The Systematic Risk of the Brazilian Textile Industry: Consequences of their Increasing International Exposure

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Abstract. The systematic risk of multinational companies (MNC) has been discussed as consequence of their internationalization and home country development levels. Some scholars have early found evidences that the classic theory of portfolio diversification was able to explain the lower systematic risk of MNC in comparison to their domestic counterparts. Conversely, later studies suggest that the systematic risk of American MNC have grown with their international exposure. The current paper considers the experience of public Brazilian textile companies to investigate the relationship between their international exposure and systematic risk. This industry was selected as a focus of the investigation due to sample screening. The research found two groups of companies separated by a clear hiatus. The first, with lower international revenue, could not have their systematic risk explained by the internationalization aspect. The second, with higher revenue from the external market, corroborated the previous evidences of risk elevation as consequence of internationalization. Among the applicability of such findings are the better usage of the discount rates for managers when planning international projects and capital structure. Finally, some insights on the hiatus, limitations of the small sample size and future studies suggestion were discussed.

Keywords: Systematic risk, International diversification, Beta, Textile industry, Brazilian multinationals, International business.

1. Introduction

One classic basis of internationalization studies is the firm entrepreneurship and its willingness to accept and take risks towards the company international expansion. From this, a robust field of studies have connected the internationalization process to its competence to seek and mitigate risks and manage uncertainties [1], [2]. One approach relies on the Diversification Theory, which states that multinational companies (MNC) decrease their systematic risk due to the benefit of having cash flows in different countries. The literature lists many benefits of international diversification [3]-[9], but there are also disadvantages [10]. As consequence, researchers found that decision makers have used greater discount rates when planning their international projects [11], [12].

This controversy was later discussed with findings that suggested the systematic risk of MNC have grown with internationalization [13], [14] and a third perspective concluded that when U.S. firms were more internationalized, their systematic risk tended to increase. Conversely, companies based in emerging markets tended to have their systematic risk decreased when going international [15]. This later study considered companies from 32 countries, including twelve emerging markets but not Brazil because of data limitations.

The aim of this paper is to study the relationship between Brazilian MNC ś systematic risk and their international exposure. To access this connection, the main objective is to find empirical evidences of these two main variable correlation, namely beta and foreign sales as a ratio of gross sales. The use of these proxies is in line with the existent literature but has many limitations that are later discussed.

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One contribution of this work is to conduct a local research towards this issue from a less developed country point of view. Other is to subside managers in this industry with more accurate information on the evaluation of their international expansion. A direct implication is to subside the use of discount rates to their international projects, mainly the way they should approach their foreign sales. Moreover, the systematic risk is an important component for pricing equity, evaluating returns and for determining the cost of capital of companies.

2. Literature Review

The business literature has widely used the term risk with diverse focus and ambiguity, and some scholars have put efforts on its clarification [16]. In an attempt to define a framework of integrated risk, Miller [17] made a theoretical compilation of uncertainties and defined two types of risks incurred by international exposition: financial and strategic [18]. Both studies considered the use of risk consistent to other studies that measured corporate risk using standard deviation (or variance) of accounting-based variables of firm results.

One of the seminal contributions to this risk measure is the capital asset pricing model (CAPM) [19], [20] with many updates including practical management applications [21]. The CAPM defines two types of risks in terms of diversification: the unsystematic risk, which is associated with unpredictable events and therefore may be minimized with diversification; and the systematic risk, which is the risk inherent to the market. Recall that in an efficient market premise, the systematic risk of a firm is the variation of its securities over a benchmark, usually the market variation as a whole. The CAPM is used to calculate the systematic risk by a deviation in a regression analysis, represented by the Greek letter beta, and a company with beta equals to one means it´s systematic risk is the same of the chosen benchmark.

In the context of firm internationalization process, there is a stream of literature investigating risk of MNC based on studies of cost of capital and international diversification [3], [14], [22]-[25]. The diversification theory on internationalized firms compares them to domestic firms in terms of portfolio diversification. Therefore, MNC decrease their systematic risk due to the benefit of having cash flows in different (diversified) countries. Purdy and Wei [3] reviewed the benefits of international diversification and indicated that the exposition to new opportunities, the protection against local economic events, the hedge against asset concentration, arbitrage assessment, learning intra-firm benefits, scale and scope exploitation are contributions to MNC performance increase and systematic risk decrease.

One of the earlier comparisons between local and international firms towards risk [9] found that the returns were not significant between the two groups, however the beta was lower for MNC. This study used a foreign sales ratio as a proxy of international involvement. Many following empirical evidences with American samples depicted similar results [4], [6]-[8], [26], [27].

On the other hand, after taking advantage of the portfolio diversification there is an upper inflection point in the MNC performance, a maximum from which on the costs of managing firm international operations should overcome the benefits and performance would level off [28] so the curve between return and internationalization has an inverted U-shape. These findings were later corroborated [29], and challenged by an U-shape [30].

In 1998, a research [13] suggested that the systematic risk of MNC grew with internationalization due to the increase in the standard deviation of their cash flows. This study used the foreign sales ratio and the foreign asset ratio to investigate the issue of international exposure and used the estimation of beta for systematic risk. The authors concluded that the net effect of internationalization in fact increased the systematic risk of MNC. Their findings were against the mainstream of previous studies that considered the portfolio diversification effect over the international expansion of MNC. One more recent study found that international diversification is significantly and positively associated with systematic risk [14].

An attention to the MNC origin was given in 2000 [15] when researchers considered a sample of 1921 firms from 32 countries, including twelve emerging markets. Their filters excluded firms smaller than US$ 100 million and those with lack of information. Therefore, Brazilian companies were not comprised. The paper used the beta of 36 months of return data from 1994 to 1996 and concluded that when U.S. firms

get more internationalized, their systematic risk tend to increase. Conversely, companies based in emerging markets tend to have their total systematic risk decreased when going international. These findings made the authors to propose that the total systematic risk of the MNC relates to the origin and destination countries of the internationalization processes in a named upstream-downstream hypothesis. While latter study [14] found that international diversification is significantly and positively associated with systematic risk, the authors analysed American MNC in aggregate data, with no industry segmentation. So that it is not possible to identify patterns by business segments nor relate their findings with the upstream-downstream hypothesis.

So far, risk still poses ambiguity in the business literature [31] and, as previous reviewed, there are theoretical and empirical evidences that the international commitment of firms does affect its systematic risk either directly, in terms of beta, or indirectly, as a result of return and performance. However, the specific timing, correlation and curve shape remains controversy [3]. Recall that the aim of this paper is to contribute to this clarification by studying the relationship between the systematic risk of the Brazilian MNC and their international exposure thru empirical data analysis in one strict industry, namely the textile economic sector.

3. Data Sources and Methods

Following the literature to investigate the effect of international exposure to systematic risk, firms in the financial, utilities, transport and regulated economic sectors should be excluded from the sample [13], but these were the majority among the public companies in Brazil. The use of a single economic sector was then a choice for better homogeneity and quality of analysis, once the sample size turned to be small. Considering the remaining companies, the textile industry was selected because of its greater number in the domestic stock exchange (BM&F Bovespa) that would fit a Brazilian base and control criteria, when compared to other industries. Moreover, it was considered an important economic sector in the local economy, being Brazil the 5th textile producer in the world.

The data source for this study is the BM&F Bovespa database, which had 336 companies with at least one trade in the calendar year of 2013, out of the 683 listed companies. In the final collection there were 22 Brazilian firms operating in the textile industry by the end of the fiscal year of 2013, according to the Economática database index. From this, five were selectively excluded: two had their trading cancelled or temporarily interrupted in the studied period, one had low liquidity and other two were completely controlled by other companies already comprised in the sample. The final sample was composed by 17 Brazilian companies with five or more years of trading records. The authors understand that the use of a small sample weakens the robustness of the results, but the nature and numbers of other industries were considered worse.

The beta indexes were estimated for the date of December 31st in 2013. In accordance to the majority of literature reviewed, the beta calculation considered 36 months of return data in a monthly basis, in the local currency and with the BM&F Bovespa Index as a benchmark.

As for the international exposure, a proxy of foreign sales ratio (FSR) was used according to many reviewed studies [9], [13], [14]. A research into the explanatory notes in the annual company reports with CVM returned the data to compose a percentage of international gross sales over total gross sales according to the formula: FSR = Foreign gross sales / Total gross sales. As CVM does not require firms to list their foreign revenue sources, it was not possible to identify the sales ratio per geographic distribution.

The results were analysed to find evidences of the relation between FSR and beta using the general linear model (GLM) and the analysis of variance (ANOVA) [27].

4. Empirical Findings and Discussions

The foreign sales ratio (FSR) and beta are depicted in Table 1. It was possible to identify a concentration of firms with low FSR despite of some peaks as high as 48%. Two companies did not report any sales to a foreign country in 2013. The average FSR for the seventeen companies was found to be 12.68% (St.Dev.=13.07%).

From these results on, the implication of FSR for beta was explored using the GLM. The first outcome in a 95% significance level was a Pearson′s correlation (R) of +0.28, which is considered a positive weak correlation. This first result was not conclusive and led to a further search of possible clusters in the sample.

Moreover, it is also detailed in the literature that sizes influences the beta and to minimize this effect authors [15] have excluded firms with assets lower than 100 million dollars. One company in the sample had assets bellow this limit and was kept in attention to later explanations.

Table 1: Sample of 17 Brazilian textile companies, their international revenue and beta*.

Company	FSR	Beta	Company	FSR	Beta	Company	FSR	Beta
Le Lis Blanc	0,00%	0,68	Arezzo Co	5,01%	1,13	Grendene	20,82%	0,26
Guararapes	0,00%	0,49	Karsten	5,83%	0,76	Vulcabras	28,22%	0,36
Tex Renaux	0,54%	-0,34	Teka	6,86%	0,32	Alpargatas	29,43%	0,80
Cia Hering	1,57%	1,19	Dohler	6,95%	0,47	Pettenati	32,13%	0,48
Cremer	1,70%	0,09	Santanense	7,40%	0,11	Coteminas	47,92%	1,18
Cedro	2,24%	-0,14	Cambuci	18,92%	0,00			

Source: Elaborated by the authors.   * Beta of 36 months in a monthly basis by December 31st, 2013

The second analysis returned two possible explanations to the match between beta and FSR. One for the firms with FSR lower than 10% and other for those with higher FSR. The Table 2 shows these two groups, its number of companies, GLM and ANOVA results. This second analysis found a positive strong Pearson ́s correlation (R = +0.92) between the group with higher international exposure (FSR>10%) and its beta. However, the group with lower international exposure (FSR<10%) had its beta dispersion related to chance, with significant F (F value) much higher than 0.10 and therefore was not possible to be explained by FSR.

Table 2: Two groups of Brazilian textile companies and their FSR and Beta correlations.

FSR	Number of firms	Pearson ́s correlation (R)*	Coefficient of determination (R2)	P value*
<10%	11	0.0966	0.0093	0.7779
>10%	6	0.9221	0.8504	0.0088

Source: Elaborated by the authors.

As for the division, Table 2 first raises a discussion related to the number of companies in each group. There is a cluster of eleven firms with FSR up to 7.40% and a second group with FSR greater than 18.92%, with a hiatus between them. For the sake of using a natural number, the limit of 10% was preferred. This mark also leads to conclude that only 35% of the Brazilian textile companies listed in the stock market have more than 10% of their gross income due to international sales. The implications of systematic risk for this group of more internationally exposed firms are later discussed. As for the only company with total assets lower than equivalent to 100 million dollars, it has fallen into the inconclusive group of FSR<10%.

The empirical results of Table 2 do not show evidences of decrease in the systematic risk of Brazilian textile companies as consequence of their international exposure. This result is in opposition to the findings of studies with the same proxy [9], [27]. Therefore, the portfolio diversification effect proposed by the earlier referred scholars [23] is not valid for the sample here analysed. Also, the propositions about the home and host countries of MNC [15] cannot be discussed for the group of companies with less than 10% of FSR.

The two identified clusters and their relation with international revenue are better shown in the dispersion Chart 1, where companies were plotted between their FSR (horizontal axis) and beta (vertical axis). The vertical column designed by the companies with FSR<10% draws attention to its wide dispersion, confirming the inconclusive correlation between the systematic risk and foreign sales previously discussed. In the same chart it is also possible to identify the positive inclination of the trend line in the group of companies with foreign sales ratio greater than 10%.
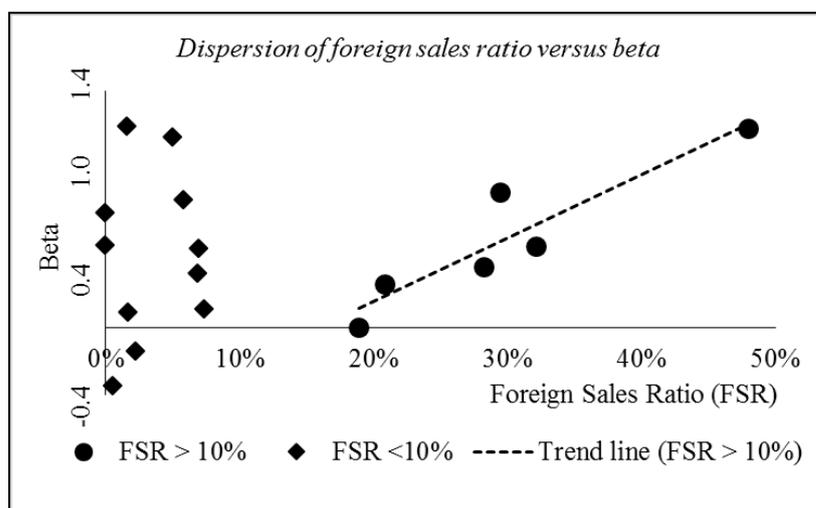
Source: Elaborated by the authors.
Chart 1: Dispersion of foreign sales ratio and beta of Brazilian textile public companies.

The group of MNC with FSR higher than 10% reveals empirical findings which are against the propositions that negatively relates systematic risk to international portfolio diversification [23]. Thus, the results here evidence that the Brazilian MNC in the textile industry have their systematic risk raised as they sell internationally. However, this statement is valid only when foreign sales ratio are greater than 10%. Recall that this 10% mark was arbitrary chosen by the authors and the internationalization is here considered in terms of foreign cash flow.

Other analyses can be made regarding the origin of the sample companies, as firms based in emerging markets are expected to have their systematic risk decreased when going international [15]. Following this hypothesis, Brazil should expect a decrease in MNC betas when they become more international exposed. The previous authors did not study Brazilian companies and the findings shown on Chart 1 are not explained by their upstream-downstream hypothesis neither in aggregate nor by the FSR>10% group. In opposition, the Brazilian MNC that could overcome the barrier of 10% of their gross sales to the foreign market had their beta proportionally increased. In addition, the implications of the positive correlation between beta and FSR in the more international exposed MNC find explanations on some early studies [13], [14], [26], and [27] which concluded that the net effect of internationalization in fact increase the systematic risk of MNC.

4.1. Insights on the FSR barrier

The first insight about the existence of the 10% FSR barrier is inspired on the trend of researches that found many curve shapes for the performance and international diversification relationship [11], [24], [32]. From this raised the hypothesis of an U shape curve for the systematic risk as a function of FSR. This hypothesis was then tested in a new binomial modelling that returned high F values for two and three degrees of freedom, thus was rejected in acceptable significance levels. Although inconclusive, R square values of 0.309 and 0.295 were respectively found. As discussed for other conclusion limits, this analysis may draw fruitful results if further studies are able to increase the sample size.

The second insight on this hiatus may rely on the management behaviour towards international exposure, including firm specific strategies and the classic internationalization process [32]-[34]. From these stream of studies, one possible explanation is that it may take time for a given firm to learn and manage the risks in an internationalization process before engage in an international expansion. Once this first step is accomplished and the internationalization becomes a strategy, than the firm may quickly grow to more than 10% of its revenue from abroad. However, although these theories may explain the gap, they do not link it to the raise of systematic risk in the greater FSR group.

5. Conclusion and Limitations

The empirical results of this study led to two groups of Brazilian textile companies listed in the local stock market. The first group is composed by eleven firms with low international exposure, measured by its gross foreign sales rate (FSR) in the gap between zero and 7.40% ($0\% \leq FSR \leq 7.40\%$). The relation between systematic risk and international sales was not possible to be identified in this first group due to its inconclusive dispersion.

For the second group of six companies, there were evidences of the raise of systematic risk due to the higher levels of FSR in a positive correlation. Therefore, the portfolio diversification effect [23] was not valid to explain this second group. Conversely, explanations to this result were found on studies [13], [14], [26], [27] which concluded that the net effect of internationalization increases the systematic risk of MNC. Moreover, these findings do not support the upstream-downstream hypothesis [15] because, as an emerging country, Brazil should expect a decrease in its MNC risk when internationally exposed.

Also, the discovery of a gap in the FSR distribution between the analysed companies has raised some questions. One insight was the possibility of an actual U shape curve, what was not conclusive with the sample size. Other possible explanation for the existence of the 11.52-percent-points gap is a natural consequence of the internationalization processes of the firm.

Finally, this study presents an empirical contribution to the international business literature as recent discussions under this subject is still controversial and studies toward this issue are rarely conducted in developing countries. Moreover, Brazil is usually away from the aggregate data researches into this issue because of the absence of standardized information on foreign revenues, which is another contribution of this paper. The straightforward managerial contribution of this study is to give managers of Brazilian textile companies a more accurate information on the evaluation of their international expansion. A direct implication is to subside the use of discount rates to their international projects, mainly the way they should approach their foreign sales.

One big limitation of this study is the small sample size that weakens the robustness of the results, even considering all possible companies in the chosen industry. The second limitation is the use of foreign sales ratio as the only proxy for internationalization and, finally, it is not possible to extend these findings to other business segments. From these limits, the direct suggestions for future studies are the use of other variables, notably the number of countries to which a company is present or doing business. Other suggested topics and variables to be included are the international direct investments effect and the firm specific strategy. As for the sample, a suggestion is to increase the sample size ether with the use of companies with low liquidity, where another suggestion is to use algorithms to adjust its beta [35], or with the aggregation of all Brazilian public companies.

6. References

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