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Relationship between value-added tax and company growth

Relación entre el impuesto sobre el valor agregado y el crecimiento de las empresas

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Abstract

The purpose of this research was to verify the relationship between the Value Added Tax (VAT) rate and the growth of companies. For this, the research took into account that VAT makes up the price of all goods and services consumed in the country and that the price paid has as limitation the predisposition for consumption due to its level. Given this, the investigation started from the possibility that companies have to absorb part of possible increases in the VAT rate, which indirectly would cause a negative impact on the growth rate of companies. Thus, the analysis of growth was proposed in two dimensions: the growth of revenues and the growth of assets. Finally, to establish the analysis of the impact of VAT, and its increase, in the growth of companies, a representative variable of the two growth dimensions was constructed, in an analysis by main components, through the orthogonal transformation, with the greatest possible variance, between the growth of the income of the total assets. The results validated the structural model of the research, finding a negative influence of the VAT on the growth of the companies, affecting the decisions of future investment.

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JEL Code: K34, M21, M41, O23
Keywords: growth of companies; tax on consumption; VAT; indirect taxation

Resumen

Esta investigación tuvo como propósito verificar la relación entre la alícuota del Impuesto sobre el Valor Agregado (IVA) y el crecimiento de las empresas. Para eso, la investigación tuvo en cuenta que el IVA compone el precio de todos los bienes y servicios consumidos en el país y que el precio pago tiene como limitación la predisposición para el consumo debido al su nivel. Visto esto, la investigación partió de la posibilidad de que las empresas tengan que absorber parte de eventuales elevaciones en la alícuota del IVA, lo que indirectamente causaría un impacto negativo en la tasa de crecimiento de las empresas. Así, se propuso el análisis del crecimiento en dos dimensiones: el crecimiento de los ingresos y el crecimiento de los activos. Por último, para establecer el análisis del impacto del IVA, y su aumento, en el crecimiento de las empresas, se construyó una variable representativa de las dos dimensiones de crecimiento, en un análisis por componentes principales, por intermedio de la transformación ortogonal, con la mayor varianza posible, entre el crecimiento de los ingresos de los activos totales. Los resultados validaron el modelo estructural de la investigación encontrando una influencia negativa del IVA en el crecimiento de las empresas, al afectar en las decisiones de inversión futura.

Código JEL: K34, M21, M41, O23
Palabras clave: crecimiento de las empresas; impuesto sobre el consumo; IVA; impuestos indirectos

Introduction

Taxation on consumption has the characteristic of determining the price of goods and services produced and offered in a country. Thus, fluctuations in these rates have the characteristic of interfering in the economy since, in theory, consumption taxes would be paid by the consumer in the purchase price. In the Brazilian tax system, consumption taxation is complex, compared to other countries, where consumption taxation is exclusively the responsibility of the Value Added Tax (VAT). In Brazil, the consumption tax is divided into three taxes. Each tax belongs to one of the three levels of the Federation: Federal Union, States, and Municipalities. The Union levies the Tax on Industrialized Products (Portuguese: Imposto sobre Produtos Industrializados, IPI); the States levy the Tax on the Circulation of Goods and Services (Portuguese: Imposto sobre Circulação de Mercadorias e Serviços, ICMS); and the Municipalities levy the Tax on the Provision of Services (Portuguese: Imposto sobre Serviços, ISS). The IPI, ICMS, and ISS make up the Value Added Tax (VAT), levied on all goods and services consumed.

However, among the three Brazilian taxes associated with VAT, the one that best represents the determining tax on consumption is the ICMS. This tax refers to all goods circulating throughout the Brazilian territory as well as telecommunications, energy, and inter-municipal and interstate transportation

services provided in Brazil. Although the ICMS is not related to the consumption of a service, it is reflected in its price by a rebound effect. Normally, the inputs used for the provision of the service or production and the sale of any merchandise served as the basis for the collection, at some point, of the ICMS. Thus, this study considers ICMS as the Brazilian VAT.

Studies related to demand and supply, based on economic theories, explain that the market will not always be willing to pay any price for goods, sometimes imposing its reduction to reach market equilibrium (Keynes, 1936; Musgrave & Musgrave, 1983). Thus, when there is an increase in VAT rates, there may be no alternative for companies but to absorb the cost of an eventual increase in the tax burden on the price of goods and services. The absorption of this cost may compromise the generation of future cash flows of companies, affecting the return on invested equity and discouraging reinvestment. In this regard, the increase in the VAT rate will likely negatively impact the growth of companies, which is the motivation for the following research.

Damodaran (2012) emphasizes that the value of the company is linked to its expected cash flow generation and that the growth rate is the most widely used index for projecting future revenues and profits. Despite this, the impact of VAT on growth and value generation in companies is an issue that has been little explored in the scientific literature. Caldeira (2006) confirms the importance of this topic when he stresses the importance of researching it since the tax issue is a variable of fundamental importance for the value composition of organizations.

Among the existing evidence in the literature, Caldeira (2006) notes that it is limited to investigating the influence of income taxes. However, he neglects taxes that indirectly affect sales, which can impact income and, consequently, the financial results of companies (Rezende, Pereira, & Alencar, 2010). This influence is perceptible insofar as the taxes levied on operating activities and as income taxes directly affect competitiveness and are influenced by the fiscal policy of the government (Riani, 1997). Taxes even influence the calculation of the gross operating earnings, reactively modifying the liquidity and profitability of organizations. Thus, the research problem is identifying the relationship between the VAT rate and the growth of companies.

In this context, this research aims to verify the relationship between the VAT rate and the growth of companies using the Brazilian market as a reference. For growth, the study took into account two measures, the growth of total assets and the growth of net income of the company. Then, as a robustness test, a principal components analysis was performed using an orthogonal transformation to convert into a variable with the highest possible variance between the two proposed growth measures.

This research is relevant because it discusses the economic implications of the influence of VAT on the growth of companies, especially the sensitivity of companies to changes in the tax burden in times of economic recession and especially in taxes related to their operating activities.

This research also contributes to the scientific literature due to the opening of new perspectives through tax accounting and company growth. It provides relevant evidence that supports further studies in these areas. Moreover, the research also contributes to the market concerning investment decision-making in environments of economic recession and tax increases.

Theoretical principles

VAT controls high values in the economy since it affects almost everything that is consumed within countries. The scope of its effects covers both essential goods and services, such as transportation, telephone systems, and telecommunications, and superfluous products that have even higher rates, such as cosmetics, alcoholic beverages, and cigarettes (Rezende, Pereira, & Alencar, 2010). Therefore, it is reasonable to consider that variations in its rate impact the absolute majority of companies in the market and, in periods of economic recession, its influence is even greater on the growth of companies.

The average VAT rate in Latin America is around 15%. The highest rate is found in Uruguay, at 22%, affecting almost all goods and services consumed within its territory, and in Argentina, at 21%, which corresponds to the most significant tax for its finances, where it is the responsibility of the Federal Administration of Public Revenues (Spanish: Administración Federal de Ingresos Públicos, AFIP) to collect it. The countries with the lowest percentage are Paraguay (10%) and Panama (7%). Cuba is one of the countries that do not charge VAT, and Puerto Rico introduced it in 2016 (Seitz, 2015).

In Brazil, VAT is called Tax on the Circulation of Goods and Services (ICMS) and is a tax under the jurisdiction of the States, accounting for more than 85% of its collection and representing, in 2015, 4.5% of the national GDP (Landim, 2016). Brazil is the largest economy in Latin America and the only country in the region to oblige companies to disclose the Value Added Tax Return (Portuguese: Demonstração do valor adicionado, DVA), where it is possible to extract the information necessary to calculate the approximate VAT in the period. It is important to observe the reflection of VAT in the growth of companies, given the possibility that companies are forced to assume part of the burden of this tax to minimize the reduction in demand.

In an environment of economic crisis and global competition, companies need to be as efficient as possible in their management to stay in business and not perish in the marketplace and react quickly to technological, economic, and political changes. Companies need to continuously expand their innovation capacity, modernizing and seeking better strategic positioning against their market competition (Santos, 2008). However, all these improvements in management must go through their expenses since they are decisive for companies to maintain a minimum competitiveness level in the market.

Thus, companies became concerned with their operating costs and their tax costs, which have been a determining factor in managers' decision-making processes (Noble, Souza, & Almeida, 2006). The opportunity cost verified in the activities carried out by the companies is constantly measured using tax planning as a tool in order to reduce the tax cost or even abandon the activity or operation when these costs exceed the profit expected by the minimum rate of return of investors (Martins & Dantas, 2010). Thus, the increase in the VAT tax cost may discourage companies from reinvesting and growing when the expected return and the risk assumed are weighed against the costs of the activity in which taxes appear to compete predominantly.

VAT is an indirect tax applied on consumption, i.e., it is financed by the final consumer. At this point, its collection will directly affect the price of goods since its variation determines the higher or lower value to be paid in the final price for goods, services, commercial transactions, and imports.

Latin American VAT rates are not the highest in comparison with other countries in the world, such as Hungary (27%), Denmark, Norway, Sweden, and Croatia (25%) or Finland, Iceland, and Romania (24%). However, VAT in Latin American countries has a considerable impact on the public treasury and the national economy, as can be seen in the percentage applied in each country, as displayed in Table 1.

Table 1
Latin American countries that charge VAT

Latin American countries in descending order of VAT rates			
1. Uruguay	22%	10. Costa Rica	13%
2. Argentina	21%	11. El Salvador	13%
3. Chile	19%	12. Ecuador	12%
4. Peru	18%	13. Guatemala	12%
5. Dominican Republic	18%	14. Venezuela	12%
6. Brazil	17 – 18%	15. Puerto Rico	11.5%
7. Mexico	16%	16. Paraguay	10%
8. Colombia	16%	17. Panama	7%
9. Bolivia	13%		

Source: created by the authors

Table 1 shows that the VAT rate charged by Latin American countries varies between 22% in Uruguay and 7% in Panama, while the average is 15%. In European countries, it is around 21.1%, between 15% (Luxembourg) and 27% (Hungary) (EUROPA.EU., 2016).

As VAT includes the value paid for the goods or services sold, it is necessary to observe the Economic Theory, which explains that the market will not have the capacity to absorb the entire price increase in the value of the goods sold or services rendered. The above forces companies to wholly or partially absorb tax expenses with eventual increases in the VAT rate, thus decreasing their contribution margin (Keynes, 1936). At this point, the tax cost that VAT can represent for companies becomes obvious,

as a consequence of the impossibility of passing on its increase to the price of goods or services, modifying investment decisions, depending on the decrease in profits earned.

Harberger's triangle highlights the effect of taxation on the economy. It refers to the study resulting from the deadweight loss (excess weight or allocative inefficiency) caused by taxes in the markets due to government intervention, generating losses in tax revenue due to economic inefficiency. It may be observed that the triangular shape becomes more marked with the change in tax incidence as a third vertex on the supply and demand curve line. There, it is possible to glimpse that the greater the tax intervention of the government, the lower the quantity consumed. The above is due to the contraction of demand in the face of the increase in the prices of the goods and services offered caused by the increase in taxes (Harberger, 1995).

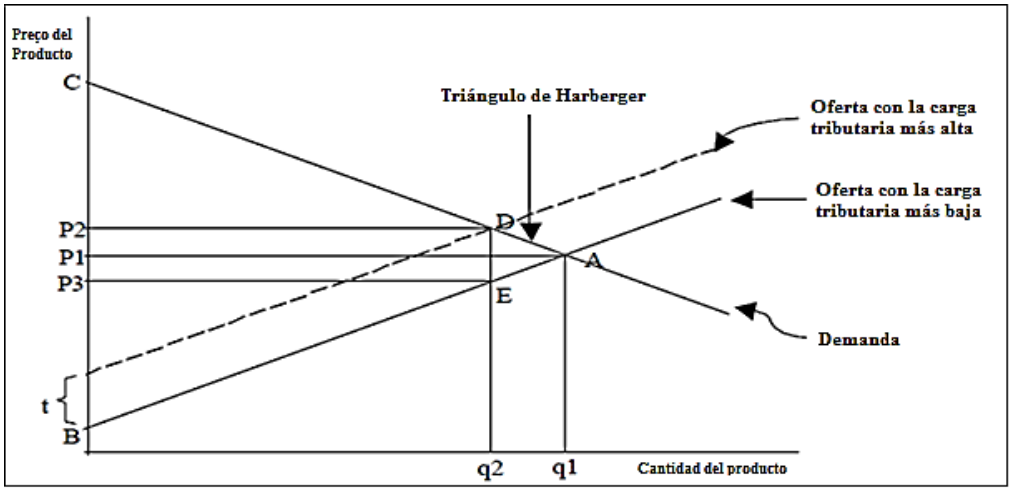


Figure 1. Harberger's triangle
Source: adapted from Hines JR (1998)

Figure 1, according to Harberger (1995), illustrates that in the absence of taxes, the market equilibrium is represented by point "A." In this scenario, companies sell quantity "q_1" of goods at a price "p_1." Here, the rectangle formed by points "B," "q_1," "A," and "P_1" represents the value received by the company, while the triangle formed by points "C," "P_1," and "A" is the consumer surplus. With the introduction of taxes at a rate "t," there is a shift of the supply line to a higher level (represented by the dashed line), causing a new market equilibrium point (D) in which the quantity demanded is reduced to "q2" at a supply "P2." However, the company will only receive "P3" after revaluing the tax values to the authorities.

Thus, the new demand is represented by the triangle of points "C," "p2," and "D," the supply by points "q2," "B," and "E." The government collected the equivalent of the triangle portrayed by points "P3," "P," "D," and "E." Finally, the area of the smaller triangle drawn by points "A," "D," and "E" represents the deadweight loss of taxes, demonstrating that high tax rates are inefficient because they reduce their incidence base, causing an economic loss or welfare cost (Nogueira, Teixeira, & Baptista, 2012).

The VAT rate increase plays the same role as presented in Figure 1. It can then contribute significantly to the inflationary process since VAT is contained in the prices of goods produced and services rendered by companies. Therefore, its cost may not be transferred in full to the price of goods and services and is likely to be absorbed as an expense by companies, discouraging them from reinvesting due to reduced return on invested capital. In this way, companies can expropriate their activities, applying their resources to other capital goods that bring better profitability. They can also move to different locations where the determining factors for their operations are more advantageous, such as other States with a more beneficial tax burden, thereby decreasing their costs and causing social problems such as unemployment, the need to import products, and the flight of investments, among other things.

It is important to verify the influence of VAT on the growth of Brazilian companies, taking into account the relationship between the tax burden and the capacity to generate the cash flows necessary for reinvestment in companies, which guarantees their survival and growth (Damodaran, 2012).

Methodological procedures

The survey sample consisted of companies listed on the Brazilian Stock Exchange (B^3). Among the B3 companies, only the regular VAT taxpayers were imported for the research, thus excluding companies in the financial sector, insurance companies, and service providers outside the tax net. Therefore, the sample included companies that were regular taxpayers of Brazilian VAT, totaling 241 companies. The periods analyzed were the years from 2010 to 2016. The study was cut off in 2010 because it was in that year that Brazil fully adhered to international accounting practices. The use of previous periods would possibly have caused distortions to the result. Thus, the sample has 1595 observations, referring to the fiscal years from 2010 to 2016.

The financial statements of the companies were collected from the Economática® database and the Securities and Exchange Commission (Portuguese: Comissão de Valores Mobiliários, CVM). The data on state taxes for each period were extracted from the DVA, using them to calculate the VAT changes for each period relative to the previous one.

In the proposed econometric model, it was not necessary to isolate the effects of inflation to verify the impact of the change in the VAT rate increase on the growth of companies since the analysis did not compare absolute values but simply the percentage found within the period itself. The econometric model used to verify the relationship between the VAT rate change and growth is presented in Equation 1.

$$C_{it} = \alpha_{0\_} \alpha_1 VAT_{it} + \alpha_2 INCREASE_{it} + \alpha_3 CRISIS_{it} + \alpha_4 VAP_{it} + \alpha_5 DEBT_{it} + \alpha_6 ROE_{it} + \varepsilon \quad (1)$$

In which the variables used were:

- C_{it}: the economic-financial growth of company i at time t, measured by the variation of net income in period t relative to period t-1 (ΔI), variation of total assets in period t relative to period t-1 (ΔAT), a variable (XC) calculated by the orthogonal transformation, with the highest possible variance between the variables ΔI and ΔAT;
- VAT_{it}: the percentage of VAT on the operating income of company i in period t;
- $INCREASE_{it}$: a dummy variable in which 1 was assigned for the year 2016 when the VAT increase occurred and 0 for the other periods;
- $CRISIS_{it}$: a dummy variable in which 1 was assigned for the years between 2014 and 2016 and 0 for the other periods;
- VAP_{it}: the Value Added Produced over the total assets of company i in period t;
- $DEBT_{it}$: the indebtedness of company i, calculated as interest-bearing liabilities over total assets, in period t-1;
- ROE_{it}: the return on net income over the net worth of company i in period t;
- $\alpha_{0...n}$: the estimated parameters;
- ε: the model error term

Regarding growth, this research is calculated in two dimensions, the variation of revenues and the variation of assets. The variation of income denotes the effective growth of the company, making it possible to observe the evolution of its cash flow generation capacity over time. As for the variation of assets, the invested capital is an excellent parameter since it is through it that the company generates future cash flows that determine its value. Thus, it can be calculated both by the criterion of identification of the investments made, as well as by the financing obtained or the expenses already incurred, such as research and development, which have not yet generated cash flows but will be able to generate cash flows in the future (Frezzati, 1998).

In 2016, 20 of the 26 states of the Brazilian Federation raised the VAT rate (Laporta, 2016). Companies may not have been able to pass on this increase to product prices, resulting in a contraction in

investment growth or a contraction in revenues, the latter due to higher prices for goods and services (Seitz, 2015). Thus, a dummy variable was established to capture the effect of this event on the growth of the companies.

As the research used accounting data covering the years from 2014 to 2016, it was necessary to control for the effect of the economic recession that reached Brazil during the period because it may have negatively influenced the analyzed companies' growth. At the end of 2014, the fall of Brazilian economic indicators began, so that the Gross Domestic Product (GDP) decreased by 0.2% in the last quarter of that year. However, the Brazilian economic recession's happened to be confirmed in 2015, when GDP ended the year with a 3.8% decline compared to 2014. With these indicators, deep negative oscillations in the Brazilian economic activity are verified in the period, leading to a period of recession in 2014 (Barbosa Filho, 2017).

The net value added produced by the company in each period was used as a measure of the wealth generated by the companies. The net value added produced is the difference between the income of the companies minus the inputs necessary to generate income and the amortization, depreciation, or depletion for the period. The analysis of the value added produced to control growth is crucial because companies that produce a higher percentage of wealth could be stimulated to grow, either by seeking higher revenues or by investing more resources to expand their operations.

Indebtedness is the participation of third-party capital in financing the activities of the company (Bastos & Nakamura, 2009). The indebtedness of the company is measured by an index in the literature, using interest-bearing liabilities over invested capital, because it considers only interest-bearing debts, or liabilities over total assets, which includes all the onerous or non-onerous debts of the company (Machado, Medeiros, & Eid Júnior, 2010). Thus, it is possible to highlight the influence of indebtedness on growth due to the guarantee clauses offered by companies. Whether for onerous financing or term transactions between suppliers, tax obligations, employee and other provisions, this influence permeates the decisions of companies to grow (Titman & Wessels, 1988; Machado, do Prado, Vieira, & Antonialli, 2015).

To control for the growth stimulated by the performance of equity, the Return on Equity (ROE) was used. ROE is a parameter frequently used in the market to measure the economic performance of companies, serving as a basis for investment decisions and the quest to increase revenues (Barber & Lyon, 1996; Bonfim & Callado, 2016).

The data used in the research were worked in an unbalanced panel to maximize the number of observations from the years 2010 to 2016. The study used main panel data techniques to verify the most appropriate model for treating the data, among the unrestricted pooled model, the restricted fixed effects model, and the restricted random effects model, through the Chow, Hausman, and Breusch-Pagan tests.

The Wooldridge and modified Wald tests for panel data were also applied to observe the autocorrelation and heteroscedasticity respectively of the data (Fávero, 2013).

Results

The sample, containing 1,595 observations relating to 233 companies between 2010 and 2016, is distributed in 9 economic sectors, using the B3 classification, as described in Table 2.

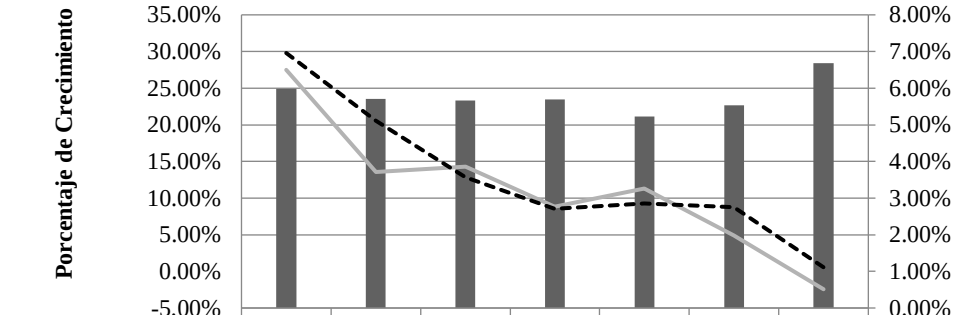
Table 2
Description of Companies by Economic Sector

Economic Sector	Companies	Observations	$\overline{VAT}$	$\bar{\Delta}I$	$\overline{\Delta TA}$
Industrial Goods	47	320	2.52%	8.36%	11.26%
Cyclical Consumption	67	437	3.49%	9.39%	13.88%
Non-cyclical Consumption	20	137	4.95%	13.35%	13.66%
Basic Materials	28	190	3.31%	8.54%	8.12%
Oil, Gas, and Biofuels	9	56	13.18%	12.43%	14.21%
Health	13	80	2.76%	16.26%	18.89%
Information Technology	7	37	0.52%	4.15%	16.05%
Telecommunications	4	26	27.87%	20.71%	24.19%
Utility	46	312	12.45%	14.10%	11.08%
TOTAL	241	1 595	5.78%	10.84%	12.58%

$\overline{VAT}$ = average percentage of VAT on operating income of company i in period t; $\bar{\Delta}I$ = average change in net income in period t compared to period t-1; $\overline{\Delta TA}$ = the average change in total assets in period t relative to period t-1. The variables ΔTA and ΔI were accounted for at 1% due to the high standard deviation initially found in the data, especially in the public utility sector. This occurred due to the seasonal capital contributions existing in that sector, with the acquisition of concessions or permits for exploitation of public utilities impacting revenues and investments. Source: created by the author.

According to Table 2, the sectors in the sample that bore the highest VAT rates were Telecommunications (27.87%), Oil, Gas, and Biofuels (13.18%), and Utilities (12.45%). The Brazilian government, including specific regulatory agencies, strictly regulates these sectors. Furthermore, it is in these sectors' goods and services where the highest proportion of VAT tax collection is identified, mainly due to the impossibility for consumers to adopt substitution practices in the consumption relationship. In terms of revenue growth ($\bar{\Delta}I$), the Telecommunications (20.71%) and Health (16.26%) sectors presented the greatest variation. Similarly, in terms of growth in total assets ($\overline{\Delta AT}$), the Telecommunications (24.19%) and Health (18.89%) sectors presented the highest percentage variation in the last two years.

Figure 2 below presents the behavior of companies' average growth over the study period relative to Value Added Tax (VAT) during the study window.



	2010	2011	2012	2013	2014	2015	2016
IVA	5.99%	5.71%	5.66%	5.69%	5.23%	5.53%	6.69%
Ingresos netos	27.49%	13.54%	14.29%	8.84%	11.30%	4.88%	-2.44%
Activos totales	29.80%	20.55%	12.82%	8.53%	9.26%	8.76%	0.55%

Figure 2. Average behavior of business growth and value-added tax on business income over the year in the sample analyzed.
VAT percentage on the operating income of company i in period t; Net income = change in net income in period t compared to period t-1; Total assets = change in total assets in period t compared to period t-1; Net income = change in net income in period t compared to period t-1; Total assets = change in total assets in period t compared to period t-1.
Source: created by the author

According to Figure 2, there is a symmetrical behavior in the growth measures. Both the growth of net income and the growth of total assets had a sharp drop in 2016 when the increase in Brazilian VAT rates occurred. However, net revenue growth is perceived to have declined in 2016, with the VAT increase denoting a greater sensitivity of revenue growth to swings in the VAT rate compared to total asset growth.

Table 3 presents the quantitative composition and descriptive statistics of the accounting variables calculated for the sample companies.

Table 3
Descriptive statistics of the companies in the sample

	All companies of the sample				
Variables	Average	Median	Standard Deviation	Minimum	Maximum
ΔI	0.1280	0.8355	0.3985	-0.7228	2.6109
ΔAT	0.1258	0.0705	0.2969	-0.3836	1.8154
VAT	0.0578	0.0153	0.1064	-0.1399	2.1354
VAP	0.3178	0.2742	0.2546	-0.1636	1.2726
DEBT	0.3125	0.3032	0.2454	0	3.5598

ROE	0.3982	0.0881	0.5663	-3.5579	2.0848
Companies			241		
Observations			1 595		

ΔI = change in net income in period t relative to period t-1; ΔTA = change in total assets in period t relative to period t-1; VAT = VAT percentage on the operating income of company i in period t; VAP = Value Added Produced over the total assets of company i in period t; DEBT = onerous liabilities over the total assets of company i in period t-1; ROE = the return on net income over net assets of company i in period t. Variables ΔTA, ΔR, VAP, and ROE were winsorized at 1% due to the high standard deviation initially found in the data, especially in the public utility sector. This occurred due to seasonal capital inflows in that sector, with the acquisition of concessions or permits for public services, impacting revenues and investments.
Source: created by the author

Table 3 indicates that in the sample mean, the growth of revenues (ΔR) was 12.80%, the growth of total assets (ΔTA) was 12.58%, and the percentage of VAT over the revenues of the company (VAT) was 5.78%. The value added produced by the companies (VAP) in the sample average was 31.78%, the leverage (LEV) was 31.25%, and the return on equity (ROE) was 39.82%.

Table 4 illustrates the Pearson correlation between the sample variables used to estimate Equation 1.

Table 4
Pearson correlation

	ΔTA	ΔI	VAT	VAP	DEBT	ROE
ΔTA	1					
ΔI	0.4719***	1				
VAT	-0.0154	0.0118	1			
VAP	0.2974***	0.1748***	0.2479***	1		
DEBT	-0.0071	-0.0073	0.0029	-0.1318***	1	
ROE	0.1022***	0.0491**	0.0571**	0.1777***	-0.0317	1

*** is significant at 1%, and ** is significant at 5%. The sample includes 241 companies and 1,595 observations. ΔI = change in net income in period t relative to period t-1; ΔTA = change in total assets in period t relative to period t-1.; VAT = VAT percentage on the operating income of company i in period t; VAP = Value Added Produced over the total assets of company i in period t; DEBT = onerous liabilities over total assets of company i in period t-1; ROE = the return on net income over the net worth of company i in period t.
Source: created by the author

Table 4 presents a high positive correlation between asset growth (ΔTA) and revenue growth (ΔI), at a percentage of 47.19%. However, there is no bi-causal relationship between variation in revenues and variation in assets. The above is because revenues depend on the market predisposition for consumption, while investments in assets depend on the decisions of company management. The increase in revenues may encourage company managers to invest, increasing assets, in an attempt to make up for the supply limitation in the face of high demand. Similarly, the expansion of assets makes it possible to

offer more goods and services for consumption, expanding income. As for the other variables, no high correlation coefficients were discerned to send the analysis of the results.

Therefore, the econometric model proposed in Equation 1 was used to measure the influence that the perception of correction in the public sector has on the economic performance of the companies in the sample, also using, in principle, the Chow test to compare the pooled model and the unrestricted fixed-effects model. The Hausman test was used to verify which was best, the random-effects or the fixed-effects model. Finally, the Breusch-Pagan LM test was used to compare the restricted and unrestricted random effects models (Clark & Linzer, 2015). From the tests applied, the best model for data analysis is the fixed effects panel, as shown in Tables 5, 6, and 7.

With the normality assumption in the data distribution, based on the central limit theorem, autocorrelation and homoscedasticity tests of the data were performed. Thus, through the Wooldridge test, the study found autocorrelation in all the models. And, through the modified Wald test for panel data, it found the heteroscedasticity of the data (Wooldridge, 2002).

After passing all the budget tests to estimate the regressions, the study robustly estimated the regressions using the balanced and unbalanced panel data. The coefficients found, in both forms, led to the same conclusion regarding the relationship between the variables of interest. Thus, the unbalanced panel was chosen to increase the number of observations and generalize the parameters more broadly. The results obtained with the estimation of Equation 1 are presented in Tables 5, 6, and 7.

Table 5
Estimating the regression of equation 1 for income growth

Variables	Fixed Effects Model			Random Effects Model			
ΔI	Coefficients		t	Coefficients		t	VIF
VAT	-0.8467***		-5.04	-0.3349**		-2.33	1.07
INCREASE	-0.0789**		-2.92	-0.1017***		-3.62	1.28 1.29
CRISIS	-0.0448*		-1.84	-0.0651**		-2.58	1.13
VAP	1.1102***		6.54	0.4489***		4.43	1.03 1.03
DEBT	0.1491		0.93	0.0912		0.78	
ROE	0.0028		-0.11	0.0094		0.32	
Intercept	-0.1910***		-2.43	0.0234		0.38	
	Within	Between	In general	Within	Between	In general	Groups 241
R^2	0.2095	0.0110	0.0391	0.1780	0.0194	0.0510	Obs. 1 595
	F (6.240) = 26.65 Prob > F = <0.0001			Wald chip2(6) = 101.28 Prob > F = <0.0001			
Tests	Chow (F)	Breusch-Pagan		Hausman	Wooldridge		Wald
	<0.0001	<0.0001		<0.0001	0.0019		<0.0001
	Test results: fixed effects of the model						

ΔI = change in net income in period t compared to period t-1; VAT = VAT percentage on the operating income of company i in period t; INCREASE = dummy variable in which 1 was assigned for 2016 when the VAT increase occurred, 0 for the other periods; CRISIS = dummy variable in which 1 was assigned for the years between 2014 and 2016 and 0 for the other periods; VAP = Value Added Produced over the total assets of company i in period t; DEBT = onerous liabilities over total assets of company i in period t-1; ROE = the return of net income on the net worth of company i in period t. Statistical significance level: 10%*, 5%**, and 1%***.
Source: created by the author

Table 5 presents the result of Equation 1 for income growth (ΔI). The relationship found between VAT and ΔI was negative (-0.8467) and significant, at the 1% level, so that, on average in the sample, the increase in the VAT rate on the net income of companies reduced revenue growth by 84.67% over the study period. This empirical evidence is associated with the theoretical assertion that the consumption tax can have a negative influence on income growth because it could modify the propensity to consume, given that higher prices in the products and services offered, due to the passing on of higher taxes to the consumer, could reduce the number of goods and services consumed and, consequently, the income of the companies (Keynes, 1936; Harberger, 1995; Seitz, 2015).

Table 5 illustrates that the VAT rate increase in 2016 (INCREASE) had a negative (-0.0789) and significant relationship at the 1% level. Similarly, the period of economic recession in Brazil (CRISIS) exerted a negative (-0.0448) and significant influence at the 1% level on income. The empirical evidence demonstrates that, in the sample average, the VAT rate increase in Brazil in 2016 generated a 76.12% higher negative effect on the income growth than the economic recession. This result reveals that raising taxes on consumption during periods of economic recession can further aggravate economic growth problems, mainly in terms of business income derived from the consumption relationship. The market shrinks with the economic recession, reducing revenues, and the increase in tax friction in the period compounds the problem of consumption shrinkage, impacting negatively on the growth of business revenues.

Therefore, the value added produced (VAP) presented a positive (1.1102) and significant relationship, at the 1% level, with the ΔI. Higher percentages of wealth generation in the company would stimulate management to pursue revenue expansion due to the greater availability of resources to share with capital providers and for reinvestment.

Indebtedness (DEBT) and return on equity (ROE) did not present statistically significant relationships in the model.

Table 6
Estimation of the regression of equation 1 for asset growth

Variables	Fixed Effects model			Random Effects Model			
ΔTA	Coefficients		t	Coefficients		t	VIF
VAT	-0.3297***		-3.26	-0.3153***		-4.11	
INCREASE	-0.0538***		-3.77	-0.0723***		-4.93	1.07
CRISIS	-0.0409**		-2.97	-0.0700***		-4.88	1.28
VAP	1.1132***		9.47	0.4781***		7.02	1.29
DEBT	0.0758		0.72	0.0813		1.12	1.13
ROE	0.0032		0.27	0.0218**		2.12	1.03
Intercept	-0.2067***		-4.33	0.0084		0.24	1.03
	Within	Between	In General	Within	Between	In general	Groups 241
R^2	0.3148	0.0236	0.1075	0.2687	0.0205	0.1312	Obs. 1 595
	F (6.240) = 33.04			Wald chip2(6) = 187.59			
	Prob > F = <0.0001			Prob > F = <0.0001			
Tests	Chow (F)	Breusch-Pagan		Hausman		Wooldridge	Wald
	<0.0001	<0.0001		<0.0001		<0.0001	<0.0001
	Test result: fixed effects model						

ΔTA = change in total assets in period t compared to period t-1; VAT = VAT percentage on the operating income of company i in period t; INCREASE = dummy variable in which 1 was assigned for 2016 when the VAT increase occurred, 0 for the other periods; CRISIS = dummy variable in which 1 was assigned for the years between 2014 and 2016 and 0 for the other periods; VAP = Value Added Produced over the total assets of company i in period t; DEBT = onerous liabilities over total assets of company i in period t-1; ROE = the return of net income on the net worth of company i in period t. Statistical significance level: 10%*, 5%**, and 1%***
Source: created by the author

Table 6 presents the result of Equation 1, using the change in assets (ΔTA) as a measure of growth. The relationship found between VAT and ΔTA was negative (-0.3197) and significant, at the 1% level, so that, on average in the sample, the increase in the VAT rate on the net income of the company reduced the growth in the total assets of the company by 31.97%. This finding is consistent with the premise that states that the consumption tax may negatively affect asset growth because it could influence the investment decisions of management as it could lead to lower returns. VAT as a cost for the company would lead to a misalignment of investment, causing a contraction in companies' growth (Harberger, 1995; Caldeira, 2006; Martins & Dantas, 2010; Damodaran, 2012).

Table 6 also illustrates that the increase in the VAT rate in 2016 (INCREASE) had a negative (-0.0538) and significant relationship, at the 1% level, with the growth of total assets. Similarly, the period of economic recession in Brazil exerted a negative (-0.0409) and significant influence at the 1% level on the growth of total assets. The empirical evidence found demonstrates that, in the sample average, the VAT rate increase in Brazil in 2016 generated a 31.54% greater negative effect on asset growth than the economic recession. Thus, during the economic recession, by reducing profits, the increase in tax friction in the period contracts companies' total asset growth rate even more.

Next, according to Table 6, the value added produced (VAP) presented a positive (1.1132) and significant relationship, at the 1% level, with the ΔTA. The high rates of wealth generated due to income could stimulate managers to invest and seek to increase the capacity of their companies.

As in the model estimated in Table 5, Table 6 illustrates that indebtedness (DEBT) and return on equity (ROE) did not present statistically significant relationships in the model for asset growth.

Therefore, a proxy variable for company growth (XC) was constructed, in a principal component analysis, through orthogonal transformation, containing the highest possible variance between revenue growth (ΔI) and total assets growth (ΔTA). The total explanatory variance obtained in the factor resulting from the principal component, represented by the XC variable, correlated with the ΔI and ΔTA variables, was 73.60%. The Kaiser-Meyer-Olklin (KMO) test found a statistical value of 0.5, a level acceptable in the literature for the study of the variability, as a whole, of the orthogonally explained variables in a new vector (Hair, Black, Barry, & Anderson, 2009).

Table 7 presents the result of Equation 1, using company growth (XC) as a measure.

Table 7
Equation 1 regression estimation of orthogonal growth in income and assets

Variables	Fixed Effects Model			Random Effects Model			
XC	Coefficients		t	Coefficients		t	VIF
VAT	-1.8835***		-3.63	-1.4249***		-4.47	1.07
INCREASE	-0.3403***		-5.55	-0.4130***		-6.55	1.28
CRISIS	-0.2382***		-3.98	-0.3369***		-5.08	1.29
VAP	4.5195***		9.85	2.1571***		7.51	1.13
DEBT	0.3015		0.67	0.3255		1.00	1.03
ROE	0.0483		0.90	0.1122		1.98	1.03
Intercept	-1.2683***		-6.53	-0.4909**		-3.12	
	Within	Between	In general	Within	Between	In general	Groups 241
R^2	0.3609	0.0072	0.1144	0.2687	0.0205	0.1312	Obs. 1 595
	F (6.240) = 46.82			Wald chip2(6) = 251.59			
	Prob > F = <0.0001			Prob > F = <0.0001			
Tests	Chow (F)		Breusch-Pagan	Hausman		Wooldridge	Wald
	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001
	Test results: fixed effects model						

XC = the growth of company i in period t in relation to period t-1, calculated by the orthogonal transformation, with the highest possible variance, between the variables ΔI and ΔTA; VAT = VAT percentage on the operating income of company i in period t; INCREASE = dummy variable in which 1 was assigned for 2016, when the VAT increase occurred, 0 for the other periods; CRISIS = dummy variable in which 1 was assigned for the years between 2014 and 2016 and 0 for the other periods; VAP = Value Added Produced over the total assets of company i in period t; DEBT = onerous liabilities over total assets of company i in period t-1; ROE = the return of net income on the net worth of company i in period t. Statistical significance level: 10%*, 5%**, and 1%***
Source: created by the author

According to Table 7, the relationship between VAT and XC was negative (-1.8835) and significant, at the 1% level, so that, on average in the sample, the increase in the VAT rate on the net income of companies reduced the growth of companies by 188.35%. This finding is in line with all the theoretical references in this research, which state that the consumption tax can generate a negative effect on the growth of companies (Harberger, 1995; Caldeira, 2006; Martins & Dantas, 2010; Rezende, Pereira, & Alencar, 2010; Seitz, 2015).

Therefore, as seen in the models in Tables 5 and 6, it is observed in Table 7 that the VAT increase in 2016 (INCREASE) impacted negatively (-0.3403) and significantly, at the 1% level, on the growth of companies. Similarly, the period of economic recession in Brazil generated a negative (-0.2382) and significant impact, at the 1% level, on the companies' growth. The results indicate that, on the sample average, the VAT rate increase in Brazil in 2016 generated a 42.86% higher negative impact on business growth than the economic recession. Thus, during the economic recession, by reducing profits, the increase in tax friction in the period decreases companies' growth rates even more.

The results found in tables 5, 6, and 7 regarding the negative influence of VAT on Brazilian companies' growth corroborate the theoretical construction proposed in the deadweight loss (Haberger, 1995). The reason is that the price paid for the item consumed is associated with a certain level of income. Thus, in the event of an increase in the product's price, due to the transfer of the indirect tax to the merchandise price, there will be a reduction in consumption and, consequently, a reduction in companies' net income. Thus, companies will not invest because there will be no need to exploit businesses, causing a decline in the factor related to company growth (Nogueira, Teixeira, & Baptista, 2012; Damodaran, 2012).

According to Table 6, value added (VAP) presented a positive (4.5195) and significant relationship at the 1% level with XC. High rates of wealth generation have a positive influence on the growth of companies.

As in the models presented in Tables 5 and 6, indebtedness (DEBT) and return on equity (ROE) did not present statistically significant relationships in the model proposed for company growth in Table 7.

Conclusions

The purpose of the research was to verify the relationship between the VAT rate and business growth. Taking into account that VAT determines the price of all goods and services consumed in the country and that a limitation of the price is the predisposition for consumption due to a certain price level, the research was based on the possibility that companies will have to absorb part of the eventual increases in the VAT

rate. The above would harm the growth rate of companies. Thus, growth analysis in two dimensions, revenue growth and asset growth, was proposed. Finally, to establish the study of the impact of VAT and its increase on the development of companies, a representative variable of the two dimensions of growth was constructed. The construction was done in a principal components analysis through the orthogonal transformation, with the highest possible variance, of the growth of income from total assets.

The results revealed that, with the increase in the VAT rate, companies might reduce their growth, thus diminishing their capacity to generate future cash flows and leading to a decrease in the country's GDP. Therefore, when changing the VAT rate, the consequences that it will produce in the country's economy must be taken into account. It is noticeworthy that companies will not always be able to take on the cost increase in the same proportion as the price increase in goods and services that the market will not always be willing to pay, imposing the absorption of this tax on organizations through the reduction of their contribution margins.

Increased consumption taxes may discourage reinvestment and growth for companies, reducing their revenue generation potential. At that point, to increase revenues, it might be more productive to maintain or decrease the tax burden on companies, seeking a future increase in their tax revenues due to the increase in the volume of transactions that would be caused by the growth of companies and, consequently, the increase in tax collection. In this way, companies would be stimulated to reinvest and grow, generating a possibility of increased future economic benefits that would cover, in the medium and long term, the expected revenue goals that the State or country would receive in the short term with the increase in the tax rate.

On the other hand, as far as company management is concerned, the main conclusion that can be drawn is that the influence of VAT on company growth is negative and significant, further worsening company performance in the short to medium term. The above situation requires management to review its tax and strategic planning, among other measures. Thus, it would be appropriate, given the tax costs borne by Latin American companies, to discuss fiscal policies in Latin America and their fundamental role in the economic development of these countries.

In this manner, a more efficient tax policy aimed at reducing the tax cost borne by organizations should be pursued, taking into account that the increase in the tax burden, especially VAT, impacts on the assets of companies by losing value in the market due to their inability to maintain or increase future cash flows that guarantee the profitability and returns expected by the market. As important and necessary as it is to increase government revenues to meet public demands such as health, education, and security, it is also vital to favor private initiative, stimulating the growth of companies to create a favorable environment for their development and for the fulfillment of their fundamental role in society, which is the generation of income.

Finally, suggestions for future studies include the possibility of observing the same relationship studied in this research in other countries and verifying the influence of other indirect taxes on the development of Latin American companies.

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