

Alba, Joseph D.; Park, Donghyun; Wang, Peiming

**Working Paper**

## Corporate Governance and Foreign Direct Investment

ADB Economics Working Paper Series, No. 202

**Provided in Cooperation with:**

Asian Development Bank (ADB), Manila

*Suggested Citation:* Alba, Joseph D.; Park, Donghyun; Wang, Peiming (2010) : Corporate Governance and Foreign Direct Investment, ADB Economics Working Paper Series, No. 202, Asian Development Bank (ADB), Manila,  
<https://hdl.handle.net/11540/1954>

This Version is available at:

<https://hdl.handle.net/10419/109377>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<http://creativecommons.org/licenses/by/3.0/igo>

## ADB Economics Working Paper Series



### Corporate Governance and Foreign Direct Investment

---

Joseph D. Alba, Donghyun Park, and Peiming Wang  
No. 202 | May 2010





**ADB Economics Working Paper Series No. 202**

# **Corporate Governance and Foreign Direct Investment**

**Joseph D. Alba, Donghyun Park, and Peiming Wang**

May 2010

Joseph D. Alba is Associate Professor at the Nanyang Technological University, Singapore; Donghyun Park is Principal Economist in the Economics and Research Department, Asian Development Bank, Manila; and Peiming Wang is Associate Professor at the Auckland University of Technology, New Zealand.

**Asian Development Bank**

Asian Development Bank  
6 ADB Avenue, Mandaluyong City  
1550 Metro Manila, Philippines  
[www.adb.org/economics](http://www.adb.org/economics)

©2010 by Asian Development Bank  
May 2010  
ISSN 1655-5252  
Publication Stock No.

The views expressed in this paper  
are those of the author(s) and do not  
necessarily reflect the views or policies  
of the Asian Development Bank.

The ADB Economics Working Paper Series is a forum for stimulating discussion and eliciting feedback on ongoing and recently completed research and policy studies undertaken by the Asian Development Bank (ADB) staff, consultants, or resource persons. The series deals with key economic and development problems, particularly those facing the Asia and Pacific region; as well as conceptual, analytical, or methodological issues relating to project/program economic analysis, and statistical data and measurement. The series aims to enhance the knowledge on Asia's development and policy challenges; strengthen analytical rigor and quality of ADB's country partnership strategies, and its subregional and country operations; and improve the quality and availability of statistical data and development indicators for monitoring development effectiveness.

The ADB Economics Working Paper Series is a quick-disseminating, informal publication whose titles could subsequently be revised for publication as articles in professional journals or chapters in books. The series is maintained by the Economics and Research Department.

## **Contents**

Abstract	v
I. Introduction	1
II. Data and Empirical Model	2
A. Data	3
B. Econometric Model	3
C. Estimation	6
III. Determinants of FDI	7
IV. Empirical Results	8
V. Concluding Observations	11
References	12



## **Abstract**

Merger and acquisition (M&A) activity is motivated by increasing shareholder value through improved corporate governance. Therefore, stronger corporate governance can reduce the returns from M&A activity, including M&A foreign direct investment (FDI). This, in turn, can reduce the returns from non-M&A FDI in light of the complementary relationship between M&A and non-M&A FDI. We use firm-level evidence to empirically examine the effect of corporate governance in the United States (US) on Japanese M&A and non-M&A FDI inflows. In doing so, we expand upon Alba, Park, and Wang (2009), which looked only at the M&A FDI inflows. We find that two landmark US corporate governance regulations help explain the sharp drop in both Japanese M&A and non-M&A FDI into the US during the 1990s. The regulations apparently encouraged US firms to improve their corporate governance. Our evidence thus suggests that corporate governance may affect both M&A and non-M&A FDI.





# I. Introduction

Traditional theories of foreign direct investment (FDI) are based on industrial organization motives related to the ownership of firm-specific assets such as advanced technology, superior management skills, and global marketing and distribution networks. While such traditional theories are useful, they fail to explain the stylized fact of FDI sometimes occurring in waves, as happened in the case of Japanese FDI into the United States (US) during the 1980s and 1990s. To address this gap, Froot and Stein (1991) put forth relative wealth—i.e., depreciation of the US dollar increasing the relative wealth of foreign firms—as a key driver of FDI into the US. A depreciation of the US dollar increases the dollar value of those funds and enables foreign firms to bid more aggressively for US assets.

The Froot and Stein hypothesis does a good job of explaining the stylized facts of the 1980s and early 1990s. During that time, Japanese FDI into the US rose when the dollar weakened and fell when the dollar strengthened. However, after 1991, Japanese FDI fell sharply despite a depreciation of the US dollar. To explain the paradoxical drop in Japanese FDI, Klein et al. (2002) proposed the relative access to credit hypothesis. The basic idea is that the sharp drop in Japanese FDI in the 1990s can be explained by the reduction in credit flows to Japanese firms. The Klein et al. hypothesis is based on the confluence of two stylized facts—the Japanese banking crisis of the 1990s and the Japanese main bank system. The deterioration of the financial health of Japanese banks adversely affects the flow of credit to Japanese firms from their main banks.

Another potential explanation for the sharp decline of Japanese FDI into the US despite the dollar's depreciation has to do with improvement in corporate governance in the US since the early 1990s. In particular, two landmark corporate governance regulations by the US Securities and Exchange Commission (SEC) in 1992 reshaped the US corporate governance landscape. This explanation is especially relevant for merger and acquisition (M&A) FDI since M&A activity in the US and elsewhere has been motivated to a large extent by improving corporate governance to create shareholder value. There is some empirical evidence for the notion that corporate governance influences M&A FDI. Rossi and Volpin (2004) find evidence from a cross section of 48 countries that protection of shareholder rights has a negative effect on M&A FDI inflows. Alba, Park, and Wang (2009) also find that improved corporate governance in the US had a negative effect on the rate of firm-level Japanese M&A FDI in the US. In this paper, we expand the empirical work of Alba, Park, and Wang (2009) by analyzing the impact of the improvement in US

corporate governance since 1992 on both Japanese M&A and non-M&A FDI into the US with a larger data set.

In this paper, we go beyond the corporate governance as a determinant of M&A FDI hypothesis to empirically test the possibility that corporate governance also influences non-M&A FDI. Although M&A FDI is an important form of FDI, it is only one of several forms of FDI, along with new plants and joint ventures. However, there are strong grounds for at least some complementarity between M&A and non-M&A FDI. For one, assets, including assets acquired as a result of M&A FDI, are usually not perfectly divisible (Penrose 1959). Therefore, utilizing the indivisible assets acquired from M&A FDI more efficiently may require additional, non-M&A FDI (Teece 1980). For example, when a Japanese company buys a high-tech US company, it may build new production facilities in the US or enter into joint ventures with US firms to more fully utilize its newly acquired technology assets. In fact, Calderón et al. (2004) find that M&A FDI is followed by other types of FDI in a large sample of countries. This implies that to the extent that improved corporate governance has a negative impact on M&A FDI, it may also adversely affect other types of FDI such as new plants and joint ventures.

The central objective of this paper is to empirically examine the impact of corporate governance on both M&A and non-M&A FDI. To do so, we use firm-level data from Japanese FDI into the US. We use the same set of firm-level explanatory variables as Klein et al. (2002), i.e., relative access to credit, relative wealth, profitability, and size. In addition, we include a dummy variable that captures the two landmark corporate governance regulations by the US SEC in 1992. For our purposes, this is the most significant variable since we seek to investigate the relationship between corporate governance and FDI. In contrast to Klein et al., we use a Markov bivariate zero-inflated negative binomial regression model (hereafter MBZINB), which is well suited to positively correlated bivariate panel data with a high proportion of zeros, such as number of M&A and non-M&A FDI projects. MBZINB has the added advantage of modeling the serial dependence of repeated observations over time as a Markov chain with transition probabilities that depend on covariates. For comparative purposes, we also estimate the bivariate zero-inflated negative binomial regression model (hereafter BZINB), which is a special case of MBZINB.<sup>1</sup>

## II. Data and Empirical Model

In this section, we discuss the data and empirical model that we use to analyze the impact of corporate governance and other explanatory variables on firm-level Japanese FDI into the US. Our model is based on a stylized two-stage investment process. In the first stage, we look at the probability of whether the Japanese firm intends to invest in

<sup>1</sup> See Wang (2003) for a comprehensive discussion of the BZINB model.

the US. In the second stage, we investigate the effect of the various determinants of FDI, including US corporate governance, on both M&A and non-M&A FDI.

## A. Data

Our sample consists of 317 firms listed in the first section of the *Japan Company Handbook* with at least one FDI in the US from 1987 to 1994. Each firm is associated with one of the 11 banks identified by Klein et al. (2002) as a main bank. There are 2,057 observations in the sample and each observation indicates the number of both M&A and non-M&A FDI projects for a given firm in a given year. For M&A FDI, 89.4% of 2,057 observations are zeros with the sample mean and variance 0.13 and 0.43 respectively. For non-M&A FDI 75.6% of 2,057 observations are zeros, with the sample mean and variance at 0.39 and 0.95, respectively. The sample correlation between M&A and non-M&A FDI is 0.23 with p-value of 0.0000. This suggests a high proportion of zero counts and positive correlation between M&A and non-M&A FDI in the data. The number of M&A and non-M&A FDI projects are compiled from the United States International Trade Administration (ITA) publication, *Foreign Direct Investment in the United States: Transactions* (ITA, various years). We use the number rather than the dollar values of FDI projects because the ITA does not report the values on majority of the FDI projects.

In addition to data on Japanese M&A and non-M&A FDI into the US, our empirical analysis also requires data on three firm-specific characteristics of Japanese firms, namely, relative wealth, profitability, and size; and the credit ratings of their respective main banks. The data on main banks' credit ratings are from Moody's long-term deposit ratings. Data on firm characteristics are from the Pacific-Basin Capital Markets Databases. The US dollar-yen exchange rate, which is required to calculate each firm's relative wealth, is from the International Monetary Fund's International Financial Statistics. The S&P 500 index is from Global Financial Data.

## B. Econometric Model

In this section, we describe the MBZINB model used for the econometric analysis in this paper. For firm  $i$ , let  $\{(y_{it}, x_{it}); t = 1, \dots, n_i\}$  be a set of its repeated observations over time, where  $y_{it} = (y_{it}^{(1)}, y_{it}^{(2)})$  with  $y_{it}^{(1)}$  and  $y_{it}^{(2)}$  records the number of M&A and non-M&A FDI projects in year  $t$  respectively, and  $x_{it} = (x_{it}^{(1)}, x_{it}^{(2)}, x_{it}^{(3)})$  is a vector of covariates where  $x_{it}^{(j)}$  is a  $(k_j \times 1)$  vector,  $j = 1, 2, 3$ . The BZINB model assumes that:

- (i) Each observation  $y_{it}$  is generated by either of the two stochastic processes represented by a partially observed binary random variable,  $S_{it}$ , with  $S_{it} = 1$  when  $y_{it} \neq (0, 0)$  and  $S_{it} = 0$  or 1 when  $y_{it} = (0, 0)$ . Note that the two states represented by  $S_{it} = 0$  and  $S_{it} = 1$  can be interpreted as the situation where firm  $i$  does not intend ( $S_{it} = 0$ ) or intends ( $S_{it} = 1$ ) to engage in FDI projects in year  $t$ . Moreover,

$S_{it}$ , follows a two-state first order Markov chain with the probabilities of the initial states and the transition probabilities defined by:

$$\begin{aligned} p_0(i1) &= P(S_{i1} = 0) = \text{logit}(\beta_3' x_{it}^{(3)}) \\ p_1(i1) &= P(S_{i1} = 1) = 1 - p_0(i1) \\ p_{00}(it) &= P(S_{it} = 0 | S_{i(t-1)} = 0) = \text{logit}(\beta_4' x_{it}^{(3)}) \\ p_{01}(it) &= P(S_{it} = 1 | S_{i(t-1)} = 0) = 1 - p_{00}(it) \\ p_{11}(it) &= P(S_{it} = 1 | S_{i(t-1)} = 1) = \text{logit}(\beta_5' x_{it}^{(3)}) \\ p_{10}(it) &= P(S_{it} = 0 | S_{i(t-1)} = 1) = 1 - p_{11}(it) \end{aligned}$$

where  $\beta_j$  ( $j = 3, 4, 5$ ) is a  $(k_3 \times 1)$  vector of unknown parameters, and  $t = 2, \dots, n_i$ ;

Conditional on  $S_{it} = 1$ ,  $y_{it}$  follows a bivariate negative binomial distribution with

$$\begin{aligned} f_1(y_{it}) &\equiv f(y_{it} | x_{it}^{(1)}, x_{it}^{(2)}, \alpha, \beta_1, \beta_2, S_{it} = 1) \\ &= \frac{\Gamma(y_{it}^{(1)} + y_{it}^{(2)} + \alpha)}{\Gamma(\alpha) y_{it}^{(1)}! y_{it}^{(2)}!} \times \frac{\lambda_1(it)^{y_{it}^{(1)}} \lambda_2(it)^{y_{it}^{(2)}} \alpha^\alpha}{(\lambda_1(it) + \lambda_2(it) + \alpha)^{y_{it}^{(1)} + y_{it}^{(2)} + \alpha}} \end{aligned}$$

where  $\alpha > 0$  is the dispersion parameter of the bivariate negative binomial distribution,  $\lambda_j(it) = \exp(\beta_j' x_{it}^{(j)})$ ,  $j = 1, 2$ , and  $\beta_j$  is a  $(k_j \times 1)$  vector of unknown parameter; conditional on  $S_{it} = 0$ ,  $y_{it} \equiv (0, 0)$ , i.e.,  $f_0(y_{it}) \equiv f_0(y_{it} | S_{it} = 0) = 1$ , if  $y_{it} = (0, 0)$ , and 0 otherwise.

Under the preceding assumptions, the likelihood function of the observed data

$D_i \equiv \{(y_{it}, x_{it}); t = 1, \dots, n_i\}$  for firm  $i$  is

$$L_i(\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5) = (p_0(i1)f_0(y_{i1}) + p_1(i1)f_1(y_{i1})) \prod_{t=2}^{n_i} \left[ \sum_{u=0}^1 \sum_{v=0}^1 p_{uv}(it) f_v(y_{it}) \right]$$

Furthermore, under the assumption that the series of repeated observations for different firms are independent of each other, the log-likelihood function of the observed data  $\bigcup_{i=1}^k D_i$  for  $k$  firms is  $l = \sum_{i=1}^k \log(L_i(\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5))$ .

The mean and variance of both M&A and non-M&A FDI for any firm  $i$  in year  $t$  are given respectively by

$$E(y_{it}^{(j)}) = \Pr(S_{it} = 1) \lambda_j(it) \quad \text{and} \quad (1)$$

$$\text{Var}(y_{it}^{(j)}) = \Pr(S_{it} = 1) \lambda_j(it) [1 + \lambda_j(it) (\Pr(S_{it} = 1) + \alpha^{-1})], \quad \text{for } j=1, 2. \quad (2)$$

Equations (1) and (2) indicate that the MBZINB model can account for the extra dispersion in FDI counts relative to the Poisson distribution. Furthermore, equation (1) can be calculated by

$$E(y_{it}^{(j)}) = \Pr(S_{it} = 1) \lambda_j(it) \\ = \left( \sum_{j_{t-1}=0}^1 \sum_{j_{t-2}=0}^1 \dots \sum_{j_1=0}^1 p_{j_{t-1}1}(it) p_{j_{t-2}j_{t-1}}(i(t-1)) \dots p_{j_1 j_2}(i2) p_{j_1}(i1) \right) \lambda_j(it) \quad (3)$$

Equation (3) shows that the rates of both M&A and non-M&A FDI for any firm in a year are affected not only by the conditional rate of that type FDI for a firm with intention of engaging in FDI in that year, but also by the probability that the firm has any intention of engaging in FDI in that year, which, in turn, depends on the probabilities of whether the firm had or had not intended to engage in FDI in the past.

The correlation between M&A and non-M&A FDI for any firm  $i$  in year  $t$  is determined by

$$\rho(y_{it}^{(1)}, y_{it}^{(2)}) = \frac{1 + \alpha \Pr(S_{it} = 1)}{\sqrt{\sum_{j=1}^2 (1 + \alpha \Pr(S_{it} = 1) + \alpha / \lambda_j(it))}} \quad (4)$$

Equation (4) indicates that the correlation between M&A and non-M&A FDI is non-negative.

Since the BZINB model (Wang 2003) is a special case of the MBZINB model with restriction of  $\beta_3 = \beta_4 = -\beta_5$ , the likelihood ratio test can be applied to compare the BZINB to the MBZINB model and test for the serial dependence of repeated observations over time.

A firm may have no FDI project in a given year but this does not mean that it has no intention to undertake any FDI in that year. A firm may have the intention to undertake FDI but, for whatever reason, does not undertake any FDI in that year. Therefore, in the MBZINB model, we can distinguish between whether a firm does or does not intend to undertake FDI by assuming that the firm's intention to undertake FDI is a partially observable binary random variable  $S_{it}$ ; if a firm has no intention of engaging in FDI in a year, it will undertake no M&A and non-M&A FDI projects in that year; otherwise, the numbers of M&A and non-M&A FDI projects undertaken by the firm in that year follow the bivariate negative binomial distribution with a positive correlation between M&A and non-M&A FDI, and the rates of M&A and non-M&A FDI for a firm with intention to undertake FDI are modeled as exponential functions of FDI determinants.

As noted earlier, there may be complementarities between M&A FDI and non-M&A FDI. Such complementarities imply a positive correlation between M&A and non-M&A FDI. Furthermore, a firm may change its intention of engaging in FDI over time because of changes in its financial situation or business environment. Therefore, in the MBZINB model, we can assess the impact of FDI determinants on the change in the firm's intention of engaging in FDI. The intention is characterized by a Markov chain in which both transition probabilities and probabilities of the initial states of the Markov chain depend on FDI determinants. In contrast, the BZINB model assumes that the firm's intention of engaging in FDI is independent over time.

### C. Estimation

To estimate the MBZINB model, we first use the expectation–maximization (EM) algorithm proposed by Dempster et al. (1977) until the parameter estimates converge, and then switch to the quasi-Newton algorithm to obtain the maximum likelihood estimates of the model parameters and standard errors. In the implementation of the EM algorithm, we treat the partially observable binary variable  $S_{it}$  as missing information and define a complete data set as  $\{(y_{it}, x_{it}, z(i, t, u), w(i, t, u, v)); i = 1, \dots, k, t = 1, \dots, n_i, u, v = 0, 1\}$ , where  $z(i, t, u) = 1$  if  $S_{it} = u$ , and 0 otherwise, and  $w(i, t, u, v) = 1$  if  $S_{i(t-1)} = u$  and  $S_{it} = v$ , and 0 otherwise. Thus the log-likelihood of the complete data set is

$$Q = \sum_{i=1}^k (z(i, 1, 0) \log p_0(i1) + z(i, 1, 1) \log p_1(i1)) \\ + \sum_{i=1}^k \sum_{t=2}^{n_i} \sum_{u=0}^1 \sum_{v=0}^1 w(i, t, u, v) \log p_{uv}(it) + \sum_{i=1}^k \sum_{t=1}^{n_i} z(i, t, 1) \log f_1(y_{it})$$

In the E-step of the EM algorithm, the partially missing information,  $z(i, t, u)$  and  $w(i, t, u, v)$ , is estimated by the conditional expectations:  $\check{z}(i, t, u) = E\{z(i, t, u) | y_{i1}, \dots, y_{in_i}\}$  and  $\check{w}(i, t, u, v) = E\{w(i, t, u, v) | y_{i1}, \dots, y_{in_i}\}$ , respectively. We use the recursive formula proposed by Baum et al. (1970) for the computation of the conditional expectations. In the M-step of the EM algorithm, we replace  $z(i, t, u)$  and  $w(i, t, u, v)$  in  $Q$  by  $\check{z}(i, t, u)$  and  $\check{w}(i, t, u, v)$  to define a function  $\tilde{Q}$ , and maximize  $\tilde{Q}$  to obtain the parameter estimates. Since the EM algorithm does not converge as fast as the quasi-Newton algorithm, we use the latter when the change in parameter estimates becomes small under the EM algorithm. Our study shows that the combination of the EM and quasi-Newton algorithms works better than either of the two algorithms.

### III. Determinants of FDI

Kaplan (1997) points out that two landmark corporate governance regulations by the US SEC in 1992 played a pivotal role in reshaping US corporate governance in the 1990s. One regulation lowered the shareholders' cost of coordinating challenges against underperforming management teams by relaxing proxy rules regarding shareholder communication. The other regulation required public companies to provide more detailed disclosure of top executive compensation and its relation to the firm's stock performance. The consequent improvement in US corporate governance may have reduced domestic and cross-border M&A activity. Alba, Park, and Wang (2009) find empirical evidence supportive of the corporate governance as a determinant of FDI hypothesis. More specifically, using a data set of 147 Japanese firms for 1987–1994, they find that the improvement in US corporate governance since 1992 had a negative impact on Japanese M&A FDI into the US.

According to Froot and Stein (1991), a depreciation of the US dollar increases FDI into the US. Their key assumption is imperfect capital markets with asymmetric information about the assets' payoff. The owners of assets know the assets' realized payoffs without cost but external creditors can verify the payoffs only at a cost. This makes external finance more expensive than internal finance and foreign firms who wish to bid for US assets raise most of their funds internally. Since internal funds of foreign firms are denominated in foreign currency, a depreciation of the US dollar increases foreign firms' relative wealth and allows them to bid more aggressively for US assets. Movements of the exchange rate do a good job of explaining fluctuations in FDI inflows into the US in the 1980s. However, FDI, especially from Japan, fell markedly in the 1990s even though the dollar weakened substantially.

To explain the sharp drop in Japanese FDI flows into the US after 1991 despite the depreciation of the US dollar, Klein et al. (2002) propose the relative access to credit hypothesis. According to this hypothesis, Japanese firms' reduced access to credit, resulting from the deterioration of the financial health of their main banks, contributed to the sharp decline in Japanese FDI into the US in the 1990s. To test their hypothesis, Klein et al. use Moody's long-term deposit credit rating to measure the financial position of the main bank and control for relative wealth. Using firm-level data, Klein et al. find that Japanese firms with healthier main banks are more likely to invest in the US. In addition, they find that credit rating downgrades of main banks have a negative effect on Japanese firms' FDI into the US.

In defining the regressors of the MBZINB model, we follow FDI determinants from Klein et al. to control for firm-specific characteristics such as relative access to credit, relative wealth, profitability, and size. For a Japanese firm with intention to invest in the US, the conditional rates of M&A and non-M&A FDI are determined by the same set of the regressors, i.e.,  $x_{it}^{(1)} = x_{it}^{(2)}$ . These include single and multiple downgrades in the



Moody's long-term deposit rating of the firm's main bank (denoted as  $DR1_{it}$  and  $DR2_{it}$  respectively), and the change in the firm's relative wealth, profits, and size (denoted as  $DRW_{it}$ ,  $DFP_{it}$ , and  $DFS_{it}$  respectively). We expand KPR's empirical framework by adding a corporate governance dummy variable (denoted as  $DC_{it}$ ), which is 0 from 1988 to 1992; and 1 from 1993 to 1994. For reasons outlined earlier, 1992 marked a pivotal year in US corporate governance, which is likely to have improved significantly since then. We expect a negative coefficient on this dummy because stronger corporate governance reduces opportunities for firms to create shareholder value through M&A FDI. Due to potential complementarities between M&A and non-M&A FDI, the reduction in M&A FDI may lead to a reduction in non-M&A FDI.

The probability of whether a Japanese firm intends to invest in the US is regressed on a single and multiple downgrade in Moody's rating  $DR1_{it}$  and  $DR2_{it}$ , the firm's size ( $FS_{it}$ ), profits ( $FP_{it}$ ), and relative wealth ( $FW_{it}$ ). Those regressors are denoted as  $x_{it}^{(3)}$ .

## IV. Empirical Results

In this section, we report and discuss the results of our empirical analysis. Table 1 reports the results of parameter estimates, t-ratios, and log-likelihood value for the MBZINB model. All the coefficient estimates of a single downgrade in the main bank's credit rating (DR1) and multiple downgrade (DR2) in the conditional (on the Japanese firm's intending to invest in the US) rates of a firm's M&A and non-M&A FDI are negative. The coefficient estimate of DR2 is significant at the 1% level for both M&A and non-M&A FDI. This suggests that the deterioration of financial health of a firm's main bank has a negative impact on both types of FDI projects. The result lends support to Klein et al.'s relative access to credit hypothesis. Furthermore, the conditional rate of M&A FDI is positively associated with firm size (DFS) at 5% level of significance. This suggests that firms undertaking M&A FDI tend to be large, which is consistent with the industrial organization explanation for FDI. The conditional rate of non-M&A FDI is positively associated with relative wealth (DRW) at 5% level of significance, which supports the relative wealth hypothesis proposed by Froot and Stein (1991).

Table 1: Estimates, t-ratios, and log-likelihood for the BZINB and MBZINB Models

	BZINB				MBZINB			
	M&A		Non M&A		M&A		Non M&A	
	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio
Intercept	-1.4139***	-11.4445	-0.2729***	-2.9766	-1.3570***	-10.9395	-0.2136**	-2.3710
DR1	-0.0669	-0.3468	-0.0175	-0.1256	-0.0737	-0.3876	-0.0319	-0.2375
DR2	-0.7182**	-2.0430	-0.6037**	-2.5443	-0.7952**	-2.3151	-0.6883***	-3.0887
DRW	0.2397	1.1410	0.4356***	2.9770	0.1556	0.7403	0.3467**	2.3750
DFP	6.0595	1.0706	-2.7175	-0.6309	6.5200	1.1744	-1.3351	-0.3202
DFS	1.5372**	2.2471	-0.4020	-0.8023	1.6342**	2.2859	-0.2956	-0.5775
DC	-0.8597***	-3.8232	-0.3152**	-2.4025	-0.7972***	-3.4719	-0.2503*	-1.8252
Zero-Probability								
Intercept	7.4265***	3.0312			p0		p00	
DR1	0.3146	1.0880			3.6053	0.7687	-2.4172	-0.6012
DR2	0.1136	0.2181			1.5549***	2.9645	0.3646	0.8106
FW	-0.6440**	-2.0875			-2.1172	-0.1427	0.4802	0.5441
FP	-8.2283	-1.4389			-1.1596	-1.7358	-0.3870	-0.6999
FS	-0.9450***	-8.4851			7.9351	0.5774	-7.0670	-0.8884
Ln( $\alpha$ )	0.3632**	2.2281			-0.9502***	-4.3497	0.0580	0.3386
Log-likelihood	-2347.85				0.5244***	3.1515	1.2427***	6.2497
					-2330.75			

\* Significant at 10%; \*\* significant at 5%; \*\*\* significant at 10%.

Note: The likelihood ratio test statistic for comparing the MBZINB with the BZINB is 34.21 with p-value of 0.006.

The change in corporate governance has a negative effect on the conditional rates of M&A and non-M&A FDI at the 1% and 10% levels, respectively. This indicates that the post-1992 improvement in the US corporate governance reduced both M&A and non-M&A FDI into the US by Japanese firms. Specifically, the conditional rates of M&A and non-M&A FDI for a Japanese firm with intention to undertake FDI in the US have declined by 54.94% and 22.14%, respectively, holding all other factors constant.<sup>2</sup> The negative impact of the change in US corporate governance is much larger on Japanese M&A FDI than on non-M&A FDI. Japanese M&A FDI is more sensitive to US corporate governance than Japanese non-M&A FDI. This is intuitively plausible since corporate governance has a more direct impact on M&A FDI than on other types of FDI.

The coefficient estimate of FDI determinant in  $p_0$  is positive for a single downgrade (DR1) and negative for firm size (FS), and both are significant at 1% level. If a firm's main bank suffered a single downgrade in credit rating in 1988, it was less likely to have the intention to engage in FDI in the US in that year. On the other hand, it was more likely for a larger Japanese firm to have the intention to engage in FDI in the US in 1988. Since the coefficient estimate of FS in  $p_{11}$  is positive and significant at the 1% level, given it had the intention to engage in FDI the previous year, a firm is more likely to have the intention to engage in FDI this year if it has become larger. Note that none of the coefficient estimates of the firm-level FDI determinants are significant in  $p_{00}$ . This implies that when a Japanese firm has no intention to invest in the US in a particular year, FDI determinants do not have any impact on the change in the firm's intention to engage in FDI in the US the next year. Our findings shed light on how firm-level FDI determinants affect Japanese FDI into the US.

We test for serial dependence over time for the MBZINB model against the BZINB model. The statistic of the likelihood ratio test is 34.2 with p-value of 0.0006. We can thus reject the BZINB model in favor of the MBZINB model. This means that the MBZINB model is more appropriate for jointly analyzing M&A and non-M&A FDI. Table 1 also shows the discrepancies in parameter estimates and t-ratios between the MBZINB and BZINB models. For example, the coefficient estimate of the corporate governance dummy variable (DC) in the conditional rate of non-M&A FDI is significant at the 5% level under the BZINB model but is significant at 10% level under the MBZINB model. In addition, the negative effect of improved US corporate governance is larger under the BZINB model than the MBZINB model. Therefore, failing to account for serial dependence over time may lead to wrong parameter estimates and standard errors, and inaccurate interpretations about the relationship between FDI and its determinants.

<sup>2</sup> The percentage of the change in the conditional rate between the prior and post-1992 improvement in US corporate governance is calculated by  $(\exp(-0.7972)-1) = -54.94\%$  for M&A FDI and  $(\exp(-0.2503)-1) = -22.14\%$  for non-M&A FDI.

## V. Concluding Observations

In this paper, we empirically investigate the impact of an improvement in US corporate governance on both M&A and non-M&A FDI into the US by Japanese firms. More specifically, we analyze the impact of the two landmark corporate governance regulations by the US SEC in 1992 on both types of FDI, controlling for other determinants of FDI such as the financial health of the firm's main bank and the firm's relative wealth, profitability, and size. To carry out our empirical analysis, we develop and apply a Markov bivariate negative binominal regression model for the joint analysis of bivariate panel count data. The model allows for a high proportion of excess zeros, positive correlation between M&A and non-M&A FDI, and serial dependence of repeated observations over time. We find that the two landmark regulations had a negative impact on M&A FDI into the US by Japanese firms. This is consistent with the notion that improved corporate governance reduces the scope for creating shareholder value through better management, and thus reduces the scope for M&A activity, including M&A FDI. It is also consistent with the few existing empirical studies of this issue. Our findings also lend support to the relative access to credit and relative wealth explanations of FDI.

The main original contribution of this paper has been to empirically examine the relationship between corporate governance and non-M&A FDI. At a conceptual level, the relationship between corporate governance and non-M&A FDI is not as straightforward as the relationship between corporate governance and M&A FDI. The quality of US corporate governance, i.e., how efficiently US companies are managed, has no obvious direct implications for Japanese firms' incentives for new plants, joint ventures, or other non-M&A FDI into the US. However, in light of the indivisibility of assets acquired during M&A FDI, there are grounds for complementarity between M&A and non-M&A FDI. More precisely, efficiently utilizing the indivisible assets may require additional non-M&A FDI. For example, after the Japanese firm Bridgestone acquired the US firm Firestone, it expanded its US production facilities for producing synthetic rubber, which is a core product of Firestone.

Our empirical evidence indicates that the two landmark US corporate governance regulations had a negative effect on Japanese non-M&A FDI into the US. Although corporate governance has a predictably stronger effect on M&A FDI, it nevertheless also influences non-M&A FDI. This suggests that the complementarities between M&A and non-M&A FDI are significant enough for a negative effect on M&A FDI to translate into a negative effect on non-M&A FDI. The upshot is that a stronger corporate governance environment may reduce not only M&A FDI inflows but also overall FDI inflows. Our paper suggests at least three fruitful avenues for future research. One is to investigate the determinants of different modes of FDI rather than FDI as a whole. FDI is heterogeneous and different modes of FDI are often driven by different underlying factors. A second avenue is to examine the relationship between corporate governance and FDI. Our evidence suggests that corporate governance may influence not only M&A FDI but also non-M&A FDI. A third avenue for future research is to investigate the relationship between M&A and non-M&A FDI.

## References

- Alba, J. D., D. Park, and P. Wang. 2009. "Corporate Governance and Merger and Acquisition (M&A) FDI: Firm-level Evidence from Japanese FDI into the US." *Journal of Multinational Financial Management* 19:1–11.
- Baum, L. E., T. Petrie, G. Soules, and N. Weiss. 1970. "A Maximization Technique Occurring in the Statistical Analysis of Probabilistic Functions of Markov Chains." *The Annals of Mathematical Statistics* 41:164–71.
- Calderon, C., N. Lozaya, and L. Servén. 2004. Greenfield Foreign Direct Investment and Mergers and Acquisitions—Feedback and Macroeconomic Effects. Policy Research Working Paper Series 3192, The World Bank, Washington, DC.
- Dempster, A. P., N. M. Laird, and D. B. Rubin. 1977. "Maximum Likelihood from Incomplete Data via the EM Algorithm (with discussion)." *Journal of the Royal Statistical Society B*(39):1–38.
- Froot, K., and J. Stein. 1991. "Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach." *Quarterly Journal of Economics* 106:1191–217.
- ITA, various years. Foreign Direct Investment in the United States: Transactions. International Trade Administration, Department of Commerce, Washington, DC.
- Kaplan, S. 1997. "The Evolution of US Corporate Governance: We are All Henry Kravis Now." *Journal of Private Equity* Fall:7–14.
- Klein, M., J. Peek, and E. Rosengren. 2002. "Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit." *American Economic Review* 92:664–82.
- Rossi, S., and P. R. Volpin. 2004. "Cross-country Determinants of Mergers and Acquisitions." *Journal of Financial Economics* 74:277–304.
- Teece, D. 1980. "Economies of Scope and the Scope of the Enterprise." *Journal of Economic Behavior and Organization* 1:223–47.
- Wang, P. 2003. "A Bivariate Zero-inflated Negative Binomial Regression Model for Count Data with Excess Zeros." *Economics Letters* 78:373–8.
- Penrose, E. 1955. *The Theory of the Growth of the Firm*. New York: Oxford University Press.

**About the Paper**

Joseph D. Alba, Donghyun Park, and Peiming Wang use firm-level evidence from Japanese foreign direct investment (FDI) into the United States (US) to investigate the effect of US corporate governance on merger and acquisition (M&A) and non-M&A Japanese FDI. The results indicate that stronger US corporate governance contributed to the decline in both M&A and non-M&A Japanese FDI into the US during the 1990s. The evidence thus suggests that corporate governance may affect both M&A and non-M&A FDI.

**About the Asian Development Bank**

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.