



## **DETERMINANTS OF CORPORATE INCOME TAX REVENUE IN LATIN AMERICA**

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### **Abstract**

Taxes are considered as an important fiscal policy tool in catalyzing inclusive economic growth and achieving the Sustainable Development Goals. Latin America as a region with great natural resource potential, still has a narrow tax base due to problems of law enforcement, tax incentives and tariff reductions. The corporate income tax that significantly increases revenue in the Latin America/LAC region in 2019 around 3.7 percent of GDP is interesting to study. Therefore, this research was conducted to examine the determinants of corporate income tax revenue in the Latin American region. This study uses panel data on 12 countries in Latin America in the 2008-2018 period. The statistical method used is a quantitative method with multiple linear regression. Based on testing the panel-corrected standard error estimation model is the best model. The results show that all independent variables simultaneously affect tax revenue. The variables of economic growth, FDI inflows, land area, and trade openness partially have a significant positive effect on corporate income tax revenues. Meanwhile, the tax attractiveness index variable has a significant negative effect on corporate income tax revenue in the Latin American. In addition, from the moderating variable, trade openness only managed to moderate the relationship between FDI inflows and corporate income tax revenues with a weakening result and failed to moderate the relationship between economic growth and corporate income tax revenues. Based on the results of this study, it is necessary to further review the international trade policies in the Latin American region because trade openness still tends to have no effect and even weaken the positive relationship between FDI inflows and corporate income tax revenues.

**Keywords:** Corporate income tax, Latin America, Tax revenue

### **INTRODUCTION**

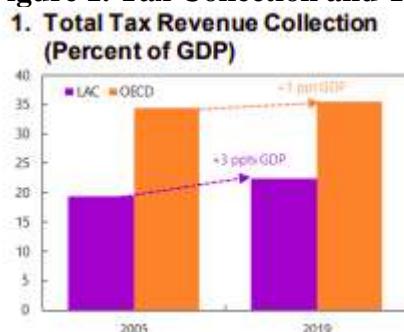
In accordance with economic theory, taxes are considered an important fiscal policy tool (Tahlova & Banociova, 2019). Fiscal policy has an important role in catalyzing inclusive economic growth and achieving the Sustainable Development Goals (OECD, 2022). In relation to fiscal policy, there are several issues that affect the rate of increase in Gross Domestic Product (GDP) and subsequently affect the capacity to build a society with income disparities (Karpowicz, 2022). These issues include (i) the size of government inflows, (ii) government spending in general, as well as (iii) its composition and (iv) the volatility of government spending, as well as (v) the stability and (vi) the composition of tax-derived revenue sources. Since spending in the long run is not possible without revenue, tax collection is very important in the implementation of economic policy.

This interest in taxation is universally true, but it is particularly true for Latin American countries. Latin America in the last three decades has experienced a high level of tax activity with several efforts aimed at reforming its countries' tax systems. Most governments that took office promised to improve the tax system to make it more manageable, easier to comply with, and fairer. However, most governments also quickly chose to tinker with the tax system rather than actually reform it. Strong political opposition to reform and administrative difficulties have been obstacles that governments have found difficult if not impossible to remove. As mentioned by Tanzi (2000) three decades ago, "with very few exceptions, Latin American countries remain allergic to income taxes".

Despite increasing over 15 years, between 2005 and 2019 from 19.4 to 22.4 percent of GDP, revenue collection including tax revenue and social security contributions in Latin American and Caribbean (LAC) countries is well below the level of OECD countries which hovered around 35.5 percent of GDP during the same period as shown in Figure 1.



**Figure 1. Tax Collection and Tax Structure in LAC and OECD Countries**



**2. Tax Structures, 2019 (Percent of GDP)**

	LAC	OECD
Value added taxes	6.3	7.2
Personal income taxes	2.3	8.8
Corporate income taxes	3.7	2.8
SSCs and payroll taxes	4.0	10.2
Other taxes	6.1	7.0
<b>Total tax revenue</b>	<b>22.4</b>	<b>35.5</b>

Source: OECD Tax Revenue Statistics Database and IMF Staff Calculations in Acosta-Ormaechea et al. (2022)

Value-added tax (VAT) is still a sizable part of the overall tax collection. This is demonstrated by several LAC countries showing higher VAT collection rates than the OECD average. However, it is interesting to compare individual income tax statistics with corporate income tax between LAC and OECD countries. LAC countries show a stronger reliance on corporate income tax while personal income tax in OECD countries holds a much higher percentage of corporate income tax. It is interesting to know the role of corporate income tax, as according to IMF (2014) that a well-designed and enforced corporate income tax, with an allowance for corporate equity to avoid the debt bias created by deducting interest from taxable profits, may be better for growth than a poorly designed and implemented VAT.

Narrow tax bases due to enforcement issues, tax incentives, and reduced rates remain a recurring weakness in Latin American countries (Acosta-Ormaechea et al., 2022).. This ultimately makes the system more complex and reduces tax efficiency. In addition, corporate income tax evasion is also a significant issue in the LAC region, with higher rates of evasion than personal income tax. ECLAC 2020) states that corporate income tax evasion rates range from 19.9% in Mexico to almost 80% in Guatemala. State revenue losses due to this tax evasion are estimated to exceed 4% of GDP in the Dominican Republic, Guatemala, Peru and Panama.

Corporate income tax raised significant revenue in the Latin America/LAC region in 2019 at around 3.7 percent of GDP (Acosta-Ormaechea et al., 2022).. This was driven by tax competition that has led to rate reductions around the world as part of the so-called 'race-to-the-bottom' process of attracting investment and the tax base. Several Latin American countries experienced an increase in corporate income tax revenue collection on average during 2005-2019 due to higher commodity prices, tariff increases (Colombia), and in some cases base broadening efforts. In this regard, several countries in the Latin American region have taken steps to rationalize tax incentives. In Uruguay for example, corporate income tax revenue increased despite a reduction in the rate from 30 percent in 2005 to 25 percent in 2019.

Over the past two decades economic growth rates in the world have varied widely. Many countries in Latin America recorded growth of less than 1.0 percent over the period 1960 to 2010. This is a far cry from the Asian Tigers, which have performed well with average per capita growth rates of more than 5.5 percent over the same period (Canavire-Bacarreza et al., 2013). And fiscal policy remains one of the most powerful tools to achieve the goals of increased economic growth and poverty alleviation in Latin America mainly because of its potential to correct market failures and increase the benefits of redistributive policies. As according to (Gaspar et al., 2015) that fiscal reforms are often followed by accelerated growth. The relationship between economic growth and tax revenue also applies vice versa where many previous studies show that economic growth also has a positive influence on overall tax revenue and in terms of income tax (Imam Syairozi & Fatah, 2017; Inriama & Setyowati, 2020; Maryantika & Wijaya, 2022; Muttaqin & Halim, 2020).



In 2008, foreign direct investment (FDI) inflows in Latin America and the Caribbean rose to a record high despite slowing down compared to the previous year. The region received US\$ 128.301 billion, 13% more than in 2007 (United Nations, 2009). Considering the economic and financial turmoil of the time, this result was positively surprising given that worldwide FDI flows shrank by 15% over the same period. The capital mobility that resulted in a sharp increase in FDI turned out to create conditions for international tax competition which meant that FDI also affected a country's tax revenue (Ghinamo et al., 2007). This is in line with research by Pratomo (2020) shows that the FDI regression results have a positive and statistically significant effect on total tax revenue, corporate tax revenue, personal tax revenue, and VAT revenue, but has no effect on land and building tax revenue (United Nation, nd).

Modern markets for all types of businesses, ranging from small to large scale, currently tend to seek locations where they have the greatest competitive advantage. This is in accordance with the theory put forward by Charles Tiebout (1956) where if citizens are faced with a series of communities that offer different types or levels of public goods and services at different costs or tax levels, then all citizens will choose the community that best satisfies their specific demands according to their respective preferences (Fritts & Walczak, 2022). Tiebout suggests that citizens with high demand for public goods will concentrate on communities with high levels of public services and high taxes while those with low demand will choose communities with low levels of public services and taxes. Meanwhile, according to Alouini & Hubert (2020) the management of public services is influenced by land area measured from the aspect of country size which in turn can affect economic growth both positively and negatively as shown by Alesina et al. (2005). With the diverse conditions of country size in the Latin American region, it is interesting to test the effect of country size variables on corporate income tax revenue. This is also supported by research from Tahlova & Banociova (2019) which states that countries with a larger land area have the potential to achieve higher corporate income tax revenues.

With increasing globalization, countries are also competing for companies to operate and invest in their regions. As income tax laws have not been globally harmonized so far, international companies also view a country's tax conditions as an important location selection factor. Corporate location decisions and the tax attractiveness of a country depend on various factors. A tax attractiveness index that includes 20 different tax components with equal weights provides a comprehensive picture of a country's tax conditions. Specifically, the tax attractiveness index includes 20 components which include anti-avoidance rules, CFC rules, corporate income tax rates, depreciation, European Union (EU) member states, group tax regime, holding tax climate, loss carryback, loss carryforward, patent box regime, personal income tax rates, research and development tax incentives, taxation of capital gains, taxation of dividends, thin capitalization rules, transfer pricing rules, treaty network, dividend tax rates withholding mechanism, interest tax rates withholding mechanism, and royalty tax rates withholding mechanism (Schanz et al., 2017). Seeing that the design of a country's tax policy affects the choice of firms which in turn has a significant influence on the size of FDI inflows (Simmons, 2003). It is interesting to know the effect of tax attractiveness index on corporate tax revenue in Latin America. This is in line with the research of Tahlova & Banociova (2019) that the tax attractiveness index that describes better tax conditions will result in higher corporate income tax revenues.

Reflecting on past experiences, the Washington Consensus encouraged many developing countries to reduce trade restrictions (Tanzi, 2000). Mexico, Bolivia, and other Latin American countries supported this trend and some of them significantly reduced restrictions on trade. Export duties, which in previous years played an important role in some Latin American countries, almost disappeared. Import duties also fell, reducing the share of tax revenue that



had been derived from import duty sources. This was a significant change in the tax structure of these countries. This created a need for the tax system to compensate for its revenue sources. This case is an important development for tax systems in the Latin American region. Tahlova & Banociova (2019) which examines the effect of trade openness specifically on corporate income tax revenues in the EU provides results that countries that are more open to trade have the potential to achieve higher corporate income tax revenues.

Previous studies on the reduction of trade restrictions measured by trade openness show that for small economies, trade liberalization helps tax reforms promote growth by increasing consumption taxes on inelastic goods (Naito & Abe, 2008). Empirical evidence from other studies also shows that the degree of international trade openness plays a positive role in increasing tax revenues by increasing output productivity and promoting economic growth so as to generate more government revenue (Bornhorst et al., 2009; Drummond et al., 2011; Stotsky & WoldeMariam, 1997). In addition, trade openness also contributes positively to FDI inflows (Liargovas & Skandalis, 2012). According to theoretical models (including neoclassical trade theory) that focus on the effects of FDI on the general welfare and tax revenue of the host country, FDI can improve national competitiveness and national welfare, mainly through increased tax revenue (Faeth, 2005). Furthermore, welfare and revenues from FDI can be maximized to their potential by imposing optimal taxes on foreign-owned capital or entities operating in the country. The existence of an indirect relationship between trade openness and tax revenue, especially corporate income tax revenue, is also interesting to be tested further as trade openness has been shown to directly affect both economic growth and FDI.

Based on the previous explanations, this study tries to identify the factors that are important for Latin American countries in collecting corporate income tax revenue. Latin America is an ideal study context for this purpose because it is one of the most homogeneous regions in the world, even more homogeneous than Asia, Africa, or Europe (Gomez-Mejia & Palich, 1997).. In addition, Latin American countries also have similar economic development based on their abundant access to natural resources such as mining, petroleum, and agriculture which are also the most important commodities exported and represent Latin America's most important commercial relations with the rest of the world (Bulmer-Thomas, 2003).

Seeing the lack of research related to the determinants of corporate income tax revenue, especially with the Latin American locus, this study was conducted with the following objectives: (1) To examine the effect of economic growth on corporate income tax revenue; (2) To examine the effect of FDI inflows on corporate income tax revenue; (3) To examine the effect of country size on corporate income tax revenue; (4) To examine the effect of tax attractiveness index on corporate income tax revenue; (5) To examine the effect of trade openness on corporate income tax revenue; (6) To examine whether trade openness can moderate the relationship between economic growth and corporate income tax revenue; and (7) To examine whether trade openness can moderate the relationship between FDI inflows and corporate income tax revenue. Thus, the results of this study are expected to provide additional references, study materials, and comparisons for further research, as well as materials for consideration to determine strategies and policies for factors that can be maximized in increasing corporate income tax revenues.

## **LITERATURE REVIEW**

### **Economic Growth Theory**

Economic growth is a complex concept that began to be discussed when Adam Smith questioned its causes in his book entitled "An Inquiry into the Nature and Causes of the Wealth of Nations" published in 1776 (Çiğdem & Altaylar, 2021). According to Myles (2009), growth is essential for improving individual welfare. Therefore, the policy to be chosen should ensure



the growth of the economy itself. One of the necessary and significant factors for economic growth is the availability of an effective taxation system. Although taxes (especially income taxes) are considered to have a temporary effect in the Neoclassical growth model. Tax rates are considered to affect the long-run growth rate or the country's stable growth rate in the endogenous growth model.

The Solow model with a constant savings rate leaves little role for tax policy to affect the growth rate. As a result, the Ramsey growth model has become more commonly used in analyzing optimal taxation. This model assumes a single consumer but can endogenize consumption, labor supply, saving and investment choices. This allows taxation to distort decisions on these four variables (Myles, 2009).

The relationship between economic growth and tax revenue has been the subject of debate among economists since 1776 until now (Smith, 2007). In periods of economic contraction, a decline is seen in taxes, which are the source of government financing, while tax revenues increase in periods of economic expansion. In this context, tax revenues in developed countries that show stable growth will receive higher tax revenues than those in developing countries with unstable growth rates (Goode, 1980). According to Tanzi (1987) in Çiğdem & Altaylar (2021) the correlation between per capita income and overall tax revenue is positive, especially for developing countries, where increased growth increases tax revenue by growing the tax base.

The corporate tax side can also be seen using the growth rate function first developed by Solow (Solow, 1956) as follows.

$$Y_i = \alpha_i K_i + \beta_i L_i + \mu_i$$

Where  $Y_i$  denotes the growth rate of real GDP in country  $i$ ,  $K_i$  is the net investment rate expressed as a share of GDP or the change in capital stock over time,  $L_i$  is the percentage growth rate of the effective labor force over time, and  $\mu_i$  measures the productivity growth of the economy as a whole. Meanwhile, the coefficients  $\alpha_i$  and  $\beta_i$  measure the marginal productivity of capital  $K$  labor, respectively.

First, high corporate taxes can be a disincentive to the level of investment ( $K$ ). In addition, higher corporate tax rates relative to personal income tax rates may cause business owners to evade taxes by underreporting corporate profits. Corporate tax policy may also hinder productivity growth by discouraging research and development (R&D) and venture capital development for industries that rely heavily on advanced technology. In addition, sectoral tax revenue will be unbalanced and lead to distortion of investment from high-tax to lower-tax sectors. It also allows for an inefficient allocation of labor, so that tax policy alters the marginal productivity of labor (Forbin, 2012).

To put it another way, the conventional method of measuring economic growth is to calculate a country's quarterly or annual change in GDP or GNP with the following equation.

$$GDP = C + I + G + EX$$

Taxes directly affect all four of the above GDP determinants. Corporate taxes mostly have a direct influence on investment. It also determines government spending decisions as taxes are one source of government revenue. Corporate tax rates also reflect a country's level of attractiveness for businesses, with the potential to stimulate export output, create more jobs and thus generate consumption income (Forbin, 2012).

### **Tobin's Q Investment Theory**

Tobin's  $q$  theory of investment is an important and widely used theory in the tax-investment literature (Klemm & Van Parys, 2012).. This approach offers an alternative to neoclassical thinking to explain how taxation can affect FDI. The neoclassical investment theory used in the taxation and investment literature was written by Jorgenson (1963). According to Jorgenson (1963), a fundamental feature of the neoclassical theory of optimal



capital accumulation is how derived capital demand reacts to relative input prices. Romer (1996) explains the neoclassical investment model with adjustment costs that the firm's objective is to maximize the net present value (NPV) of profits.

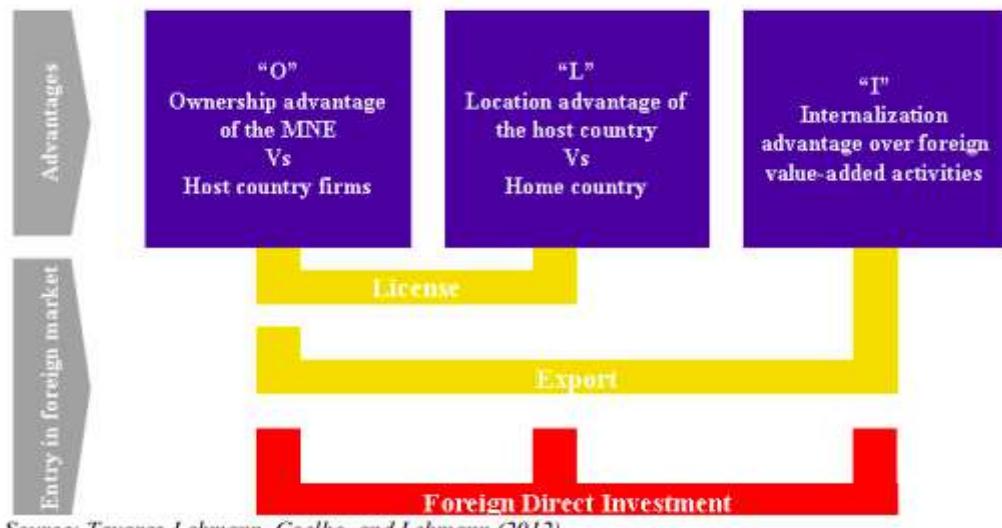
Romer (1996) states that the enterprise value of a unit of capital at time  $t$  summarizes all information about the future that is relevant to the firm's investment decision. This implies that what matters for the firm's investment decision is the marginal  $q$  (i.e. the ratio of the market value of the marginal unit of capital to its replacement cost). Parys & James (2010) stated that the argument underlying neoclassical investment theory is that firms will invest until the benefits of investment equal the cost of capital accumulation. In other words, as long as the benefits or net present value of the company's future cash flows are greater than the cost of capital, it will be profitable to continue investing. This fact is supported by Shah & Ahmed (2002) who found that the cost of capital has strong implications for investment.

### **Ownership, Location, and Internalization (OLI) Framework - The Eclectic Paradigm**

According to Faeth (2009) the first general theoretical attempt to explain FDI was from the Heckscher-Ohlin model of trade theory. Faeth (2009) says the model has criticized assumptions that led to the emergence of Multinational Enterprise (MNE) theory. Denisia (2010) supports this claim and explains that neoclassical trade theory fails to explain the existence of multinational enterprises. This led to the emergence of MNE theories such as the ownership advantage theory based on Hymer (1960) and the theory of location advantage and internalization (Buckley & Casson, 2003). From these pre-existing theories, Professor Dunning brought together the ownership, location, and internalization theories to formulate what is called the eclectic paradigm or OLI paradigm of FDI (Dunning, 2001).

Letto-Gillies (2012) in Daniel Mudenda (2015) stated that Dunning's approach to internalization consists of an attempt to analyze why, where, and when/how in terms of ownership, location, and internalization (OLI) gains. Bellak & Leibrecht (2009) through an eclectic paradigm asserts that FDI flows arise if firms have ownership, location, and internalization (OLI) advantages. Coelho (2009) discusses this advantage theory based on the model presented in Figure 2.

**Figure 2. Relationship between OLI Advantage and International Activity**



Source: Tavares-Lehmann, Coelho, and Lehmann (2012)

Source: Daniel Mudenda (2015)

To explain the three primes, the following justifications of ownership, location, and internalization (OLI) influence FDI and MNE presence (Eden & Dai, 2010). (i) The investing firm has a certain net ownership advantage over other businesses from other countries in serving a particular national market. This advantage is referred to as the ownership advantage ('O') in



the OLI paradigm. Such firm-specific advantages as described by Coelho (2009) are advantages such as technical capabilities, human skills and competencies, ability to leverage financial resources, product differentiation, economies of scale, and firm size. (ii) Secondly, it is emphasized that MNE investments actually emphasize utilizing the benefits of own ownership as opposed to allowing other companies from other countries to utilize them through leasing or selling. When this ability is possible, it is known as internalization advantage ('I'). So utilizing ownership advantages allows firms to internalize profits by controlling foreign investment ventures. (iii) Finally, investment firms in the form of MNEs enjoy profitability through overseas subsidiaries if they capitalize on this net ownership advantage by combining production factors from outside the home country with production factors from the host country. This strategy is referred to as location advantage ('L'). Eden & Dai (2010) emphasize that it is through this advantage that taxation affects FDI. Coelho (2009) points out that these location advantages include cultural, legal, political and institutional, as well as government laws and policies such as taxation and corporate activities.

From the previous analysis, it is clear that Eden & Dai (2010) directly state that taxes affect FDI through location advantage or 'L'. However, Hajkova et al. (2007) stated that in principle taxes can affect FDI through all three OLI advantages. For example, since taxation can influence the decision of MNEs to invest abroad, then the tax treatment of royalties and dividend profits will be related to ownership advantages. With respect to location advantage ('L'), taxation determines the competitiveness of the host country compared to other potential FDI destinations. And for internalization, Hajkova et al. (2007) show that corporate taxation can affect the extent to which MNEs enjoy internalization. This is due to the possibility that taxation may affect the wedge between pre-tax and after-tax FDI rates of return. This internalization as already explained is where the firm itself utilizes the benefits of ownership rather than allowing another firm from another country to lease.

### **New Trade Theory**

The new trade model incorporates four innovations in neoclassical economics: market imperfections, strategic behavior and new industrial economics, new growth theory, and political economy arguments. While much of the literature linking trade and new growth theory supports trade liberalization (primarily on the basis of knowledge spillovers), there is also the possibility that free trade can be detrimental to economic growth (Deraniyagala & Fine, 2001). Leahy & Neary (1996) considered the issue in the context of R&D competition as according to Durkin Jr. (1997) that the pursuit of comparative advantage in generating technological progress can itself lead to inefficiency.

### **Hypothesis**

Based on previous research by Tahlova & Banociova (2019) which aims to determine the determinants of corporate income tax revenue in EU-28 member countries during the period 2007-2016, it is found that the factors that affect the level of corporate income tax revenue include the following.

**Economic growth:** This variable is used to measure the corporate sector expressed by GDP growth. The model generated from Tahlova & Banociova's (2019) research confirmed the significance of the GDP growth variable on corporate income tax revenue. With the increasing level of GDP, the corporate sector will also experience growth which will lead to an increase in corporate income tax revenue.

**FDI inflows:** This variable describes the influence from the international side where an increase in the share of FDI in relation to GDP leads to capital growth in the country which in turn leads to the growth of the corporate sector and thus to an increase in corporate income tax receipts. Tahlova & Banociova's (2019) research model demonstrates the fact that international influences currently determine the trend of corporate income tax revenue. As a statistically



significant variable, FDI inflows have a positive relationship with corporate income tax receipts.

Country size: In the research of Tahlova & Banociova (2019), the country's land area is a dummy variable where if the country's land area is greater than the country's land area according to the sample average of all EU-28 member countries, it will be assigned a value of one. In the Fixed Effect model, this variable shows positive and significant results on corporate income tax revenue.

Tax attractiveness index: This variable describes the perception of taxation observed from the tax attractiveness index with a value from the interval 0 to 1. The growth of the tax attractiveness index assumes more favorable legislative and tax conditions and a tax environment that makes it more attractive to entities both at home and abroad. This variable is one of the factors that can improve the corporate sector and subsequently this index has a positive effect on the trend of corporate income tax revenue.

Trade openness: Besides country size, this variable is also used as a dummy variable by Tahlova & Banociova (2019) with positive and significant results.

To answer the research objectives, based on theory and previous research, the hypotheses that form the basis of this research are as follows:

- H1: Economic growth affects corporate income tax revenue.
- H2: FDI inflows affect corporate income tax revenue.
- H3: The size of the country affects corporate income tax revenue.
- H4: Tax attractiveness index affects corporate income tax revenue.
- H5: Trade openness affects corporate income tax revenue.
- H6: Trade openness affects the relationship between economic growth and corporate income tax revenue.
- H7: Trade openness affects the relationship between FDI inflows and corporate income tax revenue.

## METHODS

This study uses secondary data taken from the Economic Commission for Latin America and the Caribbean (ECLAC), the publication of (Schanz et al., 2017) and the World Bank with the scope of research limited to countries in Latin America from 2007 to 2018. The limited data available in the source also makes this research only cover 12 countries in Latin America, namely Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru, and Uruguay.

The variables used in this study refer to previous research with the operational definition of variables presented in Table 1.

**Table 1. Variable Description**

<b>Dependent Variable</b>	<b>Notation</b>	<b>Definition (Unit of Measure)</b>
Corporate Income Tax Revenue	CITR	Percentage of total corporate income tax revenue (central tax) to GDP (% of GDP)
<b>Independent Variable</b>	<b>Notation</b>	<b>Definition (Unit of Measure)</b>
Economic Growth	Growth	Growth rate of total GDP at constant prices (percentage)
FDI Inflows	FDI	Net inflows (% of GDP)
Country Area	LnLand	Natural logarithm of a country's total area, excluding the area under inland waters, national claims to the



		continental shelf, and exclusive economic zone (square km)
Tax Attractiveness Index	TaxAttractive	20 different tax components with the same weight (index)

<b>Moderating Variable</b>	<b>Notation</b>	<b>Definition (Unit of Measure)</b>
Trade Openness	Open	Total exports and imports (% of GDP)

The method used in this research is the panel data regression analysis method. Panel data regression analysis is a method that combines cross section data and time series data. The panel data regression analysis procedure consists of several steps. After preparing the data with a panel data structure, then select the appropriate model from the common effect, fixed effect, or random effect options to estimate the panel data. The next step is to test classical assumptions such as normality, nonmulticollinearity, homoscedasticity, and nonautocorrelation. After testing classical assumptions, tests will be conducted to assess the relationship and influence between variables by looking at the coefficient of determination, simultaneous tests using the F-test, and partial tests with the t-test. Then we can interpret the panel data regression to understand the results and implications of the analysis that has been carried out.

The panel data regression model that will be used is a model that is selected based on the test results (Baltagi, 2005) which can be seen in Table 2.

**Table 2. Panel Data Model Selection Test**

<b>Panel Data Model Test</b>	<b>Null Hypothesis</b>	<b>Alternative Hypothesis</b>
Breusch and Pagan		
Lagrangian Multiplier (BPLM) test	CEM is better than REM	REM is better than CEM
Chow Test	CEM is better than FEM	FEM is better than CEM
Hausman Test	REM is better than FEM	FEM is better than REM

After the best model is selected, classical assumptions are tested that must be met in applying the panel data regression model. (Gujarati, 2003). The classical assumption test can be seen in Table 3.

**Table 3. Classical Assumption Test**

<b>Assumption Test</b>	<b>Null Hypothesis</b>	<b>Alternative Hypothesis</b>
Normality	Data is normally distributed	Data is not normally distributed
Multicollinearity	Non-multicollinearity data	Data multicollinearity
Heteroscedasticity	Data variance is homoskedastic	Data variance is heteroscedastic
Autocorrelation	Non-autocorrelation model	Autocorrelation model

Next, the Goodness of Fit test is carried out, which is a test to evaluate how well the selected regression model explains the relationship and influence of the independent variables on the research dependent variable. First, it can be seen from the coefficient of determination of the panel data regression model which provides information on how much variation in the dependent variable can be explained by the independent variables in the model. Second, a simultaneous test is conducted using the F-test. If the p-value of the F-test is smaller than the predetermined significance level ( $\alpha$ ), it can be concluded that together all the independent variables in the regression model affect the dependent variable of the study. Third, a partial test is conducted using the t-test for each regression coefficient. If the p-value of the t-test is smaller than the significance level ( $\alpha$ ), it can be concluded that each independent variable partially affects the research dependent variable, either with a positive or negative relationship according to the resulting regression coefficient value (Walpole et al., 2012).



## RESULTS AND DISCUSSION

It is first necessary to understand the characteristics of the variables studied through descriptive analysis shown in Table 4.

**Table 4. Descriptive Analysis**

Variables	Mean	Std. dev.	Min	Max
CITR	3.119338	1.295199	0.698	6.6983
Growth	3.702526	2.582189	-5.285744	12.11266
FDI	4.134017	2.78911	-0.8970824	12.67247
Land	1,266,250	2,227,073	20,720	8,358,140
TaxAttractive	0.3447917	0.0700646	0.17	0.47
Open	62.79275	26.85412	22.10598	166.6985

Source: STATA 17, processed by the author (2023)

Based on table 4, summary statistics are obtained which contain the mean value, standard deviation, minimum value, and maximum value of each variable tested in this study. During the study period, from 2007 to 2018, the average value of corporate income tax revenue in 12 Latin American countries was only 3.12% of GDP with a minimum value of 0.7% in Ecuador in 2010 and a maximum value of 6.7% for Chile in 2007. As for other variables, the average value is 3.7% for economic growth, 4.13% for FDI inflows, 1,266,250 square km for country size, 0.34 for tax attractiveness index, and 62.79% for trade openness.

To find the best panel data regression model to describe the determinants of corporate income tax revenue in Latin America, the Chow test, Hausman test, and BPLM test are summarized in Table 5.

**Table 5. Panel Data Model Test**

Test	Prob. Value	Conclusion
BPLM	0.0000	REM is better than CEM
Chow	0.0000	CEM is better than FEM
Hausman	0.9630	REM is better than FEM

Source: STATA 17, processed by the author (2023)

This means that the random effect model is the best model to describe the determinants of corporate income tax revenue in Latin America. Then, to determine the fulfillment of classical assumptions, a test is conducted with a summary of the results as listed in Table 6.

**Table 6. Classical Assumption Test**

Test	Prob. Value	Conclusion
Normality	0.2035	Data is normally distributed
Heteroscedasticity	0.0481	Data variance is heteroscedastic
Autocorrelation	0.0001	Autocorrelation model

### Multicollinearity Testing

Variables	Variance Inflation Factor
FDI*Open	29.37
Growth*Open	18.08
FDI	11.33
Open	8.04
Growth	6.26
LnLand	1.86
TaxAttractive	1.47



Source: STATA 17, processed by the author (2023)

From the test results, it can be seen that this panel data regression model does not meet the multicollinearity test, heteroscedasticity test, and autocorrelation test. The multicollinearity problem in this regression model can be ignored as one of the rules of thumb in the use of panel data which is a combination of cross section and time series data (Gujarati, 2003). As for the autocorrelation and heteroscedasticity problems, if the violation of these two assumptions occurs simultaneously, the model chosen in the study can use the panel-corrected standard error/PCSE panel estimation method (Hoechle, 2007).

After selecting the PCSE panel estimation model, the Goodness of Fit test results can be seen in Table 7.

**Table 7. Goodness of Fit Test**

Variables	Coefficient	Panel-corrected std. err.	z	P> z
_cons	1.981998	1.060561	-1.87	0.062
Growth	0.1364421	0.0598785	2.28	0.023
FDI	0.4042497	0.0945446	4.28	0.000
LnLand	0.3016179	0.0376346	8.01	0.000
TaxAttractive	-3.221521	1.260984	-2.55	0.011
Open	0.0247062	0.0060113	4.11	0.000
Growth*Open	-0.0007821	0.0008659	-0.90	0.366
FDI*Open	-0.0040023	0.0011817	-3.39	0.001
R-squared	0.3832			
Prob > chi2	0.0000			

Source: STATA 17, processed by the author (2023)

From the goodness of fit test results, it can be seen that the coefficient of determination (R-squared) generated from the PCSE model is 0.3832. This result means that all independent variables together are able to explain changes in the value of the dependent variable by 38.32%. While the remaining 61.68% is influenced by other variables not tested in this study. While the F-test results provide the result that the independent variables simultaneously have a significant effect on the level of corporate income tax revenue as the dependent variable.

After testing simultaneously, the effect of independent variables partially is also tested with the t-test. This test is done by looking at the P>|z| value on each independent variable. Table 7 shows that all independent variables and moderation variables have a significant effect on the dependent variable, only the economic growth variable that has been moderated by trade openness partially has no effect on the dependent variable. So that from these results can be described in the following equation.

$$\begin{aligned}
 CITR_{it} = & -1.981998 + 0.1364421Growth_{it} + 0.4042497FDI_{it} + 0.3016179LnLand_{it} \\
 & - 3.221521TaxAttractive_{it} + 0.0247062OPEN_{it} \\
 & - 0.0007821Growth * Open_{it} - 0.0040023FDI * Open_{it}
 \end{aligned}$$

### **The Effect of Economic Growth on Corporate Income Tax Revenue**

Based on the t-test results in Table 7, the regression coefficient value is positive at 0.1364421 and the probability value is 0.023. This result means that a 1 percent increase in economic growth will increase the percentage of corporate income tax revenue to GDP by 0.14%. This is in line with the research of Tahlova & Banociova (2019) where corporate income tax revenues can be compared in relation to GDP or overall tax revenue. In addition to depending on the tax system itself, corporate income tax revenues also depend on the size of the corporate sector and the relative size of corporate income in relation to GDP. In this regard, all countries in Latin America have required or recommended a corporate governance



framework that focuses on the business climate to enable investors to assess credibility and progress in achieving sustainability goals (OECD, 2023).

Increased economic growth can also increase tax revenue through per capita income. When people's per capita income increases, this will be followed by an increase in tax payments, especially income tax, both for corporations and individuals (Imam Syairozi & Fatah, 2017). This is also consistent with the theory of economic growth where when GDP increases, production and company business activities will also grow. This leads to an increase in business income and profits that affect the increase in corporate income tax revenue (Inriama & Setyowati, 2020).

### **The Effect of FDI Inflows on Corporate Income Tax Receipts**

Based on the t-test results in Table 7, the regression coefficient value is positive at 0.4042497 and the probability value is 0.000. This result means that a 1 percent increase in FDI inflows will increase the percentage of corporate income tax revenue to GDP by 0.40%. This result is in line with the research of Tahlova & Banociova (2019) where the increasing impact of international influence observed through the inflow of foreign direct investment causes growth in the corporate income tax revenue variable.

The existence of the relationship between FDI and corporate income tax revenue is also in accordance with Tobin's Q investment theory where corporate investment decisions described by FDI inflows affect the replacement cost which in this study is described by corporate income tax revenue, or internalization according to the eclectic paradigm. FDI is more influential on income tax revenue in countries that are highly dependent on natural resources and countries that are not tax haven countries (Gnangnon, 2021). Latin America as a region with very rich natural resource potential shows that one way for policymakers to increase the stability of corporate tax revenue is to ensure the stability of FDI inflows. Foreign capital flows, especially these FDI flows play an important role for the country's economic development through, among others, technology transfer, job creation, and economic growth which in turn can increase firm productivity (Santos, 2023). Increased firm productivity will be in line with firm profits (The Donor Committee for Enterprise Development, n.d.) which in turn attracts greater corporate income tax revenue.

### **The Effect of Country Size on Corporate Income Tax Revenue**

Based on the t-test results in Table 7, the regression coefficient value is positive at 0.3016179 and the probability value is 0.000. This result means that countries with larger land areas tend to get greater corporate income tax revenues. This positive result is in line with Tahlova & Banociova (2019) although in previous studies the size of the country was only calculated as a dummy variable. This is related to land as a factor of production where in the early days of economics, land played a significant role in the main economic sector at that time, namely agriculture. Once agriculture became less important relative to trade, industry and services, the land factor received less attention.

However, land actually plays a major role in specialized sub-fields of the economy such as regional and urban economics. In the neo-classical concept, marginal cost will be equal to marginal productivity which means that firms will acquire the optimal amount of land from a cost and productivity perspective. Therefore, firms tend to own more land than necessary. While this decision is considered inefficient for the community who are the land users, it is rational in the eyes of the firm (Metzemakers & Louw, 2005). Rationally, this land will be cultivated and make the company earn additional income, so there will be corporate income tax levied on the additional income.

### **The Effect of Tax Attractiveness Index on Corporate Income Tax Revenue**

Based on the t-test results in Table 7, the regression coefficient value is negative at 3.221521 and the probability value is 0.0011. This result means that an increase of 1 tax



attractiveness index will reduce the percentage of corporate income tax revenue to GDP by 3.22%. The coherence of interpretation between tax attractiveness index and corporate income tax revenue is still very rare. The index is a reflection of the political, economic, social, tax, and corporate environment (Tahlova & Banociova, 2019).

This result is in accordance with the measurement of tax attractiveness index where the closer to 1, the happier the company will be to invest or do business in that country. From the elements forming the tax attractiveness index, for example regarding anti-avoidance rules, for countries that do not have anti-avoidance rules will be given an index of one, vice versa (Schanz et al., 2017). So basically, the amount of tax attractiveness index will be inversely proportional to tax revenue, especially corporate income tax. Because the better a country's tax rules are applied, the more reluctant companies are to invest or run their business in that country and result in non-optimal corporate income tax revenues.

### **Effect of Trade Disclosure on Corporate Income Tax Revenue**

Based on the t-test results in Table 7, the regression coefficient value is positive at 0.0247062 and the probability value is 0.0000. This is in line with previous studies, that international trade openness plays a positive role in increasing tax revenue by increasing output productivity, reducing barriers, facilitating export-import activities which ultimately encourage economic growth so as to generate more revenue from the tax sector, especially corporate income tax (Listikarini & Wijaya, 2023; Shubita & Warrad, 2018).

### **Trade Openness Moderates Economic Growth on Corporate Income Tax Revenue**

The test results show that trade openness is not able to moderate the effect of economic growth on corporate income tax revenue. This is because the probability value is 0.366, which means that the effect of trade openness on the relationship between economic growth and corporate income tax revenue is insignificant. This may be due to the role of trade openness which has a greater effect on VAT and taxes on imports (Brun & Kimm Gnangnon, 2017). Moreover, if we look back at the tax structure in Latin American countries which is still dominated by VAT, the effect of trade openness on the relationship between economic growth and corporate income tax revenue is too weak or insignificant.

### **Trade Openness Moderates FDI Inflows on Corporate Income Tax Receipts**

The results of testing this hypothesis show that trade openness can moderate the effect of FDI inflows on corporate income tax revenue. The regression results obtained show a negative regression coefficient of -0.0040023. This shows that trade openness weakens the relationship between FDI inflows and corporate income tax revenues. Based on Pratomo (2020), this may be because policymakers only focus on how to attract as much FDI inflows as possible to the country by opening trade through trade liberalization, but do not ensure that FDI will erode tax revenues due to transfer pricing, massive tax incentives, and unbalanced competition with domestic companies. For this reason, governments in the Latin American region need to formulate policies that invite FDI for industries that do not undermine the main products of the host country. The selection of FDI that does not harm the development of domestic industries due to monopoly will result in a policy that is sustainable with tax revenue.

## **CONCLUSIONS**

The results of research on the determinants of corporate income tax revenue in the Latin American region from 2007 to 2018 show that simultaneously all variables affect tax revenue. Economic growth variables, FDI inflows, country size, and trade openness partially have a significant positive effect on corporate income tax revenues. While the tax attractiveness index variable has a significant negative effect on corporate income tax revenue in the Latin American region. In addition, judging from the moderation variable, trade openness only succeeded in moderating the relationship between FDI inflows and corporate income tax revenues with



weakening results, and did not succeed in moderating the relationship between economic growth and corporate income tax revenues. Based on the results of this study, it is necessary to further review international trade policies in the Latin American region because trade openness still tends to have no influence and even weaken the positive relationship between FDI inflows and corporate income tax revenues.

This study still has limitations, especially in the research locus that has not been able to examine the determinants of corporate income tax revenue in all countries in the Latin American region. In addition, seeing the coefficient of determination of this study which only amounted to 38.32%, it is expected that future researchers can add other variables to find out what other factors affect corporate income tax revenue.

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