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Benjamin Miranda Tabak and Eduardo José Araújo Lima

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Edited by:

Research Department (Depep)

(e-mail: conep.depep@bcb.gov.br , workingpaper@bcb.gov.br)

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The Effects of the Brazilian ADRs Program on Domestic Market Efficiency

Benjamin Miranda Tabak[*]

Eduardo José Araújo Lima

Abstract

This paper examines the impact on Brazilian stocks following American Depositary Receipts (ADRs) listing in the U.S. stock markets. Evidence suggests that a systematic change has taken place in the post-listing period as the multivariate variance ratio statistics have significantly decreased if compared to the pre-listing period, which indicates a move toward a more efficient domestic stock market. This empirical evidence is robust to the use of dollar and local currency-denominated returns. These results add to the literature that finds evidence on changes in domestic volatility and abnormal returns around listing dates.

Keywords: random walk, variance-ratio test, emerging markets, weak-form efficiency, American Depositary Receipts.

JEL: G14, G15

[*] Research Department, Central Bank of Brazil. Address: SBS – Quadra 3 – Bloco B – Ed.-Sede – 9th floor – 70074-900 Brasília, DF, Brazil. E-mail: benjamin.tabak@bcb.gov.br.

1. Introduction

One of the main questions in modern financial literature is whether financial asset returns are predictable. The predictability of asset returns is of particular interest for both academic and practitioners. Active portfolio managers are looking for recognizable patterns in history of past returns that requires, at least to some extent, a certain degree of predictability in order to produce higher returns. Most practitioners involved in active management are looking for trading rules that would maximize profits within a certain period. In this sense, they assume that it is possible to predict returns from past returns.

In contrast, most asset pricing models assume that one cannot forecast future returns using past returns, usually called the random walk hypothesis. It is important to notice that financial asset prices may have different stochastic processes governing their behavior. The rejection of the random walk hypothesis would lead to question most financial models that use this assumption.

The issue whether returns on stocks are predictable using past returns has been subject of extensive research in the financial literature. Lo and MacKinlay (1988, 1989) have put a framework for testing whether returns can be forecasted using past returns. They suggest testing for serial correlation between returns at different dates using variance ratio statistics. Their main idea is to test whether returns follow a random walk process, which would imply the absence of serial correlation. If one cannot reject that returns follow a random walk then stock markets would be weak-form efficient.

Assessing empirically whether this is a valid assumption is an important issue on it's own. This explains the huge literature found focusing this topic. However, in this paper we not only assess whether the Brazilian stocks that issued American Depository Receipts (ADRs) follow a random walk but we also test whether the Brazilian ADRs program has put a structural break on the dynamics of asset prices.

Cross-listing could have increased domestic efficiency in two ways. Firstly, stocks now could be traded by a greater number of investors (expansion of the shareholder base) and liquidity would rise which could increase efficiency domestically on those stocks. Finally, arbitrage arguments could be used to explain why stocks prices listed in two stock exchanges should converge and in this sense there could be a spillover effect from one market to the other, increasing efficiency.

Research on dual listing focuses on the effects around the date securities are listed on U.S. stock exchanges and search for the significance of abnormal returns or changes in domestic volatility around that date. In our paper we use this date in order to test if the dynamics of asset prices change with the introduction of the ADRs[1].

The contribution of this paper is that it tests whether the Brazilian ADRs program has increased domestic market efficiency. We put together two different strands in the financial literature. In one hand, we have a lot of research focusing on the impact of cross-listing on domestic markets and in the other hand, we have a huge literature analyzing the Random Walk Hypothesis (RWH) for stock markets. In order to do so the multiple variance ratio of Chow and Denning (1993) is used. The RWH is tested before and after the launching of the ADRs program for domestic firms. In order to assess whether there has been a structural change we use a sign test (nonparametric test) for the variance ratio statistics.

The paper is organized as follows. In the next section, a literature review is done and we put in perspective authors contributions for different markets. In section 3, we review the theory and methodology used in this paper. In section 4 empirical results are shown and some inferences on the results are made. Section 5 concludes the paper.

2. Literature Review

A lot of research has been done in testing whether stock prices follow random walks. Evidence for U.S. stock prices suggests that prices do not follow random walks. Fama and French (1987) found evidence suggesting that for North-American stocks 25 to 40 percent of the variation of longer-term returns were predictable from past returns. Lo and MacKinlay (1988) used a variance ratio methodology to assess whether stocks on the North-American market followed random walks. Their findings suggest that stock prices do no follow random walks.

Many tests have been made on international markets. Frennberg and Hansson (1993) test the RWH on the Swedish stock market. Their results suggest that Swedish stock prices have not followed a RW in the past 72 years. As the sample interval

[1] For this literature see Eun et al. (1993), Domowitz et al. (1998), Martell et al. (1999), Hargis (2000) and Costa Jr. et al. (2002).

increases they have found evidence on mean reversion as the variance ratios goes below unity.

Ayadi and Pyun (1994) show that under the assumption of homoscedastic error terms the RWH for the Korean Stock Exchange is rejected. However, if this assumption is relaxed and heteroscedastic disturbance is allowed the RWH cannot be rejected. Shastri and Shastri (1994) analyze stocks in the Tokyo Stock Exchange and found evidence supporting the RWH for medium and large-sized stocks but found evidence that returns on small stocks do not follow a random walk. Huang (1995) analyzes Asian stock markets and finds evidence that the RWH is rejected for the Hong Kong, Singapore and Thailand markets using the heteroscedasticity-consistent variance ratio estimator.

Most of the studies cited before used variance ratio statistics to assess whether the RWH should be rejected. This statistic is used in the financial literature in many other markets other than the stock markets such as exchange rates, derivatives contracts[2]. For example, Lee, Gleason and Mathur (2000) tested for efficiency of four financial contracts traded on the MATIF (French International Futures and Options Exchange). Using variance ratio tests they have shown that these contracts do not depart from the random walk.

Urrutia (1995) examined stock indexes from Argentina, Brazil, Chile and Mexico using variance ratio tests. He found evidence in support of mean reversion in index returns for each of the four countries, rejecting the RWH. Grieb and Reyes (1999) used variance ratio tests to examine random walk properties of Mexican and Brazilian stock market indexes and individual securities. Their results suggest that individual securities exhibit mean reversion in Brazil that could be attributed to the incidence of nonsynchronous trading. Karamera, Ojah and Cole (1999) used a multiple variance ratio test due to Chow and Denning (1993) to asses whether emerging market stock indices are random walks. Their results suggest that exchange rate effects are important in the determination of these indices dynamics. They found that the RWH is consistent with the majority of the 15 emerging equity series analyzed[3].

[2] The reader is referred to Liu and He (1991), Pyun et al. (1994), Bahmani-Oskooee (1998) and Choi (1999) for examples using VR and other statistics in exchange rate markets and Lee et al. (2000) for applications in derivatives contracts.

[3] They analyzed Argentina, Brazil, Chile, Hong Kong, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Phillipines, Singapore, Taiwan, Thailand and Turkey.

Recently, some interesting papers focusing on the impact of cross-listing on domestic stock markets have been published. Hargis (2000) shows how international cross-listing can increase market capitalization and liquidity of a local market by reducing market segmentation due to investment barriers[4]. Karolyi (1998) in his survey concludes that local liquidity increases after issuance of ADRs.

Jayaraman, Shastri and Tandon (1993) examine the effects of the ADRs listing on a sample of European and Asian stocks and find that variances of the underlying stocks are significantly higher after the introduction than before. Domowitz et al. (1998) show that liberalization can induce greater participation by foreign investors whose entry can reduce price volatility.

Miller (1999) examines the impact of dual listing and finds evidence of positive abnormal returns around announcement dates of a DR program Martell (1999) finds no systematic change in volatility after the cross-listing of Latin American stocks while Huang and Yang (2000) found that out of 10 emerging markets only 4 experienced diminished volatility. For the Brazilian case, Costa Jr. et al. (2002) found evidence suggesting that dual listing has diminished domestic volatility on subjacent stocks.

Results in this literature are far from conclusive. It is far from clear whether stock markets, exchange rates or derivative contracts are efficient and whether cross-listing can induce a reduction in volatility and foster domestic efficiency. Evidence is somewhat conflicting depending on the specific markets that are being analyzed and on the techniques that are used.

We will be focusing in this paper in testing whether the cross-listing for Brazilian stocks had any impact on domestic market efficiency. Using multivariate ratio statistics and nonparametric tests we build formal tests of the assumption that price dynamics for cross-listed companies moved toward a random walk after the listing.

3. Theory and Methodology

In this section we explore the variance ratio methodology and the sign test that will be used to assess whether there has been a statistically decrease in variance ratio

[4] The author derives a model that shows the benefits of international cross-listing on local equity markets. One of the main benefits is the increase in liquidity.

statistics after the launching of ADRs, which could be seen as evidence in favor of a move towards a price dynamics that resembles a random walk.

3.1. The variance ratio methodology

Let P_t be the log of price, μ a constant drift parameter and ε_t a random disturbance, white noise with normal distribution. Let P_t be a stochastic process satisfying:

$$P_t = \mu + P_{t-1} + \varepsilon_t \text{ , with } E[\varepsilon_t] = 0, \text{ for all } t, \tag{1}$$

or

$$r_t \equiv P_t - P_{t-1} = \mu + \varepsilon_t \tag{2}$$

where r_t is the return of one period.

Lo and Mackinlay (1989) exploit the fact that the variance of the increments in a random walk is linear in the sampling interval[5]. If a series follows a random walk the variance of its q-differences would be q times the variance of its first differences. That is

$$\frac{1}{q}\frac{Var\left(P_t - P_{t-q}\right)}{Var\left(P_t - P_{t-1}\right)} = 1 \tag{3}$$

To accept the RWH this ratio should be statistically indistinguishable from one. Let the data consist of $nq+1$ observations, $P_0, P_1, \ldots\ldots P_{nq}$, where both n and q are arbitrary integers greater than one, then the estimators for μ and σ^2 are:

[5] See also Campbell (1991), Campbell, Lo and MacKinlay (1997), Campbell and Mankiw (1987), Cochrane (1988), Faust (1992), Poterba and Summers (1988), Richardson (1993) and Richardson and Stock (1989).

$$\hat{\mu} = \frac{1}{nq}\sum_{k=1}^{nq}\left[P_k - P_{k-1}\right] = \frac{1}{nq}\left[P_{nq} - P_0\right] \tag{4}$$

$$\hat{\sigma}_a^2 = \frac{1}{nq-1}\sum_{k=1}^{nq}\left(P_k - P_{k-1} - \hat{\mu}\right)^2 \tag{5}$$

The estimator $\hat{\sigma}_a^2$ is simply the unbiased sample variance of the first-difference of P_t. The unbiased estimator of the variance of the qth differences is:

$$\hat{\sigma}_b^2 = \frac{1}{m}\sum_{k=q}^{nq}\left(P_k - P_{k-q} - q\hat{\mu}\right)^2 \tag{6}$$

with

$$m \equiv q\left(nq - q + 1\right)\left(1 - \left(\frac{q}{nq}\right)\right) \tag{7}$$

If the process follows a random walk then

$$M(q) = \frac{\hat{\sigma}_b^2(q)}{\hat{\sigma}_a^2} - 1 \tag{8}$$

should be close to zero. Then the standard homoscedastic Z_1 statistics is given by:

$$Z_1(q) = \sqrt{nq}\,M(q)\left(\frac{2(2q-1)(q-1)}{3q}\right)^{-1/2} \tag{9}$$

which has an asymptotically standard normal distribution. Let

$$\hat{V}(q) = \sum_{j=1}^{q-1}\left[\frac{2(q-j)}{q}\right]^2 \hat{\delta}(j) \tag{10}$$

and

$$\hat{\delta}(j) = \frac{\sum_{k=j+1}^{nq} \left(P_k - P_{k-1} - \hat{\mu}\right)^2 \cdot \left(P_{k-j} - P_{k-j-1} - \hat{\mu}\right)^2}{\left[\sum_{k=1}^{nq} \left(P_k - P_{k-1} - \hat{\mu}\right)^2\right]^2} \qquad (11)$$

The heteroscedasticity-consistent standard normal test-statistics $Z_2(q)$ is:

$$Z_2(q) \equiv \sqrt{nq}\, M(q) \hat{V}^{-1/2}(q) \qquad (12)$$

which is also asymptotically normal with zero mean and unit variance.

One of the problems found in the use of this statistics is that one can reject and accept the RWH for different investment horizons, which can lead to inconclusive results. Chow and Denning (1993) developed a multiple variance ratio test, which is similar to an F-test as the RWH requires that variance ratios (VR) for all investment horizons (q) be equal to one.

The null of the Chow and Denning (1993) test is given by $H_{0_i} : M(q_i) = 0$ for $i = 1,2,...m$ and the alternative is given by $H_{A_i} : M(q_i) \neq 0$ any i. Any rejection of H_{0_i} will lead to the rejection of the RWH. The appropriate statistics are given by:

$$Z_1^*(q) = \max_{1 \leq i \leq m} |Z_1(q_i)| \qquad (13)$$

for the homoscedastic case and

$$Z_2^*(q) = \max_{1 \leq i \leq m} |Z_2(q_i)| \qquad (14)$$

for the heteroskedastic case.

They use the Studentized Maximum Modulus (SMM) distribution, which has a critical value of 2.491 for the 5 percent level of significance, to test the RWH. We build these statistics for Brazilian stocks that have issued ADRs and there was a long enough

time series.

3.2. Signal Test

In order to test whether there has been a significant change in these statistics we use a nonparametric test. A sign test is developed. We have pairs of z-statistics for the pre and post-issuance of ADRs. If r of these n pairs show one sign, then we could test the hypothesis that half the population pairs have this sign, the appropriate statistic would be:

$$Z_S = \left(|2r - n| - 1\right) / \sqrt{n} \tag{15}$$

which has a standard normal distribution. As we will be using a one-sided tail test the critical value happens to be 1.65.

In the next section we present the empirical evidence on variance ratio statistics for Brazilian ADRs and test whether a substantial change has taken place after the launching of ADRs.

4. Empirical Evidence

In this paper we use daily closing prices, from the Economatica Database, which is a commercial software package, of Brazilian stocks that traded in North-American stock exchanges or OTC markets. The series for stock prices in local currency are adjusted for dividends and bonuses. We compare results with series deflated by U.S. dollar in order to investigate for foreign exchange rate effects.

4.1. Data

We have 70 firms that issued ADRs since 1992. From these 32 were selected as there is enough number of observations in order to control for the power of the test conducted in this experiment. Corporations, which issued ADRs after 1998, were not considered (22 firms). Furthermore, those that issued simultaneously (or almost simultaneously) in the domestic and U.S. markets were not considered also.

Additionally, as Telebras has been privatized and split in 13 companies it was not included in the sample.

In table 1 we present the stocks that were used in this paper and their characteristics. Most stocks are “ON” (common shares) and “PN” (preferred shares) and were issued as type I. Only Aracruz issued type III ADRs.

Companies have a choice of four types of Depositary Receipts (DRs) facilities: unsponsored and three levels of sponsored DRs (levels I, II and III). Unsponsored DRs are issued by one or more depositaries in response to market demand, but without a formal agreement with the company. Sponsored DRs are issued by one depositary appointed by the company under a Deposit Agreement or service contract. Sponsored Depositary Receipts offer control over the facility, the flexibility to list on a U.S. exchange and the ability to raise capital.

A sponsored Level-I Depositary Receipt program is the simplest method for companies to access the U.S. and non-U.S. capital markets. Level-I is traded in the U.S. over-the-counter (“OTC”) market and on some exchanges outside the United States. The company does not have to comply with U.S. Generally Accepted Accounting Principles (“GAAP”) or full Securities and Exchange Commission (“SEC”) disclosure. Essentially, a Sponsored Level-I DR program allows companies to enjoy the benefits of a publicly traded security without changing its current reporting process.

Companies that wish either list their securities on an exchange in the U.S. or raise capital use sponsored Level-II or III Depositary Receipts respectively. These types of DRs can also be listed on some exchanges outside the U.S. Each level requires different SEC registration and reporting, plus adherence to U.S. GAAP. The companies must also meet the listing requirements of the exchange (NYSE or AMEX) or NASDAQ, whichever chooses. Each higher level of Depositary Receipt program generally increases the visibility and attractiveness of the DR.

In addition to the three levels of sponsored DRs programs that trade publicly, a company can also access the U.S. and other markets outside the U.S. through a private placement of sponsored DRs. Through the private placement (Rule 144A), a company can raise capital buy placing DRs with large institutional investors in the United States, avoiding SEC registration and to non-U.S. investors in reliance on Regulation S.

As it is often found in the literature abnormal returns around the beginning of listing dates we use a one-month window before and after the listing. Thus, returns for the first sub-sample were considered only until one month before the listing began and for the post-listing period the series begin one-month after the listing has begun. We also perform a robustness check using the complete series.

4.2. Variance ratio tests

In table 2.a we present results for the entire period using local currency returns. As we can see, using the multiple variance ratio statistic we reject the RWH for 26 stocks if we use the homoscedastic version of the variance ratio statistic. However, when one takes into account that most stocks traded are heteroscedastic we reject the RWH only for 10 stocks.

Table 2.b shows results for the pre-listing period for local currency returns. In this case we reject the RWH for all but one stock in the homoscedastic case. If we allow for heteroscedasticity we reject the RWH for 14 stocks. In table 2.c results for the post-listing period are shown. The RWH is rejected for 24 stocks in the homoscedastic case and for 10 stocks in the heteroscedastic case.

Table 3.a shows results for US$ dollar denominated returns. The RWH is rejected for 29 and for 14 stocks using homoscedastic and heteroscedastic consistent statistics, respectively. Comparing sub-samples we find that we reject the RWH for 27 and 21 stocks for the pre and post-listing periods (homoscedastic version) and for 12 and 11 stocks for the heteroscedastic statistic, respectively.

Evidence so far would suggest that if the difference between these two periods seems to be more pronounced using local currency returns. However, we use a nonparametric test to assess whether there has been a statistically significant change in the variance ratio statistics. We calculated the difference between the multiple variance ratio statistic (in absolute value) of the pre and post-listing periods for the heteroscedastic case for all stocks. If this difference is positive we attributed a positive sign for it and on the contrary a zero was attributed. We then have the statistic given in (15) which allows to test whether there has been a substantial change in the magnitude of these statistics[6].

[6] It is important to notice that this nonparametric statistic allows us to circumvent the problem of the low power of these variance ratio statistic, in testing for differences in the pre and post-listing.

Using local currency denominated returns we found that for 23 stocks out of 32 we had a significant drop in the variance ratio statistics. The Z_S –statistic is given by 2.30 that are high enough to reject the null that there is no significant change. If we use dollar denominated returns the results remain unchanged. Results so far were found using a one-month window before and after the listing. As robustness check we also perform sign tests for the complete series, which includes the two months surrounding the beginning of the listing. In local currency the Z_s is equal to 1.94 while in U.S. dollar denominated returns this statistic is equal to 1.59 (we can only reject the null on a 90% confidence level).

Our results are in line with the findings of Costa Jr. et al (2002), which found a significant change in autocorrelation coefficient for an equally weighted portfolio of Brazilian ADRs after the listing. Although the autocorrelation was significant before the listing (at the 90% confidence level) it lost significance after the listing[7].

Evidence suggests that the Brazilian ADRs experience may be different from that found for other emerging markets. Our main results are in accord with the findings of Martell et al (1999). They found no systematic change in volatility of stocks that followed ADRs listings in the U.S. markets when analyzing many emerging equity markets. However, he only studies Aracruz for the Brazilian stock market and in that case the return variance in the post-listing period divided by the return variance in the pre-listing period is 0.526, which indicates that volatility has significantly decreased in the post-listing period.

5. Conclusions

In this paper we tested whether the cross-listing of Brazilian stocks in the North-American stock market has had any significant change in domestic efficiency. Using a multivariate ratio statistic due to Chow and Denning (1993) and a nonparametric test we have found evidence suggesting that the magnitude of these variance ratio statistics have significantly decreased for the post-listing period, which can be seen as evidence in favor of a price dynamic that resembles more a random walk than in the former period.

[7] They follow Beakert and Harvey (1997) that argue that a standard test for market predictability is the significance of autocorrelation coefficients.

The evidence presented in this paper suggests that the issuance of ADRs has indeed increased domestic market efficiency. Our results are in line with recent literature on the impact of cross listing, which finds evidence of a decrease in volatility, an increase in liquidity and absence of significant autocorrelations after the listing begins.

Further research analyzing other emerging markets and testing whether results remain would be interesting. However, as Hargis (2000) pointed out one should control for differences in stock markets and other issues to test for the impacts of cross listing.

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TABLE 1. Brazilian ADRS

	COMPANY	INITIAL TRADING DATE	LEVEL	SHARE TYPE
1	ACESITA	7/21/94	I	ON
2	ACESITA	7/21/94	I	PN
3	ALPARGATAS	4/7/94	I	ON
4	ALPARGATAS	4/7/94	I	EP
5	ARACRUZ	5/26/92	III	PNB
6	BELGO MINEIRA	11/21/95	I	EP
7	BOMBRIL	5/24/94	I	PN
8	BRADESCO	6/9/97	I	PN
9	BRAHMA	7/23/96	II	ON
10	BRAHMA	7/23/96	II	PN
11	CEMIG	7/15/94	I	PN
12	CESP	2/23/94	I	PN
13	CEVAL	9/22/94	I	EP
14	COPEL	7/23/96	I	ON
15	COPENE	1/12/93	II	EPA
16	ELETROBRÁS	12/21/94	I	ON
17	ELETROBRÁS	12/21/94	I	BN
18	EMBRAER	10/25/96	I	PN
19	EUCATEX	1/11/94	I	PN
20	GERDAU	11/7/97	I	PN
21	IOCHPE-MAXION	5/17/94	I	EP
22	KLABIN	11/17/94	I	PN
23	LOJAS AMERICANAS	6/21/95	I	PN
24	MARCOPOLO	9/24/96	I	PN
25	PERDIGÃO	10/17/96	I	PN
26	PETROBRÁS	11/12/96	I	ON
27	PETROBRÁS	11/12/96	I	PN
28	SUZANO	11/22/93	I	PN
29	TEKA	2/9/94	I	PN
30	USIMINAS 144A e REG S	9/27/94	144-A	PNA
31	VALE	2/17/94	I	PN
32	VOTORANTIM CELULOSE	11/30/92	I	PN

Source: Comissão de Valores Mobiliários (CVM)

Table 2a. Returns in local currency - Closing prices

	q						n
	2	4	8	16	32	64	
Acesita on	1.13178	1.29087	1.35931	1.51734	1.72574	2.34590	2627
	(6.75405) [a]	(7.96888) [a]	(6.22576) [a]	(6.02395) [a]	(5.83147) [a]	(7.55623) [a]	
	(3.21115) [a]	(3.35924) [a]	(2.58667) [a]	(2.54987) [a]	(2.54690) [a]	(3.41355) [a]	
Acesita pn	1.20651	1.35120	1.37347	1.33556	1.53925	2.03071	3275
	(11.81788) [a]	(10.74294) [a]	(7.22536) [a]	(4.36264) [a]	(4.83802) [a]	(6.46108) [a]	
	(4.09917) [a]	(3.56663) [a]	(2.43194) [b]	(1.54158)	(1.82160)	(2.51183) [a]	
Alpargatas on	0.93032	0.85278	0.77880	0.81633	0.97398	1.26820	2467
	(-3.46074) [a]	(-3.90862) [a]	(-3.71425) [a]	(-2.07256) [b]	(-0.20260)	(1.45918)	
	(-1.14722)	(-1.37862)	(-1.39119)	(-0.83805)	(-0.08810)	(0.66654)	
Alpargatas pn	0.99121	0.97967	0.94154	0.87334	0.96544	1.15948	3283
	(-0.50373)	(-0.62265)	(-1.13236)	(-1.64870)	(-0.31048)	(1.00096)	
	(-0.25180)	(-0.31992)	(-0.60626)	(-0.91054)	(-0.17791)	(0.59171)	
Ambev on	1.02523	0.97037	0.76537	0.74459	0.87323	0.97950	2360
	(1.22555)	(-0.76944)	(-3.85329) [a]	(-2.81889) [a]	(-0.96550)	(-0.10908)	
	(0.49198)	(-0.28313)	(-1.40315)	(-1.06897)	(-0.39154)	(-0.04758)	
Ambev pn	0.99904	0.94197	0.74341	0.69529	0.68610	0.61287	3882
	(-0.05952)	(-1.93272)	(-5.40461) [a]	(-4.31310) [a]	(-3.06613) [a]	(-2.64206) [a]	
	(-0.01754)	(-0.55613)	(-1.62165)	(-1.39460)	(-1.07257)	(-1.00472)	
Americanas	1.11564	1.20735	1.43254	1.72787	2.15870	2.35217	3154
	(6.49438) [a]	(6.22457) [a]	(8.21203) [a]	(9.28673) [a]	(10.20170) [a]	(8.31813) [a]	
	(2.39844) [b]	(2.47026) [b]	(3.30159) [a]	(3.85392) [a]	(4.35604) [a]	(3.73681) [a]	
Aracruz	0.95672	0.89823	0.85992	0.82141	0.82091	0.94837	3709
	(-2.63563) [a]	(-3.31304) [a]	(-2.88410) [a]	(-2.47094) [b]	(-1.70990)	(-0.34441)	
	(-0.91224)	(-1.24311)	(-1.17563)	(-1.07130)	(-0.78651)	(-0.16757)	
Belgo	0.99709	1.01108	0.99222	1.02940	1.10711	1.09852	3726
	(-0.17747)	(0.36158)	(-0.16062)	(0.40769)	(1.02502)	(0.65873)	
	(-0.06476)	(0.14265)	(-0.06753)	(0.17692)	(0.45460)	(0.29767)	
Bombril	0.94979	0.91495	0.96322	1.06264	1.20357	1.43997	3253
	(-2.86361) [a]	(-2.59283) [a]	(-0.70917)	(0.81168)	(1.82023)	(2.74868) [a]	
	(-1.18637)	(-1.12388)	(-0.32141)	(0.39384)	(0.92439)	(1.45070)	
Bradesco	1.09576	1.06225	0.96508	0.95559	0.99072	0.76138	3888
	(5.97107) [a]	(2.07480) [b]	(-0.73615)	(-0.62905)	(-0.09075)	(-1.62976)	
	(2.39090) [b]	(0.86870)	(-0.32241)	(-0.28395)	(-0.04194)	(-0.77744)	
Cemig	1.10946	1.09179	0.91819	0.87331	0.84954	0.72391	3836
	(6.77934) [a]	(3.03889) [a]	(-1.71286)	(-1.78266)	(-1.46090)	(-1.87305)	
	(3.57501) [a]	(1.51371)	(-0.84194)	(-0.89238)	(-0.75843)	(-1.01292)	
Cesp pn	1.12382	1.11635	1.02505	0.97257	1.01511	1.05866	3348
	(7.16432) [a]	(3.59848) [a]	(0.48996)	(-0.36062)	(0.13706)	(0.37182)	
	(2.45896) [b]	(1.28829)	(0.18735)	(-0.14667)	(0.06008)	(0.17590)	
Ceval	1.00562	0.98130	0.91715	0.93265	1.08845	1.06375	3659
	(0.34000)	(-0.60447)	(-1.69428)	(-0.92555)	(0.83883)	(0.42243)	
	(0.15448)	(-0.28812)	(-0.84030)	(-0.47982)	(0.44998)	(0.23583)	
Copel on	1.08935	1.09657	1.00936	1.01606	1.03524	0.83563	1814
	(3.80558) [a]	(2.19853) [b]	(0.13480)	(0.15543)	(0.23529)	(-0.76685)	
	(2.57238) [a]	(1.43132)	(0.08463)	(0.10008)	(0.15755)	(-0.54051)	
Copene	1.10334	1.13457	1.13288	1.10036	1.20010	1.38074	3865
	(6.42432) [a]	(4.47190) [a]	(2.79283) [a]	(1.41752)	(1.95021)	(2.59282) [a]	
	(2.74497) [a]	(2.02212) [b]	(1.33743)	(0.70709)	(1.00410)	(1.35468)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 2a (Continuation). Returns in local currency - Closing prices

	q						n
	2	4	8	16	32	64	
Eletrobras on	1.10232	1.14250	0.96144	0.91612	0.85633	0.71790	2213
	(4.81318) [a]	(3.58329) [a]	(-0.61324)	(-0.89642)	(-1.05959)	(-1.45365)	
	(2.92633) [a]	(2.08037) [b]	(-0.36590)	(-0.56549)	(-0.71335)	(-1.03717)	
Eletrobras pn	1.08126	1.10345	0.91044	0.85975	0.81191	0.70398	2821
	(4.31580) [a]	(2.93696) [a]	(-1.60813)	(-1.69227)	(-1.56620)	(-1.72219)	
	(2.15170) [b]	(1.39324)	(-0.78779)	(-0.89279)	(-0.89800)	(-1.06010)	
Embraer	1.04684	1.02292	0.96256	1.06775	1.25831	1.27268	2348
	(2.26953) [b]	(0.59371)	(-0.61323)	(0.74581)	(1.96225) [b]	(1.44730)	
	(0.76112)	(0.21561)	(-0.24700)	(0.32404)	(0.90367)	(0.69545)	
Eucatex	1.10117	1.23365	1.38266	1.65712	2.03665	2.15011	1904
	(4.41471) [a]	(5.44961) [a]	(5.64475) [a]	(6.51411) [a]	(7.09147) [a]	(5.49714) [a]	
	(0.92988)	(1.38601)	(1.75874)	(2.31078) [b]	(2.74503) [a]	(2.42212) [b]	
Gerdau	1.11220	1.17502	1.11051	1.07289	1.11115	1.14910	3102
	(6.24898) [a]	(5.21035) [a]	(2.08076) [b]	(0.92225)	(0.97048)	(0.90961)	
	(2.15123) [b]	(1.90979)	(0.82133)	(0.40163)	(0.45953)	(0.46074)	
Iochpe	1.10814	1.10863	1.10598	1.25944	1.48798	1.90051	2487
	(5.39302) [a]	(2.89568) [a]	(1.78676)	(2.93941) [a]	(3.81511) [a]	(4.91912) [a]	
	(1.47562)	(0.86255)	(0.57961)	(1.05163)	(1.50261)	(2.11022) [b]	
Klabin	0.98445	0.95549	0.93499	0.96168	1.09249	1.36238	3863
	(-0.96624)	(-1.47871)	(-1.36590)	(-0.54113)	(0.90121)	(2.46715) [b]	
	(-0.44526)	(-0.68690)	(-0.65728)	(-0.27246)	(0.47350)	(1.36920)	
Marcopolo	0.85681	0.81756	0.81913	0.79333	0.76975	0.77366	2376
	(-6.97970) [a]	(-4.75333) [a]	(-2.98047) [a]	(-2.28861) [b]	(-1.75949)	(-1.20852)	
	(-3.21538) [a]	(-2.36387) [b]	(-1.59476)	(-1.30777)	(-1.07666)	(-0.78036)	
Perdigao	0.99003	0.93700	0.89930	0.85805	0.84077	0.88177	3497
	(-0.58949)	(-1.99133) [b]	(-2.01307) [b]	(-1.90704)	(-1.47617)	(-0.76582)	
	(-0.28593)	(-1.02407)	(-1.09452)	(-1.08863)	(-0.87583)	(-0.47401)	
Petrobras on	1.07784	1.01536	0.93150	0.94013	0.95584	0.82661	3621
	(4.68382) [a]	(0.49393)	(-1.39356)	(-0.81851)	(-0.41657)	(-1.14290)	
	(2.35101) [b]	(0.22339)	(-0.60515)	(-0.35894)	(-0.18848)	(-0.53498)	
Petrobras pn	1.11996	1.08081	0.98029	1.01969	0.98665	0.74665	3883
	(7.47529) [a]	(2.69177) [a]	(-0.41528)	(0.27880)	(-0.13041)	(-1.72930)	
	(3.68780) [a]	(1.26743)	(-0.19355)	(0.13276)	(-0.06433)	(-0.88629)	
Suzano	0.92029	0.88272	0.91041	1.03191	1.20768	1.53634	3386
	(-4.63806) [a]	(-3.64788) [a]	(-1.76230)	(0.42186)	(1.89458)	(3.41859) [a]	
	(-2.03283) [b]	(-1.64577)	(-0.82729)	(0.20786)	(0.98385)	(1.84136)	
Teka	0.92951	0.86093	0.84731	0.83082	1.02723	1.35352	3597
	(-4.22775) [a]	(-4.45820) [a]	(-3.09576) [a]	(-2.30509) [b]	(0.25603)	(2.32244) [b]	
	(-1.88275)	(-2.03991) [b]	(-1.45414)	(-1.09111)	(0.12062)	(1.10105)	
Usiminas	1.06373	1.06781	0.94218	0.96508	1.12769	1.27458	2438
	(3.14657) [a]	(1.78975)	(-0.96509)	(-0.39171)	(0.98843)	(1.48506)	
	(2.05083) [b]	(1.14137)	(-0.62589)	(-0.26774)	(0.70884)	(1.09693)	
vale	0.99450	0.95433	0.80028	0.76090	0.72502	0.65917	3885
	(-0.34278)	(-1.52168)	(-4.20831) [a]	(-3.38568) [a]	(-2.68697) [a]	(-2.32697) [b]	
	(-0.14979)	(-0.67349)	(-1.90034)	(-1.59742)	(-1.32644)	(-1.18900)	
votorantim	1.06691	1.16293	1.18503	1.06383	1.01348	1.02240	3652
	(4.04350) [a]	(5.26289) [a]	(3.78002) [a]	(0.87627)	(0.12774)	(0.14825)	
	(1.70333)	(2.36854) [b]	(1.84232)	(0.44245)	(0.06570)	(0.07757)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 2b. Returns in local currency - Closing prices - first sub-sample.

	q						n
	2	4	8	16	32	64	
Acesita on	1.14076	1.26005	1.63507	2.28275	2.15839	3.09420	846
	(4.09412) [a]	(4.04299) [a]	(6.24456) [a]	(8.47630) [a]	(5.28214) [a]	(6.67217) [a]	
	(1.45417)	(1.42652)	(2.08134) [b]	(2.66405) [a]	(1.66307)	(2.26259) [b]	
Acesita pn	1.36320	1.83673	2.54425	3.51219	3.03073	3.06072	1467
	(13.91096) [a]	(17.13027) [a]	(19.99536) [a]	(21.85982) [a]	(12.19375) [a]	(8.64566) [a]	
	(3.80617) [a]	(4.63204) [a]	(5.37230) [a]	(5.75354) [a]	(3.24163) [a]	(2.42345) [b]	
Alpargatas on	1.06435	1.15606	1.28001	1.96284	2.80678	2.55763	1649
	(2.61331) [a]	(3.38750) [a]	(3.84392) [a]	(8.88271) [a]	(11.50233) [a]	(6.92847) [a]	
	(0.34328)	(0.46898)	(0.57821)	(1.42891)	(2.04855) [b]	(1.45459)	
Alpargatas pn	1.17156	1.41695	1.92835	2.94614	3.94293	3.78647	1938
	(7.55252) [a]	(9.81126) [a]	(13.81611) [a]	(19.46392) [a]	(20.31075) [a]	(13.43678) [a]	
	(0.87620)	(1.30635)	(2.11294) [b]	(3.15229) [a]	(3.51957) [a]	(2.70996) [a]	
Ambev on	0.96747	0.76956	0.74008	0.85586	1.13827	1.68961	1257
	(-1.15323)	(-4.36707) [a]	(-3.11538) [a]	(-1.16097)	(0.76853)	(2.67814) [a]	
	(-0.63101)	(-2.08583) [b]	(-1.46799)	(-0.55767)	(0.38299)	(1.38892)	
Ambev pn	1.17630	1.19320	1.01033	1.10451	1.38493	1.59861	2556
	(8.91314) [a]	(5.22100) [a]	(0.17662)	(1.20037)	(3.05094) [a]	(3.31505) [a]	
	(3.13698) [a]	(1.93770)	(0.06809)	(0.47811)	(1.28849)	(1.47603)	
Americanas	1.11031	1.22275	1.28613	1.56830	2.14988	2.58162	1610
	(4.42601) [a]	(4.77738) [a]	(3.88119) [a]	(5.18050) [a]	(7.23325) [a]	(6.95150) [a]	
	(1.66693)	(1.94291)	(1.61240)	(2.16226) [b]	(3.08672) [a]	(3.00090) [a]	
Aracruz	1.23089	1.72554	2.18379	2.60781	3.14213	3.70524	1406
	(8.65772) [a]	(14.54181) [a]	(15.00594) [a]	(13.69641) [a]	(12.59241) [a]	(11.11124) [a]	
	(1.69790)	(2.92633) [a]	(3.17912) [a]	(3.15057) [a]	(3.24489) [a]	(3.15328) [a]	
Belgo	1.00954	1.01687	1.00934	1.11678	1.33070	1.70977	2338
	(0.46148)	(0.43589)	(0.15272)	(1.28280)	(2.50685) [a]	(3.75927) [a]	
	(0.14020)	(0.12740)	(0.04553)	(0.39641)	(0.82125)	(1.30633)	
Bombril	0.96228	0.77722	0.77783	1.19723	2.05832	2.86221	1597
	(-1.50735)	(-4.75872) [a]	(-3.00144) [a]	(1.79065)	(6.63037) [a]	(8.15165) [a]	
	(-0.31955)	(-1.06572)	(-0.68015)	(0.40699)	(1.56422)	(2.07518) [b]	
Bradesco	1.06925	1.01230	0.90636	0.93793	1.04469	1.09912	2776
	(3.64860) [a]	(0.34637)	(-1.66791)	(-0.74300)	(0.36914)	(0.57207)	
	(1.31618)	(0.12824)	(-0.67955)	(-0.33329)	(0.17746)	(0.28772)	
Cemig	1.25978	1.63199	2.05920	2.22893	1.45226	1.80403	2012
	(11.65242) [a]	(15.15265) [a]	(16.06153) [a]	(12.52339) [a]	(3.18032) [a]	(3.95047) [a]	
	(2.03856) [b]	(2.81384) [a]	(3.22418) [a]	(2.59717) [a]	(0.67699)	(0.92281)	
Cesp pn	1.23051	1.54094	1.67900	1.51506	1.36625	1.75388	1439
	(8.74438) [a]	(10.96848) [a]	(8.70754) [a]	(4.43880) [a]	(2.17811) [b]	(3.13254) [a]	
	(1.43545)	(1.89494)	(1.67517)	(0.98063)	(0.56292)	(0.94089)	
Ceval	1.25748	1.65417	1.92663	2.58974	4.36347	6.35737	2089
	(11.76819) [a]	(15.98182) [a]	(14.31771) [a]	(16.50722) [a]	(24.10051) [a]	(26.82159) [a]	
	(2.55466) [a]	(3.50446) [a]	(3.16465) [a]	(3.83243) [a]	(5.89039) [a]	(6.84355) [a]	
Copel on	0.97913	0.90226	0.81702	0.75343	0.70579	0.87202	514
	(-0.47305)	(-1.18450)	(-1.40240)	(-1.26999)	(-1.04569)	(-0.31783)	
	(-0.37168)	(-0.98989)	(-1.24686)	(-1.17002)	(-0.97923)	(-0.30195)	
Copene	0.98495	1.07181	1.13834	1.14914	1.36765	1.89728	1691
	(-0.61902)	(1.57846)	(1.92314)	(1.39332)	(2.37017) [b]	(4.04170) [a]	
	(-0.18989)	(0.51165)	(0.66150)	(0.48041)	(0.82877)	(1.44580)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 2b (Contin.). Returns in local currency - Closing prices - first sub-sample.

	q						n
	2	4	8	16	32	64	
Eletrobras on	1.16948	1.13413	0.98931	1.22306	1.57674	1.99284	496
	(3.77461) [a]	(1.59674)	(-0.08050)	(1.12860)	(2.01368) [b]	(2.42206) [b]	
	(1.88205)	(0.81340)	(-0.04213)	(0.60671)	(1.10656)	(1.38023)	
Eletrobras pn	1.18435	1.15035	1.03588	1.35275	1.78985	2.29022	1104
	(6.12515) [a]	(2.67018) [a]	(0.40301)	(2.66277) [a]	(4.11432) [a]	(4.69584) [a]	
	(2.27168) [b]	(0.97208)	(0.14483)	(0.97800)	(1.53979)	(1.80675)	
Embraer	0.94203	0.82308	0.67291	0.61880	0.63491	0.78666	1288
	(-2.08030) [b]	(-3.39383) [a]	(-3.96845) [a]	(-3.10804) [a]	(-2.05410) [b]	(-0.83868)	
	(-0.56266)	(-1.02667)	(-1.32696)	(-1.11095)	(-0.77756)	(-0.31892)	
Eucatex	1.46851	2.06133	3.31314	5.34792	5.62775	4.79213	1244
	(16.52459) [a]	(20.00912) [a]	(27.58092) [a]	(34.83944) [a]	(25.58878) [a]	(14.65065) [a]	
	(2.19782) [a]	(2.87243) [a]	(4.42393) [a]	(5.91785) [a]	(4.96042) [a]	(3.51804) [a]	
Gerdau	1.06078	1.16133	1.18866	1.17501	1.24369	1.74296	2100
	(2.78549) [a]	(3.95165) [a]	(2.92268) [a]	(1.82199)	(1.75075)	(3.72938) [a]	
	(1.23734)	(1.74707)	(1.30389)	(0.83265)	(0.82602)	(1.81060)	
Iochpe	1.32687	1.61022	1.76724	1.92827	2.68568	3.36965	1117
	(10.92448) [a]	(10.90127) [a]	(8.66871) [a]	(7.04826) [a]	(8.83226) [a]	(8.67509) [a]	
	(2.36349) [b]	(2.36742) [b]	(1.91453)	(1.63544)	(2.17176) [b]	(2.34827) [b]	
Klabin	1.23881	1.43362	1.73990	2.19047	3.13247	4.53575	2129
	(11.01883) [a]	(10.69447) [a]	(11.54143) [a]	(12.47914) [a]	(15.42553) [a]	(17.87033) [a]	
	(1.57743)	(1.77293)	(2.18105) [b]	(2.65789) [a]	(3.72551) [a]	(4.87106) [a]	
Marcopolo	1.00406	1.11382	1.37614	1.51843	1.55137	1.74089	1340
	(0.14852)	(2.22704) [b]	(4.65477) [a]	(4.31142) [a]	(3.16419) [a]	(2.97078) [a]	
	(0.04855)	(0.78085)	(1.64515)	(1.53857)	(1.14725)	(1.12929)	
Perdigão	1.07852	1.03264	0.97503	1.07035	1.09529	1.36088	2267
	(3.73843) [a]	(0.83066)	(-0.40200)	(0.76098)	(0.71128)	(1.88216)	
	(1.11061)	(0.25313)	(-0.12634)	(0.25495)	(0.25503)	(0.71691)	
Petrobras on	0.89122	0.83154	0.80982	0.81394	0.80839	0.88201	2375
	(-5.30114) [a]	(-4.38817) [a]	(-3.13317) [a]	(-2.06003) [b]	(-1.46392)	(-0.62988)	
	(-1.38814)	(-1.30019)	(-1.03922)	(-0.74980)	(-0.55119)	(-0.24832)	
Petrobras pn	1.10928	1.08226	0.96808	1.07091	1.26769	1.64694	2637
	(5.61195) [a]	(2.25782) [b]	(-0.55416)	(0.82721)	(2.15508) [b]	(3.63901) [a]	
	(2.40258) [b]	(0.87296)	(-0.20998)	(0.31957)	(0.84950)	(1.46078)	
Suzano	1.28724	1.70248	2.03094	2.52519	3.72511	4.89019	1739
	(11.97816) [a]	(15.65846) [a]	(14.53378) [a]	(14.44955) [a]	(17.81574) [a]	(17.76988) [a]	
	(2.98642) [a]	(3.59805) [a]	(3.48804) [a]	(3.63719) [a]	(4.68979) [a]	(5.04764) [a]	
Teka	1.11693	1.33189	1.38662	1.52291	2.04164	3.05820	1855
	(5.03622) [a]	(7.64071) [a]	(5.62921) [a]	(5.11658) [a]	(7.03327) [a]	(9.71010) [a]	
	(1.31337)	(1.73278)	(1.27214)	(1.21359)	(1.78888)	(2.65911) [a]	
Usiminas	1.29147	1.47261	1.29833	1.40774	1.95287	3.31423	665
	(7.51618) [a]	(6.51454) [a]	(2.60079) [a]	(2.38877) [b]	(3.85226) [a]	(6.53705) [a]	
	(2.69743) [a]	(2.55365) [a]	(1.08011)	(1.04558)	(1.74480)	(3.06553) [a]	
Vale	1.17034	1.67273	2.20055	2.60917	2.86235	3.45084	1960
	(7.54134)	(15.91973) [a]	(17.96821) [a]	(16.18490) [a]	(12.92587) [a]	(11.88519) [a]	
	(1.48911)	(3.01176) [a]	(3.31070) [a]	(3.11545) [a]	(2.78262) [a]	(2.90187) [a]	
Votorantim	0.89633	0.88786	0.80940	0.86712	1.00399	1.10676	1543
	(-4.07229) [a]	(-2.35466) [b]	(-2.53108) [a]	(-1.18579)	(0.02458)	(0.45934)	
	(-1.10661)	(-0.70324)	(-0.77123)	(-0.35906)	(0.00765)	(0.14733)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 2c. Returns in local currency - Closing prices - second sub-sample.

	q						n
	2	4	8	16	32	64	
Acesita on	1.10758	1.23615	1.20799	1.24746	1.13061	1.12373	1738
	(4.48509) [a]	(5.26228) [a]	(2.93132) [a]	(2.34372) [b]	(0.85361)	(0.56502)	
	(2.39305) [b]	(2.40019) [b]	(1.30620)	(1.06751)	(0.40429)	(0.28063)	
Acesita pn	1.18033	1.30388	1.19473	0.98847	0.97460	0.96709	1765
	(7.57581) [a]	(6.82400) [a]	(2.76569) [a]	(-0.11002)	(-0.16730)	(-0.15143)	
	(3.21738) [a]	(2.71899) [a]	(1.11210)	(-0.04656)	(-0.07625)	(-0.07253)	
Alpargatas on	0.92525	0.79367	0.57590	0.45609	0.44841	0.51053	775
	(-2.08087) [b]	(-3.07031) [a]	(-3.99132) [a]	(-3.43998) [a]	(-2.40733) [b]	(-1.49259)	
	(-1.10008)	(-1.75351)	(-2.46304) [b]	(-2.36200) [b]	(-1.84165)	(-1.21877)	
Alpargatas pn	0.98291	0.96860	0.91678	0.79405	0.76479	0.73609	1302
	(-0.61650)	(-0.60564)	(-1.01518)	(-1.68827)	(-1.33057)	(-1.04309)	
	(-0.47754)	(-0.48230)	(-0.84249)	(-1.44600)	(-1.18536)	(-0.96285)	
Ambev on	1.02719	0.97681	0.76834	0.74761	0.87941	0.97622	1060
	(0.88512)	(-0.40353)	(-2.54972) [a]	(-1.86684)	(-0.61551)	(-0.08481)	
	(0.51537)	(-0.21554)	(-1.34772)	(-1.02779)	(-0.36250)	(-0.05374)	
Ambev pn	0.99666	0.93883	0.73978	0.69122	0.67840	0.58283	1283
	(-0.11970)	(-1.17113)	(-3.15100) [a]	(-2.51273) [a]	(-1.80594)	(-1.63678)	
	(-0.06043)	(-0.57681)	(-1.61804)	(-1.39038)	(-1.08119)	(-1.06547)	
Americanas	1.11553	1.19924	1.47154	1.79263	2.19254	2.38361	1501
	(4.47601) [a]	(4.12596) [a]	(6.17594) [a]	(6.97658) [a]	(7.24324) [a]	(5.87175) [a]	
	(1.96290) [b]	(1.94517)	(2.94877) [a]	(3.44763) [a]	(3.68688) [a]	(3.15770) [a]	
Aracruz	0.95664	0.89789	0.85929	0.81997	0.81918	0.94783	2260
	(-2.06114) [b]	(-2.59461) [a]	(-2.26140) [b]	(-1.94434)	(-1.34764)	(-0.27165)	
	(-0.91383)	(-1.24690)	(-1.18068)	(-1.07985)	(-0.79417)	(-0.16934)	
Belgo	0.99558	1.01190	0.99304	1.02322	1.08979	1.03421	1345
	(-0.16200)	(0.23324)	(-0.08628)	(0.19345)	(0.51624)	(0.13743)	
	(-0.08612)	(0.13492)	(-0.05333)	(0.12340)	(0.33577)	(0.09086)	
Bombril	0.94924	0.89894	0.93951	1.01462	1.11543	1.20920	1613
	(-2.03856) [b]	(-2.16958) [b]	(-0.82130)	(0.13337)	(0.72678)	(0.92032)	
	(-1.16498)	(-1.29748)	(-0.51427)	(0.08948)	(0.51083)	(0.67355)	
Bradesco	1.09765	1.06481	0.96659	0.95844	1.00971	0.78529	1069
	(3.19278) [a]	(1.13259)	(-0.36925)	(-0.30873)	(0.04975)	(-0.76895)	
	(2.28230) [b]	(0.84671)	(-0.28865)	(-0.24866)	(0.04102)	(-0.65452)	
Cemig	1.10679	1.08972	0.91186	0.85721	0.82382	0.68607	1781
	(4.50689) [a]	(2.02399) [b]	(-1.25753)	(-1.36903)	(-1.16563)	(-1.45120)	
	(3.43677) [a]	(1.45738)	(-0.89345)	(-0.99060)	(-0.87484)	(-1.13481)	
Cesp pn	1.12363	1.11722	1.02669	0.97616	1.02235	1.07663	1866
	(5.34028) [a]	(2.70663) [a]	(0.38975)	(-0.23401)	(0.15138)	(0.36257)	
	(2.44647) [b]	(1.29330)	(0.19890)	(-0.12702)	(0.08856)	(0.22892)	
Ceval	0.97121	0.93003	0.86256	0.87104	0.93628	0.75348	1527
	(-1.12518)	(-1.46148)	(-1.81569)	(-1.14483)	(-0.39033)	(-1.05522)	
	(-0.75736)	(-1.03460)	(-1.33542)	(-0.87826)	(-0.31036)	(-0.87737)	
Copel on	1.09995	1.11529	1.02763	1.05724	1.09434	0.87442	1257
	(3.54365) [a]	(2.18483) [b]	(0.33111)	(0.46104)	(0.52435)	(-0.48771)	
	(2.59670) [a]	(1.53816)	(0.22432)	(0.32028)	(0.37897)	(-0.37134)	
Copene	1.10363	1.13541	1.13475	1.10447	1.21038	1.40314	2131
	(4.78389) [a]	(3.34119) [a]	(2.10293) [b]	(1.09566)	(1.52256)	(2.03852) [b]	
	(2.75489) [a]	(2.03558) [b]	(1.35633)	(0.73594)	(1.05545)	(1.43398)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 2c (Cont.). Returns in local currency - Closing prices - second sub-sample.

	q						n
	2	4	8	16	32	64	
Eletrobras on	1.09832	1.14217	0.95529	0.89539	0.79768	0.60294	1674
	(4.02288) [a]	(3.10916) [a]	(-0.61848)	(-0.97240)	(-1.29775)	(-1.77949)	
	(2.61517) [a]	(1.92636)	(-0.39406)	(-0.65595)	(-0.93684)	(-1.36707)	
Eletrobras pn	1.07553	1.10196	0.90697	0.84422	0.76990	0.62986	1674
	(3.09030) [a]	(2.22976) [b]	(-1.28673)	(-1.44798)	(-1.47592)	(-1.65884)	
	(1.88948)	(1.29621)	(-0.77284)	(-0.93745)	(-1.04007)	(-1.25772)	
Embraer	1.10168	1.12840	1.11763	1.31683	1.63048	1.60027	1017
	(3.24277) [a]	(2.18881) [b]	(1.26815)	(2.29544) [b]	(3.15213) [a]	(2.09688) [b]	
	(1.32167)	(0.95215)	(0.61330)	(1.20328)	(1.75269)	(1.23882)	
Eucatex	1.10299	1.24044	1.40117	1.70762	2.15350	2.31304	617
	(2.55820) [a]	(3.19238) [a]	(3.36874) [a]	(3.99318) [a]	(4.49190) [a]	(3.57260) [a]	
	(0.94427)	(1.42284)	(1.83934)	(2.48229) [b]	(3.04705) [a]	(2.75858) [a]	
Gerdau	1.10637	1.15596	1.10377	1.05498	1.11080	1.17572	959
	(3.29395) [a]	(2.58160) [a]	(1.08632)	(0.38682)	(0.53791)	(0.59607)	
	(1.87812)	(1.57008)	(0.71253)	(0.28040)	(0.42395)	(0.50204)	
Iochpe	1.07719	1.02001	0.96701	0.98742	0.97913	0.85699	1327
	(2.81202) [a]	(0.38964)	(-0.40628)	(-0.10414)	(-0.11918)	(-0.57065)	
	(0.97272)	(0.14687)	(-0.16722)	(-0.04774)	(-0.06076)	(-0.31973)	
Klabin	0.96554	0.91729	0.89200	0.89126	0.98774	1.20010	1691
	(-1.41700)	(-1.81799) [*]	(-1.50132)	(-1.01585)	(-0.07907)	(0.90133)	
	(-0.94015)	(-1.20787)	(-1.03169)	(-0.72911)	(-0.05905)	(0.71186)	
Marcopolo	0.82754	0.75790	0.70328	0.63954	0.61146	0.60599	993
	(-5.43452) [a]	(-4.07784) [a]	(-3.16091) [a]	(-2.58052) [a]	(-1.91947)	(-1.36003)	
	(-3.32880) [a]	(-2.69619) [a]	(-2.26839) [b]	(-1.99645) [b]	(-1.60676)	(-1.20379)	
Perdigão	0.97497	0.92294	0.89426	0.83116	0.81721	0.84037	1187
	(-0.86237)	(-1.41912)	(-1.23153)	(-1.32153)	(-0.98730)	(-0.60242)	
	(-0.62915)	(-1.10287)	(-1.01522)	(-1.14099)	(-0.88222)	(-0.56026)	
Petrobras on	1.08610	1.02338	0.93619	0.94327	0.95562	0.78991	1203
	(2.98639) [a]	(0.43337)	(-0.74821)	(-0.44704)	(-0.24130)	(-0.79818)	
	(2.50878) [a]	(0.32722)	(-0.54222)	(-0.32723)	(-0.18233)	(-0.62416)	
Petrobras pn	1.12143	1.08179	0.98354	1.02111	0.97555	0.67297	1203
	(4.21164) [a]	(1.51631)	(-0.19297)	(0.16637)	(-0.13294)	(-1.24245)	
	(3.52382) [a]	(1.21028)	(-0.15242)	(0.13431)	(-0.11126)	(-1.08129)	
Suzano	0.92051	0.88337	0.91211	1.03718	1.22276	1.57075	1604
	(-3.18358) [a]	(-2.49668) [a]	(-1.18994)	(0.33827)	(1.39867)	(2.50387) [a]	
	(-2.02794) [b]	(-1.63658)	(-0.81139)	(0.24204)	(1.05461)	(1.95817) [b]	
Teka	0.92567	0.85265	0.83419	0.80922	0.98990	1.27550	1699
	(-3.06379) [a]	(-3.24639) [a]	(-2.31053) [b]	(-1.78653)	(-0.06528)	(1.24390)	
	(-1.96607) [b]	(-2.14089) [b]	(-1.56440)	(-1.21909)	(-0.04433)	(0.85023)	
Usiminas	1.05519	1.05041	0.93434	0.94543	1.08164	1.12557	1730
	(2.29543) [b]	(1.12075)	(-0.92328)	(-0.51564)	(0.53235)	(0.57209)	
	(1.66173)	(0.79167)	(-0.66243)	(-0.39086)	(0.42548)	(0.47269)	
Vale	0.99427	0.95384	0.79829	0.75647	0.71643	0.63769	1882
	(-0.24852)	(-1.07040)	(-2.95820) [a]	(-2.40014) [b]	(-1.92861)	(-1.72170)	
	(-0.15567)	(-0.67944)	(-1.91678)	(-1.62551)	(-1.36660)	(-1.26266)	
Votorantim	1.06690	1.16297	1.18520	1.06357	1.01357	1.02312	2066
	(3.04098) [a]	(3.95952) [a]	(2.84579) [a]	(0.65648)	(0.09668)	(0.11512)	
	(1.70228)	(2.36792) [b]	(1.84340)	(0.44060)	(0.06609)	(0.08006)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 3a. Returns in US$ dollars - Closing prices

	q						n
	2	4	8	16	32	64	
Acesita on	0.98745	1.07140	1.13873	1.10890	1.22983	1.07709	2627
	(-0.64317)	(1.95600)	(2.40387) [b]	(1.26810)	(1.84671)	(0.43280)	
	(-0.20746)	(0.67906)	(0.88962)	(0.48154)	(0.71072)	(0.16882)	
Acesita pn	1.03382	1.04362	1.00549	1.05211	1.22351	1.38359	3275
	(1.93532)	(1.33419)	(0.10618)	(0.67750)	(2.00531) [b]	(2.40458) [b]	
	(0.56221)	(0.34876)	(0.02743)	(0.17499)	(0.53697)	(0.68468)	
Alpargatas on	1.04318	1.05135	1.10921	1.15482	1.13869	0.83203	2467
	(2.14453) [b]	(1.36320)	(1.83379)	(1.74698)	(1.07993)	(-0.91384)	
	(0.84206)	(0.60655)	(0.96387)	(0.99944)	(0.64257)	(-0.56567)	
Alpargatas pn	1.07648	1.23019	1.39623	1.59239	1.64576	1.20763	3283
	(4.38203) [a]	(7.05013) [a]	(7.67507) [a]	(7.71122) [a]	(5.80065) [a]	(1.30310)	
	(2.13796) [b]	(3.27875) [a]	(3.54233) [a]	(3.67907) [a]	(2.84101) [a]	(0.67584)	
Ambev on	1.02708	0.98926	0.84390	0.78507	0.88194	0.90350	2360
	(1.31562)	(-0.27897)	(-2.56363) [a]	(-2.37213) [b]	(-0.89917)	(-0.51353)	
	(0.78733)	(-0.15659)	(-1.39828)	(-1.31759)	(-0.52216)	(-0.31346)	
Ambev pn	1.06532	1.04140	0.89537	0.83045	0.84400	0.68914	3882
	(4.06990) [a]	(1.37882)	(-2.20391) [b]	(-2.40000) [b]	(-1.52380)	(-2.12156) [b]	
	(1.77798)	(0.58924)	(-0.95302)	(-1.08356)	(-0.72475)	(-1.06250)	
Americanas	1.11782	1.18269	1.14175	1.04740	1.10195	1.00679	3154
	(6.61656) [a]	(5.48416) [a]	(2.69123) [a]	(0.60472)	(0.89759)	(0.04179)	
	(2.32405) [b]	(2.18555) [b]	(1.19390)	(0.30172)	(0.49291)	(0.02476)	
Aracruz	1.08327	1.14143	1.11338	1.07350	0.89128	0.84318	3709
	(5.07113) [a]	(4.60390) [a]	(2.33427) [b]	(1.01690)	(-1.03800)	(-1.04618)	
	(2.47537) [b]	(2.46427) [b]	(1.32597)	(0.59129)	(-0.62709)	(-0.67454)	
Belgo	1.09480	1.14519	1.11835	1.13606	1.11553	0.98952	3726
	(5.78646) [a]	(4.73726) [a]	(2.44222) [b]	(1.88688)	(1.10558)	(-0.07008)	
	(3.10762) [a]	(2.49506) [a]	(1.24147)	(0.93848)	(0.56498)	(-0.03695)	
Bombril	1.02735	0.98947	0.80136	0.70616	0.68440	0.69667	3253
	(1.55990)	(-0.32088)	(-3.83004) [a]	(-3.80740) [a]	(-2.82196) [a]	(-1.89504)	
	(0.76937)	(-0.16317)	(-2.06660) [b]	(-2.20575) [b]	(-1.73796)	(-1.22058)	
Bradesco	1.13917	1.14837	1.08093	1.07195	1.06464	0.82344	3888
	(8.67778) [a]	(4.94499) [a]	(1.70589)	(1.01927)	(0.63189)	(-1.20595)	
	(4.41253) [a]	(2.53420) [a]	(0.90392)	(0.56790)	(0.36864)	(-0.73657)	
Cemig	1.13519	1.14029	1.00204	0.95960	0.94167	0.74367	3836
	(8.37323) [a]	(4.64454) [a]	(0.04282)	(-0.56842)	(-0.56638)	(-1.73902)	
	(4.61210) [a]	(2.40161) [b]	(0.02166)	(-0.29397)	(-0.30702)	(-0.99064)	
Cesp pn	1.15699	1.18770	1.11019	1.05089	1.15799	1.03611	3348
	(9.08366) [a]	(5.80521) [a]	(2.15547) [b]	(0.66898)	(1.43312)	(0.22888)	
	(4.18869) [a]	(2.70522) [a]	(1.05716)	(0.34733)	(0.78742)	(0.13445)	
Ceval	1.06968	1.09269	1.04897	1.00856	0.97851	0.89245	3659
	(4.21510) [a]	(2.99681) [a]	(1.00130)	(0.11766)	(-0.20377)	(-0.71261)	
	(1.87854)	(1.31542)	(0.45792)	(0.05744)	(-0.10521)	(-0.39005)	
Copel on	1.07798	1.11564	1.07994	1.11211	1.12921	0.91255	1814
	(3.32107) [a]	(2.63259) [a]	(1.15108)	(1.08474)	(0.86275)	(-0.40797)	
	(2.29566) [b]	(1.79331)	(0.75400)	(0.72121)	(0.60246)	(-0.30243)	
Copene	1.15859	1.25124	1.27097	1.29019	1.31367	1.23978	3865
	(9.85966) [a]	(8.34887) [a]	(5.69487) [a]	(4.09860) [a]	(3.05717) [a]	(1.63284)	
	(4.49525) [a]	(3.97540) [a]	(2.93057) [a]	(2.31591) [b]	(1.85325)	(1.05022)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 3a (Continuation). Returns in US$ dollars - Closing prices

	q						n
	2	4	8	16	32	64	
Eletrobras on	1.12241	1.15077	0.98681	0.95276	0.91175	0.74924	2213
	(5.75840) [a]	(3.79112) [a]	(-0.20982)	(-0.50491)	(-0.65082)	(-1.29216)	
	(3.57214) [a]	(2.22666) [b]	(-0.12556)	(-0.31774)	(-0.43511)	(-0.91503)	
Eletrobras pn	1.12443	1.16912	1.03278	1.03205	0.95466	0.77036	2821
	(6.60868) [a]	(4.80127) [a]	(0.58854)	(0.38674)	(-0.37752)	(-1.33599)	
	(3.60876) [a]	(2.44625) [b]	(0.30578)	(0.21497)	(-0.22772)	(-0.87051)	
Embraer	1.40503	1.62866	1.02456	0.81374	0.52953	0.32967	2348
	(19.62608) [a]	(16.28294) [a]	(0.40234)	(-2.05045) [b]	(-3.57398) [a]	(-3.55794) [a]	
	(2.00917) [b]	(1.78913)	(0.04658)	(-0.26974)	(-0.57677)	(-0.73232)	
Eucatex	1.17874	1.31815	1.42674	1.48639	1.50358	1.24544	1904
	(7.79949) [a]	(7.42056) [a]	(6.29498) [a]	(4.82165) [a]	(3.44484) [a]	(1.17311)	
	(3.24504) [a]	(3.61902) [a]	(3.61780) [a]	(3.14637) [a]	(2.41231) [b]	(0.87638)	
Gerdau	1.12821	1.23586	1.22592	1.23010	1.32090	1.27488	3102
	(7.14092) [a]	(7.02175) [a]	(4.25375) [a]	(2.91147) [a]	(2.80192) [a]	(1.67697)	
	(3.54057) [a]	(3.69170) [a]	(2.37158) [b]	(1.74203)	(1.78875)	(1.14737)	
Iochpe	1.11128	1.14523	1.11793	1.05803	1.03026	1.08067	2487
	(5.54928) [a]	(3.87123) [a]	(1.98815) [b]	(0.65751)	(0.23655)	(0.44069)	
	(2.28911) [b]	(1.67006)	(0.89093)	(0.31151)	(0.11919)	(0.23721)	
Klabin	1.13883	1.23244	1.24114	1.18267	1.01862	0.90980	3863
	(8.62877) [a]	(7.72215) [a]	(5.06669) [a]	(2.57938) [a]	(0.18143)	(-0.61407)	
	(2.49422) [a]	(2.68636) [a]	(2.18765) [b]	(1.30824)	(0.10084)	(-0.36146)	
Marcopolo	0.60693	0.48491	0.41556	0.37530	0.33228	0.28512	2376
	(-19.15992) [a]	(-13.42070) [a]	(-9.63068) [a]	(-6.91785) [a]	(-5.10255) [a]	(-3.81700) [a]	
	(-6.37152) [a]	(-4.48624) [a]	(-3.33841) [a]	(-2.52831) [a]	(-1.95705)	(-1.54937)	
Perdigão	1.19475	1.19908	1.11811	0.91171	0.81086	0.59678	3497
	(11.51667) [a]	(6.29270) [a]	(2.36115) [b]	(-1.18616)	(-1.75349)	(-2.61191) [a]	
	(1.85156)	(1.04967)	(0.42680)	(-0.24395)	(-0.41639)	(-0.72344)	
Petrobras on	1.05473	1.01189	0.97872	1.00944	1.05629	0.94377	3621
	(3.29307) [a]	(0.38235)	(-0.43280)	(0.12908)	(0.53106)	(-0.37066)	
	(1.77207)	(0.20185)	(-0.22711)	(0.07087)	(0.30921)	(-0.22339)	
Petrobras pn	1.12495	1.10088	1.04073	1.09018	1.12434	0.95372	3883
	(7.78613) [a]	(3.35996) [a]	(0.85801)	(1.27660)	(1.21466)	(-0.31589)	
	(4.21510) [a]	(1.75336)	(0.44763)	(0.69873)	(0.70878)	(-0.19412)	
Suzano	1.06118	1.08092	1.10237	1.08029	0.95257	0.88786	3386
	(3.55986) [a]	(2.51677) [a]	(2.01370) [b]	(1.06137)	(-0.43272)	(-0.71480)	
	(1.55401)	(1.22652)	(1.08946)	(0.62444)	(-0.27715)	(-0.49284)	
Teka	1.14948	1.22978	1.41518	1.81309	1.97842	1.20703	3597
	(8.96519) [a]	(7.36632) [a]	(8.41783) [a]	(11.07864) [a]	(9.19949) [a]	(1.36009)	
	(1.59147)	(1.37651)	(1.71858)	(2.27093) [b]	(1.90337)	(0.30182)	
Usiminas	1.08473	1.09659	0.90689	0.81876	0.81741	0.86166	2438
	(4.18365) [a]	(2.54914) [a]	(-1.55420)	(-2.03301) [b]	(-1.41339)	(-0.74824)	
	(2.71163) [a]	(1.60642)	(-0.97921)	(-1.32454)	(-0.96250)	(-0.52928)	
Vale	1.01918	0.97855	0.86181	0.83856	0.79808	0.72152	3885
	(1.19565)	(-0.71476)	(-2.91186) [a]	(-2.28609) [b]	(-1.97305) [b]	(-1.90128)	
	(0.68334)	(-0.42101)	(-1.76909)	(-1.45614)	(-1.31602)	(-1.33061)	
Votorantim	1.06495	1.09494	1.09124	1.06364	1.03329	0.87507	3652
	(3.92518) [a]	(3.06691) [a]	(1.86403)	(0.87368)	(0.31543)	(-0.82699)	
	(2.37105) [b]	(1.93404)	(1.23429)	(0.59662)	(0.21890)	(-0.58817)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 3b. Returns in US$ dollars - Closing prices - first sub-sample.

	q						n
	2	4	8	16	32	64	
Acesita on	0.98386	1.06816	1.14378	1.12581	1.28590	1.16938	846
	(-0.46933)	(1.05965)	(1.41379)	(0.83134)	(1.30368)	(0.53964)	
	(-0.25897)	(0.62941)	(0.89532)	(0.54024)	(0.85860)	(0.36020)	
Acesita pn	1.02403	1.02733	0.99185	1.05952	1.25389	1.44627	1467
	(0.92041)	(0.55960)	(-0.10551)	(0.51789)	(1.52449)	(1.87231)	
	(0.37815)	(0.20681)	(-0.03853)	(0.18906)	(0.57691)	(0.75347)	
Alpargatas on	1.05282	1.06994	1.14466	1.19220	1.18615	0.87048	1649
	(2.14510) [b]	(1.51806)	(1.98590) [b]	(1.77312)	(1.18508)	(-0.57611)	
	(0.94112)	(0.75611)	(1.17302)	(1.14255)	(0.79470)	(-0.40235)	
Alpargatas pn	1.08073	1.25687	1.46398	1.71692	1.80136	1.30493	1938
	(3.55405) [a]	(6.04444) [a]	(6.90506) [a]	(7.17008) [a]	(5.53059) [a]	(1.47040)	
	(1.97147) [b]	(3.18901) [a]	(3.61208) [a]	(3.87876) [a]	(3.07179) [a]	(0.86605)	
Ambev on	0.99074	0.86079	0.75440	0.70710	0.63613	0.56256	1257
	(-0.32836)	(-2.63823) [a]	(-2.94364) [a]	(-2.35917) [b]	(-2.02246) [b]	(-1.69882)	
	(-0.23946)	(-1.87276)	(-2.16186) [b]	(-1.80047)	(-1.58364)	(-1.36308)	
Ambev pn	1.14029	1.15527	0.96658	0.87504	0.86985	0.71931	2556
	(7.09283) [a]	(4.19599) [a]	(-0.57127)	(-1.43532)	(-1.03155)	(-1.55443)	
	(3.90819) [a]	(2.37081) [b]	(-0.33347)	(-0.86544)	(-0.65612)	(-1.04018)	
Americanas	1.10372	1.14648	1.00688	0.80324	0.77030	0.58631	1610
	(4.16192) [a]	(3.14170) [a]	(0.09333)	(-1.79359)	(-1.44494)	(-1.81823)	
	(1.52698)	(1.31431)	(0.04377)	(-0.95417)	(-0.85320)	(-1.16241)	
Aracruz	1.22341	1.45086	1.51198	1.48218	0.98769	0.79502	1406
	(8.37704) [a]	(9.03646) [a]	(6.49001) [a]	(4.10757) [a]	(-0.07234)	(-0.84192)	
	(3.71268) [a]	(4.33524) [a]	(3.14163) [a]	(1.95886) [b]	(-0.03539)	(-0.44488)	
Belgo	1.10278	1.15501	1.12591	1.14648	1.11832	0.98757	2338
	(4.96947) [a]	(4.00629) [a]	(2.05823) [b]	(1.60911)	(0.89691)	(-0.06583)	
	(3.06800) [a]	(2.42101) [b]	(1.19846)	(0.91602)	(0.52462)	(-0.03973)	
Bombril	1.08470	1.04069	0.78451	0.62147	0.53241	0.50034	1597
	(3.38490) [a]	(0.86914)	(-2.91127) [a]	(-3.43664) [a]	(-2.92944) [a]	(-2.18723) [b]	
	(1.69401)	(0.45582)	(-1.64498)	(-2.11977) [b]	(-1.95424)	(-1.55217)	
Bradesco	1.09996	1.08610	0.98324	0.87124	0.79981	0.65526	2776
	(5.26654) [a]	(2.42489) [b]	(-0.29850)	(-1.54118)	(-1.65354)	(-1.98961) [b]	
	(2.32707) [b]	(1.06545)	(-0.13944)	(-0.79061)	(-0.91742)	(-1.16747)	
Cemig	1.13756	1.20600	1.22032	1.13821	1.14529	0.89941	2012
	(6.17036) [a]	(4.93918) [a]	(3.34089) [a]	(1.40840)	(1.02170)	(-0.49423)	
	(2.59507) [a]	(2.06981) [b]	(1.41865)	(0.61782)	(0.46398)	(-0.23744)	
Cesp pn	1.17862	1.34815	1.32405	1.08756	1.11211	0.78471	1439
	(6.77575) [a]	(7.05937) [a]	(4.15559) [a]	(0.75462)	(0.66670)	(-0.89459)	
	(1.57118)	(1.86839)	(1.26073)	(0.24688)	(0.22983)	(-0.33691)	
Ceval	1.08015	1.12113	1.10363	1.05779	0.95759	0.87371	2089
	(3.66318) [a]	(2.95932) [a]	(1.60126)	(0.60011)	(-0.30391)	(-0.63226)	
	(1.62233)	(1.27807)	(0.72003)	(0.28896)	(-0.15536)	(-0.34361)	
Copel on	0.96366	0.89877	0.77743	0.67298	0.58740	0.67639	514
	(-0.82389)	(-1.22673)	(-1.70588)	(-1.68438)	(-1.46650)	(-0.80364)	
	(-0.66488)	(-1.04105)	(-1.50197)	(-1.51952)	(-1.34258)	(-0.74892)	
Copene	1.14589	1.25682	1.35632	1.43111	1.31899	0.96515	1691
	(5.99945) [a]	(5.64507) [a]	(4.95348) [a]	(4.02755) [a]	(2.05647) [b]	(-0.15696)	
	(2.38796) [b]	(2.36173) [b]	(2.28346) [b]	(2.08331) [b]	(1.14405)	(-0.09335)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 3b (Cont.). Returns in US$ dollars - Closing prices - first sub-sample.

	q						n
	2	4	8	16	32	64	
Eletrobras on	1.13827	1.08592	0.98081	1.02376	1.11798	1.00769	496
	(3.07932) [a]	(1.02287)	(-0.14445)	(0.12023)	(0.41194)	(0.01876)	
	(2.44010) [b]	(0.79794)	(-0.11378)	(0.09638)	(0.33690)	(0.01596)	
Eletrobras pn	1.15427	1.21707	1.27254	1.40768	1.28479	1.00715	1104
	(5.12586) [a]	(3.85524) [a]	(3.06128) [a]	(3.07736) [a]	(1.48347)	(0.02602)	
	(3.64403) [a]	(2.59754) [a]	(2.01779) [b]	(2.04053) [b]	(1.00540)	(0.01857)	
Embrear	1.40625	1.63229	1.02862	0.82049	0.53849	0.34347	1288
	(14.57965) [a]	(12.12950) [a]	(0.34721)	(-1.46360)	(-2.59663) [a]	(-2.58092) [a]	
	(2.01215) [b]	(1.79684)	(0.05420)	(-0.25964)	(-0.56509)	(-0.71639)	
Eucatex	1.13655	1.22931	1.31071	1.30921	1.26832	0.95216	1244
	(4.81604) [a]	(4.32317) [a]	(3.70480) [a]	(2.47766) [b]	(1.48367)	(-0.18482)	
	(3.17652) [a]	(2.99706) [a]	(2.63582) [a]	(1.85182)	(1.16543)	(-0.14645)	
Gerdau	1.08060	1.18675	1.28242	1.27778	1.21941	1.06433	2100
	(3.69368) [a]	(4.57452) [a]	(4.37520) [a]	(2.89196) [a]	(1.57626)	(0.32293)	
	(2.20378) [b]	(2.91055) [a]	(2.84157) [a]	(1.93399) [b]	(1.07015)	(0.23105)	
Iochpe	1.10548	1.21045	1.26110	1.11779	1.11310	1.11055	1117
	(3.52545) [a]	(3.75955) [a]	(2.95002) [a]	(0.89440)	(0.59260)	(0.40471)	
	(1.67242)	(1.80358)	(1.44757)	(0.45231)	(0.31877)	(0.24114)	
Klabin	1.19246	1.32552	1.37299	1.29238	1.02265	0.76829	2129
	(8.88039) [a]	(8.02838) [a]	(5.81803) [a]	(3.06488) [a]	(0.16384)	(-1.17112)	
	(2.29763) [b]	(2.52816) [a]	(2.31877) [b]	(1.45959)	(0.08611)	(-0.65453)	
Marcopolo	0.56749	0.43194	0.35844	0.32189	0.27449	0.23095	1340
	(-15.83251) [a]	(-11.11517) [a]	(-7.93939) [a]	(-5.63939) [a]	(-4.16358) [a]	(-3.08368) [a]	
	(-6.23240) [a]	(-4.39797) [a]	(-3.25824) [a]	(-2.44047) [b]	(-1.89064)	(-1.48196)	
Perdigão	1.19755	1.20281	1.12191	0.91415	0.81392	0.59973	2267
	(9.40617) [a]	(5.16149) [a]	(1.96236) [b]	(-0.92865)	(-1.38899)	(-2.08759) [b]	
	(1.85554)	(1.05630)	(0.43513)	(-0.23427)	(-0.40458)	(-0.70926)	
Petrobras on	0.92720	0.87020	0.81350	0.79893	0.75834	0.70209	2375
	(-3.54790) [a]	(-3.38126) [a]	(-3.07265) [a]	(-2.22612) [b]	(-1.84633)	(-1.59029)	
	(-1.40762)	(-1.50816)	(-1.51390)	(-1.17514)	(-1.00626)	(-0.90986)	
Petrobras pn	1.10909	1.08007	1.03074	1.03694	1.08808	1.16834	2637
	(5.60196) [a]	(2.19770) [b]	(0.53373)	(0.43095)	(0.70912)	(0.94689)	
	(3.19045) [a]	(1.13663)	(0.27131)	(0.22503)	(0.38063)	(0.52474)	
Suzano	1.13734	1.20435	1.25058	1.19264	0.95574	0.74889	1739
	(5.72725) [a]	(4.55494) [a]	(3.53255) [a]	(1.82503)	(-0.28937)	(-1.14703)	
	(2.45498) [b]	(2.27472) [b]	(2.03176) [b]	(1.15736)	(-0.19954)	(-0.85766)	
Teka	1.15006	1.23161	1.42011	1.82695	2.01003	1.23995	1855
	(6.46311) [a]	(5.33208) [a]	(6.11693) [a]	(8.09148) [a]	(6.81989) [a]	(1.13200)	
	(1.59670)	(1.38675)	(1.73833)	(2.30877) [b]	(1.96414) [b]	(0.34968)	
Usiminas	1.16963	1.21353	0.97850	0.73333	0.44692	0.41531	665
	(4.37447) [a]	(2.94328) [a]	(-0.18744)	(-1.56230)	(-2.23598) [b]	(-1.65157)	
	(2.82710) [a]	(1.89092)	(-0.11843)	(-1.00170)	(-1.47995)	(-1.13911)	
Vale	0.99182	1.03862	1.09153	1.11650	1.10088	1.02368	1960
	(-0.36217)	(0.91387)	(1.36986)	(1.17177)	(0.70020)	(0.11483)	
	(-0.13100)	(0.36842)	(0.60929)	(0.57602)	(0.35401)	(0.06446)	
Votorantim	1.08084	1.08933	1.13168	1.19453	1.18365	0.94866	1543
	(3.17545) [a]	(1.87553)	(1.74858)	(1.73598)	(1.13094)	(-0.22092)	
	(1.88958)	(1.17359)	(1.15161)	(1.17721)	(0.77668)	(-0.15562)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 3c. Returns in US$ dollars - Closing prices - second sub-sample.

	q						n
	2	4	8	16	32	64	
Acesita on	1.13685	1.27043	1.23365	1.25119	1.09537	1.11833	1738
	(5.70517) [a]	(6.02618) [a]	(3.29296) [a]	(2.37905) [b]	(0.62332)	(0.54035)	
	(2.68826) [a]	(2.43572) [b]	(1.29405)	(0.95491)	(0.26038)	(0.23643)	
Acesita pn	1.19138	1.30769	1.19377	0.96017	0.93634	0.92520	1765
	(8.04032) [a]	(6.90967) [a]	(2.75207) [a]	(-0.38012)	(-0.41930)	(-0.34423)	
	(3.02428) [a]	(2.45242) [b]	(0.98828)	(-0.14413)	(-0.17099)	(-0.14748)	
Alpargatas on	0.95648	0.82863	0.59424	0.52715	0.50568	0.51986	775
	(-1.21157)	(-2.55008) [a]	(-3.81871) [a]	(-2.99057) [a]	(-2.15740) [b]	(-1.46413)	
	(-0.73393)	(-1.51077)	(-2.11873) [b]	(-1.69140)	(-1.32469)	(-0.97460)	
Alpargatas pn	1.02804	1.05851	0.98577	0.83557	0.85970	0.82491	1302
	(1.01161)	(1.12851)	(-0.17361)	(-1.34790)	(-0.79368)	(-0.69205)	
	(0.71430)	(0.81661)	(-0.12942)	(-1.02092)	(-0.61988)	(-0.55826)	
Ambev on	1.03629	1.02109	0.87068	0.81586	0.96180	1.03330	1060
	(1.18166)	(0.36703)	(-1.42333)	(-1.36199)	(-0.19496)	(0.11877)	
	(0.87336)	(0.25393)	(-0.95447)	(-0.92935)	(-0.13918)	(0.08922)	
Ambev pn	1.05794	1.03117	0.89234	0.83966	0.86739	0.72019	1283
	(2.07553) [b]	(0.59678)	(-1.30360)	(-1.30480)	(-0.74468)	(-1.09784)	
	(1.42696)	(0.40120)	(-0.88663)	(-0.92665)	(-0.55713)	(-0.86490)	
Americanas	1.14924	1.26281	1.48793	1.71200	1.95380	2.12544	1501
	(5.78191) [a]	(5.44256) [a]	(6.39069) [a]	(6.26683) [a]	(5.79321) [a]	(4.77613) [a]	
	(3.04965) [a]	(3.05634) [a]	(3.67731) [a]	(3.74477) [a]	(3.58423) [a]	(3.12423) [a]	
Aracruz	0.98612	0.92783	0.83766	0.79491	0.82342	0.89417	2260
	(-0.65965)	(-1.83396)	(-2.60900) [a]	(-2.21505) [b]	(-1.31603)	(-0.55107)	
	(-0.34963)	(-1.08123)	(-1.73836)	(-1.60271)	(-1.01235)	(-0.44360)	
Belgo	1.02596	1.06783	1.07546	1.09487	1.19936	1.21547	1345
	(0.95195)	(1.32966)	(0.93557)	(0.79043)	(1.14620)	(0.86558)	
	(0.57815)	(0.87495)	(0.66117)	(0.58020)	(0.86285)	(0.66230)	
Bombril	0.95941	0.92908	0.84694	0.86630	0.91582	0.87636	1613
	(-1.63030)	(-1.52251)	(-2.07812) [b]	(-1.21987)	(-0.53004)	(-0.54391)	
	(-0.83312)	(-0.76317)	(-1.06817)	(-0.65332)	(-0.29499)	(-0.31212)	
Bradesco	1.15237	1.16559	1.10337	1.12835	1.16229	0.91949	1069
	(4.98178) [a]	(2.89392) [a]	(1.14252)	(0.95338)	(0.83185)	(-0.28833)	
	(3.77516) [a]	(2.21710) [b]	(0.90247)	(0.78791)	(0.71724)	(-0.26008)	
Cemig	1.13189	1.12793	0.95812	0.91116	0.87499	0.67633	1781
	(5.56605) [a]	(2.88579) [a]	(-0.59756)	(-0.85179)	(-0.82706)	(-1.49624)	
	(3.90894) [a]	(1.89264)	(-0.38244)	(-0.55708)	(-0.56783)	(-1.08057)	
Cesp pn	1.13306	1.16851	1.07052	1.05095	1.07286	1.04809	1866
	(5.74785) [a]	(3.89089) [a]	(1.02983)	(0.50006)	(0.49343)	(0.22756)	
	(3.44293) [a]	(2.38524) [b]	(0.65127)	(0.32986)	(0.34659)	(0.17075)	
Ceval	1.00391	0.97533	0.87918	0.88049	0.94426	0.74320	1527
	(0.15283)	(-0.51520)	(-1.59612)	(-1.06097)	(-0.34147)	(-1.09922)	
	(0.08765)	(-0.31177)	(-1.00759)	(-0.69431)	(-0.23053)	(-0.77682)	
Copel on	1.11181	1.18081	1.17271	1.27709	1.33723	1.03686	1257
	(3.96418) [a]	(3.42660) [a]	(2.07009) [b]	(2.23189) [b]	(1.87443)	(0.14314)	
	(2.65569) [a]	(2.23678) [b]	(1.28438)	(1.40362)	(1.24435)	(0.10157)	
Copene	1.16874	1.24897	1.20887	1.18838	1.34331	1.52171	2131
	(7.78935) [a]	(6.14329) [a]	(3.25956) [a]	(1.97561) [b]	(2.48454) [b]	(2.63807) [a]	
	(4.10484) [a]	(3.35124) [a]	(1.87427)	(1.21608)	(1.63640)	(1.82878)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

Table 3c (Cont.). Returns in US$ dollars - Closing prices - second sub-sample.

	q						n
	2	4	8	16	32	64	
Eletrobras on	1.11884	1.17236	0.98563	0.94336	0.84312	0.61817	1674
	(4.86236) [a]	(3.76941) [a]	(-0.19881)	(-0.52644)	(-1.00628)	(-1.71124)	
	(2.77823) [a]	(2.01960) [b]	(-0.10889)	(-0.30596)	(-0.63045)	(-1.15523)	
Eletrobras pn	1.11051	1.15329	0.94462	0.90295	0.82833	0.65395	1674
	(4.52161) [a]	(3.35245) [a]	(-0.76606)	(-0.90213)	(-1.10113)	(-1.55088)	
	(2.37644) [b]	(1.63723)	(-0.38385)	(-0.48907)	(-0.65703)	(-1.01152)	
Embraer	1.09569	1.10304	1.06481	1.21629	1.48672	1.47870	1017
	(3.05146) [a]	(1.75640)	(0.69874)	(1.56706)	(2.43338) [b]	(1.67221)	
	(1.53167)	(0.92788)	(0.39723)	(0.95064)	(1.54265)	(1.10442)	
Eucatex	1.25337	1.43011	1.57671	1.81790	2.06594	2.05533	617
	(6.29351) [a]	(5.71074) [a]	(4.84281) [a]	(4.61552) [a]	(4.15091) [a]	(2.87139) [a]	
	(1.88859)	(2.08937) [b]	(2.24824) [b]	(2.58313) [a]	(2.55072) [a]	(2.00925) [b]	
Gerdau	1.13125	1.21379	1.19068	1.16818	1.36568	1.45039	959
	(4.06438) [a]	(3.53886) [a]	(1.99627) [b]	(1.18320)	(1.77533)	(1.52778)	
	(2.47539) [b]	(2.30139) [b]	(1.39285)	(0.89825)	(1.44489)	(1.32782)	
Iochpe	1.08423	1.01043	0.94181	0.99095	1.00533	0.94960	1327
	(3.06818) [a]	(0.20308)	(-0.71657)	(-0.07492)	(0.03042)	(-0.20109)	
	(1.11214)	(0.07795)	(-0.28857)	(-0.03267)	(0.01435)	(-0.10250)	
Klabin	1.02911	1.03353	0.99544	0.98215	1.02634	1.14892	1691
	(1.19699)	(0.73705)	(-0.06337)	(-0.16671)	(0.16980)	(0.67079)	
	(0.86587)	(0.52803)	(-0.04578)	(-0.12520)	(0.13421)	(0.55984)	
Marcopolo	0.92817	0.92250	0.89377	0.82779	0.84656	0.82560	993
	(-2.26338) [b]	(-1.30537)	(-1.13164)	(-1.23287)	(-0.75804)	(-0.60199)	
	(-1.76078)	(-1.02239)	(-0.88179)	(-0.98620)	(-0.64994)	(-0.54642)	
Perdigao	0.99903	0.97608	0.96070	0.88887	0.83581	0.79010	1187
	(-0.03357)	(-0.44049)	(-0.45777)	(-0.86982)	(-0.88681)	(-0.79212)	
	(-0.02231)	(-0.31772)	(-0.34882)	(-0.70441)	(-0.76232)	(-0.72256)	
Petrobras on	1.08685	1.04879	1.02328	1.06724	1.13388	0.98428	1203
	(3.01247) [a]	(0.90462)	(0.27295)	(0.52981)	(0.72798)	(-0.05972)	
	(2.40105) [b]	(0.69879)	(0.20810)	(0.42214)	(0.61620)	(-0.05230)	
Petrobras pn	1.13278	1.11175	1.05322	1.12601	1.16325	0.88004	1203
	(4.60529) [a]	(2.07175) [b]	(0.62407)	(0.99290)	(0.88769)	(-0.45574)	
	(3.39939) [a]	(1.48478)	(0.44816)	(0.75029)	(0.71907)	(-0.39006)	
Suzano	0.93713	0.89530	0.89680	0.94460	0.99840	1.18333	1604
	(-2.51775) [a]	(-2.24145) [b]	(-1.39723)	(-0.50411)	(-0.01005)	(0.80426)	
	(-1.21340)	(-1.07881)	(-0.69297)	(-0.26547)	(-0.00578)	(0.49268)	
Teka	0.95636	0.93098	0.92084	0.89344	1.05328	1.26190	1699
	(-1.79864)	(-1.52061)	(-1.10301)	(-0.99782)	(0.34432)	(1.18249)	
	(-0.89068)	(-0.78467)	(-0.58621)	(-0.52831)	(0.18084)	(0.62200)	
Usiminas	1.04997	1.04738	0.89450	0.87131	0.97692	0.97301	1730
	(2.07838) [b]	(1.05329)	(-1.48345)	(-1.21606)	(-0.15049)	(-0.12298)	
	(1.34789)	(0.65604)	(-0.93112)	(-0.80419)	(-0.10685)	(-0.09204)	
Vale	1.02054	0.96500	0.80438	0.76825	0.73052	0.66580	1882
	(0.89090)	(-0.81154)	(-2.86887) [a]	(-2.28409) [b]	(-1.83278)	(-1.58811)	
	(0.63858)	(-0.59144)	(-2.13667) [b]	(-1.77272)	(-1.49489)	(-1.34967)	
Votorantim	1.05053	1.11479	1.05755	0.92372	0.89942	0.86768	2066
	(2.29695) [b]	(2.78892) [a]	(0.88425)	(-0.78774)	(-0.71672)	(-0.65881)	
	(1.62458)	(2.01552) [b]	(0.66690)	(-0.61538)	(-0.57418)	(-0.53979)	

[a] The VR are statistically different from one at the 5% level using the SMM distribution critical value.
[b] Indicates inferential error in which the VR are statistically different from 1 if one uses the standard normal distribution critical values but are insignificant under the SMM distribution critical values.
q indicates the investment horizon in days

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