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Post-Earnings Announcement Drift in Latin America

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Abstract

Purpose – This research investigates the post-earnings announcement drift (PEAD) anomaly in the Latin American stock markets.

Theoretical framework – The theoretical fundamentals of PEAD analysis lie in the efficient market hypothesis (EMH).

Design/methodology/approach – We use firms from Argentina, Brazil, Colombia, Chile, Mexico, and Peru. We examine the PEAD anomaly by estimating the cumulative abnormal returns (CAR) around earnings announcement dates. We replicate the analysis using a sample of firms from the New York Stock Exchange (NYSE) for comparison. We analyze how firm-level and country-level (institutional) variables can explain the PEAD anomaly.

Findings – Under different specifications, we find that good news firms yield positive CAR while bad news firms yield negative CAR even after a window of 20 days. We find that the effect of earnings surprises on CAR in Latin America varies with firms' size and countries' risk, while in the US it varies with firms' size and the market-to-book (MTB) ratio.

Practical & social implications of research – We fill a gap in the literature on the role of accounting in the capital markets by analyzing the Latin American markets, which are usually left unexplored. In addition, our results are important for portfolio selection strategies, since the PEAD anomaly represents an opportunity to gain abnormal returns based on earnings surprises.

Originality/value – We contribute to the literature on the PEAD anomaly by providing evidence on how investors react to earnings announcements in Latin American countries. While other studies have investigated how accounting numbers are useful for investment strategies in the region, by including earnings surprises we go back a step and first investigate the reaction around these surprises.

Keywords: Post-Earnings Announcement Drift, Latin America, abnormal returns, firm-level factors, country-level factors.

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1 Introduction

In this research paper, we investigate post-earnings announcement drift (PEAD) in Latin America. While the literature on PEAD has been around for several decades, the investigation around its origins and consequences has been focused on developed markets, especially the United States. Although recently some studies focusing on emerging markets have also studied PEAD along with other anomalies, such as that of Qin and Bai (2014), and some others investigate accounting fundamentals investing strategies in specific Latin American countries, such as those of Galdi and Lima (2017) and Dosamantes (2013) for Brazil and Mexico, respectively, there is no research on how investors react around earnings announcements in these countries in the classical event study setting.

With this in mind, we select a sample of firms from the largest Latin American countries: Argentina, Brazil, Colombia, Chile, Mexico, and Peru. We examine the PEAD anomaly by estimating the cumulative abnormal returns around earnings announcements of firms from these countries. Additionally, we also replicate the analysis using a sample of firms from the New York Stock Exchange (NYSE), which has been extensively used in prior literature, as well as a subsample of matched NYSE firms. By examining the NYSE firms and matched NYSE firms, we can analyze and compare the results found for Latin America with a benchmark sample. Furthermore, this comparison allows us to examine whether any differences between the findings from the two markets are driven by differences in the institutional and market environment, as the previous literature has analyzed (see, e.g., Chui et al., 2010; Dou et al., 2016; Moreira et al., 2019), or by inherent firm characteristics.

The origins of this line of research date from the 1960s and the 1970s, when the market efficiency hypothesis (EMH) (Fama, 1970) was introduced in finance and when the first studies relating accounting disclosures with stock price behavior were being produced, namely the seminal works of Beaver (1968), who analyzed the movement of stock prices and trading volume around earnings announcement, and that of Ball and Brown (1968), who investigated how stock prices reacted to earnings changes. Since then, this literature has continued with a large body of research dedicated to understanding the role of accounting in the capital markets, as one can see in the review of Dechow et al. (2013).

Dechow et al. (2013) explore three main lines of this literature. First, they review works that seek to investigate the usefulness of accounting numbers to understand whether and how investors use accounting information in their decisions. The second line of research is about the characteristics of earnings that make them useful for market prices. The third line asks whether stock prices correctly reflect earnings information. While the studies from the first two lines assume the EMH, some studies have presented results that are inconsistent with market information efficiency. Dechow et al. (2013) cite works that document that prices take several months to fully incorporate accounting information, contradicting the premise of efficiency where prices instantly incorporate new information. The original work of Ball and Brown (1968) showed that the drift in stock prices starts several months before the announcement and that it continues throughout the year after the announcement. This is the post-earnings announcement drift (PEAD) anomaly, which is the focus of this study. Besides this PEAD anomaly, other results in the accounting literature have been mixed in finding inconsistencies in market efficiency.

Analyzing the Latin American firms, we found the traditional pattern present in the literature since Ball and Brown (1968): good news firms yield positive abnormal returns while bad news firms yield negative abnormal returns. The same occurs for the NYSE firms (both matched and full sample). Although the pattern is the same for all samples, we found some differences between the three samples. First, the strategy of buying good news firms and selling bad news firms yields around 3.46% cumulative abnormal returns (CAR) 20 days after the announcement for Latin America and the matched NYSE firms, but this result is 3.17% for the full NYSE sample firms. Second, different firm-level and institutional factors are associated with the CAR 20 days after the announcement. For the Latin America sample, the percentage of minority interests is negatively associated with CAR while the level of financial development is positively associated. For the full NYSE sample, only firms' minority interests (in addition to the news type) can explain the CAR. However, while the matched NYSE firms generate similar CAR to those from the Latin America sample, only firm size can explain them. Third, when evaluating the sensitivity of CAR to news type, we found that larger Latin American firms are more sensitive to good news, as well as those in countries with lower risk levels. For the matched US sample, no variable mediates

the effect of earnings surprises. For the full US sample, larger firms are less sensitive and firms with higher levels of market expectations are more sensitive. Therefore, both firms' characteristics and institutional factors have a role in explaining the PEAD anomaly in Latin America, as well as in the US.

The PEAD pattern implies that a strategy of buying good news firms (firms with positive earnings surprises) and selling bad news firms (firms with negative earnings surprises) can consistently yield positive abnormal returns, which defies the EMH. Under efficient markets, if accounting earnings convey relevant information, we expect the market to react to their announcements. However, once the information is publicly available and absorbed by investors, the abnormal returns should go back to zero, which does not happen in our analyses. As discussed in Section 3, there are some explanations for this anomaly, but they are not within the scope of this research.

Our research is important for two main reasons. First, we fill a gap in the literature on the role of accounting in the capital markets by analyzing the Latin American markets, which are usually left unexplored. Second, our results have important implications for portfolio selection strategies, since the PEAD anomaly represents an opportunity to gain abnormal returns based on annual and quarterly earnings surprises both in the Latin American countries and in the US.

The paper is structured as follows. Section 2 characterizes the Latin American setting and Section 3 reviews the PEAD literature. Section 4 discusses the data and models used in this research, Section 5 presents the results, and Section 6 summarizes the research and offers some concluding remarks.

2 Latin America characterization

The economics of Latin America is an important issue as many of these economies are large and are growing and seeking to join developed financial markets. Historical development and different colonization patterns have formed striking differences in economic structure between regions of the world. Financial markets in such regions have, therefore, developed at a different pace and with different focuses. Following this pattern, accounting has also developed with different objectives and structures (see, e.g., Nobes & Parker, 2008).

Figure 1 shows the evolution of some economic figures for Latin America in comparison with the European Union and with Canada and the United States, according to data from the World Bank. From it, one can see that while the GDP per capita chart shows the striking income differences between the regions, Latin America's GDP growth for the years around the global financial crisis showed a promising outlook. However, the last few years saw a downturn in the upward trend. When examining international capital flows, we see that foreign direct investment (FDI) inflows are relatively high for Latin America, and they have also been more constant over the years. However, foreign inflows of investments through portfolios are low, evidencing the small proportion of Latin American capital markets. The last two charts in Figure 1 make this clearer. The proportion of market capitalization relative to GDP barely reaches 70% right before the global financial crisis, although it surpasses the European Union in a couple of years following the crisis. If we compare Latin America with Canada and the US, the lower levels of market capitalization are even more highlighted. The differences between the regions become even more striking when analyzing the value of stocks traded relative to GDP. While in Canada and the US the volume of stock trading reaches 300% of GDP, in Latin America it averages only 15%.

The World Bank classifies 29 countries as forming the region of Latin America and the Caribbean. Figure 2 (data from the World Bank) shows the population and GDP distribution in the region for 2013, highlighting a few large countries, such as Brazil and Mexico, and several small nations, especially in the Caribbean and Central America. Figure 2 also shows the distribution of Latin America's stock market capitalization (domestic) and the value of shares traded in 2015. While the proportion of stock market capitalization is similar between Mexico and Brazil, the total value of shares traded in Brazil is more than 75% of total trading in the region. However, when analyzing each country separately in Figure 3 (data from the World Bank), one can see that although the Chilean market is relatively smaller, it is the only one which has reached a domestic market capitalization of more than 100% of GDP, while Brazil, Colombia, Mexico, and Peru have an average of around 40% and Argentina has less than 10%.

The movement towards financial globalization has turned attention to emerging economies, explaining the movement of several Latin American countries towards

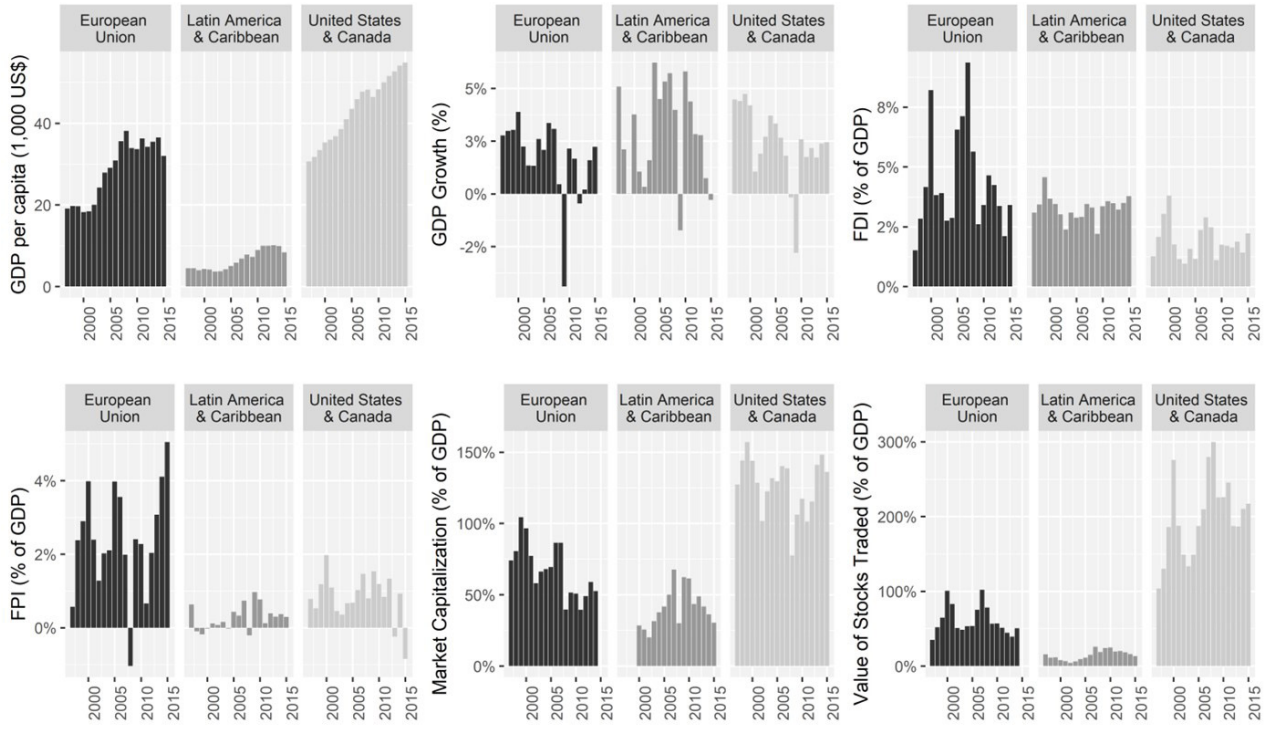

Figure 1. Economic Characteristics of Latin America, the European Union, and Canada and the United States

accounting harmonization through the adoption of the International Financial Reporting Standards (IFRS). Costa Rica adopted them in 2002, Paraguay in 2005, Guatemala in 2007, Venezuela in 2008, Chile in 2009, Brazil and Ecuador in 2010, El Salvador and Nicaragua in 2011, Argentina, Honduras, Mexico, Peru, and Uruguay in 2012, and Colombia in 2015 (IFRS Foundation, 2018). Figure 4 illustrates the spread of IFRS in the region. According to the IFRS Foundation (2018), in Paraguay, the IFRS are only permitted, not required, but few firms use them. Further, Bolivia was also planning adoption, but there was no information about Haiti.

3 The Post-Earnings Announcement Drift literature

In the 1960s, new accounting knowledge was being formed (Hopwood, 2007). The works of Fama (1965, 1970) and Fama et al. (1969) on the efficiency of capital markets formed the grounds for a new perspective in accounting research, inaugurating the field of positive research that explores the empirical relationship between market prices and accounting numbers. The works of Beaver (1968) and Ball and Brown (1968) are cited as the seminal works of this line of research.

Beaver (1968) analyzed how investors perceive the information content of earnings, by evaluating stock prices and trading volume movements in the weeks surrounding earnings announcements. The author finds significant abnormal movements of both prices and volume around the week of earnings announcements for a sample of firms traded on the New York Stock Exchange (NYSE) during the years from 1961 to 1965. Ball and Brown (1968), in turn, specifically assess the usefulness of the income numbers, through the analysis of stock price behavior around the announcement of unexpected earnings changes, arguing that, under capital market efficiency, changes in security prices reflect the flow of information in the market. The authors analyzed firms traded on the NYSE during the years from 1957 to 1966 and, as predicted, they found that when accounting income differs from its predicted values, the market tends to react in the same direction. However, Ball and Brown (1968) also find that the drift starts several months before the announcement and that it continues throughout the year after the announcement.

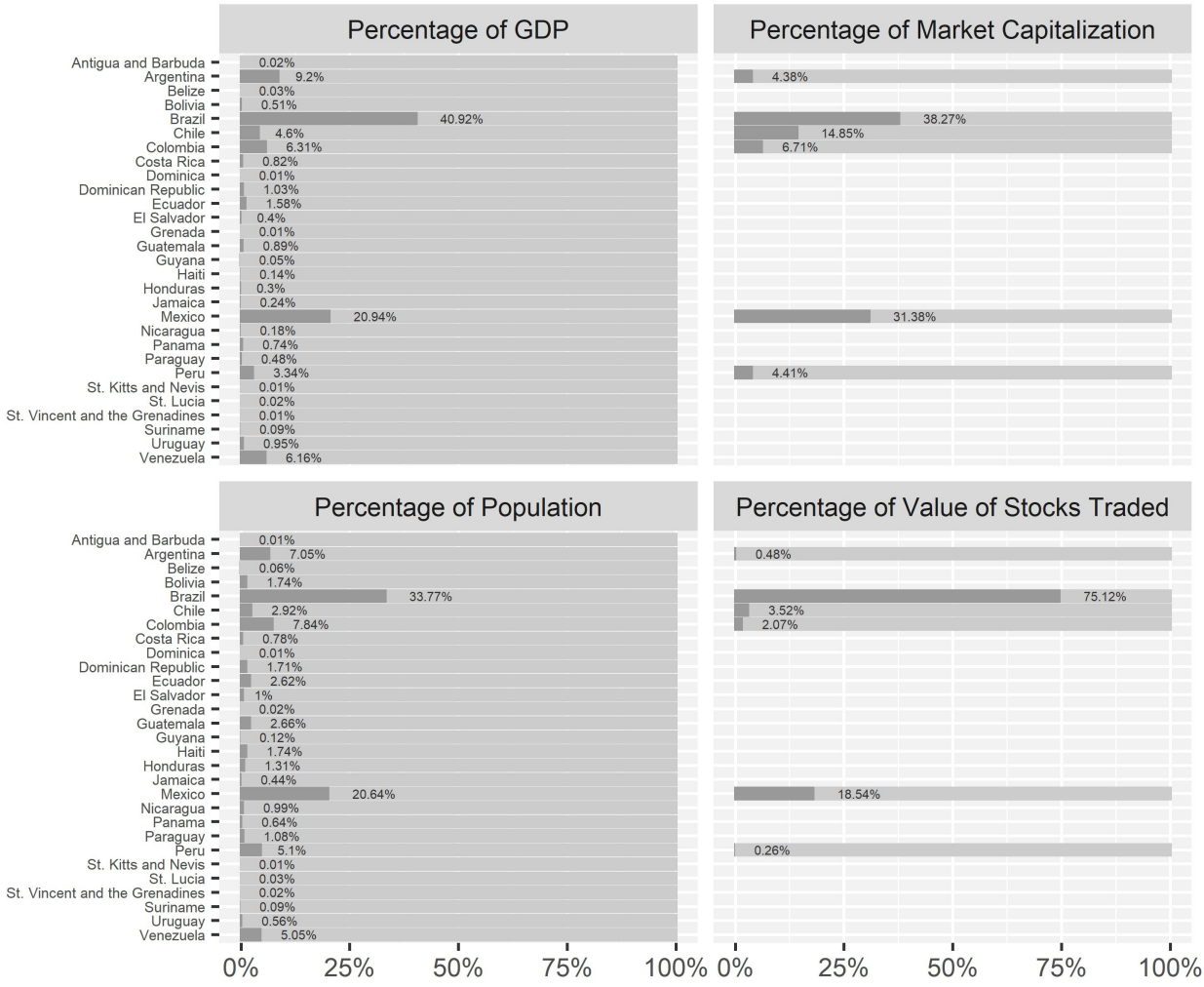

Figure 2. Latin America's Population, GDP, Stock Market Capitalization, and Value of Shares Traded by Country

Later work has examined this result, forming the now well documented PEAD anomaly. While the EMH predicts that prices instantly adjust to new information, the documented PEAD constitutes an anomaly, since it shows that stock prices take too much time to incorporate accounting information. In the subsequent years after Ball and Brown (1968), several studies were published documenting the PEAD anomaly. A few examples include the works dating from the 1970s, such as that of Jones and Litzenberger (1970), who argue that the information available to the public (quarterly financial statements) is not properly (fully and timely) discounted by the market. This conclusion is shared by Joy et al. (1977), who argue that the price adjustment to earnings reports is gradual rather than instantaneous, and by Brown (1978), who found that the adjustment of stock prices to earnings takes some time.

In the following decades, some works were dedicated to finding explanations for the PEAD anomaly. Foster et al. (1984) discuss in their paper two different categories of explanations. The first category involves market inefficiencies, but they argue that conclusions that markets are not efficient due to the existence of the drift are premature. For Bernard and Thomas (1989), the delayed response of prices to earnings announcements indicates either that traders fail to assimilate the new information, or that transaction costs exceed the potential gains from immediately exploiting the new information. The second category includes several explanations that do not imply market inefficiency. Foster et al. (1984) argue that the asset pricing models may not be correctly specified and even if the model is correct, its parameters may be biased. There is the possibility that the models are using hindsight information or that the fact is specific for

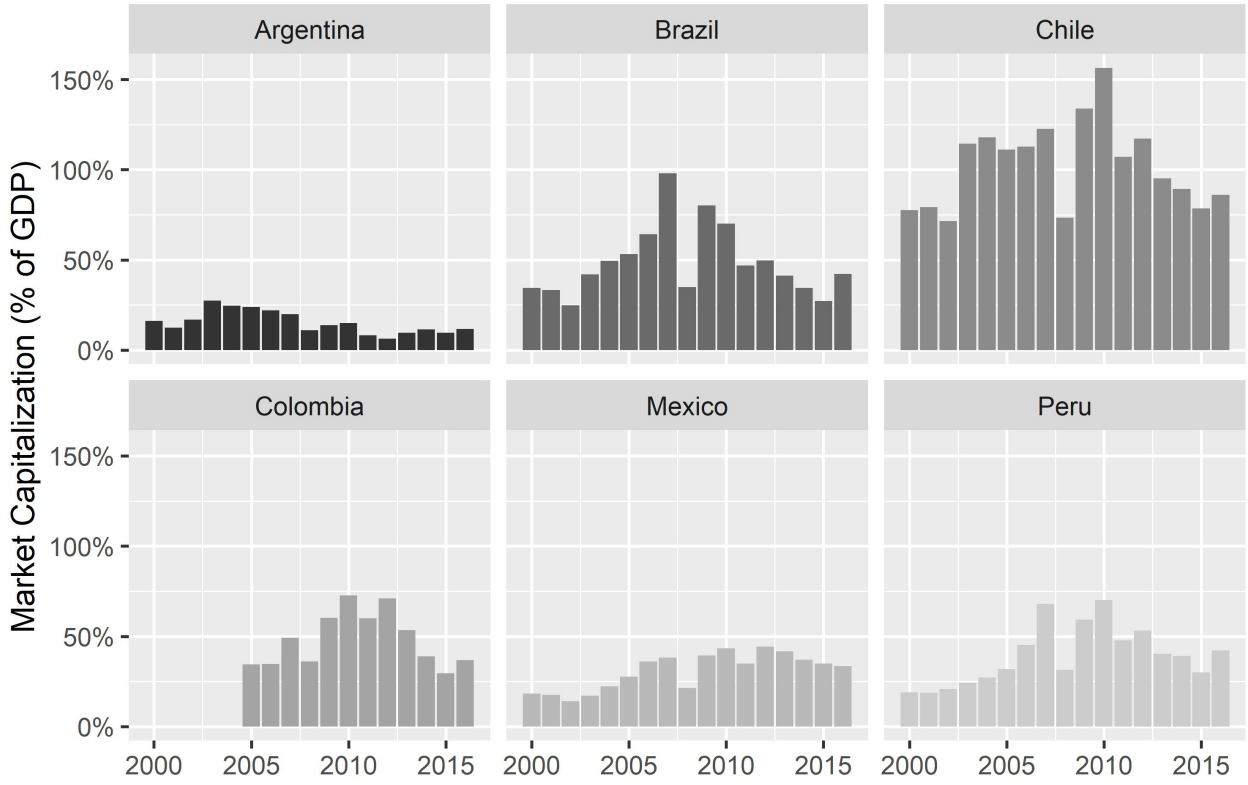

Figure 3. Stock Market Capitalization inside Countries

a certain period of time. Discussing the potential issues in estimating the capital asset pricing model (CAPM) to calculate abnormal returns associated with drift, Bernard and Thomas (1989) explain that researchers fail to fully adjust the returns to risk. Therefore, the documented abnormal results may simply be a fair compensation for bearing the priced risk that was not captured by the CAPM, in such a way that firms with more (fewer) surprises are simply more (less) risky.

Bernard and Thomas (1989) develop their paper to disentangle the explanations for post-earnings announcement drift into either a delayed price response or a lack of risk adjustment. The authors present the results from Foster et al. (1984), who found that only when analyzing the returns according to an earnings-based model is drift evidenced, indicating that this result was interpreted as evidence that drift is due to problems in risk measurement; however, the authors highlight that this result is also consistent with the delayed price response. After a battery of tests, Bernard and Thomas (1989) fail to support the CAPM misspecification hypothesis for

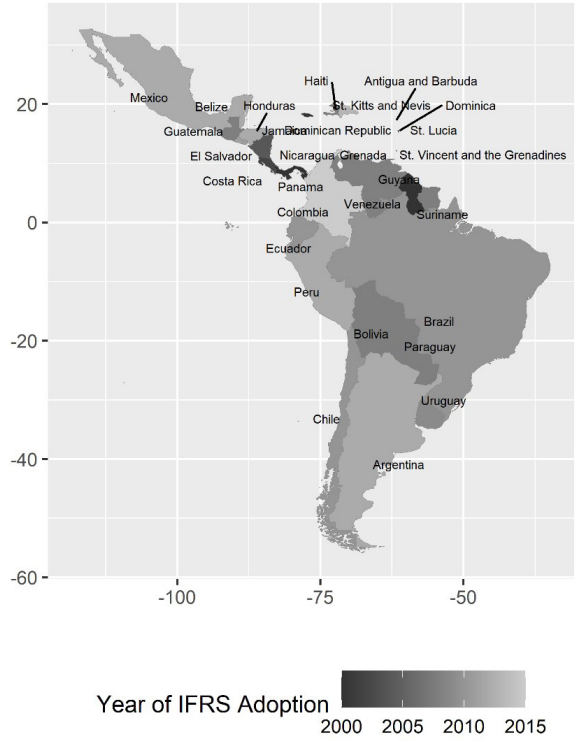

Figure 4. IFRS Adoption in Latin America

explaining drift and find evidence supporting the delayed price response hypothesis. These pieces of evidence are also supported by further works of the authors (Bernard & Thomas, 1990).

Some decades after the works of Bernard and Thomas (1989, 1990), the roles of different kinds of risk were emphasized. Mendenhall (2004) finds evidence supporting the idea that part of the PEAD anomaly can be explained by liquidity risk, while Sadka (2006) finds that arbitrage risk is also important, supporting the view that the anomaly can be seen as an underreaction to earnings announcements. Also converging to the information inefficiency perspective, Bhushan (1994) shows that direct and indirect transaction costs are positively related to the magnitude of the drift.

A common feature of these works dating from the 1960s to the 2000s is that they basically evaluate the United States stock market. Although in the last decades several papers have studied different markets, such as those of Hew et al. (1996) in the United Kingdom and Ariff et al. (1997) in Singapore, the evidence outside the US is still modest. More recently, some papers have started focusing on other markets.

The work of Griffin et al. (2010) shows that the PEAD and its associated abnormal returns are similar for emerging and developed countries. However, differences between the US and other markets are also documented. Forner and Sanabria (2010), for example, analyze the drift in Spain, adding behavioral theories to explain the anomaly, and they find different results from those presented in the US. The authors argue that these differences may be due to structural differences in the markets, such as the level of investor protection and the underlying legal system. Another recent example is the work of Chen and Huang (2014), who, when comparing the US and Chinese markets, show that both markets present consistent evidence of the PEAD. However, the authors find that differences emerge, namely, the Chinese market tends to respond much stronger to good news and less strongly to bad news, and while in the US larger firms present less drift, in China smaller firms present less drift.

4 Data and models

4.1 Models for earnings surprises and abnormal returns

To analyze abnormal returns reactions to earnings surprises we must first define what "normal" returns and earnings are, so we can evaluate the unexpected components. Ball and Brown (1968) use the market model logic for both (log) prices and earnings, assuming that the expected price and earnings of a specific firm are the average of the market. A similar approach is followed by Brown (1978). Foster et al. (1984) also use the CAPM for calculating abnormal returns and a univariate seasonal time-series model for estimating quarterly earnings surprises.

Bernard and Thomas (1989, 1990) follow Foster et al. (1984), but the earnings surprises are standardized. Mendenhall (2004) also uses standardized earnings surprises, but the forecasts come from analysts' forecasts instead of the time-series model, while the abnormal returns are gauged as the difference between the firm's returns and the market return. Sadka (2006) uses a seasonal random walk model for calculating earnings surprises, including a trend term. In more recent years, Forner and Sanabria (2010) also used a seasonal random walk to model earnings, along with the difference regarding analysts' forecasts, which is also used by Hung et al. (2014). Chen and Huang (2014) use a random walk model for earnings surprises and abnormal returns are defined as the difference between firms' returns and the market return.

Based on this range of work, we calculate earnings surprises as the percentage variation between actual earnings per share (EPS) (adjusted by stock splits) and analysts' forecasts for earnings in each year:

$$EarningsSurprise_{ict} = \frac{ActualEPS_{ict} - EstimatedEPS_{ict}}{\left|EstimatedEPS_{ict}\right|}, \quad (1)$$

and also as the variation between actual and previous (comparable) earnings, that is, following the logic of a random walk model:

$$EarningsSurprise_{ict} = \frac{ActualEPS_{ict} - ComparableEPS_{ict}}{\left|ComparableEPS_{ict}\right|}, \quad (2)$$

In Equation (1), estimated EPS are the average of the earnings forecasts from the financial analysts in that period. In Equation (2), comparable earnings are

the lagged actual earnings, that is, the earnings reported in the previous period.

To calculate abnormal returns, we assume returns follow the market model in Equation (3):

$$r_{ict} = \alpha_{ic} + \beta_{icm} r_{cmt} + e_{ict}, \quad (3)$$

where the "normal" returns are calculated as $\alpha_{ic} + \beta_{icm} r_{cmt}$, in which the parameters α and β are estimated using data from the estimation windows. We estimate the model via the generalized method of moments (GMM) to gauge parameters robust to autocorrelation and heteroskedasticity. The model is estimated using data from the estimation window, which we defined as the last six months of the previous year, a period when we assume no information about the annual earnings released affects prices. Next, the estimated parameters are applied to the data in the event window, which we define as 20 days before and 20 days after the announcement day, to calculate the abnormal returns.

4.2 Latin America sample

Our sample comprises firms from Argentina, Brazil, Chile, Colombia, Mexico, and Peru from 1998 to 2017. We restrict our sample to firms whose last five years of trading value is different from zero and that have earnings announcements data available at Bloomberg. Therefore, the announcement dates, actual EPS, and analysts' estimated EPS are taken from Bloomberg. The stock returns and accounting data are from Economatica. We filtered the announcements data from Bloomberg, selecting only those which refer to the annual financial statements and that occurred in the first four months of each subsequent year. After this, the data comprised 443 firms, of which 37 are from Argentina, 197 from Brazil, 19 from Colombia, 69 from Chile, 71 from Mexico, and 50 from Peru, totaling 5,557 announcements (516 from Argentina, 2,524 from Brazil, 143 from Colombia, 803 from Chile, 946 from Mexico, and 625 from Peru).

There are annual earnings announcements data ranging from 1998 (relative to the 1997 fiscal year) to 2017 (relative to the 2016 fiscal year). However, the data on analysts' estimates are only available from 2005, reducing our sample by about half, leaving 2,406 announcements (313 firms). By country, 100 announcements are from Argentina (15 firms), 1,276 from Brazil (150 firms), 61 from Colombia (12 firms), 293 from Chile (44 firms), 527 from Mexico (66 firms), and 149 from Peru (26 firms). There are more available data for calculating earnings surprises using comparable EPS, but we still lose several observations, especially before 2005. Retaining only the announcements with available actual and comparable (lagged) EPS, this leaves 3,797 announcements (436 firms), 334 of which are from Argentina (35 firms), 1673 from Brazil (196 firms), 107 from Colombia (17 firms), 610 from Chile (69 firms), 640 from Mexico (70 firms), and 433 from Peru (49 firms). Figure 5 shows the distribution of each of these samples by country over the years. After merging with the accounting data from Economatica, some more observations are lost, leaving 2,406 observations, starting in 2004.

4.3 Matching with the NYSE sample

To compare the Latin American firms with the United States firms, in order to avoid the differences between the behavior of firms from the NYSE and Latin American stock exchanges being due to inherently different characteristics of the firms in each group, we selected a group of NYSE firms matched with the Latin American ones based on firm characteristics. Using propensity score matching (PSM), we define a function that evaluates the probability of a specific firm being part of a specific group according to this set of observable variables and estimate this probability via logistic regression.

In the regression, we include firm size, market-to-book (MTB), debt/equity ratio (DE), industry classification, and the magnitude of earnings surprises. The matching is then based on the proximity of the propensity scores of the firms in each group according to the nearest neighbor method, which looks for the firm in the "control" group (NYSE firms) with the nearest propensity score to each firm in the "treated" group (Latin American firms).

Table 1 shows the logit results from the PSM, in which the dependent variable is a dummy indicating the Latin American firms. We show two versions: model (1) includes earnings surprises calculated using Equation (1) and model (2) includes earnings surprises calculated using Equation (2). From Table 1 we can see Latin American firms are generally smaller, have lower market expectations (as measured by the MTB ratio), and present lower earnings surprises.

Figure 6 shows the density plots of each variable (except for the industry dummies, for the sake of space), for the Latin American firms (black line) and the NYSE firms (grey line) before (first columns of plots) and after the matching (second column of plots) to analyze the

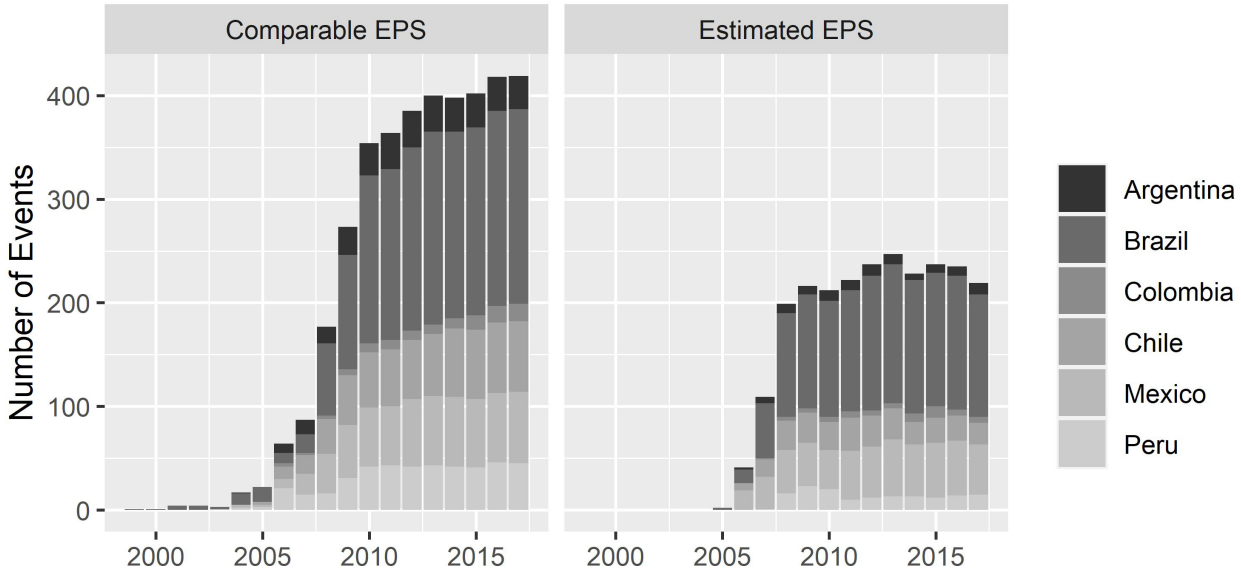

Figure 5. Number of earnings announcements over the years by country at Bloomberg. The first sample is the one that calculates earnings surprises using comparable (previous) EPS and the second one uses analysts' estimates

Table 1
Logit regression results for the PSM

	Dependent variable:	
	***P*(Latin American firm)**	
	(1)	**(2)**
Size	-0.335***	-0.347***
	(0.026)	(0.025)
MTB	-0.174***	-0.180***
	(0.017)	(0.017)
DE	-0.040*	-0.029
	(0.021)	(0.020)
Earnings Surprises (1)	-0.366***	
	(0.054)	
Earnings Surprises (3)		-0.095***
		(0.031)
Constant	4.757***	4.965***
	(0.493)	(0.490)
Industry Dummies	Yes	Yes
Observations	9,773	9,773
Log Likelihood	-3,906.374	-3,925.107
Akaike Inf. Crit.	7,862.748	7,900.214

Note: *p<0.1; **p<0.05; ***p<0.01

matching balance. From the figure, one can see a relatively good overlap of the two samples after the matching, showing a proper balance between the two matched samples. We only report the balance for the earnings surprises calculated using Equation (1).

4.4 Descriptive statistics

Table 2 shows some descriptive statistics for our sample of firms from Latin America, separately by country, as well as for the full sample of NYSE firms and the matched sample, separately for good news and bad news firms. There are 1,404 good news earnings announcements and 1,002 bad news earnings announcements for the Latin American firms.

On average, good news amounts to a 111% increase in reported earnings per share over the analysts' estimates, while bad news amounts to 106% lower average earnings per share than the analyst's estimates. Despite the high variation in these numbers, the difference between good and bad surprises is statistically significant. The good news firms are larger, but the two groups of firms have (statistically) the same levels of MTB, DE ratios, and profitability as measured by the return on assets (ROA).

The Brazilian firms amount to around half of the Latin American sample, followed by the Mexican firms, which comprise around one quarter of the sample. The remaining quarter is composed of the other four countries. The firms' size is relatively homogeneous across countries, but the Colombian ones are the least profitable and the ones that are least financed by debt. The biggest good surprises come from the Chilean firms, followed by the Peruvian ones. The biggest bad surprises come from Brazil, followed by Mexico.

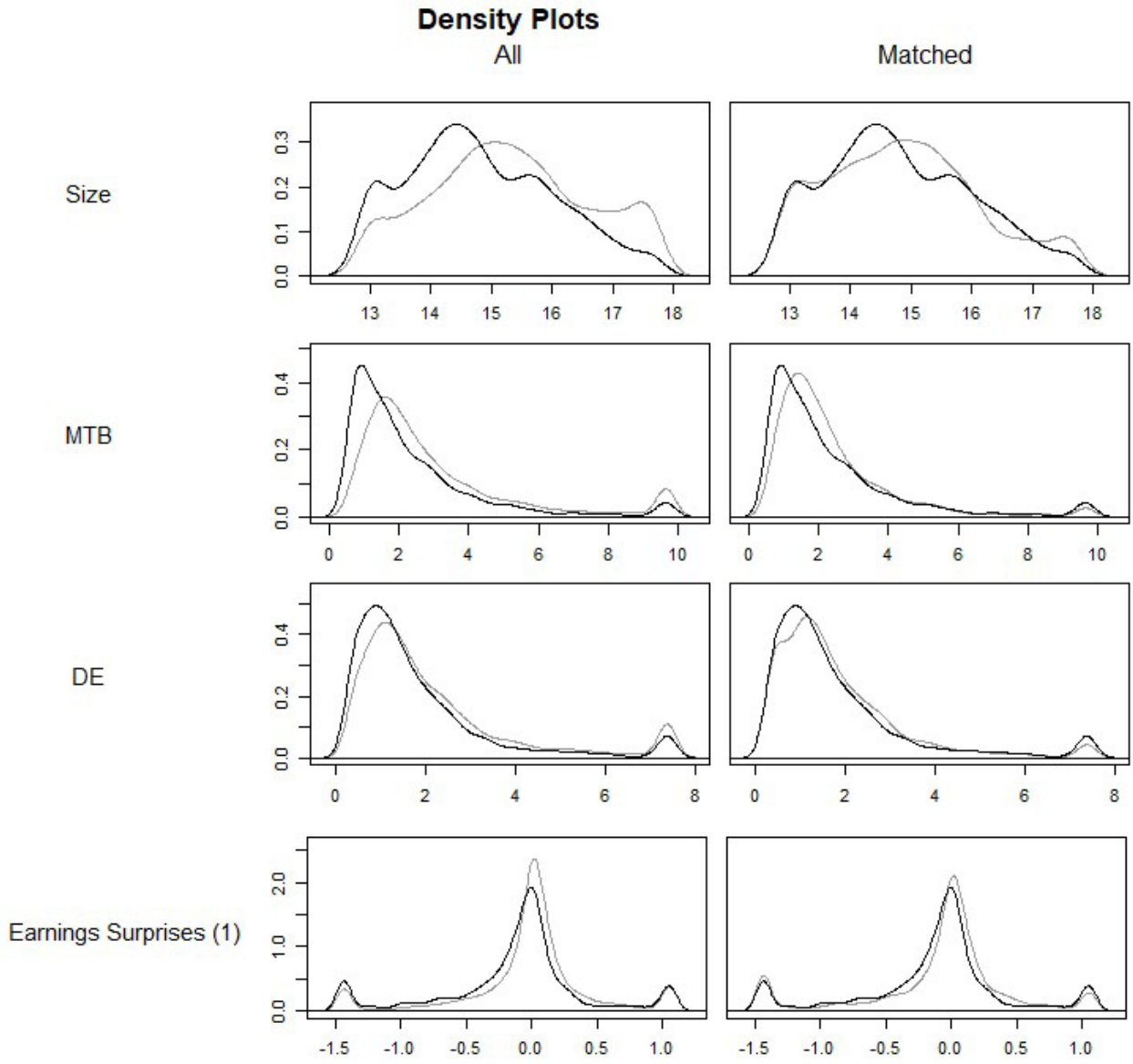

Figure 6. Matching Balance

On average, the good news firms in the NYSE sample, as well as in the matched sample, are smaller than in the Latin American sample, while the bad news ones are larger. The bad news NYSE firms are also much more profitable than the Latin American ones, while the good news ones are similarly profitable in both groups. The NYSE firms also tend to be more financed by debt and to have a larger MTB.

Since our Latin America sample is limited by the available data concerning the earnings announcements, EPS, and analysts' estimates, our final sample might not be representative of the Latin American capital markets. To explore this, Table 3 compares a set of characteristics between the firms remaining in our sample and all the firms available at Economatica. Our sample firms are indeed different from all the ones available at Economatica. Our sample firms are larger, have a higher market valuation relative to book value, and have lower levels of debt. For some countries, our sample firms are less profitable. Therefore, when analyzing our results, one should keep in mind that they hold for firms with such characteristics and might not hold for smaller, lower-growth firms and firms without an analyst following. We come back to this issue when discussing our results.

Finally, for the event study analysis, we also require firms to have at least five consecutive days with available returns around the announcement date to be included in the portfolio of good or bad news. This again considerably

Table 2
Descriptive Statistics

Group	News	Stat.	Earnings Surprise	Size	ROA	MTB	DE
Latin America	Good News	Mean	111.0%	15.02	6.9%	2.52	2.45
	N = 1,404	Std. Dev.	1197.0%	1.56	6.9%	3.17	3.18
	Bad News	Mean	-106.0%	14.78	6.6%	2.78	2.69
	N = 1,002	Std. Dev.	533.0%	1.46	12.8%	7.91	7.39
	Difference	t Stat.	5.382***	3.705***	0.864	-1.097	-1.044
Argentina	Good News	Mean	66.0%	14.8	5.3%	2.12	3.61
	N = 53	Std. Dev.	121.0%	1.11	4.0%	2.04	2.68
	Bad News	Mean	-50.0%	14.88	6.6%	2.85	3.23
	N = 47	Std. Dev.	65.0%	0.98	4.8%	6.94	7.22
	Difference	t Stat.	5.865***	-0.356	-1.478	0.360	0.36
Brazil	Good News	Mean	96.0%	15.23	6.9%	2.65	2.66
	N = 772	Std. Dev.	371.0%	1.7	6.3%	4.11	3.54
	Bad News	Mean	-136.0%	14.69	6.9%	3.14	3.01
	N = 504	Std. Dev.	681.0%	1.59	14.9%	10.39	9.3
	Difference	t Stat.	7.841***	5.580***	0.01	-1.162	-0.935
Colombia	Good News	Mean	56.0%	15.84	2.6%	1.29	2.16
	N = 36	Std. Dev.	66.0%	1.04	1.8%	0.36	2.96
	Bad News	Mean	-20.0%	15.51	3.4%	1.57	1.12
	N = 25	Std. Dev.	18.0%	1.2	3.7%	0.68	0.88
	Difference	t Stat.	5.597***	0.949	-0.959	-1.720*	1.366
Chile	Good News	Mean	337.0%	14.73	7.5%	2	2.56
	N = 164	Std. Dev.	3240.0%	1.5	11.1%	1.29	3.52
	Bad News	Mean	-53.0%	15.27	4.5%	1.9	2.29
	N = 129	Std. Dev.	183.0%	1.27	4.1%	0.99	2.78
	Difference	t Stat.	1.365	-3.269***	2.931***	0.705	0.692
Mexico	Good News	Mean	38.0%	14.94	6.6%	2.7	1.75
	N = 298	Std. Dev.	123.0%	1.35	4.4%	2	1.96
	Bad News	Mean	-90.0%	14.86	6.9%	2.61	2.3
	N = 229	Std. Dev.	320.0%	1.31	12.5%	2.41	4.11
	Difference	t Stat.	6.308***	0.682	-0.295	0.468	-2.008***
Peru	Good News	Mean	101.0%	14.2	9.3%	2.57	2.36
	N = 81	Std. Dev.	333.0%	1.19	9.0%	1.34	3.11
	Bad News	Mean	-58.0%	14.04	7.7%	2.21	2.03
	N = 68	Std. Dev.	173.0%	0.97	7.9%	1.34	2.61
	Difference	t Stat.	3.551***	0.827	1.106	1.543	0.664
NYSE	Good News	Mean	72.0%	15.3	7.1%	5.29	3.84
	N = 4,443	Std. Dev.	363.0%	1.43	7.6%	28.5	25.14
	Bad News	Mean	-137.0%	15.24	10.3%	5.73	4.71
	N = 5,491	Std. Dev.	1300.0%	1.46	244.9%	53.48	42.71
	Difference	t Stat.	10.418***	1.883*	-0.802	-0.446	-1.102
NYSE Matched	Good News	Mean	25.0%	14.87	0.07	2.49	1.7
	N = 858	Std. Dev.	31.0%	1.22	0.06	1.73	1.3
	Bad News	Mean	-48.0%	14.9	0.07	2.3	1.92
	N = 1,002	Std. Dev.	51.0%	1.26	0.12	1.72	1.52
	Difference	t Stat.	7.189***	0.975	-0.999	2.363**	-1.032

Note: *p<0.1; **p<0.05; ***p<0.01

Table 3
Sample Comparison

Country	Group	Size	ROA	MTB	DE
Latin America	All firms from Economatica	13.278	0.107	2.078	4.261
	Our Sample	14.882	0.067	2.673	2.592
	t Stat	-35.796***	1.463	-3.501***	3.033***
Argentina	All firms from Economatica	12.508	0.08	1.947	2.865
	Our Sample	14.844	0.06	2.511	3.408
	t Stat	-17.127***	2.668***	-0.939	-0.788
Brazil	All firms from Economatica	13.404	0.16	2.51	7.198
	Our Sample	14.905	0.069	2.942	2.877
	t Stat	-20.757***	1.314	-1.295	3.203***
Colombia	All firms from Economatica	14.205	0.048	1.12	1.858
	Our Sample	15.636	0.031	1.459	1.519
	t Stat	-5.040***	2.066**	-2.397**	0.683
Chile	All firms from Economatica	13.199	0.065	1.638	2.026
	Our Sample	15.034	0.058	1.947	2.408
	t Stat	-17.834***	1.225	-1.551	-0.792
México	All firms from Economatica	13.871	0.067	1.789	2.222
	Our Sample	14.899	0.068	2.644	2.062
	t Stat	-11.266***	-0.137	-6.273***	0.616
Peru	All firms from Economatica	13.044	0.085	1.95	2.46
	Our Sample	14.111	0.084	2.368	2.169
	t Stat	-8.602***	0.022	-2.693***	0.898

Note: *p<0.1; **p<0.05; ***p<0.01

decreases the number of observations available in each analysis. We detail the number of events included in each plot for each analysis.

5 Results

5.1 Event study results

To separate firms into good and bad news firms, we select all firms with positive earnings surprises (good news) and all firms with negative earnings surprises (bad news). Figure 7 shows the plot of cumulative abnormal returns (CAR) around the earnings announcement dates of the two groups of firms, both considering analysts' estimates (first plot) and the comparable earnings per share (second plot).

In the first plot, 952 announcements are included in the good news portfolio and 716 are included in the bad news portfolio, while for the second plot these numbers are 864 and 1,158. The shaded area represents confidence intervals (CIs) estimated via bootstrapping (Davison et al., 1986). The first plot in Figure 7 shows that from day one after the announcement the good news portfolio presents continuous positive abnormal returns, averaging 2% by the end of 20 days, while the bad news portfolio drops to -1.5% after one day and continues to be negative even after 20 days. Since the shaded areas for both series are far apart by the end of 20 days, the good news portfolio generates statistically higher abnormal returns than the bad news portfolio. The second plot shows the same patterns, but since there is much more variation after 10 days, the CIs overlap. Therefore, Figure 7 shows the post-earnings announcement drift anomaly occurs for the Latin American capital markets as previously documented in other regions, especially if we consider earnings surprises according to analysts' forecasts.

As we mentioned in Section 4.4, the results might not be generalized for all Latin American firms, and Figure 7 shows this is especially true for firms not followed by analysts, since the PEAD pattern is much weaker when we estimate earnings surprises using comparable earnings. The PEAD is clearer when we estimate surprises according to analysts' forecasts, therefore, an investment strategy based on the PEAD should focus on estimated EPS values. As seen in Table 4, our sample is formed of larger and growing firms, which are usually the ones most frequently traded and viewed in the market.

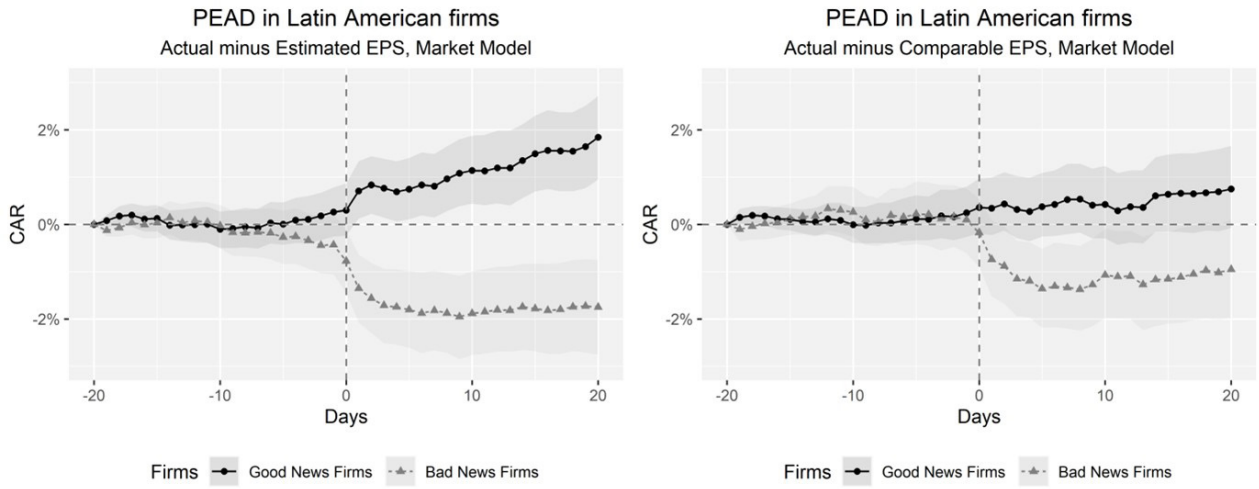

Figure 7. CAR around earnings announcements in Latin America. First plot: 716 good news and 952 bad news events. Second plot: 1158 good news and 864 bad news events

Table 4
CAR for the Latin America, NYSE, and matched NYSE samples

Sample	Firms	Lower CI	CAR	Upper CI
Latin America	Good News Firms	0.010	0.018	0.027
	Bad News Firms	-0.028	-0.017	-0.007
NYSE	Good News Firms	0.011	0.016	0.021
	Bad News Firms	-0.022	-0.015	-0.009
NYSE Matched	Good News Firms	0.001	0.011	0.022
	Bad News Firms	-0.043	-0.028	-0.013

Further, Figure 8 shows the analysis separated by country. We can see the PEAD pattern for the Brazilian, Chilean, and Mexican firms, which present statistically positive abnormal returns for the good news portfolio and statistically negative abnormal returns by the end of 20 days. These are the countries with the highest number of observations, so it is possible that the lack of a pattern for the Argentinean, Colombian, and Peruvian firms is due to the lack of events to be analyzed. We reran the analysis including events only for the Brazilian, Chilean, and Mexican firms, and present the results in Figure 9, which basically shows the same pattern as Figure 7. Therefore, the results in Figure 7 are driven by these three larger countries.

The results so far show that the PEAD anomaly is alive and (relatively) well in the Latin American markets. Next, we investigate the PEAD anomaly during the same period for firms in a much more financially developed setting: the firms listed on the NYSE. First, we estimate the drift for the whole NYSE sample and then we reestimate it for a sample of NYSE firms matched (by industry, size, MTB, debt/equity ratio, earnings surprises, and industry) to the Latin American firms, as a starting point to investigate potential differences in the PEAD anomaly between the US and the Latin American markets.

Figure 10 shows the well-known PEAD pattern also for the NYSE firms, both for the full sample and the matched one. It is worth noting the pattern is clearer for the NYSE sample, since the CIs are smaller and the jump from day -1 to day 0 and then to day +1 is steeper. Table 4 shows the CAR for the three samples (Latin America, NYSE, and NYSE matched) at day +20, that is, at the end of our event window. As in the plots, the CIs are estimated via bootstrapping.

From Table 4, as in the previous figures, we can see positive (negative) and statistically significant CAR for the good (bad) news portfolios for all three samples. Interestingly, the average CAR for unmatched NYSE firms is similar to the average CAR of the Latin America sample, while the matched NYSE sample has a lower average CAR for both the good and the bad news portfolios. This indicates that firms in the NYSE with similar characteristics as those from Latin America present poorer results and a weaker pattern in the PEAD anomaly, suggesting firms' characteristics play some role in determining abnormal returns after earnings announcements.

Figure 11 shows the average returns of an investment strategy of buying good news firms' stocks and selling

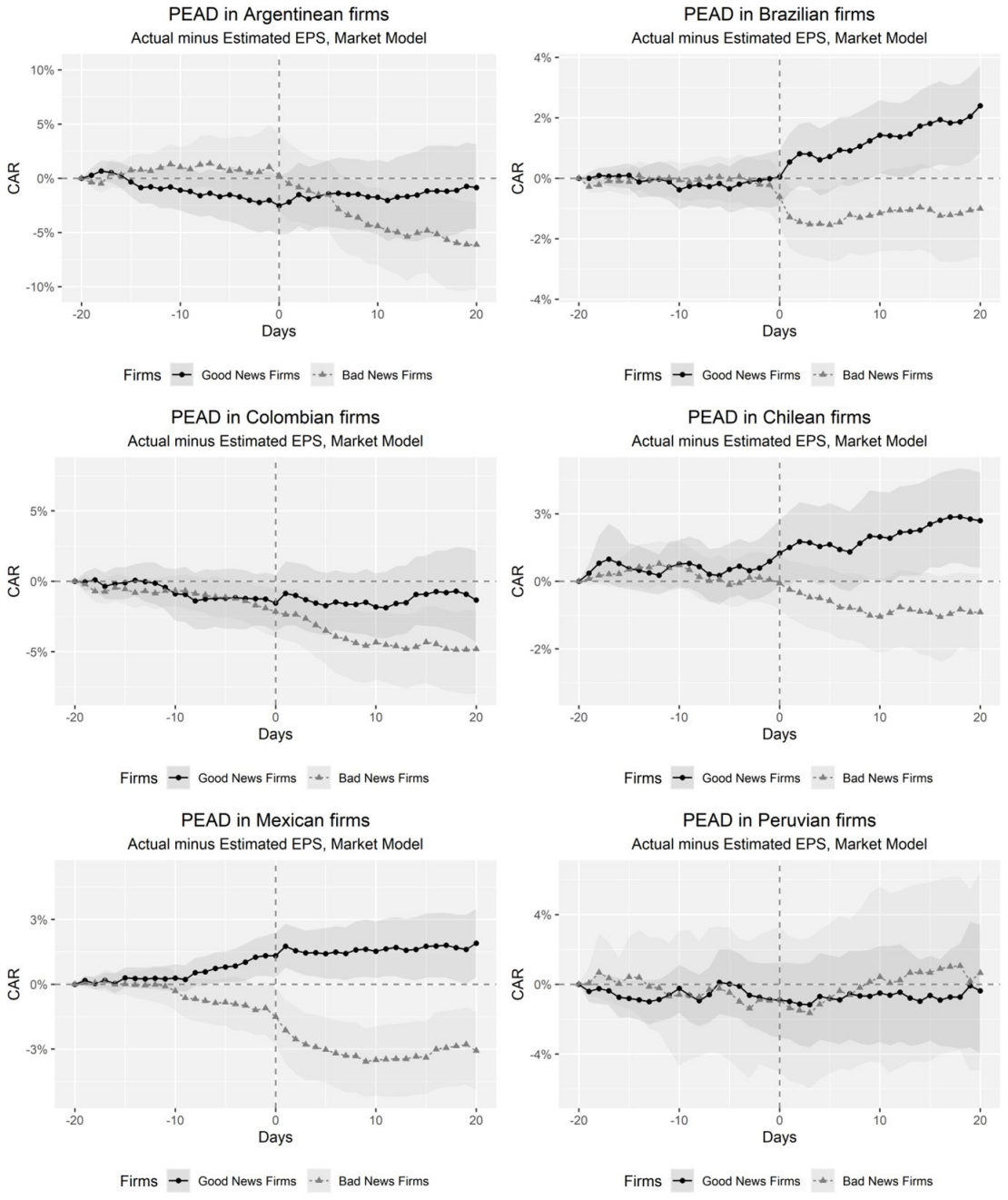

Figure 8. CAR around earnings announcements in Latin American countries. Argentina plot: 36 good news and 34 bad news events. Brazil plot: 335 good news and 478 bad news events. Colombia plot: 18 good news and 29 bad news events. Chile plot: 104 good news and 141 bad news events. Mexico plot: 185 good news and 228 bad news events. Peru plot: 38 good news and 42 bad news events

bad news stocks 20 days before the announcement and holding them until 20 days after. The PEAD anomaly implies that such a strategy should yield positive returns because the good news firms keep generating positive returns and the bad news firms keep generating negative returns. This is what happens with the firms listed in the main Latin American stock markets as well as those on the NYSE, either considering all of them or just the ones matched with the Latin American firms. The returns of these portfolios are statistically different from zero, as indicated by the CI represented by the black dots in each panel.

These portfolios yield gross returns of 3.46% for the Latin America sample, 3.17% for the full NYSE sample,

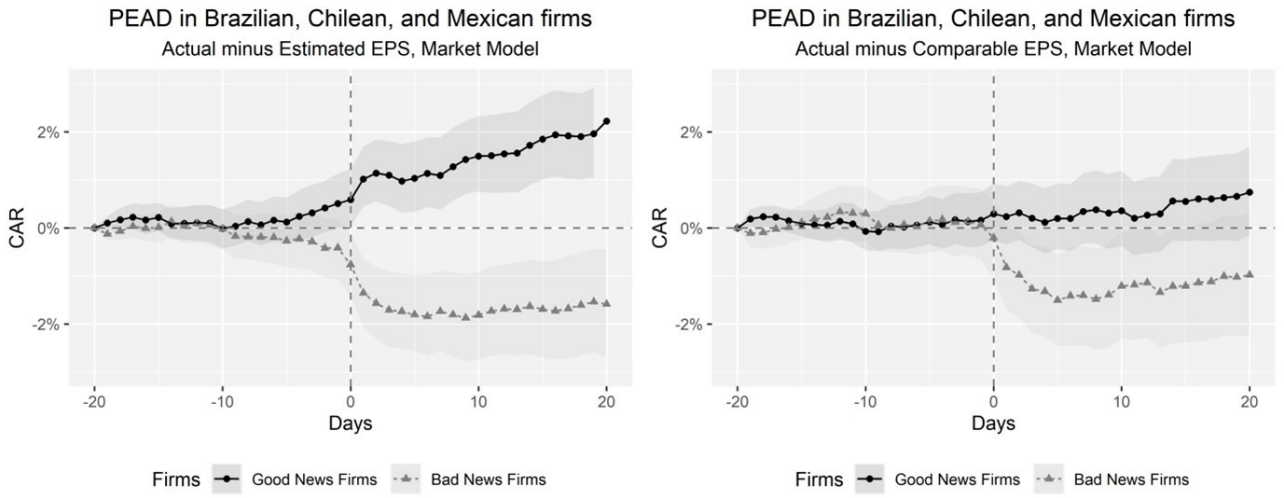

Figure 9. CAR around earnings announcements in Brazil, Chile, and Mexico. First plot: 624 good news and 847 bad news events. Second plot: 938 good news and 697 bad news events

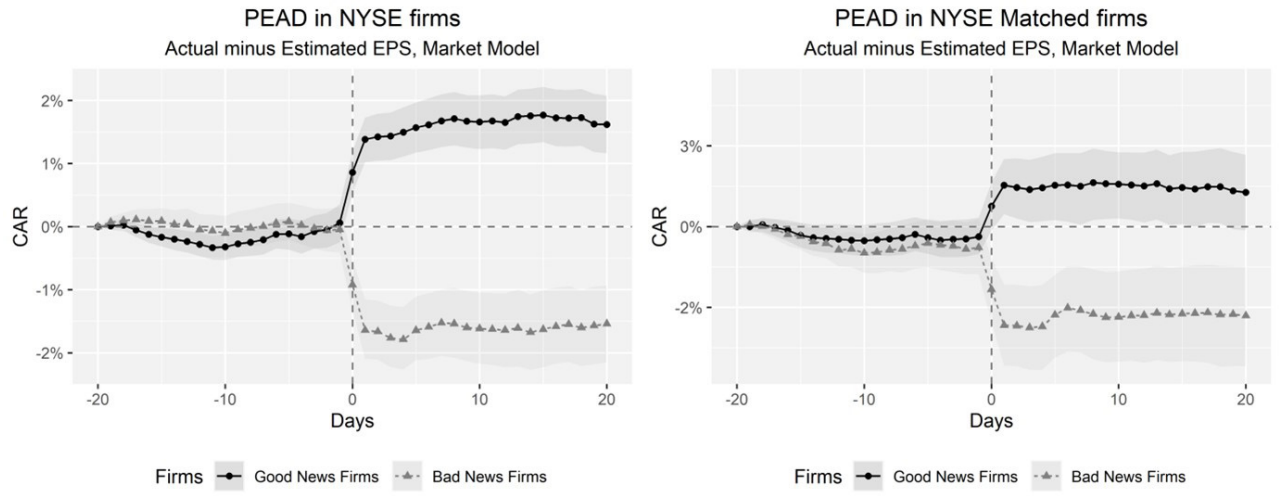

Figure 10. CAR around earnings announcements for NYSE and matched NYSE firms. First plot: 2,763 good news and 2,179 bad news events. Second plot: 525 good news and 515 bad news events

and 3.46% for the matched NYSE sample. Considering the countries separately, consistently with the results in Figure 8, this strategy generates statistically significant abnormal returns for the Brazilian (3.67%), Chilean (3.41%), and Mexican (5.20%) samples. Although the CAR results of the Latin American and the matched NYSE firms differ, the resulting buy-and-hold strategy yields similar results. Therefore, in the US, this strategy yields higher abnormal returns for those firms with characteristics similar to the Latin American ones. We better discuss the roles of firm characteristics and institutional (country-level) factors in the PEAD anomaly in the US and in Latin America in the next section.

5.2 Regression analyses

The previous literature has found that cultural differences can explain differences in stock market anomalies across countries (see, e.g., Moreira et al., 2019). Chui et al., (2010), for instance, analyze individualism and momentum, while Chui et al. (2010) and Dou et al. (2016) analyze both individualism and uncertainty avoidance, characteristics whose differences across countries were documented by

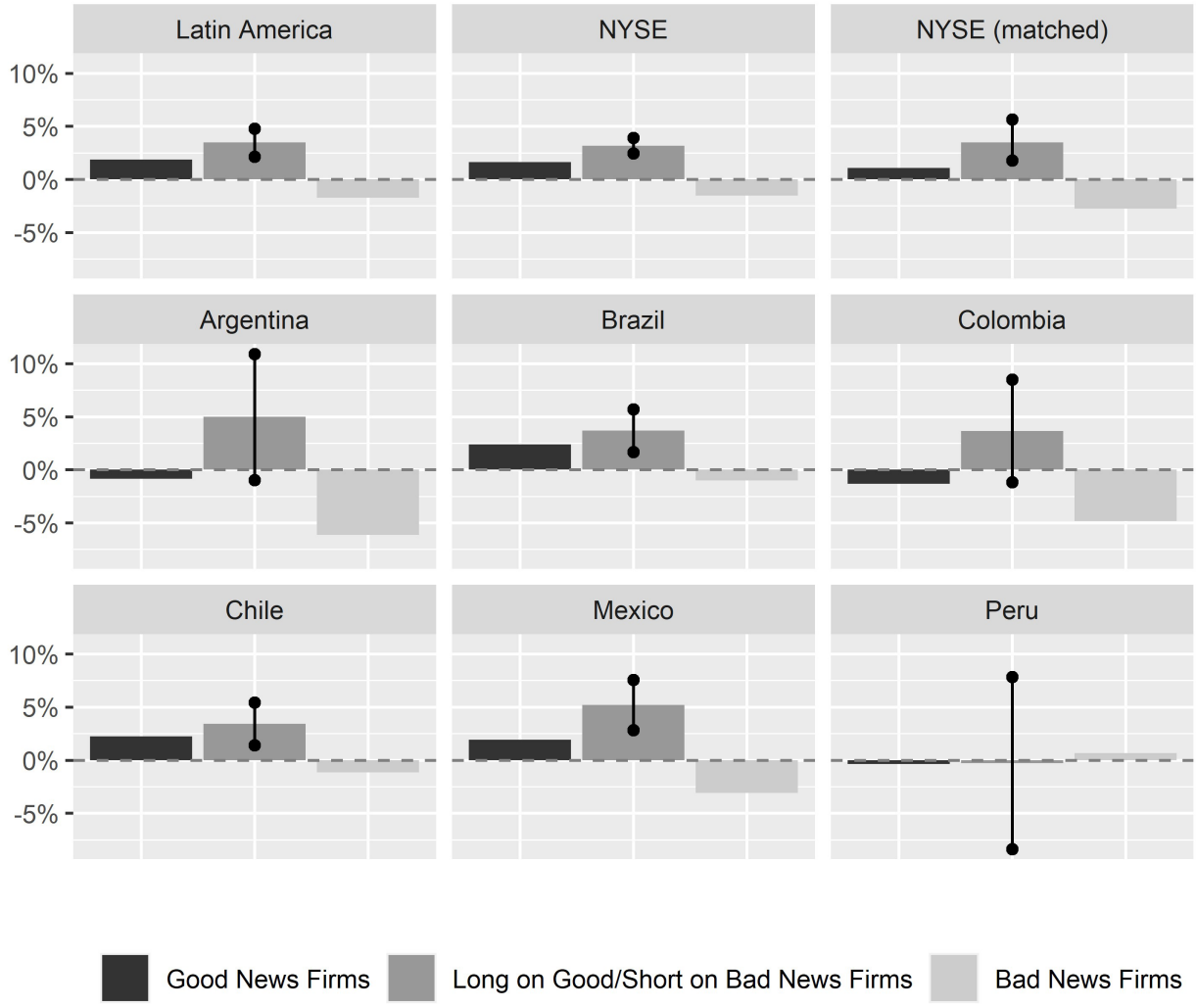

Figure 11. Returns of portfolios of good and bad news firms. The black connected dots represent confidence intervals for the long/short portfolios

Hofstede (2001). Figure 12 shows the different levels of financial development (index calculated from the variables collected from the World Bank database), individualism and uncertainty avoidance from Hofstede (2001), and a composite risk index (obtained from the International Country Risk Guide (ICRG), for which higher values indicate lower risk). From the Figure, we see how the US stands out from the Latin American countries with high levels of financial development and individualism as well as low levels of uncertainty avoidance. The US also has lower levels of risk (higher values), but during the sample period, Chile also presented lower risk compared to the other Latin American countries. Therefore, such differences might be important to explain the PEAD anomaly in the countries we study.

To investigate that, we proceed to some regression analyses. First, we investigate whether there are statistically significant differences in CAR between the samples (Latin America, NYSE, and NYSE Matched) and whether the amount of the effect of earnings surprises varies according to the sample. To test this, we regress the CAR against two sets of variables: (i) an indicator variable identifying which sample a given event belongs to, (ii) and an interaction between this indicator variable and a dummy identifying good news events. The results in Table 5 show, as seen in the analyses in the previous section, that the CAR are larger (more positive) under good news. However, no significant differences between the three samples appear, either in the CAR or in the effect of good news on the CAR. Since the samples involve firm-level characteristics

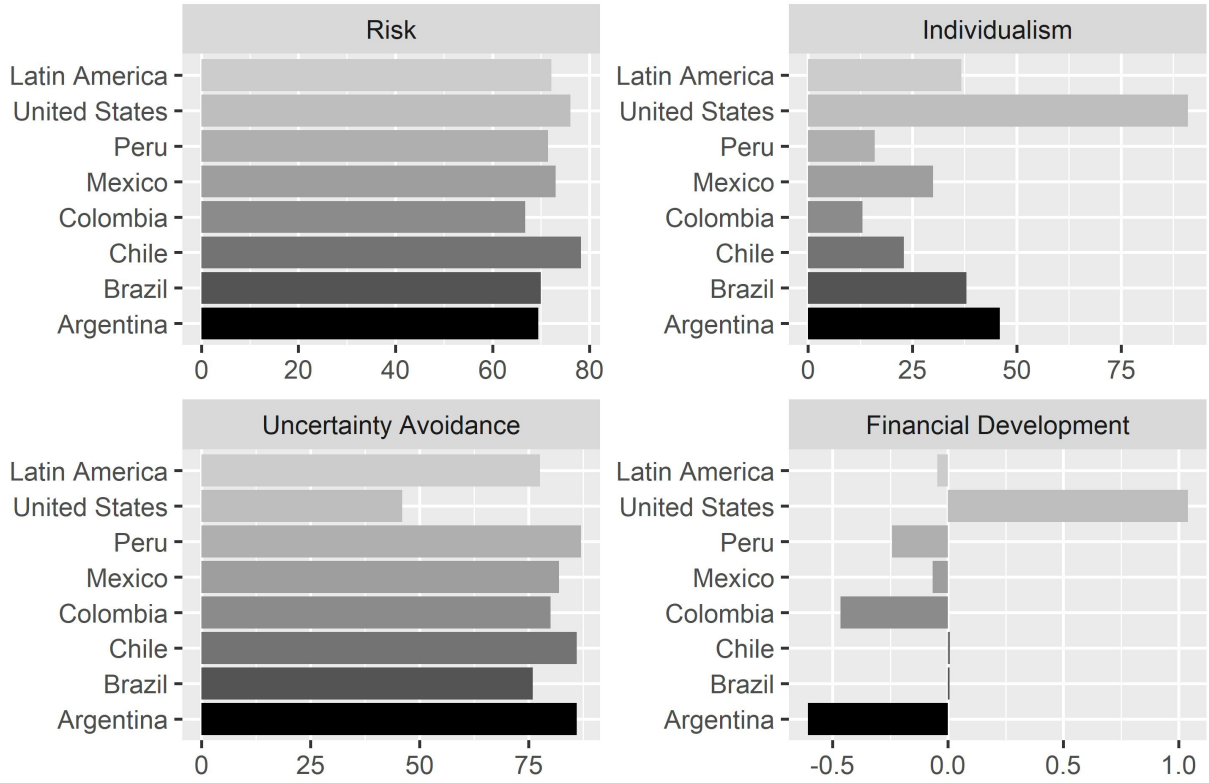

Figure 12. Institutional Variables

Table 5
Regression of the PEAD Analysis

	Dependent variable:
	CAR
Sample: NYSE	0.007
	(0.006)
Sample: NYSE Matched	-0.008
	(0.009)
News: Good	0.038***
	(0.007)
Sample: NYSE x News: Good	-0.009
	(0.008)
Sample: Matched NYSE x News: Good	0.001
	(0.012)
Constant	-0.080***
	(0.018)
Firm fixed effects	No
Year fixed effects	Yes
Observations	6,610
R^2	0.038
Adjusted R^2	0.035
F Statistic	11.344***

Note: *p<0.1; **p<0.05; ***p<0.01

that are constant over time, we did not include firm fixed effects to see their specific effects. If we do, the conclusions remain the same: only the good news dummy is statistically significant. Therefore, there are no statistically significant differences in the average CAR 20 days after the earnings announcement in Latin America and in the US, nor in their sensitivity to earnings news, regardless of firm characteristics matching.

Next, we explicitly evaluate how firm-level and country-level (institutional) variables help explain the CAR alongside the good news dummy for four different samples: all events, events from Latin America, events from NYSE, and events from the matched NYSE sample. Table 6 shows the results of these analyses, in which we can see that besides the good news (for all samples), the MTB is positively associated with CAR for the Latin America sample (Model 2), while larger firms have lower CAR in the matched NYSE sample. The proportion of minority interests in firms' capital (a variable obtained in Worldscope) is negatively associated with CAR for all samples, except the matched NYSE one. Country risk is only significant for the full sample, highlighting the difference between the US and the other countries.

Table 6
Regression of the PEAD Analysis: the effect of firm and institutional factors

	Dependent variable:			
	CAR			
	(1)	(2)	(3)	(4)
	Full sample	**Latin America**	**NYSE**	**Matched NYSE**
News: Good	0.036***	0.050***	0.031***	0.036**
	(0.005)	(0.010)	(0.006)	(0.015)
Number of Analysts	0.001	-0.0005	0.00001	0.005
	(0.001)	(0.003)	(0.002)	(0.007)
Size	-0.006	0.012	-0.009	-0.064***
	(0.009)	(0.025)	(0.010)	(0.024)
MTB	-0.00003	0.004*	-0.00003	0.003
	(0.00003)	(0.002)	(0.00004)	(0.005)
Minority Interests	-0.173**	-0.240*	-0.197*	0.020
	(0.076)	(0.135)	(0.113)	(0.130)
Country Risk	-0.005***	-0.0004	0.005	-0.013
	(0.002)	(0.003)	(0.009)	(0.022)
Financial Development	-0.089***	0.338***	0.018	-0.242
	(0.024)	(0.117)	(0.098)	(0.251)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,329	1,110	2,513	706
R^2	0.032	0.121	0.045	0.063
Adjusted R^2	-0.182	-0.107	-0.199	-0.682
F Statistic	6.449***	6.733***	5.868***	1.641*

Note: *p<0.1; **p<0.05; ***p<0.01

Finally, the level of financial development is relevant to explain the CAR for the full and the Latin America sample, which is expected, since there are different countries with different levels of financial development in that sample (see Figure 11). The regressions in Table 6 are estimated including firm and year fixed effects. Therefore, the institutional variables that do not vary across firms and time (uncertainty avoidance and individualism) are eliminated along with the firm fixed effects.

The results in Table 6 indicate that both firm- and country-level factors are relevant for explaining the CAR after earnings announcements in our different samples, but neither group of variables emerges as the most important one.

Finally, we evaluate how these firm and institutional factors may explain the effect of the good news on CAR for each of the samples. To do so, we estimate the model including interactions between the good news dummy and each other variable. The results are in Table 7. Now, with the interactions, the good news dummy alone is no longer significant, indicating its effect is fully captured by the interactions. The estimation results show that larger firms experience a larger impact of good news in the Latin America sample, but a smaller impact in the NYSE sample. Firms with a larger MTB in the NYSE sample experience a larger impact of good news, but this is not relevant for the other samples. Finally, countries' risk is only important to explain the effect of good news on CAR for the Latin America sample.

In sum, the results in this section show that different factors explain the PEAD anomaly in the Latin American (firms' size and country risk) and US markets (MTB and size). Again, the results indicate that both

Table 7
Regression of the PEAD Analysis: the effect of firm and institutional factors

	Dependent variable:			
	CAR			
	(1)	**(2)**	**(3)**	**(4)**
	Full Sample	**Latin America**	**NYSE**	**Matched NYSE**
News: Good	-0.149	-0.835	-0.054	0.058
	(0.633)	(0.733)	(0.429)	(1.130)
Number of Analysts	0.001	-0.00002	0.0002	0.006
	(0.002)	(0.003)	(0.002)	(0.008)
Size	-0.005	0.007	-0.004	-0.060**
	(0.010)	(0.025)	(0.011)	(0.024)
MTB	-0.0001	0.003	-0.0001*	0.002
	(0.00004)	(0.003)	(0.00004)	(0.005)
Minority Interests	-0.234**	-0.336*	-0.222	0.032
	(0.103)	(0.184)	(0.157)	(0.245)
Risk	-0.005**	0.003	0.003	-0.017
	(0.002)	(0.003)	(0.009)	(0.027)
FD	-0.093***	0.321***	0.011	-0.252
	(0.026)	(0.121)	(0.101)	(0.264)
News: Good x Num. of Analysts	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.003)	(0.001)	(0.003)
News: Good x Size	-0.002	0.011***	-0.010*	-0.015
	(0.003)	(0.004)	(0.005)	(0.011)
News: Good x MTB	0.0001	0.001	0.0001*	0.002
	(0.00005)	(0.002)	(0.00005)	(0.005)
News: Good x Minority Interests	0.084	0.123	0.042	-0.080
	(0.079)	(0.122)	(0.131)	(0.325)
News: Good x Risk	-0.001	-0.007*	0.004	0.005
	(0.002)	(0.003)	(0.005)	(0.014)
News: Good x Individualism	0.002	0.007		
	(0.004)	(0.005)		
News: Good x Uncert. Avoidance	0.004	0.011		
	(0.007)	(0.009)		
News: Good x Fin. Develop.	0.008	0.008	0.029	-0.048
	(0.021)	(0.132)	(0.026)	(0.060)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,329	1,110	2,517	706
R^2	0.032	0.132	0.049	0.072
Adjusted R^2	-0.184	-0.103	-0.195	-0.690
F Statistic	4.481***	5.104***	4.715***	1.370

Note: *p<0.1; **p<0.05; ***p<0.01

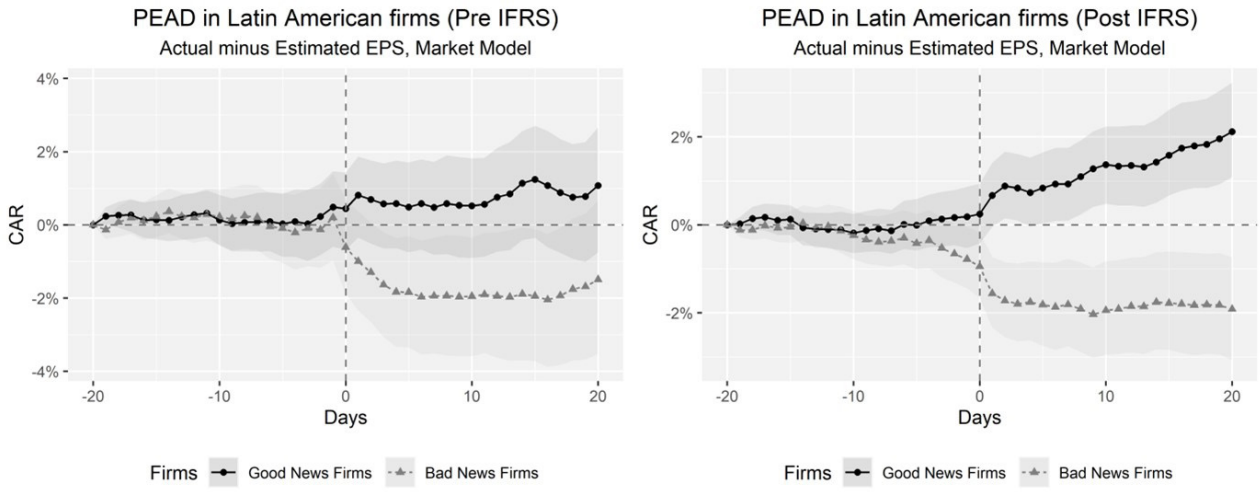

Figure 13. CAR around earnings announcements in Latin America pre and post IFRS adoption. First plot: 189 good news and 269 bad news events. Second plot: 527 good news and 663 bad news events

firm- and country-level factors are relevant for explaining the market reaction to the earnings announcements in our different samples, but neither group of variables emerges as the most important one.

The regressions in Table 6 are estimated with firm and time fixed effects. The institutional variables that are constant across firms inside each country and vary with time (risk and financial development) only appear with the interactions and the institutional variables that are constant across firms and over time (uncertainty avoidance and individualism) are eliminated along with firm fixed effects for the NYSE samples (no country variation).

5.3 Robustness analyses

In this section we evaluate a number of aspects that might be driving the results reported in the previous sections. First, we evaluate whether the adoption of IFRS by the countries we studied are interfering with our results, re-running our analysis for the pre- and post-adoption periods in Latin American countries (see Figure 4). In the pre-adoption sample, there are 189 announcements in the good news portfolio and 269 in the bad news portfolio, while in the post-adoption period these numbers are 527 and 663, respectively. The results are presented in Figure 13, which shows that the PEAD pattern forms for both subsamples, but it is only statistically significant for the post-adoption period. This might suggest accounting information became more important after IFRS adoption, but it is also possible that the post-adoption period generates statistically different CAR series for the good and bad news portfolios due to the higher number of observations.

Second, in order to avoid the pattern found in the results being due to model misspecifications, we repeat the analyses by calculating abnormal returns according to the constant mean model, where abnormal returns are estimated as the difference between the returns observed in the event window and the mean returns from the estimation window. As Figure 14 shows, the results remain the same.

Third, we analyze whether the PEAD also appears in the quarterly report announcements. This is important because quarterly announcements may be considered as timelier than annual announcements (Ball & Brown, 1968). Figure 15 shows that the PEAD results are also found for the quarterly announcements, both considering surprises calculated according to analysts' forecasts for the period (estimated EPS) or according to the earnings reported in the previous period (comparable EPS).

Finally, we consider a larger window to investigate how long the PEAD anomaly persists in the Latin American markets. Figure 15 shows the PEAD analysis for a three-month event window (60 days) for the Latin America, NYSE, and matched NYSE samples. Figure 16 shows that the PEAD pattern continues for up to 60 days, when the differences between the CAR of the good and bad news portfolios become no longer indistinguishable for the Latin America and the matched NYSE samples.

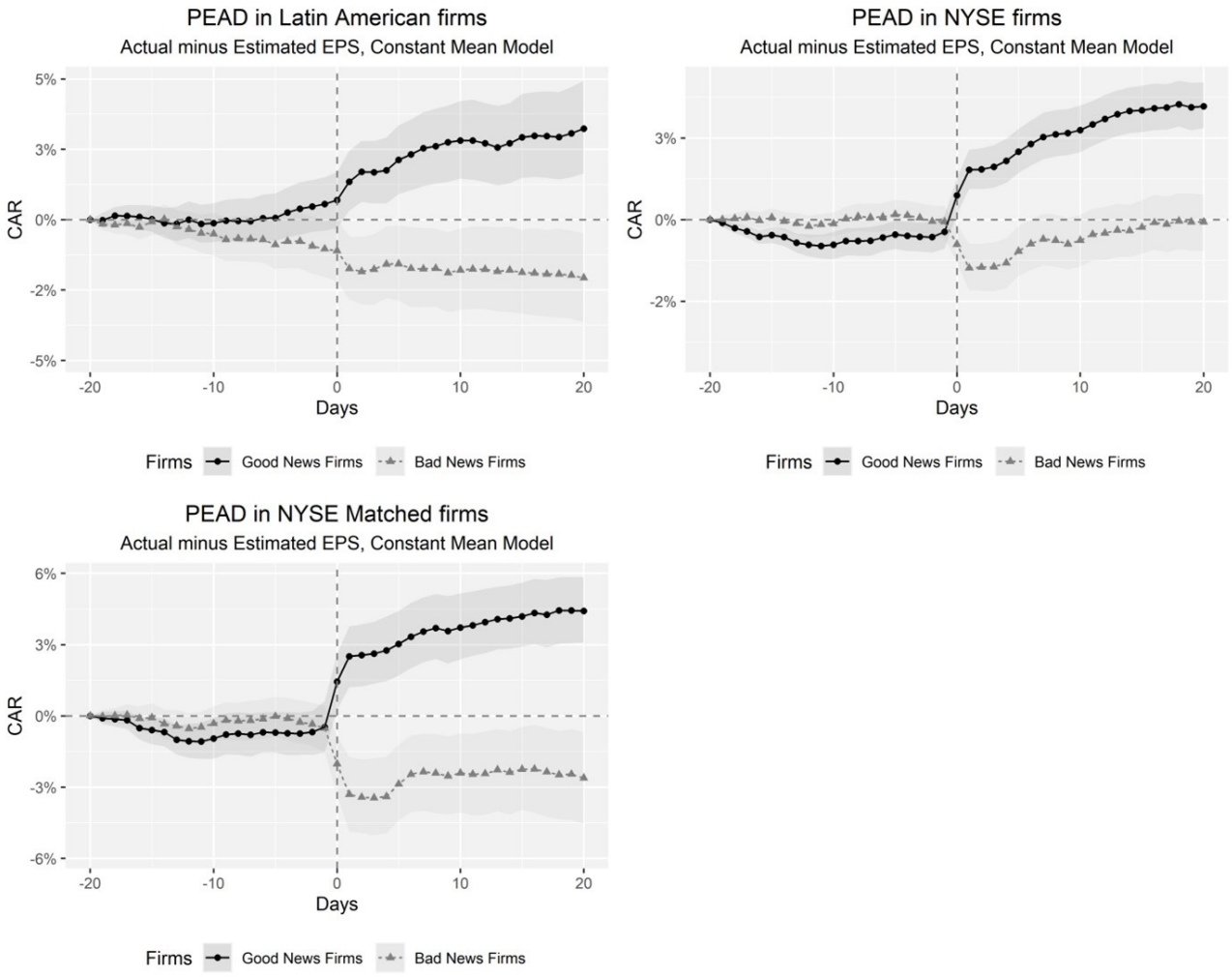

Figure 14. Alternative specifications. First plot: 384 good news and 494 bad news events. Second plot: 1,129 good news and 1,134 bad news events. Third plot: 349 good news and 350 bad news events

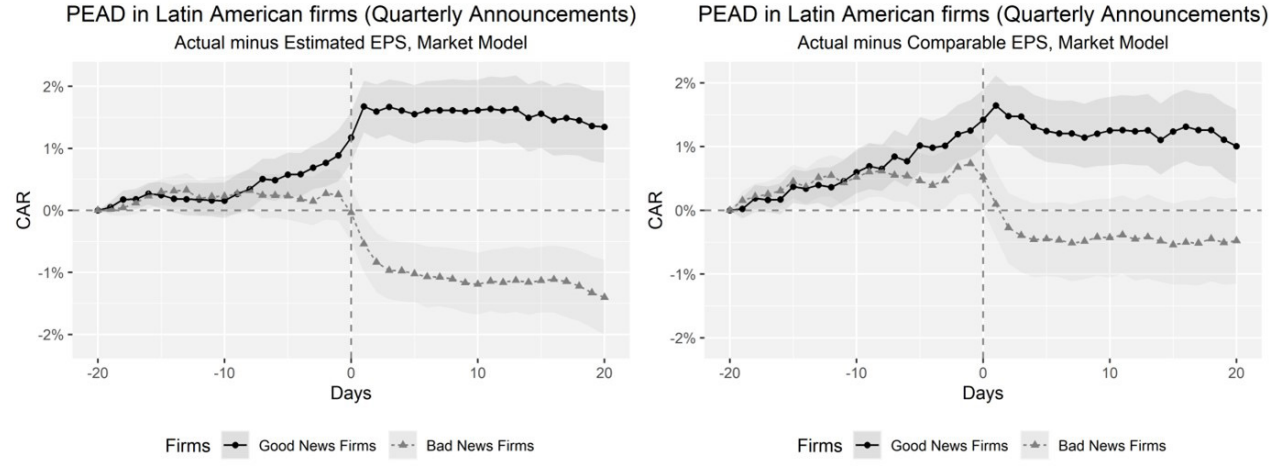

Figure 15. PEAD for the quarterly earnings announcements. First plot: 1,504 good news and 1,883 bad news events. Second plot: 1,991 good news and 1,929 bad news events

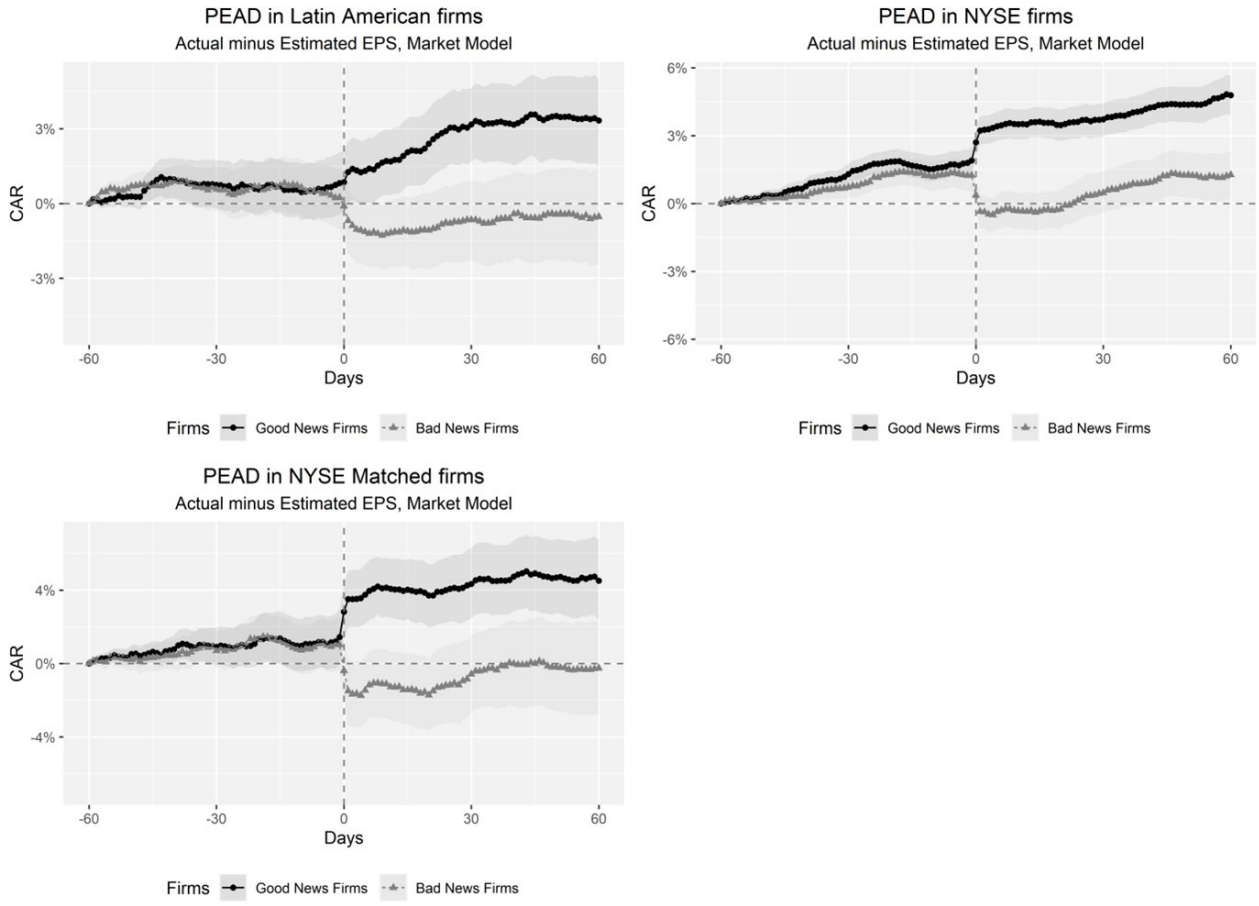

Figure 16. 60-day event window. First plot: 716 good news and 952 bad news events. Second plot: 2,763 good news and 2,179 bad news events. Third plot: 550 good news and 490 bad news events

6 Concluding remarks

In this research, we evaluated the post-earnings announcement drift (PEAD) for the Latin American stock markets. Using a sample of firms from of the stock markets of Argentina, Brazil, Chile, Colombia, Mexico, and Peru, we found the PEAD anomaly is alive and well in the Latin American markets, as well as in the US market. Investigating countries separately, we find the pattern for Brazil, Chile, and Mexico, the countries which present the largest number of observations. To investigate potential differences between the Latin American and the US markets, we also perform the analysis for a sample of NYSE firms, as well to a sample NYSE firms matched to the Latin American ones. For all three samples, we found the same pattern: good news firms yield positive abnormal returns while bad news firms yield negative abnormal returns. In further analyses, we found that the CAR for NYSE firms are slightly lower, and that they can be explained by minority interests in the firms' capital (both in Latin America and in the US) and, in Latin America, by the countries' level of financial development. The effect of good news on CAR, in turn, can be explained by firms' size and countries' risk in Latin America, while for the US sample, the effect of good news depends on firms' size and MTB.

The results imply that a long strategy on good and short strategy on bad news firms can consistently yield positive abnormal returns, which defies the EMH. While under the EMH one expects the market to react to the announcement of good or bad news, the reaction should not last long, once the information is available to the public after the financial statements are released, and arbitrage should return the abnormal returns to zero. Possible explanations for this anomaly under the EMH often rely on the CAPM not pricing risk factors associated with earnings surprises or on delayed price responses due to, for instance, transaction costs (Bernard & Thomas,

1989). Nevertheless, this discussion goes beyond the scope of this research.

Our results are important for two main reasons. First, our paper fills a gap in the PEAD literature by analyzing a general sample of Latin American firms, since the traditional literature focuses on more developed markets, mainly the US. Second, the implications of the results for portfolio selection might be useful for individual and institutional investors, since the PEAD anomaly represents an opportunity to gain abnormal returns based on annual and quarterly earnings surprises.

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