Latin America Headline News Impact on the Carry Trade

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Abstract:

Currency prices in Latin America have proven over time to be unstable. Influences on currency prices include macroeconomic factors such as global growth, inflation, global confidence, etc. Microeconomic factors impacting currency prices include commodity prices, economic growth, unemployment, housing prices, etc. The lack of stability of the countries in Latin America makes these countries vulnerable to changes in exchange rates and currency prices due to headline news items. Investors seek countries in Latin America for their high interest rates and high volatility to generate higher returns. As a result, the currency will often experience heighten changes in price levels.

We evaluate headline news from three countries within Latin America; Brazil, Colombia and Mexico. Headlines were taken from Bloomberg world news from 1999 to 2011. Headlines were then identified and coded into several categories including; global outlook, peso falls, commentary, DTF index, sell dollars, stocks fall, spending reserves, index falls, index rises, buy debt, inflation, IMF, auction, bond rise and banks profit. Additionally, the news item was associated with whether the currency price was at a local high or a local low in terms of price. After a local high the value of the currency would experience a drop or a decline in value. Conversely, after a local low, the value of the currency would experience an increase in value.

Four headlines were evaluated to determine a relationship between the headline and the market reaction to the news. The headlines evaluated were; peso drops, sell debt, peso rises and commentary. Each country went through various periods in which headline news contributed to volatility and variability of the currency price. Time periods were then evaluated to see if the returns of the carry trade differed. We found that time periods without a specific types of news differed to time periods with the specific types of news.

Keywords: Headline News, Emerging Markets, Currency Prices, Carry Trade, Emerging Markets, Latin America, Threshold Ratio

JELCODE: F21, F22, F23

Introduction

Need for Accurate Pricing

Forecasting and estimating foreign exchange prices are essential for both multi-national enterprises (MNE) and for traders. Accurately predicting prices allows for better hedging for MNE's allowing for better planning and managing budgets (Pantzalis, Simkins, Laux 2001). Traders need to accurate pricing to properly be compensated for the level of associated risk of the trade (Rubinstein 1988). The volatility of the Latin American currency creates challenges for accurate pricing for both traders as well as MNEs (Jacks, O'Rourke, Williamson 2011).

Forward Premium Puzzle:

The carry trade represents a violation of both purchasing power parity (PPP) and uncovered interest rate parity (UIP) (Bilson 1981). This phenomenon has been empirically demonstrated and proved in both mature and emerging markets (Bilson 1981). UIP demands the difference of the interest rates of the countries or the interest rate differential (IRD) is the expected change in price levels (Juselius 1992). Potential profit opportunity arises from short-term deviations of UIP (Chaboud, Wright 2005). Normal markets conditions allow for small positive excess returns. Bears markets which are markets by high volatility often receive large negative returns (Brunnermeier, Nagel, & Pederson, 2009).

The forward premium puzzle looks to explain excess returns from violations of uncovered interest rate parity (URIP). The two main theories include (a) time-varying foreign exchange risk premia and (b) investment forecast error. Spikes on dramatic increases in volatility increases the risk premia allowing for higher returns (Menkhoff et al. (2012a)). Another economic contributing factor for driving profits are from global imbalances in economic growth and inflation (Chistiansen, Ranaldo & Soderlind, 2011).

Challenge of PPP & UIP; Peso Problem:

Purchasing power parity and uncovered interest rate parity doesn't fully behavior of short-term or long-term behavior of exchange rates. Problems have been noted and explored (Neely, Sarno 2002). The models do not take into account the impact of both macro and micro economic news. Economic models which begin to incorporate news include the Muth model of 1961 which incorporates rational expectations (Muth 1961). Further development of the Muth framework comes from Frankel (Frankel 1979), Bomhoff and Korteweb (Bomhoff, Korteweb 1983), Copeland (Copeland 1984) and MacDonald (1985). These models assume arbitrage free conditions which forces the cancellation of emerging market effects, which eliminated the associated impact (Jackson, Thompson, Zheng 2005).

Emerging markets face additional challenges to foreign exchange price levels as compared with mature markets. The peso problem theory attempts to explain the behavior by stating in emerging markets unforeseen financial volatility is embedded into the price (Krasker 1980). Excess returns are demanded as the fears excess volatility.

Leverage Effect:

Premium puzzle's or mispricing's often occur in other asset classes outside of foreign exchange. For example, the stock market often will exhibit a leverage effect generating lower price levels after a period of higher volatility which can be caused by bad news (Black 1976). Many studies have empirically demonstrated evidence of leverage in the stock markets (Johnson, Soriano 2003). A common technique for determining leverage is the employment of ARCH and GARCH modeling (Bouchaud 2001).

Utilizing ARCH and GARCH allow for the data to demonstrate leverage as well as evidence of short-term memory and long-term memory of the financial time series data (Engle 2004). Markets with long-term memories are more often cautious with investments and generate lower volatility in reactions. On the other hand, markets with short-term memories are often more sensitive to changes in the market and will react more quickly.

The leverage effect takes into account the downside risk of price movements. Often prices have a larger downward movement than upward movement. Investors are often more concerned about losses than they are gains, which can result in irrational behavior such as selling an asset too early putting further downward pressure on the deflated asset. The leverage effect focuses on the downward side as opposed to the upward side or the asymmetric downside risk. The leverage effect does not typically occur in Latin American foreign exchange markets. Rather, price levels react similarly to downside and upside price changes (Maya, Gomez 2008).

Markets react differently to different types of news. Since there is no leverage effect, determining what is good news and what is bad news becomes a problematic. Different countries react differently to different types of news. This paper seeks to determine what types of news cause either an increase in foreign exchange price levels or a decrease in foreign exchange prices levels. As a result we do not define news as good or bad.

Data:

Price data including price levels of foreign exchange prices and interest rate prices were downloaded from Bloomberg. News data was taken from Bloomberg. Foreign exchange price charts were evaluated from 1998 through 2011. Every relative "high" or "low" was recorded. Using Bloomberg's charting tools; the associated news items for every "high" or "low" price were recorded. This information was then coded by the researcher into distinct groups of information.

Analysis:

Latin American Countries Have Greater Price Volatility

The carry trade generates additional excess returns due to the high variability in asset prices or high volatility. Variability in asset prices is relative. Some asset classes traditionally have higher or lower reactions to news and economic events. Other asset classes move much more slowly. Foreign exchange assets typically react much more quickly than other classes such as Treasury bonds (Blume, Klein 1991). Within the foreign exchange asset class, we find some countries have higher volatility than others. We evaluated the returns of the carry trade of Latin American countries of Argentina, Brazil, Colombia and Mexico from 1995 through 2011 against non-Latin American countries of Canada, Euro-Area, Japan, Sweden, Switzerland and the United Kingdom.

To find the carry trade we used the basic interest rate differential and allowed for appreciation of the domestic currency.

$$Excess\ Returns = \left(\frac{S_t^* - S_{t-1}^*}{S_{t-1}^*}\right) * \left(1 + i_{t-1}^* * \frac{Date_t - Date_{t-1}}{365}\right) + (i_{t-1}^* - i_{t-1}^{USD}) * \left(\frac{Date_t - Date_{t-1}}{365}\right) \quad (1.1)$$

$\left(\frac{S_t^* - S_{t-1}^*}{S_{t-1}^*}\right)$ is the appreciation of the spot currency price of the foreign currency? The forward prices are multiplied by the change of the date divided by 365 to take into account any weekend or holiday effects. $(i_{t-1}^* - i_{t-1}^{USD})$ is the interest rate differential between the foreign currency and the domestic currency.

The Latin American countries produced higher carry trade returns than the non-Latin American countries. Graph 1 demonstrates the cumulative returns of the carry trade of the Latin American countries. Graph 2 demonstrates the cumulative returns of the carry trade of the non-Latin American countries.
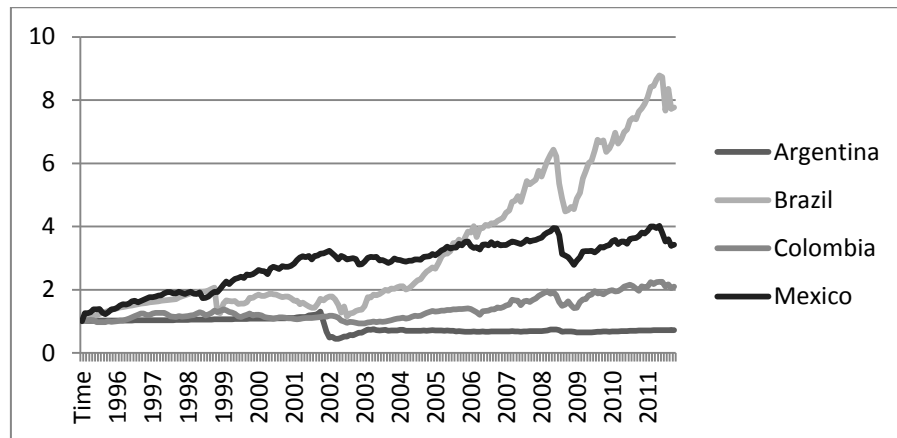
Graph 1: Cumulative Carry Trade Returns Latin American Countries
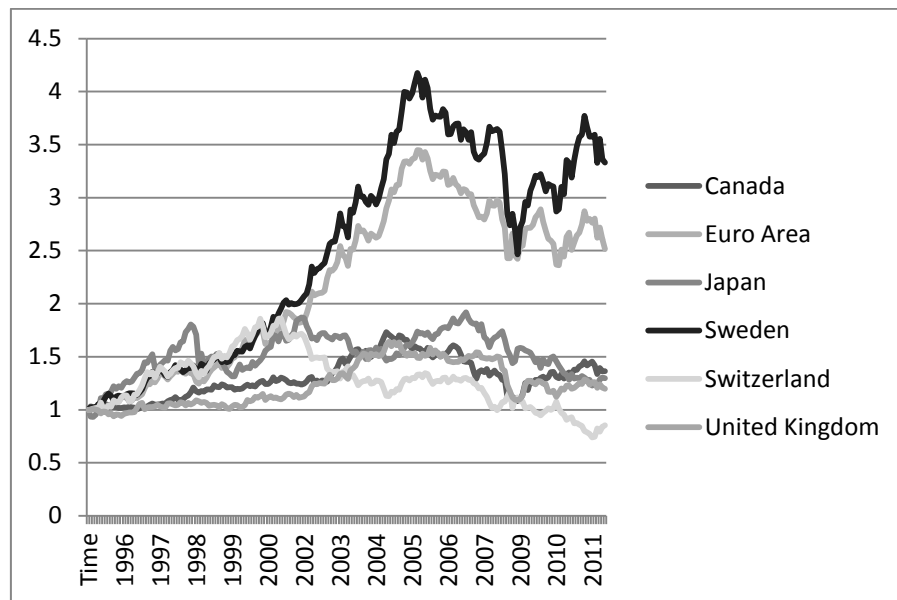
Graph 2: Cumulative Carry Trade Returns non-Latin American Countries

Combing the cumulative returns of the Latin American countries as well as the non-Latin American countries allows for easier comparison. Graph 3 demonstrates the summation of returns for the Latin American countries carry trade returns and the summation of the returns for the non-Latin American countries returns.
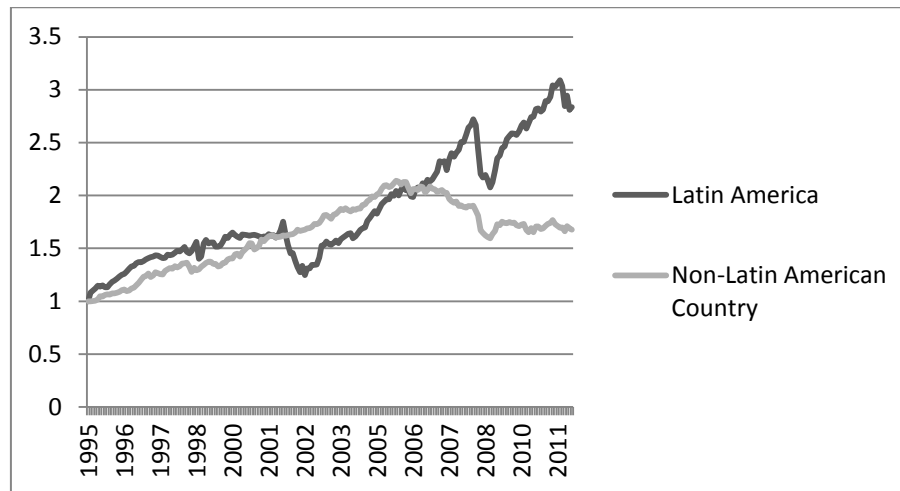
Graph 3: Latin American Countries and Non-Latin American Countries
Carry Trade Returns

Graph 3 demonstrates Latin American countries have nearly twice the carry trade returns as non-Latin American countries, indicating significantly higher variance in price levels. Countries in the Latin American region have higher price volatility than other more established countries such as Canada, Euro-Region, Japan, Sweden, Switzerland and the United Kingdom.

Tables 1, 2 and 3 demonstrate the descriptive statistics of each of the Latin American countries, non-Latin American countries and the summation of both the Latin and non-Latin American countries. The descriptive statistics include the average, standard deviation, skew, kurtosis, minimum, maximum and Sharpe ratio of the monthly carry trade returns over the US dollar.

Descriptive Statistics
Latin American Countries

	Argentina	Brazil	Colombia	Mexico
Average	-0.00068	0.01188	0.00424	0.00672
Standard Deviation	0.03973	0.05480	0.03355	0.03457
Skew	-5.21216	-1.97846	-0.18119	1.20319
Kurtosis	36.93395	15.39031	1.53088	16.51343
Minimum	-0.31310	-0.37831	-0.11696	-0.15982
Maximum	0.08791	0.23414	0.12559	0.26137
Sharpe	-0.01717	0.21680	0.12647	0.19430

Table 1 Descriptive Statistics Latin American Countries

Descriptive Statistics
Non-Latin American Countries

	Canada	Euro Area	Japan	Sweden	Switzerland	United Kingdom
Average	0.00184	0.00505	0.00181	0.00655	-0.00025	0.00119
Standard Deviation	0.02428	0.03000	0.03174	0.03306	0.03241	0.02402
Skew	-0.61674	-0.23503	-0.52045	-0.14192	-0.30952	-0.33086
Kurtosis	4.30082	0.96039	3.07494	1.14539	1.05010	1.96103
Minimum	-0.12807	-0.10637	-0.15766	-0.11593	-0.13707	-0.09799
Maximum	0.08942	0.09553	0.11184	0.10584	0.10225	0.08989
Sharpe	0.07568	0.16822	0.05692	0.19805	-0.00782	0.04942

Table 2 Descriptive Statistics Non-Latin American Countries

Descriptive Statistics

	Latin America	Non-Latin America
Average	0.00554	0.00270
Standard Deviation	0.02609	0.01539
Skew	-0.92799	-0.85431
Kurtosis	3.61914	3.05527
Minimum	-0.10206	-0.07724
Maximum	0.08621	0.03962
Sharpe	0.21232	0.17510

Table 3 Descriptive Statistics Summation of Latin and Non-Latin American Countries

As seen in Table 1, the Latin American countries exhibited higher volatility and higher returns. Argentina behaved differently than its neighbors of Brazil, Colombia and Mexico. Argentina was the only country in the region which produced negative carry trade returns for the time period of 1995 through 2011. The average monthly return was -0.00068, which produced a negative Sharpe ratio of -0.01717. The kurtosis was the highest of all countries which were evaluated at 36.93395. Brazil produced the most desirable trading results with a monthly average of 0.01188. The Sharpe ratio and maximum monthly returns were also the highest at 0.21680 and 0.23414 respectively. Additionally, Brazil also had the most extreme standard deviation as well as minimum monthly return of 0.0540 and -0.37381 respectively.

As seen in Table 2, the non-Latin American countries exhibited lower volatility and lower returns. The pricing behavior was much more stable. The two notable countries were Sweden and the Euro Area which produced the highest Sharpe ratios for the monthly carry trade. Sweden had a Sharpe Ratio of 0.19805 and the Euro Area had monthly returns of 0.16822. The standard deviation of Sweden was 0.0331 and the standard deviation of the Euro Area was 0.03000.

Comparing the summation of the countries in Table 3 demonstrates the Latin American countries having almost twice the monthly returns compared to the non-Latin American countries of 0.00554 and 0.00270 respectively. The standard deviation is 0.026 for Latin American countries compared with 0.015 for non-Latin American countries. The maximum one-month carry trade return for Latin American countries was 0.08621 compared with a maximum one-month carry trade return for non-Latin American countries of 0.03962. The Sharpe ratio for Latin American countries was 0.21232 compared to the non-Latin American countries of 0.17510.

Regression Analysis of the Carry Trade of Latin American Countries

Carry trade regression analysis was done on each of the four Latin American countries. The currency returns were regressed against the interest rate differentials (IRD). The IRD is the difference in the interest rate of the country in question and the United States. The basic carry trade mechanism is to sell the lower interest rate sovereign bond (thus paying a lower rate) and buys the higher interest rate sovereign bond (thus earning a higher rate). The difference or spread of the two interest rates becomes the main driver of earnings of the carry trade. Traders also have the opportunity to make an additional source of revenue through the appreciation of their home currency. However, the IRD is the main source of excess gains for the carry trade trader.

The regressions utilized were the currency appreciation regressed against the interest rate differential in a cross regression.

$$r = \propto + \beta * w + \mu \ (1.2)$$

Table 4 demonstrates the regression statistics for the Latin American countries using the carry trade. The statistics include the slope, intercept, r-square, F and threshold. Brazil had the highest slope of 0.03918 and Argentina had the lowest slope of -0.16438. The highest level of intercept was Argentina of 0.00481 and the lowest intercept is -0.00578. The threshold ranged from -0.063 (Colombia) to 0.207 (Mexico).

1998-2011

Argentina

				Threshold
Slope (beta)	-0.16438	0.00481	Intercept (alpha)	**0.029**
+/-	0.02778	0.00464	+/-	
r-square	0.18525	0.04973	s(y)	
F	35.01489	154.00000	df	
regression ss	0.08658	0.38080	residual ss	

Brazil

Slope (beta)	0.03918	-0.00578	Intercept (alpha)	**0.147**
+/-	0.03400	0.00590	+/-	
r-square	0.00855	0.06606	s(y)	
F	1.32775	154.00000	df	
regression ss	0.00579	0.67213	residual ss	

Colombia

Slope (beta)	-0.02423	-0.00152	Intercept (alpha)	**-0.063**
+/-	0.01957	0.00286	+/-	
r-square	0.00986	0.03567	s(y)	
F	1.53295	154.00000	df	
regression ss	0.00195	0.19591	residual ss	

Mexico

Slope (beta)	0.01980	-0.00409	Intercept (alpha)	**0.207**
+/-	0.01377	0.00261	+/-	
r-square	0.01325	0.02829	s(y)	
F	2.06779	154.00000	df	
regression ss	0.00166	0.12328	residual ss	

Table 4 Regression of Carry Trade

Table 5 demonstrates the thresholds from each of the rolling regressions of 1999-2008, 2000-2009, 2001-2010 and 2002-2011. The full regressions for each time periods in Appendix A-D. The threshold table allows for analysis of how the threshold changes over time.

Threshold Table

	1999-2008	2000-2009	2001-2010	2002-2011	Average	Stnd Dev	1999-2011
Argentina	0.020	0.024	0.029	0.034	0.027	0.006	0.029
Brazil	0.206	0.069	0.039	0.042	0.089	0.079	0.147
Colombia	-0.125	-0.018	0.037	0.039	-0.017	0.077	-0.063
Mexico	0.235	0.236	0.200	0.213	0.221	0.018	0.207

Table 5 Threshold Table

The threshold for Argentina increased from 0.020 to 0.035 with an average of 0.027. The overall threshold for the entire time period was 0.029. Brazil had the most fluctuation in their threshold with a standard deviation of 0.079. The threshold dropped from 0.206 to 0.069 from the first period to the second period. Colombia also experienced significant deviations in the threshold measurements from -0.0125 in period 1 to 0.039 in period 4. The overall threshold was -0.063, the only negative threshold. Mexico's threshold ranged from 0.200 to 0.236, which the largest change from period 2 to period 3 where the threshold dropped from 0.236 in period 2 to 0.200 in period 3.

The threshold levels were further used to develop the carry trade for each of the four Latin American countries. The threshold becomes a signal to enter into the carry trade or to not enter the carry trade. In the time period from 1998 through 2011 there are 157 monthly opportunities to enter the trade. Table 6 demonstrates the number of possibilities for the overall time period as well as the smaller rolling time periods, which have different associated thresholds which were found in the rolling regressions. Table 7 demonstrates the percentage of possible trades within the total sample as well as the rolling time periods as previously described.

	Total Count of Carry Trade				
	1998-2011	1999-2008	2000-2009	2001-2010	2002-2011
Argentina	87	12	100	87	84
Brazil	62	12	88	100	100
Colombia	101	138	85	41	38
Mexico	38	16	15	41	34

Table 6 Total Count of Carry Trade

	Percentage of Carry Trade Trades				
	1998-2011	1999-2008	2000-2009	2001-2010	2002-2011
Argentina	55%	8%	64%	55%	54%
Brazil	39%	8%	56%	64%	64%
Colombia	64%	88%	54%	26%	24%
Mexico	24%	10%	10%	26%	22%

Table 7 Percentage of Carry Trade Trades

Mexico had the least number of opportunities to invest in the carry trade utilizing the threshold as a signal. Colombia had the most opportunities with 64% of the time creating an opportunity to invest in the carry trade. The highest frequency for opportunities was in the first period from 1999-2008, where 88% of the time the opportunity was above the threshold. Brazil and Argentina both had small opportunities when evaluating the threshold during the first period of 1999-2008, with only an investment opportunity of 8% of the time.

Latin American News

To determine the impact of news as presented by Bloomberg, high foreign exchange price levels were determined visually by looking at the foreign exchange price graph. The countries from Latin American which were included in the study are Brazil, Colombia and Mexico. Argentina was dismissed from the study because their currency was pegged to the US dollar and thus news didn't have much of an impact on how the currency price levels changed.

Appendices E-G contains the headline news from as observed from the highs and lows of the foreign exchange price levels. Altogether there were 230 observations for the 3 countries, with Mexico having the most observations of 82. Table 8 demonstrates the headline observations including number of observations per country, number of high observations, number of low observations and number of various codes for headline news.

Headline Observations

	Observations	High	Low	Codes
Brazil	74	39	35	25
Colombia	74	38	36	36
Mexico	82	40	42	26
Total	230	117	113	

Table 8 Headline News Observations

The news was coded based on the headlines at the researcher's discretion. The codes ranged budget summary to surplus to IMF. None of the news is categorized as "good" or "bad" news. Rather the news is associated with whether the price level was at a local high price or a local low price. The coding is seen in the Appendices E-G.

The four most common headlines among the three countries are: "Peso drops", "Sell Debt", "Peso Rises" and "Commentary." These four headlines are evaluated further. Peso drops has a total of 24 observations. Sell debt has a total of 28 observations. Peso Rises has a total of 22 observations. And finally commentary has a total of 29 observations.

Table 9 demonstrates the observations come from each of the three countries equally. Each country has 8 total observations, representing 33% each.

Peso Drops

Brazil	8	33%
Colombia	8	33%
Mexico	8	33%

Table 9 Peso Drops Country Observations

Table 10 breaks down the Peso Drops observations into high and low for total count and for each country. Colombia had the most "high" observations of 75%. Whereas Mexico had the most "low" observations of 63%.

Peso Drops			Brazil		Colombia		Mexio	
High	14	58%	5	63%	6	75%	3	38%
Low	10	42%	3	38%	2	25%	5	63%

Table 10 Peso Drops High / Low Observations

Table 11 demonstrates the Peso Drops observations by year. The table demonstrates a breakdown of each of the highs and lows associated with the Peso Drops. There are no observations for 2001, 2004, 2005, 2006 or 2008.

	Peso Drops			
	High	Low	High	Low
1999	4	4	50%	50%
2000	0	1	0%	100%
2001				
2002	1	0	100%	0%
2003	3	1	75%	25%
2004				
2005				
2006				
2007	1	0	100%	0%
2008				
2009	2	0	100%	0%
2010	1	2	33%	67%
2011	1	2	33%	67%

Table 11 Peso Drops Annual Comparison High / Low Observations

Table 12 demonstrates a breakdown of the total number of observations by country every year. Just like the breakdown in high and low, the breakdown by country shows a lack of observations in years 2001, 2004, 2005, 2006 and 2008. In 2002, Brazil had 100% of all Peso Drops observations.

	Peso Drops					
	Brazil	Colombia	Mexico	Brazil	Colombia	Mexico
1999	6	1	1	75%	13%	13%
2000	1	0	0	100%	0%	0%
2001						
2002	1	0	0	100%	0%	0%
2003	3	1	0	75%	25%	0%
2004						
2005						
2006						
2007	0	1	0	0%	100%	0%
2008						
2009	0	2	0	0%	100%	0%
2010	0	3	0	0%	100%	0%
2011	0	0	3	0%	0%	100%

Table 12 Peso Drops Annual Comparison by Country

Table 13 depicts the number of observations of the Sell Debt code. The majority of the observations are from Brazil, with 46%. Colombia and Mexico split the difference of 25% and 29% respectively.

Sell Debt		
Brazil	13	46%
Colombia	7	25%
Mexico	8	29%

Table 13 Sell Debt Country Observations

Table 14 demonstrates the breakdown of highs and lows within the Sell Debt code. The majority of the codes are high, 82% of the observations. The table demonstrates the observations of highs and lows of each of the three countries. Brazil and Colombia are almost equally split in their highs and lows. Mexico has more lows than high observations.

Sell Debt			Brazil		Colombia		Mexico	
High	23	82%	7	54%	4	57%	3	38%
Low	5	18%	6	46%	3	43%	5	63%

Table 14 Sell Debt High / Low Observations

Table 15 demonstrates the Sell Debt observations by year. The table demonstrates a breakdown of each of the highs and lows associated with the Sell Debt code. There are no observations for 2007, 2009, 2010 or 2011. The highs represent 100% of the population in 2003 and 2004. In 2002 and 2005 the lows represent 100% of the population.

	Sell Debt			
	High	Low	High	Low
1999	1	2	33%	67%
2000	3	1	75%	25%
2001	4	1	80%	20%
2002	0	3	0%	100%
2003	1	0	100%	0%
2004	3	0	100%	0%
2005	0	1	0%	100%
2006	2	3	40%	60%
2007				
2008	2	1	67%	33%
2009				
2010				
2011				

Table 15 Sell Debt Annual Comparison High / Low Observations

Table 16 demonstrates a breakdown of the total number of observations by country every year. Just like the breakdown in high and low, the breakdown by country shows a lack of observations in years 2008, 2009, 2010 and 2011. In 1999 and 2008, Brazil had 100% of the observations. In 2003 and 2006 Colombia had all of observations. In 2000 and 2005 Mexico had 100% of all of the observations.

| | | Sell Debt | | | | |
	Brazil	Colombia	Mexico	Brazil	Colombia	Mexico
1999	3	0	0	100%	0%	0%
2000	0	0	4	0%	0%	100%
2001	2	1	2	40%	20%	40%
2002	3	0	0	100%	0%	0%
2003	0	1	0	0%	100%	0%
2004	2	0	1	67%	0%	33%
2005	0	0	1	0%	0%	100%
2006	0	5	0	0%	100%	0%
2007						
2008	3	0	0	100%	0%	0%
2009						
2010						
2011						

Table 16 Sell Debt Annual Comparison by Country

Table 17 depicts the number of observations of the Peso Rises code. The majority of the observations are from Mexico, with 45%. Brazil and Colombia split the difference of 27% and 27% respectively.

Peso Rises		
Brazil	6	27%
Colombia	6	27%
Mexico	10	45%

Table 17 Peso Rises Country Observations

Table 18 demonstrates the breakdown of highs and lows within the Peso Rises code. The highs and lows are fairly split with highs representing 45% of the population and lows representing 55%. The table demonstrates the observations of highs and lows of each of the three country. Colombia and Mexico are almost equally split in their highs and lows. Brazil has significantly more lows than highs of 83% lows compared with only 17% highs.

Peso Rises			Brazil		Colombia		Mexico	
High	10	45%	1	17%	3	50%	6	60%
Low	12	55%	5	83%	3	50%	4	40%

Table 18 Peso Rises High / Low Observations

Table 19 demonstrates the Peso Rises observations by year. The table demonstrates a breakdown of each of the highs and lows associated with the Peso Rises code. There are no observations for 1999, 2002, 2005, 2006 or 2007. The highs represent 100% of the population in 2004. In 2010 and 2011 the lows represent 100% of the population.

Peso Rises

	High	Low	High	Low
1999				
2000	1	2	33%	67%
2001	1	2	33%	67%
2002				
2003	1	2	33%	67%
2004	2	0	100%	0%
2005				
2006				
2007				
2008	2	1	67%	33%
2009	2	4	33%	67%
2010	0	1	0%	100%
2011	0	1	0%	100%

Table 19 Peso Rises Annual Comparison High / Low Observations

Table 20 demonstrates a breakdown of the total number of observations by country every year. Just like the breakdown in high and low, the breakdown by country shows a lack of observations in years 1999, 2002, 2005, 2006 and 2007. In 2011 Colombia had all of observations. In 2004 and 2010 Mexico had 100% of all of the observations.

Peso Rises

	Brazil	Colombia	Mexico	Brazil	Colombia	Mexico
1999						
2000	1	0	2	33%	0%	67%
2001	1	0	2	33%	0%	67%
2002						
2003	2	1	0	67%	33%	0%
2004	0	0	2	0%	0%	100%
2005						
2006						
2007						
2008	1	2	0	33%	67%	0%
2009	1	2	3	17%	33%	50%
2010	0	0	1	0%	0%	100%
2011	0	1	0	0%	100%	0%

Table 20 Peso Rises Annual Comparison by Country

Carry Trade in Different Time Periods

To demonstrate the carry trade changes based on news, we broke up the time period into two periods one with news on sell debt and one without news on sell debt. This was done for each of three countries. The time period for news with sell debt was from 2001-2002. The time period for no news on sell debt was from 2009-2010. We then ran hypothesis

tests to determine whether the means of the two sample set per country were the same. Table 21 is the results from the hypothesis test for Brazil. Table 22 is the results from the hypothesis test for Colombia and Table 23 is the results from the hypothesis test for Mexico.

T-Test: Paired Two Sample for Means

Brazil

	Variable 1	Variable 2
Mean	-0.008995411	0.022594584
Variance	0.00644781	0.00116162
Observations	24	24
Pearson Correlation	-0.214933953	
Hypothesized Mean Difference	0	
df	23	
t Stat	-1.651058791	
P(T<=t) one-tail	0.056158337	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.112316674	
t Critical two-tail	2.06865761	

Table 21 Hypothesis Test for Brazil

T-Test: Paired Two Sample for Means

Colombia

	Variable 1	Variable 2
Mean	-0.006342578	0.022594584
Variance	0.000594541	0.00116162
Observations	24	24
Pearson Correlation	-0.092840971	
Hypothesized Mean Difference	0	
df	23	
t Stat	-3.243331928	
P(T<=t) one-tail	0.00179336	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.00358672	
t Critical two-tail	2.06865761	

Table 22 Hypothesis Test for Colombia

t-Test: Paired Two Sample for Means

Mexico

	Variable 1	Variable 2
Mean	0.003744952	0.008692052
Variance	0.000494449	0.000735968
Observations	24	24
Pearson Correlation	0.324773797	
Hypothesized Mean Difference	0	
df	23	
t Stat	-0.836918267	
P(T<=t) one-tail	0.205625202	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.411250405	
t Critical two-tail	2.06865761	

Table 23 Hypothesis Test for Mexico

The means were different for each country based on each time set. The news changes the overall mean for the carry trade.

Conclusions

Countries in Latin America are more volatile with their price levels than other mature developed economies. When evaluating Argentina, Brazil, Colombia and Mexico against developed countries such as Canada, Euro Area, Japan, Sweden, Switzerland and the United Kingdom we find more stability in the latter group. We are able to further demonstrate this by evaluating the carry trade returns for each country as well as the summation of each group. We see that on average the countries in the Latin American group have more variability in price levels than those of the non-Latin American group.

We further investigated the returns of the carry trade of the Latin American countries by regressing price levels against the interest rate differentials. We found that these countries exhibited unstable price levels which generated positive excess returns for the carry trade. We were able to then demonstrate utilizing the threshold as generated from dividing the slope by the intercept as a trigger for the carry trade. We found that more often than not the signal generated a positive sign to enter into the trade indicating further instability.

Based on the theory of the leverage effect of bad news having a larger effect on the asset than good news we went to investigate the impact of news on foreign exchange prices in Latin America. Further research demonstrated there is no asymmetric effect on price levels based on whether the news is good or bad. As a result, we focused purely on news as provided and generated by Bloomberg. Since most in the financial markets utilize Bloomberg terminals, Bloomberg information becomes news and as a result becomes embedded into the price of the asset.

We found 230 observations of three countries within Latin America, Brazil, Colombia and Mexico. We were able to observe local high and low prices for each of the countries. At each local high or low, we were able to collect the news

of the day as defined by Bloomberg. This data was then coded. We analyzed the data as related to each country, year, and high / low.

We then utilized the natural breaks in data from frequent coded pieces of news to determine whether the means of the carry trade returns differed with frequent specific news to that of a time period without frequent news. We found the means of those returns to be different.

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Appendix A: Rolling Regression 1999 - 2008

1999-2008

Argentina

				Threshold
Slope (beta)	-0.16497	0.00335	Intercept (alpha)	0.020
+/-	0.03165	0.00579	+/-	
r-square	0.18720	0.05655	s(y)	
F	27.17707	118.00000	df	
regression ss	0.08692	0.37740	residual ss	

Brazil

Slope (beta)	0.05052	-0.01042	Intercept (alpha)	0.206
+/-	0.03789	0.00749	+/-	
r-square	0.01484	0.07140	s(y)	
F	1.77776	118.00000	df	
regression ss	0.00906	0.60161	residual ss	

Colombia

Slope (beta)	-0.02621	-0.00327	Intercept (alpha)	-0.125
+/-	0.01848	0.00305	+/-	
r-square	0.01676	0.03337	s(y)	
F	2.01094	118.00000	df	
regression ss	0.00224	0.13137	residual ss	

Mexico

Slope (beta)	0.02217	-0.00522	Intercept (alpha)	0.235
+/-	0.01380	0.00297	+/-	
r-square	0.02141	0.02742	s(y)	
F	2.58197	118.00000	df	
regression ss	0.00194	0.08869	residual ss	
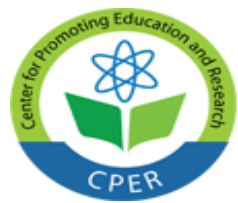
Appendix B: Rolling Regression 2000-2009

2000–2009

Argentina — Threshold 0.024

Slope (beta)	-0.16495	0.00395	Intercept (alpha)
+/-	0.03198	0.00594	+/-
r-square	0.18396	0.05671	s(y)
F	26.60120	118.00000	df
regression ss	0.08556	0.37952	residual ss

Brazil — Threshold 0.069

Slope (beta)	0.06517	-0.00449	Intercept (alpha)
+/-	0.02932	0.00524	+/-
r-square	0.04018	0.05253	s(y)
F	4.93930	118.00000	df
regression ss	0.01363	0.32556	residual ss

Colombia — Threshold -0.018

Slope (beta)	-0.02969	-0.00054	Intercept (alpha)
+/-	0.01983	0.00325	+/-
r-square	0.01864	0.03557	s(y)
F	2.24155	118.00000	df
regression ss	0.00284	0.14933	residual ss

Mexico — Threshold 0.236

Slope (beta)	0.01757	-0.00415	Intercept (alpha)
+/-	0.01499	0.00285	+/-
r-square	0.01151	0.02790	s(y)
F	1.37364	118.00000	df
regression ss	0.00107	0.09186	residual ss

Appendix C: Rolling Regression 2001-2010

2001–2010

Argentina — Threshold 0.029

Slope (beta)	-0.16573	0.00484	Intercept (alpha)
+/-	0.03241	0.00608	+/-
r-square	0.18143	0.05677	s(y)
F	26.15407	118.00000	df
regression ss	0.08428	0.38026	residual ss

Brazil — Threshold 0.039

Slope (beta)	0.06956	-0.00272	Intercept (alpha)
+/-	0.02993	0.00512	+/-
r-square	0.04377	0.05294	s(y)
F	5.40190	118.00000	df
regression ss	0.01514	0.33077	residual ss

Colombia — Threshold 0.037

Slope (beta)	-0.03392	0.00127	Intercept (alpha)
+/-	0.02001	0.00326	+/-
r-square	0.02378	0.03556	s(y)
F	2.87429	118.00000	df
regression ss	0.00363	0.14919	residual ss

Mexico — Threshold 0.200

Slope (beta)	0.01583	-0.00317	Intercept (alpha)
+/-	0.01534	0.00271	+/-
r-square	0.00895	0.02750	s(y)
F	1.06574	118.00000	df
regression ss	0.00081	0.08922	residual ss

Appendix D: Rolling Regression 2002-2011

2002–2011

Argentina

				Threshold
Slope (beta)	-0.21417	0.00730	Intercept (alpha)	0.034
+/-	0.03505	0.00591	+/-	
r-square	0.24032	0.05462	s(y)	
F	37.32776	118.00000	df	
regression ss	0.11134	0.35197	residual ss	

Brazil

Slope (beta)	0.10643	-0.00443	Intercept (alpha)	0.042
+/-	0.03243	0.00513	+/-	
r-square	0.08365	0.05212	s(y)	
F	10.77131	118.00000	df	
regression ss	0.02926	0.32053	residual ss	

Colombia

Slope (beta)	-0.04213	0.00163	Intercept (alpha)	0.039
+/-	0.02350	0.00342	+/-	
r-square	0.02653	0.03746	s(y)	
F	3.21563	118.00000	df	
regression ss	0.00451	0.16558	residual ss	

Mexico

Slope (beta)	0.02403	-0.00513	Intercept (alpha)	0.213
+/-	0.01802	0.00291	+/-	
r-square	0.01485	0.02912	s(y)	
F	1.77826	118.00000	df	
regression ss	0.00151	0.10004	residual ss	

Appendix E: Colombia Headlines

Colombia Headlines

Date	High/Low	Code	Headline
4/1/99	Low	Global Outlook	Colombia's Central Bank Today: Bloomberg Central Bank Watch
4/1/99	Low	Global Outlook	Colombian Money Market and Investment Rates for April 6
4/1/99	Low	Peso Falls	Colombia Peso Closes at 1,556, Weakest Level for Three Weeks
4/1/99	Low	Commentary	Colombia May Eliminate 0.2% Banking Tax By Mid-May
7/12/99	High	DTF Index	Colombia 90-Day DTF Index Rises to 18.59% as Banks Hedge Peso
7/12/99	High	Sell Dollars	Colombia Sells Dollars, Pledges to Limit Drop in Peso
7/12/99	High	Stocks Fall	Colombian Stocks Fall on Peso Concerns; Suramericana Leads Drop
7/12/99	High	Spending Reserves	Colombia Spending Reserves to Steady Peso Amid Dollar Demands
12/28/99	Low	Commentary	Colombian Banks Buy $80 Mln in Options, Hedging for Strong Peso

12/28/99	Low	Index Falls	Colombia DTF Rate Index Falls to 15.75%; Lowest Ever
9/18/00	High	Buys Pesos	Colombia Central Bank Buys 58.3 Bln Pesos Worth of TES
9/18/00	High	Lower Rate	Colombia Central Bank to Buy 70 Bln Ps in TES to Lower Rate
9/18/00	High	Index Rises	Colombia 90-Day DTF Rate Index Rises 9 Basis Points to 13.01%
11/10/00	Low	Buy Debt	Colombia's Clavijo Says Central Bank to Continue Debt Purchase
11/10/00	Low	Commentary	Colombian One-Year TES Yields Remain Unchanged at 13.24%
11/10/00	Low	Commentary	Colombian One-Year TES Yields May Fall on Small Auction Size
11/10/00	Low	Commentary	Colombian Rebels Freeze Peace Talks, Peso Falls
5/16/01	High	Inflation	Colombian 1-Yr Debt Rise on Peso, Inflation
5/16/01	High	IMF	Colombian Senate Passes IMF-Backed Funding-Cap Bill
5/16/01	High	Auction	Colombian 1-Yr Debt Yields Seen Rising at Auction on Weak Peso
5/16/01	High	Bonds Rise	Emerging Market Bonds Rise After Fed Cuts Rates by Half Point
5/16/01	High	Banks Profit	Colombian Banks Post Profits in March on Recovery
10/3/02	High	DTF Rate	Colombia's 90-Day DTF Rate Falls to 7.77% From 7.91%
10/3/02	High	Inflation	Colombian September Inflation Speeds to 0.36%
10/3/02	High	IMF	Colombia May Obtain Emergency IMF Loan Accord, Tiempo Reports
11/18/02	Low	IMF	Colombia Sets New Economic Goals to Secure IMF Loans
11/18/02	Low	IMF	Colombia Says in IMF Letter It will Target 5-6% 2003 Inflation
11/18/02	Low	Inflation	Colombia Says in IMF Letter It will Target 5-6% 2003 Inflation
1/28/03	High	Sell Debt	Colombian Treasury Sells Dollars to Boost Peso From Record Low
1/28/03	High	Peso Rises	Colombia's Currency Recovers From Record Low in Early Trading
1/28/03	High	Currency Falls	Colombia's Currency Falls to Record Low on Venezuela Companies
4/26/04	Low	Sold Pesos	Colombia Central Bank Sold 10.3 Billion Pesos of TES This Week
4/26/04	Low	Buy Dollars	Colombian Central Bank Holds Rates, to Buy Dollars
4/26/04	Low	Hold Rates	Colombian Central Bank Holds Rates, to Buy Dollars
4/26/04	Low	IMF	IMF Completes Third Review of Colombia's Stand-by Arrangement
4/26/04	Low	Hold Rates	Colombian Central Bank Holds Overnight Rate Unchanged
5/25/04	High	Sell Pesos	Colombia Sells 81.54 Bln Pesos of 90-Day T-Bills
5/25/04	High	Commentary	Colombia Central Bank Repo Results for May 27
5/25/04	High	Currency Preview	Brazil's Real, Colombian Peso: Latin America Currency Preview
5/25/04	High	Sell Pesos	Colombia Sells 47 Bln Pesos of 5-Year Bonds
9/8/04	Low	Add Pesos	Colombian Central Bank to Add 3.2 Tln Pesos Cash Into Market
10/1/04	High	Repo Results	Colombia Central Bank Repo Auction Results for Oct 6
12/20/04	Low	Repo Results	Colombia Central Bank Repo Auction Results for Dec 20

Date	Level	Category	Headline
2/20/06	Low	Sell Bonds	Colombia to Sell 20- or 30-Year Peso Inflation Bonds
2/20/06	Low	Sell Bills	Colombia Sells COP61 Bln 182-Day Bills; Avg Yld 6.10%
2/20/06	Low	Sell Bills	Colombia Sells COP91.3 Bln 182-Day Bills; Avg Yld 6.05%
6/23/06	High	Auction	Colombian Yields Rise at Auction on U.S. Rate Concern
6/23/06	High	Auction	Colombian 15-Yr Peso Bond Due 2020 Yields 11.63% at Auction
6/4/07	Low	Inflation	Colombia's Annual Inflation Rate Rose 6.23 Percent Last Month
6/4/07	Low	Inflation	Colombia's Peso Advances on Expectations Inflation Will Slow
9/7/07	High	Peso Drops	Colombia Peso Drops, Bonds Fall Most in Week on Growth Concern
9/7/07	High	Buy Peso	Colombia Buys Back 885 Billion Pesos of 2007 Bond to Yield 9.3%
9/7/07	High	Bonds Fall	Colombia Peso, Bonds Fall to One-Week Low on U.S. Growth Concern
6/19/08	Low	Hold Rates	Colombia Bank Keeps Rate 9.75% Ignores Pressure for Cut
6/19/08	Low	Commentary	Colombia Bonds Approach Record Low on Currency Controls Concern
6/19/08	Low	Commentary	Colombia Bonds Near Record Low on Currency Controls Concern
7/1/08	High	Peso Rises	Colombia's Peso Rises Most Since 1995 on Rate Outlook
7/1/08	High	Peso Rises	Colombia's Peso Surges After U.S. Report, Hostage Rescue
10/28/08	High	Capital Controls	Colombia Lifts Capital Controls in Credit Crisis
12/19/08	Low	Economic Forecast	Colombia Economic Forecasts Dec.17-Dec.19 Bloomberg Survey
3/3/09	High	Peso Drops	Colombia Peso Drops Amid Global Recession; Peruvian Sol Falls
3/3/09	High	Economic Forecast	Colombia Economic Forecasts March 3-March 5 Bloomberg Survey
3/3/09	High	Peso Drops	Colombia Peso Drops on Size of Rate Cut; Argentine Peso Falls
10/13/09	Low	Trade Balance	Colombia August Trade Balance (Summary)
10/13/09	Low	Peso Holds	Colombia Central Bank Didn't Buy or Sell Dollars in September
10/13/09	Low	Peso Rises	Colombia Peso Gains to 14-Month High; Argentine Peso Bonds Fall
10/13/09	Low	Peso Rises	Colombian Peso Climbs to 14-Month High; Chile Peso Delcines
10/5/10	Low	Peso Drops	Colombia's Peso Bond Yields Fall Most in 2 Months on CPI Report
12/28/10	High	Peso Drops	Colombian Peso Falls on Lower-Than-Forecast Economic Growth
12/28/10	High	Commentary	Colombia Third-Quarter GDP Rises Less Than Expected
12/28/10	High	Peso Drops	Colombian Peso Falls on Lower-Than-Forecast Third-Quarter Growth
7/13/11	Low	Peso Gains	Colombian Peso Gains to Two-Month High on China Growth, Inflows
7/13/11	Low	Bonds Fall	Colombia 2024 Peso Bond Yields Falls to 7.747% at Auction
10/4/11	High	Bonds Rise	Colombian Bonds Rise as Yields Draw Investors Betting on Growth