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The Determinants of Tax Revenue in the Context of International Transactions in the Latin America and Caribbean (LAC) Regions 2002-2019

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ABSTRACT: Tax revenue is one of the backbones of economy in almost every country in the world. There are several determinants that influence the amount of tax revenue in one country, one of which is international transaction activities. Such activities can partly be presented by three variables; Foreign Direct Investment (FDI), Trade Openness (TO), and External Debt. This study aims to acknowledge the effects of international transaction experienced by a country regarding its tax revenue. External Debt is used as a moderating variable to the effects of FDI and TO on tax revenue. The data source was taken from the World Bank within the period of 2002-2019 in 19 countries around LAC regions. The study implements an associative quantitative method with PCSE regression. The result showed that FDI affects tax revenue negatively, whereas trade openness and external debt affect tax revenue positively. External debt as a moderating variable strengthens the effect of FDI and weakens the effects of trade openness to tax revenue. Further research is expected to include all the LAC countries, add more variables relevant to the international transactions, and renew the research period.

Keywords: Tax Revenue, Foreign Direct Investment, Trade Openness, External Debt, Latin America and Caribbean

INTRODUCTION

Almost all countries in the world rely on taxes to support the government's economy. Taxation is the most practical system of raising government revenue to finance the spending on the goods and services demanded by the society" (Tanzi & Zee, 2001). The economic growth of one country depends on sustainable funding for programs such as social, health, education, and infrastructure to support the country in achieving its goals. Therefore, the aspect of taxation should be a major highlight in state affairs. A measurement to valuate the taxation performance is the proportion of tax revenue to a country's Gross Domestic Product (GDP). There are a number of factors affecting tax revenue, one of which is international transactions between countries.

Latin America and Caribbean (LAC) regions refers to a composition of countries characterized by diverse international transaction activities. One of the largest countries in the region, Mexico, is considered a nation with the most open economy in the world, establishing 50 Free Trade Agreements (FTAs) with other countries(trade.gov, 2022), whereas the other two major countries in the region with the closest economies are Brazil and Argentina. Both countries have a proportion of international trade below 30% of GDP (O'neil, 2022). However, LAC is considered regions with the most exports, with an average trade to GDP *of* 67% in 2019 if compared to the percentage of 56% for the average country. The diversity across LAC countries is an interesting research topic, from which an investigation regarding how the region's tax revenue is related to international transaction activities was conducted.

As can be seen from Table 1, the tax revenue of countries in the LAC region varies with an average above the world's revenue of 16.5%, whereas the average tax revenue in the world is 13.8%. There are three international transactions affecting a country's tax revenue, among others are *Foreign Direct Investment* (FDI)*, Trade Openness* (TO)*,* and *External Debt* (EXT or foreign debt). FDI or foreign direct investment is an international capital flow in which companies from other countries or multinational companies invest their capital either in the form of establishing or expanding their business in other countries (Obsfield, 1991). FDI is not only limited to the establishment of new corporate units, but also in the form of acquisitions of FDI recipient of companies in one country, to companies in others. As defined by the World Bank, TO or trade openness is the ratio between the amount of exports and the amount of imports either in a form of goods or services with other countries, calculated as a proportion of GDP. The EXT, in this case the government external debt is a debt owned by the central government, comprising bilateral and multilateral debts, export credit facilities, commercial debts, leasing, and some other kinds.

Table 1 Tax Revenue (%GDP) of LAC Countries in 2019

Negara	Tahun	*Tax Revenue (%GDP)*
Argentina	2019	10.64932467
Belize	2019	26.25967344
Bolivia	2019	24.61570104
Brazil	2019	13.73616364
Colombia	2019	15.07137014
Costa Rica	2019	13.47177923
Dominica	2019	24.14728928
Dominican Republic	2019	13.3027786
Ecuador	2019	14.35727421
El Salvador	2019	18.071017
Grenada	2019	21.558417
Guatemala	2019	10.45602392
Haiti	2019	12.83992672
Honduras	2019	18.70742178
Jamaica	2019	27.45394175
Mexico	2019	13.14822085
Nicaragua	2019	17.5430986

Paraguay	2019	10.00060649
Peru	2019	14.5160313
		source : worldbank

There are several researches that examine how FDI affects tax revenue. Pratomo (2020) stated that FDI inflows have a positive effect on tax revenue in the developing countries. In addition, Camara (2023) argued that FDI inflows serve as a stimulus to increase tax revenue. However there is no connection with countries exporting the natural resources since tax revenues are not sensitive to FDI inflows. Nevertheless, Gaspareniene et al. (2022) stated the opposite. In European Union countries, FDI inflows have dampening implications for tax revenues. Their argument was FDI generates a reduction in tax revenue through tax incentives offered by the state in order to attract investors, for instance free trade zones where goods are exempt from duties and taxes. Similarly, other studies examining the relationship between trade openness and tax revenue have been conducted. A research by Kwaku et al. (2018) explained that *trade openness* has a positive effect on tax revenue, particularly the international trade tax. On the contrary, Shubita & Warrad (2018) emphasized that there is a negative relationship between trade openness and government revenue. It occurred as taxation is "forced" to compete, which ultimately reduces state revenue, a condition signaling economic openness (liberalization), Another research by Wijaya & Dewi (2022) pointed out that trade openness has no effect on tax revenue in Indonesia.

(Khalid, 2016) stated further that aside from being related to tax revenue, trade openness has a direct effect on economic growth through international competitiveness, productivity, and other economic activities .These economic activities need funding, and if the government cannot rely on the revenue generation, it will be in debt. Eddine Salhi & El Aboudi (2021) conducted a study on the relationship between external debt and tax revenue. The results indicated that foreign debt affects the tax revenue and it was signified by currency devaluation. Furthermore, Saibum M.O. & Olatunbosun (2013) revealed that foreign debt in Nigeria erodes tax revenue. It directly affects not only the tax revenue, but also the relationship between the two other variables. External debt can influence government response to FDI inflows. The economic growth in countries with high levels of external debt differs from those with low external debt (Tanna et al., 2018). Pyeman et al. (2016) stated further that these two variables have a negative relationship, where the amount of foreign debt of a country will affect investors' decisions regarding the location of investment and the type of investment. With TO, foreign debt has a positive relationship, since the higher the foreign debt, the more increased the export activities will be (Zakaria, 2012). Other studies however, revealed a negative relationship between these two variables. Mugasha (2007) argued that the debt problem in a developing country with stagnant economic conditions will be considered unfavorable for trade partners, which has implications for the decline in TO.

The emergence of various opinions related to the influence of international transactions on tax revenue and the importance of taxes for a country's economy creates an urgency for further research on this matter. Furthermore, the diversity of international transactions in the LAC region signifies an interesting point of research. Therefore, this study aims to determine how FDI, TO, and foreign debt impact the tax revenue and how the role of foreign debt as a moderating variable on the effect of FDI and TO is on tax revenue in the LAC Regions within the periods of 2002-2019.

METHODS

The research method implemented is quantitative associative research, aiming to determine the influences between the independent variable and the dependent variable. The data of over an 18-year period from 2002 to 2019 in 19 Latin American and Caribbean (LAC) countries were used. The countries listed are Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, and Peru. Whereas for the secondary data, the sources from the World Bank were added. The dependent, independent, moderating, and control variables used in this study are described in Table 2.

Table 2 Research Variables

Dependent Variables	Unit	Data Scale	Data Transformation
Tax Revenue (%GDP)	Percent	Ratio	-
Independent Variables	**Unit**	**Data Scale**	**Data Transformation**
Foreign Direct Investment (FDI)	USD	Ratio	Natural Logarithm
Trade Openness (%GDP) (TO)	Percent	Ratio	-
Moderating Variables	**Unit**	**Data Scale**	**Data Transformation**
External Debt (EXT)	USD	Ratio	Natural Logarithm
Control Variables	**Unit**	**Data Scale**	**Data Transformation**
CORR	Index	Ratio	-
EFF	Index	Ratio	-
LAW	Index	Ratio	-

Operationalization Variable

Tax Revenue (%GDP)

Tax revenue refers to mandatory transfers to the central government for public purposes. The mandatory transfers include fines, penalties, with the exclusion of most social security contributions. Refunds and corrections of erroneously collected tax revenues are treated as negative revenues.

Trade Openness (%GDP)

Trade openness is the total value of exports (+) and imports (-) of goods and services measured as a proportion of GDP.

External Debt

External debt is a debt to a country that is repayable in currency, goods, and services.

The analytical tool used is Multiple Linear Regression Analysis with panel data type. The data processing application implemented is Stata 17 as described in the following regression equation:

$$\boldsymbol{Y = \alpha + \beta_1 FDI + \beta_2 TO + \beta_3 EXT + \beta_4 EXT.FDI + \beta_5 EXT.TRD + \beta_6 CORR + \beta_7 EFF + \beta_8 LAW + \varepsilon}$$

where

$Y = Tax\ Revenue$
$\alpha = Constant$
$\beta_{1-8} = Variable\ Coefficient$
$FDI = Foreign\ Direct\ Investment$
$TO = Trade\ Openness$
$EXT = External\ Debt$
CORR = Corruption Control Level
EFF = Government Effectiveness
LAW = Quality of Law Enforcement
$\varepsilon = Residual$

The classical assumption test is carried out before the hypothesis testing, in order to ascertain whether or not the model fulfills the econometrics model (Purba et al., 2021). The classical assumption tests are normality, heteroscedasticity , multicollinearity , and autocorrelation tests with details in Table 3.

Table 3 Classical Assumption Test

Test	H0	H1
Skewness and Kurtosis Tests	Data is normally distributed	Data is not normally distributed
Breusch–Pagan/Cook–Weisberg test	Homoskedastic data variance	Heteroscedastic data variance
Breusch–Godfrey LM test	Model is not autocorrelated	Model is autocorrelated
	<10	≥10
Variance Inflation Factor (VIF)	Data is not multicollienar	Data with multicollienar problem

After ensuring that the model meets the classical assumption test, the *goodness-of-fit* (GOF) test was proceeded. The GOF of a model describes how well the model fits a set of observations(Alberto & Forero, 2010). The GOF test was conducted with an *alpha* level = *5%* as in Table 4 below.

Table 4 Goodness of Fit Test

GOF Test	H0	H1

T Test	Independent variables partially have no effect	Independent variables partially affect	
F Test	All independent variables simultaneously have no effect	All independent variables simultaneously affect	
	Strong	Moderate	Weak
Adjusted R-Squared	>0.67	0.67<R-Squared<0.33	<0.33

RESULTS AND DISCUSSIONS

Descriptive Analysis

The research began with descriptive analysis to provide an overview of information in a more concise presentation. The data distribution are described as follows:

Table 5 Variable Description Analysis

Variabel	Min	Max	Mean	Std. Deviation
Tax Revenue	7.108	33.692	15.89667	5.501
Foreign Direct Investment	-4.974	16.229	3.883	2.790
Trade Openness	22.106	136.489	65.232	25.578
External Debt	20.469	27.137	23.639	1.625

The descriptive analysis indicates that there is a significant difference between countries with the lowest and highest shares of tax revenues. In 2014, Bolivia ranks the highest with a tax revenue of 33% of GDP, whereas Paraguay is the lowest, at only 7.1% in 2002. If the 4 highest and lowest data are taken, Bolivia will be in the same position, marking the country with the highest tax revenue meanwhile Paraguay is a nation with the lowest tax revenue. This is an interesting finding since Bolivia is a lower-middle income country and Paraguay is an upper-middle income country with the tax revenue considered much lower . It is apparent that Paraguay is the country in Latin America with the lowest tax rate, around 10%, compared to another similar country such as Brazil with a tax rate of 30% (Biz Latin Hub, 2023). Paraguay is often regarded as a country of tax haven. One of the reasons lies in Paraguay's implementation of territorial taxation, which means that the country only taxes income generated from the jurisdiction of Paraguay, whereas Paraguayans' income outside the territory is excluded from the tax calculations(Paraguay Solutions, 2023). The tax rate for individuals ranges from 8%-10% and for entities 10% with a special scheme for MSMEs (Micro, Small, and Medium Enterprises). Therefore, Paraguay is considered a primary destination for tax residency of global entrepreneurs (Soomro, 2022).

A country's low taxation strategy has a strong impact on the investment decisions of foreigners into the country (Bellak & Leibrecht, 2005). The attractiveness of the tax system in Paraguay lures a lot of incoming foreign investment. In accordance with the empirical data, in 2006 Paraguay becomes a country with highest FDI data amounted to 16,229. In addition, the nation remains on the top of the FDI data. In contrast, Guatemala is marked as a country with the lowest FDI data, at around -4.974 in 2002, followed by Bolivia at -2.4988 in 2005. It is likely that Bolivia has low FDI values if compared to other regions each year.

Moving away from Paraguay and Bolivia, a country with interesting tax revenue and FDI data is Dominica. It has the second highest tax revenue and the third highest FDI of all Latin American and Caribbean countries. According to Sunlife (2023), Dominica's tax system is similar to Paraguay, it includes territorial taxation but with higher rates within the range of 25%-35% for its income tax. Dominica is an upper-middle income Caribbean country termed as *The Nature Island* a region blessed with natural beauty as its main attraction. This signifies a 'branding' to attract investors, especially those interested in *sustainable* activities (InvestDominica, 2023). It can be stated that the combination of these two attributes helps Dominica generate high tax revenue with the qualified FDI inflow.

Further on is Honduras. The data from its TO range from as low as 22.106 for Brazil in 2009 to as high as 136.489. Among all Latin American and Caribbean countries, Honduras has the highest Trade Openness, and it remains stable, above 100. The region focuses mainly on exporting agricultural products, especially bananas and coffee beans. From the data published by *Statista*, Honduras is among the top 10 coffee bean exporting countries in the world. As shown in Figure 1, the products form the agriculture sector serve as its primary export. Nevertheless, Brazil, unlike Honduras, tends to have low Trade to GDP figures. Despite being one of the largest economies in the world, Brazil's economy sector is one of the closest economies in the world (Fleischhaker et al., 2015).

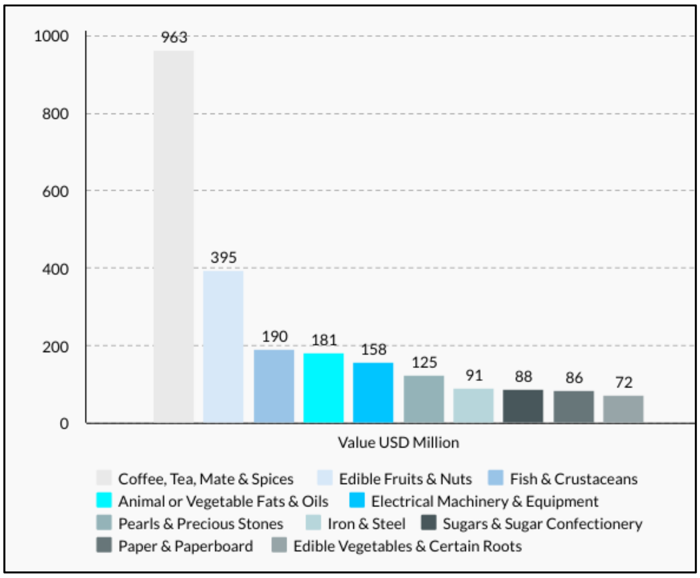

Figure 1 Honduras's Top 10 Export Products, source: Exportgenius

To determine the relationship between all variables after the analyses of each descriptive variable, a regression test is used. However, before the regression test is conducted, a series of classical assumption tests on the model are carried out . The classical assumption tests performed are (1) normality test; (2) heteroscedasticity test; (3) multicollinearity test; and (4) autocorrelation test. Table 6 indicated the results in which the model fails all the classical assumption tests. As for the problem of *non-normally* distributed data, based on the *Central Limit Theorem* it can be stated that since N has a big number (more than 30), a larger sample follows a normal distribution (Hays, 1994). The multicollinearity problem can be ignored due to its use of panel data and considering that combining cross section and time series data is one of the rules of thumb (Gujarati, 2004). Therefore, to overcome the problems of heteroscedasticity and autocorrelation, *Panel Corrected Standard Error (PCSE)* regression is used in this study. It can be described in table 6 below:

Table 6 Classical Assumption Test Results

Test	Prob > chi^2	Interpretation
Skewness and Kurtosis Tests	0.0001	Not normally distributed
Breusch–Pagan/Cook–Weisberg test	0.0013	Heteroskedastic
Autocorrelation Woolridge test	0.0187	Autocorrelated
	VIF	Interpretation
Variance Inflation Factor (VIF)	186.39	Multicollinear Problem

Next is the PCSE regression results described in table 7. From the results obtained, the F Test value (Prob> F) is below the alpha value of 0.000, which means that all variables simultaneously and significantly affect the *Tax Revenue* in 18 countries. The R-Squared value obtained is 0.2973 or 30% which means that the dependent variable is influenced by 30% of the independent variables used in the study, thus the remaining 70% is the impact of other variables not being tested. According to (Chin & Marcoulides, 1998) the R-Squared value below 33% indicates a weak category, which means that the ability of the independent variables to explain the dependent variable is considered insufficient (Ghozali, 2016). Moreover, the partial tests show that FDI and Trade Openness have a significant effect on Tax Revenue, even after being moderated by the External Debt variable.

Table 7 PCSE Regression Results

Variables	Coefficient	Prob
Cons	-42.3263	0.000
Foreign Direct Investment (FDI)	-3.1239	0.057
Trade Openness (TO)	1.4895	0.000
External Debt(EXT)	2.3872	0.000
FDI.EXT	0.1301	0.064
TO.EXT	-0.0627	0.000
CORR	3.197	0.001
EFF	3.776	0.000
LAW	-5.304	0.000
R-Squared		0.2973
Prob > F		0.0000

The Effects of FDI on Tax Revenue

The results of partial tests conducted on FDI indicate that FDI has a negative effect on tax revenue. It contradicts the research by Pratomo (2020) which states that the increase in FDI has a positive relationship with the total tax revenue, alongside with the corporate, the personal, and the value added taxes in the developing countries. The study states further that the type of FDI shows its effects on the tax revenue.

FDI inflow is divided into two types, *greenfield* and *brownfield*. Greenfield FDI is FDI in the form of construction of new production units by multinational companies in the recipient country, whereas Brownfield FDI is FDI in the form of acquisitions or mergers of domestic companies in the recipient country, carried out by multinational companies (Takayama, 2023). It is apparent that Greenfield FDI has a positive effect on tax revenue while Brownfield FDI tends to dampen the revenue.

Referring to Pratomo's research, Latin American and Caribbean countries are prone to accept Brownfield FDI (on the ground that FDI has a negative impact on tax revenue). One of the recent investment issues of Latin America and the Caribbean with other countries is its cooperation with China, channeled through the China and the Community of Latin America and Caribbean States (CELAC) meeting. Since 2015, Chinese investment in Latin America and the Caribbean has become more massive, with the proportion of brownfield FDI or mergers and acquisitions (M&A) amounting to 35% from the total investment (Abdenur, 2017).

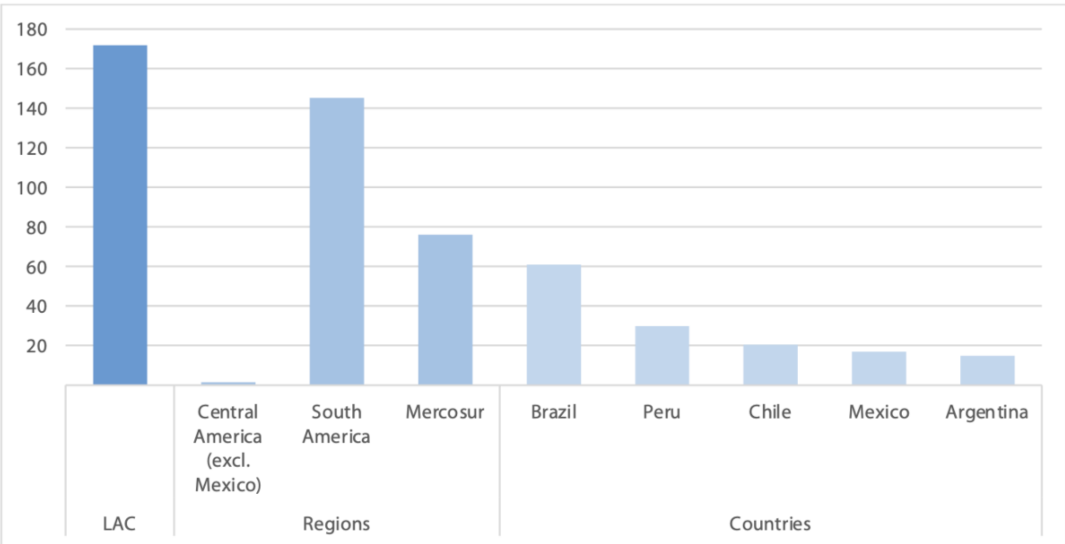

Figure 2 the accumulated Chinese FDI Outflows to the LAC Region in Billion USD 2000-2001, source : European Parliament

Over the years, the trend of Chinese Brownfield FDI into LAC has been increasing, with the average share of Chinese FDI deals from 2015-2021, thus the M&A (Merger and Acquisitions) was 47%. Even in 2019 (12 out of 19 deals were M&A) and 2020 (13 out of 20 deals were M&A), M&A transactions exceeded greenfield FDI. In terms of numbers, M&A transactions were recorded at 66.45 billion USD while greenfield reached only 22.68 billion USD. This trend can be attributed to the opposition and social conflicts associated with greenfield investments in LAC

(Raza & GROHS, 2022). However, M&A is only limited to change of ownership of existing companies/projects.

The Effects of Trade Openness on Tax Revenue

Partial tests conducted on trade openness indicate that trade openness has a positive effect on tax revenue. The result is in line with a study by Gnangnon & Brun (2019) which stated that through tax reform, developing countries which become more open to international trade receive more positive impacts on tax revenue than countries with closed economies. Similarly, another research by Kwaku et al (2018) examined the effect of *trade openness* on *trade tax revenue* in Ghana. The results obtained are that *trade openness has a* positive effect on tax revenue in the international trade sector (import / export taxes, import / export duties) both in the short and long terms.

In LAC, a country with the highest level of *trade openness* is Honduras and its biggest exported product is coffee reaching a value of 1.35 Billion USD (this marks Honduras the seventh largest coffee exporting country in the world) with the United States as its largest export market (OECD, 2023). The driving factor is the fiscal policies that intersect with the coffee production sector in Honduras. An annual report on the Honduran coffee sector published by the *United Stated Department of Agriculture Foreign Agricultural Service* (USDA) reported that in 2022, the Honduran government passed a regulation that excludes the imposition of a 12% sales tax on the country's coffee production. The policy is estimated to generate USD 183 million in fiscal relief which will reduce the cost of coffee production and increase the competitiveness of the Honduran coffee sector, including the export policy (Fiallos, 2022). With a reference to the research results described, it can be concluded that the implementation of tax relief policies in leading export sectors will increase exports of these products, *trade openness* rates, and tax revenues.

The Effects of Foreign Debt on Tax Revenue as a Moderating Variable

Partial tests conducted on foreign debt revealed that a foreign debt borne by the government has a positive effect on tax revenue. A research by Eddine Salhi and El Aboudi (2021) indicated a similar result: a foreign debt has a positive effect on the tax revenue. The study measures foreign debt associated with currency devaluation (it relates to foreign debt payments and the exchange rates) against tax revenue. Basically, devaluation is a factor that makes the government fails to pay foreign debt. Therefore, the government is encouraged to continue seeking for more state revenue, one of which is by increasing tax revenue. However, foreign debt management must be implemented with the right strategy. Accumulating economic growth through debt proposals is not the right strategy to implement, since reducing high debt levels will benefit the country's economic performance (Chien et al., 2022).

The foreign debt variable as moderation of FDI (Foreign Direct Investment) strengthens the effect of FDI on tax revenue, from the initial coefficient value of -3.1239 to 0.1301 after moderation. The relationship between foreign debt and FDI in a country can be stated in an analogy : a country with high foreign debt will try to find more revenue to pay its debts, one of which is from FDI entering the country. Similarly, a research by Tanna et al. (2018) emphasized that FDI-based economic growth depends on the level of foreign debt owned by a country. When a country has a high level of foreign debt (high indebtedness), the economic growth from FDI can no longer be generated since the country will focus more on paying off its foreign debt. One of the steps taken by the state in response to this case is to improve its international tax competitiveness strategy to help increase foreign investment. If a country's domestic tax base tends to be higher than other countries, investors will move their operations to countries with a smaller tax base, and this will result in FDI outflows (Gropp & Kostial, 2001).

Foreign debt variable as moderation of trade openness weakens its effect on tax revenue, from the initial coefficient value of 1.4898 to -0.0627 after moderation. A number of studies indicate a positive relationship between foreign debt and trade openness. A research by Zakaria (2012) that trade openness has a significant positive effect on Pakistan's foreign debt. It is proven that the country's economic openness is one of the stimuli for the growth of its foreign debt. A similar relationship is shown in a study by Casares (2015) which indicated an increase in the proportion of foreign debt to GDP and a decrease in the currency exchange rate, thus it results in a relative price decrease of *non-tradable good. Non-tradable goods* are goods which are not offered to international market, such as electricity, water, or goods with high accommodation costs or specialized commodities, including the public service sectors like hotels, construction, real estate, and some others (Jenkins et al., 2011).

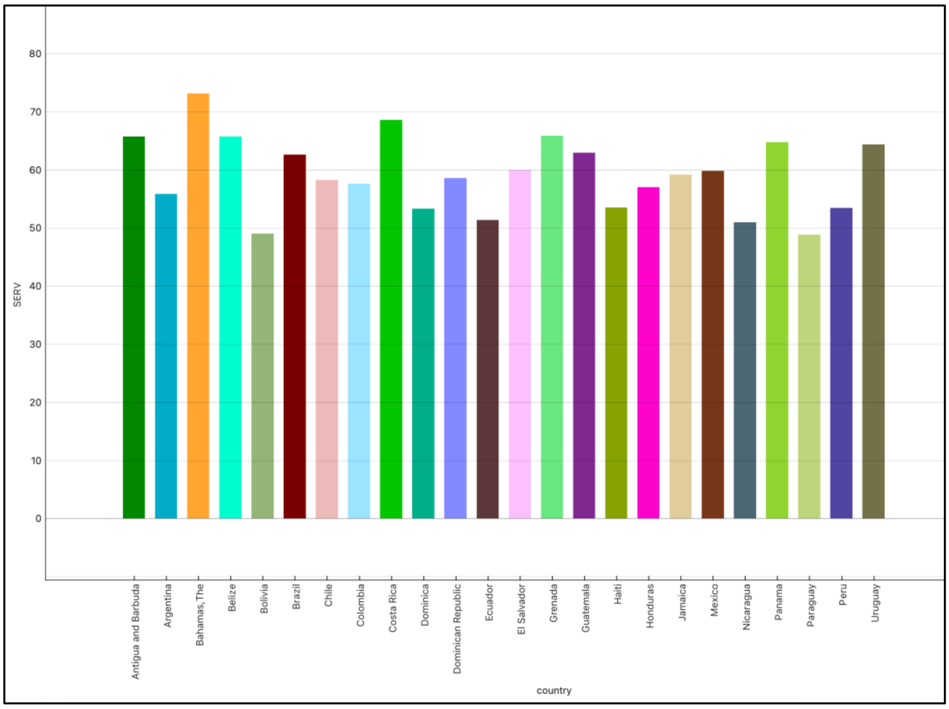

Figure 3 Service Sector Contribution to GDP in LAC in 2019, source : Worldbank

From the previous explanation given, it can be emphasized that countries in LAC tend to have a high contribution to GDP from the services sectors as shown in Figure 3. The implication is that the decline in the relative price of the services sector in LAC countries affects a decrease in tax revenue. As for the tax calculations, when the nominal transaction on which the tax base decreases, the tax imposed by the state will proportionally become lower. Therefore, it can be stated that a foreign debt will affect the trade openness on tax revenue through a decrease in the tax base of *non-tradable goods,* particularly the service sectors.

CONCLUSIONS

Tax revenue serves as the backbone of the economy in almost every country in the world. Factors affecting the amount of tax revenue generated by the state include international transaction activities. The activities can partially be represented by three variables, FDI, TO, and foreign debt. The results of the study using regression model suggest that FDI has a negative effect on tax revenue in LAC. This occurs since *brownfield* FDI dominates FDI transactions in the LAC region, particularly from China. TO has a positive effect on tax revenue, on the grounds that exports of Honduras' main product, coffee beans, are given tax incentives to stimulate growth in the sector. As a result, the export activities become better, the international trade increases, and so does the tax revenue. Furthermore, foreign debt has a positive effect on tax revenue. This is explained an analogy, that if a country is indebted, it will try to increase its state revenue, one of which is from taxes. Foreign debt as a moderating variable of FDI is able to strengthen the influence of FDI on tax revenue through a *tax competitiveness* strategy for the purposes of attracting investors to come and encouraging tax revenue to increase. Conversely, foreign debt as a moderating variable of TO, weakens its influence on tax revenue. This is due to the impact of foreign debt that causes currency devaluation and lowers the price of *non-tradable goods*, thus a decrease in the basis of tax calculation occurs, particularly in the service sectors in LAC regions. It is suggested that the regions set up more strategies to utilize FDI inflows and optimize foreign debt management in the context of tax revenue. As a study has limitations, future research is expected to involve all countries in the LAC region, add variables that represent international transactions, and consider a more recent research period.

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