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Fool's Gold: The Impact of Venezuelan Currency Devaluations on Multinational Stock Prices

ABSTRACT This paper documents negative cumulative abnormal returns (CARs) to five exchange rate devaluations in Venezuela within the context of stiff exchange controls and large black-market premiums, using daily stock prices for 110 multinational corporations with Venezuelan subsidiaries. The results suggest evidence of statistically and economically significant negative CARs of up to 2.07 percent over the ten-day event window. We find consistent results using synthetic controls to causally infer the effect of each devaluation on the stock prices of global firms active in the country at the time of the event. Our results are at odds with the predictions of the efficient market hypothesis stating that predictable devaluations should not affect the stock prices of large multinational companies on the day of the event, and even less so when they happen in small countries. We interpret these results as a suggestive indication of market inefficiencies in the process of asset pricing.

JEL Codes: F31, G12, G14, G15

Keywords: Devaluations, stock prices, market efficiency, event study, synthetic controls

Under the efficient market hypothesis, investors and financial analysts are expected to price any present or foreseeable event that affects a company's value. There are instances, however, in which loss aversion can lead investors to behave in myopic ways. While many macroeconomic events might be considered unforeseeable shocks, others are of a more predictable nature that we can reasonably expect to be priced into the valuation of companies. In this paper, we study the stock performance of 110 multinational corporations (MNCs) with subsidiaries in Venezuela, in response to

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several arguably foreseeable episodes of currency devaluation in the context of an exchange control. We find significant and relevant negative cumulative abnormal returns (CARs) on the stock prices of these MNCs after various devaluations. Given the existence of a parallel exchange rate market running at large premiums over the official fixed rate and the fact that most of the affected MNCs were not even eligible to purchase dollars at the official rates, we contend that these abnormal returns provide suggestive evidence of market inefficiency.

We start by putting together an event study covering a sample of 110 companies trading on the NYSE and NASDAQ markets, with active subsidiaries in Venezuela between 2010 and 2014. We find that the stock prices of this group of MNCs were, on average, negatively affected by three Venezuelan devaluations spreading over a period of thirty-five months, on a magnitude that is both statistically and economically significant. We find maximum significant negative CARs ranging from 1.36 to 1.74 percent, depending on the event. Our results remain strong under different specifications, including different estimation sizes and event windows.

To ensure that our results are not driven by unobservable factors, we perform an analysis based on the synthetic control methodology, where we create a synthetic firm—that is, a counterfactual—for each firm active in Venezuela and compare their stock value over time following each devaluation.[1] Using synthetic controls, we find significant negative CARs on MNC stock prices in three Venezuelan devaluations, up to a maximum of 0.83 percent and 1.24 percent over the five-day and ten-day event window.

Our results are important for three reasons. First, they are highly significant from statistical and practical standpoints. Based on year-end market capitalization, the maximum negative CARs on stock prices reported on the three events mentioned above are equivalent to an average loss per MNC ranging from US$689.1 million (2011) to US$750.8 million (2014). The cumulative loss of the composite of MNCs operating in Venezuela on each end of that range is US$37.293 billion (2011) to US$41.295 billion (2014). This is particularly noteworthy in light of the trifling size of the Venezuelan economy, accounting only for 0.3 percent of the world's GDP, on average, over the period studied.[2] Second, our results are suggestive of market inefficiencies, as they are driven by financial statements naively converted at the massively overvalued official

1. For details on the synthetic control methodology, see Abadie and Gardeazabal (2003); Abadie, Diamond, and Hainmueller (2010).

2. International Monetary Fund (IMF), World Economic Outlook (WEO).

exchange rates, despite subsidiaries not having access to dollars at these prices.[3] Most likely, the loss recorded among those firms on the days following the devaluation had de facto materialized well in advance of these events, as signaled by the continuous upward trend in the parallel black market exchange rate. Third, markets seem to have been consistently "surprised" by a series of devaluations, all of them arguably foreseeable. The stock prices of MNCs operating in Venezuela exhibited negative and significant CARs in three devaluations spanning over a period longer than three years. That feature is even more extraordinary given that—throughout the period—the impact of the Venezuelan devaluations on MNCs was widely reported in the media as strongly affecting American and European companies' earnings and stock prices.[4]

Within this context, our contribution to the literature is twofold. First, we present novel results showing negative CARs following devaluations in a country under stiff exchange controls. These results are in stark contrast with previous studies that find negative CARs before—not after—devaluations or studies that show positive CARs following devaluations in the currency of the country where they operate, driven by exporting firms.[5] Second, to the extent of our knowledge, our paper is the first to implement the synthetic controls methodology on asset pricing and, more particularly, to assess the impacts of devaluations on multinational stock prices.

The paper is organized as follows. In the next section, we explain the Venezuelan exchange rate system and explore its intricacies. Subsequent sections describe the data in our sample of MNCs, our selection criteria, and the dates and nature of the events studied; use the event-study methodology to estimate

3. The list of companies eligible to buy dollars at the official fixed exchange rate was public information, as reported on the website of the commission in charge of administering the exchange control (Comisión de Administración de Divisas, CADIVI).

4. *Market Watch*, "Venezuela Currency Devaluation Weighs on Avon, Telefonica," 11 January 2010; *Fierce Telecom*, "Telefonica's Stock Drops amidst Venezuela's Currency Devaluation," 11 January 2010; *Sydney Morning Herald*, "Venezuela Devaluations: U.S. Companies Face Earnings Hit," 12 January 2010; *Business News*, "Venezuela Devaluation Hits U.S., European Companies," 11 February 2013; CNBC, "Why Venezuela's Devaluation Is Biting: Reports Colgate-Palmolive, Halliburton, Avon, and Merck as Taking a Big Hit on Earnings," 14 February 2013; *New York Times*, "Profits Vanish in Venezuela after Currency Devaluation," 8 July 2014; *Business News*, "U.S. Companies Face Billions in Venezuela Currency Losses, Reuters Analysis Shows," 2 February 2015; and *CNN Money*, "Venezuela Is Causing Havoc on U.S. Companies," 11 February 2015.

5. Examples of the former include Glen (2002), Chue and Cook (2008), and Patro, Wald, and Wu (2014); for the latter, see He and Ng (1998), Gao (2000); Wilson, Saunders, and Caprio (2000), Becker, Richards, and Gelos (2000), García Herrero, Gyntelberg, and Tesei (2008), and Muller and Verschoor (2008).

the MNC stock price reaction to devaluations affecting their subsidiaries in Venezuela; and implement the synthetic control methodology to causally infer the existence of cumulative abnormal returns to MNC stock prices following devaluation events. Our conclusions, the implications of our results, and further research topics are presented in the final section.

The Venezuelan Exchange Rate System

In February 2003, the Venezuelan government implemented an exchange control administered by the Central Bank of Venezuela. Although the initial idea was to protect international reserves in the wake of falling oil prices and political turmoil, the control persisted throughout the lengthy oil bonanza registered between 2004 and 2013, and it remains in place today. Initially, the system was designed to have a single official fixed exchange rate that would coexist with a parallel (semilegal) market rate. Companies had to register at the Commission for the Administration of Currency Exchange (CADIVI) and request access to official dollars for goods and services imports, foreign debt payments, or dividend repatriation.

Over the first two years of the exchange rate control, the official fixed rate was devaluated once a year. From March 2005 to January 2010, the rate was fixed at 2.15 Venezuelan bolívares fuertes (VEF) per U.S. dollar, despite inflation running at a compounded annual growth rate of 18.6 percent.[6] In 2010, the parallel market was rendered illegal. The fact that devaluation significantly lagged inflation for five years caused a massive appreciation of the official exchange rate and inflated the profits of MNCs in foreign currency calculated at those rates. The problem is that profits were recorded at the official rates, regardless of whether the company had access to dollars at those prices to repatriate dividends. Indeed, official authorizations issued by CADIVI to purchase dollars for foreign debt service or dividend repatriation came to a halt in 2008, in the middle of the financial crisis that brought the price of the Venezuelan oil basket from US$117.60 a barrel in June 2008 to US$31.60 in December. Though prices recovered, averaging more than US$100 per barrel in 2011, 2012, and 2013, authorizations and liquidations for dividend repatriations remained close to zero, at least until the last quarter of 2011,

6. The Venezuelan bolívar (VEB) was replaced by the Venezuelan bolívar fuerte (VEF) on 1 January 2008. For simplicity, given that all devaluation events studied in the paper occurred after 2008, we have restated the VEB to the dollar exchange rates prior to that date and use VEF throughout.

when this information was last publicly available. The process led to a massive overestimation of the assets of MNCs operating in Venezuela, distorting the relative size and importance of their Venezuelan subsidiary.

Between 2010 and 2014, there were five devaluations of the official exchange rate. Reuters reported on 10 February 2015 that forty major U.S.-based companies had substantial exposure to Venezuela and could collectively take billions of dollars in write-downs.[7] By then, multiple official exchange rates coexisted with a parallel market, with the ratio between the exchange rate in the latter and the lowest official fixed rate running at a factor of 35.3. Based on the ten largest companies in the Standard and Poor's 500 (S&P 500) Index with operations in Venezuela, switching the calculation of retained earnings in foreign currency from the lowest official fixed exchange rate to the highest would have resulted in estimated losses close to US$5.8 billion.[8]

Figure 1 illustrates the trajectory of the different official and parallel exchange market rates over 2010–14 in logarithmic scale. The parallel exchange market premium over the lowest official fixed exchange rate went from a factor of 1.9 in January 2010 to a factor of 29.3 in December 2014. In 2014, two additional intermediate official rates were introduced (SICAD I and II). In total, five devaluations occurred in 2010–14. We describe these events in the next section.

These devaluations did not affect the trend of the parallel exchange rate. The parallel market would only react to changes in fundamentals, including an increased supply of dollars at the official fixed exchange rates, changes in the legal restrictions on parallel exchange trading, or changes in expected inflation.

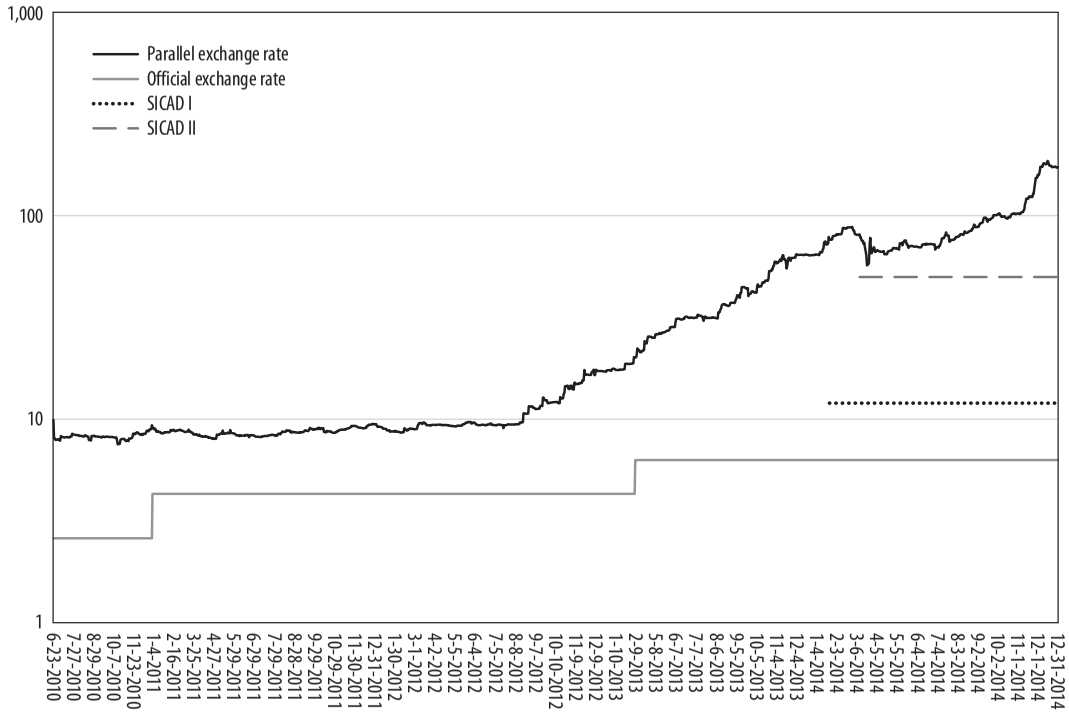
The official exchange rate significantly lagged inflation. Figure 2 represents the evolution of inflation, devaluation, and depreciation from the beginning of the exchange control until the end of 2014.[9] We use a logarithmic scale to depict the accelerated evolution of these rates. To put it another way, from February 2003 to December 2014, the cumulative inflation was 1,776 percent, equivalent to a compounded annual growth rate of 28.1 percent. Over that same period, the official fixed exchange rate increased 294 percent (12.3 percent

7. *Business News*, 2 February 2015.

8. Tim McLaughlin, "U.S. Companies Face Billions in Venezuela Currency Losses, Reuter's Analysis Shows," *Reuters Business News*, 2 February 2015 (www.reuters.com/article/us-venezuela-usa-corporations-insight/u-s-companies-face-billions-in-venezuela-currency-losses-reuters-analysis-shows-idUSKBN0L60CT20150202).

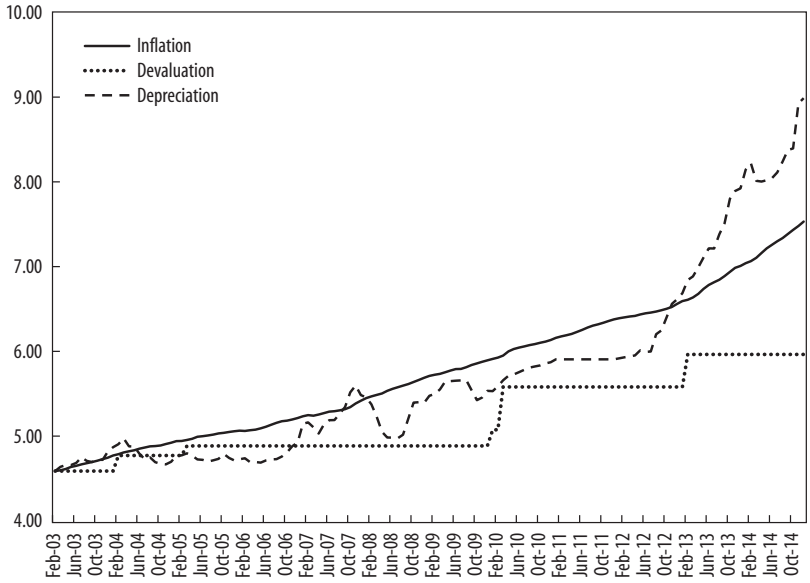
9. Given that in some periods there was more than one official fixed exchange rate, in figure 2 we take devaluations as announcements affecting the lowest official exchange rate.

FIGURE 1. Venezuela: Multiple Exchange Rate System



Source: Central Bank of Venezuela, *DolarToday* (dolartoday.com).

FIGURE 2. Venezuela: Inflation, Devaluation, and Depreciation

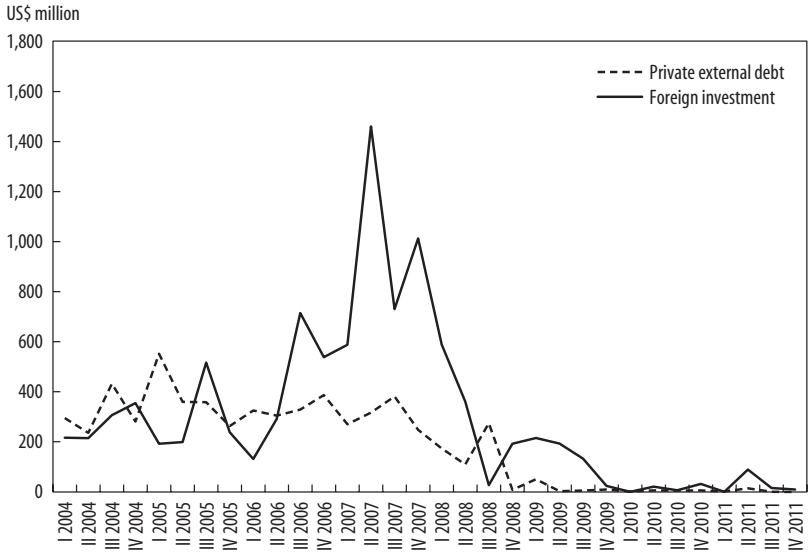


Source: Central Bank of Venezuela, *DolarToday* (dolartoday.com).

compounded annual growth rate), and the parallel exchange market rate 7,899 percent (44.8 percent compounded annual growth rate). The large differences between these three resulted in enormous distortions. When profits and a large portion of assets tend to grow with inflation and the official fixed exchange rate lags inflation at the magnitudes reported here, the value of profits and assets in foreign currency as calculated at the official fixed—massively overvalued—rate grows exponentially.

To illustrate this effect, consider a hypothetical MNC that produced yearly profits of VEF 100 in 2002, when there was no exchange control. Thus the company could have exchanged those profits for US$84.00 at the prevailing rate and repatriated them home. Imagine now that the profits of that company parsimoniously grow with inflation every year. By 2014, those VEF 100 in profits would have become VEF 1,876. At the average official exchange rate prevailing in 2014, that would have been equivalent to US$297.80, or three and a half times the figure of 2002. At the parallel market rate, however, the 2014 profits would have been equivalent to US$19.20, one-fifth of the original 2002 figure.

FIGURE 3. CADIVI: Total Authorizations to Acquire Dollars at the Official Fixed Rates (AADs)

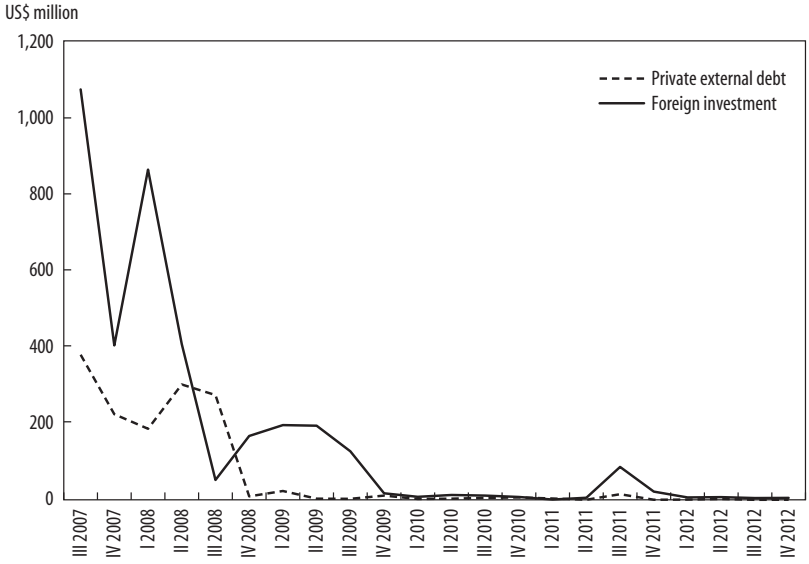


Source: Commission for the Administration of Currency Exchange (CADIVI).

This example illustrates the large distortions affecting MNC profits for 2014 alone. From a financial standpoint, distortions accumulated every year from 2003 to 2014. To assess the real value in foreign exchange of those retained earnings, we need to determine whether the MNCs had access to dollars at the official fixed exchange rates to repatriate dividends home. Obtaining access to dollars at the official rate in Venezuela entails registering with CADIVI and obtaining two different types of authorizations. First, MNCs must introduce a request stating the details of the operation and attesting that their specific use of dollars complies with the provisions for access to the official rate. This first step ends with an authorization to acquire dollars (AAD). Once this step is completed and the MNC has provided all the associated documentation, CADIVI instructs the central bank to sell the corresponding amount of dollars to the MNC at the stated rate, through the issue of an authorization to sell dollars (ALD).

Figures 3 and 4 depict the total number of AADs issued by CADIVI from 2004 to 2011 and the total number of ALDs from 2007 to 2012,

FIGURE 4. CADIVI: Total Authorizations to Sell Dollars at the Official Fixed Rate (ALDs)



Source: Commission for the Administration of Currency Exchange (CADIVI).

respectively.[10] Since some MNCs registered investments as loans to the subsidiary (private external debt), while others used the more traditional foreign direct investment approach (foreign investment), we have incorporated the total number of AADs and AALs for both categories. Total authorization to acquire dollars at the official fixed rate (for both purposes) peaked in 2007 (US$4.670 billion) and then fell 40 percent in 2008 (US$2.787 billion) and another 71 percent in 2009 (US$801 million). Since then, they have been hovering around zero. With regard to ALDs, we have figures only from the third quarter of 2007 onward. We know that total ALDs fell by 75 percent between the second half of 2007 (US$2.080 billion) and the second half of 2008 (US$502 million). Total ALDs for both purposes fell by another 75 percent between 2008 (US$2.250 billion) and 2009 (US$573 million) and have since remained close to zero. In the boom years for AADs and ALDs, the parallel exchange market premium was below 30 percent. By the time

10. These are the last official statistics published by CADIVI.

they slowed down—2007 and 2008—it was around 100 percent. By 2009, it was 185 percent. By the end of our study (December 2014), the parallel market rate was equivalent to 27.5 and 3.5 times the lowest and highest official fixed exchange rates, respectively.

Data

We use the Orbis database published by Bureau van Dijk to collect data for all MNCs listed on the New York Stock Exchange (NYSE), NASDAQ Capital Market, or NASDAQ National Market that have a subsidiary in Venezuela with at least 25 percent ownership by the MNC. We also use the Center for Research in Security Prices (CRSP) database to collect daily stock returns for the parent companies of these subsidiaries. The data collected are from 3 April 2009 to 20 February 2015. Our sample consists of 110 MNCs with subsidiaries in Venezuela and data available from 2009 to 2015. Of these 110, twenty-nine were registered with CADIVI and could potentially access U.S. dollars at the official fixed exchange rate, as documented on the CADIVI website. The remaining eighty-one MNCs in the sample were not registered with CADIVI and therefore did not have any possibility of purchasing dollars at the official rate.

We have also collected daily returns for the S&P 500 Index from the CRSP database, which we use as a market index proxy. The appendix lists the 110 parent companies in our final sample with their corresponding three-digit North American Industry Classification System (NAICS) code, their market capitalization at year-end for each of the years in the study, and whether they were registered with CADIVI. Table 1 presents the dates on which the five devaluations where announced and a brief description of the changes introduced in the exchange rate control.

The first three events are relatively straightforward devaluations of the official fixed exchange rate. The first debased the official rate that had prevailed for four years and ten months (VEF 2.15 per U.S. dollar), substituting it for a dual exchange rate system. The new fixed exchange rates represented a devaluation of the domestic currency by 17.3 percent (2.60) and 50.0 percent (4.30).[11] The dual system lasted only twelve months and was followed by a reunification of the official fixed exchange rate at VEF 4.30 to the dollar. The unification represented a devaluation of the domestic currency by 39.5 percent

11. Devaluations are calculated using the inverse of the exchange rate, that is, the dollar price of one unit of domestic currency.

TABLE 1. Exchange Rate Devaluation Events

Event	*Date*	*Description*
1	08 Jan 10	A dual exchange rate system was established. The previous fixed exchange rate of VEB 2.15 to the U.S. dollar was replaced with new official fixed rates of VEB 2.60 and 4.30 to the dollar.
2	30 Dec 10	The dual exchange rate system was unified into a single exchange rate of VEB 4.30 to the dollar.
3	08 Feb 13	Devaluation of the exchange rate from VEB 4.30 to 6.30 VEB to the dollar.
4	23 Jan 14	A new currency tier (SICAD) was added to the fixed rate created in Event 3, which remained unchanged. The SICAD rate starts at VEB 11.30 VEB to the dollar.
5	10 Mar 14	The SICAD II rate was introduced, complementing the original SICAD rate (now SICAD I) and conforming to a three-way exchange rate system: (1) the fixed rate of VEB 6.30 to the dollar; (2) the SICAD I rate of VEB 11.30 to 12.00 to the dollar; and (3) the new SICAD II rate starting at VEB 51.86 VEB to the dollar

Source: Central Bank of Venezuela (www.bcv.org.ve).

for those firms that had access to the rate of VEF 2.60 to the U.S. dollar. In 2013, a third devaluation occurred, where the official fixed exchange rate was devalued 31.7 percent, from VEF 4.30 to 6.30 to the dollar.

Thereafter, the system got more complicated. In every case, a new official fixed rate was added to the preexisting ones, while at the same time the government insisted that at least some form of market would determine one of the rates. That promise never materialized, and rates either remained fixed or were somewhat flexible, but determined unilaterally and arbitrarily by the central bank, unrelated to the rising inflation rates. It might appear that these two latter events did not represent devaluations for companies with access to the lowest prevailing exchange rate (6.30). In practice, however, none of the MNCs in our sample had access to dollars to repatriate dividends (or service foreign debt) at VEF 6.30 per U.S. dollar. The specific devaluation for our last two events is hard to pin down, as it depends on the tier in which the company was located within CADIVI. In any case, moving from 6.30 to the rate at which SICAD I started (11.30, Event 4) represented a devaluation of 44.2 percent.[12] From SICAD I to the rate at which SICAD II started (51.86, Event 5) there was an additional devaluation of 78.2 percent. In total, cumulative devaluations of the official fixed exchange caused the Venezuelan bolívar to lose 95.9 percent of its value over the period studied.

Of particular interest in our study are the rates at which the MNCs reported the financial statements of their subsidiaries in Venezuela. Before Event 1, all the companies in Venezuela translating financial statements needed

12. The Ancillary Foreign Currency Administration System (SICAD) was created in March 2013 as a complement to CADIVI.

to use the rate of VEF 2.15 per U.S. dollar. After Event 1, they had to move to either the VEF 2.60 or 4.30 per U.S. dollar, depending on their industry classification, but the firms had some discretion as to which exchange rate to use. We do not have access to data concerning specific exchange rates used. After Event 2, MNCs had to use the rate of VEF 4.30 to the dollar. With Event 3, all the firms switched to the VEF 6.30 to the dollar. Event 4 introduced a new rate (SICAD I). Firms with no access to CADIVI (and thus to the 6.30 rate) needed to use VEF 11.30 to the dollar in their financial statements. With the introduction of the SICAD II rate in Event 5, firms with no access to the SICAD I rate were forced to use the much higher SICAD II exchange rate. Firms not registered with CADIVI did not have access to either SICAD I or SICAD II rates.

Event Studies

We follow MacKinlay's classic event study methodology and Ang and Ghallab in the research design.[13] Devaluations could have affected the value of the subsidiaries in our sample, but we measure their impact on the MNC parent company using daily frequency stock prices adjusted by dividends.

In the design of the event study, we first define an event over which we measure the impact of the devaluation on the MNC stock return. For robustness, and to gauge the speed at which markets interpret and assimilate the impact of devaluation on stock prices, we have incorporated all event windows surrounding the devaluations from [–1, +1] to [–10, +10].[14] The reasons for using such a long event window are twofold. On the one hand, these devaluations—in particular, from Event 3 onward—represented complex arrangements involving multiple official fixed rates, depending on the nature of the operation and the company. As such, it might have taken markets a few days to assess its impacts on stock prices. On the other hand, the long window allows us to study whether there is mean reversion on the returns to MNC stock prices.

We estimate a market model to measure the expected return of the MNC stocks during the event window. Following MacKinlay, we estimate equation 1 using least squares:[15]

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{1}$$

13. MacKinlay (1997); Ang and Ghallab (1976).
14. Kanas (2005).
15. MacKinlay (1997).

where R_{it} is the daily stock return of the MNC parent and R_{mt} is the daily market stock return. We use the S&P 500 Index as a proxy for the market. For each stock in our sample, we estimate the market model on a window of time previous to the event. There is no fixed estimation period in the literature. Cox and Peterson use 100 days, Carow and Kane use 200 days, and MacKinlay suggests an estimation window of 250 days.[16] For our base case model, we use a window of 150 days to estimate the market model for each stock return. We form our expectations as to how the MNC stock should have behaved in the absence of a devaluation based on the stock price behavior in an estimation window from 180 days to 30 days prior to the event [–180, –30].[17] We then estimate the abnormal return (AR) as follows:

$$AR_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \varepsilon_{it}, \tag{2}$$

where AR_{it} is the estimated abnormal return and $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimates of coefficients α_i and β_i in equation 1. The abnormal return is outside the normal statistical range of the market model. Under the null hypothesis, the abnormal return is normally distributed with zero conditional mean, and it is calculated cumulatively around the different estimation windows. To do this, we sum the abnormal returns by business days over the event window. The CARs obtained and their standard deviations will ultimately determine whether the sample has evidence of significant deviation from what we would expect from those stocks given the market behavior and the stocks' relationship to the market over the estimation window.

Our null hypothesis is that the Venezuelan devaluations should not significantly affect the stock price of the MNC parents. First, devaluations decreed in such a small country should be immaterial to the stock price of large globalized multinational corporations. In addition, the evolution of parallel exchange market premiums and the fact that AADs and ALDs came to a halt two to five years prior to these events (depending on the specific devaluation analyzed) should have given market analysts enough cues regarding the implausibility of those retained earnings to be converted back into dollars at the official fixed exchange rates. More important, subsidiary firms in Venezuela used to translate their balance sheets to dollars at the official fixed exchange rate, even

16. Cox and Peterson (1994); Carow and Kane (2002); MacKinlay (1997).

17. Our results are robust to using different estimation window sizes. Specifically, we tried 220 days [–250, –30], 190 days [–220, –30], 150 days [–180, –30], and 120 days [–150, –30] and found no significant difference in the size or significance of coefficients. The results are available on request.

though most firms did not have access to those rates. Even if the company had legal grounds to use the official fixed exchange rate and some discretion around the possibility of creating provisions in advance of a possible loss, market analysts should have easily recognized that financial statements at official fixed rates were unrealistic. That statement is particularly true for companies that were not registered with CADIVI (the registration is public information) and therefore were not even eligible to acquire dollars at the official exchange rates. First we present the results for the full sample of 110 MNCs. We then break the sample into companies registered and not registered with CADIVI and report the results for each of these subgroups.

Table 2 presents the results for the CARs of the stock prices of the 110 MNCs in our sample for the five devaluation events described in table 1. Each column reports the results for a different event window, with $t = 0$ as the day of the devaluation announcement. We find significant negative abnormal returns for Events 2, 4, and 5. The numbers are both statistically and economically relevant. The maximum negative impact recorded in each of these three events ranges from 1.32 percent (Event 5, window [–8, +8]) to 1.74 percent (Event 2, window [–5, +5]). The long event window allows us to evaluate whether markets initially overreacted to devaluation announcements and then reverted back to their mean stock price. Ten days after these devaluations, stock prices had not reverted back to their expected values, displaying negative CARs that range from 1.04 percent (Event 5) to 1.21 percent (Event 2). It is worth stressing the strength of these results, as the long window (twenty days around the devaluation event) also increases the possibility of confounding the impacts of Venezuelan devaluations with those of other material events occurring at the same time worldwide.

Although it is hard to assess which of the multiple exchange rates applies to each MNC in our sample, we record significant negative CARs in the three events where the devaluations were potentially the largest. In Event 1, companies could have passed from VEF 2.15 to 2.60 to the dollar (a devaluation equivalent to 17.3 percent). In Event 3, firms unequivocally went from VEF 4.30 to 6.30 to the dollar (31.7 percent). The three remaining devaluations—where we record significant negative CARs—are larger than these: 39.5 percent for Event 2 (from VEF 2.60 to 4.30 to the dollar), 44.2 percent for Event 4 (from VEF 6.30 to 11.30 to the dollar), and 78.2 percent in Event 5 (from VEF 11.30 to 51.86 to the dollar).

The negative effects of devaluations did not wane over time but continued to show up three years after the first negative surprise. If Venezuela had initially been neglected by the analysts—for example, due to the country's

TABLE 2. CARs of Stock Price of MNCs with Venezuelan Subsidiaries: Full Sample[a]

Devaluation event	*Event window (days)*									
	[−1,+1]	*[−2,+2]*	*[−3,+3]*	*[−4,+4]*	*[−5,+5]*	*[−6,+6]*	*[−7,+7]*	*[−8,+8]*	*[−9,+9]*	*[−10,+10]*
Event 1	**−0.0029**	**−0.0007**	**−0.0054**	**−0.0054**	**−0.0042**	**−0.0077**	**−0.0061**	**−0.0076**	**−0.0028**	**−0.0032**
	(0.3411)	(0.8549)	(0.1940)	(0.2999)	(0.4501)	(0.1756)	(0.3077)	(0.2225)	(0.6507)	(0.6245)
Event 2	**−0.0017**	**−0.0067*****	**−0.0136*****	**−0.0150*****	**−0.0174*****	**−0.0153*****	**−0.0135*****	**−0.0122*****	**−0.0113****	**−0.0121****
	(0.1325)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0004)	(0.0026)	(0.0060)	(0.0200)	(0.0211)
Event 3	**−0.0026**	**−0.0010**	0.0004	0.0063*	0.0055	0.0088*	0.0060	**−0.0001**	**−0.0007**	**−0.0006**
	(0.1049)	(0.7189)	(0.9067)	(0.0982)	(0.1772)	(0.0806)	(0.2529)	(0.9874)	(0.9066)	(0.9259)
Event 4	**−0.0088*****	**−0.0094*****	**−0.0091*****	**−0.0097****	**−0.0133****	**−0.0101**	**−0.0127***	**−0.0116**	**−0.0133***	**−0.0146***
	(0.0009)	(0.0025)	(0.0066)	(0.0473)	(0.0264)	(0.1227)	(0.0615)	(0.1154)	(0.0923)	(0.0927)
Event 5	**−0.0063****	**−0.0066****	**−0.0104*****	**−0.0103*****	**−0.0136*****	**−0.0126****	**−0.0131****	**−0.0132****	**−0.0082**	**−0.0104***
	(0.0142)	(0.0106)	(0.0005)	(0.0014)	(0.0016)	(0.0132)	(0.0148)	(0.0271)	(0.1856)	(0.0897)

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

a. The table presents the cumulative abnormal returns (CARs) of stock prices for the 110 MNCs in our sample with subsidiaries in Venezuela. The devaluation events are described in table 1; each event has 110 observations. The CARs are reported for ten event windows, from one [−1, +1] to ten [−10, +10] days before and after the event, where $t = 0$ is the day of the devaluation announcement. For each event/window, *p* values are in parentheses.

meager size—the successive negative impact of devaluations on MNC stock prices should have alerted them. To the contrary, markets persisted in overlooking the large parallel exchange market premiums and the fact that these companies either never had access to dollars at the official fixed rates or had some positive right in theory that had not materialized for years prior to these events.

As previously mentioned, only twenty-nine of the MNCs with subsidiaries in Venezuela, in our sample of 110 companies, were registered with CADIVI. This could have substantiated some expectation that retained earnings and their corresponding assets might eventually convert to dollars at official fixed rates. Table 3 presents the CARs on stock prices resulting for our event study for the twenty-nine MNCs in our sample registered at CADIVI.[18] The results in table 3 differ from those in table 2. When we consider only those firms with normative access to the official fixed exchange rate, we find no consistent abnormal returns for any of these events. That does not necessarily mean that markets were efficient in pricing these stocks, however, for two reasons. First, when restricting the sample to MNCs registered with CADIVI, we are left with only twenty-nine firms. Across devaluations 2, 4, and 5, the CARs reported are consistently negative and similar in size to those in table 2, but they are not large enough to achieve statistical significance in such a small sample. Second, lack of statistical significance might also be a case of getting the right results for the wrong reasons. Devaluations did not have an impact on the asset prices of these companies as they had piled up authorizations to acquire dollars at past official fixed rates (AADs) that were not altered by the new devaluations. Retained earnings were registered in dollar values on the subsidiaries' balance sheets at the official rates prevailing when these earnings were recorded. From an accounting standpoint, devaluations could affect the rate of recorded future earnings, but did not affect the way they had registered retained earnings. In other words, the financial statements of CADIVI-registered firms were not translated at a unique official fixed rate. These firms used multiple official fixed rates because in most cases they received AADs for dividend repatriation at different official exchange rates over time. The markets possibly did not adjust the probability they were assigning to these AADs being honored with successive devaluations. Years passed without MNCs being able to convert these AADs into ALDs, and ultimately into effective dollars. In the meantime, the parallel market premium continued to rise. However, one might argue that registration with CADIVI provided

18. These companies are listed in the appendix.

TABLE 3. CARs of Stock Price of MNCs with Venezuelan Subsidiaries: Companies Registered with CADIVI[a]

Devaluation event	*Event window (days)*									
	[−1, +1]	*[−2, +2]*	*[−3, +3]*	*[−4, +4]*	*[−5, +5]*	*[−6, +6]*	*[−7, +7]*	*[−8, +8]*	*[−9, +9]*	*[−10, +10]*
Event 1	**−0.0005**	0.0073	0.0052	0.0077	0.0082	0.0072	0.0032	0.0015	0.0005	**−0.0023**
	(0.9167)	(0.1820)	(0.3998)	(0.2668)	(0.3282)	(0.3735)	(0.6877)	(0.8546)	(0.9539)	(0.8025)
Event 2	0.0007	**−0.0045****	**−0.0069**	**−0.0081**	**−0.0082**	**−0.0101**	**−0.0116**	**−0.0123**	**−0.0070**	**−0.0120**
	(0.7366)	(0.0444)	(0.1116)	(0.1238)	(0.2209)	(0.2182)	(0.1887)	(0.1704)	(0.5262)	(0.2875)
Event 3	**−0.0015**	0.0026	0.0046	0.0117	0.0104	0.0122	0.0110	0.0118	0.0115	0.0130
	(0.4599)	(0.7289)	(0.5784)	(0.2416)	(0.2485)	(0.2305)	(0.2632)	(0.2907)	(0.3333)	(0.3000)
Event 4	**−0.0088**	**−0.0091**	**−0.0127***	**−0.0163***	**−0.0186***	**−0.0198***	**−0.0137**	**−0.0113**	**−0.0090**	**−0.0128**
	(0.1767)	(0.1388)	(0.0707)	(0.0855)	(0.0622)	(0.0710)	(0.1625)	(0.3209)	(0.4143)	(0.2347)
Event 5	**−0.0029**	**−0.0039**	**−0.0050**	**−0.0029**	**−0.0079**	**−0.0075**	**−0.0053**	**−0.0099**	**−0.0070**	**−0.0065**
	(0.2701)	(0.3365)	(0.3513)	(0.5768)	(0.3696)	(0.4606)	(0.5981)	(0.4358)	(0.5973)	(0.5882)

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

a. The table presents the cumulative abnormal returns (CARs) of stock prices for the twenty-nine MNCs in our sample with subsidiaries in Venezuela that are registered with CADIVI. The devaluation events are described in table 1; each event has twenty-nine observations. The CARs are reported for ten event windows, from one [−1, +1] to ten [−10, +10] days before and after the event, where $t = 0$ is the day of the devaluation announcement. For each event/window, p values are in parentheses.

reasonable grounds to expect the conversion of these assets at the official exchange rate prevailing in the year the profits were recorded.

The case of MNCs whose Venezuelan subsidiaries were not registered with CADIVI is different. Based on the previous table, one would expect that most of the significant negative CARs reported in table 2 were driven by the eighty-one MNCs not eligible to buy dollars at the official fixed exchange rates. Table 4 presents the results for the CARs of the stock prices of these companies. We confirm that companies not registered with CADIVI drove most of the results reported in response to devaluations 2, 4, and 5. In Event 2, CARs are negative and significant across the full range of event windows. There are no signs of mean reversion, and the maximum size of –2.07 percent [–5, +5] is large and economically significant. In Event 4, the most significant impacts seem to be concentrated on the first three event windows, but the magnitudes are largest on the [–9, +9] window (1.50 percent, significant at the 10 percent level) and the [–10, +10] window (1.53 percent). Given that the size of these coefficients is slightly higher than those registered in table 2, the loss of statistical significance on the latter seems to be more a consequence of the increased variance due to the lower number of observations. Finally, in Event 5, negative and significant CARs are registered across all but one of the event windows, with the negative impact at [–10, +10] statistically significant and practically relevant (1.18 percent), and the maximum cumulative negative impact of 1.60 percent registered at event window [–7, +7].

For these eighty-one MNCs, markets seem to have reacted belatedly to an accounting change, when in fact the likelihood of those retained earnings being converted into dollars at the official rates was actually zero. Instead of gradually adjusting the stock price as the parallel market rate evolved and dissociated from the official exchange rate, markets seem to have waited for companies to incorporate the devaluations through accounting changes, apparently unaware that the equity values of these MNCs were actually much lower.

Based on these results, we now focus our analysis on the eighty-one firms not registered with CADIVI. Our next step is to assess whether Venezuelan devaluations had differential impacts on the stock prices of MNCs of different sizes. We divide our sample into three groups of similar size (twenty-seven each) by average market capitalization over the period studied: MNCs with less than US$4.0 billion fall into our small group; companies ranging from US$4.0 billion to US$11.2 billion are considered medium; and companies above US$11.2 billion conform to our large bucket. Small MNCs in our sample have an average market capitalization of US$2.3 billion, significantly lower

TABLE 4. CARs of Stock Price of MNCs with Venezuelan Subsidiaries: Companies Not Registered with CADIVI[a]

Devaluation event	*Event window (days)*									
	[−1, +1]	*[−2, +2]*	*[−3, +3]*	*[−4, +4]*	*[−5, +5]*	*[−6, +6]*	*[−7, +7]*	*[−8, +8]*	*[−9, +9]*	*[−10, +10]*
Event 1	**−0.0038**	**−0.0036**	**−0.0092**	**−0.0101**	**−0.0086**	**−0.0131**	**−0.0094**	**−0.0108**	**−0.0040**	**−0.0035**
	(0.3235)	(0.4597)	(0.0752)	(0.1264)	(0.2096)	(0.0690)	(0.2175)	(0.1708)	(0.6149)	(0.6705)
Event 2	**−0.0026***	**−0.0074*****	**−0.0160*****	**−0.0175*****	**−0.0207*****	**−0.0172*****	**−0.0141*****	**−0.0122****	**−0.0129****	**−0.0121****
	(0.0563)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0009)	(0.0070)	(0.0183)	(0.0165)	(0.0409)
Event 3	**−0.0030**	**−0.0023**	**−0.0011**	0.0043	0.0037	0.0076	0.0042	**−0.0044**	**−0.0051**	**−0.0055**
	(0.1466)	(0.3729)	(0.7190)	(0.2508)	(0.4106)	(0.1942)	(0.5009)	(0.5074)	(0.4820)	(0.4531)
Event 4	**−0.0088*****	**−0.0095*****	**−0.0078****	**−0.0073**	**−0.0114**	**−0.0066**	**−0.0123**	**−0.0117**	**−0.0150***	**−0.0153**
	(0.0016)	(0.0089)	(0.0414)	(0.2028)	(0.1209)	(0.4079)	(0.1501)	(0.2030)	(0.0949)	(0.1735)
Event 5	**−0.0074****	**−0.0076****	**−0.0123*****	**−0.0129*****	**−0.0156*****	**−0.0144****	**−0.0160****	**−0.0144****	**−0.0086**	**−0.0118***
	(0.0259)	(0.0184)	(0.0006)	(0.0011)	(0.0016)	(0.0147)	(0.0130)	(0.0341)	(0.2196)	(0.0988)

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

a. The table presents the cumulative abnormal returns (CARs) of stock prices for the eighty-one MNCs in our sample with subsidiaries in Venezuela that are not registered with CADIVI and thus do not have access to dollars at the official fixed exchange rate. The devaluation events are described in table 1; each event has eighty-one observations. The CARs are reported for ten event windows, from one [−1, +1] to ten [−10, +10] days before and after the event, where $t = 0$ is the day of the devaluation announcement. For each event/window, p values are in parentheses.

than the US$6.4 billion registered by medium-sized companies, which in turn have a market capitalization significantly lower than the US$46.0 billion registered by large MNCs.

The results of our event study on the MNCs of each group not registered with CADIVI are reported in table 5. As the table shows, large MNCs not registered with CADIVI suffered the most statistically and practically significant impacts following three Venezuelan devaluations. In these events, the maximum negative CARs were recorded at the end of the spectrum of event windows, ranging from 1.17 percent (Event 5) to 2.10 percent (Event 2). For MNCs in our small and medium-sized buckets, the coefficients are mostly negative and sizable, but they lack statistical significance, possibly as a consequence of the small sample size. However, the results reported for large companies are remarkable despite the small sample size, providing suggestive evidence that the negative CARs were not driven by the markets neglecting a number of small firms whose operations were overrepresented in Venezuela.

Another interesting issue is whether firms with exporting subsidiaries were less affected by these devaluations. For exporters, devaluation would typically have a positive income effect, as it reduces the relative cost of products manufactured by the Venezuelan subsidiary of the MNC while increasing the relative price of exports in the domestic market.[19] By focusing on exporters, we can test whether the balance-sheet impacts (one-time loss in the value of assets denominated in VEF, net of domestic liabilities) are strong enough to yield negative and significant CARs.

Our sample does not contain information on whether the MNCs under consideration exported products and services from Venezuela. We therefore classify companies as exporters if their industry code registered positive exports from Venezuela to the United States.[20] Table 6 reports the results for the restricted sample of MNCs active in exporting sectors.[21] The results show negative CARs in Events 2, 4, and 5 throughout the full length of the event window, albeit statistically weak. For Events 2 and 5, the negative impacts are statistically and economically significant for most of the range of event

19. He and Ng (1998), Gao (2000), Wilson, Saunders, and Caprio (2000), Becker, Richards, and Gelos (2000), García Herrero, Gyntelberg, and Tesei (2008), and Muller and Verschoor (2008) all report positive abnormal returns on MNCs in response to devaluations in the currency of the country where they operate.

20. We rely on data from https://usatrade.census.gov.

21. The sample size changes over the course of the period because for each devaluation-year, we check whether a given NAICS code had positive exports and adjust the definition of firms in exporting industries accordingly.

TABLE 5. CARs of Stock Price of MNCs with Venezuelan Subsidiaries: Companies Not Registered with CADIVI, by Size[a]

Devaluation event	*Event window (days)*									
	[−1,+1]	*[−2,+2]*	*[−3,+3]*	*[−4,+4]*	*[−5,+5]*	*[−6,+6]*	*[−7,+7]*	*[−8,+8]*	*[−9,+9]*	*[−10,+10]*
A. Small companies										
Event 1	**−0.0064**	**−0.0084**	**−0.0145**	**−0.0072**	**−0.0072**	**−0.0145**	**−0.0090**	**−0.0104**	**0.0029**	**−0.0006**
	(0.3463)	(0.3983)	(0.1458)	(0.5455)	(0.5656)	(0.3283)	(0.5622)	(0.5186)	(0.8621)	(0.9704)
Event 2	**−0.0058****	**−0.0090****	**−0.0181*****	**−0.0222*****	**−0.0283****	**−0.0182**	**−0.0094**	**−0.0077**	**−0.0057**	−0.0026
	(0.0462)	(0.0327)	(0.0044)	(0.0019)	(0.0102)	(0.1407)	(0.4237)	(0.5022)	(0.6265)	(0.8370)
Event 3	0.0018	0.0054	0.0059	0.0084	0.0073	0.0132	0.0036	**−0.0082**	**−0.0056**	**−0.0077**
	(0.4995)	(0.2374)	(0.3041)	(0.3017)	(0.4578)	(0.3048)	(0.7790)	(0.5578)	(0.7254)	(0.6263)
Event 4	**−0.0078**	**−0.0145****	**−0.0150****	**−0.0193****	**−0.0197****	**−0.0144**	**−0.0249***	**−0.0200**	**−0.0297****	**−0.0250**
	(0.1337)	(0.0407)	(0.0492)	(0.0233)	(0.0326)	(0.2184)	(0.0665)	(0.1212)	(0.0429)	(0.1272)
Event 5	**−0.0092**	**−0.0074**	**−0.0136**	**−0.0100**	**−0.0130**	**−0.0178**	**−0.0163**	**−0.0137**	**−0.0054**	**−0.0138**
	(0.3115)	(0.3882)	(0.1176)	(0.3025)	(0.2851)	(0.2475)	(0.3255)	(0.4252)	(0.7581)	(0.4402)
B. Medium-sized companies										
Event 1	**−0.0105**	**−0.0091**	**−0.0115**	**−0.0223**	**−0.0197**	**−0.0270**	**−0.0232**	**−0.0249**	**−0.0183**	**−0.0176**
	(0.1541)	(0.2997)	(0.2556)	(0.1262)	(0.1838)	(0.0545)	(0.1341)	(0.1191)	(0.2303)	(0.2867)
Event 2	**−0.0035**	**−0.0099*****	**−0.0204*****	**−0.0181*****	**−0.0207*****	**−0.0157****	**−0.0119**	**−0.0116**	**−0.0128**	**−0.0125**
	(0.1348)	(0.0005)	(0.0001)	(0.0017)	(0.0061)	(0.0271)	(0.1253)	(0.1312)	(0.1130)	(0.1436)
Event 3	**−0.0074**	**−0.0096**	**−0.0047**	0.0066	0.0067	0.0155	0.0163	0.0081	0.0061	0.0070
	(0.1505)	(0.0820)	(0.4744)	(0.3548)	(0.3966)	(0.1231)	(0.1553)	(0.4902)	(0.6446)	(0.5858)
Event 4	**−0.0097****	**−0.0086**	**−0.0076**	**−0.0077**	**−0.0138**	**−0.0066**	**−0.0136**	**−0.0140**	**−0.0155**	**−0.0204**
	(0.0340)	(0.1287)	(0.1846)	(0.5668)	(0.4628)	(0.7346)	(0.4977)	(0.5407)	(0.5376)	(0.4668)
Event 5	**−0.0120*****	**−0.0097*****	**−0.0156*****	**−0.0191*****	**−0.0255*****	**−0.0176****	**−0.0216****	**−0.0187***	**−0.0115**	**−0.0097**
	(0.0010)	(0.0083)	(0.0039)	(0.0004)	(0.0005)	(0.0319)	(0.0175)	(0.0604)	(0.2810)	(0.3606)

(*continued*)

TABLE 5. CARs of Stock Price of MNCs with Venezuelan Subsidiaries: Companies Not Registered with CADIVI, by Size[a] (*Continued*)

Devaluation event	*Event window (days)*									
	[−1,+1]	*[−2,+2]*	*[−3,+3]*	*[−4,+4]*	*[−5,+5]*	*[−6,+6]*	*[−7,+7]*	*[−8,+8]*	*[−9,+9]*	*[−10,+10]*
C. Large companies										
Event 1	0.0056	0.0068	**−0.0015**	**−0.0008**	0.0011	0.0023	0.0039	0.0028	0.0033	0.0076
	(0.3268)	(0.2679)	(0.8229)	(0.9138)	(0.8879)	(0.7629)	(0.6133)	(0.7172)	(0.7024)	(0.4031)
Event 2	0.0016	**−0.0034**	**−0.0095****	**−0.0121****	**−0.0132****	**−0.0176*****	**−0.0211*****	**−0.0173****	**−0.0202****	**−0.0210****
	(0.3314)	(0.1301)	(0.0164)	(0.0221)	(0.0496)	(0.0085)	(0.0049)	(0.0229)	(0.0135)	(0.0218)
Event 3	**−0.0035**	**−0.0026**	**−0.0047**	**−0.0019**	**−0.0029**	**−0.0059**	**−0.0074**	**−0.0130**	**−0.0159***	**−0.0156***
	(0.1551)	(0.3274)	(0.2627)	(0.6263)	(0.6068)	(0.4038)	(0.3256)	(0.1035)	(0.0519)	(0.0759)
Event 4	**−0.0090**	**−0.0054**	**−0.0007**	0.0052	**−0.0007**	0.0011	0.0016	**−0.0011**	0.0005	−0.0003
	(0.0741)	(0.3968)	(0.9127)	(0.4531)	(0.9265)	(0.8970)	(0.8663)	(0.9098)	(0.9594)	(0.9746)
Event 5	**−0.0011**	**−0.0056***	**−0.0078****	**−0.0096****	**−0.0084***	**−0.0078***	**−0.0100***	**−0.0106***	**−0.0090**	**−0.0117***
	(0.6728)	(0.0620)	(0.0364)	(0.0339)	(0.0797)	(0.0806)	(0.0539)	(0.0616)	(0.1662)	(0.0827)

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.

a. The table presents the cumulative abnormal returns (CARs) of stock prices for the eighty-one MNCs in our sample with subsidiaries in Venezuela that are not registered with CADIVI, divided into three groups of identical size (twenty-seven firms). The devaluation events are described in table 1; each event has twenty-seven observations. The CARs are reported for ten event windows, from one [−1, +1] to ten [−10, +10] days before and after the event, where $t = 0$ is the day of the devaluation announcement. For each event/window, p values are in parentheses.

TABLE 6. CARs of Stock Price of MNCs with Venezuelan Subsidiaries: Firms in Exporting Sectors Not Registered in CADIVI[a]

Devaluation event	*Event window (days)*									
	[−1,+1]	*[−2,+2]*	*[−3,+3]*	*[−4,+4]*	*[−5,+5]*	*[−6,+6]*	*[−7,+7]*	*[−8,+8]*	*[−9,+9]*	*[−10,+10]*
Event 1	0.0000	0.0034	**−0.0015**	**−0.0025**	**−0.0011**	**−0.0072**	**−0.0028**	**−0.0044**	0.0007	0.0010
	(0.9934)	(0.5734)	(0.8143)	(0.7442)	(0.8870)	(0.4011)	(0.7492)	(0.6388)	(0.9443)	(0.9150)
Event 2	**−0.0013**	**−0.0062*****	**−0.0147*****	**−0.0184*****	**−0.0229*****	**−0.0190*****	**−0.0134****	**−0.0132****	**−0.0114***	**−0.0105**
	(0.3525)	(0.0013)	(0.0000)	(0.0000)	(0.0001)	(0.0028)	(0.0397)	(0.0404)	(0.0855)	(0.1299)
Event 3	**−0.0021**	**−0.0019**	**−0.0005**	0.0046	0.0038	0.0042	**−0.0017**	**−0.0107**	**−0.0119**	**−0.0142**
	(0.4250)	(0.5780)	(0.8991)	(0.3755)	(0.5051)	(0.5809)	(0.8193)	(0.2024)	(0.1913)	(0.1218)
Event 4	**−0.0095*****	**−0.0097****	**−0.0085***	**−0.0043**	**−0.0068**	**0.0012**	**−0.0047**	**−0.0042**	**−0.0040**	**−0.0030**
	(0.0055)	(0.0281)	(0.0728)	(0.3829)	(0.2675)	(0.8677)	(0.5594)	(0.6115)	(0.6193)	(0.7368)
Event 5	**−0.0074****	**−0.0090*****	**−0.0119*****	**−0.0129*****	**−0.0129****	**−0.0139****	**−0.0146***	**−0.0140***	**−0.0065**	**−0.0117**
	(0.0311)	(0.0045)	(0.0025)	(0.0029)	(0.0196)	(0.0345)	(0.0502)	(0.0812)	(0.4217)	(0.1585)

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

a. The table presents the cumulative abnormal returns (CARs) of stock prices for the eighty-one MNCs in our sample with subsidiaries in Venezuela that are not registered with CADIVI and that belong to industries that reported positive exports to the United States the year of the devaluation event ($N = 54$ for Events 1 and 2; $N = 53$ for Events 3, 4, and 5). The devaluation events are described in table 1. The CARs are reported for ten event windows, from one [−1, +1] to ten [−10, +10] days before and after the event, where $t = 0$ is the day of the devaluation announcement. For each event/window, p values are in parentheses.

windows and only lose significance toward the end of spectrum [–10, +10]. In any case, the negative CARs are not fully offset by better exporting conditions for those firms following a devaluation, so we can infer that the results reported in table 4 are indeed driven by balance-sheet effects.

Estimating CARs Using Synthetic Controls

In the absence of a measured counterfactual, it is not straightforward to claim that our results are driven by the devaluation events. Even if we control for the aggregate market returns (proxied by the S&P 500 Index), other confounding factors at the industry level, for example, could be affecting firms that are active in Venezuela, thereby biasing our estimates. To address this possibility, we implement the synthetic controls methodology in the context of our exercise. This methodology allows us to causally infer the effect of the devaluations on the stock price of MNCs active in Venezuela in each event by creating a synthetic counterfactual based on other firms with similar characteristics but not active in Venezuela. The synthetic firms allow us to form our expectations of what would have happened to stock prices in the absence of each of the five devaluation events.

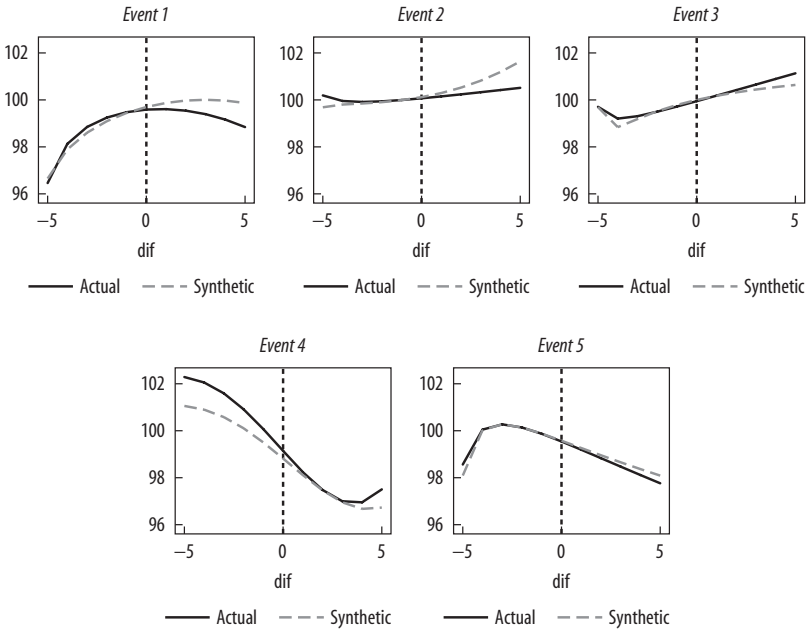
Since first used by Abadie and Gardeazabal to gauge the impacts of terrorism on the economy of the Basque country in Spain, synthetic controls have been applied to estimate causal impacts in a wide range of topics.[22] Recent examples in the literature include the estimation of effects of tobacco control programs in California, the impact of financial liberalization on economic growth, the impact of natural disasters on economic growth, and the effects of changes in handgun laws on suicide rates in Missouri and Connecticut.[23] To the extent of our knowledge, this is the first time that synthetic controls are used in the context of research on asset pricing and, in particular, on changes in CARs in response to currency devaluations.

To implement the synthetic controls, we collect daily stock returns for MNCs listed on the New York Stock Exchange (NYSE), NASDAQ Capital Market, or NASDAQ National Market from the Center for Research in Security Prices (CRSP) that had no subsidiaries in Venezuela at the time of the

22. Abadie and Gardeazabal (2003).

23. Abadie, Diamond, and Hainmueller (2010); Billmeier and Nannicini (2013); Cavallo and others (2013); Crifasi and others (2015).

FIGURE 5. Synthetic Controls and Devaluation Events[a]



a. The figure plots a polynomial fit of the average stock value of actual versus synthetic firms five days before and five days after each devaluation, where the value is normalized to 100 on day 0.

events ("control firms"). This results in a sample of 2,851 unique publicly listed firms that we use as the base to construct our synthetic firms.

Based on daily stock returns, we reconstruct a nominal stock value for each firm normalized to 100 on the day of the devaluation for each event. For each firm active in Venezuela ("treated firm") and each devaluation, we construct a synthetic firm that corresponds to a weighted sum of the stock value using the synthetic control methodology, taking as the main input the market capitalization for 100 days prior to devaluation day. The synthetic firm for each treated firm is based on a subset of the control firms that are active in the same three-digit NAICS industry code as the treated firm. Across all devaluation events, each synthetic firm is based on an average of 88.95 firms, with the range going from four to 275, depending on the treated MNC and devaluation day. Figure 5 plots, for each event, the average stock values for

actual versus synthetic firms five days before and five days after the devaluation date, using a fractional polynomial plot.

The figure shows two important trends. First, the two groups behave similarly before day zero, and second, they often diverge after day zero. That is what we would expect to see using this methodology. We refrain, however, from making any conclusions from the graphs, as we are simply averaging across each type of firm (actual versus synthetic) instead of looking at the proper comparison (that is, each firm with its synthetic control) and evaluating the impact by estimating the standard error of all those differences.

That comparison can be performed analytically by employing a difference-in-differences (DID) regression to estimate the impacts of the five Venezuelan devaluations on the average stock value of the treated firms for ten days following each event. The choice of DID—instead of first differences—is conservative, as graphically we do see small differences in the baseline level for some events. For these regressions—consistent with the event study reported above—we limit our sample to data from ten days before and after the event. The equation for each event takes the following form:

$$\text{STOCK}_{it} = \beta\ \text{TREATED}_i X\ \text{AFTER}_t + \text{TREATED}_i + \text{AFTER}_t + \eta_i + \varepsilon_{it}, \tag{3}$$

where AFTER is defined as a dummy variable for the days following the devaluation (inclusive of day zero), TREATED is a dummy variable that equals one if the firm is an MNC with a Venezuelan subsidiary and zero if it is a synthetic firm, and η_i represents fixed effects for each actual firm and its corresponding synthetic firm, to guarantee that we are comparing every treated firm with its synthetic counterpart. In this context, β estimates the average difference in the stock value between firms active in Venezuela and synthetic firms (not active in Venezuela) during the ten days following the devaluation. The stock values are normalized to 100 on the day of the devaluation. Table 7 reports our results for the complete set of firms in our sample with Venezuelan subsidiaries, for firms registered with CADIVI, and for firms that are not eligible to acquire dollars at the official exchange rate.

The results derived from the synthetic control methodology confirm those of our event study estimation for devaluations 2 and 4. In Event 2, the coefficient of interest for the specification comprising the whole sample of MNCs indicates that the stock prices of firms with subsidiaries in Venezuela experienced significant negative returns that are, on average, 1.2429 percentage points lower than the corresponding synthetic firm over the event window. As the

TABLE 7. Difference-in-Differences Estimation Using the Synthetic Controls Methodology[a]

Sample and explanatory variable	*Event 1*	*Event 2*	*Event 3*	*Event 4*	*Event 5*
A. Full sample ($N = 110$)					
Treated*After	**–0.9611****	**–1.2429*****	**0.0032**	**–0.8308***	**–0.5059**
	(0.418)	(0.312)	(0.354)	(0.460)	(0.471)
Treated	0.0710	0.3817***	0.3283	1.4074***	0.1906
	(0.382)	(0.135)	(0.232)	(0.399)	(0.289)
After	0.9492***	2.4340***	0.8811***	**–3.9845*****	**–0.2660**
	(0.210)	(0.155)	(0.155)	(0.166)	(0.256)
No. observations	4,536	4,578	4,704	4,746	4,746
R^2	0.26	0.29	0.17	0.41	0.14
B. Firms registered with CADIVI ($N = 29$)					
Treated*After	0.7833	**–1.6837****	**–0.1057**	**–0.2321**	**–0.1211**
	(0.622)	(0.768)	(0.782)	(0.862)	(0.725)
Treated	**–0.2871**	0.4420*	1.3915***	1.3486*	0.0873
	(0.575)	(0.237)	(0.326)	(0.659)	(0.301)
After	0.2773	2.7145***	1.6011***	**–4.4936*****	**–0.4645**
	(0.488)	(0.491)	(0.381)	(0.189)	(0.339)
No. observations	1,218	1,218	1,218	1,218	1,218
R^2	0.31	0.26	0.29	0.52	0.13
C. Firms not registered with CADIVI ($N = 81$)					
Treated*After	**–1.6015*****	**–1.0832*****	0.0412	**–1.0376***	**–0.6387**
	(0.507)	(0.323)	(0.395)	(0.544)	(0.584)
Treated	0.2025	0.3958**	**–0.0431**	1.4277***	0.2263
	(0.392)	(0.163)	(0.281)	(0.488)	(0.375)
After	1.1958***	2.3323***	0.6295***	**–3.8038*****	**–0.1971**
	(0.231)	(0.175)	(0.153)	(0.211)	(0.325)
No. observations	3,318	3,360	3,486	3,528	3,528
R^2	0.24	0.30	0.13	0.38	0.14

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. The table presents the coefficients for the difference-in-differences estimation described in specification 3. The devaluation events are described in table 1. The coefficient of interest (β) is reported on the top row and represents the change in stock price in percentage points as compared to a synthetic firm. Standard errors are in parentheses.

table shows, the results for Event 2 are significant and negative for both registered firms (1.6837 percentage points) and unregistered firms (1.0832 percentage points). Here again, this suggests that the lack of significance of the same results using the event studies could have been driven by the small sample size. Nevertheless, across the board, our results indicate that CADIVI-registered firms did not suffer from devaluations as did their unregistered counterparts.

In the case of Event 4, the coefficient of interest for the whole sample of MNCs with subsidiaries in Venezuela is statistically significant and negative,

indicating that within a ten-day window around the devaluation, the stock prices of firms with subsidiaries in Venezuela experienced returns that are, on average, 0.8038 percentage points lower than those of the corresponding synthetic firm. In this case, the results are driven by MNCs that are not registered with CADIVI (1.0376 percentage points).

The results differ from those of the event study reported above in two important ways. First, the former identifies one devaluation that does not show up in the latter (Event 1) as having a statistically significant negative impact on the stock prices of MNCs with subsidiaries in Venezuela, which is strongly driven by MNCs that are not registered with CADIVI. This could be explained by parallel incidents affecting our market proxy in the event study—the S&P 500 Index—to a higher degree than the synthetic firms based on a sample of companies of similar market size and industry not present in Venezuela.

Second, in the event study, devaluation 5 appeared to have a significant negative impact on the stock prices of MNCs with subsidiaries in Venezuela, which was also strongly driven by unregistered MNCs. That could, in turn, be explained by world industry trends affecting firms present and not present in Venezuela to a larger degree than their impact in the market index.

All in all, our findings based on the synthetic control methodology, without many impositions in the formation of the synthetic firms beyond their industry classification and market capitalization value, are consistent with the results obtained through the event study methodology.

Conclusions

This paper studies changes in stock prices following arguably foreseeable exchange rate devaluations in Venezuela in the past decade. We find statistically and economically significant negative returns of up to about 2 percent over a window of twenty days [–10, +10] surrounding the event. The results are surprising for several reasons. First, Venezuela is a small economy, representing on average less than 0.3 percent of the world gross domestic product over the period studied. Second, most firms in our sample were in fact not registered with CADIVI—the government agency managing access to foreign currency at the official fixed exchange rate—during the period of the study and therefore were not eligible to buy foreign currency at those rates. Third, even if official devaluations occurred, nothing actually changed in the fundamentals of the parallel exchange market premium, which rose steadily throughout the

period studied. Fourth, the observed impact is not a one-time negative surprise. More than three years after the first devaluation, which had a significant negative impact on MNC stock prices, market analysts continued to be surprised by Venezuelan devaluations. Finally, we find that the most significant and negative abnormal returns were recorded among large companies not registered with CADIVI, with an average market capitalization of US$46.0 billion. That indicates that our results are not driven by markets neglecting a few small firms whose operations were overrepresented in Venezuela.

Our findings contrast with previous studies showing that devaluations are either anticipated by markets—with abnormal returns registered before, not after, the event—or have a positive impact on subsamples of exporters. To the extent of our knowledge, our paper is the first to report significant negative abnormal returns to the stock prices of MNCs in response to devaluations. Methodologically, our paper also contributes to the literature by being the first to apply synthetic control methods in the context of asset pricing.

Our preferred interpretation of these results is market myopia, as analysts failed to incorporate the foreseeable devaluations into the companies' valuation ex ante. Market myopia can also apply to other countries with macroeconomic imbalances and multiple exchange rates, whose particularities are neglected by market analysts.

Moreover, the evidence suggests that while analysts were not neglecting specific companies—as our results are particularly prevalent among large companies, which are usually subject to considerable analyst coverage—they were consistently neglecting the country as a whole. Our results at the country level present a parallel with the findings of a strand of the asset-pricing literature dealing with neglected-firm effects: namely, the existence of price anomalies in securities that are neglected by market analysts.[24] Whether our findings conform to a wider syndrome—a sort of neglected-country effect—is fertile ground for future research.

Since the parallel exchange rate is neither official nor legal, MNCs translate the financial statements of their Venezuelan subsidiaries using the official exchange rate. By doing so, MNCs comply with current applicable regulations.[25] However, our results suggest that MNCs with operations in countries with

24. Arbel and Strebel (1982); Arbel, Carvell, and Strebell (1983); James and Edmister (1982); Barry and Brown (1984, 1985, 1986); and Bhardwaj and Brooks (1992).

25. Namely, the requirements of the Securities and Exchange Commission (SEC), the Financial Accounting Standards Board (FASB), the U.S. Generally Accepted Accounting Principles (GAAP), and the International Accounting Standards (IAS).

exchange control and multiple exchange rates should be compelled to include a disclosure note in their financial statements. In that note, firms should estimate the impact on their assets and profits of translating their subsidiaries' financial statements at all different exchange rates that may exist. In addition, MNCs must explain which exchange rate or combination of rates is more likely to apply given its legal status. A disclosure note along these lines would not only promote more transparent assessment of equity values and stock prices but would prevent insiders from taking advantage of the kind of market anomalies we have documented in the paper.

Appendix: Data Sample

TABLE A1. Sample of 110 Multinational Companies with Venezuelan Subsidiaries

				Market capitalization					
No.	*Ticker*	*Company name*	*NAICS*	*2011*	*2012*	*2013*	*2014*	*CADIVI*	*Exportable*
1	MMM	3M Co.	339	61,692.34	63,796.46	93,300.17	105,299.40	1	1
2	T	AT&T, Inc.	517	173,635.80	191,472.79	185,222.90	174,231.30	0	0
3	ABT	Abbott Laboratories	325	74,060.04	103,533.74	59,265.30	67,790.70	1	1
4	ACN	Accenture PLC Ireland	541	23,324.08	39,103.72	55,541.66	63,520.78	0	0
5	ALB	Albemarle Corp.	325	5,107.83	5,544.82	4,705.40	4,705.40	0	1
6	AGN	Allergan, Inc.	325	6,472.21	10,987.08	22,371.08	68,229.38	0	1
7	AXE	Anixter International, Inc.	423	2,027.34	2,063.18	2,915.94	2,895.61	0	0
8	ADSK	Autodesk, Inc.	511	9,250.43	8,693.57	11,562.00	12,287.25	0	0
9	AVT	Avnet, Inc.	423	3,640.77	4,476.33	4,604.92	6,132.49	0	0
10	AVP	Avon Products, Inc.	325	12,471.98	6,205.85	7,469.51	4,081.42	1	1
11	BAX	Baxter International, Inc.	339	29,497.65	36,621.53	37,744.62	39,721.58	0	1
12	BDX	Becton Dickinson & Co.	339	17,202.01	15,677.03	19,425.12	21,832.85	0	1
13	BCO	Brinks Co.	561	1,247.14	1,362.86	1,647.87	1,185.68	0	0
14	BMY	Bristol Myers Squibb Co.	325	45,325.43	53,795.95	87,513.76	97,917.58	0	1
15	BG	Bunge Ltd.	311	9,493.15	10,625.22	12,110.65	13,199.71	0	1
16	CA	C A, Inc.	511	12,333.08	11,480.16	13,871.85	14,439.88	0	0
17	CMS	CMS Energy Corp.	221	4,549.11	6,465.67	7,150.02	9,596.18	0	0
18	CBT	Cabot Corp.	325	2,128.01	2,314.69	2,727.56	3,278.75	0	1
19	CAT	Caterpillar, Inc.	333	59,832.14	58,697.91	57,920.64	55,412.16	0	1
20	CBI	Chicago Bridge & Iron Co. N.V.	237	3,263.67	4,486.37	8,938.16	4,546.09	0	0
21	CB	Chubb Corp.	524	21,127.02	27,116.70	35,224.32	38,110.01	0	0
22	CSCO	Cisco Systems, Inc.	334	131,756.30	85,442.22	136,761.60	129,245.50	0	1
23	C	Citigroup, Inc.	522	137,407.30	116,010.52	158,049.70	163,925.60	1	0
24	CLX	Clorox Co.	325	8,754.69	9,424.71	10,946.47	11,752.88	0	1
25	KO	Coca Cola Co.	312	182,421.80	162,587.10	182,421.80	184,928.40	1	1

(*continued*)

TABLE A1. Sample of 110 Multinational Companies with Venezuelan Subsidiaries (*Continued*)

				Market capitalization					
No.	*Ticker*	*Company name*	*NAICS*	*2011*	*2012*	*2013*	*2014*	*CADIVI*	*Exportable*
26	CFX	Colfax Corp.	333	798.91	3,792.01	6,490.23	6,378.50	0	1
27	CL	Colgate Palmolive Co.	325	60,332.86	49,393.24	60,332.86	63,059.65	1	1
28	COP	ConocoPhillips	324	100,054.20	70,393.75	86,553.23	85,006.84	0	1
29	CR	Crane Co.	332	2,400.40	2,634.48	3,462.36	3,462.36	0	1
30	DAN	Dana Holding Corp.	336	2,430.31	2,311.82	2,882.26	3,682.85	0	1
31	DBD	Diebold, Inc.	334	2,105.03	1,935.14	2,107.30	2,238.75	0	1
32	RRD	RR Donnelley & Sons Co.	323	3,604.06	1,620.90	3,685.90	3,357.64	0	1
33	DOW	Dow Chemical Co.	325	39,626.84	38,770.44	53,851.25	53,754.15	0	1
34	DD	E. I. du Pont de Nemours & Co.	325	45,535.15	41,941.15	60,168.91	66,985.73	0	1
35	EMN	Eastman Chemical Co.	325	5,948.51	10,436.63	12,304.10	11,276.40	0	1
36	ETN	Eaton Corp.	336	17,084.13	18,309.23	36,118.94	32,253.82	0	1
37	ECL	Ecolab, Inc.	325	11,704.25	21,060.11	31,416.47	31,368.17	0	1
38	EEI	Ecology & Environment, Inc.	813	30.27	31.71	27.75	27.43	0	0
39	EMR	Emerson Electric Co.	335	39,621.85	35,107.92	46,230.18	43,675.54	0	1
40	ETP	Energy Transfer Partners LP	221	9,928.69	12,902.50	18,901.62	22,934.28	0	0
41	FMC	FMC Corp.	333	5,711.00	8,056.47	10,027.55	7,603.11	0	1
42	FLEX	Flextronics International Ltd.	334	5,677.29	4,433.39	5,566.24	7,254.87	0	1
43	FLS	Flowserve Corp.	333	6,656.21	7,337.69	10,994.31	8,155.33	0	1
44	FLR	Fluor Corp. New	237	11,846.76	9,780.77	13,115.58	9,471.65	0	0
45	F	Ford Motor Co. Del	336	57,116.28	48,473.59	59,654.66	59,654.66	1	1
46	BGC	General Cable Corp. Del New	331	1,828.60	1,513.53	1,463.42	725.20	0	1
47	GD	General Dynamics Corp.	336	26,804.71	24,457.14	45,605.86	45,605.86	0	1
48	GE	General Electric Co.	333	195,542.40	220,107.43	253,766.20	253,766.20	1	1
49	GIS	General Mills, Inc.	311	23,632.45	24,778.99	30,350.48	33,754.06	1	1
50	GT	Goodyear Tire & Rubber Co.	326	2,878.52	3,382.94	5,888.50	7,844.25	1	1
51	GRA	W. R. Grace & Co. Del New	339	2,567.26	5,063.32	7,041.90	7,041.90	0	1
52	HAL	Halliburton Company	213	37,136.31	32,191.86	33,330.61	33,330.61	1	0
53	HRS	Harris Corp.	334	5,346.59	4,761.60	5,396.99	8,067.33	0	1

54	HSC	Harsco Corp.	332	2,279.95	1,893.74	1,526.49	1,526.49	0	1
55	HP	Helmerich & Payne, Inc.	211	4,281.22	5,032.03	7,342.38	10,592.17	0	1
56	HLF	Herbalife Ltd.	424	4,050.21	3,557.57	7,949.52	3,460.86	1	0
57	HON	Honeywell International, Inc.	336	41,473.98	49,720.63	71,695.55	78,218.41	1	1
58	HUN	Huntsman Corp.	325	3,734.15	3,808.63	5,939.40	5,556.36	0	1
59	IR	Ingersoll Rand PLC	333	15,257.66	14,436.05	17,746.13	16,828.26	0	1
60	INWK	InnerWorkings, Inc.	323	299.21	688.18	399.37	419.76	0	1
61	IBM	International Business Machines Corp.	334	182,328.90	216,438.57	203,673.70	158,781.10	1	1
62	IPG	Interpublic Group of Companies, Inc.	541	5,190.37	4,753.90	7,367.48	8,686.62	0	0
63	IILG	Interval Leisure Group, Inc.	561	921.27	—	1,772.83	1,192.79	0	0
64	JBL	Jabil Circuit, Inc.	334	2,229.00	4,680.87	4,624.64	4,312.32	0	1
65	JLL	Jones Lang Lasalle, Inc.	531	3,579.03	3,697.34	4,549.88	6,720.15	0	0
66	KMB	Kimberly Clark Corp.	322	25,707.28	33,036.24	39,866.01	43,033.47	1	1
67	KEX	Kirby Corp.	483	2,357.73	3,459.90	4,606.94	4,606.94	0	0
68	KFY	Korn Ferry International	541	745.74	773.79	805.67	1,444.75	0	0
69	LLY	Lilly Eli & Co.	325	40,406.14	57,233.52	57,459.13	76,815.52	1	1
70	LECO	Lincoln Electric Holdings, Inc.	332	2,749.22	4,037.75	5,779.26	5,319.73	0	1
71	MAN	Manpower, Inc.	561	5,119.15	3,329.69	6,782.42	5,394.95	0	0
72	MMC	Marsh & McLennan Cos., Inc.	524	14,857.94	18,765.01	26,538.79	30,961.07	1	0
73	MDT	Medtronic, Inc.	339	48,125.93	39,750.56	47,324.46	58,867.93	0	1
74	MELI	Mercadolibre, Inc.	519	2,941.14	3,468.05	4,759.25	5,637.21	0	0
75	MRK	Merck & Co., Inc. New	325	111,034.90	124,460.54	146,242.50	161,901.10	1	1
76	MSFT	Microsoft Corp.	511	201,655.90	256,982.50	288,489.00	344,459.20	1	0
77	MON	Monsanto Co. New	424	28,454.71	46,425.28	52,186.07	60,669.25	1	1
78	NOV	National Oilwell Varco, Inc.	333	34,046.81	29,178.99	34,046.81	28,215.50	0	1
79	NWL	Newell Rubbermaid, Inc.	326	5,277.65	6,404.85	10,326.20	10,326.20	0	1
80	NEU	Newmarket Corp.	339	1,763.10	3,518.17	4,430.96	5,056.65	0	1
81	NDSN	Nordson Corp.	333	2,649.34	3,784.05	4,629.90	4,830.04	0	1
82	NUS	Nu Skin Enterprises, Inc.	424	1,879.95	2,174.59	8,221.66	2,590.72	0	0
83	OXY	Occidental Petroleum Corp.	211	79,714.66	62,068.19	76,656.30	62,507.26	0	1
84	ORCL	Oracle Corp.	511	113,280.90	131,691.05	159,126.00	187,362.40	1	0
85	OI	Owens-Illinois, Inc.	327	5,026.07	3,499.55	5,903.50	4,450.92	0	1

(*continued*)

TABLE A1. Sample of 110 Multinational Companies with Venezuelan Subsidiaries (*Continued*)

				Market capitalization					
No.	*Ticker*	*Company name*	*NAICS*	*2011*	*2012*	*2013*	*2014*	*CADIVI*	*Exportable*
86	PRGX	PRGX Global, Inc.	541	151.32	204.17	196.33	155.88	0	0
87	PH	Parker Hannifin Corp.	332	8,931.04	11,612.81	14,238.57	18,725.76	0	1
88	PEP	Pepsico, Inc.	312	103,537.70	105,851.19	127,196.80	141,519.10	1	1
89	PFE	Pfizer, Inc.	325	140,254.30	184,648.19	198,515.20	196,265.50	1	1
90	PM	Philip Morris International, Inc.	312	106,196.50	139,725.05	126,550.10	126,550.10	1	1
91	PX	Praxair, Inc.	325	29,250.07	32,520.49	38,276.07	37,750.23	1	1
92	PG	Procter & Gamble Co.	325	172,736.70	167,831.49	211,012.10	212,661.40	1	1
93	PRGS	Progress Software Corp.	511	1,667.20	1,285.19	1,367.51	1,294.30	0	0
94	RPM	RPM International, Inc.	325	2,568.12	3,466.95	4,389.97	5,738.96	0	1
95	SLB	Schlumberger Ltd.	213	113,925.70	92,017.58	117,803.50	109,905.10	1	0
96	CKH	Seacor Holdings, Inc.	483	2,147.35	1,747.47	1,854.27	1,371.18	0	0
97	SEE	Sealed Air Corp. New	322	4,063.87	3,405.94	6,679.64	8,959.42	0	1
98	SHW	Sherwin-Williams Co.	444	9,039.54	15,859.93	18,594.61	25,251.23	0	0
99	SLGN	Silgan Holdings, Inc.	332	2,749.74	2,874.73	3,045.21	3,387.70	0	1
100	SJM	J.M. Smucker Co.	311	7,274.81	8,920.05	10,024.65	10,024.65	0	1
101	SON	Sonoco Products Co.	322	3,464.72	2,995.03	4,253.44	4,425.07	0	1
102	TESO	Tesco Corp.	333	593.00	441.31	773.56	508.21	0	1
103	TTI	Tetra Technologies, Inc.	325	904.27	592.64	974.52	531.73	0	1
104	TDW	Tidewater, Inc.	488	3,078.74	2,494.58	897.39	897.39	0	0
105	TKR	Timken Company	332	4,634.41	4,584.36	5,376.85	3,785.15	0	1
106	TUP	Tupperware Brands Corp.	325	3,010.28	3,544.27	4,789.22	3,173.36	0	1
107	TEL	Tyco Electronics Ltd. New	334	13,078.26	14,549.80	21,412.93	22,628.22	0	1
108	V	Visa, Inc.	522	36,882.49	70,822.85	98,338.05	105,572.70	0	0
109	WST	West Pharmaceutical Services, Inc.	325	1,371.89	1,868.21	3,426.13	3,783.78	1	1
110	XRX	Xerox Corp.	334	14,982.66	8,678.77	14,982.66	15,821.96	1	1

Source: Orbis database and Center for Research in Security Prices (CRSP)

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