Income tax and value creation in Colombian companies
Impuesto a la renta y creación de valor en empresas colombianas

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ABSTRACT

Financial literature has developed a theoretical framework on business management called Value Management, this topic has not yet been accounted for economic and monetary policies as a key factor to establish the convenience and effects of tax related decisions over business value creation. The aim of the research is to evaluate the economic and financial impact of income tax on business value creation of Colombia´s Stock Exchange companies (BVC, "Bolsa de Valores de Colombia" in Spanish) within a five year period (2012-2017). The study was made using accounting metric tools through the event study methodology allowing to calculate the Cumulative Abnormal Return (CAR), and utilizing a multivariate regression model with the dependent variable CAR and the independent variables EVA, P/E, ROE and EPS. Income tax policies established during the study period in tax reforms had neither a direct nor a proportional effect on value generation.

RESUMEN

A pesar de que la literatura financiera ha desarrollado un marco de administración gerencial denominado gerencia del valor, la política económica no ha integrado el tema como un factor importante para establecer la conveniencia y efectos de las decisiones en materia tributaria sobre la creación de valor empresarial. El objetivo de la investigación se enfoca en evaluar el impacto económico y financiero del impuesto de renta sobre la creación de valor empresarial de las compañías que cotizan en la Bolsa de Valores de Colombia durante los años 2012 al 2017. El estudio se realizó utilizando herramientas contabilométricas por medio de la metodología de estudio de eventos que permite el cálculo del Retorno Anormal Acumulado (CAR), además de la utilización de un modelo de regresión multivariable con la variable dependiente CAR y las variables independientes EVA, P/U, ROE y UPA; encontrando que, en los distintos escenarios, las nuevas políticas establecidas en el impuesto de renta sustentado por las reformas tributarias publicadas durante el periodo de estudio no tienen una relación directa ni proporcional que afecte la generación de valor de las empresas en Colombia, representado por la muestra de empresas que cotizan en la BVC.

INTRODUCTION

The tax structure in Colombia has a high degree of instability and complexity in its interpretation, as a result of the fiscal legislative reforms undertaken (Cárdenas & Mercer, 2005). Evidence of this is that the Colombian state has implemented 12 tax reforms during the last two decades; furthermore, it advanced the tax reform called Law 1819 of 2016 as the last one established in the period 2010-2017 (Economía, 2015).

Although Colombian government's intention with the tax reform was to guarantee greater tax collection, this led to a generalized discontent among the major business sectors, since their business value was threatened (Ministerio de Hacienda, 2012), and also because *"the frequent changes in tax legislation have turned the legal framework into a patchwork quilt that gives rise to legal insecurity"* (Figueroa, 2008).

This situation raises questions about the effect on business value of the income tax established in tax reforms, and it can be concluded that, whereas the financial literature a management framework called Value Management has been developed, from the economic policy perspective, the issue of value in companies has not been regarded as an important factor to establish the convenience and effects of economic policy decisions (Soto Franky, 2005).

Hence, interrelations have been generated on the topics of business valuation and tax burden, embodied in theoretical works by several authors such as Castilla (2015), who argues that tax changes become an externality that generates additional value for companies, causing a detriment to their equity; and Galindo (2005), who mentions that taxes have impact on companies' economic benefits, cash flows and profitability, affecting their financial structure. Similarly, Brennan's (1970) study on the analysis of tax effects on companies' valuation at market price and corporate financial policies concludes that if the market's effective tax rate exceeds 0 (zero), the payment of dividends by the company will reduce its value and will lead to reducing the interests of all shareholders. Furthermore, Gómez & Yagüe (2008), Díaz & Crespo (2015) and Castilla (2015), argue that any savings on income tax that can be obtained by a company generate a positive effect represented in an additional value for the company or its projects and in its equity. In this way, the authors argue that tax and value generation are closely related in an inversely proportional manner.

In this regard, Boedo (1999) conducts a collection of studies around the irrelevance of capital structure on the value of the company as posited by Modigliani & Miller (1958) and later modified in 1963, considering that the capital structure is affected by the tax burden and that taxes can lead companies to take higher levels of debts in order to take advantage of the tax savings from interests paid, which will generate a lower cost of capital and in this way greater value of the company (Modigliani & Miller, 1963). Subsequently, Miller (1977) incorporates the personal income tax into the analysis of tax effect on companies' capital structure, in addition to corporate taxes; concluding that when both taxes are present, the capital structure no longer has effect on the company's value.

From the above studies, the concept of uncertainty in tax savings is characterized, since it will not be the same due to decisions affecting the fiscal legislation, changes in the volume of debt or even losses in those companies exceeding debt obligations (Boedo, 1999). In this sense, DeAngelo & Masulis (1980) demonstrate that Miller's model (1977) does not hold if the existence of other types of deductions alternative to interests, such as depreciations and amortizations, is included as an additional assumption; in which case indebtedness would turn out to be relevant again in the increase of the value of the company. This thesis, according to Boedo (1999), is rejected by several authors since they consider variables such as inflation and its effect on companies' results.

Under the assumptions of several authors, the importance of the study's object in this research is justified. It evaluates companies' value from a long-term view, in relation to the impact tax reforms may have on companies' value generation, taking into account the value drivers; whose foundation is based on achieving the basic financial aim, since wealth should be distributed among all the people involved, taking into account good decision-making that allows to reach this aim (Vélez, 2000). In this way, the concept of Value-based Management (VBM) arises and represents the success result of the business strategy as *"the fostering of the value creation culture"* (García, 2015).

In this sense, the fiscal goal should be in accordance with the value expected to be obtained in the company; normally, companies need to know their fair market values in order to know the amount of tax they have to pay or vice versa. Appraisals to

fiscal effects should seriously take into account the changes in legislation impacting business value, so corporate strategies should tend for a fiscal planning which allows to maximize the basic financial aim (Nguyen, 2013).

Knowing the context and considering that the possible relationship between tax changes and value generation in organizations has not been previously studied, we opted to choose Colombian companies as sample for the study and in this way obtain a first observation, deeper than that of other authors who have focused only on demonstrating tax savings resulting from being indebted.

Income tax in the Colombian context

In the current Colombian legislation, taxes have their support in the constitutional precept of article 95, paragraph 9° of the Colombian Political Constitution of 1991, according to which a citizen´s duty to contribute towards the State's actions; and the taxing faculty lies on the legislative organ of public power, that is, on the Congress of the Republic, which is responsible for establishing fiscal and parafiscal contributions (Corte Constitucional, 1991); while the main tax collecting entity is the Tax and Customs Authority (DIAN, "Dirección de Impuestos y Aduanas Nacionales" in Spanish) (Fedesarrollo, 2005).

In this way, with the aim of regulating tax matters in Colombia, the Congress of the Republic issues related laws, Tax Statute or Decree 624 of 1989 being the main one, which is modified through legislative reforms passed by Congress. These represent the effort of the National Government to modernize the tax system, consisting of a complete revision of the tax structure to streamline the tax system and achieve greater tax collection (Ministerio de Hacienda, 2016).

As per the tax income comprised in each tax reform and contained in the Tax Statute, tax payers are all those natural and legal persons that conduct activities that are susceptible of increasing their net equity or their wealth, the legal persons having the condition of being tax filers (Fedesarrollo, 2005).

Business value generation

The concept and theories of value creation were studied mainly by Adam Smith, but the theories of Karl Marx, David Ricardo, John Keynes, among others (Alvarado,

2009), also started to relate the term "value" with the concept of "useful measurement", which takes into account the intention of a company's stakeholders (Copeland, Koller & Murrin, 2000). It is from those theoretical evolutions where a basis is established to create numerical measures allowing to know whether a business is creating value or not, considering operating and economic results, using analysis techniques that have been applied from then seventies, such as Net Present Value (NPV) and Internal Return Rate (IRR), the maximization of shareholder value being the main aim (Vera, 2000). Additionally, with these tools, the profitable growth of companies is evaluated, giving rise to the increase of real benefit (Correa, Hernández, Vásquez & Soto, 2016).

In this way, the so-called Value-based Management, defined by García (2015) as a *"series of processes leading to the alignment of all the staff with the strategic direction of the company in such a way that when they make decisions, these tend to the permanent increase of its value"*, has its foundations on a series of indicators that show the creation of value in companies, such as the EVA (Economic Value added), MVA (Market Value Added), Cash flow added, Free cash flow, Return on equity (ROE), Earnings per share (EPS), among others. In the case of EVA, Hall & Brummer (1999) define it as a measure of the development of corporate performance that shows the profits of a business after deducting the total cost of capital. On the other hand, the ROE compares the net profit after tax with the capital invested in the company by the shareholders (Van Horne & Wachowics, 2010); while the EPS becomes a measure employed to evaluate the profitability per share in a given time period (Martín & Trujillo, 2004).

Other measures that enable an approximations to a companies' valuation are the so-called multiples, which represent relationships between the market price of a share and a measure of the economic or accounting value of the business in terms of each share, among which the most used multiple is the market price/current earnings relationship (Martín & Trujillo, 2004).

RESEARCH METHODOLOGY

The development of the study was determined within a quantitative approach, since it uses *"(…) random, experimental and quasi-experimental techniques, pen*

and paper "objective" tests, multivariate statistical analyses, sample studies, etc." (Cook & Reichardt, 1986); all these focusing on the new theoretical accounting metrics trend considered as a tool that involves quantitative, mathematical and statistical methods to solve accounting problems (Francischetti, Poker & Padoveze, 2017).

In this way, and using accounting metric tools, the event study method was employed, which evaluates the impact of a given event at a given date, to evaluate the possible abnormal returns caused by the event (Yoshinaga, 2004). To this end, an analysis of the abnormal returns and the volatilities of share prices is performed through the variations of the volume traded and/or share prices on the Colombian Stock Exchange, applying the concept of Cumulative Abnormal Return (CAR). In this sense, the abnormal variation in the share price allows to establish whether or not a volatility or an abnormal behavior occurs on the date of the event, which was determined taking into account the entry into force of the income tax established in the tax reforms studied, in relation to the expected asset return, represented in this case by the share price of the companies (Mackinlay, 1997).

The data selected for the analysis were treated by means of cross-sectional panel data and, additionally, they incorporate time series of secular trend since, according to Pindyck & Rubinfeld (2004), the multicollinearity of the explanatory variables is reduced, a problem arising when there are linear relationships between the independent variables of the model. In this way, there is intertemporal dynamics and a greater number of observations,

which gives rise to an increase of the level of freedom and efficiency of the parameters. Additionally, the panel data technique captures the unobservable heterogeneity of the information that is not detected with time series studies or with cross-sectional studies (Mayorga & Muñoz, 2000).

In this way, in order to achieve the research aim, an initial population of the share prices of 59 companies which are active on the BVC per year, from 2011 to 2017, is obtained to calculate the dependent variable without considering the share price as a measure of value. The population criteria established for each event are subsequently filtered according to:

i)   stock movement, excluding companies that are not active on the Stock Exchange for more than six consecutive days,

ii) the presence of EVA, P/E, ROE and EPS indicators, which become the variables that evidence value generation,

iii) exclusion of preferential shares, since they generate information duplicity from the value drivers of the companies,

iv) exclusion of companies belonging to the financial sector, since these businesses are highly leveraged (Fama & French, 1993), and

v)   elimination of zero-data yielded after normalizing the EVA, P/E and EPS variables.

The final sample per year is the following (see Table 1).

Table 1. Sample filtering. Source: own elaboration.

Concept	Event 2012	Event 2014	Event 2016
Initial	59	59	59
Stock Market Movement	-34	-35	-35
EVA	-2	-2	-1
P/E	0	0	0
ROE	0	0	0
EPS	0	0	0
Preferential Share	-4	-6	-7
Financial Company	-5	-3	-3
Standardization	-3	-3	-3
Total sample	11	10	10

The standardization of the EVA, P/E and EPS variables was carried out taking normalization (0.1) into account and eliminating the different scales presented, transforming the original variable into a similar one that keeps the same proportions, but taking into account a standard scale (Cubero & Berzal, w.d.):

$$Y = \frac{X - \text{original minimum}}{\text{original maximum} - \text{original minimum}} \quad (1)$$

Before the variables regression analysis and taking into account the determination of the impact on the generation of business value of the income tax established in the tax reforms, this study departs from the event study methodology as a first approximation to the impact.

Event study

With the aim to identify the existing volatility in the share price of the BVC as an effect of the publication of the tax reforms during the period 2012-2017, the event study methodology will be used which allows to determine the effects of an external event on a capital market´s assets (Mackinlay, 1997). In this way, the events that will be used first are defined, for the analysis of the variability in income tax and its direct or indirect impact on the share price, taking the tax precepts existing from January 01 of 2012 through December 31 of 2017.

Event windows of 110, 106 and 96 days are considered for the years 2012, 2014 and 2016, respectively, which were selected according to the date on which the law was filed in Congress: (04 October 2012 for Law 1607 of 2012, 03 October 2014 for Law 1739 of 2014 and 19 October 2016 for law 1819 of 2016 (Andes, 2017)).

In this way, starting from the date of the event, 55, 53 and 48 days are considered prior to and after the publication date of Law 1607 of 2012, 1739 of 2014 and 1819 of 2016, respectively; the first event being 26 December 2012, the second 23 December 2014 and the third 29 December 2016; periods in which the abnormal returns of the share prices will be analyzed, considering an estimation window of 180 working days prior to the event window (see Figure 1).
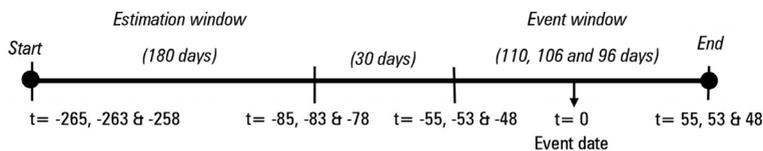

Figure 1. Scheme of event study and estimation window. Source: own elaboration.

Once the event and estimation windows are defined, as observed in Figure 1, share prices are taken to carry out a normalization process and determine the basis for the calculation of the cumulative abnormal returns.

Cumulative Abnormal Return - CAR

With the aim of determining whether the previously described events presented volatility in the share prices of the companies that are or were listed on the BVC during the study period, the cumulative abnormal return was used as statistical measurement instrument. To this end, the actual share return is compared with the estimated return, a difference that is called abnormal return and which, according to Mackinlay (1997), is denoted as:

$$AR_{i,t} = R_{i,t} - E[R_{i,t} / X_t] \quad (2)$$

where, $AR_{i,t}$ is the abnormal return of share i on date t of the event, $R_{i,t}$ is the return of share i on date t of the event, and $E[R_{i,t} / X_t]$ is the expected return of share i on date t of the event multiplied by the return. X_t is the return of market on date t of the event.

Additionally, the following formula is derived from the previous one:

$$AR_{i,t\ event} = R_{i,t\ event} - R_{normal\ i,t\ event} \quad (3)$$

where, $R_{normal\ i,t\ event}$ is the normal or estimated return during the event's window.

The COLCAP reflects the variations in the prices of the most liquid shares listed in BVC (Bolsa de valores de Colombia, 2016), this variation is calculated by standardizing the share prices and the index prices through the natural logarithm of the ratio between the price in period *t-1* and the price in period *t*. It was used to calculate the share's returns and market returns in the Colombian case.

The following formula is employed in order to determine the normal returns (Mackinlay, 1997):

$$R_{normal\ i,t\ event} = \alpha_i + \beta_i \times R_{m,t} + \varepsilon_{i,t} \qquad (4)$$

here, $R_{m,t}$ is the profitability of the shares in the market in period t, $\varepsilon_{i,t}$ is the random error in the process of generating profitability in period t, α_i is the intercept, and β_i is the coefficient of the slope.

To determine the value of the intercept and that of the coefficient, a linear regression is performed with the SPSS software, taking the COLCAP index as dependent variable and each share price of the sample as independent variable.

Finally, the cumulative abnormal return is calculated, which corresponds to the sum of the abnormal returns of each share price of the sample (Mackinlay, 1997):

$$CAR_i = \sum_{t1}^{t2} AR_{i,\ t\ event} \qquad (5)$$

Where CAR_i is the Cumulative Abnormal Return of the company, t_1 represents the first day of the event, and t_2 represents the last day of the event.

After calculating the CAR, a multivariate regression model is constructed, in which the independent variables are EVA, P/E, ROE and EPS, which turn out to be the variables that evidence the value generation (see Table 2) and the dependent variable is the CAR result for each event.

Table 2. Variables description. Source: own elaboration.

Variable	Description	Way to Calculation
CAR	It represents the independent variable of the linear regression model; constitutes the cumulative abnormal return of the shares resulting from the change in tax reforms concerning income tax.	Simple linear regression
EVA	Economic Value added. It represents the final result after covering all costs, expenses and expected gains or costs of capital.	EVA = Invested Capital × (Net asset profit − Weighed average cost of capital)
P/E	Price/Earnings is a multiple that functions as the company's value indication and is calculated as the share closing price over the earnings per share.	P/E = Share price / Earnings per share
ROE	Returns on equity show the profitability of invested capital, calculated as the net profit over equity.	ROE = Net profit/Total equity
EPS	Earnings per share is a multiple that shows the net profit obtained over the number of circulating shares.	Net profit / Circulating shares

The indicator of the independent variables of value corresponds to the calculations with the information related to the financial statements of the year after the event's occurrence (2013, 2015 and 2017) since, according to the literature, the impact of the tax reforms on financial reports and the generation of value measured with value drivers (García, 2015), is generated the year after their publication, date on which the regulatory application occurs.

Hence, to meet the research goal and following the characteristics of a quantitative study, the next research hypotheses are posited, seeking to test them by means of accounting metric tools:

H_i: The income tax modifications established by the tax reforms in Colombia do not have an impact on

the business value creation of the companies listed on the BVC.

H_o *(Null):* The income tax modifications established by the tax reforms in Colombia do not have an impact on the business value creation of the companies listed on the BVC.

With the aim of determining the significance of the cumulative abnormal returns derived from the tax reforms, the T-Student statistics was calculated with degrees of freedom and a probability at a significance level $\alpha = 0.05$ (see Equation 6)

$$ t = \frac{\overline{CAR}}{\sigma AR / \sqrt{n}} \sim t_{N-2} \qquad (6) $$

where represents the average of abnormal returns, represents the deviation of abnormal returns and is the number of days of the event window.

To continue with the hypotheses testing and the results analysis, the search for the financial data of the companies in the sample during a time period between the years 2012 and 2017 is employed as data collection technique. This information is collected from the databases of the corresponding Superintendencies, Bloomberg and corporate information from the respective business website in terms to obtain the accounting information related to financial statements and ratios, and the BVC and the Economática software to obtain market variables.

The use of different information sources is due to financial markets in Colombia are considered in the literature as emerging markets and thus information is limited; as pointed out by Peña, Ortiz & Espitia (2015), according to the theory of efficient markets, the Colombian market can be classified as a weak market which offers very limited information to its users (Gutierrez, 2011).

RESULTS ANALYSIS AND CONCLUSIONS

To support the research hypotheses and have a first approximation to the collected data, a descriptive analysis of each selected variable was performed to evaluate its behavior and identify atypical data altering the sample average. Consequently, after characterizing the variables, the correlation analysis of the study object was conducted to establish, in this case, the impact of the tax reforms (income tax) on the value generation of the companies that are or were listed on the BVC in the time period 2012-2017, by means of a multivariate regression model.

Descriptive analysis of the variables

The statistical descriptive analysis of the information results from the collection, ordering, and processing of the data allowing to interpret it and identify the behavior and nature of the dependent and independent variables, departing from the analysis of the mean and the deviation present in the statistics of the variables (see Table 3).

Table 3. Statistics of the variables. Source: own elaboration based in results from SPSS.

Variables	Event 2012			Event 2014			Event 2016		
	Mean	Typical deviation	N	Mean	Typical deviation	N	Mean	Typical deviation	N
CAR	0.058	0.160	11	- 0.000	0.153	10	0.024	0.130	10
EVA	0.157	0.288	11	0.744	0.110	10	0.214	0.150	10
P/E	0.150	0.295	11	0.229	0.278	10	0.979	0.011	10
ROE	0.062	0.045	11	0.066	0.041	10	0.074	0.063	10
EPS	0.082	0.065	11	0.282	0.201	10	0.220	0.194	10

Initially, and as a first approximation to the impact of the changes in income tax, an analysis is performed taking as a basis the share price, assuming it not as a measure of value but as an input to understand whether atypical fluctuations are generated in per share earnings in the period in which the event was

defined. Thus, the dependent variable CAR measures the cumulative abnormal returns obtained due to an event that may have an impact on the normal return of a share price and allows to measure the volatility of the shares, either for their transactional volume or their price.

During the studied period, the CAR indicates that the returns expected in the companies did not observe a significant volatility in face of the tax reforms (see Table 4), generating an average CAR of 0% for the year 2014, revealing that the event did not motivate a price fluctuation in the market. Conversely, for the years 2012 and 2016 the result of the CAR yielded a mean of 5.8% and 2.4%, respectively. These values are not quite significant to claim that the companies that are or were listed on the BVC presented an abnormal behavior in face of each significant tax event. This permits to initially conclude that the tax reforms did not significantly intervene in the normal development of the financial behavior of the share market price during the study period.

Additionally, with respect to the independent variables selected for the research, according to the theoretical antecedents indicating that they are representative at the time of measuring the generation of business value and according to the results obtained, the result of the EVA variable is highlighted. For the three analyzed events, this result indicated that the companies of the sample created value, because profitability in the business was generated after deducting the total cost of capital (Hall & Brummer, 1999). The price to earnings per share (P/E) indicates that there is a high price in comparison with the earnings per share generated during the time period analyzed, reason why investors are willing to pay more for each Colombian peso of earnings generated by the company (Martín and Trujillo, 2004). Likewise, the ROE variable presented a positive mean during the three events, which indicates that the companies are generating net profits after tax with the capital invested in them by the shareholders (Van Horne & Wachowics, 2010). A result of 6.2%, 6.6% and 7.4% per year was obtained respectively, and the Earnings per Share (EPS) present positive earnings for each one of the shares the companies have in circulation (Martín and Trujillo, 2004). In this way, the mean behavior was positive, although little significant, in the three events of the independent variables considered in the study, which indicates that the

companies of the sample created value during the time period analyzed.

Similarly, when conducting the analysis of the atypical observations by means of box-and-whisker plots for each one of the variables, it was identified that for events 2012, 2014 and 2016, atypical data was obtained. For the case of event 2012, seven atypical observations occur: four in the EVA variable, two in the P/E variable and one in the ROE variable. For event 2014 four outliers appeared: two for the P/E variable, one for the CAR variable and one for the ROE variables. Lastly, for event 2016, two atypical observations occurred in the EVA variable.

Atypical observations or data are frequent in the statistical studies dealing with data related with the analysis of stock markets (Gutierrez, 2011). Therefore, they were not eliminated from the sample base. Since the intention was to analyze the global behavior of the selected data, meeting the population selection criteria to generalize the effect of the event analyzed to all the population studied.

Table 4 illustrates the average of the t statistics and the percentage of companies with a statistics $|t_{(N-2)}| \geq 3.1824$, at a significance level $\alpha = 0.05$. The above statistical analyses permit to conclude, prior to proving the model, that the research hypothesis that there are no abnormal returns derived from the tax reforms is not rejected, since with the calculation of the t statistics it is generally identified that there is significance in the 2012-2013 and 2016-2017 event windows. Therefore, there are no cumulative abnormal returns derived from the tax reforms at 100%. However, for the 2014-2015 event, only 20% of the companies analyzed have significance, which leads to rejecting the research hypothesis for this case, which indicates that there was an impact on the share price derived from the tax reform of 2014. That is, the impact of the selected event on the volatility of the share price is null or little significant. However, this conclusion can only be confirmed from a global perspective, jointly considering all the variables under study through the multivariate regression model.

Table 4. Statistics of the variables. Source: own elaboration based in results from SPSS.

	CAR 2012-2013	CAR 2014-2015	CAR 2016-2017	General
T-Student	108.318	2.735	93.714	69.548
Significance percentage	100.00%	20.00%	100.00%	74.19%

Multivariate analysis per event for the period 2012 – 2017

The multivariate analysis helps to analyze and generalize the behavior of the dependent variable according to how the independent variables behave, besides helping to explicitly control the factors affecting the dependent variable (Wooldridge, 2006). Considering the above and with the aim of achieving and responding to the research goal, an analysis of the multivariate regression model (see Equation 7) was conducted to evaluate the main hypothesis (H_i). This hypothesis states that changes in the income tax established by tax reforms in Colombia have an impact on the business value creation of the companies listed on the BVC during the years 2012-2017.

After applying a systematic information search, the results show that no previous study or research on the multivariate regression model (see Equation 7) has related the two knowledge areas that are the object of this study. Thus, it can be indicated that the procedure to define the dependent variable was determined according to the object of study that, in this case, consists in evaluating the possible impact of disclosing information from a tax reform on companies' value generation.

$$CAR_{i,j} = \beta_0 + \beta_1 \times EVA_{i,j} + \beta_2 \times PE_{i,j} + \beta_3 \times ROE_{i,j} + \beta_4 \times EPS_{i,j} + \varepsilon \qquad (7)$$

where *i*, *j* indicates the company and the year of study, respectively.

In this case, the CAR (cumulative abnormal returns) were used with the aim of evaluating such impact by means of the event study methodology, which has been employed in studies evaluating the impact in stock markets in North America, Europe and Asia (Gutierrez, 2011). To achieve the research aim it was necessary to evaluate companies' value generation, this becoming the independent variables, which, in our case, was derived from value drivers, described in the literature (Gutierrez, 2011).

Thus, to appraise the explanatory power of the multivariate regression model, the R^2 coefficient is evaluated which shows how much of the CAR variance is explained by the independent variables defined in Table 3. Hence, considering an R^2 for each one of the events analyzed at a significance level of 10%, it is observed that for the case of the 2012 event, the independent variables explain 52% of the changes in the value of the cumulative normal returns of the model, for the 2014 event they explain 47%, for the 2016 event they explain 60%, and for the period 2012-2017 they explain 11% of the changes in the CAR (see Table 5).

Table 5. Regression model coefficients and significance. Source: own elaboration based in results from SPSS.

Event	R	R2	Adjusted R2	Std. Error	Durbin-Watson	F	Significance
2012	0.72	0.52	0.19	0.14	1.56	1.60	0.29
2014	0.68	0.47	0.04	0.15	1.62	1.09	0.45
2016	0.77	0.60	0.28	0.11	2.00	1.86	0.26
2012-2017	0.33	0.11	-0.03	0.15	1.59	0.81	0.53

In a first moment it can be claimed that a small R^2 reflects the difficulty of predicting results with high accuracy with respect to the changes in the cumulative abnormal returns, given that when an R^2 is close to zero, this means that the independent variables do not explain the behavior of the dependent variable (Fávero, Belfiore, Lopes & Chan, 2009). However, even though the explanatory power of the models per event is small, this does not necessarily indicate that the model employed is little useful or that it does not adequately explain the analyzed phenomenon. As cited by Gutierrez (2011, p. 98), Wooldridge points out that a small R^2 is typical of studies related to social sciences, in which it is difficult to anticipate the individual behaviors of the independent variables over the depending variable. For this reason, the models of the 2012, 2014, 2016 events and the 2012-2017 period, are reliable in the sense that it can be claimed they are significant.

To support the above conclusion, the degree of significance of the regression model for each one of the events was analyzed, according to a statistical significance level of 5% (see Table 5). This test intends to prove whether or not the independent variables explain the behavior of the dependent variable, providing the result is above the defined 5% (Wooldridge, 2006).

In this way, the ANOVA (Analysis of variance) in Table 5 presents the results of the model significance for the three events analyzed and for the set of data grouped from year 2012 to year 2017. In the case of event 2012, Sig $F=0.29>0.05$; in event 2014, Sig. $F=0.45>0.05$; in event 2016, Sig. $F=0.26>0.05$. For the period 2012-2017, Sig. $F=0.53>0.05$. This means that none of the independent variables considered in the model is significant to explain the

behavior of the CAR in any of the events proposed, let alone for the evaluation period.

Likewise, in the results of the models it can be evidenced that the betas of the independent variables are generally not significant at 1% and 5% (see Table 6). The EVAestad coefficient is negative, indicating that with an additional increase the cumulative returns decrease, given that when increasing company value, investors will not perceive this in their share returns; rather, this increase must be compensated via higher income taxes. On the other hand, the coefficient of the PUest variable is negative, indicating that in the face of a tax reform, investors are willing to pay a lower price per share, thus generating lower abnormal returns since they will obtain lower net profit benefits. ROE and UPAest variables have a positive coefficient, which is consistent with financial literature.

Table 6. Model coefficients. Source: own elaboration based in results from SPSS.

Variable	Non standardized coefficients		Typified coefficients		t	Significance
	B	S.E.	Beta			
(Constant)	0.065	0.061			1.079	0.290
EVAestad	- 0.165	0.094	- 0.374	-	1.747	0.092
PUest	- 0.058	0.066	- 0.175	-	0.873	0.391
ROE	0.305	0.586	0.103		0.520	0.607
UPAest	0.149	0.161	0.183		0.925	0.363

Similarly, considering the correlational analysis of the variables (see Table 7), it is evidenced that they do not have a significant linear relationship with the CAR, which means that the independent variables of value do not explain the changes in the CAR resulting from the changes in income tax, based on the assumption of a linear model.

Additionally, with the help of the SPSS software, the validation tests of the regression analysis assumptions for the period 2012-2017 are conducted. The aim is to support the development of the multivariate regression model and evaluate whether the variables meet the hypothesis of normality, homoscedasticity, autocorrelation and multicollinearity of the residuals. This was verified with the Kolmogorov-Smirnov, Pesaran-Pesaran, and Durbin-Watson tests (see Table 5) and the VIF variables and tolerance analysis (see Table 8), respectively.

The results of the tests performed (see Table 8) allowed to validate the assumptions of the multivariate

linear regression model, giving additional support to the previously shown results. The evaluation of the K-S test yielded a statistic of 0.44 with a significance of 0.99. According to Corrar, Paulo & Filho (2007), this result indicates that the residuals of the variables are normally distributed since the significance of the statistic is greater than 0.05 (Sig. $T = 0.99 > 0.05$).

Additionally, according to the Pesarán-Pesarán test, it is concluded that the data are not heteroscedastic, that is, the variance of the residuals is not constant for the independent variables, considering that the significance of the test is greater than 0.05 (Sig. $T = 0.72 > 0.05$). Besides, it is evidenced that there is no correlation among the explanatory variables of the model, since its result for the analysis period is equal to 1.59, which is close to two, a value accepted to confirm the nonexistence of the autocorrelation (Fávero, Belfiore, Lopes & Chan, 2009).

In a similar way, autocorrelation tests to the residuals of the model in Equation 7 were conducted by the

Table 7. Correlation analysis. Source: own elaboration based in results from SPSS.

		CAR	EVA	P/E	ROE	EPS
CAR	Corr. Pearson	1.00	-0.24	-0.05	-0.00	0.06
	Sig.		0.19	0.78	0.98	0.74
EVA	Corr. Pearson		1.00	-0.26	0.23	0.33
	Sig.			0.16	0.21	0.07
P/E	Corr. Pearson			1.00	0.18	0.04
	Sig.				0.33	0.85
ROE	Corr. Pearson				1.00	0.07
	Sig.					0.72
EPS	Corr. Pearson					1.00
	Sig.					

Table 8. Model tests. Source: own elaboration based in results from SPSS.

Premise	Test	Statistic	Sig. T	Evaluation
Residuals Normality	Kolmogorov-Smirnov	0.44	0.99	The null hypothesis is accepted for residuals normality
Residuals homoscedasticity	Pesarán-Pesarán	0.13	0.72	The null hypothesis is accepted for residuals homoscedasticity
Absence of correlation between the residuals	Durbin-Watson	1.59	-	Absence of correlation between the residuals
Multicollinearity of the independent variables	Maximum VIF- Minimum Tolerance	1.34 - 0.75	-	Acceptable multicollinearity

Breusch-Godfrey test. Table 9 illustrates the results for each one of the models estimated in the study. In general, the model does not present autocorrelation of order 1 and 2, given that in each one of the analyses p-values > 0.05.

Table 9. Breusch-Godfrey test for serial correlation. Source: own elaboration based in results from SPSS.

Model	Breusch-Godfrey order 1 P-value	Breusch -Godfrey order 2 P-value
2012-2013	0.57	0.053
2014-2015	0.40	0.32
2016-2017	0.89	0.59
General	0.30	0.29

Lastly, the multicollinearity of the variables, evaluated with the VIF and the tolerance, -statistics which are close to the unit- shows that there are no significant multicollinearity problems among the explanatory variables invalidating the regression model (Hair, 2005), which may be a sign that the explanatory variables do not have strong correlations among each other, reinforcing the model's pertinence.

DISCUSSION AND CONCLUSIONS

In conclusion, as evidenced in the statistical analyses and the multivariate regression model, based on the results obtained, in first place, and taking into account the CAR calculation, it is observed that the abnormal returns of share profitability do not present significant alteration resulting from the modifications in the income tax in the Colombian tax regulation. This result is confirmed with the analysis conducted with the regression model, which yields low correlations between the independent variables and the dependent variable. This assertion is confirmed with the tests of the correlation analysis assumptions; in this way, the main hypothesis (H_i) posited is not rejected, which states that income tax does not have an impact on the value generation of the companies of the sample in the period 2012-2017.

Regarding the correlational analysis, a low statistical significance was observed between the CAR as dependent variable and the value generation variables of the companies included in the accounting metric model. For the present research, this indicates that the modifications of the income tax established in the tax reforms between the years 2012 to 2017 in Colombia did not have an impact on the business value creation of the sampled companies listed on the BVC. In general terms, changes mentioned in the income tax for such companies do not lead to substantial modifications, as mentioned by Gómez and Steiner (2015), which affects their finances to a great extent, and therefore their value generation.

The present research is a study that empirically contrasts the financial theoretical support led by the work of Modigliani & Miller (1963), who conclude about a positive impact on the optimal financial policy, considering the maximum indebtedness within the capital structure, due to the tax deductibility of the interests. Besides, this research becomes a support to the premise developed in the Miller's model (1977), which claims that the integration of tax to natural and legal persons in an equilibrium context causes the tax incentive to debt financing to disappear totally for each individual company, so tax impact on business value would not be generated.

The Colombian tax system is particular and changing mainly due to the following aspects: i) the taxable nature of corporate tax, ii) the different reasons for deductions and the types of deductions permitted, iii) the possibility of transferring unused tax deductions to later exercises, and iv) the tax discounts permitted by law. These aspects generate a different magnitude of fiscal advantage or disadvantage for each company in particular. Therefore, the results yielded in the present analysis are not interpreted as a rejection of the financial theory led by Miller (1977).

It is also important to mention that, with the great amount of reforms taking place in the country, the big companies have opted to plan their tax issues with the aim of legally controlling and reducing the tax burdens without incurring tax avoidance or evasion (Romero, 2010). This becomes a cause for the low impact of the tax changes on the creation of value of the big companies, which are mainly the ones listed on the BVC.

Along this line, highlighting the conceived interdisciplinarity, it is recommended for future analyses to consider a nonlinear model and evaluate the hypothesis considered in a Latin American context with the aim of obtaining a greater sample size. Additionally, it is important to conduct studies to develop joint work including tax aspects and theoretical financial developments, involving the value drivers in the analysis of the tax regulation implementation, not only considering the capital structure and the impact on share price.

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