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The Determinants of Cross-border M&As: the Role of Institutions and Financial Development in Gravity Model

Hea-Jung Hyun and Hyuk Hwang Kim

KIEP Korea Institute for International Economic Policy

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Executive Summary

This paper examines the macroeconomic determinants of cross-border M&As. Using a panel data set of bilateral M&A deal values for 101 countries and 17 years ranging from 1989 to 2005, we investigate both home and host country factors that may play an important role in determining the size and direction of M&A flows. Overall, the empirical results suggest that legal and institutional quality and financial market development increase M&A volume across countries. The significant effect of institutions however, may disappear for transactions between countries of the similar stage of the development.

Keywords: Cross-border M&A, Quality of Institutions, Financial Market Development, Economic Integration, Tobit Model

JEL Classification: F23, C23, O11

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The Determinants of Cross-border M&As: the Role of Institutions and Financial Development in Gravity Model

Hea-Jung Hyun* and Hyuk Hwang Kim**

I. Introduction

During the past two decades, the world has witnessed rapid growth in cross-border M&A flows, which now constitute 80% of global FDI. Cross-border M&A volumes have grown from around US$ 100 billion in the early 1990s to US$ 1.3 trillion in 2006, albeit there were some decline in the early 2000s (See Figure 1).

In practice, policy makers in most countries compete over the incentives to attract foreign investment based on the belief that foreign direct investment can have important positive effects on development either through direct or indirect channel such as technology transfer, knowledge spillover and learning-by-watching. At the same time, governments make various efforts to encourage domestic firms to invest abroad on the purpose of developing a target industry. Somehow, cross-border M&A is currently the dominant policy issue for both acquirer and target firms' home countries.

Compared to the outstanding growth of global M&A volume,

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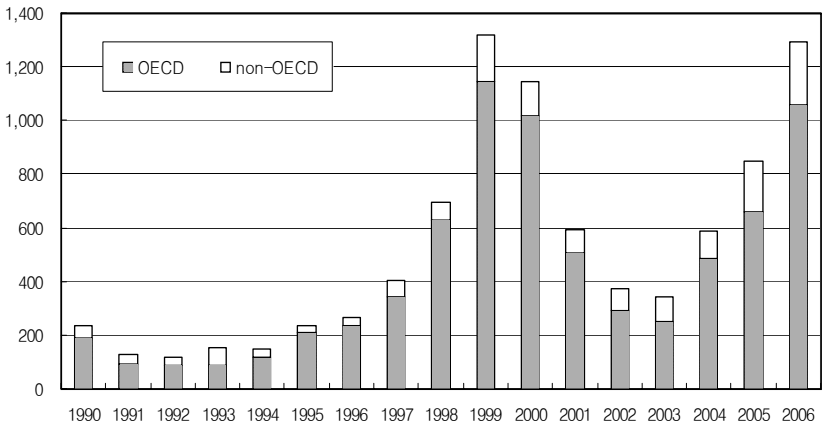
Figure 1. Cross-border M&A Trends

(Unit: US$ billion)



Source: Thomson One Banker.

however, the capital flow does not seem to go where it should go. Contrary to the theoretical prediction that capital should flow from capital rich to capital poor regions, the majority (about 70%) of global capital flows still occur among developed countries thereby confirming the "Lucas Paradox." Only a limited number of emerging large economies such as China, India, Brazil, and Russia are attracting massive inward M&As. This raises important issues: what are then the barriers to M&A flows to certain countries? Which macroeconomic factors in the acquiring source country and target country are the driving forces of the cross-border M&As? Is there a distinct pattern in determinants of M&A flows according to the development path?

The purpose of this paper is to examine the relationship between country characteristics and multinationals' M&A activity in the gravity model framework. Using data from a large number of countries in the most recent period available, we focus particularly on the role of

institutions and financial deepening on cross-border M&A volume and add further evidence to previous literature on the effects of geographical factors. A large panel data set covering 101 countries for period 1989-2005 is employed to identify the bilateral country characteristics in bilateral cross-border M&A flows. We also estimate sub-samples of data to examine the role of development stage of the

Table 1. Cross-border M&A deals

(Unit: US$ billion)

	From OECD to OECD		From OECD to Non OECD		From Non OECD to Non OECD	
Year	case	amount	case	amount	case	amount
1989	1,217	158,966	102	11,509	19	1,595
1990	1,226	153,174	160	35,224	52	5,393
1991	1,141	79,208	194	14,024	130	7,852
1992	1,026	77,533	230	11,064	114	6,291
1993	1,027	75,002	292	14,288	242	9,695
1994	1,172	101,037	403	18,104	262	10,039
1995	1,440	184,340	557	26,389	253	6,964
1996	1,452	194,166	609	39,844	302	14,389
1997	1,719	274,439	694	69,280	397	26,502
1998	2,086	546,251	790	80,985	415	16,224
1999	2,329	1,050,707	939	94,361	478	33,716
2000	2,891	890,100	1,132	124,640	604	61,944
2001	2,002	417,347	812	90,843	526	23,609
2002	1,488	237,967	653	51,977	582	37,981
2003	1,508	215,987	685	35,543	597	26,606
2004	1,772	397,934	850	86,196	787	26,969
2005	2,005	537,947	954	123,073	841	57,312
2006	2,362	875,127	1,200	181,878	964	88,288

Source: Thomson ONE Banker.

source and host countries in an attempt to determine the behavior of MNEs.

Since most study on FDI is concentrated on Greenfield FDI, there is a dearth of economic literature exploring the role of country characteristics in determining cross-border M&As. However, there is growing literature on this topic recently. di Giovanni (2005) shows how domestic financial deepening affects firms investing abroad. Using a panel data set of cross-border M&A deals for the 1990-1999, he finds that deep financial markets in the acquisition countries can play a significant role in cross-border M&As. However, his model does not include institutional quality as a potential explanatory variable. Rossi and Volpin (2004) mainly focus on the role of laws and regulation across countries, but they exclude financial market development as a determinant of M&A flows. Their results suggest that M&A activity is greater in countries with higher accounting standards and stronger shareholder protection.

The main contribution of this paper is to uncover the determinants of the size and direction of cross-border M&As in a bilateral country-pair setting. To our knowledge this is the first study that incorporates the quality of institutions in host country and financial development in the home country together into a gravity model for international M&A. It makes an important distinction between this paper and the other trade literature in which either variable is omitted. To identify the nature of the way two key factors affect the direction of the cross-border M&A, we use sub-samples of data classified by the development level of the country.

The remainder of this paper is organized as follows. Section Ⅱ provides the theoretical motivations for empirical tests on the main

determinants of cross-border M&A. Section Ⅲ outlines the econometric frameworks. Section Ⅳ defines the data. Empirical results including robustness checks and main findings are reported in section Ⅴ. Section Ⅵ concludes and discusses policy implications.

II. Theoretical Background

There are two strands of studies in the macroeconomic causes of international capital flows. One emphasizes external push factors such as financial market failures and asymmetric information. The other focuses more on fundamental pull factors such as GDP growth, quality of institutions, openness to trade and technological differences. Both can be useful in explaining M&A flows. The former view is supported by the evidence that imperfect financial markets are one of the main obstacles to capital flows, while the fundamental factors addressed in the latter view are considered to be important long-run factors. Based on this background, we select two main factors-quality of institutions and financial market development, as the key determinants of M&A activity, in addition to economic integration and geographic characteristics.

1. Quality of Institutions

The quality of institutions in the host country has received growing attention as one of the key determinants in location decision of MNEs in recent FDI literature. Institutional variables, such as legal and political systems, provide the incentive structure for exchange that determines the cost of transaction and the cost of transformation in an economy (North 1990). The role of institutions has also been emphasized in the context of long-term FDI and development. Low corruption levels, less risk of opportunism, and a well observed law may create a favorable environment for investment. For foreign

investors who are not familiar with the rules of the game in the host country society, the quality of governance may be particularly an important issue. Thus far, the majority of papers in the field of development that has concentrated on this issue have found evidence to suggest a positive relationship between institutions and capital flows (Alfaro *et al*. 2005; Wei 2000; Aizenman and Spiegel 2006; Hyun 2005). However, these studies do not explicitly deal with the link between institutions and cross-border M&As, although M&As are now one of the most important types of global capital flows. Daude and Fratzscher (2007) have recently tested the effects of institutions on the compositions of investment, but they do not include M&A flows in their model.

2. Financial Market Development

Firms are often constrained by their inability to raise external funds in the presence of an imperfect domestic capital market. Financial deepening in the source country, therefore, can provide a more favorable environment for firms to gain access to capital for cross-border acquisitions. Klein et al. (2002) argue that the collapse of the banking sector in Japan played a significant role in reducing the number of FDI from Japan to the United States in the 1990s even after they controlled for the relative wealth movements caused by fluctuations in stock prices and exchange rates. Employing the method from di Giovanni (2005), we consider the stock market capitalization (stock market size as a percentage of GDP) and the amount of credit provided by banks and other financial institutions to the private sector as financial market development indicators. The

size of the stock market is the share price times the number of shares outstanding. Domestic credit to private sector is defined as financial resources provided to the private sector through loans, purchases of non-equity securities, and trade credits and other receivable accounts that establish a claim for repayment (World Development Indicators 2007).

3. Openness and Economic Integration

There is no consensus in the literature on whether FDI and trade are complements or substitutes. The traditional proximity-concentration hypothesis predicts that scale economies at the plant level relative to the corporate level create incentives for firms to agglomerate in one location, while transport costs and trade barriers provide a countervailing force towards establishing a plant adjacent to the foreign market. Brainard (1997) finds that affiliate production increases as a share of total foreign sales the greater are transport costs and foreign trade barriers and the lower are foreign investment barriers. Head and Ries (2004) argue that FDI complements exports through a mechanism of stimulating the export of intermediate goods for use by overseas affiliates, while a substitutive relationship can be found for individual products. Thus, the relationship may differ depending on the motivation and type of FDI or degree of vertical specialization. Tariff-jumping FDI tend to substitute exports while outsourcing FDI may increase trade in intermediate goods and services. However, trade volume itself may not be directly linked to trade policy to openness. The RTA (Regional Trade Agreement) between two parties may need to be considered in order to examine the true relationship between economic

integration and cross-border investment flows. Recent literature on FTAs suggest that RTAs may have a positive impact on FDI because RTAs are comprehensive and focused on enlarging the market and liberalizing investment through investment chapter. Analyzing the RTAs between the United States and other countries, Chen (2006) finds that US-owned MNEs (multinational enterprises) could increase sales in the host RTA member country by 33 percent higher than sales in non-member countries, though the effect would depend on host country characteristics such as market size, comparative advantages, and its tax system.

4. Geography

The gravity model, originally developed for bilateral trade volumes, postulates that bilateral trade is positively related to the GDP levels of two economies and negatively to the geographic distance between them. GDP levels measure the market size of the economy; potential demand for bilateral imports in the host country and the potential supply from the source country. Distance serves as a proxy for transportation and transaction costs associated with trade, reflects the resistance to bilateral trade. Cultural variables, such as common language, are also expected to increase with distance. When applied to FDI, the gravity model also predicts that the market size should appear as positive sign toward investment flows. According to FDI theory, however, the sign for the coefficient of the effect of distance on FDI could be either positive or negative depending on the motivation of investment. Tariff-jumping FDI could be positively associated with distance, because it can reduce the transportation

costs of exporting. On the other hand, market-seeking FDI or outsourcing FDI could be negatively related to physical distance as they are complementary to trade.

5. Exchange rate

The Neoclassical theory assumes that exchange rates will not affect investment flows as the source of financing should not matter when the financial market is efficient. A recent study on the relationship between exchange rates and FDI, however, suggests that the level of exchange rates may, in fact, affect FDI, as exchange rate movements involve returns in currency, which are used for the purchase of an asset (Cushman 1985; Froot and Stein 1991). Currency depreciation is predicted to attract FDI either through reduced production costs in the host country vis-à-vis other countries or decreased value of assets in the depreciating country. Exchange rate volatility may be a signal of both high uncertainty and flexibility at the same time. Conventional wisdom of the standard option theory predicts that higher uncertainty on exchange rates will lead risk-averse multinationals to substitute foreign production for exports. Empirical studies, in contrast, show that the direction of the link can operate the other way around under different assumptions (Goldberg and Kolstad 1995). For the period from 1983 to 1995, Gorg and Wakelin (2002) find a positive relationship between US outward investments and the appreciation of host country's currency. They, however, find no clear evidence of exchange rate volatility impacting capital flows. From data on Japanese M&As pursued in the United States over the period 1975-1992, Blonigen (1997) also finds that exchange rates can have a significant

impact on cross-border M&As, though the relationship between the variability of exchange rate and FDI is rather ambiguous. di Giovanni points out that depending on the way that the home currency equivalent of expected future cash flows from the target firm correlates with other assets in the acquiring firm's portfolio, high exchange rate volatility may have either positive or negative impact on investment decisions. Kiyota and Urata (2004) argue that aggregate national-level data may mask the impacts of exchange rate volatility among industries by offsetting the impacts across industries, thus producing mixed results.

III. Econometric Model

Based on the idea that country characteristics, as well as gravity forces, are important determinants of M&A flows, we employ an augmented gravity model to capture the effects of macroeconomic variables of interest together with variables commonly used in standard gravity model: economic size and distance. As investors take into account the GDP growth of the host country when making investment decisions, we include GDP growth as a control variable. Since the majority of M&As flow from OECD countries, an OECD dummy variable for the source country is also considered. The basic model is as following:

$$MA_{ij,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 GDP_{j,t} + \beta_3 GDPgrowth_{j,t} + \beta_4 OECD_i + \beta_5 Credit_{i,t} + \beta_6 Mktcap_{i,t}$$
$$+\beta_7 \mathrm{Re}x_{ij,t} + \beta_8 Exvol_{i,t} + \beta_9 Law_{j,t} + \beta_{10} Trade_{ij,t} + \beta_{11} Lang_{ij} + \beta_{12} Dist_{ij} + \beta_{13} RTA_{ij,t} + \varepsilon_{ij,t}$$

where i and j denote acquirer country and target country, respectively. $MA_{ij,t}$ denotes cross-border M&As as a percentage of source country GDP at time t. GDP_i is log of the real GDP of country i, $Credit_{i,t}$ is the domestic credit provided to the private sector as a percent of GDP in host country j and $Mktcap_{i,t}$ denotes stock market capitalization relative to GDP in country i. $\mathrm{Re}x_{ij,t}$ and $Exvol_{i,t}$ are the real exchange rate and volatility of exchange rate, respectively. $Law_{j,t}$ is the level of "Law and Order" of the target country at time t. $Trade_{ij,t}$ is a log of trade volumes between the two countries. A common language dummy, $Lang_{ij}$, is a binary dummy variable which is unity if i and j have a common language and zero otherwise. $Dist_{ij}$ is the distance between

i and j. $RTA_{ij,t}$ is a binary variable which is unity if i and j both belong to the same RTA.

Since there are no deals at all in many cases, a substantial portion of the observations cluster at zero. To correct for the censoring bias that may have been caused by zero flows, we estimate a tobit model (censored regression model). The tobit model is useful for situations in which outcomes are not observable over some range.

To check the robustness of the model, we try various approaches using different model specifications and sub-samples of the original data set. First, both probit and OLS models are estimated. Linders and Groot (2006) point out that the conventional log-linear gravity model cannot straightforwardly account for the occurrence of zero flows between countries. Zero flows, they argue that, may rather be the outcome of the binary decision to invest or not. This can be estimated by using a probit model. As an alternative approach, the OLS regression is used to estimate the model for the transformed sample in which the zeros are replaced by a small constant[1]. Linders and Groot (2006) conclude that by omitting zero flows from the regression, the sample may yield more satisfactory results. Second, we break the data into sub-samples based on whether the acquirer country is an OECD member country, and whether the target country belongs to the OECD. Table 1 through 3 show that the OECD dummy variables for the home country is positive and significant in many specifications. Thus, there can be different patterns and motivation of M&A activities between developed and developing countries, since the stage of development in either the source or the host country can

1) This method is used in Linders and Groot (2006) and Raballand (2003).

affect the way in which cross-border M&As react to country characteristics. For example, RTA may be less important in M&A between high income developed countries, since there are a number of RTAs already signed among them; thus, they may not play a significant role in determining M&A flows.

IV. Data Description

The data source for cross-country M&As is the Thomson One Banker database. It provides daily information on all M&A deals worldwide. The number of observation in our sample, though, is constrained by the number of other variables; specifically, by geographic variables. M&A is measured as the M&A deal value in millions of US dollars.

Table 2. Summary Statistics

Variable	Obs	Mean	Std	Min	Max
MA	171700	0.04	0.97	0.00	206.71
logMA	171700	13.22	2.55	13.82	5.33
GDPi	170100	10.57	0.89	8.08	13.04
GDPj	170100	10.57	0.89	8.08	13.04
GDPgrowth	169400	3.50	5.72	51.03	106.28
Credit	166100	1.54	0.44	0.21	2.41
Mktcap	119500	1.39	0.61	2.38	2.75
Rex	134515	1.73	2.19	0.00	11.77
Exvol	161800	1.21	1.58	0.00	8.27
Law	170500	3.84	1.50	0.00	6.00
Trade	111148	40.03	6.73	9.96	61.17
Ex	117978	16.16	3.54	0.00	26.43
Im	124116	16.01	3.69	0.00	26.39
Lang	40427	0.18	0.38	0.00	1.00
Dist	40427	8.22	0.78	4.40	9.42
RTA	171700	0.01	0.08	0.00	1.00

To capture the institutional quality we use annual data from *International Country Risk Guide* that reports on the quality of various

institutional types up to 2004.[2] We designate "law and order" as one of the subcomponents, since it is proven to be the most relevant variable to economic performances according to past empirical studies on development. Law and order is an assessment of the strength of the legal system and popular observance of the law. Its score is measured on a scale ranging from zero to a bounded random number 6. A score of zero indicates the presence of institutions of very low quality of institutions and a maximum score means a very high quality of law and order in the country. The data on domestic credit to the private sector and monthly real exchange rates are from the IMF's *International Financial Statistics* (2007). Real exchange rate data is constructed by calculating nominal exchange rate times the CPI (Consumer Price Indices) ratio between the two countries. The volatility of exchange rates is measured by the annual standard deviation of the monthly changes. The data source for real GDP, GDP growth, market capitalization, export and import is the World Bank's *World Development Indicator* (2007). In terms of the variables, we take log for real GDP, credit to private sectors to GDP, market capitalization to GDP, Real exchange rate between the two countries, exchange rate volatility, trade (sum of export and import), exports and imports and distance. Gravity variables such as common language dummy variables, distance, and RTA dummy variables are from Rose (2004).

2) Due to the limitation of the time span of the raw data, 'law and order' are mismatched with other variables.

V. Results

1. Tobit Model

Table 3 shows the results of the Tobit model estimations. The first column reports the estimates of the standard gravity equation for control variables. As conventional theory predicts, the coefficients on GDP, common language dummy, distance, and RTA dummy variables have highly significant signs. The market size of both the source and host countries have positive effects on bilateral M&A volumes. The coefficients on common language and RTA dummies are both positive and significant, which is in line with literature. The size of coefficient on RTA dummy, however, appears to be larger than that in previous literature (Daude and Fratzscher 2007; di Giovanni 2005). The physical distance between the two countries has a negative impact on cross-border M&A activities: a 1% increase in distance is associated with a 0.25 % point decrease in M&A flows between countries. The size of the distance coefficient is small compared to Leamer and Levinsohn (1995) where the value is around - 0.6. This suggests that transportation costs may be relevant not only to trade, but also in constraining international asset transactions (Obstfeld and Rogoff 2000). In fact, the results are contradictory to the conventional idea that tariff-jumping FDI may increase with distance, if high transport costs make it expensive to export to the host country (Loungani et al. 2002). Rather, it seems that greater distances are associated with reduced international assets, which adds to the literature in favor of the presence of complementarity between investments and exports. GDP

growth in the host country has a negative sign. These results are consistent across various equations.

Columns (1) through (7) show that market size, common language and regional trade agreements between countries have positive and significant effects, while distance is negatively related to cross-border M&As. In addition to the variables employed in the traditional gravity equation, GDP growth and OECD dummies are considered as control variables. GDP growth has negative signs in most specifications, though there are some insignificant effects. This result seems to be in contrast to former prediction that growth may positively influence capital flows. One possibility behind this result is that GDP growth, being negatively associated with GDP size, may have adverse effect on cross-border M&As and statistically insignificant when the effect of market size is dominant. The coefficient on the OECD dummy is positive and significant as expected, except in equation (7). When variables for financial market depth are included in the same equation, the effect of the OECD dummy disappears.

The impact of stock market capitalization and domestic credit to the private sector as indicators of the degree of financial development in the source country are presented in columns (2) and (7). The coefficients of both financial variables have a positive sign, but domestic credit is not significant in the case of equation (7) and marginally significant at the 90% level in equation (2). Market capitalization, on the other hand, is significant at the 99% level in both equations (2) and (7). A 1% increase in stock market capitalization to the GDP ratio contributes to a 0.89% increase in cross-border M&A flows. These results are in line with di Giovanni (2005) who finds that there is a positive association between both indicators of domestic

financial market depth and outward M&A, as well as the fact that the stock market has a greater effect on the private sector than credit.

Column (3) investigates whether M&A flows react to real exchange rates and exchange rate volatility. The results show that both variables have negative and significant effects on M&As. These results, however, are robust only for the volatility of exchange rates in column (7) in which all variables of interest are included. This may be caused by the nature of aggregate data as pointed out in Kiyota and Urata (2004).

The results reported in column (4) and (7) show that the coefficient on law and order is positive and highly significant at the 1% level. A 1% increase in the index of law and order of a target country is associated with a 0.12% increase in cross-border M&As from the acquisition country. This implies that rule of law in the host country plays an important role in attracting M&A FDI, which supports the findings of Alfaro (2005) who argues that institutional quality is a leading factor of international capital mobility.

The estimation results on the effects of aggregate bilateral trade on M&A activities are presented in column (5). Trade has a positive and significant impact on M&A flows. This result does not change even when all explanatory variables are included in the estimation as in column (7). This can also be confirmed when the effects of trade are separately estimated by the effects of exports and imports of the source country. The results are reported in column (6), which show that both exports and imports have positive effects on cross-border M&As. A 1% increase in the exports and imports of the acquirer country contributes to an increase in cross-border M&A activities by 0.09% and 0.06%, respectively.

2. Robustness Check

Next, to investigate the robustness of our results, we estimate analogous equations for cross-border M&As by adopting an alternative approach. Table 4 details the estimates from the probit model in which the dependent variable is a binomial variable on whether to invest or not. The main results are similar to the tobit model with a few exceptions. The GDP of home and host countries, the common language dummy and OECD dummy variables are all positive and significant in seven specifications. The coefficients for RTA are also positive, though the magnitude and significance of the coefficients in equation (6) and (7) are different from the tobit model. Distance has a negative and highly significant effect on cross-border M&As. GDP growth of the host country is negative. The coefficients on financial market development have the expected signs. Domestic credit to the private sector, however, is insignificant when all the variables concerned are controlled for. The level of the real exchange rate is positive and the variability of the exchange rate is negative, but not significant. Institutional quality and trade have positive impacts on M&A activities. To further assess the sensitivity of the results, we use specifications using a simple OLS regression on a sample that excludes zero value observations. The main results reported in Table 3 are similar to the tobit estimation, but there exist some gaps in the coefficients due to an upward or downward bias.

3. Development stage and cross-border M&As

Table 6 through 8 present the estimation results using a sub-

sample of the data according to OECD membership. Table 6 shows the results from cross-border M&As between OECD countries. The three different model specifications – tobit, probit, and OLS regressions where the zeros are replaced by a random constant – provide evidence of a clearly distinct pattern between models using pooled data and sub-samples of OECD countries. Many key variables, such as market size, credit, institutions, distance, and RTAs, do not have a significant impact on M&A flows across developed countries. The coefficients on market size in both acquiring and target countries are positive, but not significant. Credit to the private sector is also insignificant in the censored regression and sample selection models. Law and order, distance, RTA dummy variables are insignificant in all three specifications and sometimes even exhibit an opposite direction to the predicted sign. The effects may not be significant, since the economic conditions represented by these variables do not vary much across OECD member countries. The effects of stock market capitalization on GDP, bilateral trade volume, the common language dummy, however, are still positive and statistically significant, while the effects on the real exchange rate and the variability of exchange rate are negative. In comparison, the estimations on the determinants of cross-border M&As from OECD to non-OECD countries are more in line with the results from the data based on 101 countries, whereas there exists inconsistency in the size of the coefficients (see Table 7). The estimation results on the sub-sample of M&As from non-OECD to OECD countries have not been reported, because most of the observations are zero flows. Table 8 describes the case of M&As from non-OECD countries to other non-OECD countries. The results do not deviate significantly from the

baseline model except for the insignificance of the institutional quality and language dummies. The coefficients on the variables of interest, such as financial deepening, trade and geographical determinants, have the predicted signs and significance. From Table 6 to 8, it can be inferred that institutions matter especially when a firm from a developed source country must make investment decisions in the developing host country. Also, the quality of institutions is not expected to differ much within the same group of countries.

VI. Conclusions and Implications

The main findings of this paper suggest that both the external push factors and internal pull factors inherent to a country can explain cross-border M&A flows. The value of M&As can increase depending on the institutional quality of the host country and financial deepening of the source country. It is also affected by the level of economic integration between countries and geographic variables of the conventional gravity model. As predicted, market size and common language have positive effects on M&A flows, while distance negatively affects M&As. One paradox is that the effects of the exchange rate variables on M&As are not robust, either in level or volatility. It seems that these variables matter only when FDI enters developed countries as opposed to developing countries, as the effects may be offset by other key variables (such as institutions) in developing countries. The main results of this paper are robust to sensitivity tests including to the different specifications of the econometric model and the alternative proxy to M&A value that controls for zero value observations. To further confirm the results, we apply the same methods to estimate the gravity model for sub-samples of data classified by the origin and destination of M&As. Interestingly, the data using M&As from developed OECD countries to developing non-OECD countries show consistent results with the benchmark model using pooled data; the main estimation finding, however, does not hold for transactions between developed countries and is tenuous for capital flows between developing countries. The robustly significant determinants of cross-border M&As across country samples are stock market

capitalization, trade, and common language.

The findings of this paper have important policy implications for both recipient and source countries. Stable institutions and an open policy to trade, particularly in the host developing country, can contribute significantly to attracting more inward M&A flows from developed countries. This suggests that policies should focus more on long term fundamentals, rather than short-term reform policies. Financial market development in the home country is crucial to the facilitation of overseas investments by domestic firms. This also applies to the M&A cases between developed countries. Since policy makers in most countries aim to improve both inward and outward FDI, the key determinants of cross-border M&As should be taken into account as important policy variables.

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Appendix 1

Table 3. Tobit Model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDPi	0.42***	1.08***	0.74***	0.45***	0.56***	0.46***	0.52***
	(0.02)	(0.05)	(0.03)	(0.02)	(0.06)	(0.06)	(0.06)
GDPj	0.46***	1.22***	0.73***	0.43***	0.51***	0.44***	0.61***
	(0.02)	(0.04)	(0.02)	(0.02)	(0.06)	(0.06)	(0.05)
GDPgrowth	0.01***	0.01	0.01*	0.01***	0.02***	0.02***	0.005
	(0.003)	(0.005)	(0.003)	(0.002)	(0.005)	(0.005)	(0.004)
OECD	0.40***	0.26***	0.20***	0.22***	0.46***	0.41***	0.09
	(0.03)	(0.07)	(0.04)	(0.03)	(0.07)	(0.07)	(0.06)
Credit		0.25*					0.19
		(0.14)					(0.12)
Mktcap		1.41***					0.89***
		(0.08)					(0.08)
Rex			0.03***				0.003
			(0.006)				(0.004)
Exvol			0.11***				0.04***
			(0.14)				(0.008)
Law				0.09***			0.12***
				(0.01)			(0.02)
Trade					0.16***		
					(0.01)		
Ex						0.28***	0.09***
						(0.03)	(0.02)
Im						0.11***	0.06***
						(0.02)	(0.02)
Lang	0.43***	0.75***	0.43***	0.40***	0.63***	0.59***	0.49***
	(0.03)	(0.06)	(0.04)	(0.02)	(0.06)	(0.06)	(0.05)
Dist	0.22***	0.61***	0.31***	0.19***	0.22***	0.16***	0.25***
	(0.02)	(0.03)	(0.02)	(0.01)	(0.03)	(0.04)	(0.03)
RTA	0.68***	0.55***	0.27***	0.43***	0.41***	0.39***	0.44***
	(0.05)	(0.09)	(0.06)	(0.04)	(0.09)	(0.09)	(0.08)
_cons	9.87***	26.1***	15.4***	9.96***	19.79***	18.63***	17.58***
	(0.29)	(0.68)	(0.40)	(0.25)	(0.76)	(0.79)	(0.74)
Observations	39481	32842	35343	39332	31550	31550	25587
Censored	36485	29954	32686	36346	28579	28579	23059
log likelihood	12156	10075	8435.78	12407.8	10421	10389	7370.31
Wald Statistic	3057.98	2460.68	2554.15	3770.31	2277.8	2235.04	2333.27

Notes: The standard errors are in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Table 4. Probit Model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDPi	1.33***	1.10***	1.32***	1.28***	0.60***	0.51***	0.43***
	(0.05)	(0.06)	(0.06)	(0.05)	(0.07)	(0.08)	(0.08)
GDPj	1.24***	1.21***	1.25***	1.07***	0.50***	0.54***	0.47***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.07)
GDPgrowth	0.01*	0.004	0.01**	0.01*	0.01***	0.01**	0.01***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
OECD	0.47***	0.19**	0.40***	0.46***	0.45***	0.24***	0.21**
	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)
Credit		0.57***				0.28*	0.24
		(0.15)				(0.16)	(0.16)
Mktcap		1.20***				1.09***	1.10***
		(0.07)				(0.09)	(0.09)
Rex			0.006			0.001	0.001
			(0.01)			(0.01)	(0.01)
Exvol			0.13***			0.01	0.01
			(0.02)			(0.03)	(0.03)
Law				0.21***		0.13***	0.13***
				(0.02)		(0.02)	(0.02)
Trade					0.16***	0.13***	
					(0.01)	(0.01)	
Ex							0.20***
							(0.03)
Im							0.11***
							(0.02)
Lang	0.77***	0.71***	0.74***	0.84***	0.57***	0.56***	0.53***
	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)
Dist	0.58***	0.66***	0.56***	0.49***	0.26***	0.33***	0.29***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
RTA	0.42***	0.32***	0.31***	0.36***	0.26***	0.07	0.06
	(0.10)	(0.11)	(0.11)	(0.10)	(0.10)	(0.11)	(0.11)
Constant	26.15***	25.46***	26.22***	25.30***	19.15***	19.30***	18.02***
	(0.86)	(0.86)	(0.89)	(0.83)	(0.94)	(0.98)	(0.99)
Observations	39481	32842	35343	39332	31550	25587	25587
log likelihood	5397	4895	4795	5299	5187	4187	4174
Wald Statistic	1420	1535	1312	1552	1351	1446	1449

Notes: The standard errors are in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Table 5. OLS Model

	(1)	(2)	(3)	(4)	(5)	(6)
GDPi	0.88***	0.84***	0.88***	0.85***	0.95***	0.87***
	(0.04)	(0.05)	(0.04)	(0.04)	(0.06)	(0.07)
GDPj	1.05***	1.12***	1.08***	0.93***	1.08***	1.07***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.06)
GDPgrowth	0.01***	0.01*	0.01***	0.01***	0.01**	0.01**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
OECD	0.27***	0.04	0.23***	0.30***	0.24***	0.03
	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)	(0.08)
Credit		0.56***				0.60***
		(0.10)				(0.13)
Mktcap		0.49***				0.47***
		(0.05)				(0.06)
Rex			0.007			0.01
			(0.12)			(0.01)
Exvol			0.04***			0.03
			(0.02)			(0.02)
Law				0.15***		0.15***
				(0.01)		(0.02)
Trade					0.04***	0.02***
					(0.01)	(0.01)
Lang	0.58***	0.55***	0.56***	0.63***	0.68***	0.69***
	(0.07)	(0.08)	(0.07)	(0.07)	(0.08)	(0.08)
Dist	0.55***	0.59***	0.53***	0.51***	0.56***	0.55***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.05)
RTA	2.19***	2.25***	1.83***	2.15***	2.03***	1.79***
	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)	(0.15)
Constant	31.54***	33.10***	31.94***	30.79***	34.06***	34.93***
	(0.56)	(0.68)	(0.59)	(0.56)	(0.76)	(0.88)
Observations	39481	32842	35343	39332	31550	25587
Within R squared	0.01	0.02	0.01	0.01	0.02	0.02
Between R squared	0.36	0.36	0.35	0.37	0.36	0.40
Overall R squared	0.22	0.24	0.22	0.23	0.24	0.26

Notes: The standard errors are in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Table 6. M&A flows between OECD and OECD

	Tobit	Probit	OLS
GDPi	0.47	0.39	0.14
	(0.40)	(0.255)	(0.25)
GDPj	0.44	0.23	0.25
	(0.33)	(0.24)	(0.24)
GDPgrowth	0.03	0.04***	0.01
	(0.02)	(0.01)	(0.01)
Credit	0.95	0.40	1.38**
	(0.69)	(0.471)	(0.48)
Mktcap	1.09***	1.22***	0.75***
	(0.37)	(0.203)	(0.19)
Rex	0.19***	0.15***	0.13***
	(0.05)	(0.039)	(0.04)
Exvol	0.32***	0.21***	0.014
	(0.10)	(0.07)	(0.08)
Law	0.06	0.02	0.02
	(0.11)	(0.004)	(0.13)
Trade	0.17***	0.22***	0.06***
	(0.07)	(0.05)	(0.05)
Lang	0.86***	0.70***	0.62***
	(0.30)	(0.213)	(0.22)
Dist	0.02	0.09	0.04
	(0.16)	(0.12)	(0.11)
RTA	0.58	0.44	0.21
	(0.23)	(0.160)	(0.16)
Constant	22.90***	19.52***	11.0
	(3.53)	(2.65)	(2.64)
Observations	2259	2259	2259
Censored	1328		
log likelihood	2673.98	874.66	
Wald Statistic	280.59	260.16	
Within R squared			0.02
Between R squared			0.53
Overall R squared			0.37

Notes: The standard errors are in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Table 7. M&A flows between OECD and Non OECD

	Tobit	Probit	OLS
GDPi	0.28***	0.61***	0.89***
	(0.04)	(0.10)	(0.11)
GDPj	0.37***	0.72***	1.02***
	(0.03)	(0.09)	(0.09)
GDPgrowth	0.002	0.001	0.001
	(0.003)	(0.01)	(0.004)
Credit	0.23	0.28	0.40
	(0.10)	(0.26)	(0.26)
Mktcap	0.55***	1.05***	0.77***
	(0.05)	(0.12)	(0.11)
Rex	0.008	0.01	0.004
	(0.006)	(0.01)	(0.02)
Exvol	0.02	0.05	0.07*
	(0.01)	(0.03)	(0.04)
Law	0.06***	0.17***	0.17***
	(0.01)	(0.02)	(0.02)
Trade	0.04***	0.1***	0.05***
	(0.01)	(0.02)	(0.01)
Lang	0.25***	0.58***	0.81***
	(0.03)	(0.10)	(0.13)
Dist	0.12***	0.27***	0.40***
	(0.02)	(0.06)	(0.08)
RTA	0.39***	7.58	4.67***
	(0.16)	(2490.19)	(0.81)
Constant	9.70	20.60	34.77
	(0.48)	(1.34)	(1.38)
Observations	13344	13344	13344
Censored	12018		
log likelihood	2733.56	2570	
Wald Statistic	1037.57	747.15	
Within R squared			0.0236
Between R squared			0.3275
Overall R squared			0.1912

Notes: The standard errors are in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Table 8. M&A flows between Non OECD and Non OECD

	Tobit	Probit	OLS
GDPi	0.22***	0.70***	0.20***
	(0.05)	(0.17)	(0.05)
GDPj	0.11***	0.32**	0.23***
	(0.04)	(0.12)	(0.04)
GDPgrowth	0.01***	0.02***	0.004
	(0.003)	(0.01)	(0.003)
Credit	0.13**	0.60**	0.40***
	(0.08)	(0.26)	(0.06)
Mktcap	0.28***	1.02***	0.18***
	(0.06)	(0.18)	(0.04)
Rex	0.004	0.06**	0.0004
	(0.004)	(0.03)	(0.01)
Exvol	0.007	0.14***	0.03**
	(0.008)	(0.04)	(0.01)
Law	0.01	0.08*	0.03**
	(0.01)	(0.04)	(0.01)
Trade	0.04***	0.12***	0.03***
	(0.01)	(0.02)	(0.01)
Lang	0.06**	0.17	0.06
	(0.04)	(0.13)	(0.06)
Dist	0.09***	0.58***	0.27***
	(0.03)	(0.09)	(0.04)
RTA	0.02*	0.25*	1.99***
	(0.05)	(0.20)	(0.14)
Constant	5.26	17.08	18.74
	(0.64)	(2.15)	(0.77)
Observations	9717	9717	9717
Censored	9450		
log likelihood	515.81	672.98	
Wald Statistic	231.87	243.72	
Within R squared			0.0295
Between R squared			0.187
Overall R squared			0.1285

Notes: The standard errors are in parentheses. ***, **, * indicate significance at 1%, 5%, and 10% respectively.

Appendix 2

List of Countries

Australia	Malaysia	Cote d'Ivoire
Austria	Mexico	Ethiopia
Belgium	Panama	Gambia
Canada	Poland	Ghana
Denmark	Romania	India
Finland	Russian Federation	Kenya
France	Slovak Republic	Liberia
Germany	South Africa	Madagascar
Greece	Trinidad and Tobago	Malawi
Iceland	Turkey	Mali
Ireland	Uruguay	Mongolia
Italy	Venezuela	Mozambique
Japan	Albania	Niger
Korea, Rep.	Algeria	Nigeria
Luxembourg	Angola	Pakistan
Netherlands	Bolivia	Senegal
New Zealand	Brazil	Sudan
Norway	Bulgaria	Uganda
Portugal	Cameroon	Vietnam
Spain	China	Yemen
Sweden	Colombia	Zambia
Switzerland	Congo, Rep.	
United Kingdom	Dominican Republic	
United States	Ecuador	
Bahrain	Egypt, Arab Rep.	
Cyprus	El Salvador	
Hong Kong, China	Guatemala	
Israel	Guyana	
Kuwait	Honduras	
Saudi Arabia	Indonesia	
Singapore	Iran, Islamic Rep.	
United Arab Emirates	Jamaica	
Argentina	Jordan	
Chile	Paraguay	
Costa Rica	Peru	
Czech Republic	Philippines	
Gabon	Thailand	
Hungary	Tunisia	
Lebanon	Bangladesh	
Libya	Burkina Faso	

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Hea-Jung Hyun and Hyuk Hwang Kim

This paper examines the macroeconomic determinants of cross-border M&As. Using a panel data set of bilateral M&A deal values for 101 countries and 17 years ranging from 1989 to 2005, we investigate both home and host country factors that may play an important role in determining the size and direction of M&A flows. Overall, the empirical results suggest that legal and institutional quality and financial market development increase M&A volume across countries. The significant effect of institutions however, may disappear for transactions between countries of the similar stage of the development.

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