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THE EFFECT OF FOREIGN DIRECT INVESTMENT ON TAX REVENUE

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Abstract:

Internal resource mobilization remains a big challenge for developing countries. While many studies have attempted to highlight several strategies to increase tax revenues, the contribution of Foreign Direct Investment (FDI) inflows in this process has received little attention. This paper provides an empirical answer to the crucial role of FDI inflows in tax revenue mobilization. Using a System GMM estimator for 90 developing countries from 1996 to 2017, our results strongly suggest that FDI inflows lead to a significant tax revenue increase. Nevertheless, this effect is not observed in resource-exporting countries where tax revenues seem statistically insensitive to FDI inflows.

Keywords: Foreign direct investment, tax revenue, System GMM, resource exporting countries.

JEL Codes: F21 - H20 – E62

1 INTRODUCTION

A considerable financing gap threatens the achievement of the sustainable development goals (SDGs) included in the 2030 schedule, especially in developing countries. According to UNCTAD (2014), developing countries should mobilize an average of \$5 trillion per year to cover their financing needs. Still, only about half of this amount can be mobilized, that is, \$2.5 trillion per year. Consequently, the mobilization of all sources of financing is becoming imperative.

In this context, since the United Nations conference in Addis Ababa in 2015, much hope has been placed in tax revenues. According to the World Bank (2017), tax revenues should represent between 50 and 80% of the resources needed to finance SDGs. However, the tax revenues mobilized by most of these countries are below the standard proposed by the International Monetary Fund (IMF) for this purpose, that is, 20% of GDP. For example, in 2018, out of a sample of 92 developing countries, the share of revenue in the GDP of 74 developing countries was less than 20%. Besides, 65 countries in the sample had a ratio of less than 17%. This lack of internal resources has led several academics and institutions to address the issues through key determinants of internal revenue mobilization (Baunsgaard and Keen, 2010; Brun et al., 2005; Chambas, 2005). Alongside this, it would be relevant to analyze the correlation between external sources of finance and internal revenue mobilization, particularly Foreign Direct Investment (FDI) and tax revenues.

FDI is the primary source of external financing for developing countries, ahead of migrant remittances and official development assistance (ODA). In 2018, developing countries had mobilized \$699.3 billion in FDI (UNCTAD, 2020), \$529 billion in remittances, and \$160.4 billion in ODA (Barne and Pirlea, 2019). The importance of FDI has thus given rise to significant academic and practical debates on its effects on the host country's economy through careful testing of its main determinants. Its effects on growth, knowledge transfer, and poverty have received considerable attention in the literature, but its contribution to tax revenues remains little explored to date.

In principle, by contributing the host country's productivity, FDI could increase tax revenues directly through corporate taxes, personal income taxes, income taxes, and royalties and indirectly through VAT.

From a direct point of view, companies benefiting from FDI will increase their productivity. Therefore, this medium could increase its industrial and commercial profit (ICP). Thus, the increase in the ICP of these companies will widen the taxable base of the corporation tax and thus increase tax revenues. Besides, when FDI flows go to labor-intensive sectors, the job supply and the wage bill increase. Therefore, this medium could increase the personal income tax base. According to Zhang (2001), FDI increases tax revenues through job creation. In addition, the diffusion of technology and knowledge transfer resulting from FDI could increase productivity in the host country and thus generate income (Danielova and Sarkar, 2011; Gajigo et al., 2012; Nguyen et al., 2014). This will allow multinational companies to benefit from dividends and allow the public administration to increase its tax revenues through income taxes.

Indirectly, FDI could result in consumption in two ways: through supply and through demand. First, when FDI contributes to an increase in the production of goods and services offered on the domestic market, it can increase VAT revenues. Second, on the other hand, increased demand for goods and services because of increased employment could increase VAT receipts. Again, this would lead to an increase in tax revenues.

Notwithstanding these likely benefits, they may be neutralized or even cancelled under certain conditions. Indeed, multinational companies can implement tax optimization policies through transfer pricing practices that favor reducing revenues from international companies. This reduces the tax potential of this activity and reduces corporate tax (Fuest and Riedel, 2009; Gropp and Kostial, 2001; UNCTAD, 2012). Moreover, competition between countries to attract FDI leads them to implement tax incentive policies through tax exemptions as well as tax rate reductions, which could offset the expected positive effects (Fuest and Riedel, 2009; International Monetary Fund Staff, 2011; Zee et al., 2002). Also, the practice of bribery between tax administrators and foreign companies in specific industries could lead to lower tax revenues (Bornhorst, Gupta, and Thornton, 2009; Ehrhart, 2011).

Because of the above, we cannot predict the effects of FDI on tax revenue mobilization. Thus, this effect will be positive if the advantages outweigh the disadvantages, neutral if the two outweigh each other, and negative if the disadvantages outweigh the disadvantages. Therefore, to analyze the effect of FDI on tax revenues, an empirical study needs to be carried out to determine this relationship.

The paper's contribution is twofold: firstly, it expands the literature on the effect of FDI inflows and the drivers of tax revenues in developing countries. Some studies (Bénassy-Quéré, Fontagné, and Lahrière-Révil, 2005; Rochananonda, 2006; Becker, Fuest, and Riedel, 2012) have examined the correlation between tax revenues and FDI, but they have focused only on the impact of tax and fiscal policies on attracting FDI without exploring the opposite direction. Moreover, most studies on the determining factors of tax revenues have not considered the impacts of FDI.

Secondly, it contributes to the literature by estimating the impact of FDI on tax revenue mobilization for developing countries in general and resource-exporting economies more particularly. To our knowledge, this is the first study to analyze the effect of FDI on tax mobilization for resource-exporting economies from developing countries.

The remainder of the paper is structured as follow. Section 2 presents theoretical and empirical literature on the relationship between FDI and tax revenue mobilization. Section 3 presents the empirical methodology used to estimate the impact of FDI inflows on tax revenue. Section 4 describes the data used and provides stylized facts for this study. Section 5 discusses the empirical results and runs some robustness checks, while section 6 concludes the study.

2 THEORETICAL AND EMPIRICAL LITERATURE ON THE IMPACT OF FDI ON TAX REVENUE

This subsection reviews the theoretical studies on the relationship between FDI inflows and tax revenue collection. The theoretical framework section analyzes the transmission channels through which variation in FDI net flows may affect tax revenue. The empirical reviews section reviews the literature on the effect of FDI net inflows on tax revenue.

2.1 Review of theoretical literature

The literature on FDI partly indicates that FDI can positively impact tax revenues. However, for other studies, the positive effects of FDI on tax revenues do not automatically materialize. FDI can hurt tax revenues in several

ways. The direction of the impacts of FDI depends on the political and economic structure prevailing in the host country.

The positive effect of FDI on tax revenue

This positive impact can be direct (through productivity, technology transfer, job creation) or indirect (consumption, trade, employment). By providing financial resources for establishing activities in the formal sector, FDI inflows are likely to generate additional value-added tax (UNCTAD, 2012). Besides, by contributing to new jobs, FDI inflows might generate tax revenue on labor income (Fuest and Riedel, 2009; UNCTAD, 2012). By improving exports and facilitating access to markets or supplies, FDI increases customs-duties revenue (Anwar and Nguyen, 2011). Knowledge transfer and technology dissemination are ways in which FDI can also fund the exploitation of natural resources and generate income. FDI's capital gains and profits contribute to corporate tax revenues in the host country (Danielova and Sarkar, 2011; UNCTAD, 2012). Fuest and Riedel (2009) highlighted that most poor populations in developing countries are not taxed. Therefore, FDI inflows can contribute to revenue mobilization by broadening the taxpayer base and generating more tax revenue by supporting investment and employment opportunities. For countries with critical natural resources, FDI inflows directed toward those sectors are likely to develop royalties, which might be large enough.

Ehrhart (2011) illustrated that in resource-rich countries, democratic institutions are vital because of their higher levels of transparency, leading to the positive effects of the initial natural-resource rent on domestic tax revenues. Furthermore, given that most FDI is directed to natural-resource exploitation activities in developing countries, it can be inferred that higher levels of transparency can positively impact the income that FDI can generate. Thus, an excellent institutional environment will attract more foreign investors and ensure their effective participation in tax revenues.

The negative effect of FDI on tax revenue

Many studies explain how FDI can shrink the tax base through several mechanisms and factors. For example, revenue mobilization could be affected by the "negative consequences" of tax incentives, tax evasion, and tax fraud and avoidance by multinational companies, overly competitive conditions that can crowd out domestic and local companies, and the pursuit by tax authorities and international companies of income from rent-seeking activities.

UNCTAD (2012) shows that FDI can generate financial resource outflows in the repatriation of income or costs. According to Gropp and Kostial (2001), multinational groups can transfer taxable income to countries with a less restrictive tax system through "transfer pricing" and other tax mechanisms such as debt financing. Gropp and Kostial (2001) take the example of a multinational in a high-tax country that produces a good with a branch's inputs in a low-tax country. For business-to-business (B2B) trade, the multinational has an incentive to overestimate the price of inputs, increasing profits in the low-tax country and reducing profits in the high-tax country, thereby minimizing global tax obligations. Fuest and Riedel (2009) explain that profit displacement by multinationals acts by distorting trade prices. They argue that the prices of goods exported to developing countries are distorted upwards. On the other hand, the prices of goods imported from developing countries remain artificially low, so income generated in developing countries accrues to developed economies.

Zee et al. (2002) point out that the widespread use of tax incentives to attract FDI has several negative consequences (in terms of lost revenue). According to Zee et al. (2002) and Fuest and Riedel (2009), FDI can produce tax revenue losses through the existence of tax incentives such as Free Economic Zones, where goods are generally exempt from duties and corporate taxes are low or zero. Zee et al. (2002) explain this as follows: First, these incentives reduce the tax base. Second, tax incentives distort the allocation of resources toward activities that benefit from tax advantages to the detriment of others. Finally, tax exemptions create opportunities for corruption and rent-seeking. Therefore, the lack of visibility in the treatment of exemptions may impact revenue. In this line, IMF (2011) shows that the revenue effects of FDI could be substantially reduced when significant tax cuts accompany FDI.

According to UNCTAD (2012), FDI can, in some situations, crowd out domestic corporations, particularly Small and Medium-Sized Enterprises. Nevertheless, in the same vein, FDI can reduce the proportion of taxpayers and limit these national units' taxation.

Zee et al. (2002) state that tax incentives to attract FDI create corruption and business opportunities that generate socially unacceptable profits and enormous income. Pursuing rents is likely linked to natural-resource exploitation activities (Bornhorst et al., 2009). Most foreign companies are involved in this sector, particularly in African countries. Corrupt practices between tax officials and foreign companies in this sector can lower tax revenues. Because of this analysis, it is difficult to determine the net impacts of FDI on tax revenues a priori.

2.2 Review of the empirical literature

The economic literature has focused a great deal on the effect of taxation on attracting FDI and revealed that taxation is a crucial determinant of FDI inflows, and there was a negative relationship between tax rates and FDI inflows (Bénassy-Quéré et al., 2005; Devereux and Freeman, 1995; Loretz, 2008; Tabasam, 2014). Nevertheless, a few studies analyzed the effect of FDI on tax revenue. Furthermore, the rare studies on these issues found an ambiguous result (Gropp and Kostial, 2000; Gngangnon, 2017; Mahmood and Chaudhary, 2013; Tabasam, 2014).

The earlier literature typically found a positive relation between FDI and government revenue.

Dunning (1993) and Raff and Srinivasan (1998) focus their investigation on the FDI effect through the determinants of tax revenues. Dunning (1993) argued that the welfare effects of FDI in the host country depend on the bargaining power of the host country with foreign investors, including either by offering the tax rebates on energy or labor costs to attract foreign investment or by imposing the tax. Raff and Srinivasan (1998), on the other hand, have claimed that FDI could create employment, transfer technology through training local labor, and improve management skills; the government should lose some tax revenue to attract foreign investment inflow.

In one of the early empirical studies, Gropp and Kostial (2000) analyzed the correlation between FDI, taxation, and corporate tax revenues in 19 OECD countries over 1987–1997 using panel data analysis and found that FDI inflows affected the corporate tax revenues positively. Furthermore, Mahmood and Chaudhary (2013) analyzed the effect of FDI on the total tax revenue in Pakistan during 1972–2010 and revealed that FDI inflows affected

the total tax revenues positively. However, the results may not be generalized to other countries in the Middle East and North Africa (MENA) regions.

Okey (2013) also studied the effect of FDI inflows on tax revenue mobilization in West Africa over 1989–2009. Using a panel regression, he concluded that FDI inflows positively impact tax revenues. However, the findings may not be generalized to other countries of South Saharan Africa because the investigation is limited to only French-speaking members of ECOWAS (Economic Community of West African States), and these countries have political and economic characteristics different from those of English speaking countries in the West African Region.

In another study, Bunescu and Comaniciu (2014) studied the economic and non-economic factors that affect tax revenues in 27 EU countries over 1995–2011. Using correlation analysis, they revealed that FDI inflows had a weak positive effect on tax revenues. On the other side, Tabasam (2014) investigated the interaction between tax revenues and foreign capital inflows (FCIs) in Pakistan during 1975–2012. Using time series analysis, he concluded that FDI inflows hurt tax revenues. Besides, Aslam (2015) examined the long-run relationship between FDI inflows and tax revenues in Sri Lanka over 1990–2013 and discovered that FDI inflows made a significant positive contribution to tax revenues.

Bal and Fazl (2016) also studied the impact of FDI inflows on firms' tax payments at different levels of technology in Turkey over 2004–2012. They found that FDI inflows increased firms' tax payments and that the effect was more extensive in high-technology firms.

Gnangnon (2017) analyzed the effect of FDI on government revenue. Using panel data over the period 1980–2013, he found that the impact of FDI on government revenue depends on the level of FDI inflows. Finally, Bayar and Ozturk (2018) investigated the effect of FDI inflows on tax revenues in OECD countries with a panel cointegration and causality analysis during the 1995–2014 period. They found that there was one-way causality from FDI inflows to total revenues.

3 SPECIFICATIONS OF THE MODEL AND ECONOMETRIC METHODS

This section focuses on the specification of the empirical model for estimating the impact of FDI flows on total tax revenues and the estimation method used to evaluate this empirical model.

3.1 Empirical model specification

Because of the inertial tax structure of developing countries and the fact that a country's current fiscal capacity depends on its inherited fiscal capacity from the past (Besley and Persson, 2013), previous studies on tax effort estimate that the level of current tax revenue in each country is affected by its past values (Gnangnon and Brun, 2017; Gupta, 2007; Leuthold, 1991; Yogo and Ngo Njib, 2018). Therefore, we consider and specify a dynamic panel data model to estimate the impact of income inequality on non-resource-related tax revenues. Precisely, the estimated model is defined as follows:

$$\log(Tax)_{it} = \alpha + \delta \log(tax)_{it-1} + \beta \log(FDI)_{it} + \theta X_{it} + \vartheta_i + \mu_t + \varepsilon_{it} \quad (1)$$

where $(Tax)_{it}$ is the ratio of total tax revenues to GDP for country i in year t while $(tax)_{it-1}$ is its value in year $t - 1$. $(FDI)_{it}$ represents the ratio of FDI net inflows to GDP for the host country i in the period t . We want to point out that in Equation (1), for the variable $(FDI)_{it}$, which contains negative values, we follow Gnangnon (2017) by applying the following log formula:

$$\log(FDI) = \text{sign}(FDI) * (\text{Log}(1 + \text{abs}(FDI))) .$$

X_{it} stands for other tax revenue determinants identified by previous studies on tax revenue mobilization in developing countries. These determinants include GDP per capita, agriculture value-added, manufacturing value-added, trade openness, and corruption (Brun and al., 2005; Gupta, 2007). Temporal effects (μ_t) are included to control for the common shocks affecting developing countries, ϑ_i represents a country-specific effect, and ε_{it} is the error term.

Agriculture and manufacturing value-added include controlling the economy's sectoral composition, while trade openness contains the effect of exposure to international trade on the tax ratio. Finally, we also retain control of

corruption among the explanatory variables as a proxy for the institutional policy and GDP per capita to measure the level of development.

In Equation (1), ϑ_i is included among the right-hand side variables to control for unobserved time-invariant country-specific characteristics that are potentially correlated with tax revenues and μ_t to control for time-varying shocks and economic fluctuations that affect all developing countries.

3.2 Identification strategy

We must fix some econometric issues when estimating the baseline specification (Equation 1). First, FDI is likely to be endogenous due to the inverse causality between fiscal policy and the decision to invest. Indeed, governments may choose to reduce their tax burden to attract foreign investors. Consequently, FDI could be correlated with the error term. Besides, a lagged dependent variable among the right-hand variables creates a dynamic panel bias (Nickell, 1981) due to the correlation between the lagged dependent variable and the error term. This bias is particularly significant for panel data with a short time dimension ($T = 5$ for our panel). In this case, applying a panel fixed effects estimator would not be appropriate (Roodman, 2009b).

Following the literature on estimating dynamic panel data, we use the system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). Gnangnon (2017) adopts the same approach using the system GMM estimator to estimate the impact of FDI inflows on total non-resource tax revenue and non-resource corporate tax revenue.

In the system GMM estimator, the level and difference equation are combined as a system, and their lagged differences are used as instruments for the level variables. The lagged level variables instrument the different variables. This increases the efficiency of the system GMM estimator relative to the difference GMM estimator because the system GMM simultaneously exploits the time-series dimension and the variations in the cross-section of the data. The difference GMM estimator (Arellano and Bond, 1991) uses the first differences to remove unobserved country fixed effects in Equation (1). This solves the problem of potential correlation between unobserved country fixed effects and the explanatory variables. Then, the first differentiated variables are instrumented by the lagged values of the level variables. However, the difference GMM estimator's problem is

that lagged levels of variables may be imperfect instruments (weak instrument problem) if those variables follow a random walk process, as lagged values of the level variables provide less information about future changes (Blundell and Bond, 1998). Therefore, in this study, our preferred estimator is the system GMM one (Arellano and Bover, 1995; Blundell and Bond, 1998). The validity of the instruments in system GMM estimation is checked by the Hansen test of over-identifying restrictions, which tests the validity of the instrumental variables used in the regressions and the Arellano and Bond autocorrelation tests. Furthermore, with the system GMM estimator, we must ensure that the total number of instruments does not exceed the number of countries to avoid the problem of "instrument proliferation" in the estimations (Roodman, 2009a).

4 DATA

To achieve our objectives, we construct an unbalanced panel dataset of 90 developing countries from 1990 to 2017. The availability of data dictates the choice of the sample and the period covered. Since the 1990s, globalization has meant a new phase in the global integration of economic, financial, ecological, and cultural phenomena. Furthermore, our model specification contains the variables capturing corruption whose data start from the year 1996. We therefore retain the period from 1996 to 2017 as the analysis period of this study.

Dependent variable: Tax revenue (TAX)

Tax revenue includes national government revenue collected from tax sources aggregated at the central and local levels, taxes, and social contributions taxes. It is the ratio of tax revenue to GDP. The variable total tax revenue is extracted from the ICTD-GRD database (UNU-WIDER Government Revenue Dataset, 2020).

The primary explanatory variable: Foreign direct investment (FDI) net inflows

FDI means the acquisition of 10% of a foreign company's share capital in a foreign country different from that of the investors. It comprises the sum of equity, reinvested earnings, and other long- or short-term capital as they

appear in the balance of payments. Because of the above in section 2, we cannot predict the effect of FDI¹ on tax revenue mobilization. Thus, the impact will be positive if the advantages outweigh the disadvantages, neutral if the two outweigh each other, and negative if the disadvantages outweigh the advantages.

As in the empirical literature on economic growth and according to Islam, Madsen, and Doucouliagos (2018), we divide the panel data period into five-year intervals without overlap to obtain panel data for seven periods, except for the last sub-period, which is three years: 1995–1999; 2000–2004; 2005–2009; 2010–2014; 2015–2017. This transformation eliminates cyclical fluctuations in the data (Pickering and Rajput, 2018; Yogo and Ngo Njib, 2018) and mitigates the problem of measurement errors (Yogo and Njib, 2018), thus allowing a focus on long-term relationships. Moreover, this transformation is consistent with volatile FDI flows data for developing countries. However, the most recent years' FDI data are still preliminary and subject to revision by national authorities at the time of publication.

Control variables

As already mentioned in the paragraph following the empirical model, the control variables include GDP per capita as a proxy for the level of development, the ratio of agriculture value-added to GDP, the ratio manufacturing value-added to GDP, trade openness measured by the ratio of the sum of exports and imports to GDP, and the control of corruption. These variables were obtained from the World Development Indicators (WDI) database and World Governance Indicators (WGI). Let now discuss the expected effect of control variables on tax revenue.

Agriculture value-added

The ratio of agriculture value-added to GDP is employed as a proxy for the economy's structure or sectoral composition. In developing countries, the agricultural sector is dominated by many smallholder farmers who produce for self-consumption, sell their output in informal markets, or exchange their products for other goods. Besides, most farmers in African countries do not keep current accounts for managing their farms. All these factors, as mentioned above, contribute to making it hard to tax the agricultural sector in Africa (Fox and Gurley,

¹ UNCTADstat – documentation, available at <https://unctadstat.unctad.org/wds/TableViewer/summary.aspx?ReportId=96740>

2005; Gupta, 2007; Stotsky and WoldeMariam, 1997). We therefore expected a negative effect of agriculture value-added on tax revenues in our estimations.

Manufacturing value-added

The ratio of manufacturing value-added to GDP is employed as a proxy for the economy's structure or sectoral composition, like agriculture value-added. Hence, more extensive manufacturing in developing countries is easier to monitor and tax. Besides, the smaller the share of manufacturing in the host country, the lower the tax performance. We therefore expected a positive effect of manufacturing value-added on tax revenues in our estimations.

Trade openness

Trade openness expressed as the ratio of the sum of exports and imports to GDP is expected to increase tax mobilization as trade openness stimulates trade volume and therefore trade taxes. However, trade liberalization policies have been implemented in developing countries through cuts in tariffs. These measures have resulted in a loss in tax revenue for some countries (Baunggaard and Keen, 2010), while others have compensated for losses in tariffs by an increase in domestic tax revenue (Bird and Gendron, 2007; Cnossen, 2015). Therefore, trade openness could also affect tax revenues through domestic tax revenues. This phenomenon is mainly due to the impact of export earnings on the wages of domestic traders and their domestic consumption. Due to the expansion of exports, greater trade openness is likely to generate more export revenues for traders who participate in international trade activities. As a result, traders' profits would increase and develop a positive employment dynamic for the companies concerned. This would imply an increase in direct tax revenues and total tax revenues. This positive income effect could increase domestic consumption and thus indirect tax revenues. Within this background, the impact of trade openness on tax revenue is a priori difficult to predict. Therefore, in this study, the expected effect of trade openness on revenue variables remains a priori unknown.

Control of corruption

The functioning of tax administrations is nevertheless affected by elements of the institutional context, so in this study, we pay particular attention to the effects of corruption. The level of corruption in the country may affect its tax collection performances. For example, some taxpayers may erode their tax bases in collaboration with a tax administration official. Therefore, we control for the impact of corruption on tax revenue. To do so, we include the indicator “control of corruption index” from WGI (Kraay, Kaufmann and Mastruzzi, 2010). The index measures the perception of corruption, ranging from -2.5 to 2.5 , with higher values indicating a better control of corruption in the host country.

GDP per capita

GDP per capita measures the level of development. A high level of development tends to be associated with a greater ability to pay and collect taxes. In addition, the level of development is associated with a high demand for public goods and services (Wagner's law). The impact of GDP per capita should therefore be positive.

Table 1 provides descriptive statistics on the averaged five non-overlapping years' data of all the variables from the sample used to estimate this study. The average non-resource tax revenue equals 13.39% of GDP, while total tax revenue for the selected countries under investigation accounts for 15.42% of GDP (Table 1). The average FDI net flows are 4.03% of GDP, with the lowest FDI flows are negative at -7.76% and the highest are positive at 42.19%. The following section is devoted to analyzing the results obtained from estimating the impact of FDI on tax revenue.

FDI net inflow and tax revenue trends

We first look at the nature of the relationship between FDI net inflows as GDP and tax revenues as GDP through graphical analysis. Figure 2 depicts the relationship between FDI net inflows as GDP and tax revenues as GDP in a sample of developing countries from 1996 to 2017.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total tax revenue	405	15.424	7.653	.740	52.645
FDI net inflow	450	4.035	4.785	-7.761	42.193
Agriculture added value	450	17.658	14.153	.0183	74.584
Manufacturing added value	409	12.907	6.930	.673	47.110
Trade openness	450	76.143	39.265	17.327	279.088
Control of corruption	449	-.442	.698	-1.739	1.565
Non-resource tax revenue	414	13.391	6.607	.548	56.809
Exchange rate	435	111.267	124.323	52.177	2665.717
Financial development	440	.213	.142	.031	.730
Income tax	382	4.807	2.971	0	22.319
Tax on goods and services	408	6.178	3.350	.009	17.488
Corporate tax	314	2.286	1.474	0	8.216
Direct tax	412	4.563	3.040	.056	19.133
Political stability	449	-.390	.848	-2.763	1.304
GDP per capita	447	4225.11	6727.866	122.622	46527.75

Source: Author's calculation using data from UNU-WIDER, WDI, UNCTADsta, and WGI (Kraay et al., 2010)

FDI flows have increased significantly since the 1996 (Figure 1). Indeed, while they represented only 2% of GDP in 1996, they reached a record 6% of GDP in 2011 before declining to 3.7% of GDP. Nevertheless, just by looking closely, it is clear that this growth has not been stable over time. Indeed, since the 1990s, following economic liberalization through the vast privatization movements under structural adjustment programs, developing countries, and more precisely those in our sample, have experienced a sustained increase in the FDI share in their economies. Moreover, between the late 1990s and the early 2000s, this was followed by a decline in the FDI ratio associated with, among other things, weak economic growth in most parts of the world and falling stock markets

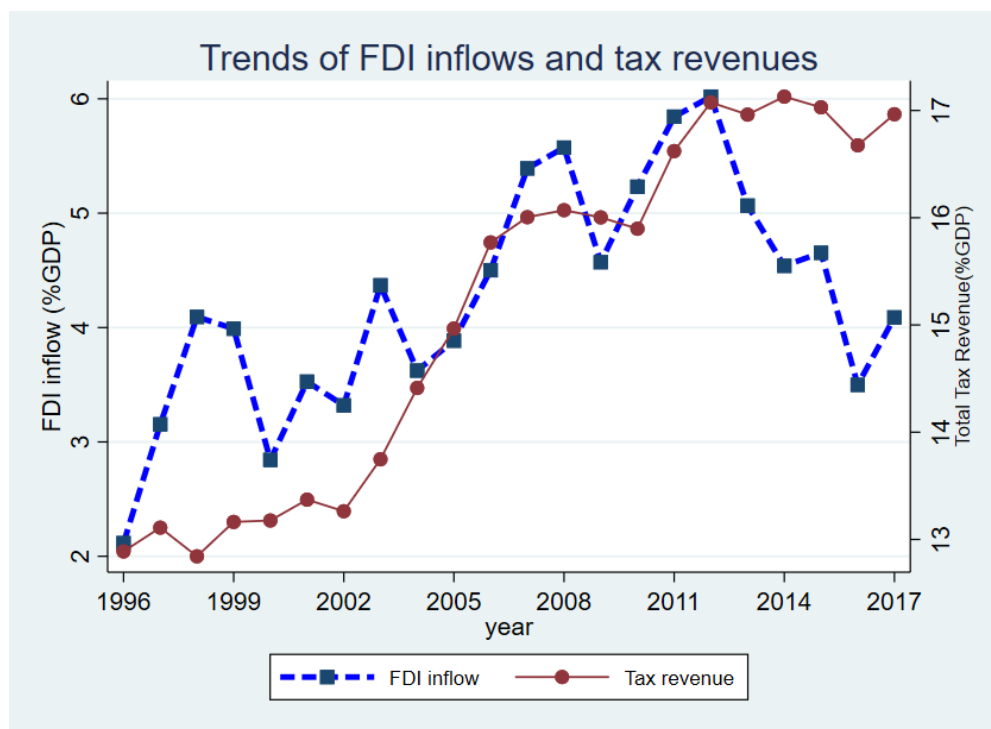
that reduced capital flows (UNCTAD, 2003). In other words, the reduction in global growth led to a decline in demand and production.

Moreover, the fall in the stock markets reduces investor confidence in the short-term prospects for recovery. This situation is a natural consequence of the decline in investment. On the other hand, the downturn of FDI flows since 2008 partly reflects the results of the financial crisis due to the subprime crisis of 2007/2008 and secondly, the difficulties encountered by globalization since the early 2010s, when a sharp decline in almost all aspects of globalization (FDI, migration, foreign trade) occurred.

Long-term trends show a positive relationship between FDI flows and tax revenues (Figure 1), although, at times, we can observe negative correlations or no correlation at all. For example, tax revenues stagnated from the 1990s to the early 2000s while FDI flows peaked at around 4% of GDP. This reflects, on the one hand, incentives and trade liberalization and the adoption of trade agreements relating to FDI. In other words, since the early 1990s, developing countries have introduced incentives through tax exemptions and reductions in tax rates to attract foreign investors. Also, to alleviate double taxation problems, governments have established non-double taxation treaties with individual partner states. These measures have increased the share of FDI in the economy, but tax revenues do not follow this FDI growth.

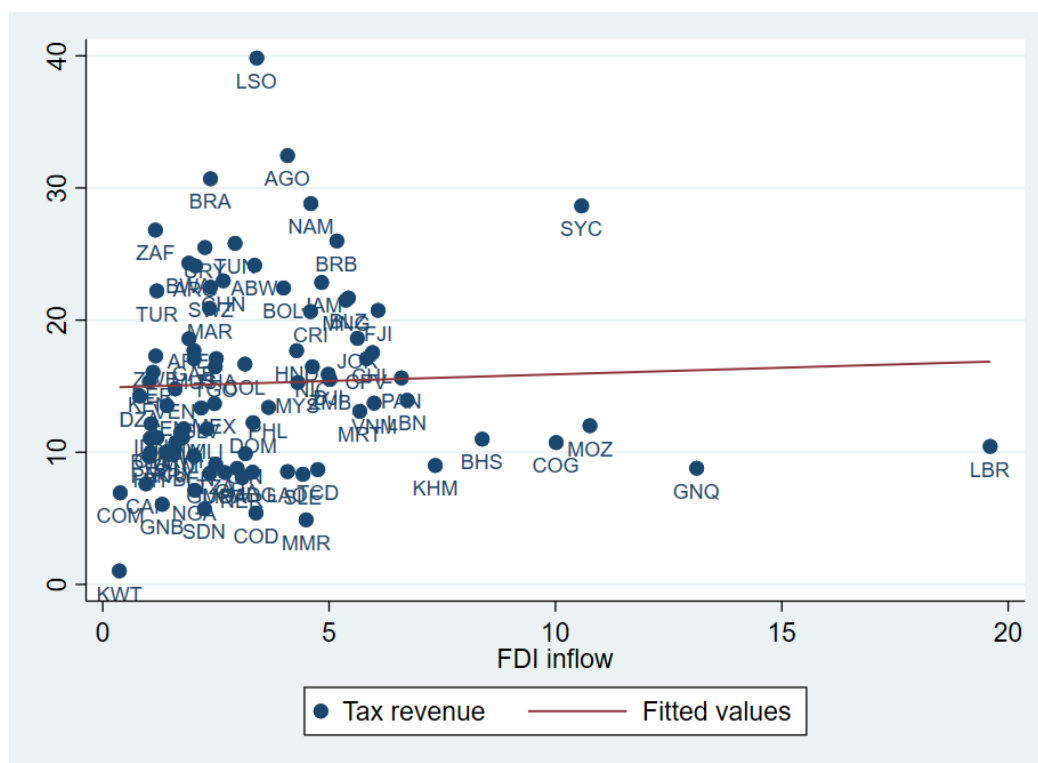
As a highlight in Figure 2, most countries have the lowest average FDI as GDP over 1996–2017. Figure 2 shows that resource-rich countries tend to have a higher level of FDI as GDP while their performance in collecting tax revenue is lower than that of the non-resource-rich countries in the continent. This is not to say that resource dependence is attracting FDI inflows but indicates that resource dependence may reduce the effort to collect taxes from tax bases.

Figure 1 Trends of FDI and tax revenue



Source: Author's calculation using data from UNU-WIDER and UNCTADst

Figure 2: Correlation between FDI and tax revenue



Source: Author's calculation using data from UNU-WIDER and UNCTADsta

The trend line in Figure 2 below shows a positive correlation between FDI inflow and tax revenue, whereas countries like Liberia, Equatorial Guinea, Mozambique, and the Republic of Congo have higher FDI inflow as

GDP. Still, their tax performances are less than 10% of GDP on average. The trend line represents, in fact, a correlation, not causality. This suggests that the relationship obtained from the graphical analysis could be biased by econometric problems like reverse causality from taxes to attraction of FDI inflow and the existence of other factors that affect the nexus between FDI inflow and taxes. Therefore, we undertake an econometric analysis to explore further the impact of FDI net inflow on tax revenue collection.

5 MAIN RESULTS

We present the main results obtained from estimating the base equation and those obtained from the various robustness analyses to check whether the main results are robust under certain circumstances.

5.1 Baseline results

Before analyzing and commenting on our results, it is essential to point out that the system GMM estimator's regressions pass all standard diagnostic tests. There is no evidence of second-order residual autocorrelation, and Hansen's test confirms that all instrumental variables are exogenous. Besides, for each system GMM regression performed, the number of instruments does not exceed the number of countries (see the last rows of Tables 2, 3, and 4). Table 2 presents the results from estimating the basic specification (Equation 1). The results show that the impact of FDI on total tax revenue is positive and statistically significant at 10%.

Furthermore, the estimates indicate that a 1% point increase in FDI flows will lead to a 1.5% point increase in developing countries' total tax revenue ratio (column 1 of Table 2). This result suggests that FDI flows are a non-negligible source of tax revenue mobilization. Therefore, policymakers can consider reasonable measures to make FDI flows more attractive and improve their countries' tax revenue collection. As regards the classical determinants of tax revenues, in line with the literature on the subject, our estimation results indicate that the coefficient of the lagged dependent variable is statistically significant at 5% in all specifications (columns 1 to 4 of Table 2), which supports the prediction of inertia in tax collection in developing countries.

Table 2: Effect of FDI on total tax revenue

VARIABLES	(1) Baseline	(2) Exchange rate	(3) Political stability	(4) Financial Development
L. Log (Total tax revenue)	0.682*** (0.103)	0.672*** (0.105)	0.643*** (0.110)	0.738*** (0.092)
Log (FDI flow)	1.497* (0.782)	1.603* (0.829)	1.156* (0.636)	1.854** (0.713)
Log (GDP per capita)	-0.048 (0.043)	-0.029 (0.043)	-0.022 (0.055)	-0.048 (0.054)
Log (Agriculture)	-0.076 (0.067)	-0.061 (0.068)	-0.057 (0.075)	-0.050 (0.062)
Log (Manufacturing)	0.083** (0.039)	0.092** (0.044)	0.082* (0.042)	0.062* (0.036)
Log (Trade openness)	0.051 (0.063)	0.019 (0.074)	0.033 (0.072)	-0.029 (0.072)
Control of corruption	0.013*** (0.005)	0.013*** (0.005)	0.028** (0.013)	0.012*** (0.004)
Log (Exchange rate)		-0.000* (0.000)		
Political stability			-0.031 (0.029)	
Financial development				0.192* (0.280)
Constant	-0.373 (0.379)	-0.493 (0.405)	-0.576 (0.436)	-0.327 (0.344)
Observations	324	324	324	319
Number of countries	68	68	68	67
Number of instruments	28	27	30	26
AR1_Pvalue	0.00124	0.00164	0.00304	0.00168
AR2_Pvalue	0.360	0.365	0.484	0.214
Hansen_Pvalue	0.497	0.277	0.279	0.130

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: author

As expected, we find that manufacturing value-added is positively correlated with total tax revenue in developing countries (column 1, Table 2). These results may show that the manufacturing industry regularly illustrates the importance of sectoral share indicators. Tax collection is likely to be based on a range of relevant elements – reflecting the fact that a more concentrated, complex, and formalized economic activity is more amenable to tax collection. Besides, we find a positive correlation between tax revenue mobilization and the control of corruption. These results are in line with the literature.

In contrast to expectations, the impact of trade on total tax revenue is positive but non statistically significant in the results reported in Table 2. One possible explanation could be a reduction in the rate of customs duties (Gupta, 2007; Keen and Simone, 2004). Gupta (2007) concluded that lower tariff rates lead to lower tax revenues. Besides, Keen and Simone (2004) suggested that in parallel with reducing tariff rates, revenues could increase if trade liberalization occurs through quota pricing, removal of exemptions, reduced tariff peaks, and improved customs procedures. It follows that policies aimed at further trade liberalization in developing countries may be detrimental to revenue generation. This could be addressed by revising trade agreements that discourage corruption in customs divisions through better service and prosecution conditions. Given the positive impact of FDI inflows on tax revenue mobilization, we subject this result to various robustness tests.

5.2 Robustness check

We perform various robustness analyses to check whether the positive impact of FDI inflows on tax revenues found by the empirical research holds when specific considerations are considered.

5.21 Analysis of transmission channels of FDI inflows to total tax revenue

This subsection discusses how FDI may affect tax collection, highlighting that political stability, the exchange rate, and financial development are potential transmission channels of FDI inflows to tax revenue. Thus, adding these variables as a control in the baseline specification may only lead to weak FDI inflows. This is the background approach we follow to test the transmission channels of FDI inflows to total tax revenue in developing countries.

Political stability

In discussing how net FDI inflows affect tax revenue mobilization, we have suggested that increasing net FDI inflows can favor government stability and significantly promote tax collection. Therefore, we need to control government stability to effectively capture the effect of net FDI inflows on the tax revenue ratio. We use the government stability index from the WGI (Kraay et al., 2010). This index captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. It ranges from -2.5 to 2.5 , with higher values indicating the most stability. We find that political stability does not significantly impact total tax revenue mobilization (Table 2, column 3)

Exchange rate

We control the exchange rate because the volume of FDI is a function of the exchange rate's stability (Udomkerdmongkol, Morrissey, and Görg, 2009). Still, this stability also reflects a better economic policy and therefore is favorable to a better taxation that may be likely to attract FDI. Moreover, developing countries' economic policies are most frequently observed with the existence of an often-negative relationship between a country's tax revenues and the real level of its official exchange rate. An appreciation of the real official exchange rate – that is, a decline in national currency units per unit of foreign currency – leads, all other things being equal, to a decrease in the ratio of tax revenue to GDP. A significantly overvalued exchange rate implies a much lower tax ratio than would otherwise have existed. The exchange rate data is taken from Darvas (2021).²

The paper's main results remain unchanged when the impact of the exchange is controlled. The effect of the FDI inflows on tax revenue is positive and significant. Furthermore, as expected, the exchange rate has overvalued significantly reduced tax revenue collection by 10% (Table 2, column 2).

² <https://www.bruegel.org/publications/datasets/real-effective-exchange-rates-for-178-countries-a-new-database/>

Table 3: Effect of FDI on disaggregated tax revenue

VARIABLES	(1) Non-resource tax	(2) Direct tax	(3) Goods and service tax
L. Log (non-resource tax)	0.680*** (0.053)		
Log (FDI inflow)	1.982** (0.900)	1.360 (1.546)	1.663* (0.923)
Log (GDP per capita)	0.008 (0.036)	-0.126* (0.075)	-0.155** (0.063)
Log (Agriculture)	-0.002 (0.044)	-0.158* (0.093)	-0.298*** (0.084)
Log (Manufacturing)	0.101*** (0.032)	0.108 (0.067)	-0.009 (0.048)
Log (Trade openness)	-0.017 (0.055)	0.038 (0.138)	-0.065 (0.060)
Control of corruption	0.010*** (0.004)	0.024*** (0.007)	0.011 (0.007)
L. Log (direct tax)		0.755*** (0.074)	
L. Log (tax on goods and services)			0.611*** (0.059)
Constant	-0.662*** (0.208)	-0.126 (0.525)	-0.791* (0.468)
Observations	294	297	237
Number of countries	66	66	60
Number of instruments	25	25	24
AR1_Pvalue	0.00158	0.0178	0.0803
AR2_Pvalue	0.613	0.247	0.174
Hansen_Pvalue	0.604	0.727	0.401

Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1. Source: author

Financial Development

In discussing how net FDI inflows affect tax revenue mobilization, we have suggested that increasing net FDI inflows can favor financial development and significantly enhance tax collection. Therefore, we need to control the impact of financial development to effectively capture the effect of net FDI inflows on the tax revenue ratio. We use a new composite index introduced by the IMF's Policy and Strategy Review Department, constructed from various financial systems indicators using Principal Component Analysis (PCA).

According to Svirydzenka (2016), the index captures financial development in a multidimensional way, involving banking and non-banking institutions and stock market development. Three dimensions of these systems are considered in calculating the index: their depth, access, and efficiency.

The paper's main results remain unchanged when the impact of the exchange is controlled. The effect of the FDI inflows on tax revenue is positive and significant. Furthermore, as expected, the suppression of financial constraints and the improvement of the financial system would increase the total tax revenue (Table 2, column 4).

5.22 Disaggregated tax revenue

Moreover, these overall results could mask considerable contrasts depending on the types of tax revenues from which this capital could benefit. A series of studies document the relationship between FDI inflows and tax policies but analyze this relationship at an aggregate level of tax revenues and do not identify which particular tax policy is likely to benefit most from FDI inflows. We seek to fill this gap by analyzing the effect of FDI inflows on disaggregated tax revenue.

Effect of FDI on non-resource tax

As tax revenues do not wholly exclude natural resource revenues (they contain the tax on mining/oil companies), we replace the chosen indicator with an indicator of tax revenues excluding natural resources. Our results show that FDI inflow increases non-resource tax mobilization (Table 3, column 1). Moreover, the estimated elasticity

is close to 2, suggesting that a 1% increase in FDI inflows may cause a non-resource tax increase of 2%. This means that policymakers could implement FDI-attracting policies that improve non-resource activities.

Effect of FDI on direct tax

Given the role of FDI in growth, business productivity, and employment, we estimate the relation of FDI with direct tax. The results show that the impact of FDI inflows on direct tax mobilization is positive but not statistically significant (Table 3, column 2). We can offer two possible explanations for this non-significant correlation. The first possibility is that because of competition between domestic and foreign companies, FDI flow could crowd out certain domestic companies. This may offset the positive effect of FDI on direct tax revenue. However, we believe that this is unlikely because the less competitive domestic companies would crowd out, and this crowding out will be compensated. The second possibility is that many developing countries provide tax incentives to foreign investors to encourage investment. However, this distorts resource allocation and is detrimental to long-term growth. This appears to be more plausible because the tax practices of multinational companies via tax evasion put the financing of sustainable development at risk. In fact, this interpretation would be consistent with the evidence of Glencore.³ Glencore's head office is located in Switzerland in the canton of Zug. The group is present in more than 50 countries and has a turnover of more than \$170 billion. The Glencore group is the subject of severe accusations by NGOs relating to its abusive transfer pricing practices in Africa, particularly in Zambia and the DRC. Glencore has been in production in the DRC since 2008 with a turnover of \$210 million. This will increase to \$808 million in 2013. However, it has been systematically posting negative results since 2008. Due to accumulated losses, the company has lost its entire capital of US\$100 million. Therefore, it has paid no corporate tax for at least five years (Peyer and Maillard, 2011).

Effect of FDI on tax on goods and services

The effect of FDI inflows on tax on goods and services depends on whether FDI activities are conducted primarily to serve the domestic market or export oriented. If FDI activities are mainly carried out to serve the domestic market, they could increase its goods and services, increasing VAT revenues. On the other hand, increased

³ Telerama (2011)

demand for goods and services resulting from increased employment could increase VAT receipts. However, this would lead to an increase in tax revenues. On the other hand, if FDI activities are primarily for export, they could reduce VAT via the problem of VAT credit or increase indirect tax through increasing demand. Indeed, the expansion of the export earnings could lead to a wage rise, which affects domestic demand and thus increases taxes on goods and services. However, the increase in exports for the activity of capital-intensive FDI activity could raise the problem of VAT credit, affecting tax on goods and services.

For this reason, we estimate the relationship between FDI flows and the mobilization of tax on goods and services. The results show that FDI inflows significantly affect tax on goods and services. This suggests that governments could put in place policies to curb FDI to increase the production of domestic goods and services and increase domestic demand.

5.23 What is the effect of FDI on resource-exporting countries?

The phenomenon known in the literature as the natural-resource curse could influence the effect of FDI inflows on tax revenues. Therefore, it will be essential to analyze the impact of FDI net inflows on the countries' net exporters of natural resources compared to other countries.⁴ Table 4 presents the findings for the resource-exporting countries (column 1) and other countries (column 2). Like the general results, when nations are resource exporting, FDI inflows affect government tax revenue positively. However, the tax revenues of these countries are not statistically sensitive to an increase in FDI. These findings could be explained by the excessive tax incentive and tax holidays accessible to multinational enterprises operating in the national economy. Another explanation could be that the leaders of resource-rich countries tend to neglect the sectors of activity and what could increase their level of fiscal effort. Besides, the extractive-resources sector, which needs more capital, is dominated by foreign companies. Therefore, excessive tax exemption can significantly reduce the involvement of FDI in tax revenues. Also, companies operating in the extractive-resources sector often advance corrupt relationships with tax officials to take advantage of substantial tax and royalty exemptions and thus reduce their

⁴ We consider a country a natural-resource exporter if its exports of natural resources represent more than 60% of its total exports for more than ten years.

liability in host countries. In addition, companies operating in this sector practice the price transfer method to avoid corporate tax, thereby reducing their corporate tax liability in host countries. However, when countries are not-resource exporters, the magnitude of the effect of FDI on tax mobilization is consistent with the results of this study and most of the literature on the relationship between FDI and government revenues.

6 CONCLUSION

Usually seen as a significant factor of economic growth in developing countries, FDI allows transfer from home countries to host countries. It stimulates local investment, which improves human capital and the quality of institutions in developing countries. Through these channels, FDI can improve tax mobilization in developing countries. However, on the other hand, tax incentives and tax complexity and natural resources often lead FDI to affect tax mobilization in developing countries negatively. A few studies about the relationship between government tax mobilization and FDI inflows in developing countries are inconclusive.

This paper contributes to empirically investigating a large sample of developing countries by finding out how FDI affects government tax mobilization, using a system GMM approach. Furthermore, we find that FDI affects government tax mobilization positively. Given the resource curse in developing countries due to tax incentives, we analyze this question for resource-exporting countries. The results suggest that FDI inflows do not affect government tax mobilizations for resource-exporting countries.

From a policy perspective, this paper shows that promotion of FDI through tax incentives should consider the role of tax evasion. The results also suggest it is necessary to substitute or combine these policies with non-tax measures such as subsidies to foreign investors, institutional environment improvement, and infrastructure development, attracting FDI without much loss of tax revenue. Besides, countries must also consider the crucial role of natural resources, agriculture, and trade openness in tax revenue mobilization.

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Table 4: Relationship between FDI and tax revenue by type of resource country

VARIABLES	(1) Resource exporters	(2) Not-resource exporters
L. log (Total tax revenue)	0.497*** (0.147)	0.701*** (0.088)
Log (FDI inflow)	0.928 (1.409)	0.827** (0.344)
L. log (GDP per capita)	-0.023 (0.063)	-0.109*** (0.029)
Log (Agriculture)	-0.031 (0.095)	-0.164*** (0.039)
Log (Manufacturing)	0.136** (0.051)	-0.040 (0.030)
Log (Trade openness)	0.240 (0.176)	0.099* (0.051)
Control of corruption	0.023** (0.010)	0.010*** (0.003)
Constant	-0.790 (0.741)	-0.196 (0.299)
Observations	147	210
Number of countries	35	47
Number of instruments	18	28
AR1_Pvalue	0.00439	0.00103
AR2_Pvalue	0.477	0.979
Hansen_Pvalue	0.497	0.315

Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Source: author