Efficient Tax Planning: An Analysis of its Relationship with Market Risk in Brazil

[1]Antonio Lopo Martinez and [2]André Vello

[1]Fucape Business School, Vitoria, ES - Brazil
[2]Fucape Business School, Vitoria, ES - Brazil

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ABSTRACT

Objective: This paper addresses the following question: Is a firm's risk perceived by the financial market influenced by the efficiency of its tax planning? Besides responding to this question, two other objectives are: (a) to relate the concepts of tax planning proposed by Scholes and Wolfson (1992) with the concepts of tax avoidance and governance; and (b) to propose the construction of an indicator of efficient tax planning and a model for its estimation. **Results:** This paper contributes to the modern theory of corporate tax avoidance by identifying evidence that a firm's tax efficiency, achieved by successful tax planning, reduces their risk in relation to the capital market, as long as this is accompanied by good corporate governance practices. Research data were obtained from three sources: (a) information from the value added statement (VAS); (b) data obtained from the Economatica; and (c) information on the level of corporate governance. Employing a sample of 86 companies listed on the BM&FBovespa, drawn from eight economic sectors over a five-year period, we performed panel-data regressions by the OLS method with fixed-effect estimators, seeking to identify the variables that explain the firms' market risk (beta). **Conclusion:** The findings indicate there is a negative and significant relation between market risk and the tax planning efficiency index of firms that have good governance practices. Our findings are based on an interdisciplinary approach involving tax planning and the theory of tax avoidance, besides studies in the areas of finance and risk, all of them considered together within the framework of corporate governance and agency theory.

INTRODUCTION

According to the Brazilian Tax Planning Institute (IBPT), the country's tax burden has grown substantially in recent years. Between 2000 and 2010 the overall tax bite rose from 30.03% to 35.04% of gross domestic product (GDP). Tax revenue in 2010 grew by 17.8% in nominal terms in relation to the previous year (Amaral, Olenike, Amaral, & Steinbruch, 2011). For comparison, according to data from the Organization for Economic Cooperation and Development (OECD), the tax burden in the United States in 2008 was 27% of GDP.

Because of Brazil's heavy and growing tax burden, firms have been putting greater effort into finding ways to reduce their tax liabilities, an effort the literature calls corporate tax avoidance. But such efforts are a double-edged sword. While they can bring benefits by reducing taxes and thus boosting cash flow, they can also attract attention from the tax authorities and create future tax contingencies (Hanlon & Heitzman, 2010). It is thus relevant to study the matter of tax avoidance, to clarify the possible positive and negative consequences for firms.

The literature on this theme is relatively recent. According to Hanlon and Heitzman (2010), few studies have assessed the consequences of tax avoidance in relation to measures of company performance, whether achieved by lawful tax planning practices or abusive evasion. Wilson (2009) and Desai and Dharmapala (2009) found significant evidence that the practice of tax avoidance together with good corporate governance brings higher abnormal returns and value to firms, respectively. In turn, Ayers, Laplante and Mcguire (2010) found evidence of a significant relation between positive or negative variations in book-tax difference (BTD) and a tendency for worsening credit risk. These variations, according to the authors, evidence deterioration in the quality of the firm's earnings.

Good tax management can enhance the competitiveness of modern firms, and as such is an important tool in their overall strategic planning, in response to the heavy current tax burden and more active and efficient oversight by the tax authorities. But there is still a relative lack of studies clarifying the consequences of tax

Corresponding Author: Antonio Lopo Martinez, Fucape Business School, Vitoria. Brazil.
E-mail, lopo@fucape.br. Tel + 55 27 4009-4444

avoidance practices on companies. In this context, the present work addresses the following question: Is a firm's risk perceived by the financial market influenced by the efficiency of its tax planning?

Besides responding to this question, our two other objectives are: (a) to relate the concepts of tax planning proposed by Scholes and Wolfson (1992) with the concepts of tax avoidance and governance; and (b) to propose the construction of an indicator of efficient tax planning and a model for its estimation.

On the one hand, there are firms that are inefficient in tax matters, causing them to have a higher tax liability than their competitors. Given the magnitude of Brazil's tax burden, this inefficiency should have a particularly strong negative effect on these firms' competitiveness, and thus on their risk in relation to their rivals.

On the other hand, companies can be too aggressive in their tax avoidance efforts, exposing themselves to legal risks that cause the market to view them as riskier investments. The capital market does not like the obscurity and uncertainty about future cash flow that can come from these increased legal risks.

For Hafkenscheid (2010), tax expenses alone do not permit assessing risk, and can thus lead to overestimation or underestimation of the economic value of the fiscal position of a company. More recent proposals about corporate tax avoidance suggest it should be evaluated together with the level of corporate governance. The transparency that comes with good governance reduces the inherent effects of agency conflicts and the market's uncertainties about a firm's concealed tax liabilities.

Here we define efficient tax planning as the set of actions that reduce a firm's tax liability, exercised within the precepts of good corporate governance practices, and that do not increase other costs with greater marginal effects than the tax savings achieved.

The aim of this article is to examine the association of systematic risk, as a proxy for the risk perceived by the financial market, with a proxy consisting of a construct for efficient tax planning, based on the definitions and concepts of corporate tax avoidance and governance taken together. We use other instrumental variables as well, as controls for the statistical methods proposed.

The data were drawn from three interrelated primary sources: (a) information from the Value Added Statement (VAS) of firms, obtained from the Institute for Accounting, Actuarial and Financial Research (FIPECAFI) of the University of São Paulo (USP), used by the business magazine Exame for its annual survey entitled Melhores & Maiores ("Best and Biggest"); (b) instrumental data obtained from the annual financial statements of firms in the Economática database; and (c) data on the level of corporate governance, as classified by the Brazilian Securities Commission (CVM), obtained from the website of the São Paulo Stock and Commodities Exchange (BM&FBovespa), regarding the companies that compose its theoretical Differentiated Corporate Governance Index (CGI, or IGC in Portuguese). These data were structured in a panel, in cross-sectional form of the firms listed on the BM&FBovespa and time-sectional form over the period from 2005 to 2009.

The results indicate there is a significant and negative relation between the market risk and the tax planning efficiency index for firms with the best corporate governance practices. This reveals the active role played by corporate governance in assuring the positive effects of efficient tax planning, indicating points of convergence of these concepts.

This research is relevant because it puts some light on the factors that influence managers' tax planning decision. In this context, it is an important research question that has broad public policy implications, especially in developing countries, where relatively little is known about why some firms appear to be more tax aggressive than others.

This study also contributes to the international literature, by presenting the relationship of governance to taxation at all levels, federal, state and municipal. By using the VAS, we can identify the taxes collected by all entities, which makes this a more comprehensive research, when compared to those, that are usually performed internationally, which focus only on metrics that calculate the taxes on profits. The VAS available in Brazil offers such information that is rarely available for researchers internationally.

The article is organized into five sections including this introduction. The second section addresses the theoretical framework and presents the research hypothesis, while the third section defines the methodology, model, statistical tests and measurement of the model's dependent, independent and control variables. The fourth section presents and discusses the results and the fifth section concludes.

Literature Review:
Factors that determine the market risk of Brazilian companies:
Many studies carried out in Brazil and other countries have sought evidence of the relationship between a firms' market risk and their accounting data or financial, management or market indicators. Among the many such studies in the international area, we can mention Hou and Robinson (2006), Gruca and Rego (2005) and Tuli and Bharadwaj (2009). The two last ones found evidence of the existence of a negative relationship between customer satisfaction and risk, utilizing a robust methodology based on the model of Fama and French (1992). In turn, the first one concluded that firms in sectors with greater concentration have higher abnormal

return, presupposing higher risk.

In Brazil, there have also been several relatively recent empirical studies on the matter, among which we can cite Dantas, Lustosa and De Medeiros (2006), Coser and Chu (2005) and Fernandes (2007), among others. Dantas *et al*. (2006) found evidence that the operational leverage variable is a determining factor for measurement of the systematic risk of companies listed on the Bovespa, and that the higher a firm's operational leverage is, the greater will be its abnormal return, again presupposing higher risk. Coser and Chu (2005), in turn, did not find a significant relationship between financial leverage and market risk of companies with shares traded on the Bovespa.

In her empirical study of the determining factors of Brazilian companies' market risk, Fernandes (2007) sought evidence to relate it to variables of liquidity, profitability, indebtedness, size, sector of activity and corporate governance. She used single and multiple sectional linear regressions with beta as the dependent variable for a sample of firms listed on the Bovespa. According to her, the results indicated that financial leverage, size and variance of liquidity are the factors that raise market risk, while profitability, variance of financial leverage, variance of profitability and growth are factors that reduce market risk.

Theory of tax planning and the Scholes-Wolfson framework:

The conceptual structure developed by Scholes and Wolfson (1992) revolutionized tax planning theory throughout the world, by bringing three basic aspects of efficient tax planning: "all parties, all taxes and all costs".

The authors brought the concept of tax efficiency, until then fragmented, which led to the analysis of tax planning actions in a new, more responsible and broader light. Efficient tax planning must take into consideration all the parties involved in the process, all the taxes levied, whether implicit or explicit, and all related costs, even if uncertain. They further pointed out that taxes per se are only one of many costs that can be influenced by tax planning (Scholes , Wolfson, Erickson, Maydew, & Shevlin, 2008).

They used the concepts of the theory of risk and return to define what they call implicit taxes. This is the marginal difference of the acquisition cost of an asset, which offers a certain rate of return, in relation to what it would be worth should there be a change in the tax rate (Scholes *et al*., 2008). They also brought the concept of tax clienteles, whose definition is near that of implicit taxes. While the former captures the marginal effect of the asset's cost before and after a change in its tax burden (time section), the former extracts this difference by comparing the tax burden of an asset in comparison with a similar one (cross section) with the same risk, subtracting the effect of the difference from the transaction cost.

These two concepts have as premises the theory of efficient markets, the absence of arbitrage, except regarding transaction cost, the theory of balanced prices and the theory of risk and return. The explanations for implicit taxes and tax clienteles are the same, and are based on financial theory. They involve the marginal value aggregated to the firm in proportion to its discounted free cash flow, when there is a marginal variation in the effective tax rate on this asset, in time or in space, that is, between the assets. This theory adds to the theory of risk, by bringing with it new conceptions of the tax aspect as a relevant factor for understanding, analysis and empirical demonstration of risk. Up until then, the asset pricing theory in the financial literature approached the tax aspect only by considering the explicit tax rate applicable to a firm, net of the tax benefit of debt financing, called tax shielding.

Tax planning can also trigger other effects on the pricing of an asset other than that of the tax shield. Here we also investigate if it influences a firms' market risk, and as a consequence, its cost of equity capital. Finally, Scholes *et al*. (2008) established all costs as one more aspect of tax planning. On this point they suggested that managers must monitor all costs in a tax plan, including the other indirect costs this process can bring to the company.

Corporate tax avoidance:

According to Hanlon and Heitzman (2010, p. 137), there is no universally accepted definition or construct for the term corporate tax avoidance. Studies proposing a new perspective on the matter are recent, starting with Slemrod (2004), Chen and Chu (2005) and Crocker and Slemrod (2005), pioneers in treating the theme of corporate tax avoidance with the agency theory developed by Jensen and Meckling in 1976.

According to Crocker and Slemrod (2005), the penalties imposed on chief financial officers are more effective than those imposed on shareholders in reducing tax evasion. Chen and Chu (2005), in turn, brought to the matter the (explicit) additional costs the shareholders incur of firms that commit tax evasion, as an incentive to maintain their control over managers. Furthermore, many of the factors affecting individual tax avoidance also apply to corporate tax avoidance. (Hanlon & Heitzman, 2010). The studies of Richardson (2006), Tsakumis, Curatola and Porcano (2007) and Richardson (2008) have investigated the individual and social factors that determine rates of individual tax avoidance. The factors observed by these authors are the level of education, the complexity of the tax rules, the type of activity exercised and the sense of justice and morality (Richardson, 2006); the aversion to uncertainty, distance from power, masculinity and individuality (Tsakumis

et al., 2007); and the legal system, trust in government and religiosity (Richardson, 2008).

These factors of individuals, however, will have greater or lesser influence on firms depending on their ownership and control structure. Although tax avoidance is not exactly a reflection of the agency problem, or even a problem in itself, separating the ownership and control structure within the theme of taxation can be interesting to better understand it, in view of the conflicting interests of the firm and its managers (Hanlon & Heitzman, 2010).

Corporate tax avoidance can bring many consequences for firms. Among the recent studies on this theme are those of Ayers *et al*. (2010), Wilson (2009) and Desai and Dharmapala (2009). Wilson (2009) found significant evidence that the practice of tax avoidance together with good corporate governance brings a greater abnormal return to firms. Likewise, Desai and Dharmapala (2009) found evidence that tax avoidance actions, when undertaken by firms with good governance, brings greater value. However, the empirical evidence found in the study suggested that this relation ceases to be significant when the governance practices are not taken into consideration.

What stands out in the literature is the lack of a universally accepted construct able to adequately capture the effects of the tax avoidance variable, as argued by Hanlon and Heitzman (2010). The authors also cite the difficulties these constructs have in capturing the effects of conforming avoidance or the measures that capture the marginal effect (marginal tax rate). The authors define conforming avoidance as the effects captured by the tax avoidance construct when its action is exercised on the firm's accounting result.

Research hypothesis:

Our aim is to investigate the existence of a relationship between companies' risk and tax efficiency. This investigation can help explain the reasons why not all actions that reduce (increase) a firm's tax rate increase (reduce) its market value, or increase (reduce) it to a greater (lesser) extent than the effects caused by the firm's discounted cash flow.

Wilson (2009) and Desai and Dharmapala (2009), when addressing the theme without considering the governance variable, did not find greater abnormal return on assets and higher value, respectively, for firms that practice tax avoidance. The likely explanation is the possible adverse effects that tax avoidance can bring to firms' market risk when not controlled. This control can be provided by good governance, by increasing market transparency, better delineating the control and ownership structure and creating overlapping interests of managers and the firm itself, i.e., by reducing the agency conflict. Good governance attenuates the occurrence of legal risk, since the transparency it brings together with alignment of the interests of shareholders and managers tends to reduce the occurrence of legal risk from tax planning actions.

Based on this logic, a firm's market risk should decline as the level of tax efficiency attained by tax planning increases, as long as the agency conflict is controlled by aligning the interests of managers and owners.

Companies that are inefficient in tax matters should be perceived by the market as having higher risk, given their inefficient management. In this situation, the market risk should be greater as the firm's operational risk increases. In contrast, tax-efficient firms, as long as they have good governance to calm the market through transparent disclosure of the efficacy of their tax planning, should be perceived as having lower risk, given their more efficient management. In this situation, the market risk should be lower in function of reduced operational risk when the legal risk is controlled by good governance practices. Based on this logic, our research hypothesis here is: The greater a firm's tax planning efficiency is, in the presence of good corporate governance practices, the lower will be its risk in relation to the financial market.

Hanlon and Heitzman (2010) point out that one should take care in the inferences drawn from research on corporate tax avoidance, in light of the constructs utilized. The construct utilized should be able to perceive the interests of the firm separately from the interests of the agents, by segregating the ownership from the control structure. To do this it is necessary to consider the influences of the corporate governance variable when investigating the theory of corporate tax avoidance.

In this respect, our focus involves an intentional "reduction" of the "all parties" concept, since our interest is exclusively the consequences and influences that tax planning brings to companies. Nevertheless, the construct must be able to absorb the other two concepts of Scholes *et al*. (2008), "all taxes" and "all costs". In this context, it is essential to use a construct that perceives all the effects, that is, conforming avoidance, tax clienteles, implicit taxes and concealed tax burden.

Methodology:

The research methodology employed here is descriptive and exploratory, because besides describing the relations of variables, we explore the proposition of a construct for efficient tax planning.

Data:

We obtained our data from three sources: (a) information from the value added statement (VAS) of Brazilian companies with shares traded on the BM&FBovespa included in the yearly survey conducted by the

magazine Exame, called Melhores & Maiores, between 2005 and 2009, based on data provided by the Institute for Accounting, Actuarial and Financial Research (FIPECAFI) of the University of São Paulo (USP); (b) data from the financial statements of firms, obtained from the Economática database; and (c) information on the level of corporate governance, according to the classification by the Brazilian Securities Commission (CVM), obtained from the website of the BM&FBovespa, of the firms that compose its theoretical Differentiated Corporate Governance Index (CGI).

We excluded from the sample firms in any year when there were fewer than five firms in these sectors, firms with representation of less than 10% by market share (sales revenue) of the entire sector or by number of firms of the total of companies in a sector and firms classified as "Others" by the Economatica database. These exclusions had two objectives: (1) to assure good representation of the firms in a given sector and year, by achieving a less significant error between the tax burden of that sector and that calculated by the average of the firms in that sector; and (2) to exclude firms without a base for comparison.

Table 1: Summary of the sample.

Economic Sector:	2005	2006	2007	2008	2009	Total
Food and Beverages				6	8	14
Commerce			5	6	10	21
Electricity	11	11	13	13	12	60
Oil and Gas	5					5
Chemicals	8	7	6	6	7	34
Steel and Metallurgy	9	8	8	7	7	39
Textiles			5	9	10	24
Vehicles and Parts	5	5		8	8	26
Total	38	31	37	55	62	223

Estimation of the independent variable – Tax Avoidance:

Before addressing the measurement of the index of tax planning efficiency itself, it is necessary to discuss some accounting concepts and studies carried out.

Value Added Statement – VAS:

The main objective of the report called the Value Added Statement (VAS), is to present the wealth created by the company in all aspects, including sales of products and/or services, non-operational results, financial revenue, equity pickup, dividends and other earnings from investments, rents and royalties. The VAS also provides information on the wealth generated for all stakeholders, namely suppliers, employees, governments (taxes), financiers and partners or shareholders. In all cases this wealth generated is accounted for by the concept of added value.

This statement is socially oriented, since it informs society of how much wealth the company generates and how it is distributed, to demonstrate to what extent the firm aggregates value to the places where it is present. Gallo (2008) thus proposes that it be used as an alternative to measure the tax burden of a country. Many firms, although not required to do so, disclose this statement as a way to provide greater transparency to the market.

Measuring the sectorial tax burden:

In the VAS it is possible to obtain the overall tax rate on a firm's value added, as well as the tax burden of a sector or market. Dividing the wealth distributed to the government (in the form of taxes) by the total value of the wealth added produces the effective tax rate paid by that firm. According to Gallo (2008), when this calculation is done for the set of companies in a given sector or market, one obtains the sectorial or market tax rate. By this same logic, the weighted average of the tax burden of all companies, using their micro-data, would be significantly representative of the overall tax burden of the country. This calculation model can even be an alternative to the current one, which relies on the sum of the tax revenues obtained by all levels of government divided by national GDP.

Gallo (2008) made adjustments in his data to enable using the "Net Value Added" to find the ratio of taxes paid over the net wealth generated by firms instead of the "Total Amount to Distribute". The difference between these two is recorded under the VAS rubric called "Value Added Received by Transfer", which is composed of the net financial income and the value of the equity pickup. For the same reason, we deduct the equity pickup for measurement of the sectorial tax rate (STR) and the firm's marginal tax rate (MTR).

It must be noted that the financial income composes the base for calculating the Tax on Financial Transactions (IOF) as well as the taxes on income (Income Tax – IR and Social Contribution on Net Profit – CSLL), and possibly for the Contribution to the Social Integration Program (PIS) and the Contribution to Fund Social Security (COFINS), in the latter two cases depending on the tax calculation regime adopted by the company. The choice of the regime for these two levies is part of the firm's tax planning. Therefore, financial revenue or expense should be maintained in the measurement of the MTR of the firm and likewise in the calculation of the STR. In line with this, we only deducted the value of equity pickup and kept the net financial

income. We performed the calculation with the denominator composed of the difference between the Value Added to Distribute and Equity Pickup rather than the Net Value Added. We obtained these figures from the VAS of the companies to calculate the tax rate of each sector of the Economática database. The equation is the following:

$$STR_{kt} = \sum_{i}^{N_{kt}} \frac{T_{ikt}}{(TVAD_{ikt} - EP_{ikt})} \times N_{kt} \tag{1}$$

Where

- STR_{kt}: Tax rate of sector k in year t;
- T_{ikt}: Taxes and other fiscal levies paid by firm i from sector k in year t;
- EP_{ikt}: Result of the equity pickup of firm i from sector k in year t;
- $TVAD_{ikt}$: Total value added to distribute of firm i from sector k in year t; and
- N_{kt}: Number of firms in sector k in year t.

The results obtained by applying Equation 1 above are presented in the table below:

Table 2: Results of the sectorial tax burden calculations.

ECONOMIC SECTOR	YEAR					
	2005	2006	2007	2008	2009	Sector average
Food and Beverages				26%	22%	24%
Commerce			42%	41%	42%	42%
Electricity	44%	51%	55%	34%	49%	46%
Oil and Gas	58%					58%
Chemicals	29%	41%	24%	24%	39%	32%
Steel and Metallurgy	35%	38%	39%	31%	21%	33%
Textiles			37%	37%	28%	33%
Vehicles and Parts	14%	20%		6%	23%	15%
Yearly Average	37%	41%	42%	29%	33%	35%

We used this calculation because we could not find any public data on the effective sectorial tax rates in Brazil. For this reason, it is also not possible to ascertain whether the tax rates in the sample are representative of the overall rates for the sectors.

Tax avoidance construct: Tax Efficiency Index (TEI):

To define the tax avoidance construct, it is first necessary to define the concept and the way to calculate the marginal tax rate (MTR). According to Hanlon and Heitzman (2010), the MTR is one of the few measures of tax avoidance proposed in the international literature able to perceive the effects of conforming avoidance, as mentioned. The MTR is defined by Hanlon and Heitzman (2010) as the "present value of taxes on an additional dollar of income."

Dividing the taxes paid by the company by its value added, net of equity pickup, produces the marginal tax rate of that company in the period. Since this measure will be compared with others only in the same time interval, it is not necessary for the calculation proposed here to obtain its present value.

Furthermore, this variable is not measured based on the firm's accounting profit, which is one more argument in support of this variable as indicative of the effects of conforming avoidance. We used Equation (2) below to calculate this variable.

$$MTR_{ikt} = \left(\frac{T_{ikt}}{TVAD_{ikt} - EP_{ikt}} \right) \tag{2}$$

Where:

- MTR_{ikt}: Marginal tax rate of firm i from sector k in year t;
- T_{ikt}: Taxes and other fiscal levies paid by firm i from sector k in year t;
- EP_{ikt}: Equity pickup of firm i from sector k in year t; and
- $TVAD_{ikt}$: Total value added distributed by firm i from sector k in year t.

To compare this variable between sectors in the same year, it is also necessary to standardize it, that is, to subtract it from the sectorial tax rate in a given year and divide the result by the standard deviation of that sector and year. The sectorial tax rate was obtained in Equation (4) above, but it can also be obtained from a sector-specific report, if available. Thus, we calculated the standardized MTR by applying Equation (3) as follows:

$$SMTR_{ikt} = (STR_{kt} - MTR_{kt}) / \sigma_{kt} \tag{3}$$

Where:
- $SMTR_{ikt}$: Standardized MTR of firm i from sector k in year t;
- STR_{kt}: Tax rate of sector k in year t;
- MTR_{ikt}: Marginal tax rate of firm i from sector k in year t; and
- σ_{kt}: Standard deviation of the MTR in sector k and year t.

This calculation method makes this variable retain a "memory" about the associated cross section, making it a relative measure, with comparable bases, and thus endowing it with the capacity to detect the effects of tax clienteles.

Returning to the requirements previously mentioned for definition of the ideal construct for the tax planning efficiency variable, there are still three actions necessary. They are: (a) to restrict it to the effects inherent to the firm, to avoid the private and conflicting interests of other agents; (b) to have a perception of the hidden tax burden; and (c) to have a perception of the implicit taxes. The first two items can be handled by including the corporate governance in the construct.

By adding the perception of governance to the construct, we also soften the effects of the hidden tax burden, for two reasons: (1) by eliminating those imposed on purpose by the agents in furtherance of their private interests and (2) because good governance also brings greater transparency, so that well governed firms are less inclined to hide factors such as tax liabilities.

Finally, so that the construct will perceive the effects of implicit taxes, it should include a long-run function, as proposed by Dyreng, Hanlon and Maydew (2008). In that study, the authors developed a construct for the tax avoidance variable they called the long-run cash effective tax rate - ETR. However, due to the absence of sufficient time series data, we did not include this is the construct developed here, but believe it should be used any time the data are sufficient. In mathematical terms, the corporate governance level is included according to the following formula, based on the three trading segments of the BM&FBovespa that require enhanced corporate governance practices (Level I, Level II and "New Market"):

$$TEI_{ikt} = -SMTR_{ikt} \times CGI_{ikt} \text{ , where } CGI = \begin{cases} 1, & SMTR_{ikt} \geq 0 \\ CGF_m, & SMTR_{ikt} < 0 \end{cases} \text{, and} \qquad (4)$$

CGF_m =	No Enhanced Governance	Level 1	Level 2	New Market
	0.1	0.85	0.9	1

- TEI_{ikt}: Tax planning efficiency index of firm i from sector k in year t;
- $SMTR_{ikt}$: Standardized MTR of firm i from sector k in year t;
- CGI_{kt}: Corporate governance index of firm i from sector k in year t;
- CGF_{nm}: Attenuation factor by disclosure of a lower level of corporate governance; and
- σ_{kt}: Standard deviation of the MTR in sector k and year t.

The steps to apply Equation (4) are as follows: Step 1) for the variable to capture the effects of tax planning, its sign must be inverted, because $SMTR_{ikt}$ is a tax rate variable; Step 2) when the firm has a positive standardized marginal tax rate ($SMTR_{ikt} > 0$), meaning ineffective planning, disregard the effect of governance, because there is no way to speak about private interests and a hidden tax rate in this situation of low tax performance by the firm; and Step 3) when the tax planning is effective ($SMTR_{ikt} < 0$), apply the attenuation factor of a low level of corporate governance (CGF_m) according to the values proposed above. This vector brings the effects of corporate governance to the model.

Chart 1: Requirements ideally proposed to estimate the efficiency of tax planning.

Requirements	Satisfaction of the construct proposed in this work (TEI) of the requirement.
1. Capture only the effects of interest to the firm, and ignore the private and conflicting interests of the other agents.	Yes
2. Be able to perceive tax planning actions that alter the firm's accounting income (conforming avoidance).	Yes
3. Be a relative measure, with bases comparable between firms, so as to perceive tax clienteles (cross section).	Yes
4. Be a relative measure, with bases comparable with time, and thus to perceive implicit taxes (time section).	No
5. Have a perception of the effects of the hidden tax burden.	Partially

A higher CGFm value means lower attenuation of the TEI, that is, the firm's tax planning is more transparent so there is less need to attenuate its effects. Therefore, we considered this variable to take on the value of 1 for firms with shares listed for trading in the New Market segment of the BM&FBovespa, because this segment requires the highest governance level, and assigned lower values to firms listed for trading in the Level 2, Level 1 and general trading segment (where no enhanced governance is required other than the general requirements for public companies issued by the Brazilian Securities Commission).

Chart 1 above summarizes the requirements we believe are ideal for estimating the tax avoidance construct, as well as whether or not this proposed construct (TEI variable) satisfies each of the requirements established. In conclusion of this section, according to the normality tests applied, there is no reason to reject the hypothesis that the TEI variable, as well as its component sub-variables, are not normally distributed.

Table 3: Normality test of Shapiro-Wilk applied to the model variables.

Test of normality applied to the main variables of the model				
	MTR	SMTR	TEI	RISK
Z	7.037	2.164	4.236	2.097
p-value	0.0%	1.5%	0.0%	1.8%
Interpretation of the test=	Normality not rejected at the 99.95% confidence level.	Normality not rejected at the 98.5% confidence level	Normality not rejected at the 99.95% confidence level	Normality not rejected at the 98.2% confidence level.

Estimation of the dependent variable – Risk:

The construct utilized as a proxy for risk in this work is the beta index, obtained from the Economatica database. We used the model for calculating beta of Economatica, which does this by measuring the variation in a firm's stock price in relation to the theoretical market index. An alternative to employing the beta calculated by Economatica would be to perform this calculation manually, by regressing the return of each firm with the market index, year by year. However, with our sample this would have required performing at least 223 regressions. Since we did not identify any restriction to the calculation performed by Economática, we do not believe this (not negligible) effort was necessary.

According to Damodaran (2002), the best way to obtain a firm's beta is to use a fundamentalist metric, according to his approach throughout his book for calculation of valuation. In this work, which is based on the risk perceived by the financial market, we believe this calculation method does not pose a research limitation.

We used the beta calculated three months after the disclosure date of the VAS, on April 1st of the following year, to give greater weight to the fact that the financial statements had already been released to the market. To calculate it we considered a period of 24 months, at weekly intervals.

According to Damodaran (2002), there is a tradeoff between longer and shorter periods for calculating beta. The former aggregates a greater degree of freedom to the regression, increasing the precision of the result, while the latter takes into account more recent circumstances that influence the firm's market risk. Further according to Damodaran (2002), short stock return intervals, such as daily or even intraday ones, increase the number of observations in the regression and its degree of freedom, but also increase the non-trading bias of the regression.

We believe this choice of 24 months with weekly intervals provides the best tradeoff between precision of the calculation on the one hand and the non-trading effect, but greater sensitivity, of the variable to more recent events on the other hand. According to Damodaran (2002), these are the parameters employed by Bloomberg, while Value Line and Standard & Poor's use periods of five years and monthly intervals.

Control variables:

We obtained our control variables from the Economática database also. There are many academic works that propose to identify the determining factors that influence a firm's market risk. In Chart 2 we briefly review the theoretical framework of some of these studies, concentrating on those that have proposed to identify the determinants of systematic risk in the Brazilian market.

Model proposed to test the hypothesis:

To test the relation between the two main variables of interest in this study – market risk and tax planning efficiency – we used polynomial Equation (5) below, with RISK as the dependent variable, represented by beta, our proxy for "risk in relation to the financial market". In turn, TEI is the construct proposed here to assess tax avoidance with governance, which is the proxy for "efficient tax planning". The estimation of these variables is discussed further below.

$$RISK_{i(t+0.25)} = \beta_0 + \beta_1 TEI_{it} + \beta_2 FINLEV_{it} + \beta_3 RET_{it} + \beta_4 DEBT_{it} + \beta_5 LIQD_{it} +$$
$$\beta_6 DIVY_{it} + \beta_7 LNASS_{it} + \beta_8 CAPSTR_{it} + \varepsilon_{it} \tag{5}$$

Where:

- $RISK_{i(t + 0.25)}$: Market risk (beta) of firm i in year t + 0.25, that is 3 months ahead, on April 1st of the following year;
- TEI_{it}: Tax planning efficiency index of firm i on the last day of year t;
- $FINLEV_{it}$: Financial leverage of firm i on the last day of year t;
- RET_{it}: Return of firm i on the last day of year t;
- $DEBT_{it}$: Indebtedness of firm i on the last day of year t;
- $LIQD_{it}$: Liquidity of firm i on the last day of year t;
- $DIVY_{it}$: Dividends paid by firm i during year t;
- $LNASS_{it}$: Natural logarithm of the total assets of firm i on the last day of year t;
- $CAPSTR_{it}$: Capital structure of firm i on the last day of year t;
- α_i: Fixed-effect constant of the model;
- ε_{it}: Error of the model; and
- βn: Coefficient of the regression of the variable n.

Chart 2: Some studies and determining factors found to explain the market risk of Brazilian firms.

Variable	Form of Measurement	Oda *et al.* (2005)	Antunes & Guedes (2006)	Fernandes (2007)	Silva & Quelhas (2006)
FINLEV: FINANCIAL LEVERAGE	(1) NOT IDENTIFIED IN THE STUDY	Significant / +			
	(2) EBIT / NET DEBT			Significant / +	
	(3) COEFFICIENT OF THE FINANCIAL LEVERAGE VALUES OVER THE PAST 5 YEARS			Significant / -	
RENT: PROFITABILITY	(1) NET INCOME / EQUITY			Significant / -	
	(2) COEFFICIENT OF THE VARIATION OF PROFITABILITY OVER THE PAST 5 YEARS			Significant / -	
	(3) STANDARD DEVIATION OF THE EARNINGS OVER PRICE RATIO				Not Significant
DEBT: INDEBTEDNESS	(1) TOTAL LIABILITIES / EQUITY		Not Significant		
	(2) GROSS FINANCIAL DEBT / EQUITY		Not Significant		
	(3) TOTAL DEBT / TOTAL ASSETS				Significant / -
LIQD: FINANCIAL LIQUIDITY	(1) NOT IDENTIFIED IN THE STUDY	Not Significant			
	(2) TOTAL ASSETS / TOTAL CURRENT LIABILITIES				Not Significant
	(3) CURRENT ASSETS / CURRENT LIABILITIES			Not Significant	
	(4) COEFFICIENT OF THE VARIATION OF THE LIQUIDITY VALUES OVER THE PAST 5 YEARS=			Significant / +	
DIVY: DIVIDEND YIELD	(1) DIVIDENDS / EARNINGS				Significant / -
	(2) NOT IDENTIFIED IN THE STUDY	Significant / -			
LNASS: Note: Applied by the function LN(x) on the value obtained from the Economática database.	(1) SIZE	Not Significant			
	(2) TOTAL ASSETS			Not Significant	
	(3) LOG TOTAL ASSETS			Significant / +	Significant / +
	(4) COEFFICIENT OF THE VARIATION IN TOTAL ASSETS OVER THE PAST 5 YEARS			Significant / -	
CAPSTR: CAPITAL STRUCTURE	(1) DEBT / MARKET VALUE	Significant / +			

Legend: Significance of the relationship / sign found when significant
Source: Oda *et al.* (2005); Antunes and Guedes (2006); Fernandes (2007); Silva and Quelhas (2006)

Results:

Having concluded the process of ascertaining the measures of market risk and tax avoidance, with the main objective of determining the variables RISK and TEI, as well as the model's control variables, we then tested the association between them, the condition sine qua non for rejection or not of the proposed research hypothesis.

To perform these tests, we used the model proposed in Equation (5) and the OLS method for estimation of panel data with fixed effects, which according to the test statistics was a better estimator than with random effects or constant (pooled) effects. We first applied the Lagrange multiplier test to verify the absence of random effects, which is the null hypothesis of this statistic. The value found was 58.28, allowing rejection (at 0.01%) the null hypothesis, indicating that the fixed-effects or random-effects estimators would be more suitable to the model than would constant (pooled) effects.

Then we performed the Hausman test to choose between the fixed-effects and random-effects estimators. The value calculated was 17.07, which permitted rejection (at 2.94% significance) the null hypothesis that the differences between the coefficients of these two estimators are not systematic. These two tests indicated there is statistical evidence to consider that the model with fixed effects gives better results than does estimation by random effects or constant (pooled) effects.

Other point to be kept in mind, is that, beta is referring to three months ahead, so this aspect contributes to eliminate any simultaneities. Nevertheless to control eventual endogeneity problems in equation (5), it was performed a 2-stage GMM (panel) in order to avoid simultaneities, and the results was not significantly different.

Finally, although not documented in the tables, to assure the robustness of the statistics we performed additional tests, among them: (i) Jarque-Bera (JB) normality test, which indicated the residuals had normal distribution $N(0, \sigma 2)$; (ii) variance inflation factor (VIF) test, which presented high values, but lower than the limits that would have indicated a serious problem of multicollinearity , and (iii) Breusch-Godfrey (BG) test, which indicated no autocorrelation of the residuals.

Test of the association between market risk and tax avoidance:

We therefore used estimation with fixed effects by the OLS method to test the model, employing the STATA version 9.1 statistical program. The results of the association of the variables are summarized in Table 4.

The results show that the TEI coefficient is negatively and significantly related to RISK, in line with the theoretical expectations. Thus, there is no evidence to reject our hypothesis at a confidence level of 90%. Based on this finding and the development of the variables, it can be inferred that the greater the tax avoidance actions of a firm are, allied with good corporate governance practices, the lower the market risk (beta) will tend to be, and in the final analysis, the greater a firm's tax planning efficiency is, the lower its market risk will tend to be, as hypothesized in this work.

The results also provide statistical evidence that the market risk is negatively related to financial liquidity, that is, with the capacity to pay obligations, and positively related to size. This means to say that in Brazil, investing in less financially liquid and larger firms is riskier. The inverse relation of financial liquidity with risk makes sense, since firms with less capacity to meet their obligations are riskier than others. This inverse relationship was previously identified by Fernandes (2007), although this relation was perceived only with the variation of the variable and not directly with it:

Table 4: Results obtained by applying multiple regression to the research sample.

Independent Variable: RISK Firms: 86 Period: 2005 to 2009		
Dependent Variables	Coefficient (Significance)	
TEI	-5.86E-02	(*)
FINLEV	-5.18E-05	
RET	-6.79E-04	
DEBT	-3.77E-05	
LIQD	-9.17E-02	(*)
DIVY	-5.36E-03	
LNASS	1.81E-01	(*)
CAPSTR	-7.92E-04	
Cons.	-1.91E+00	
prob>F	0.1126	
r-sq	0.0937	
Obs	223	
(*) Sig. 10%; (**) Sig. 5%; (***) Sig. 1%		

Source: Authors.
Note 1: OLS method and fixed-effects estimator for panel data.
Note 2:Tests run in the STATA version 9.1 software.

The positive relation between size and risk was also identified by Fernandes (2007), as well as by Silva and Quelhas (2006). An explanation for this finding is that during the period studied, 2005 to 2009, many small companies floated shares because of the good market conditions in Brazil, while large ones, generally with more global characteristics, were more affected by the global crisis as well as by Brazil's appreciating currency during most of this period. Even though Brazil was one of the countries least affected by this crisis starting in the middle of 2008, some sectors and specific firms were highly affected, such as steel and other metals, mining and pulp and paper, all sectors generally containing firms that are more capital intensive.

Sensitivity analysis of the model for measuring the TEI:
To assess the model's sensitivity to the measurement of the TEI, we applied a matrix of estimated values of the CGFm vector, which we call the attenuation factor for lower corporate governance. Here we present six proposed values and assess the model's sensitivity to the values used in computing the TEI variable, in function of the attenuation applied. Chart 3 below presents the proposed values. The importance of corporate governance goes from highest (first line – CGF1) to lowest (sixth line –CGF6), in the last case when it is disregarded altogether in calculating the TEI.

The results show that as the influence of corporate governance in the TEI variable decreases, it loses significance with risk. This occurs from column 2 onward. At the extreme where there is no influence of corporate governance on tax planning efficiency (column 6) or when it has virtually no influence (column 5), this correlation ceases to be significant. However, the highest significance between the variables does not occur with the lowest attenuation proposed (column 1), thus identifying a point of inference of the relation.

An explanation for this outcome can be the saturation caused by the variable, since the effects of corporate governance prevail over (nullify) the other effects, which are equally important to the efficient tax planning construct, as discussed above. This finding is in line with the other findings, demonstrating that the significance of the relation between the variables declines as the effects of corporate governance become stronger in relation to the other attributes necessary for efficient tax planning. Perhaps this finding can be better explored in other studies on the matter.

Chart 3: Matrix with different proposals for the vector (CGF$_m$) utilized to calculate the TEI.

	No Enhanced GC	Level 1	Level 2	New Market	Remark
CGF$_1$	0.1	0.7	0.8	1	Greatest influence of corporate governance on the TEI variable.
CGF$_2$	0.1	0.85	0.9	1	Vector that provided the highest significance of the variables.
CGF$_3$	0.2	0.75	0.85	1	
CGF$_4$	0.3	0.8	0.9	1	
CGF$_5$	0.5	0.8	0.9	1	
CGF$_6$	1	1	1	1	No influence of corporate governance on the TEI variable.

The results of this sensitivity analysis are presented in Table 5 below:

Table 5: Sensitivity analysis of the model for measuring the TEI with alterations of (CGF$_m$)

	Panel data *Independent variable: RISK* *Firms: 86* *Period: 2005 to 2009*											
	(column 1) CGF$_1$		*(column 2)* CGF$_2$		*(column 3)* CGF$_3$		*(column 4)* CGF$_4$		*(column 5)* CGF$_5$		*(column 6)* CGF$_6$	
TEI	-6.1E-02	* (0.080)	-5.9E-02	* (0.073)	-5.8E-02	* (0.086)	-5.6E-02	* (0.092)	-5.2E-02	(0.116)	-3.9E-02	(0.177)
FINLEV	-5.1E-05		-5.2E-05		-5.1E-05		-5.2E-05		-5.2E-05		-5.5E-05	
RET	-6.4E-04		-6.8E-04		-6.3E-04		-6.2E-04		-6.0E-04		-6.4E-04	
DEBT	-3.7E-05		-3.8E-05		-3.7E-05		-3.8E-05		-3.9E-05		-4.0E-05	
LIQD	-9.2E-02	* (0.057)	-9.2E-02	* (0.056)	-9.2E-02	* (0.057)	-9.2E-02	* (0.057)	-9.2E-02	* (0.057)	-9.3E-02	* (0.055)
DIVY	-5.4E-03		-5.4E-03		-5.4E-03		-5.4E-03		-5.4E-03		-5.5E-03	
LNASS	1.8E-01	* (0.052)	1.8E-01	* (0.051)	1.8E-01	* (0.056)	1.8E-01	* (0.059)	1.7E-01	* (0.067)	1.7E-01	* (0.078)
CAPSTR	-7.8E-04		-7.9E-04		-7.1E-04		-6.5E-04		-5.3E-04		-3.5E-04	
cons.	-1.9E+00		-1.9E+00		-1.9E+00		-1.8E+00		-1.8E+00		-1.7E+00	
Prob>F	0.1184		0.1126		0.1222		0.1264		0.1417		0.1724	
r-sq	0.0926		0.0937		0.0918		0.0911		0.0884		0.0838	
obs	223		223		223		223		223		223	
* Sig. 10%; ** Sig. 5%; *** Sig. 1% (p>|t|)											

This sensitivity of the model to the level of corporate governance is fully in line with the theoretical framework on which this study is based, so that our findings corroborate those of other recent articles.

Conclusion:
In the current context, in which the tax burden is becoming increasingly relevant in firms' composition of costs, tax planning is an important tool to increase competitiveness. Nevertheless, little is known about the full

range of consequences of tax planning. In this article we contribute in this area by investigating whether efficient tax planning reduces firms' market risk.

Our findings indicate that efficient tax planning in the Brazilian market tends to reduce the levels of companies' market risk, represented by beta. They also show that to attain efficient tax planning, it is important for firms to have good governance practices, meaning transparency and alignment between the interests of managers and shareholders.

It must be stressed that not all tax planning leads to reduced risk. Tax planning efforts that are obscure or mainly in the interests of managers, looking for short-term bonuses rather than the long-range health of their company (e.g., by creating future contingencies caused by overly aggressive tax planning), make the market nervous and do not provide the same benefit as do actions carried out with the transparency that is part of good governance.

The results of this study thus corroborate the tenets of the modern theory of corporate tax avoidance and the recent findings of Wilson (2009) and Desai & Dharmapala (2009), who also found evidence that tax avoidance, when exercised together with good corporate governance practices, and only in this combination, improves firms' performance. In contrast, when not exercised with good governance, no improvements are produced.

Furthermore, we proposed a new construct for the tax planning efficiency variable, the TEI, and defined some bases for its estimation, namely all parties, all costs, all taxes, conforming avoidance, implicit taxes, tax clienteles and hidden tax burden.

The theoretical basis of this work is interdisciplinary, involving theories on tax planning and tax avoidance along with studies in the area of finance and risk. All of these are addressed together with the framework of corporate governance and agency theory.

As usual, this work has some limitations, which can serve as starting points for future studies. The first is the sample, which consists of companies that voluntarily respond to the survey for preparing the annual Melhores & Maiores ranking and disclose a statement of value added (VAS). Now that this has become mandatory for all listed companies (as of 2008), future studies can rely on a broader range of data, not subject to the discretionary of this disclosure during most of our study period, enabling applying the model developed here to a more representative sample of Brazilian firms, with longer time series, even permitting adding the proposed long-run measure to the construct.

Furthermore, we only used the risk perceived by the market – beta from the CAPM – as the risk variable. Future studies can explore the relationship between tax planning efficiency and idiosyncratic risk, or apply the theory of abnormal return, as in Wilson (2009).

Studies containing proposals to estimate companies' hidden taxes would also be welcome. The studies conducted so far, as this one, assume premises on this matter that restrict the accuracy of the analysis. Even though these figures are generally confidential and as such hard to obtain, finding ways to ferret them out with some precision would be of great value to the study of corporate tax avoidance.

Another limitation is the estimation of the TEI itself, which condenses the corporate governance indicator in the variable instead of using it as an independent variable. The reason is that the governance metric used here, the classification given by the CVM, is not very sensitive to variations in time, so its effects can be lost in the method of estimating panel data with fixed effects used here.

We thus suggest performing studies with another construct for the corporate governance variable, one that is more sensitive to variations in time. This would enable working with distinct variables, one for tax planning and another for governance, in which the robustness of the model could also be better evaluated.

Also, now that disclosure of the VAS is mandatory for listed companies in Brazil, future studies will be able to call on more data per year, enabling conducting regressions only with cross-sectional data, as well as employing distinct variables.

Finally, it is important to mention the possible impact of the findings found here regarding the marginal increase of the market value of firms that practice efficient tax planning, in addition to the gain produced by the direct reflection of this practice on cash flow. The reason is that when a firm's market risk is lower, according to the CAPM its cost of capital is also lower, consequently providing a marginal increase in its value.

Despite these limitations, the results found suggest that efficient tax planning increases the value and abnormal return of Brazilian companies, in line with the conclusions reached by Wilson (2009) and Desai and Dharmapala (2009) in other markets.

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