Is Emerging Market Money Smart?

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Abstract

Neoclassical theory predicts that capital should flow from countries that are capital-abundant to countries that are capital-scarce. Contrary to this prediction, a burgeoning trend that is becoming apparent is outbound foreign direct investment flows from emerging economies to the developed world. Since little is known about the consequences of this new M&A trend, this paper attempts to fill this gap by undertaking the first systematic analysis of cross-border M&A transactions by firms in developing countries. Combining transaction-specific M&A data with firm-level accounting data, this paper evaluates the pre-and post acquisition performance of publicly traded US target firms that have been acquired by emerging market firms. To control for the endogeneity of the foreign acquisition decision, a difference-in-differences approach is combined with propensity score matching. Several alternative measures of performance are explored before and after the acquisition year. The results suggest that emerging market acquirers tend to choose targets that are larger in size (measured as sales, total assets and employment), relative to matched non-acquired firms before the acquisition year. In the years following the acquisition, the performance of foreign acquired target firms tend to improve in terms of operating income. Additionally, we provide evidence indicating that increasing performance is accompanied by changes in investment outlays and employment, suggesting significant restructuring of the target firm following the acquisition.

1 Introduction

Neoclassical theory predicts that capital should flow from countries that are capital-abundant to countries that are capital-scarce. Contrary to this prediction, a burgeoning trend that is becoming apparent is outbound foreign direct investment flows from emerging economies to the developed world. In particular, the recent spate of cross-border acquisitions by Indian and Chinese companies has become the subject of heated debate in policy circles. For example, the acquisition bid by CNOOC, the Chinese state-owned oil company to takeover Unocal met with considerable resistance in Washington and was ultimately thwarted. We know little about the consequences of this new mergers and acquisitions (M&A) trend. In this paper we attempt to fill this gap by undertaking the first systematic analysis of the performance of cross-border M&A transactions by firms in developing countries.

Traditional theories of FDI rely on comparative input costs or market access as the motivating rationale for FDI flows from developed to emerging markets. Whereas industrial country acquirers seek lower labor costs in developing country target firms, developing country acquirers may relocate (or insource) manufacturing activity while keeping existing distribution networks in the host country of the acquired business.
Recently, the theoretical framework in Helpman, Melitz and Yeaple (2004) predicts that only the most productive firms tend to become multinationals. By extension, we hypothesize these firms will improve the performance of the firms that they acquire abroad.

To test this hypothesis we examine acquisitions of U.S. companies by emerging country firms since 1980. We examine the types of firms acquired by developing country firms and the impact of the acquisition on the performance of these target firms. To the best of our knowledge this paper is the first to examine the effects of developing country acquisitions of industrial country targets. The transaction-specific data on cross-border M&As come from the Thompson Financial SDC Platinum database that records all M&As in the United States that are announced between January 1, 1980 and July 1, 2007.

The reason to concentrate only on US public targets is the availability of data on publicly traded US firms. Due to its open financial markets and sound financial institutions, the US has attracted a substantial number of cross-border M&As from developing countries. This set of cross-border acquisitions by firms in developing countries present a unique opportunity to test the general applicability of theories of FDI flows for apparently capital scarce emerging market country firms.

To examine the impact of developing-country acquisitions on US firms we examine both stock market and accounting measures. Ex-ante, the stock market measure, abnormal announcement returns, provides a forward-looking estimate of the expected shareholder value creation. Ex-post we examine accounting measures of the profitability of the target firms in the years following the acquisition.

It is worth noting that any comparison between pre-and post-acquisition performance of the acquired firms raises the issue of endogeneity and therefore raises the specter of selection bias. Ideally, one would like to compare the performance of a firm that receives foreign investment to itself in the event that it had not been acquired by foreign investors. This counterfactual is unfortunately not observable. Propensity score matching which involves constructing a "control" group of non-acquired firms closely matched to the treatment group of acquired firms is one way to get around the issue. Propensity score matching can then be combined with difference-in-differences to further eliminate time-invariant and unobservable differences between the treated and control groups.

In order to measure the performance of the target firms after they are acquired, we focus on the accounting concept of operating income before depreciation, amortization and taxes (OIBD). In the finance literature, OIBD is a commonly used measure of performances of public firms. Unlike measures based on earnings, OIBD bypasses the effects of different accounting methods of merger (purchase versus pooling) and different financing methods chosen by the acquirers. To control for the relative size of the target firms, we scale OIBD by total assets, thus focusing on return on assets. We also track changes in other

aspects of target firm operations, such as capital expenditure, employment, and sales following the acquisition.

We find that developing country firms tend to acquire public US targets with relatively high levels of sales, employment and total assets. The stock price response of the target is positive and significant around the time of the acquisition announcements. The mean cumulative returns on the target stock price within a three-day window around the announcement date of the acquisition increases by 8%. This return remains significant and positive extending the window to three, ten and twenty-one business days. After the acquisition, the performance of the acquired targets tends to improve. More specifically, the target firm's return on assets increases by 20% in the five years following acquisition. Further, there is strong evidence that the acquiring firms undertake significant restructuring in the newly acquired target firms. While employment decreases, capital expenditures of the target firm increases significantly following acquisition.

Our results, which point to increasing income and significant restructuring taking place in FDI recipients in the years following the acquisition, are consistent with anecdotal evidence and surveys conducted by private industry. Surveys of emerging market acquirers suggest several patterns (Citigroup, 2005; Boston Consulting Group, 2005). First, the most striking motivations for overseas expansions are 1) entering new markets, 2) obtaining natural resources, and 3) acquiring advanced technology and related brand equity. An anecdotal example to highlight these factors is Lenovo's 2004 purchase of IBM's personal computer business. This acquisition involved entry into the US market, acquisition of technology, and acquisition of an already well established brand. Even unsuccessful mergers such as CNOOC's bid for Unocal highlight emerging country firm demand for natural resources.

The surveys also suggest that publicly traded acquisition target firms tend to perform worse on average than private targets. The acquiring firms, on the other hand, tend to benefit from these M&As, although the dispersion of the performance outcomes reflects considerable variation. These findings are in stark contrast to the performance of US

domestic M&As, where the target usually emerges as the winner of an M&A transaction. Studies of industrial country firm acquisitions of developing country targets indicate that both parties to the transaction tend to benefit from the merger (Chari, Ouimet and Tesar, 2007). Petkova (2008) finds that Indian target firms experience an increase in productivity after they are acquired by a foreign firm. In a study of Indonesian firms, Arnold and Javorcik (2005) find that foreign ownership improves plant performance measured in terms of total labor productivity (TFP). Contrary to our results, however, this study suggests that Indonesian target firms also experience increases in investment outlays and employment.

The remainder of the paper is structured as follows. Section 2 reviews the existing literature. Section 3 introduces the various datasets employed in the empirical analysis. The details of the difference-in-differences propensity score matching estimator are explained in Section 4. Sections 5 presents the empirical results and section 6 concludes.

2 Related Literature

Numerous empirical studies have compared the productivity of foreign owned firms to domestic owned firms. Doms and Jensen (1995) find that foreign-owned companies in the U.S. are more productive than domestic-owned ones, but are on average less productive than U.S.-owned multinational companies. Many empirical papers in the developing country literature have investigated the causal link between foreign ownership and plant performance, where the target firm is usually situated in a developing country and the acquirer firm comes from an industrial country. This literature has found mixed evidence that foreign-owned firms perform better than domestic-owned firms. Arnold and Javorcik (2005) use plant-level data from Indonesia to explore the causal relationship between foreign ownership and productivity employing a difference-in-differences approach combined with propensity score matching. They find that foreign ownership leads to significant improvements in productivity in the year of acquisition as well as in subsequent years. Petkova (2008) conducts a similar study using Indian plant level data

and concludes that foreign owned plants only improve productivity after a three-year horizon. In a series of papers concentrating on acquisition targets in the United Kingdom, Girma et al. (Girma, 2005; Girma et al., 2006, 2007) document an improvement in the growth rate of firm performance following foreign acquisitions. These studies, however, do not specifically differentiate between industrialized country and emerging market acquirers. Antkiewicz and Whalley (2006) highlight several case studies of recent completed and failed attempts by Chinese companies to acquire firms in the OECD. They suggest that this wave of Chinese outbound M&A is driven by the necessity to acquire access to resources, new technology and distribution networks in the target country.

This study is also related to various papers in the finance literature studying the effects of domestic M&As on target company performance. Our contribution to this literature is to examine cross-border acquisitions. A comprehensive study by Andrade, Mitchell and Stafford (2001) finds that US domestic M&A activity creates value for shareholders, particularly shareholders of the target firms. Furthermore, they find evidence of improved operating performance following mergers, relative to industry peers.

3 Data Description

Our data sample contains all M&As initiated by firms in developing countries that are announced between January 1, 1980 and July 1, 2007, and are reported by SDC Platinum, a database from Thompson Financial. The data include all public and private M&A transactions involving at least 5% ownership of a target company in the U.S[1]. SDC collates information from over 200 English and foreign language news sources, SEC filings and the filings from its international counterparts, trade publications, news wire reports, and proprietary surveys of investment banks, law firms, and other advisory firms. For each transaction, the SDC database provides information about the date on which the transaction was announced and the date on which the transaction became effective. The database also provides some characteristics of the target and acquiring firms such as

[1] See Appendix for full list of countries

name, nation, industry sector, and primary North American Industry Classification System (NAICS). Many of the transactions contain transaction-specific information such as the percent of shares acquired, the percent of shares owned before and after the transaction is completed, the percent of shares sought by the acquiring firm, and the method of payment.

In the course of our sample period, SDC covers 7,996 completed M&A transactions between foreign acquirer and US targets. Out of that total number, 2,368 M&A transactions were conducted between foreign firms and public US targets. The focus of the formal analysis is on the subsample of 480 outbound M&A transactions by developing country firms and public US target firms. Furthermore, we eliminate countries that are tax havens, e.g. Bahamas, Bermudas[2], etc. which leaves us with a sample of 259 M&A transactions. Where information is available, these observations cover M&A transactions that result in a change in majority control in the target firm as well as acquisitions of minority shares. Furthermore, most observations indicate the method of payment, the value of the transaction and the NAICS codes of the respective acquirer and target.

The data on the US target firms come from Compustat and the Center for Research in Securities Prices (CRSP). Compustat reports financial statement data and CRSP contains stock return data. Based on the information provided in SDC on our target firms, we match the public US targets with the Compustat database. During this process, we lose a significant number of observations due to renaming of the target company after acquisition, delisting, and erroneous reporting in SDC. The availability in Compustat varies strongly by year and by variable. For instance, the employment variable is reported on a voluntary basis in Compustat which leads to spottiness in the availability. Out of the original 259 transactions between developing country acquirers and public US targets in the SDC dataset, roughly 140 of the public US targets have performance variables reported in Compustat over particular years of interest and 214 firms have usable stock returns data in CRSP.

[2] See Appendix

Table 1 displays the breakdown of acquirer nations and their respective cumulated acquisition values. The top five emerging countries acquiring US firms are: Hong Kong, Singapore, Mexico, South Korea, and Taiwan. Figure 1 displays the number of public US acquisitions by developing country firms by year. Figure 2a and 2b present acquirer nations divided by target and acquirer industry sectors, respectively, using 2-digit NAICS code. For about half of the deals, we also know the deal value reported in SDC. Figure 3a and 3b show the relationships across industries between deal number and deal values for the target and the acquiring firms, respectively. The surface area of each bubble shows the total value of deals within each one-digit sector whereas the center of the circle is determined by the average value and the total number of deals within a sector. In about half of all transactions, the target firm is in the manufacturing sector, and its average as well as total deal exceeds all other deal values. For the acquirers, on the other hand, on average, the largest number of deals is conducted by acquirer firms in the financial industry. Table 2 displays the top 20 deals by acquisition value between developing country firm and public US firms. About half of the top twenty M&A transactions are horizontal, i.e. both the acquirers and the target are in the same industry. In our entire sample, about one sixth of the firms undertake horizontal M&A. One third of the firms in our sample acquire 50 percent or more of the target. Lastly, table 3 gives an overview of specific characteristics within each target industry.

4 Econometric Strategy

Difference-in-Differences Matching Estimator

In evaluating the performance of target firms after the acquisition, we have to worry about the fact that developing country firms do not acquire US target firms at random, which in turn creates selection bias. To overcome the selection bias, we essentially want to create a control group that is comparable to the group of acquired firms. Ideally, we would like to have the counterfactual information regarding the performance of the

acquired firm had they not received FDI. Since this information is not available, we carefully select a control group of firms with characteristics similar to those of the foreign acquired targets. More specifically, for a firm to belong in the suitable control group it has to show sufficient similarity to the future acquisition target with respect to key determinants of the acquisition decision, so as to make the two plants a priori equally likely to be acquired by a developing country firm. We employ propensity score matching to accomplish this task.

Let $A_{i,t} \in \{0,1\}$ be a dummy variable indicating if a domestic firm becomes foreign acquired at time t. Then $y^1_{i,t+u}$ denotes firm performance at time $t+u$, u periods after the acquisition had taken place, i.e. $u \geq 0$. The counterfactual case, where that same firm had not been acquired, would result in the performance $y^0_{i,t+u}$. For a given firm, one can only observe $y^1_{i,t+u}$ or $y^0_{i,t+u}$. Given these outcomes, the average effect of developing firm acquisition on acquired firms, i.e. the average effect of treatment on the treated, is the following:

$$E[y^1_{i,t+u} - y^0_{i,t+u} \mid A=1]$$

$$= E[y^1_{i,t+u} \mid A=1] - E[y^0_{i,t+u} \mid A=0] - \left\{E[y^0_{i,t+u} \mid A=1] - E[y^0_{i,t+u} \mid A=0]\right\}$$

The term in the first line is the average treatment effect on the treated (ATET), and the term in the second line in braces is a ``bias" term, which will be zero if the assignment to the treatment and control is random. It is reasonable to assume that the data will involve some observed characteristics, i.e. covariate, **X**, that include the determinants of being acquired by a developing country firm. If acquired and non-acquired groups are matched on each combination of covariates, then the treatment differential can be easily calculated for each treated case and each set of **X**. The average of the differential over all acquired firms and all **X** measures the average treatment effect. Formally, Angrist and Krueger (2000) show that effect of the treatment on the treated is given by

$$E[y^1_{i,t+u} - y^0_{i,t+u} \mid A=1] = E\left\{E[y^1_{i,t+u} \mid X, A=1] - E[y^0_{i,t+u} \mid X, A=0] \mid A=1\right\}$$

$$= E[\Delta_x \mid A = 1],$$

where $\Delta_x = E[y^1_{i,t+u} \mid X, A = 1] - E[y^0_{i,t+u} \mid X, A = 0]$. The assumption underlying the above statement is that control and treated firms have the same expected performance if they were domestically owned. This is referred to as the conditional independence assumption (CIA):

$$E[y^0_{i,t+u} \mid X, A = 1] = E[y^0_{i,t+u} \mid X, A = 0] = E[y^0_{i,t+u} \mid X].$$

For the CIA to be satisfied, **X** should contain all variables that affect both acquisition and outcomes. The choice of **X** is described in more detail below. Another assumption required for matching is that one cannot predict the probability of a foreign acquisition perfectly, i.e. $0 < \Pr(A = 1 \mid X) < 1$.

Matching on a vector of variables is difficult, since it requires weighting differences in one dimension against another. Rosenbaum and Rubin (1983) provide an elegant solution to the dimensionality problem by matching firms on propensity scores, which is the conditional probability of receiving treatment given **X**, in our case being the probability of a plant being acquired by a developing country firm:

$$P_i = \Pr(A_{i,t} = A(X_{i,t-1})).$$

While matching accounts for differences in observable characteristics, its combination with difference-in-differences analysis eliminates the differences between the treated and control groups that are unobservable and time invariant. Rather than treating each control linearly and with the same weight, our difference-in-differences estimator paired with propensity matching includes only treated firms within the common support and weighs the control firms according to the weighting function specific to the matching method. In our analysis, we use the Gaussian kernel weighting function:

$$W(P_i, P_j) = \frac{G_{ij}}{\sum_{k \in \{A_k = 0\}} G_{ik}}$$

where $G_{ik} = G(\frac{P(X_i) - P(X_k)}{a_n})$ is a Gaussian kernel with $G(\alpha) = e^{\frac{\alpha^2}{2}}$ and α_n is a bandwidth parameter. The denominator insures that the weights sum to one. More generally, kernel matching takes local averages of the comparison group, i.e $A = 0$, observations near each treated observation to construct the counterfactual for that observation. Then the difference-in-differences matching estimator is the following:

$$\hat{\alpha}_{DDM} = \frac{1}{n_1} \sum_{i \in \{A_i = 1\} \cap S_P} [(y^1_{i,t+u} - y^1_{i,t'}) - \sum_{j \in \{A_j = 0\}} W(P_i, P_j)(y^0_{i,t+u} - y^0_{i,t'})],$$

where $\{A_i = 1\} \cap S_P$ is the set of treated firms that falls within the common support S_p and *t'* is the pre-treatment time. The results discussed in the following sections are based on the above estimator.

Finally, the standard errors from the matching estimation are bootstrapped as suggested by Becker and Ichino (2002). Based on Monte Carlo simulations of standard errors, the authors show that bootstrapped standard errors are the most appropriate for kernel matching.

Timing Issue

Unlike longitudinal matching studies, where treatment occurs uniformly at one point in time, the firms in our data are targets of acquisition at varying times. This variation in treatment timing poses the challenge of how to assign counterfactual treatment dates to the firms that are not acquired by developing country firms. We follow Petkova's (2008) approach of random acquisition time assignment. Based on the group of treated firms, we determine the fraction of the total number of acquisitions that happen in each calendar year during our sample period. Next, we assign the hypothetical treatment year to the firms in the control group in the same proportion as their occurrences in the treated

group. For example, if one tenth of all acquisitions occurred in 1995 in our sample of treated firms, then one tenth of all firms in the non-treated group receive the hypothetical treatment year 1995. Before assigning the date, we make sure that the control firm's year of incorporation precedes the treatment year. By employing this random acquisition time assignment, the control group consists of firms that remained non acquired throughout the entire span of our data, whereas the treatment group comprises of firms that are subject to developing country firm acquisition at some point during our sample period.

An alternative way of addressing the timing issue is to ask the question "What is the effect of being acquired during time period Δt t versus not being acquired up to and including time period Δt?" With the previous random acquisition time assignment, the control group consists of firms that were never acquired by developing country firms, the second alternative time assignment suggests that the control group consists of firms that are not subject to developing country firm acquisition up to time period Δt, but that could potentially be acquired later in the span of the data. The contrast between the two alternative time assignments lies in the interpretation of ATET. For random time assignment, the ATET captures the difference in outcomes between firms that are acquired by developing country companies and firms that never are. Using the second time assignment, which we will refer to as dynamic acquisition time assignment, the ATET measures the average performance effect of being acquired by a developing country firm during that period Δt versus being acquired in a later period in time, if at all. Note that we assign time intervals, e.g. five-year periods, instead of one year at a time as in Petkova (2008). The reason behind this strategy is that given any particular year, the number of observations fluctuates widely, as seen in Figure 1. Especially for the earlier years in the sample, the data on the treated firms is so scarce that any econometric analysis would yield insufficient degrees of freedom.

As for the notation, let $A^{d}_{i,\Delta t} \in \{0,1\}$ be a dummy variable, taken on the value one if a domestic firm becomes foreign acquired during the time period Δt after a spell of domestic ownership of length *d*. More specifically, if Δt = (t+p)-t, then we estimate:

$$E((y^{1,d}_{i,\Delta t+u} - y^{1,d}_{\Delta t}) - (y^{0,d}_{i,\Delta t+u} - y^{0,d}_{i,\Delta t}) \mid A^{d}_{i,\Delta t-1}, X_{i,\Delta t-1}).$$

The same assumptions that hold for random time assignment are also extended to dynamic acquisition time assignment. The additional requirement here, however, is that treatment and control groups have to have a similar duration of domestic ownership. Then the CIA assumption must hold conditional on both **X** and *d*.

Propensity Score

Random Acquisition Time Assignment

After randomly assigning the counterfactual foreign acquisition dates to the control firms that do not receive treatment throughout the course of our sample as described above, we have to realign the time series data for each firm. More specifically, in the year of acquisition (actual or hypothetical), we set t=0, in the year following the acquisition t=1, and in the year prior to the acquisition, t=-1, etc. The propensity score is the estimated probability of receiving treatment in period t=0 based on firm characteristics in period t=-1. We estimate this probability using a probit model, where the dummy variable $A_{i,t}$ equals 1 in the year a firm is the actual target of acquisition and zero otherwise.

Dynamic Acquisition Time Assignment

For this case of time assignment, we divided up the entire time period into five smaller sub-intervals of 1985 - 1989, 1990 - 1994, 1995 - 1999, and lastly, 2000 - 2004. The treated group then consists of firms that are targets of foreign acquisition during either one of these sub-intervals, after being domestic-owned for duration d, which ends the year before the interval starts. The control group includes all firms that do not experience foreign acquisition during a particular time interval. EDIT MORE...

Choice of Covariates

We create our control group based on a set of observable plant characteristics that comprise the vector **X**. The control variables **X** should include factors that drive both the treatment and outcome, i.e. performance of the firm. WE include variables such as age, age squared, size (measured by log of total asset, log of sales and log of employment), market share, operating income, log of debt and cash, and capital expenditure. Firm age indicates the level of development of a potential target and thus influences the FDI decisions. Variables such as total assets, sales and market share convey important information about the market power of the target firm as well as its productive capacity. The variable operating income before depreciation (OIBD) contains important information on the profitability of the target firm. Debt and cash variables are indicators of the internal structure of the firm. Capital expenditure is an indicator of the investment capacity of a firm and thus revealing of the growth process of a firm. Lastly, we include year, region and industry dummies in the vector of control variables, where industry dummies are based on 2-digit NAICS codes and regional dummies are based on the state where the target firm is located.

Stock Market Return

In the finance literature, the most statistically reliable evidence on whether mergers create value for shareholders comes from traditional short-window event studies, where the average abnormal stock market reaction at merger announcement is used as a gauge of value creation or destruction (Andrade et. al 2001). In an efficient capital market with free public information, stock prices quickly adjust following a merger announcement, incorporating any expected value changes. The two commonly used event windows are the three days immediately surrounding the merger announcement, and a longer window beginning several days prior to the announcement and ending at the close of the merger. We examine the abnormal stock return for the acquired targets around the time of the announcement of the acquisition. In particular, we calculate the mean cumulative return

of the target stock price within a one, three, and twenty day window of the announcement date.

5 Results

Stock Market Reaction to Merger Announcements

A reliable summary statistic on whether mergers create value for shareholders comes from traditional short-window event studies, where the average abnormal stock market reaction at merger announcement is used as a measure of shareholder value creation. If capital markets are semi-strong form efficient with respect to public information, stock prices will quickly adjust following a merger announcement, incorporating any expected value changes. Table 4 displays announcement period abnormal returns for targets. The announcement period cumulative abnormal return over the three-day window is 8.2% for 214 completed mergers. When the event window is expanded to three days prior to the merger announcement and ending three days after the announcement, the mean abnormal return is essentially identical. Over an even longer window of twenty days, the mean abnormal returns increase to 10.8%. In comparison to domestic US M&As, where target firms' average three-day abnormal return is around 16% for the three-day window and rises to 24% over the longer event window of 20 days according to Andrade et al. (2001), US targets of developing-country firm acquisitions tend to have lower abnormal returns. In the US study, merger transactions that involved stock financing yielded lower abnormal returns over a one-day window than transactions without stock financing. Our finding is consistent with their analysis. In our sample of developing country firm acquisitions, the majority of deals are financed with cash. Only 12 out of the 214 acquisitions in the CRSP sample involved stock financing, whereas almost 90% of the deals involved cash.

Evidence of Selection Bias

To examine whether our concern of selection bias is justified, we regress different performance measures on a dummy for plants with foreign ownership for all periods before the acquisition year controlling for industry, region and year fixed effects. The estimation results, presented in Table 5a, demonstrate that future acquisition targets of foreign ownership exhibit larger size, measured in terms of sales and total assets than non-acquired domestic firms up to three years before acquisition. Furthermore, treated firms tend to have more employees but lower capital expenditure than non treated firms. This systematic difference indicates that foreign investors indeed do not choose target firms at random which will require us to control for selection bias in our analysis on the post acquisition performance. Since half of our sample comprise of manufacturing targets, we redo the pre-acquisition assessment on the subsample of only targets in the manufacturing industry. Table 5b shows that the results for the manufacturing targets by themselves are even more pronounced. Furthermore, for manufacturing firms, developing country firms tend to pick targets that have significantly lower sales on average than non-acquired firms prior to acquisition.

Propensity Score Matching

The results from the probit regression, presented in Table 6, indicate that firms with lower market share and lower operating income performance and lower debt are more likely to be acquired. Furthermore, the data shows that firms with higher sales and higher capital expenditure tend to have higher probability of being acquired.

We perform matching based on the estimated probabilities using a Gaussian kernel estimator with a bandwidth of 0.06 and impose a common support by dropping treatment observations whose propensity score is higher than the maximum or less than the minimum propensity score of the controls. We concentrate on OIBD scaled by total assets, also referred to as return on assets (ROA) as our measure of performance. Difference-in-differences kernel matching estimation results for random time assignment

are presented in Table 7a-e. ROA increases significantly during year four after the acquisition. Net income declines during the year of the acquisition, but goes up during the fourth year after the acquisition. Sales and log employment decrease significantly in the year of the acquisition and all five subsequent years and capital expenditure for acquired firms is significantly higher than for non-acquired firms three years after the acquisition.

To contrast the difference-in differences kernel matching results, we also perform simple difference-in-differences estimation without kernel matching. The results are also listed in table 8a-e in direct comparison to the matching results. The simple Diff-in-Diff approach shows that results are not significant when we do not carefully select the control group. The problem with the simple difference-in-difference estimator is that it puts the same weight on each non-treated firms. Figure 5 provides an illustration of the effects of kernel matching. The three densities plotted in the figure depict the predicted probability, i.e. propensity score, of acquisition for the treated firms (blue), the non-weighted and non-treated firms (green), and the kernel-weighted non-treated firms (red). Evidenced by the proximity between the kernel weighted non-treated firms and the treated firms, kernel matching ensures constructing an appropriate counterfactual. Since the propensity score is a summary index of all the covariates combined, kernel matching essentially brings the non-treated group of firms closer to the treated firms on all dimensions. The density plot in Figure 5 reveals that among the non-treated firms, a large proportion of them have almost zero probability of being acquired and yet, the simple diff-in-diff estimator treats them the same as those non-acquired firms that are more likely to be acquired. The kernel matching estimator, on the other hand, gives more weight to those non-treated firms that show similar probability of being acquired to those in the treatment group. After matching, the propensity score density of the kernel-weighted non-treated firms is thus much closer to that of the treated firms. In a sense, propensity score matching ensures that we are comparing non-treated firms that are more alike to the treated firms before the acquisition.

Balancing Test

To assess how well the propensity score matching performs, we calculate the standardized differences (SDiff) for the covariates. More specifically, for each covariate, we take the average difference between the treated units and the matched (or reweighted) untreated units and normalize it by the pooled standard deviation of the covariate in the treated and untreated samples. Based on Rosenbaum and Rubin (1985), we calculate the following measure:

$$SDiff(X_k) = 100 \frac{\frac{1}{n_1} \sum_{i \in \{A_i = 1\}} [X_{ki} - \sum_{j \in \{A_j = 0\}} W(P_i, P_j) X_{kj}]}{\sqrt{\frac{\text{var}_{i \in \{A_i = 1\}}(X_{ki}) + \text{var}_{j \in \{A_j = 0\}}(X_{kj})}{2}}},$$

where n_1 is the number of treated firms and n_0 is the number of firms that are not treated. There is no clear criterion for how large a value of the standardized difference is too large. Rosenbaum and Rubin suggest that a value of 20 is large. As the balancing test results indicate in Table 9, the median of our SDiff parameters are all well below 20 and we are confident that our approach is capable of grouping together relatively homogeneous plants.

6 Conclusion

This paper undertakes the first systematic analysis of the performance of US firms that become the subject of acquisitions of firms domiciled in developing countries. To do so, we examine both stock market and accounting based measures of firm performance following the announcement of a developing-country acquisition.

Our results suggest that that developing country firms tend to acquire public US targets with relatively high levels of sales, employment and total assets. The stock price response

of the target is positive and significant around the time of the acquisition announcements. Following the acquisition, the performance of target firms tends to improve. In particular, the return on assets in target firms increases by 20%, on average, in the five years following the acquisition. The evidence also suggests that the acquiring firms undertake significant restructuring in the newly acquired target firms. While employment decreases, capital expenditures of the target firm increases significantly following acquisition.

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Appendix

Countries in our sample:

Algeria, Argentina, Bahrain, Brazil, China, Costa Rica, Croatia, Ecuador, Egypt, Hong Kong, India, Indonesia, Kuwait, Malaysia, Mexico, Nigeria, Papua N Guinea, Russian Fed, Saudi Arabia, Singapore, South Africa, South Korea¸ Taiwan, Thailand, Trinidad & Tobago, Uganda, Uzbekistan, Venezuela

Tax Haven Countries exlcluded from our sample:

Bahamas, Bermuda, British Virgin Islands, Cayman Islands, Cyprus, Netherland Antilles, Panama

Tables and Figures

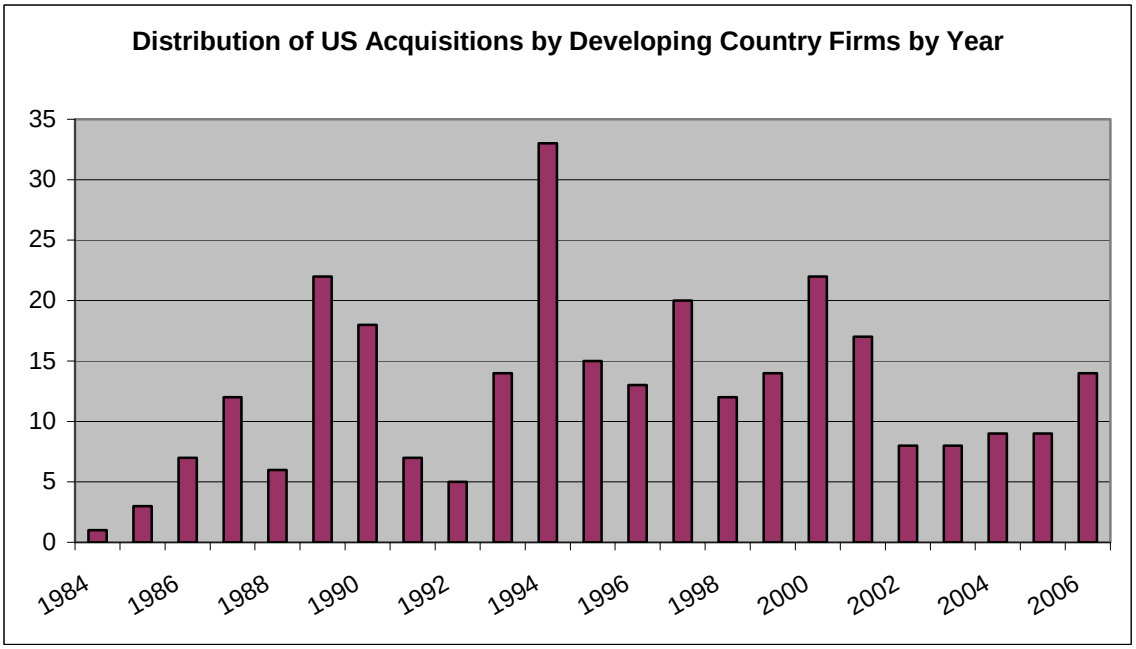

Figure 1. US Inflows of M&A by Developing Country Firms

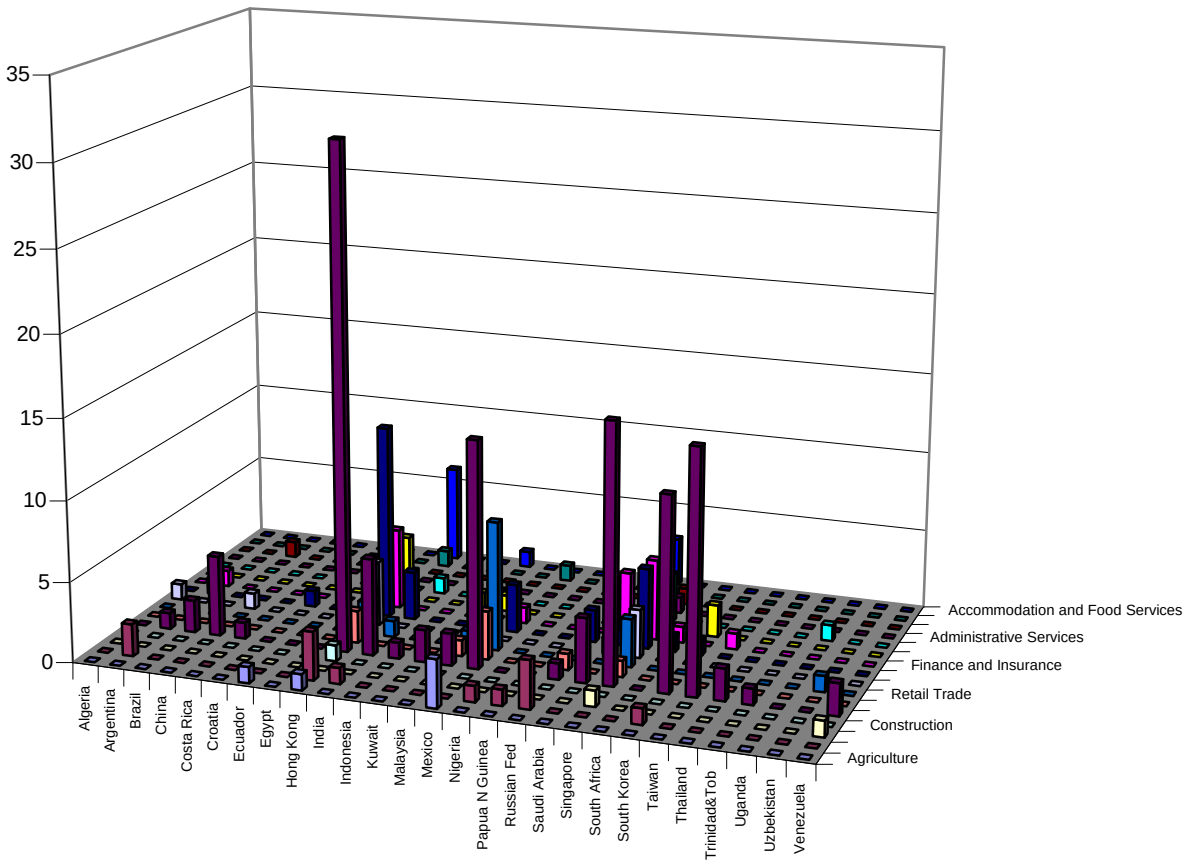

Figure 2a. Number of M&A deals by Acquirer Nation and Target Industry Sector

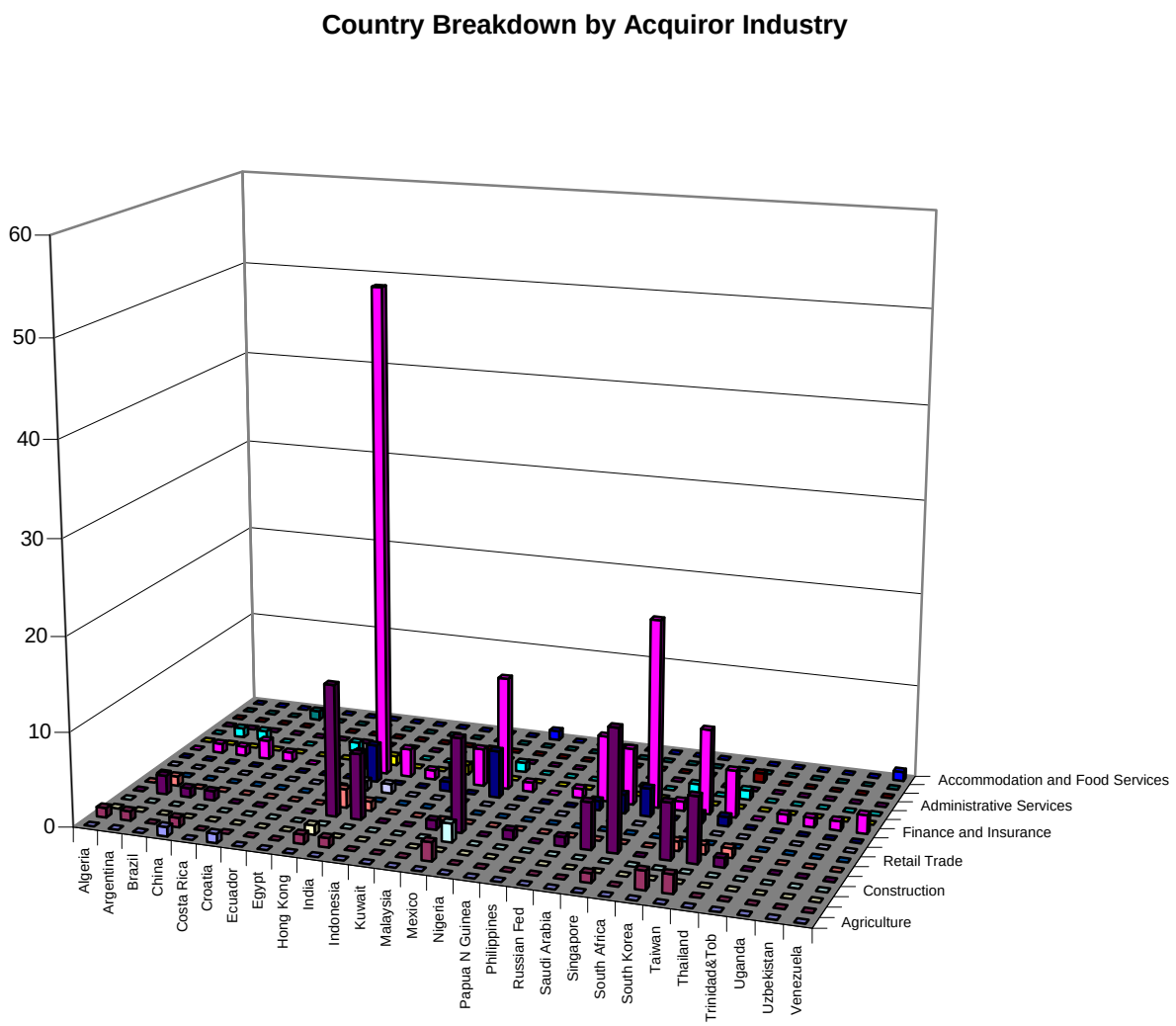

Figure 2b. Number of M&A deals by Acquirer Nation and Target Industry Sector

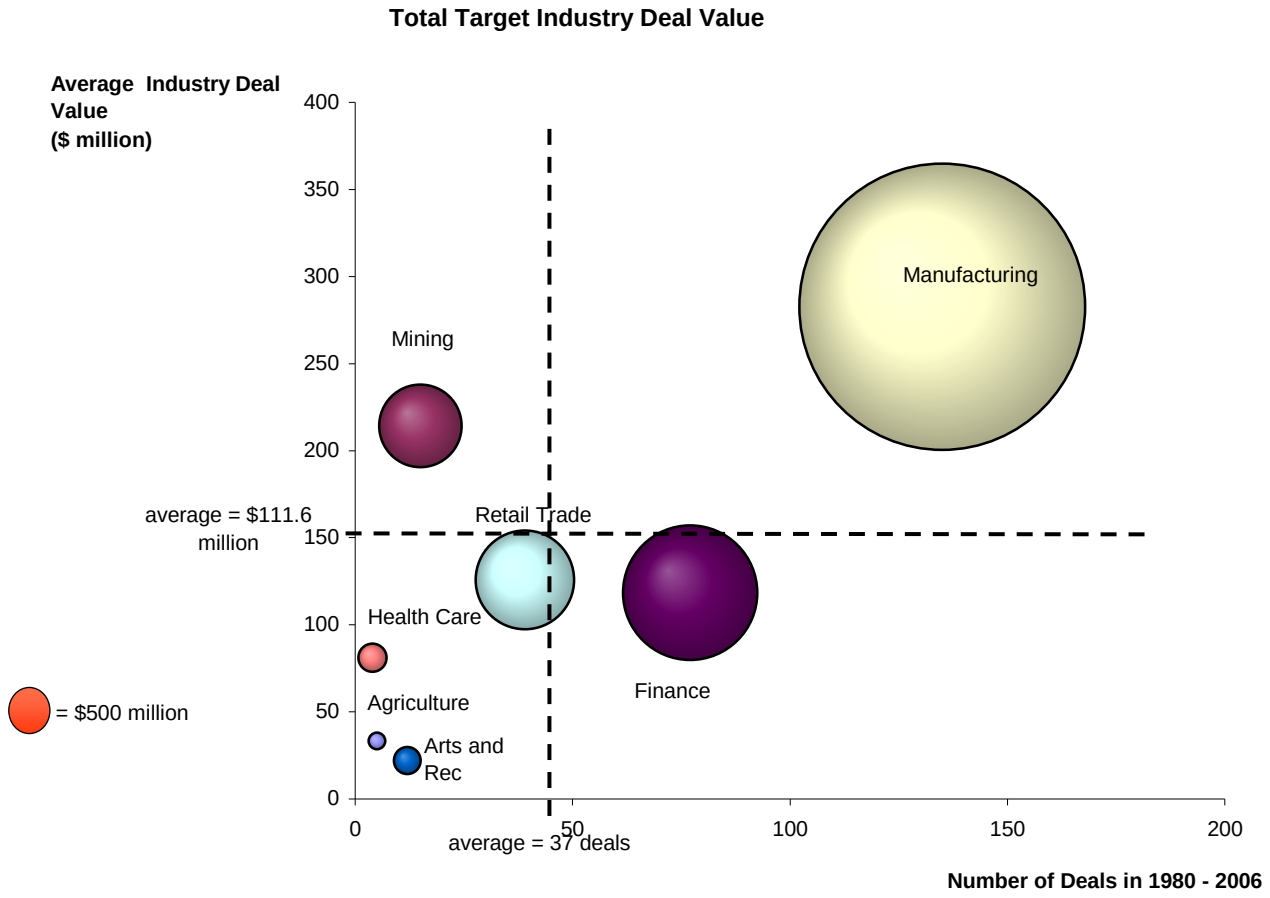

Figure 3a. Number and Value of M&A deals by Target Sector

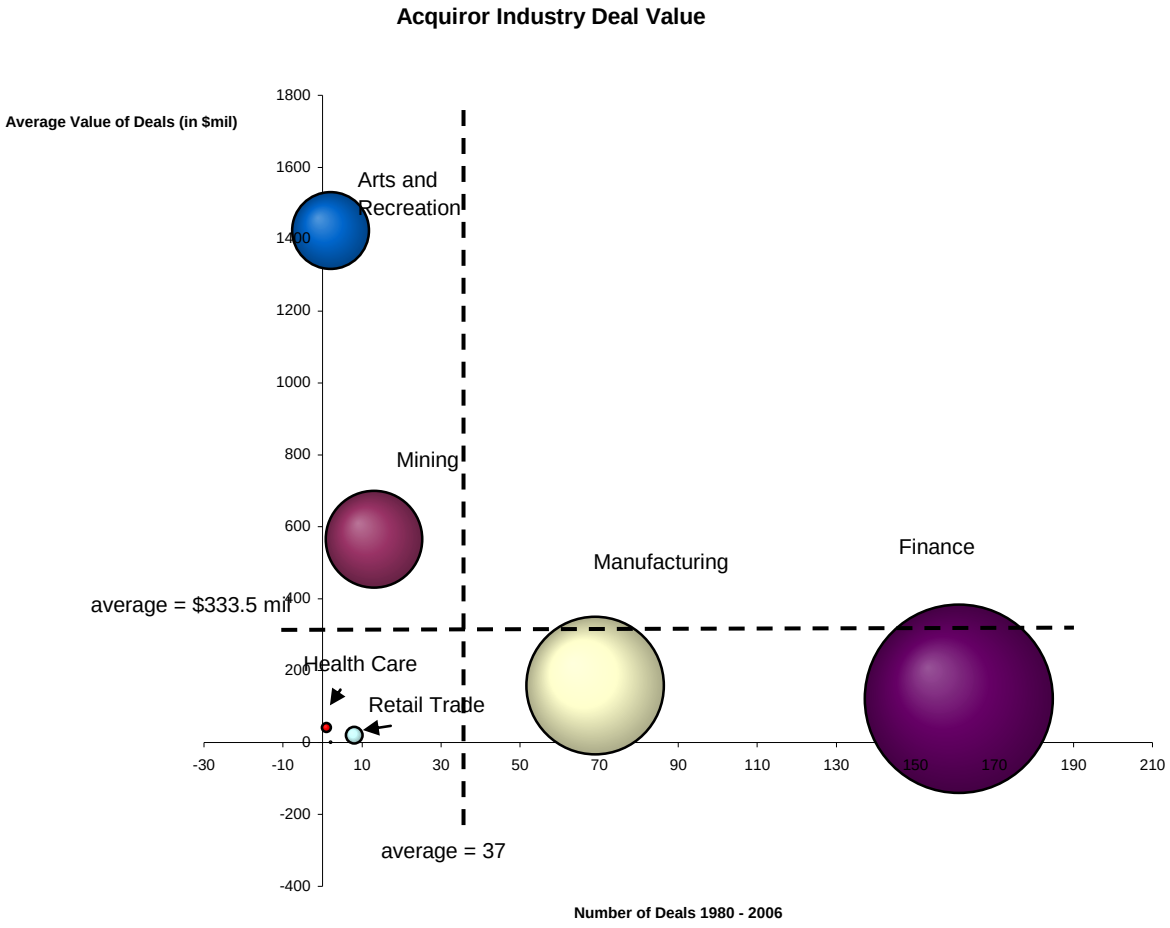

Figure 3b. Number and Value of M&A deals by Acquirer Sector

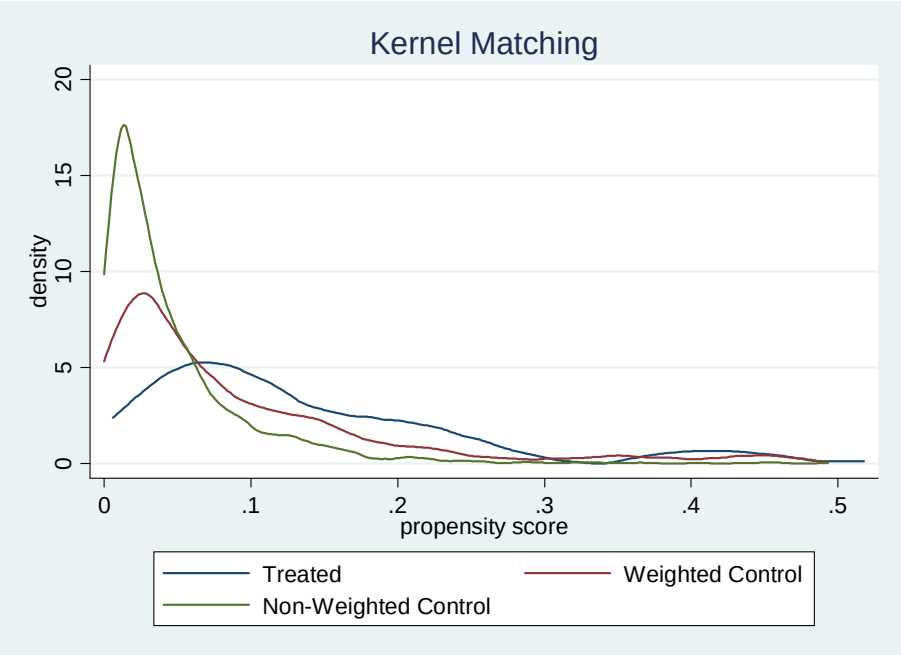

Figure 5. Propensity Scores by treated, non-weighted and kernel weighted control groups

Country	Total Number of Transactions	% of Total Transactions	Nominal Transaction Value ($ mil)
Hong Kong	74	28.57%	3617.441
Singapore	39	15.06%	6453.667
Mexico	33	12.74%	10286.24
South Korea	17	6.56%	1492.222
Taiwan	16	6.18%	739.842
Saudi Arabia	13	5.02%	1518.797
India	12	4.63%	158.246
Russian Fed	8	3.09%	965.572
China	6	2.32%	44.83
Malaysia	5	1.93%	56.61
Bahrain	5	1.93%	478.356
Argentina	5	1.93%	35.794
Kuwait	4	1.54%	5.745
Venezuela	3	1.16%	65.77
Brazil	3	1.16%	4.313
Thailand	2	0.77%	27.12
South Africa	2	0.77%	1900.151
Egypt	2	0.77%	8.905
Uzbekistan	1	0.39%	30.8
Uganda	1	0.39%	0.68
Trinidad&Tob	1	0.39%	0.6
Papua N Guinea	1	0.39%	2.7
Nigeria	1	0.39%	6
Indonesia	1	0.39%	23
Ecuador	1	0.39%	NA
Croatia	1	0.39%	1
Costa Rica	1	0.39%	12.5
Algeria	1	0.39%	NA
Total	259	100.00%	27936.901

Table 1. Acquirer Nation by Number and Value of M&A

Date Announced	Target Name	Target Industry	Acquiror Name	Acquiror Industry	Share acquired	Value of Acq in $mil	Acquirer Nation	Payment Method
6/12/2006	Maverick Tube Corp	Mnfr steel tubular prod	Tenaris SA	Mnfr seamless steel pipe prod	100	3095.57	Argentina	Cash Cash Only
9/29/2000	Southdown Inc	Mnfr cement; limestone mining	CEMEX SA DE CV	Mnfr,whl cement,ready-mix prod	100	2846.18	Mexico	Cash Liabilities
11/22/1999	DII Group	Mnfr electronic components	Flextronics International Ltd	Mnfr electn components	100	2591.41	Singapore	Common Stock
2/12/2007	Hydril Co LP	Mnfr oil,gas drilling equip	Tenaris SA	Mnfr seamless steel pipe prod	100	2212.17	Argentina	Cash Cash Only
11/20/2006	Oregon Steel Mills Inc	Mnfr steel prod	Evraz Group SA	Mnfr,whl steel	90.87	2087.97	Russian Fed	Cash Cash Only
2/28/1995	Maxus Energy Corp	Oil and gas exploration, prodn	YPF SA	Oil and gas exploration,prodn	100	1843.82	Argentina	Cash Liabilities
2/10/2004	ChipPAC Inc	Mnfr semiconductors	ST Assembly Test Services Ltd	Mnfr semiconductor testing	100	1458.68	Singapore	Amer. Depy. Receipt
6/19/2000	United Asset Management Corp	Investment management services	Old Mutual South Africa	Insurance co	100	1456.67	South Africa	Cash Cash Only
9/24/1999	ASARCO Inc	Mine, smelt, refine metals	Nueva Grupo Mexico SA de CV	Mining investment holding co	90.48	1073.27	Mexico	Cash Cash Only
6/23/1999	VoiceStream Wireless Corp	Provide cellular commun svcs	Hutchison Whampoa Ltd	Pvd telecom svcs	6.03	957	Hong Kong	Cash Cash Only
4/14/1997	APL Ltd	Shipping,trucking company	Neptune Orient Lines Ltd	Shipping company	100	878.48	Singapore	Cash Cash Only
1/25/2000	CompUSA Inc	Own,operate computer stores	Grupo Sanborns SA de CV	Mgmt hldg cia	85.5	805.261	Mexico	Cash Cash Only
7/15/1987	Marine Midland Banks Inc	Bank holding company	HSBC Hong Kong	Bank (foreign)	48.42	752	Hong Kong	Cash Cash Only
8/9/1989	Anchor Glass Container Corp	Manufacture glass containers	Vitro SA de CV	Mnfr glass containers	96.89	737	Mexico	Cash Liabilities
1/30/1997	AST Research Inc	Mnfr computers;dvlp software	Samsung Electronics Co Ltd	Mnfr,whl electn prod	55.28	495.8	South Korea	Cash Liabilities
5/7/2001	Proxicom Inc	Pvd e-bus consulting,dvlp svc	Dimension Data PLC	Pvd info tech svcs	100	443.481	South Africa	Cash Cash Only
4/15/2005	Brookstone Inc	Own,op novelty stores	OSIM Brookstone Holdings LP	Investment company	100	429.656	Singapore	Cash Cash Only
9/24/1999	CMGI Inc	Pvd direct mail advg svcs	Pacific Century CyberWorks Ltd	Internet Service Provider{ISP}	3.4	377.952	Hong Kong	Newly Issued Ord Sh
11/20/2002	Stillwater Mining Co	Platinum mining company	OAO MMC Norilsk Nickel Group	Mnfr metal prod	51.12	340.9	Russian Fed	Cash Other Consideration
11/30/1993	Motor Coach Industries Intl	Mnfr railroad cars,equipment	Consorcio G Grupo Dina'l'ads	Manufacture trucks	100	334.64	Mexico	Depositary Share Convert. Debenture

Table 2. Top Twenty Acquirers by Acquisition Value

NAICS	Industry	Freq.	Firms	Acquired	Mean OIBD/Asset	Mean Log Sales	Mean log Empl
11	Agriculture	2,015	81	5	0.022	3.371	-0.954
21	Natural Resources	13486	1,287	12	-1.058	2.746	-2.405
22	Utilities	10085	495	2	0.106	6.182	0.414
23	Construction	3733	315	1	-1.861	4.126	-1.095
31-33	Manufacturing	92935	7604	118	-0.253	4.276	-0.370
42	Wholesale Trade	9217	805	8	-0.168	4.699	-0.817
44-45	Retail Trade	10802	978	16	0.061	5.705	0.991
48-49	Transportation and Warehousing	6417	576	10	0.080	5.704	0.670
51	Information	22753	2,627	30	-0.857	3.955	-0.712
52	Finance and Insurance	30786	4,828	20	-0.107	4.478	-0.624
53	Real Estate	6042	531	8	-0.263	2.665	-2.104
54	Professional Services	10097	1,050	6	-0.389	3.331	-1.171
56	Administrative Services	4743	492	1	-0.508	3.957	-0.287
62	Health Care and Social Assistance	4049	441	2	-0.099	3.933	-0.261
71	Arts, Entertainment, and Recreation	1848	193	2	-0.730	3.278	-0.775
72	Accommodation and Food Services	5245	469	10	-0.007	4.187	0.505
81	Other Services	1126	115	8	0.000	3.616	-0.606

Table 3. Number of Acquisitions and Industry Characteristics

Days	N	Mean Cumulate Abnormal Return	Precision Weighted CAAR	Positive: Negative	Patell Z	Portfolio Time-Series (CDA) t	Generalized Sign Z
(-20,+20)	214	10.82%	12.42%	141:73	>>>6.657***	4.782***	6.348***
(-3,+3)	214	8.02%	10.37%	141:73	>>>13.447***	8.578***	6.348***
(-1,+1)	214	8.17%	10.44%	158:56	>>>20.684***	13.350***	8.687***

The symbols $,*,**, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a 1-tail test. The symbols (,< or),> etc. correspond to $,* and show the significance and direction of the generalized sign test.

The symbols $,*,**, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a 1-tail test. The symbols (,< or),> etc. correspond to $,* and show the significance and direction of the generalized sign test.

Table 4. Abnormal Stock Returns on Acquisition Targets

	Dpendent Variable:				
	OIBD/Asset	log Sales	log Asset	Cap Exp/Asset	log Empl
D_ownership	-0.024	**0.798*** **	**0.735*** **	**-0.008+**	**0.651*** **
	(0.02)	(0.11)	(0.11)	(0.00)	(0.10)
industry fixed effect	yes	yes	yes	yes	yes
year fixed effect	yes	yes	yes	yes	yes
region fixed effect	yes	yes	yes	yes	yes
Observations	10394	10394	10394	10394	10394
R-squared	0.035	0.18	0.204	0.103	0.178

Standard errors in parentheses

+ significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Evidence of Selection Bias in the three years preceding acquisition

Dependent Variable: Pr(Foreign Acquisition)		
	Marginal Effect	Std. Err.
age	-0.0009634	0.0008048
age2	0.0000170	0.0000146
OIBD	**-0.0000476**	0.0000107
log Debt	**-0.0028325**	0.0013747
Cash	0.0000067	0.0000086
MktShareInd2	**-1.4272490**	0.7404682
log Assets	0.0054931	0.0037878
Log Sales	**0.0074898**	0.0039040
log Empl	-0.0006531	0.0029244
Cap Exp	**0.0000259**	0.0000106
industry fixed effects		yes
year fixed effects		yes
region fixed effects		yes
Observations		3422
Pseudo R-squared		0.1359

All variables are lagged by one year.

*significant at 10%, **significant at 5%, ***significant at 1%

Table 6. Probit Estimation of the Propensity Score

Impact of Developing Country Acquisition on OIBD/Asset

t	OIBD/Asset				Common Support		Off Support	
	Matching Estimate	Bootstrapped Std. Err.	Z-Stat	P>|z|	Untreated	Treated	Untreated	Treated
Difference in Differences combined with Gaussian kernel matching estimates								
0	-0.024	0.042	-0.56	0.575	2,963	127	0	2
1	0.042	0.050	0.84	0.401	2,736	118	0	2
2	0.368	0.337	1.09	0.275	2,525	108	0	2
3	0.055	0.050	1.09	0.274	2,344	93	0	3
4	**0.059**	0.033	1.79	0.074	2,157	85	0	3
5	0.025	0.024	1.07	0.287	2,003	83	0	3

Table 7a. Matching Results on OIBD/Assets

Impact of Developing Country Acquisition on Net Income/Asset

t	Net Income/Asset				Common Support		Off Support	
	Matching Estimate	Bootstrapped Std. Err.	Z-Stat	P>|z|	Untreated	Treated	Untreated	Treated
Difference in Differences combined with Gaussian kernel matching estimates								
0	**-0.129**	0.076	-1.7	0.09	2,965	127	0	2
1	0.009	0.111	0.08	0.932	2,750	118	0	2
2	0.826	0.797	1.04	0.3	2,544	110	0	2
3	0.120	0.092	1.3	0.193	2,358	94	0	3
4	**0.100**	0.057	1.76	0.079	2,173	85	0	3
5	-0.003	0.052	-0.07	0.947	2,019	83	0	3

Table 7b. Matching Results on Net Income/Asset

Impact of Developing Country Acquisition on log Employment

t	log Employment				Common Support		Off Support	
	Matching Estimate	Bootstrapped Std. Err.	Z-Stat	P>|z|	Untreated	Treated	Untreated	Treated
Difference in Differences combined with Gaussian kernel matching estimates								
0	**-0.070**	0.041	-1.7	0.089	2,575	115	0	2
1	**-0.111**	0.053	-2.12	0.034	2,176	100	0	2
2	-0.071	0.058	-1.21	0.226	1,832	89	0	2
3	**-0.158**	0.109	-1.45	0.146	1,465	75	0	2
4	**-0.267**	0.161	-1.66	0.096	1,187	63	0	2
5	**-0.335**	0.178	-1.88	0.06	956	56	0	2

Table 7c. Matching Results on log Employment

Impact of Developing Country Acquisition on log Sales

t	Log Sales				Common Support		Off Support	
	Matching Estimate	Bootstrapped Std. Err.	Z-Stat	P>|z|	Untreated	Treated	Untreated	Treated
Difference in Differences combined with Gaussian kernel matching estimates								
0	**-0.068**	0.038	-1.8	0.072	2,965	126	0	2
1	**-0.167**	0.057	-2.94	0.003	2,742	117	0	2
2	**-0.224**	0.054	-4.12	0	2,532	109	0	2
3	**-0.229**	0.071	-3.22	0.001	2,341	93	0	2
4	**-0.363**	0.089	-4.08	0	2,146	83	0	2
5	**-0.343**	0.088	-3.88	0	2,000	81	0	2

Table 7d. Matching Results on log Sales

Impact of Developing Country Acquisition on Capital Expenditure/Asset

t	Capital Expenditure/Asset				Common Support		Off Support	
	Matching Estimate	Bootstrapped Std. Err.	Z-Stat	P>|z|	Untreated	Treated	Untreated	Treated
Difference in Differences combined with Gaussian kernel matching estimates								
0	0.003	0.004	0.75	0.454	2,951	126	0	2
1	0.001	0.004	0.21	0.834	2,729	116	0	2
2	0.002	0.006	0.44	0.663	2,517	106	0	2
3	**0.013**	0.007	2.06	0.039	2,333	89	0	3
4	0.007	0.008	0.86	0.392	2,151	83	0	3
5	0.004	0.008	0.47	0.635	2,003	81	0	3

Table 7e. Matching Results on Capital Expenditure

Impact of Developing Country Acquisition on OIBD/Asset

t	OIBD/Asset				Common Support	
	Estimate	Std. Err.	Z-Stat	P>|z|	Untreated	Treated
Simple Difference in Differences						
0	0.059	0.137	0.43	0.664	2,963	129
1	0.082	0.120	0.68	0.495	2,736	120
2	0.118	0.135	0.88	0.379	2,525	110
3	0.151	0.136	1.11	0.267	2,344	96
4	0.158	0.132	1.19	0.234	2,157	88
5	0.134	0.126	1.06	0.287	2,003	86

Table 8a. Simple Diff-and-Diff Results on OIBD/Assets

Impact of Developing Country Acquisition on Net Income/Asset

t	Net Income/Asset				Common Support	
	Estimate	Std. Err.	Z-Stat	P>|z|	Untreated	Treated
	Simple Difference in Differences					
0	-0.211	0.694	-0.3	0.761	2,965	129
1	-0.147	0.712	-0.21	0.837	2,750	120
2	-0.060	0.743	-0.08	0.936	2,544	112
3	-0.002	0.809	0	0.998	2,358	97
4	-0.030	0.875	-0.03	0.972	2,173	88
5	0.000	0.933	0	1	2,019	86

Table 8b. Simple Diff-and-Diff Results on Net Income/Assets

Impact of Developing Country Acquisition on log Employment

t	log Employment				Common Support	
	Estimate	Std. Err.	Z-Stat	P>|z|	Untreated	Treated
	Simple Difference in Differences					
0	0.017	0.285	0.06	0.952	2,575	117
1	-0.007	0.297	-0.02	0.982	2,176	102
2	-0.086	0.307	-0.28	0.779	1,832	91
3	-0.253	0.330	-0.77	0.442	1,465	77
4	-0.213	0.346	-0.62	0.538	1,187	65
5	-0.011	0.349	-0.03	0.975	956	58

Table 8c. Simple Diff-and-Diff Results on log Employment

Impact of Developing Country Acquisition on log Sales

t	Log Sales				Common Support	
	Estimate	Std. Err.	Z-Stat	P>|z|	Untreated	Treated
			Simple Difference in Differences			
0	-0.012	0.314	-0.04	0.97	2,965	128
1	0.063	0.326	0.19	0.846	2,742	119
2	0.094	0.336	0.28	0.779	2,532	111
3	-0.060	0.363	-0.16	0.869	2,341	95
4	-0.196	0.377	-0.52	0.603	2,146	85
5	0.270	0.385	0.7	0.482	2,000	83

Table 8d. Simple Diff-and-Diff Results on log Sales

Impact of Developing Country Acquisition on Capital Expenditure/Asset

t	Capital Expenditure/Asset				Common Support	
	Estimate	Std. Err.	Z-Stat	P>|z|	Untreated	Treated
			Simple Difference in Differences			
0	-0.005	0.012	-0.43	0.67	2,951	128
1	-0.001	0.010	-0.1	0.917	2,729	118
2	-0.006	0.011	-0.59	0.558	2,517	108
3	0.000	0.012	0.02	0.982	2,333	92
4	-0.003	0.013	-0.24	0.814	2,151	86
5	-0.001	0.013	-0.08	0.938	2,003	84

Table 8e. Simple Diff-and-Diff Results on Cap Exp/Assets

		Mean		%Reduc		t-test	
Variable	Sample	Treated	Control	%Diff	Diff	t	p>|t|
age	Unmatched	25.361	24.346	8		0.85	0.393
	Matched	25.299	24.482	6.5	19.6	0.49	0.624
age2	Unmatched	799.09	754.33	6.6		0.69	0.493
	Matched	798.38	761.93	5.4	18.6	0.41	0.684
OIBD	Unmatched	67.84	269.23	-23		**-1.9**	0.058
	Matched	86.915	200.75	-13	43.5	-1.24	0.216
logDebt	Unmatched	2.9611	2.8235	4.6		0.47	0.641
	Matched	2.8945	2.9818	-2.9	36.5	-0.23	0.821
Cash	Unmatched	72.035	100.1	-5.6		-0.46	0.647
	Matched	46.736	75.322	-5.7	-1.8	-0.57	0.566
MktShareInd2	Unmatched	0.00165	0.00301	-13.5		-1.08	0.282
	Matched	0.00162	0.00245	-8.3	38.9	-0.79	0.429
logAssets	Unmatched	5.2667	4.9057	16.5		1.57	0.117
	Matched	5.2099	5.0939	5.3	67.9	0.43	0.667
LogSales	Unmatched	5.336	4.7549	25.4		**2.44**	0.015
	Matched	5.27	5.0045	11.6	54.3	0.95	0.343
logEmpl	Unmatched	0.32517	-0.2007	24		**2.42**	0.015
	Matched	0.28637	0.01578	12.3	48.5	0.97	0.331
CapExp	Unmatched	71.097	126.79	-11.9		-1.02	0.306
	Matched	71.167	119.79	-10.4	12.7	-0.83	0.409
Number of Firms		79	1,652				
Median Sdiff	Unmatched	12.70621					
	Matched	7.363901					

Table 9. Balancing Tests