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**International Center for Public Policy
Working Paper 19-04
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**April
2019**

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Comparative Studies of Cross-border M&A and Greenfield Investments in Response to Changes in Tax Regulation and Administration of Host Economies

Gohar S. Sedrakyan¹

April 2019

Abstract

We study and compare the impact of tax indicators, described by Paying Taxes scores of Doing Business report, on two modes of FDI in equity capital- greenfield FDI and cross-border mergers and acquisitions (M&As). Then, we apply 25 percent improvement to each tax factor and evaluate this effect on inbound flow of FDI determinants. The study compares four methods-the ordinary least squares, random-effects, fixed-effects, and Hausman-Taylor models- applied to the panel data for one hundred sixty countries for the period from 2009 to 2017. The consummate range of Hausman-Taylor tools when applied to studies of panel datasets with time-varying, time-invariant and endogenous parameters of tax administration reveals the divergence among the factors appealing to M&A and greenfield investors. The study assesses the higher sensitivity of M&A to the factors of economic development, overall business friendliness and location of a potential host economy. The countries at the lower end of GDP per capita performance are more likely to attract foreign direct investments, if the message about the domestic reforms in tax regulations and administration targets greenfield investors.

Keywords: foreign direct investments (FDI), greenfield FDI, cross-border mergers and acquisitions (M&As), tax administration, tax regulations, Hausman-Taylor method

JEL classification: H3, F37; F38, G34

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1. Introduction

The existing literature contains comparatively limited volume of papers studying the effective performance of tax administration and regulation as a tool for enhancement of foreign direct investments (FDI) inflows to destination (host) economies as well as contemplating this relation from the perspective of new investments in equity capital, particularly cross-border mergers and acquisitions (M&A) and greenfield investments. Meanwhile, the debate concerning the depth of reforms to reevaluate tax regulation and administration in exchange for possibilities of substantial increases in foreign direct investments has become essential in developing and transition economies because many of these countries view FDIs as the main path in achieving economic development (Mencinger, 2003; Wang and Wong, 2009).

The objective of this analysis is to investigate the nexus between the determinants of tax regulation and administration, quantitatively evaluated and ranked by the Doing Business report, and inflows of foreign direct investments (World Bank, 2018; UNCTAD, 2018). The study also compares the divergence in the set of fiscal factors in terms of appeal to the M&A versus greenfield investments. While the Doing Business reports are available throughout 2019, and paying taxes topic of this report is available from 2004 onward, we choose the reports for the period from 2009 to 2017, corresponding with the current span of economic recovery and the latest available data on FDI. This study focuses on 160 economies.

First, this work investigates the effects of tax regulation and administration practices on FDI inflows. In general, FDI inflows consist of three main components: equity capital, reinvestment of earnings and intercompany debt (OECD, 2016). Then, the paper studies the same effects on two components of equity capital: greenfield investments and M&A. The countries, in which FDIs are viewed not only as a source of inward capital but also an opportunity for

diversifying domestic operations and enhancing the skills of domestic labor force, regard greenfield investments more favorably, due to the latter's business concept of building the operations from ground up as a new enterprise. The M&A transactions are usually conducted in the form of the parent company taking over or investing in some form of purchase of a business entity in a host economy usually accompanied by the change of management and/or operations of acquired firm (Blonigen and Slaughter, 2001; Wang and Wong, 2009).

The Hausman-Taylor model (HTM) along with random-effects, fixed-effects and ordinary least square methodologies is applied and the comparison of utilized methodologies determines advantages of HTM for studies of panel datasets with combination of time-varying, time-invariant and endogenous factors as explanatory variables. The latter methodology is also used for evaluating the impact of a hypothetical assumption of 25-percent improvement in each of the studied tax measurements on the FDI determinants.

The contribution of this study is significant in the following ways. A comparative study of M&A and greenfield investments determined through tax indicators is a fresh angle for a sought-after topic of FDI. The strategy of choosing tax performance determinants with estimated low multicollinearity coefficients has made this study possible. This paper puts forward a new perspective that the multinationals, when making decisions about inbound FDIs, respond more favorably to the potential host economies, which implement relevant reforms of tax administration, than the ones, which offer tax reductions.

This paper is structured as follows. Section 2 offers a brief review of the literature. Section 3 discusses the data used in the study. In Section 4, an empirical model with the econometric strategy is presented. Section 5 offers discussion of the main results, and Section 6 offers policy implications. Section 7 summarizes and concludes the analysis.

2. Literature Review

The vast economic literature studying the effects of FDI on the economies of host countries, particularly of developing or transition economies, suggests that foreign direct investments are viewed as an essential factor in the enhancement of economic development (Mencinger, 2003; Wang and Wong, 2009). The reports from international organizations, OECD and World Bank, also highlight the notion of developing countries to consider FDI as the primary source of economic growth and modernization (OECD, 2002; Klein et al., 2001). Therefore, the governments of these countries, being ready for negotiations, may encumber significant costs by lowering tax rates or relaxing regulatory standards associated with the attraction of new investments. The described practice is known as tax competitions and sometimes referred as “the race to the bottom” (Carkovic and Levine, 2002; Ford et al., 2008; Olney, 2013; Hanson, 2001).

Two main groups of thought can be defined when summarizing the literature on the relation of tax determinants and inbound FDI flows. On the one hand, a vast literature studies the impact of tax ratios on FDI and assesses a reverse relation between the changes in tax ratios and FDI inflows, where a reduction in tax rate, particularly of corporate income tax, may increase the inbound FDI (Bellak and Leibrecht, 2009; Devereux et al., 2008). Herein, Becker et al. (2012) measure the effects of changes in corporate tax on the quality and quantity of foreign direct investments. Their study of twenty-two European countries concludes that the governments should vigilantly consider not only the level of FDI inflow, but also the qualitative implications that each inbound unit of capital may have on both, the income tax base and labor income.

On the other hand, a smaller group studies the topics closely associated with the specifics of tax administration and its complexity (Dharmapala and Hines, 2009; Lawless, 2011; Martinez-Vazquez and Vulovic, 2011; Goodspeed et al., 2011). Lawless in 2011 analyzes the relation of FDI and tax systems by means of bilateral FDI relations between sixteen OECD FDI source countries and fifty-seven host economies and finds that tax complexity does not have strong implications on the level of FDI inflow. Her study also estimates that 10 percent reduction in tax complexity corresponds with the tax reduction by 1 percentage point.

3. Data

3.1 Independent variables

3.1.a Tax determinants

This discussion first addresses the independent variables followed by dependent variables used in the study. The control variables measuring different aspects of effective tax performance are adopted from the Paying taxes topic of the Doing Business ranking. The Doing Business report, produced as a collaboration of the World Bank and PwC (PricewaterhouseCoopers), is an unprecedented statistical tool for comparison of economies through a range of business related indicators estimated on yearly basis. It consists of ten main indicators of public sector performance, comprised of forty-one subgroups, and describes performance of 190 economies.

From the Doing Business report we choose three variables of effective tax rates that would typically be considered as determinants of tax regulation (CIT, labor tax and contributions, and other taxes) and five variables representing various aspects of tax administration (annual number of payments, time to complete tax returns, time to obtain VAT refund, number of cases for CIT audit, and time to comply with CIT audit). Based on the Doing

Business methodology the aforementioned factors represent typical conditions for medium-sized enterprises operating in a given economy at the second year of operations. For instance, the official statistics from Small Business Administration (2018) suggests that in the United States only about 79 percent of new businesses survive first year of launching and approximately 50 percent of firms fail at the fifth year of operations. Thus, the odds of first-year business survival in developing and transition economies would arguably be much lower due to more moderate business sustainable infrastructures. In addition, Tomson and Spinelli (2009) address the concept of “the liability of newness and liability of smallness” of the business launching stage, which also integrates learning curve of business related operations, including paying taxes and complying with tax bureaucracy. With this consideration of the U-shape business life-cycle combined with the common notion of governments to provide short-term incentives in the launching stage and to impose more complex compliance rules for large enterprises, we feel comfortable using Doing Business data of enterprises operating at the second year of operations, since it would be representative of the small and medium-sized enterprises at their comparatively steady stage of operations. The descriptive statistics of the variables used in the research is compiled in Table 1.

All tax variables represent effective tax rates (not statutory) calculated as a ratio of the cost of an individual tax to the commercial profit (World Bank, 2018; Djankov et al., 2010). In regard to some outliers in the data set, the min $[-0.2]$ in *profit tax rate (% of profit)* for France in 2016 is due to the method of estimation in the data source. The ratio of *other taxes as % of profit* exceeding 100% is linked with the following countries: Argentina for the period of 2015-2016, Burundi 2009-2011, Central African Republic 2009-2011, Comoros 2009-2017, Democratic Republic of Congo 2009-2013, the Gambia 2009-2014, and Sierra Leone 2009-2011.

Table 1. Descriptive statistics

Variables	Units	Mean	S.D.	Min	Max	Source
Dependent Variables						
FDI inflow	USD million	8,667.81	28,438.4	-12,390.36	465,765.00	UNCTAD
Cross-border M&A	USD million	3,008.60	18,183.36	-55,040.07	362,878.10	
Greenfield FDI	USD million	4,685.67	11,139.01	0	108,940.70	
Independent Variables						
<i>Tax Determinants</i>						
Payments	Number of payments per year	29.10	19.40	3	147	DOING BUSINESS REPORT
Time	Hours per year	278.07	246.49	12	2600	
Corporate Income Tax (CIT)	% of profit	16.01	9.38	-0.2	58.9	
Labor Tax & Contributions	% of profit	17.61	11.44	0	68	
Other taxes	% of profit	12.13	33.52	0	272.3	
Time to obtain VAT refund	Weeks	48.36	39.48	0	100	
Cases for CIT audit	Quartile of cases	2.6	0.95	0	4	
Time to comply with CIT audit	Hours per year	13.11	16.68	0	96	
<i>Other Control Variables</i>						
Ease of doing business	Score	59.81	13.12	22.49	90.87	
Regions	Range	9.06	5.51	1	18	UNCTAD
GDP per capita	USD million	13,705.26	18,899.16	213.41	108,600.90	WDI & WITS
Number of observations	1,440	Number of groups		160		

In order to get a more balanced dataset, the score for the explanatory variable *time (in weeks) to obtain VAT refund* is merged with two other measures provided in the Paying Taxes report- the indicator estimating whether VAT exists in a given economy and another one

measuring VAT refund process per each case. Basically, these three variables are logically combined, assigning to the cases with VAT and no refund practices the highest value of 100 assuming the most unfavorable terms for FDI. The cases with no VAT and no refund practices receive a 0 score, therefore assuming the most favorable conditions for FDI. Before these modifications, the score for the variable ranged [2.2; 90] weeks, with lower scores describing better VAT refund practices with the lowest in Sri Lanka. The countries with no VAT practices and, therefore, assigned 0 score include Angola, Bahrain, Bhutan, Comoros, Eritrea, Iraq, Kuwait, Liberia, Oman, Qatar, São Tomé and Príncipe, Saudi Arabia, South Sudan, the United Arab Emirates and the United States.

The variable defining CIT administration performance, *the percentage of cases exposed to a corporate income tax audit (%)*, is also modified to a more useful format for the current model. Thus, the indicator is reported as a quartile with the lowest surveillance practices being in [0%; 24%] quartile and the highest ones in [75%; 100%] quartile, creating four indices. Since, there are also countries that do not levy CIT, such as the Bahamas, Bahrain, Kuwait, Qatar, the United Arab Emirates, a score 0 is assigned to this countries summarizing the most favorable CIT practices (no tax) for FDI. Overall this variable takes the values in the range [0; 4].

The factor of the *time to comply with a corporate income tax audit* is slightly modified by adding a score 0 assigned to the aforementioned countries which do not levy CIT.

3.1.b Other control variables

The existing literature finds the level of institutional development and government infrastructure, particularly of legal institutions in securing property rights and intellectual property, being determinants for FDI inflows (Globerman and Shapiro, 2002). We use the *ease of doing business* variable to control for a set factors contributing in a business friendly

environment of an economy. This variable is extracted from the Doing Business report where higher scores correspond with more business friendly conditions. This indicator captures a set of ten characteristics necessary to conduct business, including starting a business, registering property, getting credit, protecting minority rights, enforcing contracts, resolving insolvency, and other. The lack of data for earlier periods is compensated by a small modification of replacing the missing information with the last available value for a case.

The literature suggests that one of the most popular explanatory variables of a country's propensity to attract FDI, specifically for studies of developing countries, is the size of its economy, such as GDP, population, GDP per capita, and GDP growth (Wheeler and Moody, 1992; Taylor, 2000; Nunnenkamp, 2002; Hansen and Rand, 2006). In this analysis we use *annual GDP per capita* in the US dollars and constant prices of 2010 retrieved from the World Development Indicators and World Integrated Trade Solutions databases, both published by the World Bank.

The control variable *Regions* follows the classification of economies used by the UNCTAD report (Table 2). This variable is used to control for the regional effect and, in the current case, is comprised of 18 distinct regions.

3.2 Dependent variables

This study focuses on three dependent variables which determine the levels of annual FDI in a host economy. We start with the *FDI inflows*, which, according to OECD (2016), consist of three main components, including equity capital, reinvestment of earnings, and intercompany debt. Then, the analysis proceeds with the comparison of two types of FDI in

Table 2. List of Countries included in the study and grouped by regions

Country	UN regional distribution	Country	UN regional distribution	Country	UN regional distribution	Country	UN regional distribution	Country	UN regional distribution
Austria	EU	United States	N. America	Congo, Dem. Rep.	C. Africa	Bhutan	South Asia	El Salvador	C. America
Belgium	EU	Australia	ODEC	Congo, Rep.	C. Africa	India	South Asia	Guatemala	C. America
Bulgaria	EU	Israel	ODEC	Equatorial Guinea	C. Africa	Iran, Islamic Rep.	South Asia	Honduras	C. America
Croatia	EU	Japan	ODEC	Gabon	C. Africa	Maldives	South Asia	Mexico	C. America
Cyprus	EU	New Zealand	ODEC	Rwanda	C. Africa	Nepal	South Asia	Nicaragua	C. America
Czech Rep.	EU	Algeria	N. Africa	São Tomé and Príncipe	C. Africa	Pakistan	South Asia	Panama	C. America
Denmark	EU	Egypt, Arab Rep	N. Africa	Angola	East Africa	Sri Lanka	South Asia	Antigua and Barbuda	Caribbean
Estonia	EU	Morocco	N. Africa	Djibouti	East Africa	Bahrain	West Asia	Bahamas, The	Caribbean
Finland	EU	South Sudan	N. Africa	Eritrea	East Africa	Iraq	West Asia	Barbados	Caribbean
France	EU	Sudan	N. Africa	Ethiopia	East Africa	Jordan	West Asia	Dominica	Caribbean
Germany	EU	Tunisia	N. Africa	Kenya	East Africa	Kuwait	West Asia	Dominican Rep.	Caribbean
Greece	EU	Benin	W. Africa	Madagascar	East Africa	Lebanon	West Asia	Grenada	Caribbean
Hungary	EU	Burkina Faso	W. Africa	Mauritius	East Africa	Oman	West Asia	Haiti	Caribbean
Ireland	EU	Cabo Verde	W. Africa	Seychelles	East Africa	Qatar	West Asia	Jamaica	Caribbean
Italy	EU	Côte d'Ivoire	W. Africa	Tanzania	East Africa	Saudi Arabia	West Asia	St. Lucia	Caribbean
Latvia	EU	Gambia, The	W. Africa	Uganda	East Africa	Turkey	West Asia	Trinidad and Tobago	Caribbean
Lithuania	EU	Ghana	W. Africa	Botswana	S. Africa	United Arab Emirates	West Asia	Albania	S-E Europe
Luxembourg	EU	Guinea	W. Africa	Eswatini (Swaziland)	S. Africa	Yemen, Rep.	West Asia	Bosnia and Herzegovina	S-E Europe
Malta	EU	Guinea-Bissau	W. Africa	Lesotho	S. Africa	Argentina	S. America	Macedonia, FYR	S-E Europe
Netherlands	EU	Liberia	W. Africa	Malawi	S. Africa	Bolivia	S. America	Montenegro	S-E Europe
Poland	EU	Mali	W. Africa	Mozambique	S. Africa	Brazil	S. America	Serbia	S-E Europe
Portugal	EU	Mauritania	W. Africa	Namibia	S. Africa	Chile	S. America	Armenia	CIS
Romania	EU	Niger	W. Africa	South Africa	S. Africa	Colombia	S. America	Azerbaijan	CIS
Slovak Rep.	EU	Nigeria	W. Africa	Zambia	S. Africa	Ecuador	S. America	Belarus	CIS
Slovenia	EU	Senegal	W. Africa	Zimbabwe	S. Africa	Guyana	S. America	Georgia	CIS
Spain	EU	Sierra Leone	W. Africa	China	East Asia	Paraguay	S. America	Kazakhstan	CIS
Sweden	EU	Togo	W. Africa	Korea, Rep.	East Asia	Peru	S. America	Kyrgyz Republic	CIS
United Kingdom	EU	Burundi	C. Africa	Indonesia	S-E Asia	Suriname	S. America	Moldova	CIS
Iceland	ODE	Cameroon	C. Africa	Philippines	S-E Asia	Uruguay	S. America	Russian Federation	CIS
Norway	ODE	Cent. African Rep.	C. Africa	Singapore	S-E Asia	Venezuela, RB	S. America	Tajikistan	CIS
Switzerland	ODE	Chad	C. Africa	Vietnam	S-E Asia	Belize	C. America	Ukraine	CIS
Canada	N. America	Comoros	C. Africa	Bangladesh	South Asia	Costa Rica	C. America	Uzbekistan	CIS

EU-European Union, ODE-Other Developed Europe, N. America-North America, ODEC-Other Developed Economies, N. Africa-North Africa, C. Africa-Central Africa, S. Africa-Southern Africa, S-E Asia-South-East Asia, C. America-Central America, S-E Europe-South-East Europe, CIS-Commonwealth of Independent States
Source: UN Conference on Trade and Development report, 2018

equity capital- *cross-border mergers and acquisitions* (M&A) and *greenfield FDI*. The UNCTAD online database is used as a source for compiling the data on all three dependent variables for the period from 2009 to 2017, corresponding with the start of the current economic cycle and the latest available data on FDI. All FDI related variables that are equal to zero are treated as valid cases, owing to the assumption and further testing the concept that poorly performing tax systems may negatively impact MNEs' (multinational enterprises) decisions to invest and, therefore, not generate FDI. Following the existing studies of the nexus between FDI and GDP, current analysis uses logarithmic values applied to all determinants of FDI and GDP (Globerman and Shapiro, 2002; Gao, 2005).

Since the main intention of this analysis is to define the impact of a tax performance determinant, while others being controlled, on the decision of MNEs to proceed with investments in host economies, we conduct VIF test to assess the threat of multicollinearity among the explanatory variables (after the OLS being applied). According to the literature, the estimates for considered variables are within the acceptable range and no threat of multicollinearity is detected (Hair et al., 2010) (Table 3).

Table 3. VIF test for multicollinearity of control variables

Variable	VIF*	1/VIF
Ease of doing business	3.29	0.303757
lnGDP	2.96	0.337308
Payments	1.69	0.592214
Time to comply with CIT audit	1.62	0.617660
Cases for CIT audit	1.62	0.618489
Time to obtain VAT refund	1.60	0.626075
Labor tax & contributions rate	1.43	0.700092
Time	1.34	0.746032
Regions	1.26	0.794200
Other taxes	1.20	0.831408
Profit tax	1.19	0.841259
Mean VIF	1.75	

*VIF-variance inflation factor test for multicollinearity, for $VIFs \in [1; 5]$ suggesting insignificant or moderate correlation and no further actions for corrective measures.

Similarly, Pearson correlation matrix assesses the usefulness of this set of tax performance determinants for proceeding with the methodology (Table 4).

Table 4. Pearson correlation matrix

	Easeofdoin~b	Payments	Time	Profit~x	Labort~s	Othert~s	Timeto~d	casesf~t	Timeto~t	Regions	lnGDPp~p
Easeofdoin~b	1.0000										
Payments	-0.6083	1.0000									
Time	-0.3185	0.2258	1.0000								
Profittax	-0.0803	0.0432	0.0398	1.0000							
Labortaxan~s	0.0911	-0.0482	0.2242	-0.3095	1.0000						
Othertaxes	-0.3491	0.1804	0.0879	-0.0341	-0.0977	1.0000					
Timetoobta~d	-0.4677	0.3648	0.3904	0.0860	0.1199	0.2053	1.0000				
casesforCI~t	-0.2200	0.1065	0.1026	0.1411	-0.0741	0.1102	0.1037	1.0000			
Timetocomp~t	-0.2496	0.0861	0.1964	0.0194	-0.0402	0.0247	0.1091	0.5728	1.0000		
Regions	-0.2237	0.2537	0.1542	0.0367	-0.2453	-0.0009	0.2748	0.0551	0.0986	1.0000	
lnGDPpercap	0.7797	-0.5522	-0.2175	-0.1448	0.1831	-0.2979	-0.4637	-0.2740	-0.1896	-0.2529	1.0000

4. Methodology

This section describes the empirical strategy used to evaluate the impact of the determinants of tax performance discussed in the previous section on variables measuring FDI inflows, M&A and greenfield investments. The following models- OLS, Fixed-effects, Random-effects and Hausman-Taylor- are applied and compared in terms of effectiveness of built-in tools necessary for the examined dataset.

The OLS regression is given by Eq. (1).

$$Y_{it} = \alpha_0 + \beta'X_{it} + \gamma'Z_i + \varepsilon_{it} \quad [1]$$

Where,

Y_{it} - value of one of inbound FDI variables, such as logarithmic values of $\ln FDI\ inflow_{it}$, $\ln M\&A_{it}$, and $\ln greenfield\ FDI_{it}$

X_{it} - vector of time-variant parameters

- Z_{it} - vector of time-invariant parameters
- $\alpha_0, \beta', \gamma'$ - constant and vectors of coefficients of the estimation
- ε_{it} - error term of the estimation, with the expected value of zero
- i - id of a country, $i = 1, \dots, 160$
- t - time period, $t=1, 2, \dots, 9$.

The same model in Fixed-effects scenario is described in Eq. (2), where all time-invariant parameters are dropped due to specifics of this approach:

$$Y_{it} = \alpha_0 + \beta' X_{it} + \varepsilon_{it} \quad [2]$$

The Random-effects model is estimated by Eq. (3)

$$Y_{it} = \alpha_0 + \beta' X_{it} + \gamma' Z_i + (\varepsilon_{it} + u_i) \quad [3]$$

- Z_i - general term representing time-invariant explanatory variables used in the model.

The following control variables are time-invariant: *Regions, % of cases for CIT audit, time to comply with CIT audit, and time to obtain VAT refund.*

- X_{it} - general term representing time varying parameters, including GDP per capita and the variables retrieved from the Doing Business report and not listed among Z_i variables above.

- u_i - uncorrelated with other independent variables error term.

It should be noted that the composite error term ($u_i + \varepsilon_{it}$) allows assessment of variation at both levels “micro” and “macro” and is reported as between and within errors, respectively. Additionally, if we use a term y_{it} as a general interpretation for all independent variables in equation [1], then $Cov(y_{it}, u_i) = 0$, where $t = 1, 2, \dots, 9$ and $i = 1, 2, \dots, 160$. In other words, the unobserved effect u_i is uncorrelated with all other independent variables. Since the model includes time-invariant independent variables for defining some aspects of tax

systems, the GLS transformation of the RE model, while eliminating the serial correlation in the errors, allows observation of explanatory variables that are constant over time.

The *Hausman-Taylor* method can be considered as an extension to the Random-effects model, which also combines characteristics of Instrumental Variables (IV) methodology. Hausman and Taylor (1981) find that the explanatory variables of X_2 type described below may cause bias in Random-effects estimator and suggest a model, which, if instrumented in correspondence with their proposed structure, would resolve the issue. This test distinguishes and allows to obtain corresponding coefficients for datasets, which include endogenous and time-invariant variables. Following the Hausman-Taylor assumption and adjusting it to our case Eq. (3) takes the following form:

$$Y_{it} = \alpha_0 + \beta'_1 X1_{it} + \beta'_2 X2_{it} + \gamma'_1 Z1_i + (\varepsilon_{it} + u_i) \quad [4]$$

Where the explanatory variables are grouped as:

$X1_{it}$ - time-variant variables uncorrelated with u_i

$X2_{it}$ - time-variant variables correlated with u_i

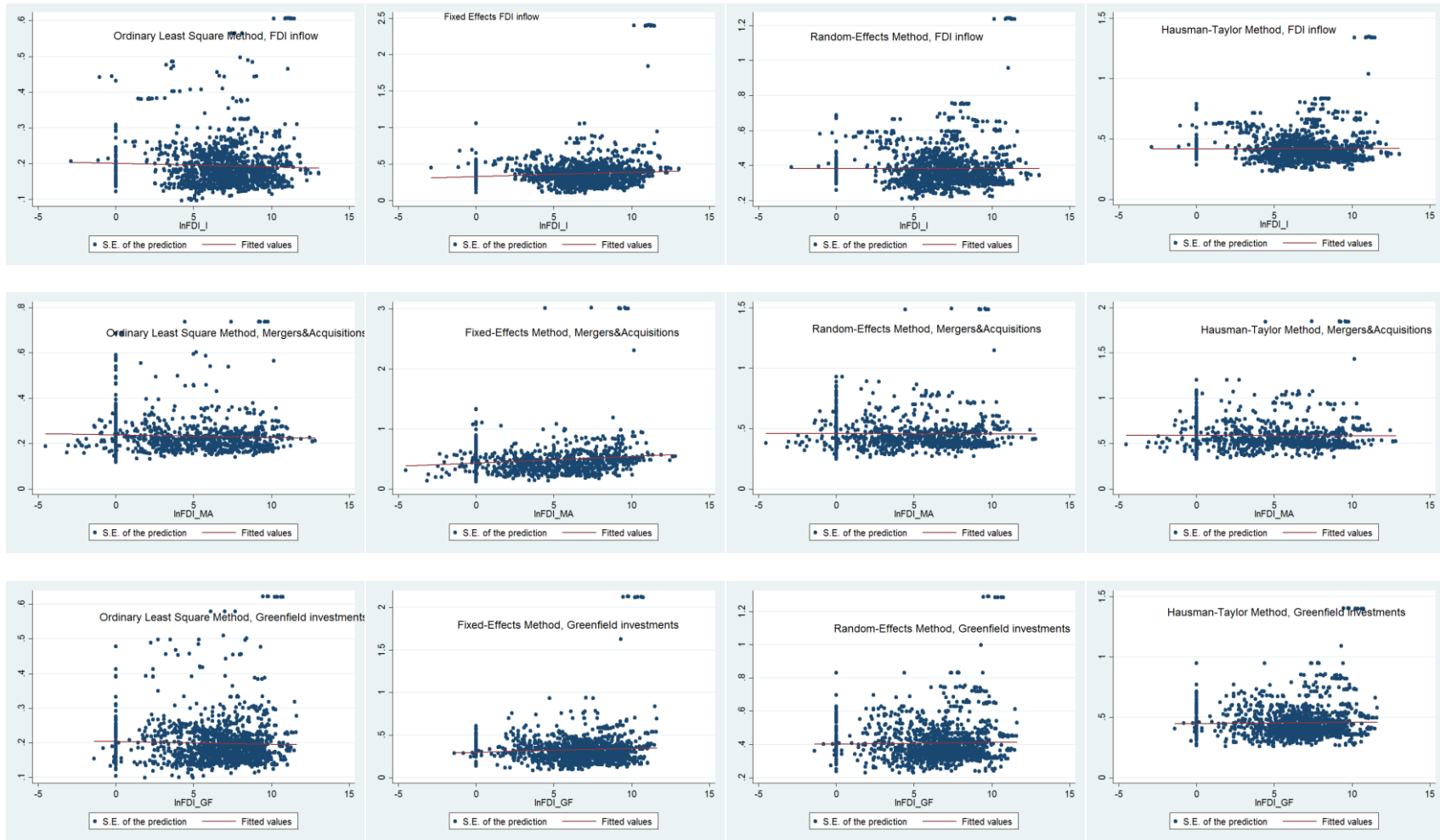
$Z1_i$ - time-invariant variables uncorrelated with u_i

With the assumption that $E(u_i | X1_{it}, Z1_{it}) = 0$ but $E(u_i | X2_{it},) \neq 0$

With consideration of the correlation matrix presented in Table 4 the variables of *GDP per capita* and *Payments* are modelled as $X2_{it}$ variable, since their correlation coefficient with other independent variables exceeds 0.5. Variables *Regions*, *% of cases for CIT audit*, *time to comply with CIT audit*, and *time to obtain VAT refund* are modelled as $Z1_{it}$ variables. All other variables are modelled as $X1_{it}$ variables.

After conducting all tests we predict the standard errors, use it for comparison of the estimators' econometric properties and assess the usefulness of Hausman-Taylor methodology for our analysis (Figure 1).

Figure 1. Standard Errors of OLS, RE, FE and HT vs. determinants of FDIs



5. Results

This section consists of two subsections. First, the discussion provides a comparative assessment of each method and elaborates on the research outcomes. Second, following the widely accepted notion of government administrators, in which relaxed tax regulations, specifically lower tax rates, are viewed as a tool for attracting inbound FDIs, we proceed with the postestimation tests where one of the tax performance determinants is hypothetically assumed at more favorable for investments level, while others are kept unchanged; this new outcome is compared with the base case. The output of the Hausman-Taylor test for three types of inbound FDI flows outlined in Table 5 is used as the base case and the same method with actual, not logarithmic, values is used in postestimation tests (Table 6).

5.1 Discussion of estimates

The results of the analysis (Table 5) outline the divergence between tax determinants for attracting M&As and greenfield investments to potential host economies. Thus, M&As have less sensitivity to tax determinants or domestic reforms, focused on improvement of these factors, and more attuned to the overall economic development and location of the host economy. On the contrary, greenfield investors are strongly susceptible to both tax regulation and tax administration factors, to a lesser degree responsive to economic development and not sensitive to the location of a potential host economy.

Taking into consideration the business concepts of M&A versus greenfield investments, makes the perceived conservatism of M&As towards particular countries to invest (higher economic development, particular regions, business friendly conditions) more clear, since the larger volume of business ventures in a country becomes an essential determinant for

possibilities of either mergers or business takeovers/acquisitions of some type. Thus, roughly 70 percent of all M&A transactions are conducted in the North America region. In the meantime, greenfield investments is a more mobile type of foreign capital that focuses on the country-specific parameters, including business and tax environments, and not on the location or, to some extent, national income. Therefore, the analysis assesses a wider range of regions attractive for greenfield investments, including East Asia and North America with 29 percent shares each, South-East Asia (10 percent), as well as Other Developed Europe and South Asia with 5 percent shares each. Furthermore, all regions, except for Central Africa and Caribbean, have obtained at least 1 percent of greenfield investments.

Overall, the M&A transactions slowed down by approximately 20 percent in 2017, including over 40 percent decline in Europe. Only a handful of countries report positive trend, including China (particularly Hong-Kong), Israel, Mauritius, Singapore, India, and Russian Federation. Greenfield investments also experienced about 13 percent decline in 2017 and the largest share of this reduction is attributable to developing economies, since the trend for developed economies was upward. Apart from this statistics, several developing economies experienced significant increase in greenfield investments, including Cameroon, Kenya, Namibia, Democratic Republic of Congo, Ghana, Singapore, Serbia, Russian Federation, Georgia and Ukraine.

Thus, according to the global scale simulation addressing three types of FDIs, the tax regulation and administration practices may serve as viable public policy tools for attracting investments (Table 5). Overall, due to the structure of **FDI inflows**, combining equity capital, reinvestment of earnings and intercompany debt, in which the component of equity capital is the highest with composition of cross-border M&A and greenfield investments, the assessed results

matching characteristics of both types of FDIs in equity capital seem natural. The countries with overall better conditions for doing business and higher GDP per capita have higher chances for attracting FDI inflows. In addition labor tax and contribution rates also have positive implications for FDI inflows.

The comparative analysis of FDI in **cross-border M&A** and greenfield investments reveals that M&A are sensitive to the overall development of an economy (*GDP per capita*), its good practices for supporting business (*ease of doing business*), and location (*regions*) and less sensitive to tax determinants. Thus, of all tax determinants, only the *number of payments per year (Payments)* has a significant impact on M&A with positive coefficient, assuming that both variables move in the same direction. Overall, due to the nature of this analysis the results capture the global trend of a determinant. However, in order to better communicate the outcome, three groups of economies should be kept in mind. The positive relation is due to two following types of economies. First, in many countries the earlier periods with higher number of payments are also characterized by higher volume of M&A inflow, e.g. Bahrain, Belarus, Russia, Philippines, Poland, Saudi Arabia, Serbia, Ukraine, etc. Second, in countries, such as Bosnia and Herzegovina, Colombia, Croatia, Estonia, Nigeria, Qatar, the US, etc., the number of payments have increased over time matching the same upward trend for M&As. Overall, the countries representing the second case scenario tend to represent the lower bounds of *Payments* determinant [< 15] (Colombia, Estonia, and the US). Third, it should be noted that the spread of this determinant is large [3; 147] and, over the course of analysis, the economies at higher bounds [40; 147], such as Armenia, Costa Rica, Côte d'Ivoire, India, Kyrgyz Republic, Nicaragua, Romania, Ukraine, have come a long way in the improvement of bureaucracy and

significant reduction of this number, frequently corresponding with the higher M&A inflow (e.g. Ukraine improved this determinant from 147 in 2009 to 5 in 2017).

Greenfield investments are more sensitive to the changes in tax determinants. Thus, the Hausman-Taylor test results indicate that *greenfield investments* are responsive to the changes in *annual time spent on preparation of tax returns (Time)*, *labor tax and contribution effective rate*, as well as non-tax related determinants of *ease of doing business* and *GDP per capita*. Similar to the case in which *Payments* determinant has a positive effect on M&A investments, *Time* has a significant positive impact on *greenfield investments*. In general, the interpretation of the analysis outcome should be considered through three main groups of countries, where first two groups contribute in the direct relation. First, in countries, such as Azerbaijan, Belgium, Botswana, Canada, Ethiopia, France, Ireland, etc., the determinant of *Time* grows over time and this positive trend is in line with the increase in inbound *greenfield investments*. Second, the economies of Estonia, Japan, and Mauritius are characterized by combination of higher determinant of *Time* and higher volume of *greenfield FDI* inflow in earlier periods and both indicators decline over the course of analysis. Third, the very large range [12; 2600] of this factor is due to the outlying [> 600] performance of few economies, including Bolivia 2009-2017; Brazil 2009-2017; Cameroon (2009-2017); Chad (2009-2017); Congo, Rep. (2009- 2017); Ecuador (2011-2017); Mauritania (2009-2016); Senegal (2009-2016); Ukraine (2009-2012); Venezuela, RB (2009-2017). Based on the statistics, almost all countries (except for Brazil) with unusually high numbers corresponding with inefficient performance of *Time* have substantially improved tax administration efforts leading to considerable reduction of this measure and higher inflow of *greenfield investments* through the observed time horizon.

The measure of *labor tax and contributions effective rate* has a positive coefficient in relation with greenfield FDI. While this measure captures the range of [0; 68], there is only a handful of countries with the tax rate exceeding 40 percent, including Belgium, 2009-2017; Brazil, 2009-2015; China, 2009-2017; France, 2009-201; Italy, 2009-2017; and Ukraine, 2009-2016. In despite to being in the upper bound of the range, in France, Italy, Brazil and Ukraine this measure has been constant or moving upward, while also maintaining high levels of greenfield investment inflows, which is unlike other discussed indicators.

Overall, when discussing the positive relation between *labor tax and contributions effective rate* and *greenfield investments* the following four groups of countries should be considered. The first and larger group of countries represents the case, in which both, the tax rate and investment flow, have growing trends (e.g. Bolivia, 2013; France, 2015; Kyrgyz Republic, 2011; Pakistan, 2012; Slovenia, 2011; Spain, 2012; United Kingdom, 2011). The second group of countries is characterized by negative trend for both the *labor tax and contributions effective rate* and *greenfield investments* (e.g. Burkina Faso, 2012; Indonesia, 2016; Kenya, 2014; Poland, 2010; Rwanda, 2010, 2012; Turkey, 2010, 2012; Uzbekistan, 2017). In addition to the countries with no *labor tax and contributions* obligations (Bangladesh, Bhutan, Botswana, Comoros, Eritrea, Lesotho and Suriname), the third group also includes the ones, where the rate has stayed unchanged corresponding, mainly, with growing volume of greenfield investments (e.g. Angola, Cameroon, Dominica, Ecuador, El Salvador, Equatorial Guinea, Grenada, Haiti, Iran, Iraq). Lastly, the fourth group represents the case of reverse effect, where an increase/decrease in the tax rate leads to significant decrease/increase of greenfield investments (e.g. China, 2010-2011; Denmark, 2010-2011; Ethiopia, 2017; Guinea, 2016-2017; Nigeria, 2016-2017).

Table 5. Comparative results for global scale simulations by types of FDI and applied methods

	Independent Variables	Dependent Variables											
		lnFDI inflow				lnFDI M&A				lnFDI GF			
		OLS	RE	FE	HTM	OLS	RE	FE	HTM	OLS	RE	FE	HTM
<i>Time varying, exogenous</i>	Methods												
	Ease of doing business	0.067*** (.008)	.051*** (.012)	.021 (.016)	0.052*** (.013)	0.083*** (.010)	.059*** (.015)	-.009 (.020)	0.051** (.017)	0.090*** (.008)	.039** (.011)	.002 (.014)	0.032** (.012)
	Time	0.001*** (.000)	.001* (.001)	.001 (.001)	0.001 (.001)	0.002*** (.000)	.002* (.001)	-.001 (.001)	0.001 (.001)	0.002*** (.000)	.002** (.001)	.002 (.001)	0.002** (0.001)
	Profit Tax	0.011 (0.006)	.006 (.010)	.004 (.013)	0.005 (0.010)	0.040*** (.008)	0.021 (.013)	.010 (.016)	0.015 (.014)	0.012 (.007)	-.004 (.010)	-.001 (.011)	-0.006 (.010)
	Labor Tax & Contrib.	0.039*** (0.006)	.034** (.011)	.016 (.018)	0.033** (.012)	0.035*** (.008)	.031* (.014)	.001 (.023)	0.026 (.016)	0.051*** (0.006)	.031** (.011)	.005 (.016)	0.027* (0.012)
	Other taxes	-0.002 (.002)	.002 (.002)	.003 (.002)	0.003 (.002)	0.002 (.002)	.004 (.003)	.003 (.003)	0.004 (.003)	-.002 (.002)	.001 (.002)	.000 (.002)	0.000 (0.002)
<i>Time-invariant, exogenous</i>	Time to obtain VAT refund	0.009*** (.002)	.005 (.004)	NA	0.005 (.005)	0.003 (.002)	-.004 (.005)	NA	-0.007 (.007)	0.002 (.002)	-.003 (.005)	NA	-0.003 (0.005)
	Cases for CIT audit	-0.132 (.071)	-.167 (.163)	NA	-0.175 (.181)	-.008 (.086)	-.051 (.193)	NA	-.116 (.262)	-.221** (.073)	-.225 (.181)	NA	-0.222 (.207)
	Time to comply with CIT audit	0.012** (.005)	0.011 (.011)	NA	0.011 (.012)	-0.001 (.006)	-.003 (.012)	NA	-.003 (0.017)	0.018*** (0.005)	.011 (.012)	NA	0.011 (.013)
	Regions	-0.002 (.012)	-.011 (.028)	NA	-.015 (.031)	-.124*** (.015)	-.145*** (.033)	NA	-.159*** (.044)	-.005 (.012)	-.026 (.031)	NA	-0.029 (.035)
<i>Time varying, endogen</i>	Payments	-.010* (0.004)	.002 (.005)	.006 (.006)	0.006 (.005)	-.010** (.005)	.010 (.006)	.019** (.007)	0.019** (.007)	-.012** (.004)	-.003 (.004)	-.002 (.005)	-0.001 (.005)
	lnGDP per capita	0.256*** (.066)	.287** (.088)	.123 (.111)	0.281** (.103)	0.692*** (.080)	.608*** (.110)	.185 (.140)	.456*** (.130)	0.027 (.068)	.176* (.084)	.060 (.099)	0.217* (.093)
	cons.	-.671 (.630)	-.138 (1.068)	3.785** (1.403)	-.148 (1.170)	-8.306*** (.766)	-5.634*** (1.296)	1.457 (1.761)	-3.428* (1.572)	.127 (.646)	2.205* (1.079)	5.397*** (1.241)	2.327* (1.175)

Note: #observations =1,440; #groups by countries (except OLS)=160; t=9; standard error in parenthesis; *, **, *** indicate significance at 0.05, 0.01 and 0.001, respectively.

In general, the nature of *labor tax and contributions* indicator is somewhat more complex, as it is not merely a tax revenue mobilization tool, but, partly, a redistribution mechanism of current earnings to retirement savings to be spent in the future, therefore it could have positive implications for state budgets both in short and long-term perspectives. To some extent, the positive relation of *labor tax and contributions effective rate* and *greenfield investments* can be explained by the business concept of greenfield investments. These companies, building their enterprises from ground-up as long-term ventures in host economies, may view the option of offering higher retirement contributions as an incentive included in the benefits package of employment agreements. Thus, setting up higher rates would give these companies competitive advantage of attracting the best talent pool available in a given economy, and shape positive attitude towards higher rates of this tax.

5.2 Comparison of FDI estimates with improved tax determinants

In this section we proceed with the task of setting a hypothetical improvement in a tax determinant from the potential FDI perspective, while other tax factors are kept unchanged, and evaluate the impact of this change on the FDI inflows. In the majority of cases, an improvement is assumed to be a reduction by 25 percent from the original value expressed by $\hat{X}_i = X_i - 0.25X_i$. The effective tax rate for three considered taxes is reduced by 5 percent, expressed by $\hat{X}_i = X_i - 5$, if $X_i > 5$ & $= 0$, if $X_i \leq 5$, where the original tax rate below 5 percent takes value $= 0$ in the new estimation. The effective tax rates reduction by 5 percent is roughly comparable with our assumption of improvement of tax administration determinants by 25 percent, also allowing for comparison among three taxes. Two different approaches are taken for the determinant of the *cases for CIT audit*, since according to the previous literature the foreign investors targeting specific regions consider an increase in annual CIT surveillance as a beneficial factor for

investments (Sedrakyan, 2018). Since this variable takes five following values [0; 4] and due to its nature described in Chapter 3, the change = 1 corresponding with 20 percent improvement in this indicator is used and the analysis tests two scenarios. In the first case scenario $\widehat{X}_i = X_i - 1, \text{ if } X_i > 0 \ \& \ = 0, \text{ if } X_i = 0$, and in the second case $\widehat{X}_i = X_i + 1, \text{ if } 0 < X_i < 4 \ \& \ = 0, \text{ if } X_i = 0 \ \& \ = 4, \text{ if } X_i = 4$.

We also evaluate the impact of the *ease of doing business*. Since the best performance is assessed for Singapore at maximum level of 90.87 (2011, 2012), a hypothetical improvement of 10 percent for all economies with the performance score below 81 is applied, while keeping this score unchanged for all economies above the threshold. This strategy allows for setting up an improvement and not a simple scaling up of the indicator (Table 6).

As it was expected, the strongest impact is assessed through a positive change in the *ease of doing business* indicator. While the tests (Table 5) have estimated significant positive impact of this indicator on all three types of FDI, the analysis of 10 percent improved measure shows that the strongest impact is seen in the case of M&A with 74.29 percent increase from the original volume of investments.

Among tax determinants the strongest implications are assessed when *the cases for CIT audit* are increased by 1 quartile, meaning that, for instance, if an economy on average used to conduct CIT surveillance in the range of 25-50 percent of all CIT cases (quartile 2), the increase to 50-75 percent (quartile 3) will strongly improve both M&A and greenfield investments. These results can be explained, if considered that the investors prefer to eliminate more severe financial risks in the long-term perspective, therefore advocating for short-term control measures.

Interestingly, a reduction in the *time to comply with CIT audit* corresponds with the increase in all types of FDIs. This pertains to the previous determinant, since higher volume of

CIT surveillance conducted annually eliminates the odds of making significant mistakes and thus reduces the time to comply with audit.

Table 6. Comparison of estimates with tax improvements

Variable \hat{X}_i	Treatment	Measure	FDI inflow	M&A	Greenfield FDI
Base case	N/A	Predicted mean	8,639.594	2,991.473	4,679.922
Ease of doing business	$= X_i + 0.1 * X_i, \text{ if } X_i \leq 81 \&$ $= X_i \text{ if } X_i > 81$	% change	16.22	74.29	0.29
		Predicted mean	10,041.23	5,213.674	4,693.462
Payments	$= X_i - 0.25 * X_i$	% change	0.43	2.49	1.18
		Predicted mean	8,676.573	3,066.005	4,735.256
Time	$= X_i - 0.25 * X_i$	% change	-4.35	-4.87	-10.67
		Predicted mean	8,263.898	2,845.923	4,180.831
Profit Tax	$= X_i - 5, \text{ if } X_i > 5 \&$ $= 0, \text{ if } X_i \leq 5$	% change	2.90	-7.44	-1.38
		Predicted mean	8,890.204	2,768.947	4,615.193
Labor Tax & Contrib.	$= X_i - 5, \text{ if } X_i > 5 \&$ $= 0, \text{ if } X_i \leq 5$	% change	-2.71	9.05	-11.90
		Predicted mean	8,405.569	3,262.143	4,123.136
Other Taxes	$= X_i - 5, \text{ if } X_i > 5 \&$ $= 0, \text{ if } X_i \leq 5$	% change	0.02	0.31	-0.07
		Predicted mean	8,641.287	3,000.852	4,676.743
Time to obtain VAT refund	$= X_i - 0.25 * X_i$	% change	-17.69	-26.09	2.04
		Predicted mean	7,111.166	2,211.136	4,775.186
Cases for CIT audit	$= X_i - 1, \text{ if } X_i > 0 \&$ $= 0, \text{ if } X_i = 0$	% change	-21.80	-53.43	-2.62
		Predicted mean	6,755.876	1,393.051	4,557.138
	$= X_i + 1,$ $\text{ if } 0 < X_i < 4 \&$ $= 4, \text{ if } X_i = 4$ $= 0, X_i = 0$	% change	19.55	47.91	2.35
		Predicted mean	10,328.440	4,424.541	4,790.003
Time to comply with CIT audit	$= X_i - 0.25 * X_i,$ $\text{ if } X_i > 0 \&$ $= 0, \text{ if } X_i = 0$	% change	0.69	3.28	2.77
		Predicted mean	8,699.13	3,089.644	4,809.377

The 25 percent reduction in *time* spent annually on preparation of tax documents reveals negative impact on FDIs. It could be assumed that foreign investors prefer not to be rushed through the tax documents, since the multinationals have much more complex business models,

taking longer time for tax preparation; therefore expectations from them to comply with tax obligations on a short-term notice would be met with objections. In addition, a new market entry is usually associated with the learning curve including regulatory standards, which, in turn, requires longer time for adjustment and submission of tax returns, especially if the regulations are complex, have limited capacity for providing common learning ground to foreign investors, less flexible tools for hiring necessary talent and, sometimes, due to the language barriers.

The direct relation of CIT reduction and both types of FDI is mainly related to the fact that almost 70 percent of M&A transactions are conducted in the North America region, including two countries, the United States and Canada. In despite to Canada substantially reducing the CIT rate, from 24.8 percent in 2009 to 3.9 percent, the M&A for the country is reported with a negative sign in 2017. In addition, the CIT rate in the United States has been around 27-28 percent, which is much higher than the mean of 16 percent for the global scale analysis. Only a handful of countries report positive trend, including China (particularly Hong-Kong), Israel, Mauritius, Singapore, India, and Russian Federation; among these countries China have increased the CIT rate from 5 to 10.8 percent, while the tax rate in India and Israel is higher than the mean (23-24 and 20-21 percent, respectively). At the same time the direct relation of CIT and types of FDI also captures the global declining trend in both M&A and greenfield investments, which, in part, may correspond with the notion of tax competition.

Finally, 5 percent reduction in *labor tax and contribution rates* causes discrepancy between M&A and greenfield investors, encouraging M&A and reducing greenfield investments, due to the reasons discussed previously in the section.

5.3 Policy implications

The existing literature and public managers are largely in an agreement concerning the reverse effect between FDI inflows and tax rates, assuming that lower tax rates may create incentives for inbound FDI flows. The literature also suggests that the reduction of tax rates is perceived more favorably by multinationals than the improvement in tax administration, estimating 10 percent improvement in tax complexity being similar to 1 percentage point reduction in taxes. Following this notion, public administrators of low-income countries consider offering high tax reductions in order to incentivize possible FDI inflows.

Our analysis, which compares cross-border mergers and acquisitions and greenfield FDI, advocates a different standpoint. The analysis does not estimate significant impact of *corporate income tax* in relation to the types of FDI inflow and a hypothetical 5 percent CIT reduction impacts negatively both M&A and greenfield investments. On the one hand, in part, this outcome may relate to the widespread practice of FDI seeking countries to offer significant reductions in tax rates, which, due to the prevalent nature of using this tool, has become an expected part of the negotiations and lost its power as an incentive when pursuing foreign capital. On the other hand, the decisions on foreign investments might not focus on particular tax rates in potential host economies as long as the economies overall offer business friendly conditions, captured by *ease of doing business indicator* and having significant impact on all three studied cases of FDI inflow. Finally, the direct trend captures the macroeconomic environment with reported decline in both M&A and greenfield investments in 2017.

The study also reveals somewhat contradictory perception of M&A and greenfield investors on reduction in *labor tax and contributions effective rate*. The analysis defines that an increase in the tax rate has positive implications particularly for greenfield investments. In the

meantime, a hypothetical decrease by 5 percent leads to 9 percent increase in M&A. Overall, the nature of *labor tax & contribution effective rate* is somewhat different than a strict tax revenue mobilization mechanism, due to the built-in income redistribution tool in the form of employers' retirement contributions, which the greenfield investors could use as a possible incentive when hiring the best talent in a host economy.

The analysis also defines significant role of tax administration of host economies impacting decisions of multinationals, particularly the greenfield investors, to move forward with capital investments. In the meantime, the forecast related to approximately 20-25 percent improvement in various areas of tax administration reveals that both, M&As and greenfield investors, are very sensitive to rigorous tax reforms of tax administration nature in host economies, aimed at improving specific conditions necessary for conducting businesses. The analysis reveals that the multinationals favor thorough requirements for CIT audit, which would eliminate the risk of financial mistakes in long-term and reduce the time spent on completing CIT audit.

The study results could particularly be useful for lower income economies when reevaluating the targeted channels of foreign capital. This study leads to the assumption that any economy can be successful in competition for foreign capital. The main objective is to clearly evaluate the resources of an economy, whether it would be better off when competing for M&A or greenfield investments and capacity that it could offer for the fair exchange. Taking into consideration that *greenfield investments* are focused on the improvement of country specific conditions for running business and paying taxes, the combination of domestic fiscal reforms and targeted marketing to relevant investors could potentially lead to new successful business ventures with much better terms than the "race to the bottom."

6. Conclusions

The analysis reveals that, in general, any country may compete for getting FDI; however, it is essential for fiscal policy managers to have a fair assessment of the scope of country specific advantages that would determine the type of targeted investments and help in designing relevant fiscal policy tools. On the one hand, in most cases, the inflow of cross-border mergers and acquisitions is predetermined by higher income countries located in particular regions. On the other hand, the low-income countries with rigorous reforms aimed at improvement of tax regulations and administration standards are likely to attract greenfield investments. This result could particularly be useful for low-income economies which have not been actively explored by foreign investors, since *greenfield investments* are more focused on the country specific conditions for running business and paying taxes, therefore the combination of relevant reforms within the country and marketing it to greenfield investors could potentially lead to establishing new successful business enterprises.

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