THE LONG-RUN PERFORMANCE OF BRAZILIAN STOCKS TRADED BELOW BOOK VALUE

DESEMPENHO DE LONGO PRAZO DAS AÇÕES BRASILEIRAS NEGOCIADAS ABAIXO DO VALOR PATRIMONIAL

EL DESEMPEÑO DE LARGO PLAZO DE LAS ACCIONES BRASILEÑAS NEGOCIADAS ABAJO DEL VALOR PATRIMONIAL

Leandro da Rocha Santos, CFA
Mestre em Administração (IBMEC-RJ)
Endereço: Av. Republica do Chile, 65 / 1002 – Centro
Rio de Janeiro, RJ, 20031-912
Email: lrochasantos@yahoo.com

Roberto Marcos da Silva Montezano
Doutor em Economia (EPGE/FGV)
Professor Titular do IBMEC-RJ
Endereço: Av. Presidente Wilson, 118 – 11º andar – Centro
Rio de Janeiro, RJ, 20030-020
Email: rmontezano@ibmec.edu.br

ABSTRACT

The price-to-book ratio (stock prices divided by book value per share) is a commonly used a valuation metric to screen for under- or overvalued stocks. Empirical evidence suggests that low price-to-book stocks (i.e., value stocks) outperform high price-to-book stocks (i.e., growth stocks) in the long run. Here we attempt to build on the vast literature on the field by applying a different methodology to Brazilian stocks in the 1989-2009 time period. We build portfolios of stocks traded below book value and compare results to the more comprehensive Ibovespa index. We found strong evidence in favor of the former. Our portfolios outperformed the Ibovespa by 1425.39 percentage points (cumulative real returns). Moreover, our portfolios seem to be less risky than the Ibovespa, given their outperformance in every state of the economy, and, more importantly, their strong relative results during economic downturns and bear markets. We speculate that the reasons for the superior performance are related to behavioral issues.

Keywords: Value Stocks, Growth Stocks, Price-to-book ratio

RESUMO

O índice preço/valor patrimonial (preço da ação dividido pelo valor contábil por ação) é uma métrica comumente utilizada para identificar ações sub ou sobrevalorizadas. As evidências empíricas sugerem que ações com baixo preço/valor patrimonial (ações de valor) têm desempenho superior ao de ações com alto preço/valor patrimonial (ações de crescimento) no longo prazo. No presente artigo, busca-se contribuir para a extensa literatura sobre o tema

aplicando-se uma nova metodologia para ações brasileiras no período 1989-2009. Foram construídas carteiras de ações negociadas abaixo do valor patrimonial e os resultados foram comparados aos do índice Ibovespa. Foram encontradas fortes evidências a favor das carteiras, cujo prêmio sobre o Ibovespa foi de 1425,39 pontos percentuais (retornos reais acumulados). Ademais, as carteiras aparentemente são menos arriscadas do que o Ibovespa, haja vista que elas tiveram desempenho superior ao do índice em todos os estados da economia, e o que é mais relevante, elas apresentaram melhores resultados em contrações econômicas e mercados de baixa. Especulamos que as razões para o desempenho superior devem-se a questões comportamentais.

Palavras-chave: Ações de Valor, Ações de Crescimento, Índice Preço/Valor Patrimonial

RESUMEN
El índice precio/valor patrimonial (precio de la acción dividido por el valor contable por acción) es una métrica utilizada para identificar acciones subestimadas o sobreestimadas. Las evidencias empíricas sugieren que las acciones con bajo precio/valor patrimonial (acciones de valor) tienen desempeño superior a las de alto precio/valor patrimonial (acciones de crecimiento) en el largo plazo. En este artículo, se busca contribuir a la extensa literatura sobre el tema mediante la aplicación de una nueva metodología para la bolsa de Brasil en el período 1989-2009. Se construyeran carteras de acciones negociadas abajo del valor contable y los resultados se compararon con el índice Ibovespa. Se encontraron fuertes evidencias en favor de las carteras cuya prima sobre el Ibovespa fue 1425.39 puntos porcentuales (retornos reales acumulados). Por otra parte, las carteras son aparentemente menos riesgosas que el Ibovespa, dado que ellas superaron el índice en cada estado de la economía, y lo que es más importante, ellas presentaron mejores resultados en las crisis económicas y los mercados a la baja. Especulamos que las razones para el desempeño superior se deben a problemas de comportamiento.

Palabras clave: Acciones de Valor, Acciones de Crecimiento, Índice Precio/Valor Patrimonial

1 INTRODUCTION

The performance of value and growth stocks has always stirred considerable interest among academics and investment professionals. In Brazil, Santos and Montezano (2011) ran a long-term analysis of value and growth stocks. Their study was based on a sample of the top 100 most liquid companies traded on the São Paulo Stock Exchange and value portfolios were defined as the ones with the lowest price-to-earnings (P/Es) stocks, the lowest price-to-book (P/Bs) stocks, or by a combination of both (the opposite stood for growth portfolios). Strong evidence of value portfolios's outperformance has been found. When sorted by P/Es, they produced a 5469.24% cumulative real return (over a 20-year time period) versus a negative 46.92% cumulative real return for growth portfolios. Risk analysis suggested that value portfolios were less risky than growth portfolios, a stark contrast to the Efficient Markets School. These results echo those found on both developed and emerging markets (see, for example, FAMA; FRENCH, 1998; CHIN, PREVOST; GOTTESMAN, 2002; CHAN; LAKONISHOK, 2004; BRAGA; LEAL, 2004; GALDI, 2008; ATHANASSAKOS, 2009), contributing to support the evidence in favor of Value Investing's outperformance in the long run.

Here we put forward a different methodology to assess Value Investing's relative performance. We build portfolios of stocks traded below book value (i.e., showing a price-to-book ratio below 1) and compare the results to a broader benchmark, the Brazilian Ibovespa index, which accounts for approximately 80% of the volume traded in the São Paulo Stock Exchange.

The price-to-book ratio has been used by both practitioners and researchers as a value metric to screen for attractive investments. Graham and Dodd (1940), while emphasizing the primacy of earning power, advocated its use as a yardstick to screen for undervalued stocks. Nonetheless, Graham also drew attention to the fact that, except for financial firms, book value should not be regarded as a proxy for liquidation value in case of bankruptcies (GRAHAM; SPENCER, 1998). This stems from the fact that, in general, fixed assets are sold at a discount, resulting in actual figures well below book value. Therefore, as a proxy for liquidation value, he championed the use of a metric called "net asset value", which was defined as the difference between current assets and *all* liabilities. Thus, fixed assets were given no value at all, which can arguably be seen as an overly conservative assumption. Remarkably, even in the frenzy of the pre-1929 market crash, Graham managed to find stocks traded below net asset value on the New York Stock Exchange (GRAHAM; DODD, 1940).

Another strong argument against the use of book value as a proxy for intrinsic value is the widely-established assumption that the value of any financial asset is to be derived from the future cash flows it may potentially generate throughout its life. Therefore, book value would not be informative for doomed industries, as future cash flows may be drastically reduced. Still, assets in place must surely have some value, since results do not come out of thin air.

Another cautionary point is worth mentioning: knowledge-intensive and other intangibles-driven companies, whose competitive advantages are derived from assets not fully recognized on their books, may not be properly labeled as value or growth stocks by P/B alone.

These caveats notwithstanding, P/B maintains its allure for investors. The main reason may be its simplicity: intuitively, it seems to make sense to buy something traded below the value of the underlying assets.

The last statement deserves further explanations. By definition, book value is the difference between a company's assets and liabilities. Therefore, it encompasses both liquid and non-liquid instruments. Due to their long-term nature, non-liquid assets are more particularly affected because of the fact that, absent revaluations and inflation adjustments, they are recorded at historical costs in the balance sheet. As a result, on the one hand, inflation may corrode their net worth in the long run. And even more perversely, should the required maintenance or technological upgrades not be carried out properly, assets may turn out to be valueless or obsolescent and the figures in the balance sheet may be far from realistic. Nonetheless, because of the difficulties entailed by the calculation of proper replacement values, investors may be excused to use book value as a useful proxy.

There is a compelling body of evidence showing that low P/Bs stocks outperform high P/Bs stocks (see, for example, FAMA; FRENCH, 1992; LAKONISHOK, SHLEIFER; VISHNY, 1994). The studies usually sort stocks according to different metrics and group them into percentiles, producing value and growth portfolios. Nonetheless, we are not aware of any long-range study that tested the hypothesis that stocks traded below book value outperform the market. This is what we undertake in the present article.

When assessing risks, we apply the same methodology used by Santos and Montezano (2011): we compare our portfolios' returns with the broader Ibovespa's returns on different states of the economy. This risk metric, first put forward by Lakonishok, Shleifer and Vishny (1994), attempts to capture the value of a given portfolio according to the marginal utility of wealth. In other words, in times of recessions and bear markets, the value accorded to money is expected to increase. If the proposed portfolio outperforms the benchmark, it can be considered less risky.

2 RESEARCH METHODOLOGY

Our time frame encompasses 20 years of market data. From December 1988 to April 2009, we build P/B-sorted portfolios. As Brazil has switched to IFRS accounting standards in the year 2010, we have decided to limit our sample period to the pre-IFRS era in order to ensure consistency. To figure in the portfolio, any given stock must be traded below book value, i.e., P/B must be less than 1.

In order to avoid any look-ahead bias, our portfolios are built every April, 30th. Thus, we make sure that book values per share for the previous fiscal year had already been disclosed, in compliance with Brazilian law.

We define P/B according to the following formula:

P/B = stock price on April, 30th Year t / book value per share on Year t-1

Hence, the first portfolios use closing market prices on April, 30th, 1989 and each company's book value per share in 1988. We hold the portfolios for a year and compute returns using closing prices on April 30th of the year subsequent to portfolio's construction. We build the last portfolios in 2008, using book value per share for 2007 and closing prices for 2009 to calculate annual returns, which are equally weighted. We do not account for taxes and transaction costs.

We also calculate returns on the inflation-adjusted Ibovespa index, which is bought and sold every April, 30th during the sample period.

Per capita GDP figures are provided by the Brazilian Central Bank. Accounting and market data, by Economatica. The latter are adjusted for splits, reverse splits and dividends and deflated by the IPCA, a Brazilian consumer price index.

Why do use deflated figures? Because the 1989-1993 period is characterized by its rampant hyperinflation (the 1994-2008 post-*Plano Real* period, by contrast, is a relatively much more stable one). Also, there is a lag between the disclosure of financial results and the date when we build the portfolios. Under a highly inflationary environment, this lag can adversely impact portfolio returns calculations.

Due to the Brazilian market's low liquidity, especially in the earlier years of our sample, we focus on the top 100 Brazilian firms by market value and we use only the firm's most liquid stock. Financial companies and firms with negative book value on the years preceding the portfolio's construction were excluded. We also eliminate companies that were

not traded on April, 30th of the ensuing year. As a resut, our portfolios had a minimum of 6 and a maximum of 93 stocks.

Our risk analysis covers four states of the economy: bull and bear markets, expansions and contractions. Bull markets are defined as the years when the Ibovespa rose in real terms (bear markets were the opposite). Expansions are termed the years when Brazilian real per capita GDP rose (contractions were the opposite). Each state is specified in Table 1.

Table 1 – Real per capita GDP yearly percentage change and inflation-adjusted Ibovespa index at year-end closing prices

Year	Real per capita GDP yearly % change	Expansion or contraction?	Inflation-adjusted Ibovespa index (year-end closing prices)	Bull or bear market?
1988	-1,9%	-	6577.68	-
1989	1.4%	Expansion	5,909.99	Bear
1990	-7.1%	Contraction	1,402.07	Bear
1991	-0.7%	Contraction	5,914.70	Bull
1992	-2.2%	Contraction	5,412.81	Bear
1993	3.3%	Expansion	11,629.84	Bull
1994	4.2%	Expansion	13,495.03	Bull
1995	2.6%	Expansion	10,702.52	Bear
1996	0.6%	Expansion	15,996.24	Bull
1997	1.8%	Expansion	22,017.27	Bull
1998	-1.5%	Contraction	14,410.80	Bear
1999	-1.2%	Contraction	33,325.95	Bull
2000	2.8%	Expansion	28,076.34	Bear
2001	-0.2%	Contraction	23,201.19	Bear
2002	1.2%	Expansion	17,111.33	Bear
2003	-0.2%	Contraction	30,894.01	Bull
2004	4.3%	Expansion	33,824.99	Bull
2005	1.9%	Expansion	40,872.48	Bull
2006	2.7%	Expansion	52,678.30	Bull
2007	4.9%	Expansion	72,443.95	Bull
2008	4.0%	Expansion	40,205.43	Bear

Source: Brazilian Central Bank (2010) and Economatica

We also present yearly results and results for the overall period, the first and second half, the pre-*Plano Real* period and the post-*Plano Real* period.

As for limitations, our research methodology produces a small survivorship bias, since we exclude from our sample the stocks that were not negotiated one year after the date the

portfolios were built. We disregard taxes and transaction costs and, due to the lack of financial data, we could not test for a lengthier period.

3 EMPIRICAL RESULTS

Table 2 presents the descriptive statistics of our sample.

Table 2 – Sample's descriptive statistics

Year	Number of stocks traded below book value	Minimum P/B	Maximum P/B	Median P/B
1989	76	0.00357324	0.94157275	0.44012466
1990	93	0.00062010	0.96012136	0.19780455
1991	44	0.00021	0.80731467	0.05812675
1992	26	0.00002	0.78097911	0.07607247
1993	58	0.00230	0.98673398	0.30872354
1994	61	0.07895	0.96684416	0.45188159
1995	79	0.00051	0.98678936	0.41981033
1996	70	0.00029	0.98329974	0.36237557
1997	63	0.00069	0.96557079	0.49743454
1998	74	0.00095	0.99905769	0.45526543
1999	66	0.00139	0.89841091	0.35700922
2000	51	0.00315	0.85359830	0.54437969
2001	61	0.00313	0.97127080	0.52727174
2002	56	0.12778	0.98470725	0.54849537
2003	42	0.11350	0.99168102	0.54642941
2004	41	0.10500	0.97861916	0.69759806
2005	25	0.09728	0.99188371	0.62448515
2006	13	0.33318	0.98945196	0.66321455
2007	6	0.28304	0.89554419	0.79708605
2008	7	0.31646	0.99188039	0.89460662

Source: The authors

The figures show that over time the number of stocks traded below book value has been decreasing (as a mirror image, the median P/B has been increasing.) This is probably a result of both the higher integration of global financial markets and the stabilization and growth of the Brazilian economy.

The following table details yearly changes on our portfolios and on the Ibovespa index (inflation-adjusted figures).

Table 3 – Inflation-adjusted yearly changes for the portfolios and the Ibovespa index

Year	Portfolio P/B<1	Ibovespa	Premium
1989	-63.78%	-80.69%	16.91%
1990	-13.81%	-9.87%	-3.94%
1991	256.45%	343.72%	-87.27%
1992	-2.85%	-24.68%	21.83%
1993	59.99%	80.57%	-20.58%
1994	0.22%	-17.03%	17.25%
1995	-19.36%	13.63%	-32.99%
1996	34.63%	78.02%	-43.39%
1997	-1.43%	12.64%	-14.07%
1998	-17.77%	-5.95%	-11.82%
1999	57.80%	28.20%	29.60%
2000	18.89%	-9.94%	28.84%
2001	8.21%	-18.77%	26.98%
2002	-6.59%	-18%	11.23%
2003	69.13%	48.35%	20.78%
2004	30.55%	17.24%	13.31%
2005	54.64%	55.28%	-0.64%
2006	48.62%	17.76%	30.86%
2007	34.26%	31.98%	2.28%
2008	-7.44%	-33.98%	26.54%

Source: The authors

Two characteristics stand out. First, wild swings prevail, both on our portfolios and on the Ibovespa. Second, our portfolios, as evidenced by the differences in the Premium column, steadily outperform the Ibovespa in the 1999-2008 period.

Nonetheless, average yearly returns certainly mask the power of compounded interest, which is unveiled on Table 4, alongside cumulative returns.

Table 4 – Compounded and cumulative real returns

Period	Metric	Portfolio P/B<1	Inflation-adjusted Ibovespa	Premium
1989-2008 (overall period)	Compounded return	15.63%	7.16%	8.46%
	Cumulative return	1724.31%	298.92%	1425.39%
1989-1998 (First half)	Compounded return	4.31%	6.45%	-2.13%
	Cumulative return	52.53%	86.77%	-34.24%
1999-2008 (Second half)	Compounded return	28.17%	7.88%	20.28%
	Cumulative return	1096.00%	113.58%	982.41%
1989-1993 (pre-*Plano Real*)	Compounded return	11.58%	0.99%	10.59%
	Cumulative return	72.96%	5.05%	67.91%
1994-2008 (post-*Plano Real*)	Compounded return	17.01%	9.30%	7.70%
	Cumulative return	954.77%	279.76%	675.02%

Source: The authors

Our portfolios outperformed the market by wide margins on every period analyzed, save for the samples' first half, when the underperformance amounted to 34.24 percentage points. Attention should be drawn to the sizeable outperformance on the overall period: our portfolios produced a cumulative return of 1724.31% versus a cumulative return of 298.92% for the inflation-adjusted Ibovespa.

Graph 1 depicts how much investors who followed our strategy by investing R$ 10.000 in 1989 would have gained in the end of the period. Applying our strategy, investors would have accumulated R$ 182.400 in a 20-year time frame (compared to R$ 39.900 for the Ibovespa index). In other words, the wealth produced by buying and holding an annually-rebalanced portfolio of stocks traded below book value would be 4.5 times higher than the results achieved by investing in the Ibovespa.

The Long-run Performance of Brazilian Stocks Traded Below Book Value

Graph 1 – Result of R$ 10.000 invested in the portfolios and the Ibovespa index (both adjusted for inflation)
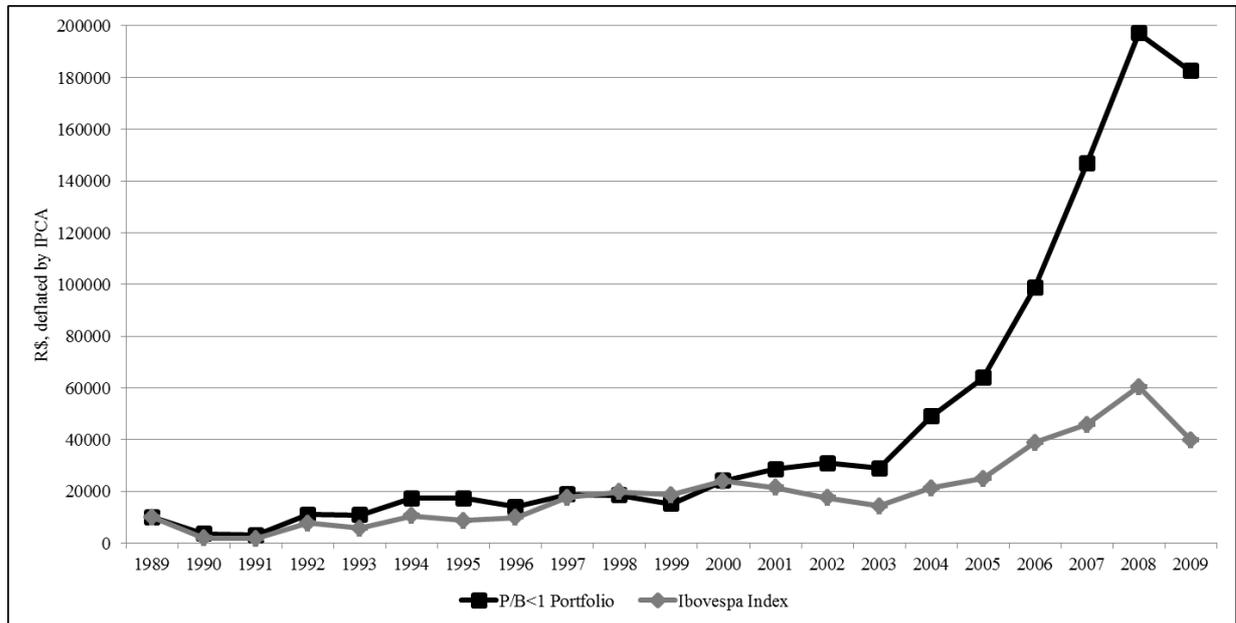
Source: The authors

What about risks? Under the rationale for assessing risk put forward by Lakonishok, Shleifer and Vishny (1994), our portfolios would be riskier if they underperformed in negative states of the economy, when money would be deemed more valuable by investors. As Table 5 shows, our portfolios outperform the broader market in all the states analyzed. Moreover, compounded returns are higher in negative states (bear markets and contractions), implying that our portfolios are indeed less risky.

Table 5 - Risk analysis

Period	Metric	Portfolio P/B<1	Inflation-adjusted Ibovespa	Premium
Bear markets (89, 90, 92, 95, 98, 00, 01, 02, 08)	Compounded return	-15.33%	-27.46%	12.13%
	Cumulative return	-77.63%	-94.44%	16.81%
Bull markets (remaining years)	Compounded return	49.20%	47.47%	1.73%
	Cumulative return	8054.35%	7073.10%	981.25%
Contractions (90, 91, 92, 98, 99, 01, 03)	Compounded return	32.28%	23.48%	8.80%
	Cumulative return	608.86%	337.70%	271.15%
Expansions	Compounded return	7.54%	-0.71%	8.25%

(remaining years)	Cumulative return	157.36%	-8.86%	166.22%

Source: The authors

4 CONCLUSIONS

We found strong evidence in favor of stocks traded below book value. Our portfolios real cumulative returns exceeded Ibovespa's by 1425.39 percentage points. What is more, our risk analysis suggests that our portfolios are less risky than the broader market: they have produced better results in every state of the economy, especially in negative states.

Our results contribute to the challenges posed to the Efficient Market School. After all, Benjamin Graham's Security Analysis was first published in 1934. Value Investing's superior performance is widely disclosed and empirical results have been published at least since BASU's article (1977). As a matter of fact, Graham and Dodd (1940) have even added a note on their book showing that a simple, mechanical strategy of low P/E portfolios outperforms high P/E portfolios. So the rational attitude for investors would be to buy low P/E (or, for that matter, low P/B) stocks. As a consequence, prices would be bid up, and, conversely, returns would go down.

Investors in general do not seem to employ such strategy. Empirical studies cover large periods of time. The two apparently most-cited papers on the field (FAMA; FRENCH, 1992; LAKONISHOK; SHLEIFER; VISHNY, 1994) cover the 1963-1990 period on the most sophisticated financial market ever. Yet, Value Investing's results persist.

It is not on the scope of the present article to elaborate on potential explanations. However, we may hazard some guesses. We believe that, while markets are efficient over the long run, they show a wild, unreasonable volatility over short stretches of time (see, for example, AKERLOF; SHILLER, 2010). Markets do overreact (DEBONDT; THALER, 1985). Investors suffer from psychological shortcomings that hinder their ability to act on the irrational movements (or, what is even worse, their actions tend to exacerbate those movements) that happen from time to time (SHEFRIN, 2002). As a result, mispricings persist for long time horizons, allowing cash-rich investors to profit on the long run.

As for suggestions for future studies, in the present article we used as a benchmark the original Ibovespa index, which itself included companies traded below book value. We believe the relative results of our strategy could be enhanced if the index were reconstructed without those stocks.

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