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Impact of Foreign Direct Investment (FDI) Inflows on Non-Resource Tax and Corporate Tax Revenue

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Abstract

This paper explores the impact of FDI inflows on government revenue, notably total non-resource tax revenue and non-resource corporate tax revenue. The analysis covers an unbalanced panel dataset comprising 172 countries (both developed and developing countries) over the period 1980-2013. Empirical results show that the impact of FDI inflows on each of these two types of government revenue depends on the level of FDI inflows, expressed in percentage of host countries' Gross Domestic Product (GDP).

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1. Introduction

In today's world of increasing mobility of international capital flows, many governments use different types of incentives, including tax incentives to attract foreign investment. Tax incentives could include tax reductions and exemptions, as well as special tax allowances. In providing tax incentives to foreign investors, governments believe that these would promote foreign direct investment inflows, which would in turn result, *inter alia*, in job creation, technology transfer, know-how, and economic growth. Nonetheless, studies (e.g., McLure, 1999; Dunning 1993; Morisset and Pirnia 2000; Wells and Allen, 2001) tend to suggest that other factors such as a conducive business environment matters more to attract FDI inflows than tax incentives. Morisset and Pirnia (2000) have reported from a survey that for one investor, "tax exemption is like a dessert; it is good to have, but it does not help very much if the meal is not there". The Tax Justice Network (2012) has argued that increased competition over FDI and growing pressure to provide investment incentives such as tax holidays and other indirect taxes to attract investors could result in a 'race-to-the-bottom' that would eventually hurt the host countries. The United Nations Conference on Trade and Development (UNCTAD) is more nuanced by arguing that a country's tax policy can have attraction or distraction effect on FDI (UNCTAD, 2007).

While tax incentives might be effective in attracting investment flows, they could induce adverse consequences for the host country. The literature that has examined the impact of FDI inflows on government revenue is still underdeveloped. Tax incentives could be associated with important losses of public revenue for the host government (e.g., Bellak et al., 2009). They could also be counterproductive by attracting investment that would not be genuinely beneficial to the host-country, or those with weak fundamentals. They could also provide disincentives to the development of competitive markets and sound policies. Likewise, one could argue that while tax incentives help attract FDI inflows, the latter could generate higher total government public revenue if its indirect effect on government public revenue outweighs its direct effect through tax incentives. The indirect effect of FDI inflows on government public revenue could occur for example through its jobs creation effects. By creating jobs, FDI inflows would increase income tax revenue as well as indirect tax revenue, notably through VAT and excise tax revenue, especially if those who get new jobs increase their domestic consumption. In the event these persons increase their imports, this can also translate into higher tariff revenue for the government.

Bond and Samuelson (1986) have argued that host countries could lose some tax revenue in the short run if tax holidays were provided to attract FDI in early period. However, tax revenue could increase in the long run because foreign investment would not pull out after the tax holiday period. FDI could also influence tax revenue through the welfare effect. Dunning (1993) has observed that welfare effects of FDI in host county depend on the bargaining power of host country with foreign investors, including either by offering the tax rebates on energy or labor costs to attract foreign investment or by imposing tax. In the same vein, Raff and Srinivasan (1998) have argued that as FDI could create employment, local labor's training, transferred technology and better management skills, government should sacrifice some tax revenue to attract foreign investment inflows.

The relatively scarce evidence on the effect of FDI on taxation tends to report a positive impact of FDI on tax revenue: Gropp and Kostial (2000) have used a panel data of nineteen OECD countries and obtained a weak correlation between FDI and corporate income tax. However, they have uncovered a strong positive impact of FDI inflows on the profit tax and on the total tax revenue. Mahmood and Chaudhary (2013) have shown empirically that FDI inflows exert a positive impact on tax revenue in Pakistan. Balıkçıoğlu et al. (2016) have provided evidence that in Turkey, the impact of FDI on taxation for high-technology firms is

bigger than that of the medium or low technology firms. Brun and Gnangnon (2017) have used a sample of 125 countries over the period 1995-2012 and provided empirical evidence that while FDI inflows do not influence total government revenue over the entire sample, they do affect positively government revenue in least developed countries (LDCs), and negatively government revenue in non-LDCs.

This paper contributes to the existing literature on the link between FDI and government revenue by examining the impact of FDI inflows on total non-resource tax revenue as well as non-resource corporate tax revenue. Non-resource tax revenue refers to total tax revenue in percentage of GDP from which we subtract the resource tax revenue (i.e. the taxes collected on natural resource products). The reliance on non-resource tax revenue rather than on total government revenue or the total tax revenue is dictated by the fact that resource government revenue is largely outside the reach of economic policy. Moreover, reliance on non-resource government revenue as a dependent variable achieves much greater homogeneity than total government revenue (see Brun, Chambas and Mansour, 2015: p206).

The remaining part of the paper is organized as follows. Section 2 describes the model specification underlying our analysis and the econometric methodology to estimate this model. In section 3, we interpret empirical results. Section 4 concludes.

2. Model specification and econometric methodology

2.1 The model specification

We present here the model specification that allows us to examine empirically the impact of FDI inflows on total non-resource tax revenue (denoted "FDI") and non-resource corporate tax revenue (denoted "NRCPTAX"). Before describing this model, we find it useful to examine graphically the correlation pattern between FDI inflows (% GDP) and our two revenue variables, namely "NRTAX" and "NRCPTAX". Figure 1 presents, on the left-hand side, the correlation pattern between "FDI" and "NRTAX", and on the right-hand side the correlation pattern between "FDI" and "NRCPTAX". These two graphs clearly show the existence of a non-linear correlation pattern, in form of U-curve, between FDI inflows and non-resource corporate tax revenue, and a non-linear correlation pattern, in form of an inverted U-curve, between FDI inflows and total non-resource tax revenue.

Therefore, we present our model specification based on the previous observation of the existence of a non-linear relationship between FDI inflows and the two revenue variables. Our model specification draws on the brief literature review laid out in Section 1, as well as on the more general empirical literature on government revenue (e.g., Khattry and Rao 2002; Bahl, 2003; Brun et al., 2008; Baunsgaard and Keen, 2010; Morissey et al., 2014 and Brun, Chambas and Mansour, 2015). Therefore, we consider the following variables (apart from the variable representing FDI inflows) in our model specification: real per capita income, degree of openness to international trade; level of inflation; share of value addition in Agricultural sector in total output, and population growth rate.

We postulate the following model:

$$\begin{aligned} Log(TAX)_{it} &= \alpha_0 + \alpha_1 Log(TAX)_{it-1} + \alpha_2 Log(FDI)_{it} + \alpha_3 \left[Log(FDI)_{it}\right]^2 \\ &+ \alpha_4 Log(GDPC)_{it} + \alpha_5 Log(OPEN)_{it} + \alpha_6 Log(INFL)_{it} + \alpha_7 Log(VAAGRI)_{it} \quad (\mathbf{1}) \\ &+ \alpha_8 Log(POPGR)_{it} + \mu_i + \varepsilon_{it} \end{aligned}$$

where i represents the country's index; t denotes the annual time-period. "TAX" is the variable representing the government revenue to GDP ratio. It could be either the total non-resource tax revenue, in % GDP ("NRTAX") or non-resource corporate tax revenue, in %

GDP ("NRCPTAX"). The model has been estimated by using an unbalanced panel dataset comprising 172 countries, including both developed and developing countries, over 7 non-overlapping sub-periods of 5-years (of the entire period of 1980-2013), with the 7th sub-period covering 4 years. α_0 to α_8 are parameters to be estimated. μ_i are countries' fixed effects and the disturbance term ε_{it} is assumed to be independently and identically distributed.

"FDI" represents the share of FDI inflows, in % GDP. It is our main variable of interest. Based on the discussion provided in the introduction (Section 1) and the correlation pattern observed in Figure 1, the impact of FDI inflows on tax revenue variables could be non-linear, and remains ultimately an empirical matter.

"GDPC" represents the real per capita GDP and acts as a proxy for the country's overall level of development. It is expected to be positively relating to each of the two revenue variables, as it would reflect the fact that the demand for public services would increase with per capita income as well as with a higher degree of economic and institutional sophistication (e.g., Chelliah, 1971; Balh, 1971; Crivelli and Gupta, 2014).

"OPEN": this is the measure of a country's degree of openness to international trade. The impact of trade openness on government revenue depends on several factors (see e.g., Ebrill et al. 1999; and Agbeyegbe et al. 2006). These factors could include the extent of replacement of quantitative restrictions with tariffs, how tariff reduction affects imports, the price elasticity of demand for imports, the price elasticity of supply of import substitutes and, how exports respond to trade liberalization measures. The empirical literature has indeed found a mixed (either positive or negative) impact of trade openness on government revenue. As far as non-resource tax revenue is concerned, the few existing studies (Thomas and Treviño, 2013 and Brun, Chambas and Mansour, 2015) have reported a positive effect of trade openness on non-resource tax revenue. In this study, the expected impact of trade openness on our revenue variables remains a priori unknown and is definitely an empirical matter.

"VAAGRI" is the ratio of the value addition in the agricultural sector to the GDP. Indeed, the literature on the determinants of government revenue has underlined the importance of the sectoral composition of domestic output for government revenue mobilization. It is indeed expected that in light of the difficulties to tax agriculture, a higher share of value added in agriculture in total output would be negatively associated with tax revenue (e.g., Balh, 2003). However, other authors such as Tanzi (1992) contend that a relatively important share of agricultural sector in a country's economy could be associated with a lower need for governmental activities and services, as many public sector activities are city-based. Bird et al. (2008) argue that for political reasons, some countries exempt a large share of agricultural activities from taxes. From the empirical perspective, virtually all studies have confirmed this theoretical expectation. In light of all these, it would be difficult to argue a priori for a positive or negative impact of the ratio of value addition in the agricultural sector to GDP on our revenue variables. Nevertheless, some studies have reported a negative impact of this ratio on non-resource tax revenue.

"INFL" is the inflation rate, in percentage. Following for example see Tanzi (1977) and Tanzi (1989), we expect that high inflation would be associated with lower total non-resource tax revenue and non-resource corporate tax revenue. Ghura (1998) has argued that high

inflation rates can reduce the tax base because economic agents will adjust their portfolio in favor of assets that typically escape the domestic tax net, with a view to protecting the real value of their wealth. Inflation could also affect non-resource tax revenue through both unindexed tax systems and the generation of seigniorage (see Crivelli and Gupta, 2014).

"POPGR" is the population growth rate. A higher population growth rate could lead to lower tax revenue because in countries experiencing faster growing populations, tax systems may lag behind in their ability to capture new taxpayers (Bahl, 2003, p. 13). However, a rise in the size of population could lead to higher level of imports and higher domestic consumption if the income of the population increases. Hence, faster growing populations, even if making it difficult for the government to capture new taxpayers, may positively affect both trade tax revenue and domestic tax revenue, and consequently total non-resource tax revenue as well as non-resource corporate tax revenue. As a result, the net impact of population growth rates non-resource tax revenue as well as non-resource corporate tax revenue is a priori unknown.

It is important to note that in model (1), the Logarithm that applies to the "NRTAX", "GDPC", "OPEN", "VAAGRI" variables is the natural logarithm. For the other variables, namely "FDI", "INFL" and "POPGR", which contain negative values, we apply the following Log formula: Log(VAR) = sign(VAR)*(Log(1+abs(VAR))) (2), where "VAR" is one of these three variables. As the dependent variable "NRCORPTAX" also contains "0" values, we also transform it into Log using the Log-formula (2)**.** .

Appendix 1 describes the variables used in model (1) as well as their source. Statistics on these variables are reported in Appendices 2 and 3, while Appendix 4 displays the list of countries used in the analysis.

2.2 Econometric methodology

We estimate model (1) by means of the two-step Generalized Methods of Moments (GMM) system approach proposed by Blundell and Bond (1998). This estimator has also been used in several previous studies on the determinants of government revenue, and is well suitable for our analysis. Indeed, it helps us address several endogeneity issues associated with model (1): first, it helps address the endogeneity problem relating to the presence of the one-year lag of the dependent variable as an explanatory variable (which induces the so-called 'Nickell bias', see Nickell, 1981). Second, it helps handle the endogeneity issue stemming from the reverse causality from the dependent variable to some explanatory variables, including "FDI", "OPEN", "GDPC" and "INFL". Therefore, these four variables are considered as endogenous in the estimations of different specifications of model (1).

The validity of the two-step System GMM estimator is checked by means of three diagnostic tests: the Arellano–Bond test of first-order serial correlation (AR(1)) in the residuals and no second-order autocorrelation (AR(2)) in the residuals as well as the standard Sargan test of over-identifying restrictions, which determines the validity of the instruments used in the estimations. We also present results of the third-order serial correlation (AR(3)) in the error term. Finally, we report the number of instruments used in the regressions, because the above-mentioned diagnostics tests may lose power if the number of instruments is higher than the number of countries (e.g., Roodman, 2009).

3. Results' Interpretation

Table 1 presents the results of model (1) estimation, respectively with the dependent variable "NRTAX" (see columns [1] & [2]) and "NRCPTAX" (see columns [3] & [4]). In particular, columns [1] and [3] provide the estimates of model (1) specifications without the square term of the "FDI" variable, but where the dependent variables are respectively "NRTAX" and "NRCPTAX". In columns [2] and [4], we report the outcomes of the estimation of model (1) specifications (including with the "FDI" variable and its square term) and where the dependent variables are respectively "NRTAX" and "NRCPTAX". Across the four columns of this Table, the coefficient associated with the one-year lag dependent variable is positive and statistically significant at the 1% level. This result aligns with previous findings and suggests that government revenue exhibits a state dependence path.

Results of diagnostic tests that help assess the validity of the two-step system GMM estimator are reported at the bottom of the columns of Table 1. They suggest that the p-values associated with the AR(1) are 0, whereas the p-values relating to AR(2) and AR(3) are higher than 0.10. In addition, the p-values relating to the Sargan test are higher than 0.10. Across all columns of this table, the number of instruments is consistently lower than the number of countries. Taken together, these results suggest that the two-step system GMM is an appropriate estimator to carry out the empirical analysis.

Turning to the estimates themselves, let us consider results reported in Table 1.

Results reported in column [1] of this Table suggest that FDI inflows are positively associated with total non-resource tax revenue (as the coefficient relating to the "Log(FDI)" variable is positive and statistically significant at the 1% level of statistical significance). At the same time, results presented in column [2] of the same Table indicate that there is a non-linear impact of FDI on total non-resource tax revenue. This is exemplified by the fact that the coefficients associated with the "FDI" variable (in Logs) and its square term (also in Logs) are respectively negative and positive. In addition, both coefficients are statistical significant at the 1% level. This means that the impact of FDI inflows on non-resource tax revenue declines up to a threshold above which it becomes positive. This threshold is approximately given by the coefficient 4.43 [= exponential[0.0560/0.0376]). Put differently, when FDI inflows (% GDP) are lower than the threshold 4.43%, FDI exerts a negative impact on non-resource tax revenue. However, above this threshold, FDI inflows (% GDP) exert a positive impact on non-resource tax revenue. While they are interesting, these results do not clearly indicate whether the impact of FDI on non-resource tax revenue is non-linear and statistically significant for all levels of FDI inflows (% GDP). To better check this, we examine how the marginal impact of FDI on non-resource tax revenue evolves for different values of FDI (% GDP). It is worth recalling here that the values of FDI inflows (% GDP) reported by UNCTAD range in our panel dataset from -12.7% to 99.8%. Figure 2 provides, at the 95 per cent confidence intervals, the evolution of the marginal impact of "FDI" on "NRTAX" for different levels of FDI (% GDP). It is important to note here that the statistically significant effects at the 95 per cent confidence intervals are those encompassing only the upper and lower bounds of the confidence interval that are either above or below the zero line. The Figure indicates that the marginal impact of "FDI" on "NRTAX" could be positive or negative, with its magnitude increasing as countries experience higher levels of FDI inflows (% GDP). However, the values of this marginal impact are not always statistically significant. More specifically, this marginal effect is negative and statistically significant only for countries that experience a level of FDI (% GDP) lower than 1.49 [= exponential (0.3970766)]. Hence, countries with a level of FDI (% GDP) lower than 1.49 % GDP experience a negative and significant impact of FDI on their non-resource tax revenue. Furthermore, for these countries, the higher the level of FDI (% GDP), the lower the negative

impact of these capital inflows on their non-resource tax revenue. At the same time, countries with a level of FDI (% GDP) higher than 2.57 [= exponential (0.9445415)] enjoy a positive and significant impact of "FDI" on "NRTAX". For this set of countries, the higher the level of FDI (% GDP), the higher the positive impact of FDI inflows on non-resource tax revenue. Finally, countries whose levels of FDI (% GDP) range between 1.5% and 2.57% do not experience a statistically significant impact of these capital inflows on their non-resource tax revenue.

Let us take the last sub-period of the study, i.e., 2010-2013 and examine which countries fall in each of the categories mentioned above. We obtain that 38 countries out of 172 countries (which represent 22.1%) show an average level of FDI inflows (% GDP) lower than the threshold 1.49%. The list of these countries is reported in Appendix 5. For these countries, the impact of FDI inflows on non-resource tax revenue was negative. Over the same sub-period, in the panel dataset, 41 out of 172 countries (which represent 23.83%) experience a level of FDI inflows (% GDP) higher than 1.49%, but lower than 2.57%. According to our empirical results, these countries presented in Appendix 5 did not experience a significant impact of FDI inflows on their non-resource tax revenue. The remaining countries of the sample (93 countries, representing 54.06% of countries in the sample) enjoyed, on average, over the sub-period 2010-2013 a level of FDI inflows (% GDP) higher than 2.57%. According to our empirical analysis, these countries had experienced a positive and significant impact of FDI on their non-resource tax revenue, and the higher the level of FDI (% GDP), the higher the positive impact on their non-resource tax revenue.

We now turn to the estimates reported in columns [3] and [4] of Table 1 (outcomes of the estimation of model (1) specification with the variable "NRCPTAX" considered as the dependent variable). It could be noted from column [3] of this Table that the coefficient associated with the "Log(FDI)" variable is positive and statistically significant at the 1% level of statistical significance. This means that FDI inflows exert a (linear) positive and statistically significant impact on non-resource corporate tax revenue. In the meantime, results in column [2] suggest a positive and statistically significant (at the 1% level) coefficient for the variable "Log(FDI)", while the coefficient relating to the square term of this variable is statistically non-significant at the 10% level. This tends to suggest that, on average, the relationship between FDI inflows and non-resource tax revenue in countries of our sample is linear. However, this result may hide different impacts (linear and non-linear) of FDI inflows on non-resource corporate tax revenue for various levels of FDI inflows (% GDP). In other words, these results do not clearly show whether the impact of FDI on non-resource corporate tax revenue is non-linear and statistically significant for all levels of FDI inflows (% GDP). To check this, we present in Figure 3, at the 95 per cent confidence intervals, the pattern of the marginal effect of "FDI" on "NRCPTAX" for different levels of FDI inflows (% GDP). The Figure indicates that the marginal effect of "FDI" on "NRCPTAX" could be positive or negative, with its magnitude increasing as countries experience higher levels of FDI inflows (% GDP). However, the values of this marginal impact are not always statistically significant. In particular, it appears that only positive values of this marginal impact are statistically significant. More specifically, this marginal effect is statistically nil for countries that experience a level of FDI (% GDP) lower than 0.33 [= exponential (-1.108452)]. For this set of countries, there is no significant impact of FDI inflows on non-resource corporate tax revenue. However, countries with a level of FDI (% GDP) higher than the 0.33% threshold enjoy a positive and statistically significant impact of FDI on their non-resource corporate tax revenue. Furthermore, for these countries, the higher the level of FDI (% GDP), the higher the magnitude of its positive impact on non-resource corporate tax revenue.

In light of these empirical results of column [4], we examine which countries fall in each of the different categories of countries mentioned above during the last sub-period of the study, i.e., 2010-2013. We note that very few countries (7 countries), representing 4.06% of countries in the entire sample, had experienced a level of FDI (% GDP) lower than the threshold 0.33%. These countries include Angola, Burundi, Denmark, Japan, Papua New Guinea, Suriname, and Yemen. For the remaining 95.94% of countries, the level of FDI inflows (% GDP) is higher than 0.33%, and the higher this level, the higher the impact of FDI on non-resource corporate tax revenue in these countries.

Let turn to the empirical outcomes obtained over the control variables in columns [2] and [4]. It is worth noting that in these two columns, the magnitudes of the impact of each these control variables respectively on total non-resource tax revenue and non-resource corporate tax revenue are not similar. However, with few exceptions, the sign and statistical significant of the coefficients associated with each of these variables are similar across the two columns. Specifically, we obtain evidence that real per capita income exerts a positive and significant impact on total non-resource tax revenue as well as on non-resource corporate tax revenue. At the same time, greater openness to international trade and inflation tend to be negatively associated with total non-resource tax revenue and non-resource corporate tax revenue. The population growth rate appears to exert a non-statistically significant and a positive and significant impact, respectively on total non-resource tax revenue and non-resource corporate tax revenue. Surprisingly, we obtain a positive and significant impact of value addition in agriculture (as a share of GDP) on both total non-resource tax revenue and non-resource corporate tax revenue. Nevertheless, the results obtained over the variables capturing trade openness and the share of value addition in agriculture (% GDP) certainly hide different impacts on the revenue variables, across countries in the entire sample. However, it is not our intention to further examine this matter here, as it goes beyond the objective of the current study.

4. Conclusion

This paper contributes to the macro-public finance literature on the link between FDI and government revenue by investigating the impact of FDI inflows on both total non-resource tax revenue and non-resource corporate tax revenue. The analysis is carried out on an unbalanced panel dataset comprising 172 countries (including both developed and developing countries) over the period 1980-2013. Results suggest evidence that the impact of FDI inflows on total non-resource tax revenue and non-resource corporate tax revenue depends on the level of FDI inflows (% GDP). More specifically, the results indicate for total non-resource tax revenue that for countries with levels of FDI (% GDP) lower than 1.49%, FDI exerts a negative and significant impact on total non-resource tax revenue. For this group of countries, the higher the level of FDI (% GDP), the lower the magnitude of the negative impact of FDI on total non-resource tax revenue. At the same time, countries with levels of FDI (% GDP) higher than 2.57% enjoy a positive and significant impact of FDI inflows on total non-resource tax revenue. For each of these categories of countries, the higher the level of FDI (% GDP), the higher the positive impact of FDI inflows on non-resource tax revenue. Finally, countries whose levels of FDI (% GDP) range between 1.49% and 2.57% do not experience a statistically significant impact of these capital inflows on their non-resource tax revenue.

Turning to non-resource corporate tax revenue, the empirical analysis suggests that for countries experiencing levels of FDI inflows (% GDP) lower than 0.33%, there is no significant impact of these capital inflows on non-resource corporate tax revenue. However,

countries with FDI inflows (% GDP) exceeding the 0.33% threshold enjoy a positive and statistically significant impact of FDI on their non-resource corporate tax revenue. For this set of countries, the higher the level of FDI (% GDP), the higher the magnitude of its positive impact on non-resource corporate tax revenue.

References

Agbeyegbe, T. D., Stotsky, J. and WoldeMariam, A. (2006). Trade liberalization, exchange rate changes, and tax revenue in Sub-Saharan Africa. Journal of Asian Economics, 17(2): 261-284.

Bahl, R. W. (1971). A Regression Approach to Tax Effort and Tax Ratio Analysis. International Monetary Fund Staff Paper, 18, 570-612.

Bahl, R. W. (2003). Reaching the Hardest to Tax: Consequences and Possibilities. Paper presented at the 'Hard to Tax: An International Perspective' conference, Andrew Young School of Policy Studies, Georgia State University, May 15-16.

Balıkçıoğlu, E., Dalgıc, B., and Fazlıoğlu, B. (2016). Does Foreign Capital Increase Tax Revenue: The Turkish Case. International Journal of Economics and Financial Issues, 6(2), 776-781.

Baunsgaard, T., and Keen, M. (2010). Tax Revenue and (or?) Trade Liberalization. Journal of Public Economics, 94(9-10), 563 – 577.

Bellak, C., Leibrecht, M., and Stehrer, R. (2009). "The role of public policy in closing foreign direct investment gaps: An empirical analysis" in *Y. Wolfmayr-Schnitzer (Ed.), Empirica*, Special Issue on FDI Policies, 37, 19–46.

Bird, R. M., Martinez-Vazquez, J. and Torgler, B. (2008). Tax Effort in Developing Countries and High Income Countries: The Impact of Corruption, Voice and Accountability, Economic Analysis and Policy, 38(1), 55-71.

Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data equations. Journal of Econometrics, 87, 115–143.

Bond, E. and Samuelson, L. (1986). Tax Holidays as Signals. American Economic Review, 76, 820-826.

Brun, J-F., Chambas, G., and Guerineau, S. (2008). Aide et Mobilisation Fiscale dans les Pays en Voie de Développement, CERDI, Etudes et Documents, E 2008.12. <halshs-00556804>

Brun J.F., Chambas, G., and Mansour, M. (2015). "Tax Effort of Developing Countries: An Alternative Measure", in *Financing Sustainable Development Addressing Vulnerabilities*, Chapter 11. Edited by Boussichas, M., and Guillaumont, P., Economica. FERDI.

Brun, J.F., and Gnangnon, S.K. (2017). Does Trade Openness Contribute to Driving Financing Flows for Development? WTO Working Paper, ERSD-2017-06, World Trade Organization, Geneva, Switzerland.

Chelliah, R. J. (1971). Trends in Taxation in Developing Countries. IMF Staff Papers, 18, 254-332.

Crivelli, E. and Gupta, S. (2014). Resource blessing, revenue curse? Domestic revenue effort in resource-rich countries. European Journal of Political Economy, 35, 88–101.

Dunning, J.H. (1993). "MNEs, the Balance of Payments and the Structure of Trade", In: Dunning, J.H. (ed.). Multinational Enterprises and the Global Economy. Addison Wesley, Wokingham, UK and Reading, MA.

Ebrill, L., Stotsky, J. and Gropp, R. (1999). Revenue implications of trade liberalization, Occasional Paper, 180. International Monetary Fund, Washington, DC.

Ghura, H. (1998). Tax Revenue in sub-Sahara Africa: Effects of economic policies and corruption. International Monetary Fund (WP/98/135. Washington D.C).

Gropp, R. and Kostial, K. (2000). The Disappearing Tax Base: Is Foreign Direct Investment Eroding Corporate Income Taxes? IMF Working Paper WP/00/173. International Monetary Fund, Washington, D.C.

Khattry, B., and Rao, M. (2002). Fiscal Faux Pas?: An Analysis of Revenue Implication of Trade Liberalization. World Development, 30(8), 1431-1444.

McLure, C.E. (1999). Tax Holidays and Investment Incentives; A Comparative Analysis. Bulletin for International Fiscal Documentation, 53, 326-339.

Mahmood, H., and Chaudhary, A.R. (2013). Impact of FDI on tax revenue in Pakistan. Pakistan Journal of Commerce and Social Science, 7(1), 59-69.

Morisset, J., and Pirnia, N. (2000). How tax policy and incentives affect foreign direct investment: A Review. Vol. 2509, World Bank Publications.

Morrissey, O., Prichard, W. and Torrance, S. (2014). Aid and Taxation: Exploring the Relationship Using New Data, ICTD Working Paper 21, Brighton: International Centre for Tax and Development.

Nickell, S. (1981). Biases in Dynamic Models with Fixed Effects. Econometrica, 49(6), 1417–1426.

Raff, H. and Srinivasan, K. (1998). Tax Incentives for Import-Substituting Foreign Investment: Does Signaling Play a Role? Journal of Public Economics, 67, 167–193.

Roodman, D. M. (2009). A note on the theme of too many instruments. Oxford Bulletin of Economic and Statistics, 71 (1), 135–158.

Tax Justice Network (2012). Tax competition in East Africa: A race to the bottom. available from:<http://www.actionaidusa.org/sites/files/actionaid/eacreport.pdf>. [28 January 2015]

Tanzi, V. (1977). Inflation, Lags in Collection, and the Real Value of Tax Revenue. Staff Papers. International Monetary Fund, 26, 154-67, Washington D.C.

Tanzi, V. (1989). The impact of macroeconomic policies on the level of taxation and fiscal balance in developing countires,‘ IMF Staff Papers(36): 633-656, Washington, DC.

Tanzi, V. (1992) "Structural Factors and Tax Revenue in Developing Countries: A Decade of Evidence", in *I. Goldin and L. A. Winters (eds.), Open Economies: Structural Adjustment and Agriculture*. Cambridge: Cambridge University Press: 267-281.

Thomas, A., and Treviño, J.P. (2013). Resource Dependence and Fiscal Effort in Sub-Saharan Africa. IMF Working Paper, WP/13/188, International Monetary Fund, Washington, DC.

UNCTAD (2007). World Investment Report: Transnational Corporations, Extractive Industries and Development. New York and Geneva: United Nations.

TABLE

Table 1: Impact of FDI inflows on government revenue_ Entire Sample
Estimator: Two-Step System GMM

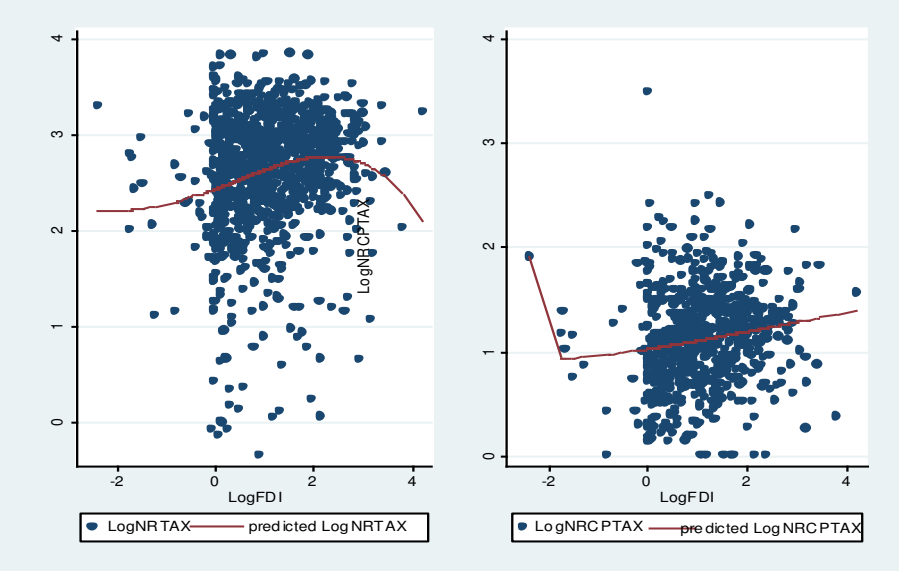
VARIABLES	Log(NRTAX)	Log(NRTAX)	Log(NRCPTAX)	Log(NRCPTAX)
	(1)	(2)	(3)	(4)
One-year lag of the dependent variable	0.729***	0.749***	0.598***	0.586***
	(0.0198)	(0.0147)	(0.0134)	(0.00902)
Log(FDI)	0.0524***	-0.0560***	0.0774***	0.0511***
	(0.0107)	(0.0180)	(0.00803)	(0.0110)
$[Log(FDI)]^2$		0.0376***		0.00677
		(0.00641)		(0.00429)
Log(GDPC)	0.0246	0.0343***	0.0778***	0.0864***
	(0.0194)	(0.0128)	(0.0162)	(0.0126)
Log(OPEN)	-0.0710***	-0.0378**	-0.0788***	-0.0700***
	(0.0252)	(0.0184)	(0.0215)	(0.0143)
Log(INFL)	-0.0366***	-0.0491***	-0.0347***	-0.0382***
	(0.00630)	(0.00493)	(0.00664)	(0.00537)
Log(VAAGRI)	0.00844	0.0531***	0.0255	0.0563***
	(0.0198)	(0.0123)	(0.0209)	(0.0124)
POPGR	0.0139*	0.00667	0.0460***	0.0353***
	(0.00791)	(0.00696)	(0.00664)	(0.00437)
Constant	0.814***	0.526***	0.00680	-0.117

	(0.217)	(0.139)	(0.214)	(0.153)
Observations-Countries	797-172	797-172	509-172	509-172
Number of Instruments	93	112	103	123
AR1 (P-Value)	0.0004	0.0003	0.0003	0.0002
AR2 (P-Value)	0.3676	0.3526	0.3766	0.3915
AR3 (P-Value)	0.4576	0.4832	0.2903	0.3207
Sargan (P-Value)	0.1715	0.4352	0.1447	0.2231

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step GMM system estimations, the variables "FDI", its square "OPEN", "GDPC" and "INFL" have been considered as endogenous. The variable "VAAGRI" and "POPGR" have been considered as exogenous.*

FIGURES

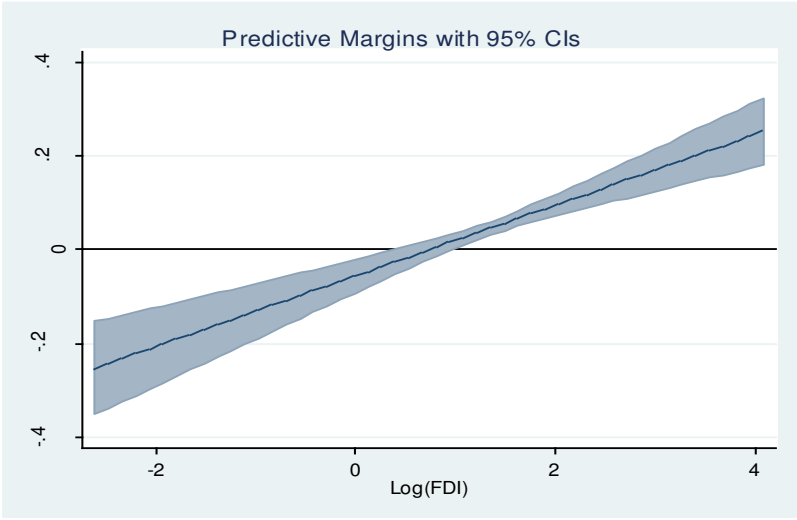
Figure 1: Correlation pattern between "FDI", "NRTAX" and "NRCPTAX"



Source: Author

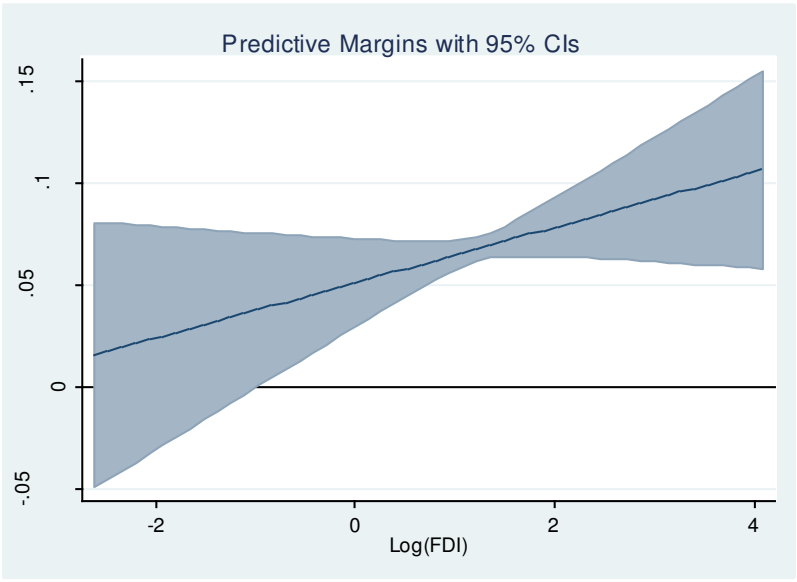
Note: *In these two graphs, LogNRTAX = Log(NRTAX); LogNRCPTAX = Log(NRCPTAX); LogFDI = Log(FDI).*

Figure 2: Marginal impact of "FDI" on "NRTAX", for varying levels of FDI (% GDP)



Source: Author

Figure 3: Marginal impact of "FDI" on "NRCPTAX", for varying levels of FDI (% GDP)



Source: Author

APPENDICES

Appendix 1: Description and source of variables used in the analysis

Variable	Definition	Source
NRTAX	This is the variable representing the total government revenue, excluding grants and social contributions, in % GDP.	ICTD Government Revenue Dataset. See online: http://www.ictd.ac/index.php/dataset#core-dataset

NRCORPTAX	Non-resource Corporate and other enterprises Tax Revenue, in % GDP	ICTD Government Revenue Dataset. See online: http://www.ictd.ac/index.php/dataset#core-dataset
FDIGDP	Inward FDI, in percentage of Gross Domestic Product	UNCTAD 2017 Database
OPEN	Level of trade openness, measured by the sum of exports and imports, in % GDP	WDI, 2017
GDPC	Real GDP per capita (constant 2010 US$)	WDI, 2017
VAAGRI	Agriculture, value added (% of GDP)	WDI, 2017
INFL	Inflation: it is measured by consumer prices (annual %); we replace here missing values by data on GDP deflator (annual %)	WDI, 2017
POPGR	Population Growth Rate (%)	WDI, 2017

Appendix 2: Standard descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
NRTAX	1,062	16.200	7.925	0.708	47.209
NRCORPTAX	726	2.425	1.946	0.000	31.699
FDI	1,153	3.336	5.624	-12.653	99.811
GDPC	1,115	10287.050	15179.550	149.756	103879.800
VAAGRI	1,016	16.838	14.321	0.038	60.997
OPEN	1,104	84.181	52.384	0.218	446.354
POPGR	1,202	1.594	1.326	-3.768	8.669
INFL	1,137	49.613	335.703	-23.822	6424.987

Appendix 3: Pairwise correlation among variables used in the analysis

	NRTAX	NRCORPTAX	FDI	GDPC	VAAGRI	OPEN	POPGR	INFL
NRTAX	1.0000							
NRCORPTAX	0.4481*	1.0000						
FDI	0.0886*	0.0841*	1.0000					
GDPC	0.4811*	0.2136*	0.1241*	1.0000				
VAAGRI	-0.5012*	-0.2486*	-0.2110*	-0.5489*	1.0000			
OPEN	0.1177*	0.1281*	0.5005*	0.2122*	-0.3324*	1.0000		
POPGR	-0.5059*	-0.2331*	-0.0712*	-0.2741*	0.3717*	-0.0458	1.0000	
INFL	-0.0626*	-0.0086	-0.0535*	-0.0713*	0.0896*	-0.0456	-0.0007	1.0000

*Note: *p-value<0.1.*

Appendix 4: List of countries used in the analysis

Countries in the Sample			
Afghanistan	Cyprus	Kuwait	Russian Federation
Albania	Czech Republic	Kyrgyz Republic	Rwanda
Algeria	Denmark	Lao PDR	Saudi Arabia
Angola	Djibouti	Latvia	Senegal
Antigua and Barbuda	Dominica	Lebanon	Serbia
Argentina	Dominican Republic	Libya	Seychelles
Armenia	Ecuador	Lithuania	Sierra Leone
Aruba	Egypt, Arab Rep.	Luxembourg	Singapore
Australia	El Salvador	Macedonia, FYR	Slovak Republic
Austria	Equatorial Guinea	Madagascar	Slovenia
Azerbaijan	Eritrea	Malawi	Solomon Islands
Bahamas, The	Estonia	Malaysia	South Africa
Bahrain	Ethiopia	Maldives	Spain
Bangladesh	Fiji	Mali	Sri Lanka
Barbados	Finland	Malta	St. Kitts and Nevis
Belarus	France	Mauritania	St. Lucia
Belgium	Gabon	Mauritius	St. Vincent and the Grenadines
Belize	Gambia, The	Mexico	Sudan
Benin	Georgia	Moldova	Suriname
Bhutan	Germany	Mongolia	Swaziland
Bolivia	Ghana	Montenegro	Sweden
Bosnia and Herzegovina	Greece	Morocco	Switzerland
Botswana	Grenada	Mozambique	Tajikistan
Brazil	Guatemala	Myanmar	Tanzania
Brunei Darussalam	Guinea	Namibia	Thailand
Bulgaria	Guinea-Bissau	Nepal	Timor-Leste
Burkina Faso	Guyana	Netherlands	Togo
Burundi	Honduras	New Zealand	Tonga
Cambodia	Hong Kong SAR, China	Nicaragua	Trinidad and Tobago
Cameroon	Hungary	Niger	Tunisia
Canada	Iceland	Nigeria	Turkey
Cape Verde	India	Norway	Uganda
Central African Republic	Indonesia	Oman	Ukraine
Chad	Iran, Islamic Rep.	Pakistan	United Kingdom
Chile	Ireland	Palau	United States
China	Italy	Panama	Uruguay
Colombia	Jamaica	Papua New Guinea	Uzbekistan
Comoros	Japan	Paraguay	Vanuatu
Congo, Dem. Rep.	Jordan	Peru	Venezuela, RB
Congo, Rep.	Kazakhstan	Philippines	Vietnam
Costa Rica	Kenya	Poland	Yemen, Rep.
Cote d'Ivoire	Kiribati	Portugal	Zambia
Croatia	Korea, Rep.	Romania	Zimbabwe

Appendix 5: Categories of countries per level of FDI (with different impacts of FDI on Non-Resource Tax Revenue)

List of Countries for which the level of FDI (% GDP) is lower than 1.49%	**List of Countries for which the level of FDI (% GDP) is higher than 1.49%, but lower than 2.57%**
Afghanistan	Argentina
Algeria	Austria
Angola	Azerbaijan
Bangladesh	Bahrain
Burundi	Bhutan
Cote d'Ivoire	Bosnia and Herzegovina
Denmark	Burkina Faso
Ecuador	Cameroon
El Salvador	Canada
Ethiopia	Central African Republic
Finland	China
France	Comoros
Germany	Croatia
Greece	Czech Republic
Iran, Islamic Rep.	Egypt, Arab Rep.
Italy	Eritrea
Japan	Guatemala
Kenya	Guinea-Bissau
Kiribati	India
Korea, Rep.	Indonesia
Kuwait	Jamaica
Libya	Lithuania
Nepal	Malawi
New Zealand	Mexico
Pakistan	Netherlands
Palau	Nigeria
Papua New Guinea	Oman
Philippines	Paraguay
Slovenia	Poland
South Africa	Portugal
Sri Lanka	Romania
Suriname	Senegal
Sweden	Slovak Republic
Timor-Leste	Spain
United States	Swaziland
Venezuela, RB	Switzerland
Yemen, Rep.	Tajikistan
	Thailand
	Turkey
	United Kingdom
	Uzbekistan