of the findings of this study to state capacity and fiscal policy. Finally, a conclusion section wraps up and summarises the main findings and restates the theses of this study.

Theoretical Framework

This section reviews recent literature on PF loans and tax rates. The review of the literature on taxes and PF loans shows that the two topics have been exhaustively studied on individually. As far as the available literature indicates, there is limited knowledge of the relationship between tax rates and PF Loans. This study tries to link tax rates and PF loans while framing PF loans as a form of windfall.

Global Project Finance Loans (PF loans) are loans that are used to finance capital-intense projects. PF loans are used to finance massive public as well as private projects. They provide a channel through which countries as well as private entities tap into the international capital market for finance for major projects. The loans are nonrecourse as the stream of flow from the completed project or asset acts as a collateral. PF loans are becoming more attractive in the emerging markets as the need for infrastructure in the emerging markets surpasses their resources (Hoffman, 2007). In countries with weak financial systems, PF loans offer an alternative to an inefficient domestic financial market. Risk management is mitigated upfront by delegating the duty to an entity that best handles it. For example, an industrial bank guarantees domestic risks (Hoffman, 2007; Kleimeier & Versteeg, 2010). The China Belt and Road Initiative (BRI) is the preeminent lender of PF loans in the developing world. For instance,

in 2021, Laos launched its first high-speed railway. The railway project was funded by BRI loans. The project cost about 6 billion dollars (Phuong, 2023). This typifies the scale of BRI-funded projects in developing countries. Hong et al., (2023) record that the flow of PF loans has grown 2,560 times between 1981 and 2018 (Hong et al., 2023). This figures emphasis the growing demand for PF loans globally (Falak Medina, 2021; Hainz & Kleimeier, 2012; Hoffman, 2007; Hong et al., 2023; Phuong, 2023).

Preliminary studies on PF loans studies show that some PF loan-funded projects are susceptible to cost overruns. Estache & Strong (1999) use the example of road projects in Mexico and Hungary to demonstrate the overestimation of returns and over-optimism to attract investors to participate in infrastructure projects. In the case of the road project in Mexico, only twenty percent of the forecasted traffic volume was realized, whilst the Hungarian road yielded only half of the projected revenue (Estache & Strong, 1999). With a high debt-to-equity ratio[2], the stream of flow of revenue from the project is expected to service the PF loan. It is, however, emerging that some projects do not live up to their projected value or, the expected returns were overestimated during the negotiation phase. Given the scale of infrastructure projects funded using PF loans, governmental intervention becomes imperative when projects either stall, experience cost overruns or, fail to meet the estimated revenue flow (Estache & Strong, 1999)

Protests have a destabilising effect on the economy. William Martin and Gabay (2017) reveal that people are more likely to protest tax increases if the tax increases are concentrated in one type of tax (William Martin & Gabay, 2018). At the same time, civil unrest and protests have been associated with the contraction of the macroeconomy. A study by Ricci et al (2021) illustrates that unrest causes a

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[2] Project companies have a high debt-to-equity ratio. There are several contracts involved given that there are various entities in interplay in the initial contract stages. As a result, creating the company can take nearly two years while the transaction costs is about 10% the cumulative cost of the project (Esty, 2004). Some notable PF loans funded assets include the Standard Guage Railway(SGR) in Kenya (Omondi, 2023), the Hambantota Port in Sri Lanka (Hillman, 2018) and the Boten-Vientiane railway in Laos (Falak Medina, 2021).

stagnation in GDP growth and dissuades investment and economic activities (Ricci, 2021). A protest, as Barret (2022) puts it, about an increase in the cost of living is likely to cause economic disruptions that would further cause steeper prices (Barrett, 2022; Ricci, 2021; William Martin & Gabay, 2018).

Increasing tax rates is advocated in early studies, (Feldstein, 1984), if the budget of a country is suboptimal (Feldstein, 1985). Literature on the track record of BRI projects indicat that Kenya (Vines, et al., 2022), Sri Lanka (Jones, 2022), Djibouti and Angola (Vines et al.,2022) were left with unsustainable debt after financing infrastructure using PF loans. Based on the theory by Feldstein (1985), governments in these states are more likely to increase tax rates to service the loans (Feldstein, 1985; Jones & Hameiri, 2020; Vines et al., 2022).

PF Loans as Windfall

PF loans offer an unscrutinized revenue source to policymakers. Examination of BRI loan-funded projects in Kenya and Sri Lanka reveals that in both cases, the projects failed because of poor governance (Jones & Hameiri, 2020; Kell, 2023). Paler (2013), in her study on windfall, avers that windfall is not limited to natural resources and oil. Thus, this study introduces PF loans as a form of windfall. From the perspective of the initial borrower, PF loans exhibit characteristics akin to windfall — "unearned revenue," that without public scrutiny could lead to unaccountability, rent-seeking and bad governance. Building on the assessment by Robinson et al., (2006) and Ross (2001) regarding windfalls, politicians are likely to use PF loans to garner or consolidate political support. This is more likely in less developed countries with a weak democracy (Paler, 2013; Robinson et al., 2006).

PF loans, while bearing most of the characteristics of windfalls, exhibit functional differences. In contrast to traditional windfalls, PF loans are perceived as windfalls by the initial recipient. This perception affords the leader the freedom to initiate projects with minimal or no scrutiny from the public. The agency of a new unearned revenue source disincentivizes long-term prudent management and fiscal discipline of policymakers. As posited by the time consistency theory, the first recipient of PF loans has

an incentive to renege on commitments because PF loans afford them a method of rent creation. As noted by John & John (1991), PF loans are expected to be repaid using the revenue generated by the project over an agreed-upon period. PF loans are not continuous, once the loans are used to fund infrastructure projects, future leaders have to bear the burden of servicing loans in the event the PF loan-funded project fails to break even (John & John, 1991).

However, PF loans have some points of convergence with traditional forms of windfall. In authoritarian systems, the leader wields significant control over how PF loans are allocated (Hong et al., 2023). The same is seen in windfall literature, (Omgba, 2013), where leaders, especially in African states, monopolize the revenue from windfalls. Private goods from PF loans help authoritarians consolidate their support bases. The same is seen in the case of natural resources where the returns are only shared among a few in the political class (Hong et al., 2023; Omgba, 2009; Paler, 2013).

Taxes have a huge bearing on state capacity. States are categorized as fragile or weak based on their ability, or inability, to raise revenue to run government businesses (Besley & Persson, 2010). Previous studies show that there is more unreported income when marginal taxes are high (Clotfelter, 1983). As a result, more individuals retreat to the underground economy crippling the service provision of the government and denting state capacity. Based on the theory of windfall, forwarded in this study, and the existing literature on windfall, weak democratic institutions could expose countries with weaker economies to the extremes of PF loan failure (Besley & Persson, 2010; Clotfelter, 1983).

Hypotheses

PF loans, though easily accessible, entail high risks including high initial cost as well as susceptibility to cost overruns. If a project fails to break even, the current government is inclined to find a way to offset the resulting debt. Galstyan & Velic (2018) highlight a positive relationship between higher public debt and higher taxation. This observation forms the basis of the first hypothesis of this study:

H1: An increase in PF loans is positively associated with tax rates

This study further categorizes government regimes into democratic, hybrid and authoritarian regimes. Cheibub (1998) postulates that tax rates[3] in autocratic regimes are affected by the pressure to service foreign debt. While tax rates in democratic regimes are mainly affected by the per capita income of the country. It is also established that in both cases that the general economy is an important factor that affects both democracy and authoritarian regimes. The study, however, did not consider hybrid regimes. This study factors in hybrid regimes. It is important to consider as a growing number of countries lie at the periphery between complete democracy and autocracy. Excluding hybrid regimes in analyses results in conflated understanding especially where government decisions on fiscal policy in developing countries is concerned (Cheibub, 1998).

To investigate this further this study proposes:

H2: The positive effect of PF loans on tax rate is conditioned on a country's GDP per capita

H3: The increase in tax rates on securing PF loans is higher in autocratic regimes.

This study anchors its theory on the study by John & John (1991) and Hong et al. (2023) where they posit that, initially, governments offer incentives – (e.g. tax breaks) – to attract PF loans. Upon completion of projects, governments are expected to ensure the project enjoys a monopoly to allow maximum profits. Additionally, Hong et al. (2023) highlight the appeal of PF loans to authoritarian regimes, employing them to fund massive projects to assert legitimacy (Hong et al. 2023; John & John, 1991). This substantiates the theory this paper forwards; countries are inclined to increase tax rates when PF loan-funded projects fail to break even.

Moreover, studies on regimes find a positive relationship between democratic regimes and

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[3] In this study, the term tax rates denote the percentage change, that is increase or decrease, in the total amount of taxes paid to a government by an individual, business or other entity in a country at a particular period of time. The types of taxes used in this study are divided into tax, direct and indirect taxes.

taxation. Democratic regimes have a higher extractive capacity as a result of better governance and legitimacy. While autocratic regimes have relatively lower tax revenue (Garcia & von Haldenwang, 2016). This undergirds the need to investigate whether the increase in tax rates is consistent across democratic, authoritarian, and hybrid regimes when they secure PF loans.

PF loans is an understudied topic especially within the political economy field. Nonetheless, Foreign Direct Investment (FDI) serves as the most comparable form of transnational finance in the existing literature (Hong et al., 2023). Preliminary studies on FDI (e.g., Jablonski, 2024) indicate that government influence on FDI is more likely during the commitment or negotiation stages of acquiring foreign funds. This study, on the contrary, finds a positive and significant relationship between tax rates and PF loans at both the commitment and disbursement stages. This signals that policymakers have a broader window of influence for rent creation and clientelism not only at the commitment stages but through to the actual disbursement phase of PF loans (Hong et al., 2023; Jablonski, 2014).

Data Analysis

The PF loan data used in this study is drawn from a previous study (Hong et al. 2023), on political institutes and their attractiveness to PF loans. The data contains a record of 27,703 PF loans between 1981 and 2018[4]. The data on political regimes used in this study is from the same study but initially accessed from the V-Dem database (Hong et al. 2023). The data on taxes was accessed United Nations University World Institute for Development Economics Research (UNU-WIDER) where there is a record of government revenues. Collectively, the data used in this data contains 176 countries.

This study employs a two-way fixed effects model. This model is employed to account for any unobserved heterogeneity across over time. Countries have specific time-invariant characteristics such as cultural traits, geographical location and historical institutional factors. These factors influence the

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[4] Initially, the dataset was accessed from the DealScan database of the Loan Pricing Corporation but retrieved through the Wharton Research Data Service (WRDS).

attractiveness and availability of a country when accessing project finance loans. Thus, the need of country fixed effects. On the other hand, year fixed effects account for global trends and shocks that are likely to uniformly affect all countries in a given year, for instance the global financial crisis caused a global drop in international capital flows. Including these two fixed effects isolate the impact of the key variables used in this study, ensuring that the estimates are not biased by omitted variable confounders that vary across countries over time.

The fixed-effects model specification is as follows:

$$Tax_{it} = \beta_0 + \beta_1 \left(ln(PF\_Loan_{it}) \right) \times X_{it} + \vartheta_{it} + \delta_{it} + \epsilon_{it} \,;$$

where Tax $_{it}$ is the tax rate of a country i in year t. PF_loan $_{it}$ captures the inflow of PF loans in state i in year t. The PF loan term interacts with the vector $X_{i,t}$ of country i in year t. ϑ_{it} and δ_{it} are the year and country fixed effects respectively. The dependent variable, tax rates, is a percentage ratio that ranges from 0 to 100%. The data on PF loans is skewed thus was logged. X_{it} is a vector that represents the interaction term between PF loans and the variable for economic development or level of polity. Economic development is represented by the logged value of GDP per capita while level of polity is represented by polyarchy from the V-dem data base. The inclusion of an interaction terms is in line with previous studies where the level of economic development, (Cheibub, 1989 and Castañeda Rodríguez, V. M. 2018), represented by GDP per capita and level of democracy (Hong et al. 2023) represented by polity score (in this study) are emphasized as important determinants of tax rates and PF loans respectively (Castañeda Rodríguez, 2018; Cheibub, 1998; Hong et al. 2023).

Data Estimation

The dependent variable, tax rates, is divided into *tax*, *direct tax* and *indirect tax* rates.[5] This is in line with the glossary by Government Revenue Dataset (GRD) where the variable, *tax,* describes

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[5] Figure A2 in the Appendix shows the trend of change of different variables over time.

resource taxes and non-resource taxes including social contributions. The *direct tax* variable includes

taxes on profit and capital gains, income, property tax as well as workforce and payroll. The *indirect*

tax variable captures tax on international trade, value-added taxes (VAT) and excise duties as well as

sales taxes (McNabb & UNU-WIDER, 2017). Corresponding density plots for the tax variables are in

the Appendix as Figure A1. Descriptive summary statistics of variables used in this study are

summarised in Table 1.

Table 1 *Descriptive Statistics*

Statistic	N	Mean	St. Dev.	Min	Max
Tax	5,389	16.736	9.418	0.000	112.805
Indirect Tax	4,839	7.496	4.962	0.000	63.036
Direct Tax	4,711	7.155	5.756	0.000	34.419
PF Commit(log)	6,428	3.099	5.590	0.000	17.358
PF Disburse(log)	6,428	4.261	5.681	0.000	16.794
Polyarchy	6,413	0.476	0.282	0.015	0.924
GDP per capita (log)	5,588	8.761	1.217	4.898	11.959
Finance devt.	5,959	0.272	0.216	0.000	1.000
Polity	5,829	2.312	7.022	-10	10
Urbanisation	6,296	0.529	0.235	0.045	1.000
Protest	6,304	1.945	6.922	0	223
Population (log)	6,313	15.87	1.72	11.07	21.05

In this study, financial development, urbanisation, protests and population have been used as

controls. Literature on PF loans indicate that foreign investors are more inclined to invest in states

with better financial institutions because the institutions provide a safety net against defaults,

expropriation, etc. Countries that are that are financially developed are likely to have a strong

domestic financial market, risk insurance measures and low rates of default. This act as a safety net to

investors in the event a project fails to breakeven or political unrest (Hong et al., 2023). In the case of large projects, population potentially translates to a continuous flow of revenue as the citizens pay to use the completed project. In the case of a railway, train tickets bought by passengers over a long period of time is a seen as a form of continuous revenue on completion of a railway project. Countries that are experiencing rapid population growth and urbanisation are more likely to have several new infrastructure projects in a bid so expand and increase the current overstretched infrastructure (Hong et al., 2023).

In the data set used in this study, PF loans is measured by the negotiated amount, commitment, and the delivered amount, disbursement. The estimations in this study mainly uses the commitment variable, denoted as *PF commit(log)*. Nonetheless, the estimation of the effect of PF loans on tax rates using disbursement, denoted as *PF disburse(log),* produces the same result as commitment. Table A1 in the appendix is a regression table of showing the result of disbursement on PF loans.

Table 2 shows the results of the first hypothesis that states that on average there is a positive relationship between PF loans and tax rates. Without inclusion of controls there is a significant and negative coefficient on the *Tax* (1) and *Indirect tax* (6) columns. On the *Direct tax* column (3) there is a significant and positive coefficient.

On inclusion of the controls, the *Tax* (2) and *Direct tax* (4) coefficients lose their statistical significance while the *Indirect tax* coefficient decrease but remains as negatively coefficient. It is worth to note that these changes in the statistical significance of the coefficients with the inclusion of the controls suggest that even after controlling for country and year fixed effects, there are important variables with within-country and across-time variations such as the level of development as captured by GDP per capita, which exerts influence on the different tax rates outcomes.

Table 2 *Regression of PF Loans on Tax rates*

	Dependent variable:					
	Tax		Direct tax		Indirect tax	
	(1)	(2)	(3)	(4)	(5)	(6)
PF loans (log)	-0.005*	-0.021	0.009***	-0.001	-0.029***	-0.024**
	(0.012)	(0.007)	(0.007)	(0.008)	(0.008)	(0.010)
GDP per capita (log)		-0.078***		0.706***		-0.363*
		(0.198)		(0.165)		(0.190)
Population (log)		3.703***		3.186***		0.371
		(0.500)		(0.396)		(0.465)
Urbanisation		3.406		0.409		-2.172
		(1.365)		(1.222)		(1.374)
Financial devt.		6.557***		4.606***		-0.278
		(0.699)		(0.581)		(0.682)
Polyarchy		-1.276		-0.017		-1.247***
		(0.478)		(0.343)		(0.416)
Controls	No	Yes	No	Yes	No	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,389	4,607	4,711	4,055	4,839	4,150
R^2	0.788	0.797	0.869	0.884	0.775	0.761

*p**p***p<0.01

Note: PF Loans is the main independent variable represented by the amount of PF loans committed at the negotiation stages. The standard errors are robust and clustered at the country level. Statistical significance is at the 0.01 level.

Second, even after the inclusion of the fixed effects and a host of control variables, both the magnitude and the statistical significance of our main independent variable, *PF loans*, do not change in any substantive manner, suggesting that the influence of the loans on tax rates, if any, are most likely to be channelled through indirect, and not direct taxation[6].

Table 3 shows the results for the second hypothesis regarding the mediating effects of a country's level of development for the association between PF loans and tax rates. In model (1), we observe a 10% increase in PF loans is associated with a 0.07 percentage point increase in tax rates.

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[6] Table A12 in the appendix shows different variations of the estimations with various variables.

Table 3 *Conditional Effect of PF loans on Tax Rates*

	Dependent variable:		
	Tax	Direct tax	Indirect tax
	(1)	(2)	(3)
PF loans (log)	0.723***	0.329***	0.486***
	(0.090)	(0.058)	(0.047)
PF loans (log) x GDP per capita (log)	-0.080***	-0.036***	-0.055***
	(0.009)	(0.006)	(0.005)
GDP per capita (log)	-0.154	0.455**	-0.227
	(0.295)	(0.202)	(0.143)
Fixed effects	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	4,606	4,055	4,150
R^2	0.797	0.883	0.763
Adjusted R^2	0.789	0.877	0.752

Notes: $^{*}p^{**}p^{***}p<0.01$

Year and Country fixed effects reported. Financial development, population and urbanization added as controls. Robust standard errors (in parentheses) are clustered at the country level. For the dependent variable, the value of PF loans committed to a country is used represented by PF Commit in the table. GDP is GDP per capita level.

In a similar manner, in model (2) shows that a 10% increase in PF loans is associated with a 0.03 percentage point increase in direct tax rates, and in model (3) with a 0.04 percentage point increase

in indirect tax rates.[7] However, this effect is moderated by the level of development of a country. This is evident by the negative significant coefficients in the PF loan and GDP per capita interaction columns, where we observe the 0.001, 0.04, and 0.06 significant negative coefficients on the interaction terms in the (1) tax, (2) direct tax, (3) and indirect tax rates columns. Figure 4 visually represents the marginal effects of the effect of PF loans on tax rates. In all three panels of Figure 1, we see that the marginal effects of PF loans on the different tax rates are positive when a country's level of development in low. However, for the countries in the mid-range of economic development, the marginal effects of PF loans become smaller and statistically insignificant. Moreover, in high income countries, the marginal effects pass the zero threshold and turns statistically significant and negative. In other words, an increase in PF loans is associated with higher levels of tax rates only in poorer countries.

Figure 1

Plots of Conditional Effect of PF loans on Tax Rates

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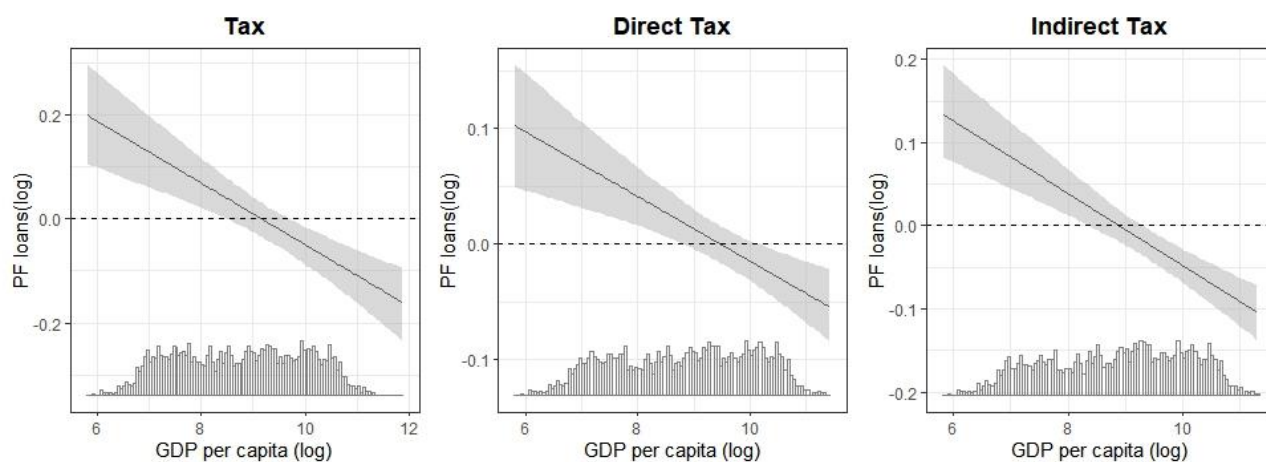
[7] Given that the main independent variable is log transformed, I interpret the coefficient taking such transformation into account. For instance, given the coefficient of 0.723 for the PF loans (log) variable, we can calculate the substantive effects for a 10% change in PF loans by calculating the following: 0.723 * log (1.1) = 0.0689.

Table 4 *Regression of Conditional Effect of PF Loans and polyarchy on Tax Rates*

	Dependent variable:		
	Tax	Direct Tax	Indirect Tax
	(1)	(2)	(3)
PF loans (log)	-0.009	-0.001	-0.005
	(0.020)	(0.010)	(0.011)
Polity	-0.003	0.037***	-0.019
	(0.022)	(0.011)	(0.014)
Population (log)	3.365***	2.984***	0.379
	(0.688)	(0.362)	(0.420)
Urbanisation	2.257	1.936*	-1.096
	(2.000)	(1.095)	(1.210)
Financial Development	5.242***	4.544***	-1.127*
	(1.150)	(0.568)	(0.655)
PF loans: Polity	-0.0004	0.002	-0.002
	(0.002)	(0.001)	(0.001)
Fixed effects	Yes	Yes	Yes
Observations	4,822	4,238	4,354
R^2	0.783	0.883	0.763
Adjusted R^2	0.774	0.877	0.753
Residual Std. Error	4.480	2.044	2.364

Note: *p**p***p<0.01

Table 3 shows the results of the estimation of the second hypothesis that states that increase in tax rates varies by the level of polyarchy. The column (1), (2) and (3) all have insignificant coefficients. This shows that the effect of level of democracy on tax rates is conditioned by the GDP per capita of a country. To further prove this a supplementary test was run with GDP per capita as the main independent

variable and tax rates as the independent variable. The results show that there is a positive and significant relationship in *Tax, Direct tax* and *Indirect tax* variables.

Table 5 *Regression of PF Loans(log) on Tax Rates by Regimes*

|	Dependent variable:		
	Tax	Direct tax	Indirect tax
	(1)	(2)	(3)
PF loans (log)	1.340***	1.024***	0.026
	(0.210)	(0.141)	(0.116)
GDP per capita (log)	2.519***	1.829***	0.146
	(0.433)	(0.255)	(0.211)
Log Polyarchy	27.642***	10.525***	2.939
	(3.652)	(2.162)	(1.840)
PF loans (log)* GDP per capita (log)	-0.157***	-0.117***	-0.007
	(0.023)	(0.016)	(0.013)
PF loans (log)* Polyarchy	-1.246***	-1.172***	0.722***
	(0.353)	(0.231)	(0.208)
GDP per capita (log)* Polyarchy	-3.536***	-1.266***	-0.540**
	(0.457)	(0.283)	(0.227)
PF loans (log)* GDP per capita (log)* log Polyarchy	0.153***	0.135***	-0.072***
	(0.036)	(0.024)	(0.022)
Fixed effects	Yes	Yes	Yes
Observations	4,794	4,209	4,310
R^2	0.798	0.876	0.779
Adjusted R^2	0.790	0.870	0.768
Note:			*p**p***p<0.01

Table 4 shows the effect of level of democracy and project finance loans on tax rates when level of democracy is considered. On inclusion of the level of development represented by GDP per capita (log) and polyarchy variable, the main results for *Tax* and *Direct tax* have a positive and significant coefficient while the *Indirect tax* model has a positive but insignificant coefficient. Figure 2, Panel 2A,2B and 2C show the marginal results of the interactions.
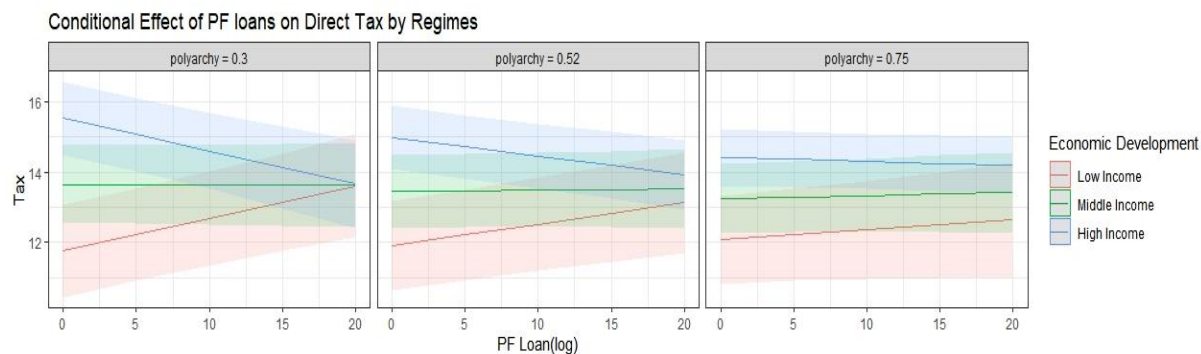
Figure 2

Panel 2A
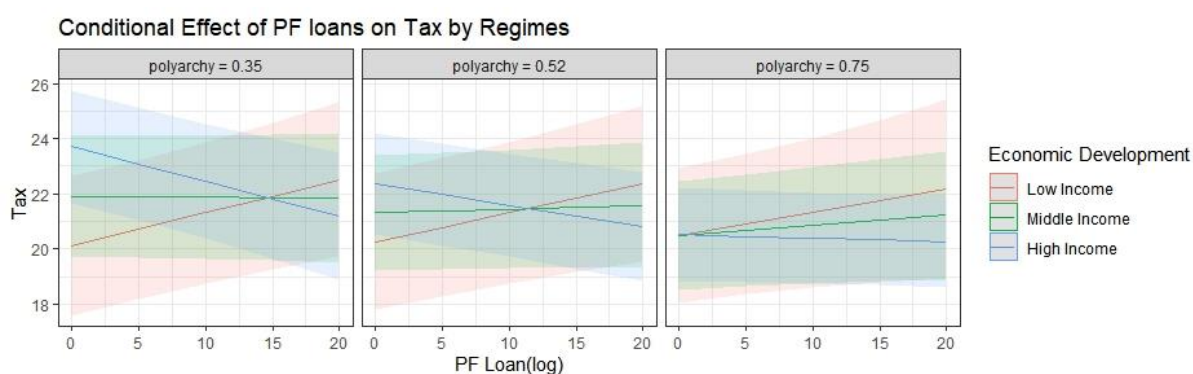
Note: Polyarchy is divided into authoritarian, hybrid and democratic regimes. The polyarchy metric is from 0 to 1. With one being fully democratic and 0 being fully authoritarian. In the plot these regimes are represented as authoritarian, hybrid and democracy; 0.3,0.52 and 0.75 respectively. Level of development is measured by the level of GDP per capita divided into low income, middle income and high income.

Panel 2A shows the results for column (1) of the *Tax* variable of table 3. In countries with low levels of income the effect of PF loans on tax rates is associated with increase in tax rates across all levels of democracy. However, as the income level gets higher the effect of PF loans on tax rates is less pronounced. It is important to note that at low levels of democracy but high income the effect of PF loans on *Tax* greatly reduces.

Panel 2B

Conditional Effect of PF loans on Direct Tax by Regimes

Note: Polyarchy is divided into authoritarian, hybrid and democratic regimes. The polyarchy metric is from 0 to 1. With one being fully democratic and 0 being fully authoritarian. In the plot these regimes are represented as authoritarian, hybrid and democracy; 0.3,0.52 and 0.75 respectively. Level of development is measured by the level of GDP per capita divided into low income, middle income and high income.

Panel **2B** represents visualizes the results for *Direct taxes* (2) of Table 3. In low-income countries across all levels of democracy PF loans are likely to cause an increase in direct tax rates. The effect is of PF loans on tax rates becomes less pronounced even in countries with low income but high level of democracy.

Panel 2C
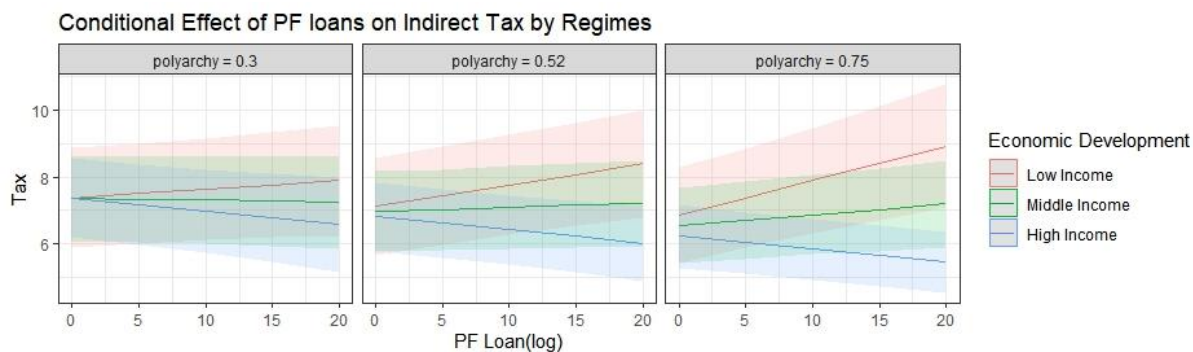

Conditional Effect of PF loans on Indirect Tax by Regimes

Note: Polyarchy is divided into authoritarian, hybrid and democratic regimes. The polyarchy metric is from 0 to 1. With one being fully democratic and 0 being fully authoritarian. In the plot these regimes are represented as polyarchy 0.24,0.52 and 0.8 respectively. Level of development is measured by the level of GDP per capita divided into low income, middle income and high income.

Panel 2C is the marginal effect of the indirect tax column of Table 3, column (3). The increase in tax rates at low levels of development is observed in authoritarian, hybrid as well as democratic regimes. At a glance, the trend of tax rates increasing with PF loans is maintained across all levels of democracy for low-income countries. It is, however, not possible to make a conclusion of the results since the main coefficient for the *Indirect tax* column is statistically insignificant in this section.

As a robust result check for the effect of polyarchy and PF loans on tax rates, I used polity2 data to run the same empirical tests. Polity data is a popularly used measure for measuring levels of democracy. The results as shown in table 5 are consistent[8] with the result I get from the V-dem's polyarchy index.

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[8] Figures A3, A4 and A5 show the missingness map of both the polyarchy data set as well as the polity2 dataset once merged with the original PF loan dataset. Some countries were dropped from the resulting polity 2 dataset probably resulting in the slight difference in missingness.

Table 6 *Regression of PF Loans(log) on Tax Rates by Regimes (Polity2 data)*

	Dependent variable:		
	Tax	Direct Tax	Indirect Tax
	(1)	(2)	(3)
PF loans (log)	0.777***	0.521***	0.313***
	(0.160)	(0.089)	(0.100)
GDP per capita (log)	0.871***	1.528***	-0.134
	(0.299)	(0.166)	(0.185)
Polity	1.005***	0.486***	0.281***
	(0.152)	(0.078)	(0.089)
PF loans (log)* GDP per capita (log)	-0.087***	-0.058***	-0.034***
	(0.017)	(0.010)	(0.011)
PF loans (log)* Polity	-0.039*	-0.042***	0.014
	(0.021)	(0.012)	(0.013)
GDP per capita (log)* Polity	-0.133***	-0.059***	-0.038***
	(0.019)	(0.010)	(0.011)
PF loans (log)* GDP per capita (log)* Polity	0.005**	0.005***	-0.001
	(0.002)	(0.001)	(0.001)
Fixed effects	Yes	Yes	Yes
Observations	4,502	3,964	4,081
R^2	0.792	0.880	0.782
Adjusted R^2	0.783	0.875	0.772
Residual Std. Error	4.498	2.095	2.380

Note: *p**p***p<0.01

Discussion

      PF Loans, while providing a way for developing countries to tap into the larger international financial market at the same time exposes them to the risk of instability. As a form of windfall, PF loans afford a current leader unchecked revenue while creating debt for a future leader. Developing countries without traditional natural resources suddenly end up with an *unearned source* of revenue that exposes an already fragile state to debt. Political leaders in time period *t-1* might view PF loans as a way of starting projects and to boost their economy or create rent for their supporters. The leader in time period *t* or *t+1* has to bear the burden if a previously implemented projected fails to meet its revenue flow (Paler, 2013).

      The results of this study show that low developing countries, despite their levels of polity, are more likely raise tax rates when PF loans are not accounted for. This is suggestive evidence that low-income countries likely lack financial systems to provide soft landing when a capital-intensive project fails to meet its revenue flow. A further examination of the results shows that sales taxes are more likely to be hiked as states take in PF loans. This action is likely to undermine state capacity as the increase in sale taxes will likely incentivize business people to retreat to the underground economy narrowing a country's tax base altogether. This is consistent with the study by Clotfelter (1983) where it was noted that tax hikes lead to more people retreating to the underground economy (Clotfelter, 1983).

      This study introduced PF loans as a form of windfall whereby the first recipient of PF loans is likely to create rents from the PF loans if they perceive the burden of servicing of the loans will by shouldered by the successor. This creates a vicious cycle where debt is pushed over and citizens in low-income countries, as shown in the results of this study, are made to shoulder the burden of the debt through higher taxes.

      The effect of PF loans is seen in both at the commitment and disbursement stages. This diverges from FDI literature where it is assumes that the influence of the leader is more likely at the commitment stages as opposed to the disbursement stage. Ergo, this suggests that the influence of PF loans on tax rates is longer signalling political leaders might create an optimum environment to secure

PF loans at the commitment stage but create rents at the disbursement stages.

The inclusion of the interaction between PF loans and the GDP per capita variable may draw doubt on the findings that PF loans are associated with an increase in tax rates. It is, however, important to note that the economic development of a country is an important factor in considering (1) the attractiveness of a country to loan lenders and (2) the tax base of a country. In their study Hong et al., (2023) establish that very democratic or autocratic systems are more likely to receive PF loans with hybrid systems being less preferred because of political volatility (Hong et al., 2023).

The amount of revenue collected in a country and tax base varies across different levels of economic development (Besley & Persson, 2014). It was necessary to interact GDP per capita with the PF loan variable to capture this variation. This shows that the decision of a country to raise tax rates when there is a problem in the domestic financial market is most likely when taxes are the only viable alternative source of revenue when in a country is in debt (Besley & Persson, 2014).

The revenue collection differs across different levels of economic development. Countries with a large informal economy tend to rely on indirect taxes because of the small number of registered taxpayers. On the other hand, countries with small informal economies and a larger tax base have a higher return on income taxes. This necessitates the need to have three levels of the dependent variable, tax rates.

The case of PF loans in South Korea juxtaposed against either Kenya or Sri Lanka typify how different countries with varying levels of economic development handle PF loan failure. The government of South Korea pumped money into the economy to prevent a ripple effect but in the case of Kenya and Sri Lanka. The only alternative source of revenue to lessen the extremes of unsuccessful PF projects and burgeoning debt was taxes (ADF, 2023; Flynn et al., 2024; Jones & Hameiri, 2020).

The relationship between tax rates and PF loans was further tested with lagged versions of PF loans commitment as well as disbursement. The results were robust to the lagged versions of the two measures of PF loans. The results are shown in table A4, A5, A6 and A7 in the Appendix.

Conclusion

PF loans are commonly used to fund capital-intensive infrastructure projects. Over the years, countries have opted for this type of finance because it allows governments to implement capital-intensive development projects without diverting funds away from essential sectors such as health and education. The potential revenue streams from the project funded by PF loans, on the one hand, make less developed states eligible for massive loans, and on the other hand, expose them to the risk of debt in the event loan payment is defaulted. Through this study, it is established that as states secure PF loans tax rates are likely to increase. This change, however, varies by the level of GDP per capita of a country. The increase of tax rates as PF loans are secured is more likely in countries with low levels of development. When tax rates are suddenly hiked, taxpayers retreat to the informal economy creating a dent in the overall service provision of the government. In worst-case scenarios, civil unrest becomes common disabling the overall economy and disrupting the society as a whole.

Further along, it was also established that when states are further disintegrated into political regimes, authoritarian regimes with a lower GDP per capita are more likely to increase tax rates as they receive PF loans. PF loans can be likened to windfall. In that, the leader that first receives PF loans may use it to create rents and or gain political mileage. The burden to repay PF loans falls on future leaders. Thus, PF loans become more attractive to leaders of states with little or no natural resources. The burden of servicing PF loans falls on the citizens as the results of this study show that countries with low GDP per capita increase tax rates to offset the debt incurred when the projected income from the PF Loans-funded enterprise fails to materialize. This underscores the need to focus on PF loans, especially in developing countries with little or no natural resources.

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Appendix

Figure A1

Density plots of different types of taxes by region.

The plots show that distribution of different types of taxes varies by regions. In Plot A1A, the regions of Sub-Saharan Africa, South Asia and Latin America & Caribbean as positively skewed indicating low remittance of tax as per the data used this study.

Plot A1A
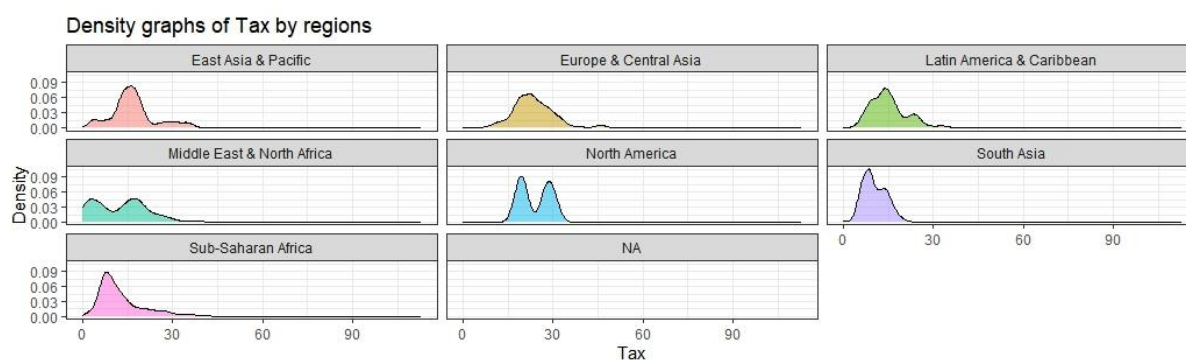
. In Plot A1B, South Asia and Sub-Saharan Africa are positively skewed with the North America and Europe and Central Asia regions showing a normal distribution.

Plot A1B

Plot A1C

Density graphs of Indirect Tax by regions
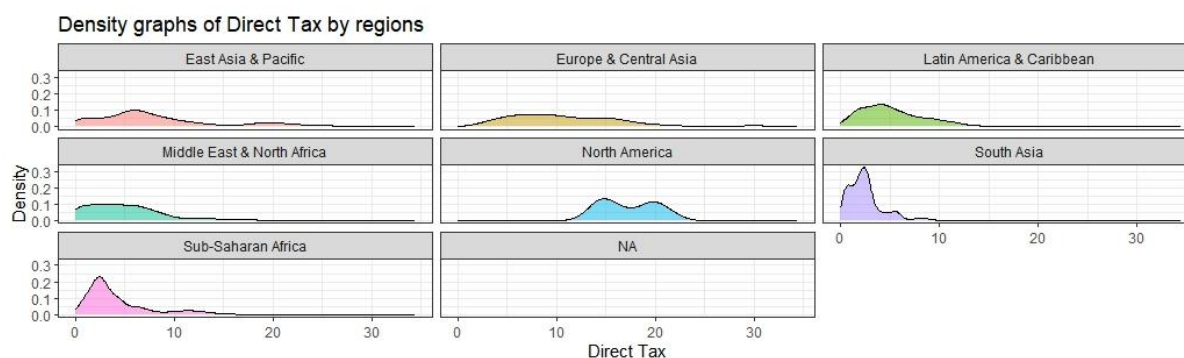
In Plot A1C, all regions represented in the density plots are positively skewed indicating on average there is low remittance of indirect taxes across all regions represented in the dataset.

Table A1

Regression of Project Finance Loans on Tax Rates using Disbursement

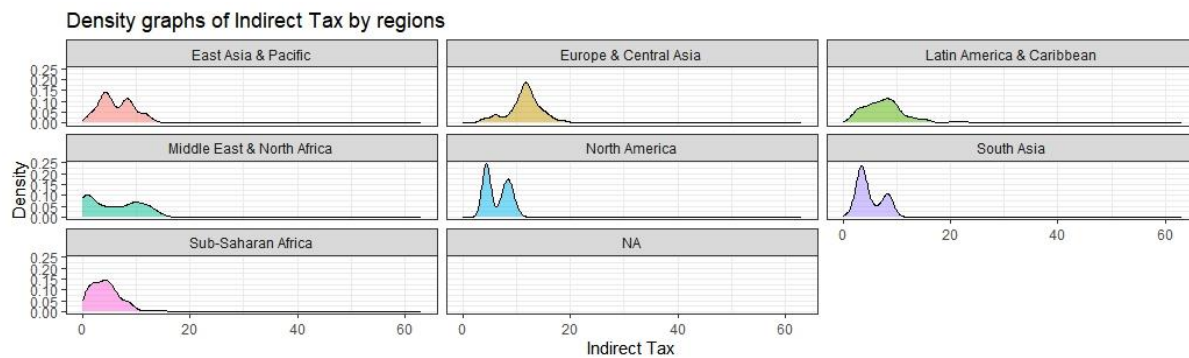|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Dependent variable:					
PF Disburse(log)	0.280***	0.260***	0.179***	0.498***	-0.766***	0.418***	0.811***	0.400***	0.467***
	(0.022)	(0.014)	(0.012)	(0.186)	(0.109)	(0.107)	(0.124)	(0.066)	(0.074)
GDP per capita (log)				4.668***	2.935***	2.031***	0.922***	1.177***	0.044
				(0.137)	(0.079)	(0.079)	(0.282)	(0.162)	(0.181)
PF Disburse x GDP per capita				-0.076***	0.074***	-0.047***	-0.087***	-0.043***	-0.052***
				(0.020)	(0.012)	(0.011)	(0.013)	(0.007)	(0.008)
Fixed effects	No	No	No	No	No	Yes	Yes	Yes	Yes
Observations	5,389	4,711	4,839	4,807	4,222	4,323	4,807	4,222	4,323
R^2	0.029	0.068	0.044	0.257	0.404	0.193	0.797	0.875	0.778
Adjusted R^2	0.029	0.067	0.044	0.257	0.403	0.192	0.788	0.870	0.768

Note: *p**p***p<0.01

The estimation used country and fixed effects. The standard errors are robust and clustered at the country level. The dependent variable contains *tax, direct tax* and *indirect tax* respectively. They appear in the same order from column (1) to column (9).

Figure A2: Trend Graph of Change of Tax Rates and PF Loans
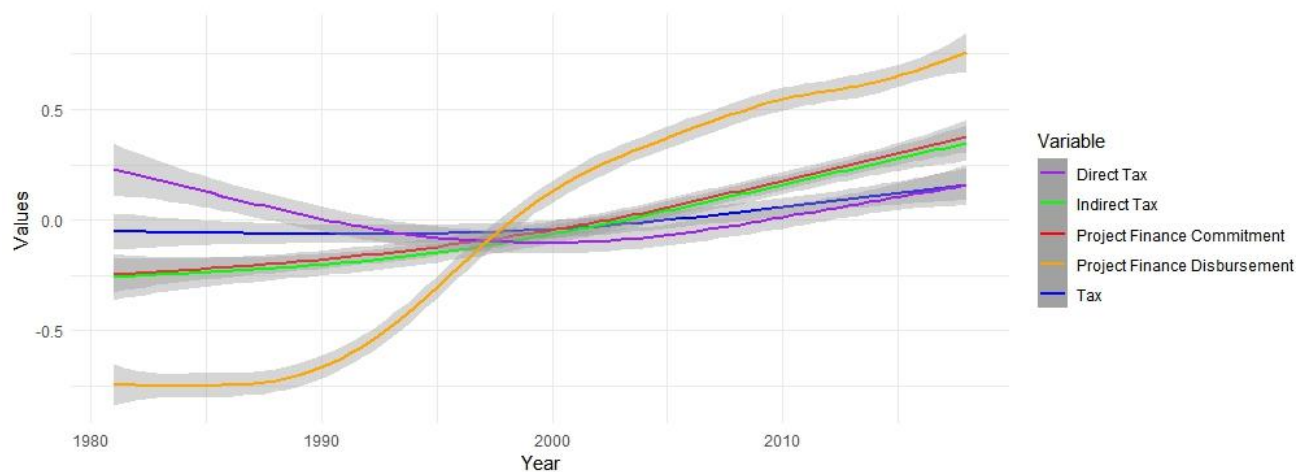
The trend graph shows that disbursement of PF loans has been on a steady rise as compared to commitment. This is consistent with existing literature(Lwere, 2024) on PF loans where it shows since 2000, China has been slowly increasing the amount of loans committed and eventually disbursed to developing countries.

Table A2

Regression of GDP per capita on Tax

	Dependent variable:	
	Taxes[9]	
	(1)	(2)
GDP	3.902***	0.604**
	(0.097)	(0.277)
Constant	-17.442***	3.373
	(0.829)	(2.168)
Fixed effects	No	Yes
Controls	No	No
Observations	4,807	4,807
R^2	0.245	0.795
Adjusted R^2	0.244	0.786
P-Values	*p**p***p<0.01	

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[9] The data on tax used here is from the World Development Indexof the World Bank

Table A3

Regression of PF Disbursement (not logged) on Tax rates with controls

	Dependent variable:		
	Tax	Direct tax	Indirect tax
	(1)	(2)	(3)
PF Disbursed	0.00000	0.00000	0.00000
Log GDP	-0.402	0.340*	-0.468***
	(0.295)	(0.202)	(0.143)
Protest	0.009	0.003	0.009**
	(0.007)	(0.004)	(0.004)
Population	0.000*	0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Urbanisation	6.296***	2.850**	-1.979
	(2.204)	(1.302)	(1.336)
Financial dev.	4.526***	3.107***	-0.069
	(1.005)	(0.729)	(0.507)
Polyarchy	-1.325*	0.134	-1.358***
	(0.773)	(0.484)	(0.360)
PF Disburse x log GDP per capita	-0.00000	-0.00000	-0.00000
Constant	30.969***	18.261***	6.869***
	(2.948)	(2.934)	(1.505)
Fixed effects	No	Yes	Yes
Observations	4,605	4,054	4,149
R^2	0.796	0.883	0.762
Adjusted R^2	0.787	0.877	0.750

Note: *p**p***p<0.01

Table A4

Regression of Project Finance Commitment lagged t+1

	(1)	(2)	(3)
PF Commitment, $_{t+1}$	0.001	0.009	-0.024*
	(0.022)	(0.016)	(0.012)
Num.Obs.	5241	4580	4702
R2	0.789	0.870	0.776
R2 Adj.	0.780	0.864	0.766
RMSE	4.35	2.08	2.35
Std.Errors	Country	Country	Country

Note: Tax, Direct Tax and *Indirect tax* are represented by (1), (2), (3) respectively

Table A5

Regression of Project Finance Commitment lagged t+1 with interaction term

	(1)	(2)	(3)
PF Commitment, $_{t+1}$	0.616***	0.272**	0.377***
	(0.184)	(0.099)	(0.101)
PF Commitment, $_{t+1}$× Log GDP	-0.066**	-0.028*	-0.042***
Log GDP	0.792	1.069*	-0.054
	(0.856)	(0.537)	(0.408)
Num.Obs.	4806	4221	4322
R2	0.796	0.875	0.778
R2 Adj.	0.787	0.869	0.767
RMSE	4.37	2.08	2.38
Std.Errors	Country	Country	Country

Note: Tax, Direct Tax and *Indirect tax* are represented by (1), (2), (3) respectively

Table A6

Regression of Project Finance Commitment lagged t-3

	(1)	(2)	(3)
PF Commitment, $_{t-3}$	-0.004	0.012	-0.024
	(0.029)	(0.018)	(0.019)
Num.Obs.	5067	4486	4611
R2	0.789	0.877	0.776
R2 Adj.	0.780	0.871	0.766
RMSE	4.33	2.00	2.36
Std.Errors	Country	Country	Country

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Note: Tax, Direct Tax and *Indirect tax* are represented by (1), (2), (3) respectively

Table A7

Regression of Project Finance Commitment lagged t-3 with interaction term

	(1)	(2)	(3)
PF Commitment, $_{t-3}$	0.721***	0.377**	0.416***
	(0.199)	(0.118)	(0.106)
PF Commitment, $_{t-3}$× Log GDP	-0.078***	-0.040**	-0.046***
	(0.022)	(0.013)	(0.013)
Log GDP	0.719	0.929+	-0.150
	(0.841)	(0.546)	(0.438)
Num.Obs.	4499	4003	4102
R2	0.797	0.882	0.778
R2 Adj.	0.788	0.877	0.768
RMSE	4.37	1.99	2.39
Std.Errors	Country	Country	Country

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table A8

Estimation of different forms of PF Commitment on Tax Rates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PF Commitment	-0.005	0.009	-0.029*	0.236***	0.235***	0.132***	-0.164***	-0.092***	-0.016
	(0.023)	(0.015)	(0.013)	(0.022)	(0.014)	(0.012)	(0.019)	(0.012)	(0.011)
Population							0.000**	0.000***	0.000**
							(0.000)	(0.000)	(0.000)
Urbanisation							3.650***	3.449***	2.945***
							(0.615)	(0.366)	(0.311)
Financial Development							12.298***	12.035***	2.087***
							(0.692)	(0.422)	(0.396)
Polyarchy							10.717***	5.162***	6.520***
							(0.498)	(0.310)	(0.267)
Num.Obs.	5389	4711	4839	5389	4711	4839	5171	4530	4648
R2	0.788	0.869	0.775	0.021	0.056	0.024	0.310	0.481	0.268
R2 Adj.	0.780	0.864	0.766	0.021	0.056	0.024	0.310	0.481	0.267
Country Effects	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year Effects	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RMSE	4.33	2.08	2.35	9.32	5.59	4.90	7.82	4.19	4.12
Clustered errors	Country	Country	Country	-	-	-	Country	Country	Country

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table A9: *Regression of PF Commitment on Tax Rates by Regimes*

	Dependent variable:		
	Tax	Direct Tax	Indirect Tax
	(1)	(2)	(3)
PF Commitment	0.022	0.007	0.033***
	(0.029)	(0.016)	(0.013)
Polyarchy	-1.167	0.078	-0.971***
	(0.781)	(0.464)	(0.375)
Log GDP	0.586**	0.981***	-0.214
	(0.293)	(0.201)	(0.145)
PF Commitment * Polyarchy	-0.058	-0.007	-0.086***
	(0.039)	(0.023)	(0.017)
Constant	3.620	-5.390***	1.127
	(2.329)	(1.389)	(1.066)
Fixed effects	Yes	Yes	Yes
Observations	4,794	4,209	4,310
R^2	0.795	0.874	0.777
Adjusted R^2	0.786	0.868	0.766
Note:			*p**p***p<0.01

Table A10: *Regression of PF Loans on Tax rates*

	Dependent variable:					
	Tax		Direct tax		Indirect tax	
	(1)	(2)	(3)	(4)	(5)	(6)
PF loans (log)	-0.005*	-0.021	0.009***	-0.001	-0.029***	-0.024**
	(0.012)	(0.007)	(0.007)	(0.008)	(0.008)	(0.010)
GDP per capita (log)		-0.078***		0.706***		-0.363*
		(0.198)		(0.165)		(0.190)
Population (log)		3.703***		3.186***		0.371
		(0.500)		(0.396)		(0.465)
Urbanisation		3.406		0.409		-2.172
		(1.365)		(1.222)		(1.374)
Financial devt.		6.557***		4.606***		-0.278
		(0.699)		(0.581)		(0.682)
Polyarchy		-1.276		-0.017		-1.247***
		(0.478)		(0.343)		(0.416)
Controls	No	Yes	No	Yes	No	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,389	4,607	4,711	4,055	4,839	4,150
R^2	0.788	0.797	0.869	0.884	0.775	0.761
Adjusted R^2	0.780	0.788	0.864	0.878	0.766	0.750
Residual Std. Error	4.420	4.466	2.126	2.072	2.402	2.449

Note: *p**p***p<0.01

Table A11: *Conditional Effect of Polyarchy and PF loans on Tax Rates*

	Dependent variable:		
	Tax	Direct Tax	Indirect Tax
	(1)	(2)	(3)
Polyarchy	-1.167*	0.078	-0.971**
	(0.678)	(0.346)	(0.406)
Polyarchy x PF Loans (log)	-0.058	-0.007	-0.086***
	(0.055)	(0.029)	(0.032)
PF Loans (log)	0.022	0.007	0.033
	(0.039)	(0.021)	(0.023)
GDP per capita (log)	0.586**	0.981***	-0.214
	(0.273)	(0.157)	(0.175)
Fixed effects	Yes	Yes	Yes
Observations	4,794	4,209	4,310
R^2	0.795	0.874	0.777
Adjusted R^2	0.786	0.868	0.766
Residual Std. Error	4.481	2.133	2.439

Note: *p**p***p<0.01

The table above shows the results of the effect of level of democracy and PF loans on tax rates. At the tax column (1) there is a significant negative coefficient of the effect of polyarchy on tax rates. However, there is no statistical significance on the conditional effect of polyarchy and PF loans on tax rates. In column (2) on direct tax rates, there is a positive insignificant coefficient of tax rates PF loans. In the indirect tax rates column (3) it is observed that there is a negative statistically significant coefficient on both the effect of polyarchy on indirect tax rates as well as the conditional effect of level of democracy and PF loans on the level of PF loans. This means that a 10% increase in the level of democracy is associated with a 0.1 percent decrease in indirect tax rates. This effect, evident by the conditional effect of level of democracy and PF loans, is observed to decrease by about 0.01 percent
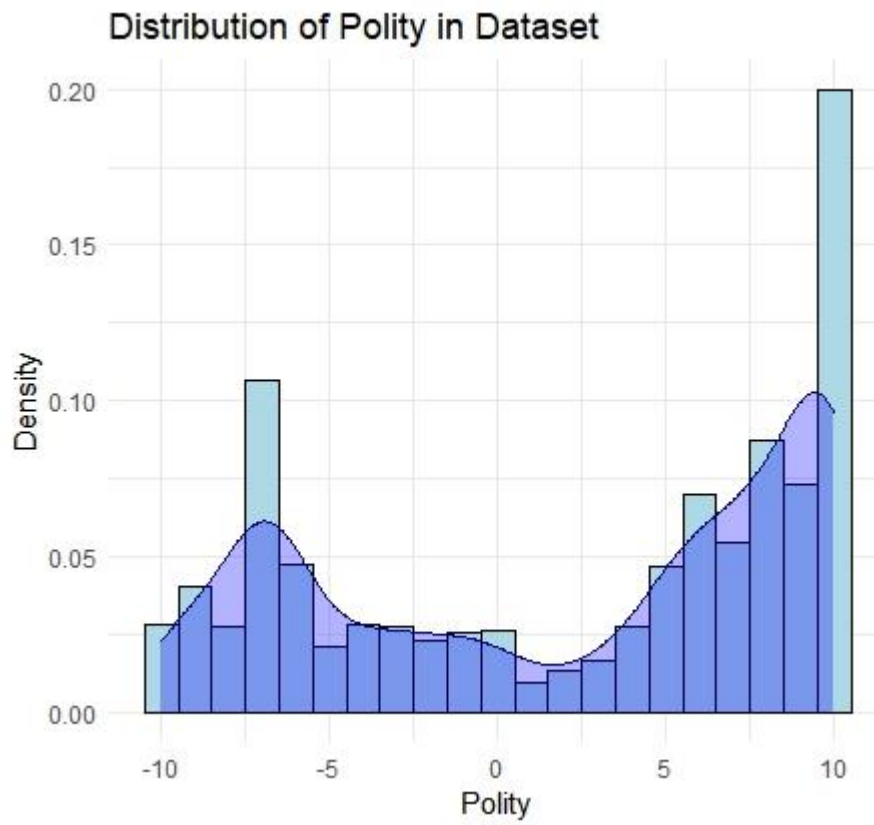
with increase in PF loans.

Figure A3

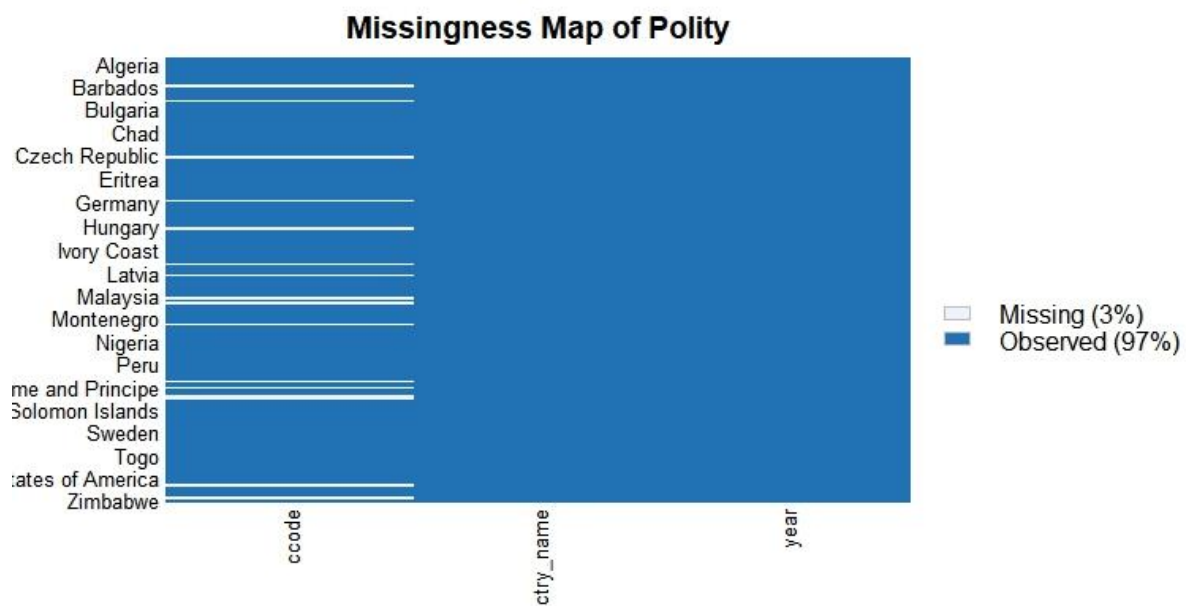## Distribution of Polity in Dataset

Figure A4

Missingness Map of Polity

Figure A5

Missingness Map of Polyarchy