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Do Non-U.S. Firms Issue Equity on U.S. Stock Exchanges to Relax Capital Constraints?

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Abstract

The positive market reaction associated with an ADR listing is frequently attributed to a reduction in market segmentation costs that improves access to capital. If so, the benefit should be greatest for ADR firms that face relatively high indirect barriers to capital access. Our paper directly tests this supposition. We document that, following a U.S. listing, the sensitivity of investment to free cash flow decreases significantly for firms from emerging capital markets, but does not change for developed market firms. Further, emerging market ADR firms mention the need for access to external capital markets in their filing documents more frequently than their developed market counterparts and, in the post-ADR period, tout their liquidity rather than a need for capital access. Finally, the increase in capital access following an ADR is more pronounced for firms from emerging markets. Our findings suggest that greater access to external capital markets is an important benefit of a U.S. stock market listing for emerging market firms and is less important for developed market firms.

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I. Introduction

The number of non-U.S. firms listing American Depositary Receipts (ADRs) on U.S. exchanges surged during the 1990s. Miller (1999) and Foerster and Karolyi (1999) have argued that firms seek a dual listing to reduce the effects of market segmentation. Market segmentation[1] may reduce firm value as it impedes the flow and formation of capital in non-U.S. markets. Consequently, non-U.S. domiciled firms have an incentive to seek a U.S. listing and improved access to capital should be an important outcome of efforts aimed at reducing the degree of market segmentation. Supporting this notion, Bruner, Chaplinsky, and Ramchand (1999) document that managers of foreign firms believe that they will obtain higher valuations and greater financial flexibility by listing their shares in the U.S.

Improved capital access facilitates the funding of projects when internally-generated funds are insufficient to meet the needs of an investment program. The positive ADR listing announcement returns documented in Miller (1999) and Foerster and Karolyi (1999) and the long-run returns indicating a decline in the cost of capital documented by Errunza and Miller (2000) are consistent with the idea that an ADR listing enhances a firm's access to capital. Stulz (1999) suggests that ADR listing announcement returns are surprisingly small given the theoretical benefit of the reduction in market segmentation. These returns may be small because the market anticipates the listing. Bekaert and Harvey (1995) provide another plausible reason for the small price reaction, namely that markets do not instantaneously become fully integrated; rather, integration is a gradual process.

This paper provides non-event study evidence on the benefits of an ADR listing. Specifically, we examine whether an ADR listing improves access to capital. We argue that greater access to capital is likely to come about because of improvements (relative to a firm's home market) in shareholder protection and liquidity, which should reduce the effects of information asymmetry.[2] Thus, if a firm is rationed in its access to capital markets and becomes eligible to list on a U.S. exchange, it may do so to take advantage of improved information production and a larger investor base, which, in turn, should lower its cost of capital and lessen its external capital market constraints. Further, since emerging market ADR firms are likely to obtain the greatest reduction in the indirect barriers to raising capital, we are especially interested in whether emerging market firms do, in fact, improve their capital access to a greater extent than developed market firms.[3]

We employ three methodologies to investigate whether firms benefit from improvements in capital access following an ADR listing. First, we test for the benefits of an ADR listing by examining whether a U.S. listing by a non-U.S. firm reduces the firm's dependence on internally-generated cash flows. Second,

[1] Market segmentation may arise from both direct (ownership restrictions, taxes) and indirect (information production and liquidity) barriers.

[2] For instance, Lang, Lins, and Miller (2003) show that analyst activity improves around an ADR listing and is value enhancing. Similarly, Doidge, Karolyi, and Stulz (2004) find a link between the value of ADR firms and home market shareholder protection.

[3] Clarke and Shastri (2001) find that emerging market ADRs still have higher spreads and less depth than developed market ADRs.

we inspect the statements of listing firms to determine whether firms state that improved access to capital is a factor in the decision to list. Finally, we document the frequency and level of capital raising in a four-year window around the ADR listing. Throughout our analysis, we pay particular attention to whether capital access benefits accrue primarily to firms that are domiciled in emerging markets.

To determine whether the investment to cash flow sensitivity of listing firms declines following the ADR listing, we employ the method described by Fazzari, Hubbard, and Petersen (henceforth FHP) (1988). If internal and external markets for capital are not perfect substitutes in the presence of asymmetric information, FHP argue, along the lines of Myers and Majluf (1984), that this information asymmetry can make capital sufficiently "expensive" that firms are effectively rationed in their access to the external capital. As a result, internally-generated cash flow will influence a firm's investment policy.

To examine our hypothesis, we use a sample of ADR listings on the NYSE and Nasdaq over the 1986–1996 period for firms that are publicly traded on the stock market in their country of domicile. We find a significant decline in the investment to cash flow sensitivity following the U.S. market listing for firms from emerging markets; that is, firms from markets that are likely to be characterized by more limited access to external capital markets. These results also extend to subsamples of firms from countries with less developed external capital markets and with more limited rule of law as defined by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (hereafter LLSV) (1997), (1998). In contrast, we find no change in this sensitivity for developed market ADR firms.

Our findings suggest that firms from emerging markets benefit from a U.S. listing through an enhanced access to external capital markets. To examine the robustness of our results, we study annual reports, F-6s, 20Fs, and other documents issued by the listing firms around the time of their ADR to determine whether they need access to external capital markets to support their growth. We find that many of these firms explicitly mention their need for external capital to finance additional capital expenditures and their concern about their ability to raise sufficient external capital. We also find that emerging market firms mention the need for capital more frequently than developed markets firms. Further, we find that emerging market firms make almost no mention of capital constraints three years after their ADR issue.

Finally, we use issue data from Securities Data Corporation (SDC) to examine the actual access of external capital markets before and after the listing and find that ADR firms tend to increase their access of external international capital markets following a U.S. listing. We find these increases for firms from both emerging and developed markets, but, consistent with our expectations, they are more pronounced for firms from emerging markets. Reese and Weisbach (2002) provide similar evidence with their finding that listing firms from countries with weak shareholder protections increase their use of external capital markets after listings on U.S. exchanges.

The remainder of the paper is organized as follows. In Section II, we describe the data and sample selection procedure. In Section III, we examine the investment to cash flow sensitivity of emerging and developed market ADR firms surrounding the ADR listing. We also conduct extensive robustness tests of our

regression results. In Section IV, we examine whether our emerging market results also hold when we segment firms based on stock market and legal characteristics. In Section V, we investigate whether ADR firms identify themselves as being capital constrained and whether they increase their access to external capital markets following the ADR listing. We conclude in Section VI.

II. Data Collection, Sample Construction, and Preliminary Descriptive Statistics

Our paper seeks to identify whether relaxation of capital constraints is an important source of the gains from listing an ADR. We use only listings on Nasdaq and the NYSE because Miller (1999) does not document listing benefits for firms with ADR programs on other markets such as PORTAL or the OTC market. We obtain information on ADR listings directly from the NYSE and Nasdaq. Our Nasdaq list covers a period from 1970 through 1996, while our NYSE list spans the period from 1928 through 1996. These data sets contain listing dates, the country of origin of the listing firm, and the type of listing. Because all the non-U.S. firms we examine list on the Nasdaq or the NYSE, our sample consists only of Level II and Level III ADRs (see Table 1 of Foerster and Karolyi (1999) or Miller (1999) for a definition of ADR programs).

We use three criteria to construct a sample that is best suited for our tests. First, we eliminate financial firms because they are highly regulated in most countries and because the FHP method we use to evaluate the investment to cash flow sensitivity cannot easily be applied to financial firms. Financial firms consist of commercial banks, insurance companies, diversified financial services, and brokerage houses, following the definitions provided by the stock exchanges.

Second, we eliminate observations if a firm is not already a publicly traded company on its home country stock exchange prior to its ADR listing on the NYSE or Nasdaq. We require prior listing because i) we want to test the benefits of a U.S. listing compared to the existing home country listing, and ii) our methodology requires market values to compute market-to-book value ratios. We define ADR to comprise a listing of either depositary receipts that represent ownership of common stock that already trades on a stock exchange in the firm's home country prior to the U.S. listing or the actual shares themselves (New York shares—used frequently by Canadian firms). Thus, our sample includes listings by existing publicly traded firms that raise new equity as well as those that re-deploy existing shares to the U.S. market, but excludes non-U.S. firms that simultaneously issue stock in their home country and/or depository receipts for the first time. Our sample construction is consistent with Foerster and Karolyi (1999) and Miller (1999) who require pre-ADR period stock returns to compute ADR announcement returns.

Finally, we collect accounting and market value data from Worldscope. We require that listing firms have sufficient coverage on Worldscope to be included in our sample. Sufficient coverage means that Worldscope provides financial data for the firm for at least three years before and two years after the U.S. listing date. The extra pre-ADR year is required because we normalize our investment and cash flow variables by total assets in the preceding period. We use Datastream, a

Mexican Bolsa database, company Web sites, and Moody's/FISOnline to complement Worldscope data for several observations. Because Worldscope coverage is extremely sparse prior to the mid-1980s, our analysis includes only ADRs listed after 1985.

We illustrate our data collection and sample construction procedure in Table 1, which shows a significant increase over time in the number of U.S. listings by non-U.S. companies. Before 1986, 104 non-U.S. companies were listed on the NYSE or Nasdaq. Between 1986 and 1996, another 540 non-U.S. companies listed on these two markets. We subdivide the ADR firms between those from developed markets and those from emerging markets using *The Economist*'s classification. There is an acceleration of listings toward the end of the 1986–1996 period, particularly for firms from emerging markets. Companies from developed markets constitute an overwhelming majority of the listings through 1990. After this time, emerging markets account for one-third to one-half of new ADR listings.

Our sample selection process eliminates 67 observations (12.4% of the sample) because they are financial firms. We eliminate 142 observations (26.3% of the sample) because they are ADR/IPOs. Finally, we lose 211 firms (39.5% of the sample) because insufficient data are available from Worldscope.[4] It is likely that small firms are generally the ones lost as a result of our Worldscope data requirements. This could bias against finding results consistent with our hypotheses because Love (2003) shows that small firms from less financially developed countries have a relatively larger sensitivity of investment to available internal funds.

Several issues arise concerning the accounting data that we use in our tests. Because of differences in international accounting practices, we are concerned about the cross-country comparability of our accounting data. We design our tests to rely primarily on time-series comparisons within firms, and not on comparisons across firms. While this lessens the impact of cross-country accounting differences, there may still be issues with intertemporal comparability of our accounting data. We find that, as a general rule, Worldscope reports accounting data using local standards, and does not change reporting practices surrounding a U.S. listing.[5] Finally, in countries with hyperinflation, deflating sales or cash flow by assets in the prior year $(t-1)$ can cause problems because the cash flow in the current year (t) could potentially be larger than the assets at $t-1$. To solve this measurement problem, we convert the accounting variables to U.S. dollars based on the exchange rate at the time of reporting.

In Table 2, we present key descriptive statistics for the main variables (primarily ratios) that we use in our regressions, which are described in the next section. The variables are reported for the year of the ADR listing. Not surprisingly, ADR firms are rather large, with mean assets of U.S.$6.7 billion and median assets of U.S.$2.1 billion. Mean (median) investment as a percentage of total assets

[4]We lose about the same proportion of emerging market firms (37.1% of the sample) as developed market firms (40.0 % of the sample) due to this Worldscope requirement.

[5]We find two exceptions to this rule, Pechiney and Daimler Benz, for which the data are in local standards before and in U.S. GAAP following the listing. We re-examine all our results by excluding these two firms and find that this exclusion does not change our results.

TABLE 1

ADR Issues over the Period 1986–1996

Country	Pre-1986 Listings	Number of Non-U.S. Listings per Year on NYSE and Nasdaq Combined (excluding listings of preferred stock)											Total Non-U.S. Listings 1986–1996	Subtract Finance Sector Firms	Subtract if IPO/ ADR	Subtract if Worldscope Coverage is Insufficient	Total ADRs in Sample
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996					
Panel A. Developed Markets																	
Australia	5	1	2	3	1	1	1	2	2	1	—	4	18	< 4 >	< 2 >	< 5 >	7
Belgium	—	—	—	—	—	—	—	—	—	—	1	1	2	< 0 >	< 1 >	< 0 >	1
Bermuda	1	—	—	—	1	—	—	—	2	2	2	8	15	< 7 >	< 6 >	< 2 >	0
Canada	26	8	4	5	8	8	4	11	18	26	28	37	157	< 18 >	< 15 >	< 91 >	33
Cayman Islands	1	—	—	—	—	—	—	—	—	—	1	—	1	< 0 >	< 0 >	< 1 >	0
Denmark	1	—	—	—	—	—	—	1	—	2	—	—	3	< 0 >	< 2 >	< 0 >	1
Finland	1	—	—	—	—	—	—	—	—	1	1	1	3	< 0 >	< 0 >	< 1 >	2
France	—	—	1	—	—	—	1	1	3	2	1	7	16	< 3 >	< 5 >	< 5 >	3
Germany	—	—	—	—	—	—	—	—	1	—	—	6	7	< 0 >	< 1 >	< 4 >	2
Ireland	—	—	—	—	1	1	—	1	1	—	4	1	10	< 2 >	< 3 >	< 2 >	3
Italy	—	—	1	—	2	1	—	0	2	2	3	2	13	< 2 >	< 2 >	< 6 >	3
Japan	21	—	—	—	2	—	—	—	—	2	—	1	5	< 1 >	< 0 >	< 3 >	1
Luxembourg	1	—	—	1	—	—	—	—	3	—	1	—	5	< 1 >	< 2 >	< 2 >	0
Netherlands	5	—	1	—	2	—	1	1	5	2	6	2	20	< 3 >	< 7 >	< 7 >	3
Neth. Antilles	1	—	—	—	—	—	—	1	—	—	—	—	1	< 0 >	< 0 >	< 1 >	0
New Zealand	—	—	—	—	—	—	1	—	1	—	—	4	6	< 0 >	< 5 >	< 1 >	0
Norway	1	—	—	—	—	—	—	—	—	—	2	2	4	< 0 >	< 1 >	< 1 >	2
Spain	1	—	2	2	1	—	—	—	1	—	—	—	6	< 3 >	< 0 >	< 2 >	1
Sweden	4	—	1	—	—	—	—	—	—	—	—	5	6	< 0 >	< 2 >	< 2 >	2
Switzerland	—	—	—	—	—	—	—	—	—	—	1	1	2	< 0 >	< 0 >	< 0 >	2
U.K.	7	6	6	3	3	4	2	6	7	4	12	17	70	< 7 >	< 24 >	< 13 >	26
Total	76	11	23	14	21	15	10	24	46	44	63	99	370	< 51 >	< 79 >	< 148 >	92

(continued on next page)

TABLE 1 (continued)

ADR Issues over the Period 1986–1996

Country	Pre-1986 Listings	Number of Non-U.S. Listings per Year on NYSE and Nasdaq Combined (excluding listings of preferred stock) 1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Total Non-U.S. Listings 1986–1996	Subtract Finance Sector Firms	Subtract if IPO/ ADR	Subtract if Worldscope Coverage is Insufficient	Total ADRs in Sample
Panel B. Emerging Markets																	
Argentina	—	—	—	—	—	—	—	—	4	5	—	2	11	< 2 >	< 1 >	< 6 >	2
Bahamas	2	—	—	—	—	—	—	—	—	—	1	2	3	< 0 >	< 1 >	< 2 >	0
Belize	—	—	—	—	—	—	—	—	—	—	1	—	1	< 1 >	< 0 >	< 0 >	0
Brazil	—	—	—	—	—	—	—	1	—	—	1	1	3	< 0 >	< 1 >	< 0 >	2
Chile	—	—	—	—	—	1	—	1	4	9	2	1	18	< 4 >	< 0 >	< 7 >	7
Colombia	—	—	—	—	—	—	—	—	—	1	1	—	2	< 2 >	< 0 >	< 0 >	0
Greece	—	—	—	—	1	—	—	—	—	—	—	—	1	< 0 >	< 0 >	< 1 >	0
Ghana	—	—	—	—	1	—	—	—	—	—	—	—	1	< 0 >	< 0 >	< 1 >	0
Hong Kong	—	—	—	1	1	1	1	3	4	2	2	3	18	< 0 >	< 9 >	< 9 >	0
Indonesia	—	—	—	—	—	—	—	—	—	1	1	2	4	< 0 >	< 1 >	< 3 >	0
Israel	10	—	—	2	1	1	4	6	8	3	7	20	52	< 1 >	< 38 >	< 13 >	0
Korea (South)	—	—	—	—	—	—	—	—	—	2	—	1	3	< 0 >	< 0 >	< 0 >	3
Liberia	—	—	—	—	—	—	—	—	1	—	—	—	1	< 0 >	< 0 >	< 1 >	0
Mexico	1	—	—	—	—	—	1	2	8	9	—	4	24	< 2 >	< 1 >	< 12 >	9
Panama	—	—	—	—	—	—	—	1	—	—	—	—	1	< 1 >	< 0 >	< 1 >	0
Papua New Guinea	—	—	—	—	—	—	—	—	—	—	1	—	1	< 0 >	< 1 >	< 0 >	0
People's Rep. China	—	—	—	—	—	—	—	—	1	2	1	1	5	< 0 >	< 5 >	< 0 >	0
Peru	—	—	—	—	—	—	—	—	—	1	1	2	4	< 2 >	< 0 >	< 0 >	2
Philippines	1	—	—	—	—	—	—	—	—	1	—	—	1	< 0 >	< 0 >	< 0 >	1
Portugal	—	—	—	—	—	—	—	1	—	—	1	—	2	< 1 >	< 1 >	< 0 >	0
Russia	—	—	—	—	—	—	—	—	—	—	—	1	1	< 0 >	< 0 >	< 1 >	0
Singapore	—	—	—	—	—	—	—	1	—	2	2	—	5	< 0 >	< 2 >	< 3 >	0
South Africa	14	—	—	—	—	—	—	—	—	—	—	3	3	< 0 >	< 0 >	< 2 >	1
Taiwan	—	—	—	—	—	—	—	—	—	—	—	2	2	< 0 >	< 2 >	< 0 >	0
U. Arab Emirates	—	—	—	—	—	—	—	1	—	—	—	—	1	< 0 >	< 0 >	< 1 >	0
Venezuela	—	—	—	—	—	—	—	—	1	—	—	1	2	< 0 >	< 0 >	< 1 >	1
Total	28	0	0	3	4	3	6	17	31	38	22	46	170	< 16 >	< 63 >	< 63 >	28
Total all markets	104	11	23	17	25	18	16	41	77	82	85	145	540	< 67 >	< 142 >	< 211 >	120

Table 1 provides the number of non-U.S. listings on the NYSE and Nasdaq over 1986–1996. Listings are classified by country of origin of the listing company. Companies that operate in the financial sector are excluded as are observations where Worldscope coverage is insufficient or the firm does not meet our definition of ADR-type listing. Sufficient coverage means that Worldscope provides financial data for the firm for at least three years before and two years after the U.S. listing date. Under our definition of an ADR-type listing, the listing firm has equity publicly traded in another market before it lists equity on the NYSE or Nasdaq. This definition of ADR comprises a U.S. listing of either depository receipts that represent ownership of common stock that already trades on a stock exchange in the firm's home country prior to the U.S. listing or the actual shares themselves. Our definition of ADRs excludes non-U.S. firms that simultaneously issue stock and/or depository receipts for the first time. Our ADR sample includes listings by existing firms that raise new equity as well as those that redeploy existing shares to the U.S. market. We use the classification of *The Economist Magazine* to identify emerging markets.

is 10% (8%) and the mean and median free cash flow as a percentage of total assets is 14%. The median of the market-to-book value ratio is 1.52, and the median sales to total assets, debt to total assets, and cash to total assets ratios are 0.69, 0.25, and 0.09, respectively. Seventy-eight percent of the observations are from developed markets.

TABLE 2

Summary Statistics for Our Sample of Non-U.S. Firms Listing on NYSE or Nasdaq

			Percentile	
	Mean	Median	1st	99th
TA	6701	2096	20	56,600
I/TA	0.10	0.08	0.01	0.29
FCF/TA	0.14	0.14	−0.07	0.40
Market-to-Book Value Ratio	1.91	1.52	0.76	6.05
Sales/TA	0.84	0.69	0.13	3.39
Debt/TA	0.26	0.25	0.00	0.65
Cash/TA	0.13	0.09	0.00	0.52
Emerging Markets Dummy	0.22	—	—	—

Table 2 presents descriptive statistics for regression variables used in our analysis. The sample consists of 28 emerging market and 92 developed market non-financial firms listing on the NYSE or Nasdaq over 1986–1996 for which we have sufficient accounting data to conduct pre- and post-ADR tests. For each variable, we provide means, medians, and the 1st and 99th percentile values for the year of the listing. All variables are in U.S.$1 million, except for the dummy variable. Total assets (TA) are the total assets reported by the company. Investment (I) is annual investment in property, plant, and equipment. Free cash flow (FCF) is the sum of income before extraordinary items and depreciation net of cash dividends. The market-to-book value ratio is the market value of common equity plus book value of debt divided by book value of total assets. Sales consist of gross operating revenue. Debt is the sum of the book value of short- and long-term debt obligations. Cash consists of cash and marketable securities. Data are predominantly from Worldscope, but also come from Datastream, a Mexican Bolsa database, company Web sites, and Moody's/FIS Online. The Emerging Markets Dummy is equal to one if the firm is from an emerging market and equal to zero elsewhere.

III. Investment to Cash Flow Sensitivity

A. Regression Methodology

To examine the change in the sensitivity of investment to free cash flow, we use regressions based on the FHP (1988) methodology, which is also discussed in detail by Hoshi, Kashyap, and Scharfstein (1991), Whited (1992), and Kaplan and Zingales (1997), among others. We adjust the model to accommodate certain characteristics of our data and to test for pre- and post-ADR effects. The regression specifications take the following form,

$$\frac{\mathrm{I}_t}{\mathrm{TA}_{t-1}} = a + B_1\frac{\mathrm{FCF}_t}{\mathrm{TA}_{t-1}} + B_2\mathrm{PostList} + B_3\frac{\mathrm{FCF}_t * \mathrm{PostList}}{\mathrm{TA}_{t-1}} + B_4(\mathrm{M/B})_{t-1} + B_5\frac{\mathrm{Sales}_{t-1}}{\mathrm{TA}_{t-1}} + B_6\frac{\mathrm{Cash}_{t-1}}{\mathrm{TA}_{t-1}} + e_t.$$

The dependent variable is investment (I_t) scaled by TA_{t-1}, the total assets in the preceding period. In FHP (1988) and related literature, the scalar is K, the initial capital stock. We use the firm's initial total assets instead because we believe that international firms are likely to be more consistent over time in reporting total assets than in reporting book values of capital employed. As mentioned, we convert the variables to U.S. dollars to alleviate biases that may arise from inflationary effects in the home currency between periods.

The independent variables and expected relations with the dependent variable are:

Free Cash Flow (FCF_t) Scaled by TA_{t-1}. FHP argue that if one controls for investment opportunities and there is costly access to external capital markets, then there will be a positive relation between internally-generated cash flow and investment. Free cash flow is the sum of income before extraordinary items and depreciation, net of cash dividends.

Post-List is a dummy variable equal to one after the listing date and equal to zero otherwise. We include this variable to control for changes in the investment pattern following the listing that are not related to the investment to internally-generated free cash flow sensitivity.

Free Cash Flow Multiplied by Post-List. If a U.S. listing enhances access to external capital markets, then there should be a negative relation between this variable and investment, indicating that the reliance on internally-generated free cash flow is lower following the listing.

Market-to-Book Value Ratio (M/B) of Debt Plus Equity for the Preceding Period. Classical investment theory predicts a positive relation between Tobin's q and investment if q correctly measures the firm's investment opportunities and if the firm invests according to these investment opportunities. The definition and hence construction of Tobin's q uses the replacement value of assets in the denominator. We use the market-to-book ratio of assets as an approximation for Tobin's q and estimate the market value of assets as the book value of debt plus the market value of equity. This approach is consistent with many other papers because, like these papers, we are not able to obtain reasonable estimates of replacement values for international firms.[6] Despite common usage, both Tobin's q and the market-to-book ratio cannot unambiguously measure investment opportunities since they capture not only the value of a firm's investment opportunities, but also the firm's ability to capitalize on them.

$Sales_{t-1}$ Relative to TA_{t-1}. Scaled lagged sales, as a proxy for production, are included in the regression to control for a possible accelerator effect. Hoshi, Kashyap, and Scharfstein (1991) argue that production should be included because it is correlated with the liquidity variables. Thus, if one excludes production, the liquidity variables might proxy for production effects that are empirically important but not well understood in the investment theory literature.

$Cash_{t-1}$ Relative to TA_{t-1}. If access to external capital markets is costly and there is a positive investment to cash flow sensitivity, then this sensitivity is likely to be lower when the firm has a lot of financial slack. Hence, we also control for the firm's available balance of cash and marketable securities.[7]

[6] Perfect and Wiles (1994) and Lewellen and Badrinath (1997), among others, show that the improvement in q estimations from using more complicated algorithms is limited.

[7] To test the robustness of our results to varying levels of cash reserves relative to total assets following the listing, we also estimate models in which we include an interaction between cash to total assets and the post-listing dummy variable. The inclusion of this variable does not affect our results on the investment to cash flow sensitivity.

We estimate a fixed-effects model that includes a dummy variable for each firm (i.e., a firm fixed-effects model). We do not include a dummy variable for each year because the sample is aligned in event time rather than calendar time. Reported *p*-values are based on robust (White) standard errors that also incorporate clustering around each firm to account for a lack of independence between the time-series observations of each firm. For each firm, we have the same number of pre- and post-listing observations, where we use two years on each side of the listing event as a minimum and three years as a maximum. We also estimate our models with only two years of data on each side of the listing. This approach yields similar results and we do not tabulate these results for brevity.

An essential part of our analysis is to compare the changes in investment to cash flow sensitivity of emerging market cross-listing firms to those of developed market cross-listing firms by estimating separate regressions for each subset. If access to external capital markets is more constrained for emerging market firms, then the decrease in reliance on internally-generated cash flow following the U.S. listing should be more pronounced for these firms. However, since we argue that emerging and developed market firms are likely to list in the U.S. for different reasons, we also conduct tests that benchmark our emerging market listing firms to various comparison groups of emerging market firms that did not list on a U.S. exchange.

B. Univariate Comparisons

Before undertaking our regression analysis, we examine our key investment regression variables to gauge whether there are substantial changes in these variables following the listing. In Panel A of Table 3, we compare variables from one year before to one year following the listing. Not surprisingly, firms from both emerging and developed markets grow in size from the pre- to post-ADR period. In emerging markets, both the market-to-book and production variables are larger just prior to the ADR than they are just afterward. To the extent that these measures capture growth opportunities, they may help explain why emerging market firms wish to list an ADR. Panel A also shows some significant differences in regression variables between emerging and developed markets. Specifically, emerging market firms invest more in both the year preceding the listing and the year afterward, while their sales to total assets levels are lower than for developed market firms over both time periods. While it can be argued that the higher investment levels in emerging markets can be explained by higher growth in these markets, the fact that the market-to-book value ratios are not different between emerging and developed markets reduces the strength of this argument.

In Panel B of Table 3, we compare variables from two years before to two years following the listing. The results for the two-year comparison show a slight decrease in the investment level over this period for emerging market firms and a decrease in production for developed market firms. Panel B also again shows that emerging market firms invest more prior to the ADR than developed market firms. It is interesting to note that median firm size is not statistically different between emerging and developed markets in either Panel A or B. This result indicates that only relatively large firms tend to pursue exchange-listed ADRs, most

TABLE 3

Comparison of Pre- and Post-Listing for Selected Variables

Panel A. One Year surrounding the Listing

	Emerging Markets		Developed Markets	
	$t-1$	$t+1$	$t-1$	$t+1$
TA	1810***	1837	2084***	2767
I/TA	0.12^^	0.12^	0.09	0.08
FCF/TA	0.15	0.11	0.14	0.14
Market-to-Book Value Ratio	1.74***	1.37	1.43	1.46
Sales/TA	0.60^^^***	0.50^^^	0.81	0.73
Debt/TA	0.32	0.33^	0.22	0.28
Cash/TA	0.05	0.05^	0.08	0.10

Panel B. Two Years surrounding the Listing

	Emerging Markets		Developed Markets	
	$t-2$	$t+2$	$t-2$	$t+2$
TA	1515***	2441	1834***	3768
I/TA	0.13^*	0.12	0.08	0.08
FCF/TA	0.14	0.14	0.14	0.13
Market-to-Book Value Ratio	1.37	1.40	1.33	1.45
Sales/TA	0.53^^^	0.53^^	0.90**	0.75
Debt/TA	0.29	0.32	0.23	0.27
Cash/TA	0.05	0.05^	0.07	0.10

Table 3 compares the medians of variables used in our regression analysis for companies from emerging markets to companies from developed markets. The sample consists of 28 emerging market and 92 developed market non-financial firms listing on the NYSE or Nasdaq over 1986–1996 for which we have accounting data from Worldscope. We compare these variables for the one and two years preceding the U.S. listing to the one and two years following the listing. All variables are defined in Table 2. ***, **, * indicate that the variables are different between years $t-1$ and $t+1$ in Panel A ($t-2$ and $t+2$ in Panel B) at the 1%, 5%, and 10% levels of significance. ^^^, ^^, ^ indicate that the variables are different between emerging markets and developed markets firms, for the same year, at the 1%, 5%, and 10% levels of significance. The distributions are non-normal and the significance levels are based on the sign test for the matched pairs and the rank sum test for comparisons between the developed and emerging markets.

likely because of the listing requirements. Overall, we are cautious about any interpretation of these univariate results because accounting standards are vastly different among various countries. In the next section, we estimate and discuss multivariate regressions, which focus on within-firm time-series comparisons.

C. Regression Evidence

We present the main results of our investment to cash flow sensitivity tests in Table 4. In the first column, we estimate the model using only emerging market firms. In the second column, we estimate the model for developed market firms. There is a positive and significant relation between a firm's free cash flow and its investment for both subsamples, consistent with the prior literature, and this relation is more pronounced in emerging markets. The coefficient on the market-to-book value ratio is also positive and significant across both emerging and developed market firms, consistent with the prior literature. For emerging market firms, we also find a positive and significant relation between investment and our measures of production and financial slack—these relations are not significant at conventional levels for developed market firms.

More important for our analysis, however, is the coefficient on the interaction between free cash flow and the post-listing dummy variable. We find a large negative and significant coefficient on the interaction in the emerging markets regression, which indicates that the investment to cash flow sensitivity declines following an ADR listing for emerging markets ADR firms. In addition, the sum

TABLE 4

Investment Regression Equations for Exchange-Listed ADRs

	(1) Emerging Markets	(2) Developed Markets
Constant	−0.013	−0.017
	(0.67)	(0.81)
FCF_t/TA_{t-1}	0.509	0.208
	(0.00)	(0.01)
Post-Listing Dummy	0.052	−0.021
	(0.07)	(0.17)
FCF_t/TA_{t-1} * Post-Listing Dummy	−0.343	0.115
	(0.04)	(0.22)
Market-to-Book Value $Ratio_{t-1}$	0.003	0.004
	(0.04)	(0.05)
$Sales_{t-1}/TA_{t-1}$	0.092	0.065
	(0.08)	(0.22)
$Cash_{t-1}/TA_{t-1}$	0.135	0.164
	(0.03)	(0.14)
Adjusted R^2	0.61	0.43
N	150	486

Table 4 presents the results of the basic investment regressions à la Fazzari, Hubbard, and Petersen (1988) and Hoshi, Kashyap, and Scharfstein (1991). The sample consists of 28 emerging market and 92 developed market non-financial firms listing on the NYSE or Nasdaq over 1986–1996 for which we have sufficient pre- and post-listing accounting data. All variables are defined in Table 2. The dependent variable is investment divided by total assets at the beginning of the period (I/TA_{t-1}). The independent variables are also normalized by total assets from the preceding period. Ratios are computed in U.S. dollars using the contemporaneous exchange rate to avoid problems with inflation between periods. Each model includes firm fixed effects. Models are estimated using robust standard errors with firm clusters that account for a lack of independence between the observations of each firm. In column (1), the model is estimated for emerging market firms only; in column (2) it is estimated for firms from developed markets. *p*-values are in parentheses below each coefficient.

of the free cash coefficient and the interacted free cash flow coefficient is statistically indistinguishable from zero. These emerging market results are consistent with the hypothesis that capital markets are segmented and that access to capital is constrained for emerging market firms prior to the ADR listing. This interaction variable is not significant, however, for developed markets firms. This result suggests that an ADR listing does not seem to affect the investment to cash flow sensitivity for firms from developed markets and supports the notion that capital market integration among developed economies (of which the U.S. is one) is at a more advanced stage. It also supports the notion that firms from developed markets (a majority of the firms in our sample) reap other significant benefits from listing their stock in the U.S., as suggested in the Introduction. We do not examine these benefits in this paper.

We conduct several robustness tests aimed at alleviating concerns with the FHP (1988) methodology, which we use to estimate the investment to cash flow sensitivity for our firms. Hoshi, Kashyap, and Scharfstein (1991) suggest alternative specifications to examine the robustness of the results. One concern about this methodology is that cash flow during the current period (t) may contain investment opportunity information not contained within beginning-of-period $(t-1)$ Tobin's *q*. To address this concern, we consider two alternative specifications. The first alternative consists of estimating the model with the addition of the end-of-period market-to-book ratio, which includes all the additional information known at time *t*, including the information from the cash flow during period *t*. The second alternative consists of estimating the model with lagged values of

free cash flow. Hoshi, Kashyap, and Scharfstein (1991) argue that the inclusion of lagged free cash flow eliminates the component of free cash flow that cannot be predicted given beginning-of-period Tobin's q. We estimate these alternative models and obtain results that are qualitatively unchanged.[8]

Kaplan and Zingales (1997) also have concerns about the FHP methodology. They argue that most papers in the investment cash flow sensitivity literature are only able to identify constrained firms and not firm-years. They conclude that such an exercise is valuable only if the investment cash flow sensitivity is monotonically increasing with respect to the difference in the cost of external and internal capital. Because we focus on the time-series component by comparing the investment sensitivities of ADR listing firms in the pre- and post-listing periods, we are less concerned about this issue. Further, the time-series nature of our tests also alleviates other Kaplan and Zingales' concerns about precautionary savings and overly risk-averse managers because it is conducted within the sample of listing firms.

We also investigate whether the significance (or lack thereof) on the interaction between the post-listing dummy and free cash flow might be affected by previous non-U.S. listings outside of a firm's home market. To the extent that such listings increase a firm's access to capital, a subsequent U.S. exchange listing by a firm with a previous outside market listing may not improve capital access by as much. We search Moody's/FISOnline and find that two of our emerging market firms and 11 of our developed market firms had exchange listings outside of their home market (and the U.S.) prior to their ADR. We re-estimate our models excluding these firms and find that our results are virtually unchanged.

D. Emerging Market Robustness Tests

1. Raising Capital

In this section, we perform a variety of additional tests to assess the robustness of our emerging market results. We begin with two primary concerns that affect the interpretation of the regressions reported in Table 4. First, because many of the firms in our sample raise equity capital at the time of their U.S. listing, one could argue that the decline in investment to cash flow sensitivity is expected given the infusion of fresh capital. This argument rings especially true for emerging market firms because a vast majority of these firms raise new capital with their listing—a result consistent with the notion that additional external financing is more important for emerging market firms than it is for developed market firms. Second, we argue in the paper that developed market firms are likely to have reasons for listing other than access to capital. As such, emerging markets tests on capital constraints conducted against a benchmark of developed market firms may not be wholly convincing.

Since it is not possible to directly control for the effect of capital raising by our emerging market ADR firms, we conduct several tests within emerging

[8]We also examine whether outliers or a change in the correlation between investment and the market-to-book ratio generate our results. To address these concerns, we estimate our model excluding observations with a Cook's distance > 1 and interact the market-to-book ratio with the post-listing dummy. The results obtained from this estimation are qualitatively unchanged from the results reported in Table 4.

markets that can provide indirect evidence on whether our emerging market result is driven by improved capital access or the cash influx at the time of the listing. Our approach is to conduct our investment to cash flow regression analysis on several comparison groups of emerging market firms.

We first look at firms that are eligible to list on U.S. exchanges, but had not done so as of year-end 1999, from the nine emerging markets in our sample that have at least one U.S. listing. These firms may have chosen not to list because they did not need to raise capital or obtain a presence among U.S. investors or because they could not afford to list. Our expectation is that there will be no change in the investment to cash flow sensitivity for these firms, because they have not listed an ADR in the U.S. and therefore have not improved their access to capital.

The listing criteria in place at the NYSE and on Nasdaq in 1999 have different levels and combinations of permissible financial performance and size standards, as well as standards on the number of round-lot shareholders; the latter are unobservable in our emerging markets sample. We select firms that meet the NYSE requirement of at least $100 million in worldwide equity value and operating cash flow of $25 million. Given the round-lot shareholder requirement, it is certainly possible that we have misclassified firms as eligible that, in fact, do not have sufficient breadth of shareholdings to allow for a listing. We next obtain a pseudo-ADR date for these comparison firms by computing the median U.S. listing date, by country, from our sample of 28 emerging market exchange-listed firms. We then eliminate firms for which we do not have at least three years financial data before and two years after the pseudo-ADR date. Our Eligible Non-Listed sample contains 65 emerging market firms.

The first column of Table 5 reports the results of the basic regression model estimated on the Eligible Non-Listed sample. The model shows that cash flow remains strongly positively related to investment levels, but there is no change in the investment to cash flow sensitivity before and after the pseudo-ADR date for these firms. Because there is no change expected, this finding gives us some assurance that our basic exchange-listed ADR result is not spurious. For all of the comparison group regressions in Table 5, the market-to-book value ratio is positive, but is no longer significant at conventional levels. Other controls are insignificant in these regressions as well.

We also look at firms that have Level I (OTC) ADRs. These firms provide an interesting comparison because having a Level I ADR does not subject a non-U.S. firm to any of the SEC regulations or U.S. GAAP reconciliation required of a firm that lists on a U.S. exchange. Level I ADRs also do not raise new capital; they simply reallocate shares to the U.S. OTC market. Further, Level I ADRs get very little visibility and are fairly illiquid. Given these features, one would expect that a firm's investment to cash flow sensitivity would not change following a Level I ADR. The Level I sample contains 26 emerging market firms that issued Level I ADRs over the 1986–1996 period for which we have sufficient pre- and post-issuance data and that did not subsequently list a Level II or III ADR by 1999. Model (2) of Table 5 indicates that there is no change in the investment to cash flow sensitivity after the Level I ADR issuance. Again, since no change is expected, these results support those contained in Table 4 and our

TABLE 5

Investment Regression Equations for Emerging Market Comparison Firms

	Firms		
	(1) Eligible Non-Listed	(2) Level I ADR	(3) Domestic Equity Issuing
Constant	0.017	0.287	0.041
	(0.64)	(0.37)	(0.63)
FCF_t/TA_{t-1}	0.442	0.236	0.330
	(0.00)	(0.00)	(0.00)
Post-Listing Dummy	0.018	−0.099	−0.112
	(0.42)	(0.06)	(0.16)
FCF_t/TA_{t-1} * Post-Listing Dummy	0.005	0.147	0.390
	(0.98)	(0.32)	(0.36)
Market-to-Book Value $Ratio_{t-1}$	0.021	0.023	0.026
	(0.17)	(0.22)	(0.22)
$Sales_{t-1}/TA_{t-1}$	−0.003	−0.253	0.142
	(0.98)	(0.42)	(0.17)
$Cash_{t-1}/TA_{t-1}$	−0.003	0.283	−0.495
	(0.98)	(0.56)	(0.32)
Adjusted R^2	0.49	0.55	0.66
N	348	152	106

Table 5 presents the results of the basic investment regressions à la Fazzari, Hubbard, and Petersen (1988) and Hoshi, Kashyap, and Scharfstein (1991) estimated on several samples of emerging market firms. The Eligible Non-Listed sample contains 65 emerging market firms that are eligible to list on U.S. exchanges but have not done so as of year-end 1999, and for which we have sufficient data before and after the median listing date for the country's U.S. listed firms. The Level I sample contains 26 emerging market firms that have issued Level I ADRs over the 1988–1996 period for which we have sufficient pre- and post-issuance data. The Domestic Equity Issuing sample contains 20 emerging market firms that issued equity in their domestic market over the 1988–1996 period and: do not also have a Level I, II, or III ADR, have no other equity placements in the two years before and after their domestic equity issuance, and have sufficient pre- and post-issuance data. All variables are defined in Table 2. The dependent variable is investment divided by total assets at the beginning of the period (I/TA_{t-1}). The independent variables are also normalized by total assets from the preceding period. Ratios are computed in U.S. dollars using the contemporaneous exchange rate to avoid problems with inflation between periods. Each model includes firm fixed effects. Models are estimated using robust standard errors with firm clusters that account for a lack of independence between the observations of each firm. *p*-values are in parentheses below each coefficient.

general hypothesis about reduced dependency on internal cash flow following an ADR listing.

Another interesting comparison group to use in our robustness tests is emerging market firms that issued domestic equity over our sample period. If these firms show a decline in their sensitivity of investment to cash flow after their domestic equity offering, then this would indicate that our result for U.S. listings by emerging market firms may indeed be driven by the cash influx at the time of the listing, rather than by improved capital access. To test this hypothesis, we search SDC's Global New Issues database and find 20 emerging market firms that issued equity in their domestic market over the 1988–1996 period and: i) do not also have a Level I, II, or III ADR, ii) have no other equity placements in the two years before and after their domestic equity issuance, and iii) have sufficient pre- and post-issuance data. We re-estimate our FHP (1988) model on this Domestic Equity Issuing sample in the third column of Table 5. The model shows that there is no change in the sensitivity of investment to cash flow in the period following these firms' domestic equity listing. This result again indicates that our exchange-listed ADR results are not spurious.

Summarizing, the three comparison samples used in Table 5 were chosen to highlight whether emerging market firms that did not have improved capital

access also show a decline in their sensitivity of investment to cash flow. In all three samples, we found no change in this relation.

2. Confounding Events

In the previous section, we determine if the emerging market evidence is the result of raising capital rather than enhanced capital market access. A second concern for the emerging market result is the presence of two confounding events; Mexico's financial crisis and ongoing home market liberalization. We conduct two additional tests to determine whether these confounding events materially affect the results presented in Table 4.

Nine firms in our emerging market sample are from Mexico, seven are from Chile, and a majority of these firms listed in 1993 and 1994, just preceding Mexico's financial crisis. Is our post-listing dummy capturing the effect of Mexico's December 1994 crisis that also affected other Latin American firms? We re-examine our results for emerging market firms and non-English law firms by including a dummy variable equal to one for post-1994 observations and equal to zero for pre-1995 observations. We also interact the pre-/post-1994 dummy with the free cash flow variable. The results obtained after the inclusion of the pre-/post-1994 dummy and the pre-/post-1994 dummy free cash flow interaction in the regression model are quantitatively and qualitatively similar to those presented in Table 4.

Bekaert and Harvey (2000) find that firms from emerging markets that liberalize access to their capital markets experience a five to 75 basis point decline in their cost of capital. Thus, it is possible that liberalization may reduce the benefit of a U.S. listing if the liberalization has been in place for a longer time. To examine this possibility we construct a time-since-liberalization variable. We use liberalization dates presented in Table 1 of Bekaert and Harvey (2000) to construct our time-since-liberalization variable, which we define as the number of months since liberalization. We include this variable and its interaction with the cash flow times post-listing dummy. The results obtained from this analysis are qualitatively and quantitatively similar to those presented before and do not indicate that the change in the sensitivity of investment to cash flow becomes less pronounced the longer an emerging market has benefited from liberalization. [9]

E. Developed Market Robustness Tests

1. New Equity or Re-Deployed Equity

We also conduct two tests using our sample of developed market firms to assess whether capital raising activities of the developed market firms in our sample affect our results. The first test exploits the fact that about half of the developed market ADRs simply re-deploy existing shares and do not raise new capital. We

[9] We also conduct an analysis to determine if the correlation between free cash flow and investment is stable prior to the ADR listing. We find that the correlation between free cash flow and investment increases from two years prior to the ADR listing to one year prior to listing. This evidence suggests that emerging market firms are indeed relatively capital constrained prior to completing their ADR listing.

estimate the same FHP regressions as in Table 4, but separate the developed market firms that attract new external financing with the ADR from those that do not. We do not find a decline in the investment to cash flow sensitivity for developed market firms, regardless of whether they attract new equity with the ADR listing. To the extent that this developed market result generalizes to emerging markets, it again suggests that it is not the cash raised with the ADR that causes the decline in the sensitivity of investment to cash flow for emerging market firms.

In the second test, we separate developed market ADR firms according to whether the NYSE or Nasdaq listing was their first listing in the U.S. or whether it follows a prior listing as a Level I (OTC) ADR or a prior 144A ADR issue—either constitutes an upgrade. We cannot perform this split for emerging market firms since the exchange listing we analyze is almost always the first U.S. listing of any type. Neither Level I nor 144A listings require compliance with standard SEC regulations or reconciliation to U.S. GAAP. However, both types of listings give a firm exposure to U.S. investors; the latter also raises capital. Thus, it could be the case that our inclusion of "upgrade" ADRs lessens the chance of finding a change in the investment to cash flow sensitivity for developed market firms since these firms already have access to U.S. investors. To assess this proposition, we re-estimate our FHP model on the 20 developed market firms whose exchange listing is an upgrade and the 72 whose exchange listing is the first one in the U.S. We find that there is no difference in the coefficient on the interaction between the post-listing dummy and free cash flow for these two developed market subgroups and that both coefficients remain insignificant.[10]

2. Canadian Firms

Thirty-three firms in our developed market sample are from Canada. However, Canadian firms can list on a U.S. exchange without modifying their disclosure substantially and often list their shares directly. Thus, U.S. and Canadian markets can be thought of as well-integrated, so it is not clear how much informational benefit a listing on a U.S. exchange would generate. We re-examine the results after excluding the Canadian firms from our developed market sample and find that there is no post-listing reduction in the sensitivity of investment to cash flow.

IV. What is an Emerging Market?

In the tests discussed so far, we segregate our sample based on whether a firm is from an emerging or a developed market. This results in subsets consisting of 28 emerging market firms (of which nine are from Mexico and seven are from Chile) and 92 developed market firms. As our results suggest, this is an important classification because we find a reduction in the investment to cash flow sensitivity only for emerging market firms. How robust is our result to this classification? More important, does our separation between emerging and developed markets capture the richness of the substantial variations in the degree of development of the markets that we study?

[10] We also repeat the analysis breaking out only the nine prior OTC Level I firms or only the 11 prior 144A firms and find identical results.

LLSV (1997) categorize the degree of development of various markets using variables based on, among others, a country's judicial system, shareholders' rights, and external stock market capitalization relative to the size of the economy. They argue that such variables are primary drivers of firms' access to external capital. As such, these variables are well suited for our study since they may constitute a more refined way of identifying countries where access to outside capital is costly. A U.S. listing should be more beneficial for firms from the subset of countries with lower rankings of their judicial system, shareholders' rights, and external stock market capitalization.

We focus on two LLSV (1997) variables (see Tables I and II, pp. 1134–1135 and 1138) and on the origin of the country's judicial system. The first variable, which we call financial development, is the ratio of external capital to GNP. This variable measures how important the external equity capital market is in relation to the economy. Countries with a high external capital to GNP ratio have more developed external equity markets and we assume that access to external capital is less restricted in those countries.[11] This variable is important for our analysis because it directly relates to the relative importance of the local capital market, the object of our study. The second variable, rule of law, represents an investor assessment of the quality of law and order environment. This variable ranges from one to 10 with higher scores representing a higher quality of law enforcement. We focus on the rule of law variable because LLSV (2000) show that how well investors are protected against expropriation is the common element explaining the large differences between countries in access to external finance and the development of capital markets.

Finally, we focus on the origin of the legal system, namely whether a country has an English-style common law system or a civil law system. Recent evidence by LLSV (1997), (1998), (2000), Demirguc-Kunt and Maksimovic (1998), and Reese and Weisbach (2002) suggests that classifications based on the origin of the legal system are significantly related to a country's financial development. They argue that English common law offers better protection to minority shareholders, and, as a result, firms in common law countries have easier access to external financing.

In columns (1), (3), and (5) of Table 6, we estimate the previous regression model for firms from markets with financial development and rule of law values below the median value and from markets that do not have an English legal system, respectively. In columns (2), (4), and (6), we estimate the models for firms with higher than median values for these two variables and from markets with an English legal system. One difficulty that arises in using the LLSV financial development and rule of law variables is that they have been collected for a specific year, yet our sample spans a decade in time. It is our belief that, if measured, the values and rank order of these measures would change somewhat over a multiyear period, but it is less likely that a country would move from a high grouping to a low grouping. Hence, we use the median rather than a continuous variable

[11] LLSV also examine other variables measuring the size of the external capital market such as IPOs per population or domestic firms per population. We also estimate our tests with these variables instead of external equity capital over GNP and our results are qualitatively similar in nature. For brevity these results are not tabulated.

to segment our samples in the regressions. Although these variables are likely to be highly correlated with the emerging markets dummy, there are some important differences. South Africa and Taiwan, for example, are classified as emerging markets by *The Economist*, but have financial development values that are higher than almost all developed markets.

TABLE 6

Investment Regression Equations Based on Legal and Stock Market Characteristics

	Financial Development		Rule of Law		Legal System	
	Below-Median (1)	Above-Median (2)	Below-Median (3)	Above-Median (4)	Non-English (5)	English (6)
Constant	−0.009	−0.041	−0.007	−0.052	0.018	−0.049
	(0.78)	(0.59)	(0.79)	(0.52)	(0.54)	(0.56)
FCF_t/TA_{t-1}	0.380	0.248	0.407	0.210	0.443	0.208
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.02)
Post-Listing Dummy	0.032	−0.016	0.062	−0.024	0.037	−0.025
	(0.17)	(0.38)	(0.02)	(0.14)	(0.04)	(0.19)
FCF_t/TA_{t-1} * Post-Listing Dummy	−0.278	0.093	−0.414	0.137	−0.256	0.135
	(0.08)	(0.35)	(0.00)	(0.14)	(0.02)	(0.18)
Market-to-Book Value $Ratio_{t-1}$	0.003	0.005	0.003	0.005	0.003	0.005
	(0.01)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
$Sales_{t-1}/TA_{t-1}$	0.081	0.084	0.083	0.105	0.018	0.107
	(0.10)	(0.15)	(0.06)	(0.11)	(0.55)	(0.14)
$Cash_{t-1}/TA_{t-1}$	0.093	0.189	0.137	0.188	0.095	0.192
	(0.19)	(0.11)	(0.01)	(0.14)	(0.10)	(0.12)
Adjusted R^2	0.63	0.44	0.61	0.43	0.66	0.41
N	154	454	176	432	270	366

In Table 6, we re-estimate the basic model reported in Table 4. Instead of separating the regressions based on the IFC emerging markets classification, we estimate separate regressions based on legal and stock market characteristics of the countries of the issuing companies. These characteristics are Financial Development and Rule of Law as defined and provided in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), and whether the firm is from a country with an English-based legal system (La Porta et al. (1998)). Financial Development and Rule of Law variables are not reported for Denmark, Peru, and Switzerland. The median values are based on the number of countries in the sample. Because there are varying numbers of observations per country, the subsamples do not have the same number of observations. The *p*-values are in parentheses below each coefficient.

Firms from less developed and less protected capital markets should benefit more from listing on the U.S. market. Therefore, we expect more of a decline in the investment to cash flow sensitivity following the listing for these firms. Table 6 shows that the investment to cash flow sensitivity does indeed decline following a U.S. listing for the sample of firms from countries with below-median financial development and below-median rule of law and from countries that do not have the English common law legal system. Consistent with Table 4, we also find a positive relation between investment and free cash flow and the market-to-book value ratio for all subsets.

We next construct a test intended to capture whether the English legal system classification is relatively more or less important than the emerging markets classification in explaining the post-listing reduction in investment to cash flow sensitivity. We re-estimate our basic regression model using the 23 developed market firms that are from non-common law countries. We find an insignificant sign on the interaction between the post-listing dummy and free cash flow (not tabulated). Overall, this result and the results of Table 6 are consistent with our

Table 4 findings that firms from emerging capital markets benefit more from a U.S. listing through a reduction in the investment to cash flow sensitivity. The emerging markets indicator variable captures a variety of factors that limit a firm's access to external capital markets—the legal system background is only one of these relevant variables.

V. Alternative Evidence on Capital Constraints

A. Kaplan and Zingales (1997) Tests

Erickson and Whited (2000) employ a measurement error consistent test in which investment is regressed on Tobin's *q* and show that the cash flow coefficient becomes insignificant. They argue that their finding is a fundamental challenge to the interpretation of the free cash flow variable in FHP models as evidence of constrained access to capital. While we cannot directly address Erickson and Whited (2000) by altering the model, we attempt to address this issue by considering an alternative testing regime. We follow Kaplan and Zingales' (1997) approach and examine annual reports as well as 20F and F-6 statements in the ADR year for a random subsample of 108 listing firms from both emerging and developed markets.[12] In reading these reports, we attempt to identify references to external capital market constraints that are consistent with our hypothesis and our regression results. We could not find such reports on Lexis-Nexis for 39 of the ADR firms. For 27 of the firms, we find the report but no mention of external capital needs. Finally, for 42 of the ADR firms, we find information suggesting that the firms need external capital and, to a certain degree, are concerned about their access to such capital prior to the ADR listing. We also find that emerging market firms mention the need for capital more frequently than developed market firms. Some of the mentions are relatively explicit in terms of the need to raise external financing, such as the following September 30, 1994, 20F filing from Telefonica de Argentina S.A.:

> The Company anticipates making capital expenditures well in excess of the amounts required to satisfy the List of Conditions. For fiscal years 1995 through 1998, total budgeted capital expenditures are expected to be in excess of P$5.0 billion. As a result, the Company anticipates that its capital requirements for the next several years will be such that they will not be able to be funded entirely by cash flow from the Company's operations. The Company expects that during the early part of such period it will have to raise additional funds in the private or public capital markets. No assurances can be given as to the availability of such financing on terms attractive to the Company.

Overall, the interpretation of these firm-issued documents is that while not all firms are necessarily capital constrained, over 60% of the non-U.S. firms listing

[12] Not all of these firms are ultimately in our final sample. We cannot perform this exercise for our final sample of firms as the archives on file at the Securities and Exchange Commission are frequently incomplete in the ADR year of our firms.

in the U.S. for which we find relevant information mention that they need external capital and are, to a certain extent, capital constrained.

To bolster our emerging market findings, we read the annual reports and 20Fs of the third year after the ADR for our random sample of emerging market firms. We find a report for all but two of these firms. The results of this post-ADR investigation confirm our capital constraints hypothesis. Of those firms explicitly mentioning capital constraints in their ADR year, over 80% make no mention of capital constraints three years after their listing. For comparison purposes, Management's Statement of Financial Position for the 20F filing of Telefonica de Argentina S.A. for fiscal year 1997 no longer states any concern about raising funds. Rather, it states that the company has a long-term bank line of credit of U.S.$264 million and a 500 million eurodollar medium-term note program. Neither source of funds was available prior to the firm's ADR. In summary, our examination of filings by emerging market firms at the time of the ADR and afterward provides strong supporting evidence that relieving capital constraints is an important motivator for these firms.

B. Access to External Capital Markets

The results from the previous section document that firms from both developed and emerging markets frequently mention the need for external capital, and that this frequency is higher for emerging market firms. Thus, they buttress our regression evidence that firms from emerging markets that list on a U.S. exchange experience a decrease in the sensitivity of investment to cash flow. If this decline in sensitivity stems from greater access to the capital markets, then firms may increase their access of the capital markets following an ADR.[13] To investigate this hypothesis, we examine the debt and equity issuance patterns of listing firms in the two years before and after listing on a U.S. exchange. We gather the offer date, the dollar amount raised in seasoned equity offerings, and public debt offerings for listing firms from SDC. We classify all convertible bond issues as debt issues, but our results are not materially affected by this classification.

We first examine the percentage of all of our sample firms that issue debt or equity in Panel A of Table 7. We find a significant increase in the frequency of access to capital markets following the listing. While 16% of the firms issue debt or equity prior to the listing, almost 33% of the firms issue debt or equity following the listing. When we subdivide the capital raising activities into debt and equity issues, we find that the percentage of all firms issuing equity after their ADR increases dramatically, from 9% to 29%. There is no significant change in the percentage of firms that issue debt after their ADR. Next, we examine the number of debt or equity issues per firm. The combined number of debt and equity issues increases from 0.53 per firm to 1.05 per firm. This increase is also statistically significant when we examine debt and equity issues separately, with debt issues increasing from 0.43 to 0.64 per firm, and equity issues almost quadrupling from 0.11 to 0.41 per firm. Finally, when we examine the dollar

[13] Although the opposite argument can be made that firms may now be less concerned about having a cash reserve because they feel that capital markets can now be accessed when needed. In this case, firms would not necessarily increase their access to capital markets following the listing.

amounts raised for all firms, we report an increase in the amount raised per firm from $112.5 million to $234.5 million, with the typical offering increasing from 1.45% of the market value to 7.50% of the market value.

TABLE 7

Access to External Capital Markets surrounding an ADR Listing

	Prior to Listing	Following Listing	*p*-Value of Difference
Panel A. All Firms			
Percent issuing debt or equity	16.2	32.9	0.00
Percent issuing debt	12.6	15.0	0.53
Percent issuing equity	9.0	29.3	0.00
Number of debt or equity issues per firm	0.53	1.05	0.00
Number of debt issues per firm	0.43	0.64	0.01
Number of equity issues per firm	0.11	0.41	0.00
Amount raised (millions)	$112.5	$234.5	0.00
Percentage of market value raised	1.45	7.50	0.00
Panel B. Emerging Market Firms			
Percent issuing debt or equity	23.1	66.7	0.00
Percent issuing debt	29.3	46.3	0.10
Percent issuing equity	2.4	34.1	0.00
Number of debt or equity issues per firm	0.74	1.67	0.00
Number of debt issues per firm	0.66	1.07	0.19
Number of equity issues per firm	0.02	0.39	0.00
Amount raised (millions)	$207.6	$383.8	0.00
Percentage of market value raised	3.75	14.58	0.00
Panel C. Developed Market Firms			
Percent issuing debt or equity	14.1	22.7	0.08
Percent issuing debt	8.9	8.4	0.98
Percent issuing equity	10.5	28.2	0.00
Number of debt or equity issues per firm	0.47	0.86	0.00
Number of debt issues per firm	0.38	0.55	0.15
Number of equity issues per firm	0.13	0.41	0.00
Amount raised (millions)	$83.5	$189.0	0.03
Percentage of market value raised	0.97	1.51	0.18

Table 7 presents summary statistics on the frequency of capital acquisition, i.e., equity and debt issues, before and after the ADR listing on the NYSE or Nasdaq. We classify all convertible issues as debt issues. We provide the percentage of listing firms raising capital, the number of times that firms access capital markets, the dollar amount of capital raised, and the capital raised as a percentage of the market value of equity by sample firms during the two years before and after listing on the NYSE or Nasdaq. All statistics are reported on a per year basis (e.g., percentage issuing equity per year, etc.). The frequency statistic is the percentage of listing firms issuing capital. The number of equity or debt issues per firm is based on information obtained from Securities Data Corporation. The amount raised is the sum of equity and debt raised. The percentage raised statistic is the sum of the capital raised deflated by the market value of equity plus the book value of debt. In Panel A, we make these pre- and post-ADR comparisons for all non-U.S. firms listing on the NYSE or Nasdaq, and also break down the numbers by debt and equity issues. In Panel B, we examine firms from emerging markets only. In Panel C, we examine firms from developed markets only. Means are presented for the amount raised and the percentage raised. The right-hand column presents the *p*-value of the *t*-test of equality of means between the pre- and post-ADR statistic.

In Panel B, we examine the access to external capital markets for emerging market firms only. In this subsample, we find increased access of capital markets in the post-ADR period and some of the trends tend to be quite pronounced when compared with the sample as a whole. For instance, the percentage of emerging market firms issuing debt or equity increases from 23% to 67% and the number of debt and equity issues per firm increases from 0.74 to 1.67. The percentage of firms issuing equity goes up by about a factor of 15 and the number of equity issues per firm goes up by about a factor of 20. The percentage of market value raised also grows dramatically after the ADR, from 3.75% of value to 14.58% of value.

In Panel C, we report the same metrics for developed markets firms. While we also find a general increase in the use of external capital markets post ADR

for firms from developed markets, these increases are not as pronounced as for emerging market firms. In fact, as a percentage of the market value, external capital raised increases from 0.97% to 1.51%, which is not significant. This statistic suggests, once again, that access to external capital markets is more important for emerging market firms both before and after the listing.

We conduct an additional test for our emerging market firms to aid in determining the motivation for a U.S. listing by these firms. If better access to external capital from the U.S. market motivates an ADR, then one would expect that emerging market firms would raise their post-ADR capital primarily in the U.S. On the other hand, if the certification of a U.S. listing and its additional reporting requirements are driving the improved capital access, then we could expect to see a significant portion of post-ADR capital raised domestically (or in other markets) where direct placement costs would presumably be lower. To test these hypotheses, we categorize the post-ADR equity and debt issues reported in Panel B of Table 7 by country of issue. We find that only a small fraction of the capital is raised outside of the U.S. (seven issues over the two years totaling $1.1 billion). This result again indicates that access to U.S. capital is an important driver of the decision for emerging market firms to list their shares in the U.S.

Finally, we also subdivide our sample according to financial development and rule of law variables and re-examine issuance activity. Not surprisingly, given the high correlation between the emerging markets dummy and the low rule of law and low financial development variable, we find results that are consistent with our results in Panels B and C (not tabulated).

VI. Conclusion

We examine whether non-U.S. firms list their stock on U.S. exchanges to enhance their access to external capital markets and, in particular, whether this benefit accrues primarily to emerging market firms. We estimate Fazzari, Hubbard, and Petersen (1988) investment to cash flow regressions and find that, for firms from emerging capital markets, the investment to cash flow sensitivity declines significantly following a listing on the NYSE or Nasdaq. As a benchmark, we find no decrease in the investment to cash flow sensitivity in samples of emerging market firms eligible to list in the U.S., that have Level I ADRs, or that raise equity domestically. Our findings suggest that firms from emerging markets benefit from a U.S. listing through an enhanced access to external capital markets.

To further examine the robustness of our results, we study the SEC filings of listing firms around the time of their ADR. We find that many of these firms explicitly mention a need for external capital to finance additional capital expenditures and a concern about their ability to raise sufficient external capital. Emerging market firms mention the need for capital more frequently than developed markets firms, yet they make almost no mention of capital constraints three years after their ADR issue, but instead trumpet their liquidity. We also examine the actual access of external capital markets by ADR firms before and after their U.S. listing. Overall, we find that ADR firms tend to increase their access of external international capital markets following a U.S. listing and, consistent with our

expectations, the increases in capital access are more pronounced for emerging market firms.

Our results indicate that there is a dichotomy in the mechanisms by which firms benefit from a cross listing. Emerging market firms acknowledge that they need expanded access to capital and respond to this need by cross listing. They utilize the cross listing to raise both debt and equity capital in the U.S. After these actions, the correlation between investment and internally-generated capital is indistinguishable from zero. Company-issued reports suggest that, post-listing, the managers of emerging market firms have substantially improved their capital access and have transferred their attentions to other issues. Taken as a whole, these results provide a robust description of the capital access benefits that accrue to emerging market firms that cross list. The study's findings are less clear for developed market firms. We do not find a decline in the investment to cash flow sensitivity for developed market firms and they are less likely to raise significant capital after cross listing. These results suggest that enhanced capital market access is not likely to be the primary rationale behind a cross listing by a developed market firm.

In sum, our results imply that future cross-listing research should be mindful of whether the cross-listing firm is from an emerging or developed market. Our results also suggest that more research is needed to determine why developed market firms cross list. Along these lines, Sarkissian and Schill (2003) investigate whether factors such as proximity, trade, language, colonial ties, and industrial structure are linked to cross listing around the world. Among their results is evidence suggesting that cross-listing firms from the G5 developed countries select capital markets with a similar industrial structure. Thus, it is possible that product markets affect the listing behavior of developed market firms. We look forward to further research in this area.

References

Bekaert, G., and C. Harvey. "Time-Varying Market Risk Premiums." *Journal of Finance*, 50 (1995), 403–444.

_____. "Foreign Speculators and Emerging Equity Markets." *Journal of Finance*, 55 (2000), 565–613.

Bruner, R.; S. Chaplinsky; and L. Ramchand. "Coming to America: A Clinical Study of IPOs in the U.S. by Foreign Firms." Working Paper, Univ. of Virginia (1999).

Clarke, J., and K. Shastri. "On the Market Microstructure of American Depository Receipts." Working Paper, Univ. of Pittsburgh (2001).

Demirguc-Kunt, A., and V. Maksimovic. "Law, Finance, and Firm Growth." *Journal of Finance*, 53 (1998), 2107–2137.

Doidge, C.; A. Karolyi; and R. Stulz. "Why are Foreign Firms Listed in the U.S. Worth More?" *Journal of Financial Economics*, 71 (2004), 205–238.

Economist Magazine (The). Economist Newspaper Group, London, U.K. (1997).

Erickson, T., and T. M. Whited. "Measurement Error and the Relationship between Investment and Q." *Journal of Political Economy*, 108 (2000), 1027–1057.

Errunza, V., and D. Miller. "Market Segmentation and the Cost of Capital in International Equity Markets." *Journal of Financial and Quantitative Analysis*, 35 (2000), 577–600.

Fazzari, S.; R. Hubbard; and B. Petersen. "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity*, 1 (1988), 141–195.

Foerster, S., and A. Karolyi. "The Effects of Market Segmentation and Investor Recognition on Asset Prices: Evidence from Foreign Stocks Listing in the United States." *Journal of Finance*, 54 (1999), 981–1013.

Hoshi, T.; A. Kashyap; and D. Scharfstein. "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups." *Quarterly Journal of Economics*, 106 (1991), 33–60.

Kaplan, S., and L. Zingales. "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics*, 112 (1997), 171–215.

Lang, M. H.; K. V. Lins; and D. Miller. "ADRs, Analysts, and Accuracy: Does Cross-Listing in the U.S. Improve a Firm's Information Environment and Increase Market Value?" *Journal of Accounting Research*, 41 (2003), 317–345.

La Porta, R.; F. Lopez-de-Silanes; A. Shleifer; and R. Vishny. "Legal Determinants of External Finance." *Journal of Finance*, 52 (1997), 1131–1150.

_____. "Law and Finance." *Journal of Political Economy*, 106 (1998), 1113–1155.

_____. "Investor Protection and Corporate Governance." *Journal of Financial Economics*, 58 (2000), 3–27.

Lewellen, W. G., and S. G. Badrinath. "On the Measurement of Tobin's *q*." *Journal of Financial Economics*, 44 (1997), 77–122.

Love, I. "Financial Development and Financing Constraints: International Evidence from the Structural Investment Model." *Review of Financial Studies*, 16 (2003), 765–791.

Miller, D. "The Market Reaction to International Cross-Listings: Evidence from Depositary Receipts." *Journal of Financial Economics*, 51 (1999), 103–123.

Myers, S. C., and N. S. Majluf. "Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have." *Journal of Financial Economics*, 13 (1984), 197–221.

Perfect, S., and K. Wiles. "Alternative Constructions of Tobin's q: An Empirical Comparison." *Journal of Empirical Finance*, 1 (1994), 313–341.

Reese, W., and M. Weisbach. "Protection of Minority Shareholder Interests, Cross-Listings in the United States, and Subsequent Equity Offerings." *Journal of Financial Economics*, 66 (2002), 65–104.

Sarkissian, S., and M. J. Schill. "The Overseas Listing Decision: New Evidence of Proximity Preference." *Review of Financial Studies*, 17 (2004), 769–804.

Stulz, R. "Globalization, Corporate Finance, and the Cost of Capital." *Journal of Applied Corporate Finance*, 12 (1999), 8–25.

Whited, T. "Debt, Liquidity Constraints, and Corporate Investment: Evidence from Panel Data." *Journal of Finance*, 47 (1992), 1425–1460.