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Enterprise Multiple and Future Returns of the Brazilian Stock Market

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Abstract

The estimation of cross-section returns for defining investment strategies based on financial multiples has been proven to be relevant following Fama and French's (1992) research. One of the challenges for such studies is to identify the main variables that are suitable for explaining the returns in a particular context because the variables that are widely used in developed markets behave differently in emerging countries. In this study, we analyze the predictive power of the EV/EBITDA multiple in the context of the Brazilian stock market. The results show that the analyzed multiple has a strong relationship with the future returns of companies listed on the BM&F BOVESPA index between 2005 and 2013. For the period under review, the investment strategy of purchasing stocks when EV/EBITDA was low and selling stocks when EV/EBITDA was high showed abnormal returns of 15.94% per year, even after controlling for risk factors.

Keywords: Enterprise multiple; expected returns; risk factors; cross-section.

Introduction

The estimation of cross-section returns for defining investment strategies based on enterprise multiples is greatly needed to assess stock markets in emerging countries. In this context, the enterprise value (EV)/earnings before interest, taxes, depreciation, and amortization (EBITDA) multiple (the EV/EBITDA multiple) may prove efficient and is recognized to be a relevant pricing tool. This multiple is also referred by the acronym EM (enterprise multiple). Despite its significant spread throughout the capital market, the EM variable (as the enterprise value multiple will be referred to in this paper) is little explored with regard to estimating portfolio returns using cross-sectional regressions, especially in Brazil, where there are no extant studies involving this approach.

The EM variable is obtained by dividing the enterprise value (market value of the common shares + debt + market value of the preferred shares – cash) by the EBITDA (operating income before depreciation and amortization). There are some advantages to using the EM variable to estimate expected returns instead of other more popular multiples, such as price/earnings. First, it is possible to include companies with different capital structures, i.e., with different levels of leverage, in the sample since a company's value includes the value of debt. In addition, operating income measured according to EBITDA has the advantage of not being affected by non-operating income; thus, it is a more appropriate metric for measuring operating performance. Another important point regarding the use of the EM variable is related to the construction of a portfolio of assets that simulates future investment returns. Intuitively, the negotiation of this portfolio can be interpreted as the negotiation of a portfolio combining debt and equity.

Although recent academic studies recognize the EM variable to be relevant, questions remain about the behavior of the expected return of stocks in Brazil when it is measured as a function of this variable.

The present study uses different methodologies commonly used to identify the presence of abnormal returns associated with the investment strategy based on the EM variable, including the formation of long and short portfolios and the estimation of the Fama and French (1993) and Carhart (1997) models for the Brazilian market, comparing them to emerging markets. In addition, this study evaluates the robustness of the EM variable with regard to cross-sectional regressions when the following factors are included: the small minus big (SMB) factor, which is calculated as the difference between the returns of the smallest and largest companies in terms of market value; the high minus low (HML) factor, i.e., the difference in returns between the companies with the 30% highest and those with the 30% lowest book-to-market values; and the up minus down (UMD) factor, which is known as momentum factor and is calculated by subtracting the equal weighted returns of higher performing companies from the equal weighted returns of lower performing companies.

The results of 96 cross-sectional monthly regressions using the stocks listed on the São Paulo Stock Exchange (BOVESPA) between January 2005 and July 2013 confirmed a negative relationship between the EM variable and returns. As expected, the EM variable was found to be robust for stock portfolios belonging to the BM&F BOVESPA Index (IBOVESPA), confirming the hypothesis that the expected return of stocks in Brazil during the study period decreased with the EM. Thus, stocks with high EMs

displayed lower rates of return as compared to those with low EMs. A strategy of buying shares with a low EM and selling shares with a high EM during this period—given that the assets in the portfolio have equal weight—would result in an abnormal return of 1.24% per month. That is, even after controlling for the factors of market premium (MKT), size (SMB) and book-to-market (HML), this investment strategy would achieve an annualized return of 15.94%.

The paper is structured as follows. In section two, a review of the literature on asset pricing and returns analysis is presented. Subsequently, the data processing procedure and the statistical summary are presented in detail in Section 3. This is followed by a description of the procedures and the methodology employed in the cross-section regressions in Section 4. In Section 5, the performance of the portfolios formed using the EM variable is analyzed, and the results are comparatively analyzed in Section 6 with the results reported in prior studies. Section 7 concludes the paper.

Theoretical background

The research on asset pricing began with Sharpe (1964), Lintner (1965), and Black and Scholes (1973), which were followed by studies that reiterated the importance of understanding the markets' movements through cross-sectional analysis. Banz (1981) is noteworthy for adding the size effect as a relevant variable for explaining the average stock returns—the returns of smaller companies (those with low market value) would be higher than the larger companies.

Basu (1983) used the ratio of return to share price, the size variable, and the market's beta (β) for explaining the returns of the shares of U.S. companies. Rosenberg, Reid, and Lanstein (1985) showed that the average U.S. companies' return of the shares was positively related to the ratio of equity and market value of shares. Moreover, Chan, Hamao, and Lakonishok (1991) found evidence that the book-to-market multiple showed strong significance in explaining the average return of the Japanese stock market.

Fama and French's (1992) study provided a great stimulus to the literature on the use of indicators as valuation measures. This study documented the importance of the size and book-to-market variables for the expected stock returns. Further, Fama and French (1993) showed that the average market returns could be explained using factors that are obtained based on the market premium, the size effect, and the book-to-market ratio.

In the stock markets of emerging countries, different studies have explored cross-section returns in order to estimate the stock returns or the implementation of investment strategies. One of the challenges for these studies was the identification of relevant variables for explaining returns, given that the variables that are widely used in developed markets have different behaviors in emerging countries.

Harvey (1995) pioneered the use of cross-sectional regressions to evaluate returns in emerging markets, identifying low and non-significant betas as relevant factors. There is evidence of a premium for stocks with a high value in small companies in emerging markets (Patel, 1998; Rouwenhorst, 1999). Claessens, Dasgupta and Glen (1995) showed that the portfolio returns in these markets generally do not display normal behavior, using non-significant beta to explain the returns. Further, they observed the size effect to be non-significant and reported strong evidence of the signifi-

cance of the book-to-market variable. Hart, Slagter and Dijk (2001) observed no significance for the size effect; however, there was a significant change in the direction of the effect when a minimum value of market capitalization was imposed. Fama and French (1998) pointed out that the difference between the periods used in the study samples, the different methodologies used, and the presence of outliers could explain the differences between the results of studies in emerging market contexts and the results identified in their seminal articles that used U.S. market data. In a recent study in Brazil, Silva et al. (2012) identified low statistical significance for the size and book-to-market variables when estimating stock returns using cross-sectional regressions.

Kim and Ritter (1999) observed that although the valuation metrics presented significant deficiencies, the performance of the EM variable is as satisfactory as the price/earnings multiple when evaluating mature companies in the market. In addition, the EM variable has the advantage of using EBITDA as a return variable. As stated by Koller, Goedhart and Wessels (2005), operating income is not affected by non-operating gains or losses. Therefore, operating income before depreciation is a more accurate and less easily manipulated measure of profitability compared to net profit. In practice, the EM variable allows companies to be compared across industries or within an industry.

Cochrane (1991) and Liu, Whited and Zhang (2009) developed models that are quite similar to the EM. In these studies, the return on investment was considered to be the weighted average of stock returns and the return of corporate bonds after tax, also known as the weighted average cost of capital (WACC). The WACC - which is recognized as the unlevered return on investment - can also be understood as EBITDA/EV, which happens to be the inverse of the EM variable. By rearranging the terms, the stock returns become the leveraged return on investment. As a result, the WACC and the EM variable are positively related to the cost of equity. By definition, companies with a high EM carry a high value for every penny of operating income compared to companies with a low EM coefficient. In other words, companies with a high EM have greater growth opportunities, lower cost of capital, and, therefore, lower expected return compared to companies with a low EM.

Given the importance of the EM variable to market analysts, Damodaran (2010) incorporated this variable in the analysis, together with the price/earnings and price/sales multiples. This allows the comparison of companies with different levels of leverage and includes the value of debt in the composition of the variable.

Loughran and Wellman (2012) evaluated the relationship between the EM variable and expected stock returns between 1963 and 2009 in the U.S. Even after controlling for size, they found that companies with a low EM obtained higher returns (by more than 5% per year) compared to companies with a high EM.

The present study aims to test the relationship between the enterprise multiple (EM) and stock returns in the Brazilian market using the three-factor model proposed by Fama and French (1993) and the four-factor model proposed by Carhart (1997) in cross-sectional monthly regressions.

Methodology

The analysis and processing of the data for this study was based on the methodology proposed by Fama and French (1992). The sample included all the stocks listed

on the São Paulo Stock Exchange (BOVESPA) between January 2005 and July 2013. The relevant financial information for this period was obtained from the Bloomberg database. The first sample included 330 companies; only the most liquid stock of each company was selected. To avoid any bias in the sample, the following companies were excluded from the analysis: all financial companies; companies that did not present consecutive quotes in the 12 months prior to the portfolio construction; and companies with a book value lower than or equal to zero on December 31 of year t-1.

After implementing the stock filtering criteria, a mean of 140 shares per portfolio was obtained for this period, as shown in Table 1.

Table 1: Number of Stocks in the Sample

Period	Jul 05-Jun 06	Jul 06-Jun 07	Jul 07-Jun 08	Jul 08-Jun 09	Jul 09-Jun 10	Jul 10-Jun 11	Jul 11-Jun 12	Jul 12-Jun 13
Number of Shares	68	88	118	130	168	177	184	184

Source: Authors.

To perform the analysis based on the Fama and French (1992) model, the portfolios were created in June of year t, and the stock returns from July of year t to June of year t + 1 were evaluated. The stock returns and the market value were extracted in monthly terms. The EM variable in this study was calculated as the ratio of enterprise value (EV) and EBITDA for year t - 1 to the portfolio formation date. In order to maintain consistency with the Fama and French model (1992) model, companies with a negative EBITDA value were excluded, since this condition is associated with reduced market value on average, a low return in the previous year, and a low return in subsequent years.

Table 2 presents the statistical summary of the 1,117 stocks observed in the portfolio between 2005 and 2012; this table provides a brief analysis of the characteristics of the portfolio. The average market value obtained was R$ 8,926.17 million, with a median of R$ 2,223.82 million and with a maximum value achieved of R$ 355,779.06 million. The subsequent average return was 0.48% per year, and the mean value for the EM variable was 11.28, i.e., on average, investors pay R$ 11.28 in debt and shares for each unit of EBITDA. The sample comprises companies with a minimum book-to-market of 0.02 and companies that potentially reach a book-to-market value of 26.87.

Table 2: Summary Statistics: 2005–2013

Statistics	Market Cap. (R$ MM)	Enterprise multiple (EM)	Book to Market	Accumulated Returns	Subsequent year return
Mean	8,794.82	57.43	0.92	11.9%	0.46%
Minimum	3.77	-52.88	0.02	-81.3%	-13.66%
25th	674.08	5.31	0.34	-18.2%	-1.78%
Median	2,224.43	7.91	0.59	6.5%	0.69%
75th	6,795.12	13.01	1.07	35.0%	2.50%
Maximum	355,779.06	11,749.65	26.87	193.0%	57.89%

Source: Authors.

Results

Cross-Section Regressions

Considering the EM variable as a relative measure of value, we sought to observe the performance of this variable based on the results of the cross-section regressions presented in Table 3. We used book-to-market as a control variable since it is commonly used as a measure of value. The dependent variable is the monthly return without weighting (equal weighted) of company i in calendar year j. The independent variables are size (market value in June of year t), book-to-market (book value of the net assets of the previous year divided by market value as of December in year t - 1), time (cumulative returns between months j - 12 and month j - 2), and EV/EBITDA as of December in year t - 1.

Table 3 presents the mean coefficients and the t-statistic obtained in the 96 monthly regressions using stocks listed on BOVESPA between January 2005 and July 2013. The first regression reproduces the Fama and French (1992) model, which serves as the foundation for analyzing stock returns in Brazil; this regression will be used for a comparative analysis with other studies. When analyzing the size variable, the value for the t-statistic is found to be -1.036, which differs in magnitude from the value reported by Fama and French (1992); however, the negative sign is maintained, in line with the seminal article. On the other hand, the book-to-market (BTM) presented a t-statistic with a value of 2.242, demonstrating the same positive relationship as in the seminal study (although the magnitude of the coefficient was lower in this study). Despite some divergence when compared to the results of studies involving U.S. companies, the values obtained from Regression 1 approximate the results reported in studies using stocks from emerging market, as will be discussed in Section 6. When the time variable proposed by Carhart (1997) is added in Regression 2, the significance level of the size variable remains unchanged. However, it is clear that beyond the book-to-market, the time variable becomes significant, with a t-statistic of 1.881.

In Regression 3, the EM variable was introduced as the only independent variable. For this variable, the market value term is in the numerator, while the accounting term is in the denominator, demonstrating its inverse relationship with the book-to-market. Although negative, the EM variable is significant, with a t-statistic of -1.883. Regression 4 included the size (MKT CAP), book-to-market (BTM), momentum (MOM), and enterprise multiple (EM) variables. Except size, all the other variables proved to be significant at 5%.

Table 3: Cross-Section Regressions of Monthly Returns on Market Capitalization, Book-to-Market, Prior Return, and Enterprise Multiple: 2005—2013

$$r_{ij} = a_{0j} + a_{1j}\ln(MKT\ CAP)_{ij} + a_{2j}\ln(BTM)_{ij} + a_{3j}\ln(MOM)_{ij} + a_{4j}\ln(EM)_{ij} + e_{ij}$$

Model		Intercept	MKT CAP	BTM	MOM	EM
1	Coef	0.019	-0.001	0.004		
	t-stat	1.666	-1.036	2.242		
2	Coef	0.019	-0.001	0.004	0.009	
	t-stat	1.516	-1.089	2.301	1.881	
3	Coef	0.015				-0.003
	t-stat	2.701				-1.883
4	Coef	0.025	-0.001	0.003	0.009	-0.002
	t-stat	1.988	-1.135	2.076	1.780	-1.685

Source: Authors.

The negative relationship between the EM variable and returns proves to be robust and significant, even after controlling its effects using the size, book-to-market, and momentum variables. This finding confirm the hypothesis that the expected stock returns in Brazil during the study period would decrease with the enterprise multiple. In other words, stocks with a high EM display a lower rate of return compared to companies with a low EM, which is in line with the results reported by Loughran and Wellman (2012) for the U.S. market.

It is important to note that even though the book-to-market and EM variables are highly correlated, they are able to predict future returns when they are used together, indicating that the EM variable explains a part of the expected return that is not captured by the book-to-market.

However, in the regression analysis, interpreting the book-to-market and EM coefficients becomes problematic, since these tend to be highly correlated. To work around this limitation, it is necessary to apply Fama and French's (1993) portfolio formation approach, since the creation of factors inhibits correlation between variables.

Portfolios Using em Variable

To estimate the degree to which an investor can obtain future returns by following an investment strategy based on the portfolios of companies with high and low EM coefficients, we use the Fama and French (1993) approach to construct portfolios based on the EM variable.

The companies in the sample were divided into quintiles according to the annual EM values every June from 2005 to 2013. In Panel A of Table 4, equal weighted average monthly returns of 1.29% are observed for companies in the quintile of firms with lower EM; therefore, these are considered to be value companies. Equal weighted average monthly returns of 0.09% are obtained for companies in the quintile with a high EM, which are considered to be growing businesses. This means that an investment strategy involving the purchase of value stocks (low EM) and the sale of growth stocks (high EM) would guarantee a return of 1.20% per month (15.39% per year) during this period.

When considering the returns weighted by market value (Panel A of Table 4), also known as value weighted returns, the quintiles of firms with the lowest and highest EM have mean returns of 1.04% and 0.30%, respectively. Thus, although an investment strategy that considers the weight of the shares at market value provides a lower return than the strategy without weighting, it would still be possible to obtain a monthly return of 0.74% over the period (9.25% per annum).

Panel B of Table 4 presents the results of the regressions when the following factors are used: (i) MKT, calculated as the difference between the returns of IBOVESPA and CDI; (ii) SMB, which is the difference between the returns of the smaller and those of the larger companies in terms of market value; (iii) HML, calculated as the difference in returns between the companies with the 30% highest and those with the 30% lowest book-to-market values; and (iv) UMD, which is the time factor. Thus, Panel B assesses whether the returns earned by the investment strategy based on the EM variable are robust with regard to the factors proposed by Fama and French (1993) and Carhart (1997). In the regressions, the dependent variable is the monthly return ob-

tained by calculating the difference between the monthly returns of the value companies (low EM) and the returns of the growth companies (high EM).

The first three rows of Panel B present Models 1–3, which use returns with equal weights (EW). In Models 4–6, the returns are weighted by the company's market value. The t-statistic is calculated based on the standard error, and the Newey-West estimator, which can be seen in White (1980), is used for correcting heteroscedasticity and serial autocorrelation.

Table 4: Value-Growth Portfolio Based on EM Variable

Panel A: Monthly Returns for EM Quintiles

Quintile	EW Returns	VW Returns
Low	1.29%	1.04%
2	0.98%	0.36%
3	0.82%	0.35%
4	0.77%	0.68%
High	0.09%	0.30%
Value-Growth	1.20%	0.74%

Panel B: Monthly EM Quintile Returns (value-minus-growth) as the Dependent Variable

Models	Weighting Method		Alpha	MKT	SMB	HML	UMD	Adjust R^2.
MOD 1	EW	coefs	0.0135	-0.0867				0.0361
		t-stats	2.2057**	-2.3981**				
MOD 2	EW	coefs	0.0124	-0.0761	-0.2571	0.2688		0.1080
		t-stats	2.2585**	-2.8937**	-1.9562**	2.3321**		
MOD 3	EW	coefs	0.0105	-0.0753	-0.1988	0.2934	0.2543	0.1249
		t-stats	1.8181	-2.8139**	-1.5732	2.2939**	1.4286	
MOD 4	VW	coefs	0.0079	-0.0256				-0.0072
		t-stats	1.1612	-0.5052				
MOD 5	VW	coefs	0.0082	-0.0248	-0.5215	-0.0631		0.0629
		t-stats	1.3270	-0.5619	-3.3129	-0.4644		
MOD 6	VW	coefs	0.0057	-0.0237	-0.4432	-0.0301	0.3416	0.0937
		t-stats	0.8463	-0.5119	-2.9746	-0.2158	1.7287	

Notes: EW: equal weighted; VW: value weighted.
Source: Authors.

For the portfolios designed with equal weights stock returns (EW), i.e., it was observed that the capital asset pricing model (CAPM), the Fama and French (1993) model, and the Carhart (1997) model (i.e., Models 1–3) are unable to fully explain the variation in returns compared to the returns of the portfolios created using the growth value investment strategy (constructed using the EM variable), which show significant abnormal returns. In Model 1 of Panel B, there is an alpha of 1.35% per month that is significant at 5%, which corresponds to a return of 17.46% per year. In Model 2 that includes the SMB and HML factors, the investment strategy delivers a return of 1.24% per month, with a t-statistic of 2.2586, i.e., an annualized return of 15.94%. The return in Model 3, which includes the time factor (UMD), continues significantly at 10% (even

though there is a reduction of the t-statistic); further, this model presents a significant abnormal return of 1.05% per month. However, for the portfolios formed with weighting, the single-factor model, the Fama and French (1993) model, and the Carhart (1997) model are able to explain the abnormal returns of the purchase and sell investment strategy in the lower and higher quintiles of the EM, respectively.

It should be noted that, with the exception of Model 3, the results obtained for the Brazilian market are in line with those reported for the U.S. market by Loughran and Wellman (2012), i.e., significant abnormal returns for the portfolios formed without weighting and non-significant abnormal returns for the portfolios formed with weighting. In addition, the portfolio formed with shares from the Brazilian market resembles the U.S. portfolio observed by Loughran and Wellman (2012) in that the size factor displayed a significant load at the same level, although the SMB is not significant in either case.

Another noteworthy point is that the HML factor in Loughran and Wellman (2012) displayed a high load (4–5 times higher than that of the other factors) in all the models (with and without weighting). However, in this study, HML did not present any significant load in the models with weighting. Moreover, even in Model 2 (where the portfolios were formed without weighting), the load of the HML factor was similar to that of the other factors. This could indicate that the book-to-market and enterprise multiple variables in the context of Brazil are not as cross-sectionally correlated as was expected, which reinforces the results presented in Table 3.

To observe the effect of the EM factor on the portfolios, the data were reorganized. The portfolios were divided into three groups according to market value and three groups according to the EM variable, which resulted in nine portfolios. It was decided to divide the portfolios into three groups for each of the control variables (instead of five groups as is commonly used in the international literature) because of the limited number of listed companies in Brazil, which consequently impacts the size and composition of the portfolios. Thus, Table 5 was constructed, in which the monthly returns are presented without weighting (Panel A) and with weighting according to the size factor (Panel B), after the portfolios have been classified by size and EM value; the monthly returns for July of year t to June of year t + 1 were considered.

The portfolios with a low EM value have average monthly returns that are higher and consistent when compared to those of the portfolios with a high EM value. This illustrates that a strategy of purchasing in low EM and selling in high EM (after controlling for the effect of the size of the companies) produces positive abnormal returns during the study period. The greatest difference in returns obtained for the investment strategy based on the EM variable (Low EM – High EM) was observed for the average portfolio without weighting (Panel A), which reached 1.27% per month; the monthly returns of the portfolio with low EM value were 1.50% compared to the 0.23% returns of the EM portfolio with high EM value. In Panel B, a similar result is observed for the weighted portfolios: the biggest difference lies in the portfolio formed by companies classified as medium-sized firms, which showed a difference of 1.02% per month compared to the EM portfolios of low and high value.

Table 5 – Monthly Returns for Size and Value-Growth

EM Portfolios			
Size Portfolios	Low Value	Medium	High Value
Panel A. EW monthly returns			
Small	1.25%	2.03%	0.70%
Medium	1.50%	0.93%	0.23%
Large	0.63%	0.34%	0.06%
Average	1.13%	1.10%	0.33%
Panel B. VW monthly returns			
Small	0.82%	0.99%	-0.04%
Medium	1.28%	0.84%	0.25%
Large	0.76%	0.03%	0.31%
Average	0.95%	0.62%	0.17%

Source: Authors.

To better evaluate the results obtained for the stock portfolios based on the IBOVESPA, the 3-factor model proposed by Fama and French (1993) was used to observe the behavior of these variables when applied to other markets.

Comparative analysis

Given the multiple applications of the Fama and French (1992) model, we expect some consistency in the results of the regressions using stock returns obtained in this study with respect to the results reported for other markets. Table 6 summarizes the results when evaluating emerging markets, the U.S. market, and Brazil in isolation. The size variable was not significant in estimating stock returns in the different periods of study, the only exception being the U.S. market. Moreover, the book-to-market variable was statistically significant at 5% and positive for different time periods in Barry et al. (2002) study in the context of emerging countries as well as in Loughran and Wellman's (2012) study of the U.S. market. The results of both these prior studies are in line with the results obtained for the same variable in this study for the period 2005–2013.

Table 6: Comparative Analysis of Cross-Sectional Regression Results: Stock returns (t-statistic)

Models	Period	Country	SIZE	BTM
Our Study	2005–2013	Brazil	-1.04	**2.24**
Silva et al. (2012)	2004–2011	Brazil	1.39	1.32
Loughran and Wellman (2011)	1963–2009	US	**–3.04**	**3.41**
Estrada and Serra (2005)	1992–2001	30 EM countries	-1.07	-0.12
Barry et al. (2002)	1985–2000	35 EM countries	-1.51	**3.37**

Source: Authors.

When analyzing the results of prior studies that use cross-sectional regressions to examine the formation of stock portfolios following the 3-factor model proposed by Fama and French (1993), the analysis becomes a bit more complex because of differences in the observed periods. However, the statistical significance for the SMB and HML factors in the equal weighted method showed the same sign and relevance when compared to the significance of these factors in Loughran and Wellman's (2012) study of the U.S. market. Further, the SMB and HML factors in this study had significance and

magnitude similar to those reported by Cakici, Fabozzi and Tan (2013) for their sample using data from Argentina, Brazil, Chile, Colombia, and Mexico between 1991 and 2011.

Table 7: Comparative Analysis of Fama and French (1993) factors (*t*-statistic)

Models	Period	Country	Weighted Method	MKT	SMB	HML
Our Study	2005-2013	Brazil	EW	**-2.89**	**-1.96**	**2.33**
			VW	-0.56	**-3.31**	-0.46
Cakici et al. (2013)	1991-2011	Argentina, Brazil, Chile, Colombia, and Mexico	VW	1.66	**1.84**	**2.16**
		18 emerging countries	VW	0.97	1.33	3.13
		USA	VW	**1.81**	1.48	1.22
Loughran and Wellman (2011)	1963-2009	USA	EW	**-4.69**	**-2.92**	**13.26**
			VW	-1.17	**2.98**	**14.53**
Rogers and Securato (2009)	2001-2006	Brazil	VW	1.63	**2.25**	1.24
Jung et al. (2009)	1992-2006	Korea	EW	0.36	-0.10	**1.74**
Iqbal and Brooks (2007)	1999-2005	Pakistan	VW	-0.59	1.04	-1.80

Notes: EW: equal weighted; VW: value weighted.

Source: Authors.

Final considerations

The enterprise multiple (EM) variable is a relative measure of company valuation that has gained relevance, mainly because of studies by Koller, Goedhart and Wessels (2005) and Damodaran (2010). This variable is calculated as the ratio of the enterprise value (equity value + debt + preferred stock – cash) and the earnings before interest, taxes, depreciation, and amortization (EBITDA). This study aimed to assess whether the use of the EM variable as a valuation tool for estimating stock returns is really justified.

Based on the 96 cross-sectional monthly regressions that used data pertaining to BOVESPA stocks between January 2005 and July 2013, a negative relationship between the EM variable and stock returns was confirmed. The EM variable proved robust and significant, confirming the hypothesis that the expected return of stocks in Brazil during this period would decrease with the enterprise multiple (EM). In other words, stocks with a high EM receive a lower rate of return compared to companies with a low EM.

In the regressions analysis using the shares of companies, the interpretation of the book-to-market and EM coefficients becomes problematic since these tend to be highly correlated. To work around this limitation, it becomes necessary to apply the portfolio formation approach proposed by Fama and French (1993), since the creation of factors inhibits correlation between variables.

Using the return of a portfolio formed according to the difference between the returns of the lowest and highest quintiles of EM as the dependent variable, the abnormal return of the portfolio formed without weighting was found to be significant for the three-factor model proposed by Fama and French (1993). This means that a strategy of purchasing stocks with a low EM and selling stocks with a high EM (the assets

included in the portfolio have equal weights) during this period would result in an abnormal return of 1.24% per month and a 5% significance level. In other words, even after controlling for the market risk (MKT), size (SMB), and book-to-market (HML) factors, this investment strategy would achieve an annualized return of 15.94%. For the portfolios formed with weighting, the investment strategy formed according to the EM variable did not present significant abnormal returns, similar to what was reported by Loughran and Wellman (2012) for the U.S. market.

By organizing the factors in a simplified panel, the difference in the returns obtained for the investment strategy based on the EM variable (Low EM – High EM) was observed. The monthly returns of the low-value EM portfolio were 1.50% as opposed to 0.23% for the high-value EM portfolio. Similar results were observed for the weighted portfolios, where the biggest difference lay in the portfolio formed by companies classified as medium-sized, which presented a difference of 1.02% per month between the EM portfolios of low and high value.

It can be concluded that the estimation of cross-section returns for defining investment strategies based on the multiples of companies is relevant. The importance of the enterprise multiple (EM) factor given by (market value of the common shares + debt + market value of the preferred shares – cash) is worth noting. This multiple has proven extremely useful for forming an investment strategy and for evaluating the performance of abnormal returns in event studies, including strategies for evaluating portfolios where weighting is attributed to the assets.

The comparative analysis of the results using the results of other studies becomes a bit more complex because of differences in the observed periods and the techniques used to identify the factors in different studies. However, it was possible to compare the statistical significance of some of the factors using the results reported for the U.S. market.

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