Market valuation of foreign asset divestitures in emerging economies : Korean evidence

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ABSTRACT

Using an event study method of OLS and GARCH market models, we find evidence that on the Korean stock market, foreign asset divestitures lead to a decrement in firm value around the announcement date. The firm value decreased by the event announcements is significantly associated with the divestitures-characteristic variables. Interestingly, the divestiture announcements by firms with substantial institutional investors holding advanced professionalism for investment contribute to an increment in firm value but those by firms with many individual investors lead to a decrement in that. Given that the intent of firms' divestitures is for retrieving money invested, the event announcements are related to an increment in firm value. In addition, the divestiture announcements of assets invested in developing host countries make a negative impact on firm value whereas those of assets invested in advanced host countries are related to a decrement in it. Unlike the case of firms in advanced countries, our differentiated finding that the divestiture announcements produce a decrement in firm value around the announcement date sheds new light on market valuation of foreign asset divestitures of firms in developing countries. Thus, this would provide firm managers, investors, and academic researchers with invaluable implications of the importance of more prudent decisions for effective foreign asset divestitures of firms based in emerging economies.

Keywords: Foreign asset divestiture, Firm value, Abnormal returns, Cumulative abnormal returns, Institutional investors

JEL: F23; F40; G10; G14; G30

1. Introduction

It is well accepted that firms' foreign direct investment (FDI) for which has been enthusiastic since 1980s has significantly contributed to growth of global economy and trade as well as those of individual countries. However, as firms' FDIs have increased, foreign asset divestitures that withdraw their assets invested in host countries has gradually done so as well due to economic or other reasons (e.g., resource rationalization, portfolio adjustment, managerial failure, a change of investment environment in the host countries, compulsory nationalization, forfeiture, etc.). (see Torneden, 1975; Casson, 1987; Sachdev, 1976, Grunberg, 1984 for details of the definition of divestiture). This implies that like FDIs, foreign asset divestitures are also an important managerial behavior and then may make a serious impact on firm value. Although a variety of foreign divestiture is a very important managerial behavior for firms, systematic and comprehensive studies on this are still sparse, compared to numerous ones on FDIs. Many of the previous studies are mostly devoted to exploring the case, motives for foreign asset divestitures, and factors that affect managers' decision for divestitures (Kojima, 1978; Caves and Porter, 1976; Boddewyn, 1979&1983; Wilson, 1980; Hamilton et al., 1993; Benito and Gabriel, 1997 among others)

When one considers the recent growth and status of emerging economies in the world economy, a desirable understanding on relationship between foreign asset divestitures and firm value in the economies should be crucial for investors, managers, and academics. Unfortunately, despite the importance of emerging economies, the literature targeting firms in the economies is really scarce. In fact, most studies focus on firms in advanced economies like Germany, UK and US. Regarding market valuation of firms' foreign asset divestitures, some studies targeting firms in the advanced economies examine direct relationship between the foreign divestitures and firm value in terms of stock price reactions to announcements of the event (Kim et al., 1993; Kim et al., 1994; Borde et al., 1998; Mathur et al., 2006; Coakely

et al., 2008). However, very few examine the case for firms in emerging economies due to unavailability of the sufficient data for the study.

Accordingly, to bridge the lacuna to the literature, we aim to shed light on an impact of foreign asset divestitures on market value of firms in Korea, where is one of leading emerging economies, in terms of stock price reactions to the event announcements. Our study provides investors, managers, and academics with valuable implications not only for firm valuation but also for an establishment of effective strategies for foreign investment and divestment of firms in the economies. To the best of our knowledge, our study is one of first studies to try market valuation of the foreign divestitures of firms in emerging economies. To this end, we employ an event study method of the OLS-market model devised by Brown and Warner (1985). For robustness, we apply the GARCH-market model combined with the GARCH method to account for any possibility of heteroscedastistic effect in stock return series (see Coakley et al., 2008; Booth et al., 1996; Corhay and Tourani, 1996; Lee et al., 2013). This study is also the first to consider the heteroscedasticity in the return series among the existing studies on this topic. In addition, we conduct cross sectional analyses to find its drivers.

Principal findings from our study are as follows. The two types of market models produce significant negative abnormal returns (i.e., decrement in firm value) at the announcement date. The models also capture effects of an information leakage and lead pre and post the announcement date for foreign asset divestitures announced by Korean listed firms. The decreased firm value is significantly associated with the divestitures-characteristic variables whereas is not associated with the firm-characteristic variables. The divestitures announced by firms with a large portion of substantial institutional investors holding advanced professionalism for investments contribute to an increment in firm value but ones by firms with many individual investors lead to a decrement in that. Given that the intent of firms'

divestitures is for retrieving money invested abroad, the event announcements create firm value. In addition, we find evidence that the divestiture announcements of firms in emerging host countries make a negative impact on firm value but those of firm in advanced host countries do a positive one on it

The structure of the paper is as follows. Section 2 reviews the existing studies on the firm value changed by announcements of the foreign divestitures. Section 3 deals with data and methods used. Section 4 provides empirical findings. Final section briefly concludes.

2. Literature reviews

Announcement effects for domestic asset divestitures

The outstanding literature address that diversified firms trade at a discount relative to break-up and divestitures is substantially helpful for an improvement in post-divestiture operating performance (Lang and Stultz, 1994; Berger and Ofek, 1995; Joh and Ofek, 1995; Servaes, 1996; Lins and Servaes, 1999 among others). An important discussion for divestitures is that firms divest assets to alleviate a financial distress. Afshar et al. (1992) and Lasfer et al. (1996) suggest that for firms in a financial distress (i.e., a high leverage), the divestiture announcements are related to an increment (i.e., a positive abnormal return) in their market value due to divestiture announcements. Within an agency framework, Lang et al. (1995) report positive abnormal returns for divestiture announcements of US firms. Hanson and Song (2002) find evidence that higher stock ownership motivates managers to sell firm assets that lead to underperform. Rosenfeld (1984) using the voluntary sell-off announcements by 62 US firms also suggests a positive stock price reaction to the event announcements on the US stock market. Regarding the extent of the announcement effect to the event, Hearth and Zaima (1984) present evidence that a positive stock price reaction to divestiture

announcements is stronger for the case of large and financially sound firms on the US market. In addition, they suggest a positive relation between a divested asset size and a price reaction.

Announcement effects for foreign asset divestitures

In a similar vein with the studies of domestic divestitures, most of the previous studies which examine announcement effects of foreign asset divestitures on firm value are devoted to the case of firms in advance countries (e.g., US, UK, etc.). First, for US firms, Kim et al. (1993) and Kim et al. (1994) investigates stock price reactions around the announcement day to foreign asset divestiture announcements of US firms in 1980s. Both studies report empirical evidence that divesting parent firms enjoy significant positive abnormal returns, which reflect an increment in firm value, due to the event disclosures around the announce day. In particular, the study of Kim et al. (1993) addresses an interesting difference that divestitures of foreign assets invested in advanced host countries contribute to an increment in firm value but divestitures of the assets invested in emerging host countries cause a decrement in the value. In their cross sectional analysis, firm value has positive relationship with extant of international diversification but negative one with that of firms' intangible assets. Borde et al. (1998) address positive relationship between firm value and the relative size of divested subsidiaries. They also suggest that on the US stock market, market participants are more favorable to firms' strategic divestitures to raise cash.

To effectively explain the choice and valuation consequences of (foreign) asset divestitures, Boddewyn (1979a) identifies a variety of factors (e.g., firms' financial conditions, poor prior investment decisions, adverse environmental conditions, lack of synergy, structural and organizational mechanisms, external market pressure, etc.). In his subsequent study (1979b), foreign investments typically come last and go first in managerial decisions of firms. If market participants see foreign asset divestitures of firms as a signal for future strategic reorientation, the event announcements may significantly contribute to a

positive increment in firm value. Mathur et al. (2006), which investigate an announcement effect of US-697 firms' foreign asset divestitures over the period 1994-2000, presents significantly positive abnormal returns around the announcement day. In association with an effect of host countries, divestitures from advanced countries make significant positive stock price reactions to the event announcements which reflect an increase in firm value while ones from emerging countries do insignificant stock price ones.

By contrast, a study of Ittner et al. (1993) makes a differentiated story that US-firms experience firm value decreased by their divestiture announcements. Recently, Mathur et al. (2006) identifies that foreign asset divestitures, on average, entail positive value gains for short-term event widows. The authors address that in the post-divestiture period, firms tend to experience an improvement in financial performance, and an increment in the capital expenditure to assets ratio that is greater for divestors than that for their control sample firms and an increment in the debt to asset ratio that is lower than that that for the control samples. This suggests that divesting firms try to reallocate their capital to more profitable business opportunities by experiencing business expansion without an increment in debt financing.

With respect to relationship between foreign asset divestitures and market value of firms in advanced countries outside US, some has been reported. For example, a recent study of Cooney et al. (2004) presents a significant positive stock price reaction to foreign asset divestitures announced by Australian firms. More recently, Coakley et al. (2008) using announcement data of UK-firms' foreign asset divestitures also find evidence that the divestitures are positively associated with firm value because the event announcements make significantly positive abnormal returns around the announced date. In particular, they try to account for heteroscedasticity in stock return series by employing the GARCH-market model. Overall, the positive relationship between the foreign divestitures and firm value reported in two recent studies is qualitatively similar with that in the above studies for US-firms. In

international academic circles, studies on market valuation of foreign asset divestitures announced by firms based in emerging economies are limited to very few, to our knowledge.

3. Data and Methods

3.1 Data

For the event study, we identify the data associated with foreign asset divestitures announced by Korean listed firms over the full sample period 1988 to 2011. All the information involved in the divestiture announcements is gathered from KIND (Korea Investor's Network for Disclosure) operated by the Korean Stock Market Division.[1]In the database source, we typed in the key words combined with 'foreign asset and divestiture'. Initially, we obtained 135 samples relevant to foreign asset divestitures. Then, we filtered the initial samples by excluding some firms that are not matched with our interest. Our selection criteria are as follows:

- firms divesting domestic assets,
- firms not listed on the Korea Stock Exchange (KSE) in the full sample period,
- firms having confounding events during the estimation and test periods,
- firms with missing accounting data during the full sample period,
- firms having a property of financial firms.

This filtering procedure gives us with a final sample of 116 announcements of foreign asset divestitures over the full sample period. Daily stock returns were calculated as the difference in natural logarithm of daily closing stock prices for two consecutive trading days,

[1] The database source (http://engkind.krx.co.kr) provides investors with extensive disclosures documents (e.g., IPO, SEO, M&A, asset sales, etc.) of Korean listed firms. This covers nearly 190 different types of disclosure information (Lee et al., 2013).

$$R_{it} = \ln\left(\frac{p_t}{p_{t-1}}\right) \times 100$$

where $R_{i,t}$ is a daily actual return of stock i at time t and p is a daily price of individual stocks.

Table 1 describes the specific feature of the final sample over the full sample period 1988 - 2011and across host countries where foreign assets are divested. In Panel A, the announcement dates have mostly been concentrated since the second half of 1990s and shows a maximum 14 in 2010 and 2011 very recently and a minimum 0 in 1990 to 1992. Foreign asset divestitures of Korean listed firms in Panel B have been extensively spread across 29 countries. Quite a few of foreign asset divestitures, which reach about 40% of the total samples, are carried out in USA and China, two major trade partner countries of the Korean firms. The span across 29 countries allows us to comprehensively study a market valuation effect of foreign asset divestitures by the Korean firms.

Table 1 around here

3.2 Methods

3.2. 1 Event study

A. OLS market model

We apply the OLS-market model devised by Brown and Warner (1985). It is assumed that the stock market is informational efficient so that firm value changed by any information disclosure could be fully reflective in abnormal returns observable around the disclosure .

The individual stock abnormal return ($AR_{i,t}$) estimated by the conventional market model are as follows. First, we run a regression of a market portfolio return ($R_{m,t}$) on an individual daily stock return ($R_{i,t}$) to estimate coefficients α_i and β_i on Eq. (1) over the estimation

period -220 to -21. ε_{it} is an error term. By plugging the estimated $\hat{\alpha}_i$ and $\hat{\beta}_i$ into Eq. (2), we obtain the expected return [$E(R_{it})$] of the individual stock i. For the event period -20 ~ +20, the daily abnormal return (AR_{it}) of the individual stock is obtainable by calculating the difference between the actual daily return and the return predicted by the market model like Eq. (3),

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

$$E(R_{it}) = \hat{\alpha}_i + \hat{\beta}_i R_{mt} \tag{2}$$

$$AR_{it} = R_{it} - E(R_{it}). \tag{3}$$

The average abnormal return (AAR_t) is the summed abnormal return (AR_{it}) of all individual stocks divided by the number of the total sample like Eq. (4)

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \tag{4}$$

The t-statistics for AAR_t are

$$t_{AAR_t} = \frac{AAR_t}{S(AAR_{t_{-200}-t_{-21}})}. \tag{5}$$

Due to any possibility of a cross sectional dependence across average abnormal returns on each event day, we use a standard deviation [$S(AAR_t)$] of average abnormal returns over the estimation period -220 to -21 days.[2]

Cumulative average abnormal returns ($CAAR_{t_1-t_n}$) are obtained by summing the average abnormal returns calculated by Eq. (4) and t-statistics for this are estimated by Eq. (7) below,

$$CAAR_{t_1-t_n} = \sum_{t_1}^{t_n} AAR_t. \tag{6}$$

[2] Brown and Warner (1985) recommend use of time-series standard deviations, which can be estimated from mean excess returns over the estimation period.

$$t_{CAAR_{t_1-t_n}} = \frac{CAAR(t_1 - t_n)}{\frac{S(CAAR_{t_{-220}-t_{-21}})}{\sqrt{N}}}, \tag{7}$$

where $S(CAAR_{t_1-t_n})$ is a standard deviation over $CAAR_s$ for the estimation period -220 to -21 days. N is a number of partitioned event days.

B. GARCH-market model

The classical OLS assumption that residuals follow a homoscedastic process may not remain valid for the event study of the OLS market model. Specifically, the OLS market model may mislead inferences given that the AR variances in estimation periods are not the same as those in event periods. In this case, the test statistics may be also biased (see Giaccoto and Ali, 1982; Morgan and Morgan, 1987 among others). To account for a heteroscedastic effect in stock return series, some literature apply the market model combined with a GARCH method (Booth et al., 1996; Corhay and Tourani, 1996; Coakley et al., 2008; Lee et al., 2012 among others). For robustness, this study also employs the GARCH market model to account for any possible heteroscedasticity in the stock return series.

It is assumed that on the GARCH-market model, residuals of stock return series are conditionally heteroscedastic. The market model with the GARCH effect is

$$\begin{aligned} &\varepsilon_{it} \mid \Omega_{it-1} \sim D(0, h_{it}, d) \\ &\varepsilon_{it} = R_{it} - \alpha_i \beta_i R_{mt} \\ &h_{it} = \gamma + \alpha_i h_{i,t-1} + \beta_i \varepsilon_{i,t-1}^2 \end{aligned} \tag{8}$$

where Ω_{it} denotes a set of all information through time t on an individual stock i, h_{it} is a conditional variance of the stock i, D is a student-t distribution with a zero mean and a time dependent variance, and d is a degree of freedom.

Even though the GARCH model allows the conditional error distribution to be leptokurtic, it might not fully explain a high level of kurtosis in the distribution of the return series.

Outstanding studies in econometrics have introduced a variety of leptokurtic conditional distribution (see Baillie and Bollerslev, 1989; Hsieh, 1989 among others). It has widely been accepted that a GARCH (1,1)-t model fits better stock returns than a GARCH (p,q)-t model with $p+q \geq 3$ (Corhay & Tourani, 1996). In line with this discussion, our study also concentrate on the GARCH (1,1)-t process. The GARCH (p,q) model with t-distributed conditional errors can be estimated by a log-likelihood function. The sum of estimated parameters ($\alpha+\beta$), which means a persistence of volatility of stock i, should be less than the unity 1 for a stable variance process. Given that this equals 1, the process becomes an integrated GARCH (IGARCH) one. This process has not only a persistence of a forecast of a conditional variance over future horizons but also an infinite variance of an unconditional distribution ε_t (Engle and Bollerslev, 1986).

Estimating the GARCH (1,1)-t parameters for each stock i, we estimate the errors over the event window- 20 to + 20 by iterating the GARCH market model and using $\varepsilon_{i,-20}$ and $h_{i,-20}$ as a starting point. Equations for this are

$$\hat{\varepsilon}_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (8)$$

$$\hat{h}_{it} = \hat{\gamma}_i - \hat{\alpha}_i \hat{h}_{i,t-1} + \hat{\beta}_i \varepsilon^2_{i,t-1} \quad (9)$$

$$GAR_{it} = \hat{\varepsilon}_{it} \hat{h}_{it}^{-0.5} \quad (10)$$

where GAR_{it} is an abnormal return of individual stock i estimated by the GARCH market model at time t.

(G)AAR, (G)CAR, (G)CAAR and the test statistics in the GARCH market model are also estimated by Equations (3-6) above discussed already.

3.2. 2 Cross sectional regressions for its drivers

For determinants of firm value changed by the foreign asset divestiture disclosures, our study

runs a cross sectional OLS regression with potential variables on CARs and GCARs around the announcement date. For robustness, we use the GMM (Generalized Method of Moments) regression method developed by Hansen (1982) to effectively deal with a biased estimate due to any possibility of a measurement error on CARs and GCARs measured by the two kinds of market model (Lee et al, 2012). See Hansen (1982) and Hansen et al. (1996) for details for the GMM method.

4. Empirical findings

4.1 Stock price reactions to foreign asset divestiture announcements

In order to examine stock price reactions to foreign asset divestitures announcements by Korean listed firms, we employ the two kinds of market model (i.e., OLS and GARCH market model). Prior to our use of the GARCH market model, both $GARCH(1,1)-t$ and $GARCH(1,1)-N$ models are equally fitted for 21 among the total sample 116. Although the two GARCH models well fit residual terms, we focus on the $GARCH(1,1)-t$ model following up the literature (Booth et al., 1996; Corhay and Tourani, 1996; Coakley et al., 2008; and Lee et al., 2013).[3] Based on the result of the $GARCH(1,1)-t$ model, 21 of our samples follow conditional t-distribution error processes which depart from the normal distribution assumption of the standard OLS specification.

Table 2 shows the specific results of the event study via OLS and $GARCH(1,1,)-t$ market models. Both models indicate significantly negative AARs (-0.224% and -0.159%) at 5% and 1% levels, respectively, at the announcement date. We see also significant negative

[3] Outstanding studies (e.g., Bollerslev, 1986, Hsieh, 1989, Baillie and De Gennaro, 1990) in econometrics address that the $GARCH(1,1)-t$ model parsimoniously better performs in capturing a conditional heteroscedasticity effect of financial return series. Particularly, to capture a high level of kurtosis in the distribution of observed return, a leptokurtic $GARCH(1,1,)-t$ model also provides a better fit to residual terms than other conditional leptokurtic distributions (Lee et al., 2013).

AARs at the same levels at some dates pre and post announcement date, which means an informational leakage effect on firm value (i.e., shareholder wealth). The results suggest that on the Korean stock market, foreign asset divestiture announcements are associated with decrement in firm value around the announcement date. Our findings are not in line with the existing literature (e.g., Kim et al., 1993; Borde et al., 1998; Mathur et al., 2006; Cooney et al., 2004; Coakley et al., 2008) which suggest that foreign asset divestitures of firms in advanced countries make them enjoy a positive increment in firm value by the event announcements. The striking results would be explained by market immaturity of the stock market due to a large portion of individual investors whose has insufficient information accessibility for firms' past financial performance pre the announcements and has less professionalism for a information analysis. In fact, individual investors in the Korean stock market have taken an overwhelmingly large portion (1136.465852 shares, on average) of trading volume, compared to the portion (63.20293358 shares, on average) of institutional ones over the last decade that information for trading volume is available. See Appendix for its details.

Table 2 around here

Figure 1 plots the CAARs obtained from OLS and GARCH market models. The CAARs from the two market models show a similar feature for whole event windows -20~+20. Even if so, the gap between the two CAAR series gradually increases post the announcement date. The gap reflects an existence of an adjustment effect of the GARCH market model on the CAARs estimated by the OLS market model for the robust study. It is worthwhile to note that the CAARs derived from the OLS market model are, overall, larger than ones derived from the GARCH market model at the full event windows. This may imply that the former is overestimated due to an ignorance of a heteroscedastic effect in the stock return series over the estimation period.

Figure 1 around here

To support our explanation for the negative AARs, we examine AARs around the announcement date for two subsamples by splitting the total sample into a group of firms with a large portion of individual investors (less than 40%) and a group of firms with a large one of institutional investors (more than 40%) out of firm's total trading volume. Note that since foreign investors who hold more advanced professionalism in investments are inclined to invest a large amount of money generally, they are included as institutional ones in the Korean stock market. Table 3 reports AARs for the two subsamples over the full event windows. For the former, the two market models yield significant negative AARs around the announcement date, which are in line with the cases of the total sample in Table 2 previously discussed. On the contrary, for the latter, both models estimate significant positive AARs around the date. This goes with most previous studies that report foreign asset divestiture announcements contribute to an increment in value of firms in advanced countries (e.g., Germany, UK, and US) in where institutional investors participate more dominantly. One possible explanation for the divergent results would be due to existences of asymmetry in information about firms' past managerial performances up to the announcement date between individual investors and institutional ones. Specifically, individual investors lacking of a monitoring ability to firms' (poor) managerial performances perceive the asset divestitures announced at the date as unexpected bad news that decrease their wealth. Meanwhile, institutional investors cautiously monitoring the firms' managerial past performances perceive the announcements as good news that increase their wealth given that sell-offs of the assets improve firms' cash flow that enables them to make new business opportunities. This would be also one explanation for the discrepancy between previous studies for firms in advanced countries and our study on this topic.

Table 3 around here

Table 4 reports the CAARs estimated by the two market models for various event intervals around the announcement date. The two kinds of market model show statistically significant negative CAARs at the standard levels for the two partitioned intervals [-1~+0] and [0~+3] and the marginally positive CAAR for the interval [-0~+5]. In particular, both models estimate the highest absolute value of the negative CAARs (-0.462% and -0.357%) at the interval [0~+3], which means the greatest decrement in firm value.

Table 4 around here

4.2 Cross sectional analysis

To find drivers of the decrement of firm value due to the divestiture announcements, we run cross sectional analyses for CARs and GCARs at the window [0~+3] that show the largest decrement of firm value around the announcement date. Cross sectional regressions specified in our study are

$$CARs_{i,0\sim+3} = a + \beta_2 D\_Institutions + \beta_3 D\_Moneyback + \beta_4 D\_G20 + \beta_5 Size_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 Growth_{i,t-1} + \varepsilon_i \quad (8.1)$$

$$GCARs_{i,0\sim+3} = \eta + \gamma_2 D\_Institutions + \gamma_3 D\_Moneyback + \gamma_4 D\_G20 + \gamma_5 Size_{i,t-1} + \gamma_6 Leverage_{i,t-1} + \gamma_7 Growth_{i,t-1} + \tau_i \quad (8.2)$$

where $CARs_{i,0\sim+3}$ and $GCARs_{i,0\sim+3}$ are dependent variables of OLS and GARCH cumulative abnormal returns for stock i at the event window [0~+3], respectively. Explanatory variables of interest consist of three dummy variables associated with characteristics of foreign asset divestitures. First, the dummy $D\_Institutions$ takes 1 for the divestitures by sample firms with more than 40% institutional investors and 0 otherwise. This is to check whether there is

a differentiated reaction to the informational disclosure of firms with a large portion of institutional investors who have superior professionalism to accessibility and analysis about firms' past information up to the announcements. $D\_Moneyback$ is a dummy to examine an effect of an intent of the firms' divestitures on the change of firm value by the event announcements. This takes value 1 for foreign asset divestitures which the firms withdraw their assets for retrieving money and otherwise 0. The dummy D_G20 is to examine a national effect of the asset divestitures on the decrement in firm value. This dummy takes value 1 for divestitures of foreign assets invested in advanced host countries proxied by G20 countries and otherwise value 0.

Regarding control variables, firm size (*Size*) is the first lagged logarithm of book value of firm's total assets at the fiscal year end, immediately proceeding to the date of the divestiture announcements. This is to investigate a firm's size effect on the changed firm value by the divestiture announcements. To control a leverage effect (*Leverage Ratio*), we use the first lag of leverage ratio, which is measured by total debt over total assets of the firm at the fiscal year end, immediately proceeding to the announcement date. Financial data related to the control variables are available from the KIS-Value database managed by the Korean Information Service. *MV/BV ratio* is a second control variable to capture an impact of firm's future growth opportunities on the change of firm value. This variable proxied for future growth opportunities of firms is measured by the first lag of market value of equity divided by book value of equity at the fiscal year end, immediately proceeding to the announcement date.

Prior to our regression analyses, we need to test for correlations across all the variables in the regression specifications. Overall, most pairs of the variables in Table 5 show statistically and economically low correlation coefficients that suggest no serious multicollinearities across them, except for the value (0.466) for the pair of *D_Institutions and Total Asset*.

Table 5 around here

The results obtained from the cross sectional OLS regressions are reported in Table 6. First, Panel A shows the regression results for CARs [0~+3] of the OLS market model. Regression 1, 2, and 3 indicate significantly positive coefficients (1.775, 1.948, 1.984) at 1% and 5% levels, respectively, for the dummy *D_Institutions.* This suggests that foreign asset divestiture announcements by firms with a large portion of professional institutional investors are associated with an increment in firm value while those by firms with a large portion of individual ones are associated with a decrement in the value. It could be said that this result statistically supports our explanation for the discrepancy between our study and the previous studies on announcement effects of foreign asset divestitures which are addressed at the above subsection 4.1. As for the dummy, *D_MoneyBack*, the three regression specifications estimate significant positive coefficients (0.917, 0.927, 0.825) at the 10 % level. This suggests that on the Korean stock market, withdrawing assets invested abroad for retrieving money contributes to an increment in firm value due to its announcements. To explore national effects of foreign assets divested, the *D_20* dummy has significantly positive coefficients (0.887, 0.915, 0.935) in the three specifications. Based on this, we address that foreign divestitures of assets invested in advanced host countries are positively with a change in firm value when the Korean firms announce the event. This is in line with Kim et al. (1993) and Mathur et al. (2006) that report foreign divestitures of assets invested in advanced host countries increase firm value by the informational disclosures but those of assets done in developing host countries make no or a negative effect for firm value. Shortly, the characteristic dummies related to the divestitures effectively explain the change in firm value by the announcements. In Panel A, three control variables (*Size*, *MV/BV ratio*, *Leverage ratio*) related to firm's financial characteristics have insignificant value on Regression 1, 2, and 3, respectively, which address no relation with the CARs.

Table 6 around here

For robustness, the GCARs results in Panel B are qualitatively similar with the CARs ones in Panel A discussed above. Exceptionally, the dummy *D_moneyback* on Regression 3 of Panel B shows a marginal positive coefficient (0.562) which is slightly different from the value (0.825) for that on Regression 3 of Panel A.

Since the two dependent variables (CARs and GCARs) are values estimated by the two kinds of market model, one could expect that they may have some measurement errors which may lead to biased estimates in OLS specifications. To assess the robustness of the results obtained with the OLS estimations, we additionally implement the GMM estimations which allow us to controls for any possibility of biased estimation due to a possible measurement error on the variables. Table 7 shows results obtained from the GMM regression estimations on the CARs measured by the two types of market model, respectively. The GMM estimation shows qualitatively identical results to the previous OLS ones. This provides us with a strong support that the findings from the OLS regressions still hold although one accounts for any possibility of measurement error on the dependent variables.

Table 7 around here

5. Conclusions

Using an event study method of OLS and GARCH market models, this paper sheds light on firm value changed by foreign divestiture announcements of Korean listed firms. Overall, we find that on the Korean stock market, foreign asset divestitures lead to a decrement in firm value at the announcement date and there are effects of informational leakage and lead around the announcement date.

By cross sectional analyses, we try to investigate principal factors to explain the change of

firm value. Specifically, the firm value decreased by the event announcements is significantly associated with divestitures-characteristics variables but is not associated with firm-characteristics variables. As for the former, first, the divestiture announcements by firms with substantial institutional investors who hold advanced professionalism for investments contribute to an increment in firm value but those by firms with many individual investors cause a decrement in that. Given that the intent of firms' divestitures is for retrieving money invested abroad, firms enjoy an increment in firm value due to the event announcements. In addition, divestiture announcements of assets invested in developing host countries make a negative impact on firm value whereas those of assets invested in developed host countries do a positive one on it. Regarding the firm-characteristics variables, firm's financial properties of firm size, leverage ratio, and future growth opportunities make no effect on firm value changed by the announcements. These suggest no explanation of anomalies such as a size and future growth opportunities effects for small firms in corporate finance for the change of firm value.

Our study targeting firms in Korea, one of leading emerging countries, provides firm managers with invaluable implications. That is, unlike the case of firms in advanced countries, our differentiated finding that the divestiture announcements produce a decrement in firm value around the announcement date sheds new light on market valuation of foreign asset divestitures of firms in emerging countries. In a practical perspective, this would also provide firm managers, investors and researchers with an invaluable implication of an importance of more prudent decisions for effective foreign asset divestitures of firms in the countries.

Some limitations need to be mentioned. First, given that a significant change in Korean firm value, due to announcements of foreign asset divestitures, is observable in a short term, it would be worthwhile to extend this study to a long term relation between foreign asset divestitures and firm value. However, this is beyond our study. In addition, it would be also

interesting to explore if the various features of announcement effects announced by firms in Korea could be applicable to studies about the cases of firms in other emerging economies, which are still scarce. So, we leave the issues for future works.

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Table 1. Distribution of the foreign divestitures announcements over the full sample period

Panel A. Foreign divestiture announcements by year

Year of announcements	Number of announcements	Percentage (%)
1988	1	0.86
1989	1	0.86
1990	0	0.00
1991	0	0.00
1992	0	0.00
1993	2	1.72
1994	2	1.72
1995	4	3.45
1996	3	2.59
1997	3	2.59
1998	6	5.17
1999	2	1.72
2000	5	4.31
2001	3	2.59
2002	4	3.45
2003	3	2.59
2004	10	8.62
2005	5	4.31
2006	5	4.31
2007	12	10.34
2008	8	6.90
2009	9	7.76
2010	14	12.07
2011	14	12.07
Total	116	100.00

Panel B. Foreign asset divestiture announcements by geographic location of divested assets

Location	Number of announcements	Percentage (%)
Asia	70	60.34
Europe	15	12.93
North America	22	18.97
Middle and South America	5	4.31
Africa	2	1.72
Australia	2	1.72
Total	116	100

Notes: Asian countries consist of 9 countries: Bangladesh, Cambodia, China, Hong Kong, Indonesia, Japan, Kazakstan, Malaysia, Mongol, Oman, Pakistan, Philipines Taiwan, Thailand, Turkey, Singapore, Sri Lanka, Uzbekistan, and Vietnam. European countries include 9 countries of Belgium, France, Germany, Ireland, the Netherlands, Poland, Russia, Sweden, and the UK. North American countries consist of 5 countries of Canada, Cayman Island, Mexico, and the USA. Middle and South American countries include 3 countries of Brazil, Guatemala, and Honduras. 2-African countries are Angola, Egypt. The remaining country is Australia.

Table 2. Average abnormal returns (AARs) for the event windows

Windows	*OLS* market model (n=116) AARs (%)	t-value	CAARs (%)	*GARCH*(1,1) − *t* market model (n= 116) GAARs (%)	t-value	GCAARs (%)	AAR Difference *OLS* − *GARCH*
-20	0.061	0.658	0.061	0.023	0.242	0.023	0.039
-19	-0.247	2.659**	-0.186	-0.172	1.841*	-0.149	0.075
-18	-0.032	0.339	-0.217	0.022	0.238	-0.127	0.054
-17	0.104	1.119	-0.113	0.107	1.150	-0.020	0.003
-11	-0.156	1.683*	-0.101	-0.130	1.392	-0.185	0.026
-10	-0.007	0.072	-0.108	-0.014	0.148	-0.198	0.007
-9	-0.089	0.959	-0.197	-0.075	0.808	-0.274	0.014
-8	-0.006	0.069	-0.203	0.034	0.370	-0.239	0.041
-7	-0.164	1.772*	-0.368	-0.079	0.842	-0.318	0.086
-6	0.115	1.243	-0.252	0.037	0.393	-0.281	0.079
-5	-0.086	0.922	-0.338	-0.072	0.771	-0.353	0.014
-4	0.101	1.083	-0.237	0.110	1.174	-0.243	0.009
-3	0.075	0.803	-0.163	0.011	0.123	-0.232	0.063
-2	0.062	0.665	-0.101	-0.007	0.077	-0.239	0.069
-1	0.027	0.288	-0.074	-0.039	0.415	-0.278	0.065
0	-0.225	2.421**	-0.299	-0.159	1.708*	-0.437	0.065
1	0.051	0.544	-0.249	0.017	0.186	-0.420	0.033
2	-0.090	0.966	-0.338	-0.037	0.397	-0.457	-0.053
3	-0.198	2.134**	-0.536	-0.178	1.912*	-0.635	-0.020
4	0.065	0.696	-0.472	0.042	0.451	-0.593	0.023
5	0.057	0.616	-0.415	-0.013	0.135	-0.606	0.070
6	0.112	1.201	-0.303	0.084	0.904	-0.521	0.027
7	-0.116	1.247	-0.419	-0.123	1.316	-0.644	0.007
8	-0.034	0.370	-0.453	-0.036	0.389	-0.680	0.002
9	0.064	0.686	-0.390	0.052	0.553	-0.629	0.012
10	0.061	0.657	-0.329	-0.003	0.030	-0.632	0.064
11	-0.031	0.329	-0.359	-0.021	0.228	-0.653	0.009
17	-0.149	1.607*	-0.596	-0.118	1.271	-1.141	0.031
18	-0.151	1.629*	-0.748	-0.109	1.169	-1.250	0.042
19	-0.127	1.366	-0.875	-0.052	0.558	-1.302	0.075
20	0.063	0.679	-0.811	0.031	0.337	-1.271	0.032

Average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) were estimated by OLS and $GARCH(1,1,)-t$ market models. The difference between AARs of the two market models is calculated by absolute value.

Note: **, and * indicate significance levels at 5% and 10%, respectively.

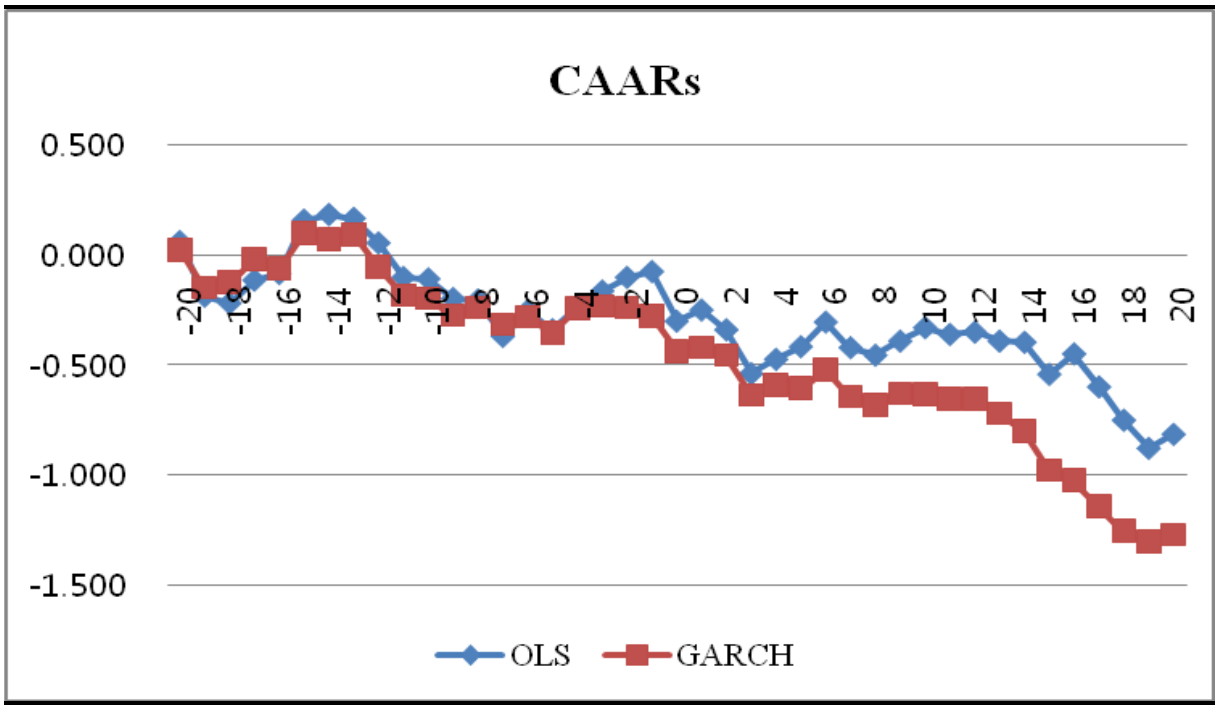

Figure 1. CAARs for divestiture announcements over the full event window -20~+20

Table 3. AARs of subsamples splited into individual investor group and institutional investor group over the full event window

	OLS market model				GARCH market model			
	sample firms with less than 40% institutional investors (individual ones) (n=102)		sample firms with more than 40% institutional investors (n=14)		sample firms with less than 40% institutional investors (individual ones) (n=102)		sample firms with more than 40% institutional investors (n=14)	
	AARs	t-value	CAARs	t-value	GAARs	t-value	GCAARs	t-value
-20	0.010	0.096	0.437	1.634*	0.002	0.015	0.174	0.652
-19	-0.279	-2.814**	-0.016	-0.060	-0.202	-2.023**	0.050	0.185
-17	0.089	0.902	0.210	0.787	0.093	0.928	0.212	0.792
-11	-0.142	-1.429	-0.263	-0.986	-0.118	-1.181	-0.214	-0.801
-10	-0.008	-0.085	0.005	0.020	-0.028	-0.281	0.090	0.336
-9	-0.155	-1.565*	0.391	1.462	-0.120	-1.204	0.250	0.935
-8	-0.009	-0.095	0.015	0.057	0.015	0.146	0.178	0.666
-7	-0.251	-2.539**	0.469	1.753*	-0.142	-1.425	0.383	1.432
-6	0.126	1.269	0.041	0.153	0.041	0.414	0.003	0.010
-5	-0.146	-1.479	0.358	1.338	-0.140	-1.404	0.422	1.581*
-4	0.100	1.013	0.102	0.383	0.116	1.156	0.065	0.245
-3	0.088	0.887	-0.021	-0.080	0.001	0.011	0.086	0.322
-2	0.019	0.195	0.371	1.388	-0.074	-0.735	0.472	1.765*
-1	-0.016	-0.165	0.340	1.273	-0.082	-0.820	0.273	1.023
0	-0.301	-3.037**	0.329	1.230	-0.203	-2.033**	0.158	0.592
1	-0.026	-0.259	0.605	2.264**	-0.066	-0.662	0.620	2.319**
2	-0.161	-1.628*	0.431	1.614*	-0.089	-0.892	0.339	1.268
3	-0.189	-1.908*	-0.265	-0.991	-0.169	-1.694*	-0.242	-0.907
4	0.017	0.167	0.414	1.551*	0.011	0.106	0.269	1.007
5	-0.044	-0.447	0.796	2.980**	-0.086	-0.859	0.517	1.933*
6	0.105	1.058	0.161	0.601	0.085	0.854	0.076	0.285
10	0.074	0.749	-0.035	-0.132	-0.012	-0.118	0.062	0.233
17	-0.167	-1.690*	-0.018	-0.066	-0.143	-1.435	0.062	0.232
18	-0.196	-1.979*	0.174	0.651	-0.135	-1.349	0.078	0.291
19	-0.143	-1.445	-0.009	-0.032	-0.044	-0.443	-0.107	-0.402
20	0.027	0.272	0.326	1.221	-0.009	-0.094	0.326	1.220

Average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) were estimated by OLS and $GARCH(1,1,)-t$ market models.

Note: **, and * indicate significance levels at 5%, and 10%, respectively.

Table 4. CAAR for partitioned intervals

Intervals	*OLS* market model	*GARCH* (1,1) – *t* market model	*OLS* – *GARCH* (Difference)
[-1~ 0]	-0.198* (1.508)	-0.198* (1.501)	0.000
[0~+3]	-0.462** (2.488)	-0.357** (1.915)	0.105
[0~+5]	-0.340 (1.496)	-0.327 (1.435)	0.013

This table reports the CAARs obtained from the two market models for partitioned event intervals. The difference between CAARs of the two market models is calculated by absolute value.

Note: **, and * indicate significance levels at 5%, and 10%, respectively.

Table 5. The correlation matrix across the whole variables

	CARs	*GGARs*	*D_Institutions*	*D_MoneyBack*	*D_G20*	*Total Asset*	*Leverage Ratio*
CARs							
GGARs	0.019						
D_Institutions	0.236	0.262					
D_MoneyBack	0.130	0.117	-0.097				
D_G20	0.168	0.226	-0.029	-0.036			
Total Asset	0.112	0.160	0.466	-0.096	0.044		
Leverage Ratio	-0.033	0.241	0.022	0.068	0.027	0.096	
MV/BV Ratio	-0.073	-0.050	0.091	-0.179	0.071	-0.078	0.217

Table 6. Results of the cross sectional OLS regressions

Panel A. Regression on CARs [0~+3] of OLS market model				Panel B. Regression on GCARs [0~+3] of GARCH market model		
Variables	Reg. 1	Reg. 2	Reg. 3	Reg. 1	Reg. 2	Reg. 3
Constant	-1.313***	-0.887	-1.086**	-1.067***	-1.034**	-0.913***
	(0.332)	(0.728)	(0.393)	(0.230)	(0.507)	(0.273)
D_Institutions	1.775**	1.948***	1.984***	1.271**	1.514***	1.542***
	(0.778)	(0.672)	(0.673)	(0.539)	(0.468)	(0.468)
D_MoneyBack	0.917*	0.927*	0.825*	0.627*	0.608*	0.562
	(0.501)	(0.501)	(0.506)	(0.347)	(0.349)	(0.352)
D_G20	0.887**	0.915**	0.935**	0.820***	0.850***	0.867***
	(0.449)	(0.446)	(0.446)	(0.311)	(0.310)	(0.310)
Total Asset	9.51e-09			1.45e-08		
	(2.33e-08)			(1.61e-08)		
Leverage Ratio		-0.006			0.00004	
		(0.010)			(0.00721)	
MV/BV Ratio			-0.180			-0.105
			(0.195)			(0.135)
Observations	116	116	116	116	116	116
F-value	3.58***	3.64***	3.77***	5.03***	4.80***	4.97
	(1%<)	(1%<)	(1%<)	(1%<)	(1%<)	(1%<)
R^2	0.114	0.115	0.119	0.153	0.147	0.152

This table reports the results of the cross sectional OLS regressions on CARs [0+3] and GCARs [0~+3] from the two market models, respectively.

Notes: ***, **, and * indicate significance levels at the 1%, 5%, and 10%, respectively. Figures in parenthesis are standard errors.

Table 7. Results of the cross sectional GMM regressions

Panel A. Regression on CARs [0~+3]of OLS market model				Panel B. Regression on GCARs [0~+3] of GARCH market model		
Variables	Reg. 1	Reg. 2	Reg. 3	Reg. 1	Reg. 2	Reg. 3
Constant	-1.313***	-0.887	-1.086**	-1.067***	-1.034**	-0.913***
	(0.325)	(0.712)	(0.385)	(0.225)	(0.496)	(0.267)
D_Institutions	1.775**	1.948***	1.984***	1.271**	1.514***	1.542***
	(0.761)	(0.658)	(0.658)	(0.527)	(0.458)	(0.458)
D_MoneyBack	0.917*	0.927*	0.825*	0.627*	0.608*	0.562
	(0.490)	(0.490)	(0.495)	(0.340)	(0.341)	(0.344)
D_G20	0.887**	0.915**	0.935**	0.820***	0.850***	0.867***
	(0.439)	(0.436)	(0.436)	(0.304)	(0.303)	(0.303)
Total Asset	9.51e-09			1.45e-08		
	(2.27e-08)			(1.58e-08)		
Leverage Ratio		-0.006			0.00004	
		(0.010)			(0.00705)	
MV/BV Ratio			-0.180			-0.105
			(0.190)			(0.132)
Observations	116	116	116	116	116	116

This table reports the results of the cross sectional OLS regressions on CARs [0+3] and GCARs [0~+3] from the two market models, respectively.

Notes: ***, **, and * indicate significance levels at the 1%, 5%, and 10%, respectively. Figures in parenthesis are standard errors.

Appendix. Trading volume of market participants on the Korean stock market

Year	Trading volume of individual investors		Trading volume of foreigner investors		Trading volume of institutional investors		Others	
	Share	%	Share	%	Share	%	Share	%
1999	736950151	82.14	325303832	3.63	1092223841	12.17	1845192372	2.06
2000	8270340326	85.90	3579160058	3.72	8275200159	8.60	1715896984	1.78
2001	1297292616	90.66	4270778381	2.98	7371275856	5.15	1723417738	1.20
2002	2427954609	94.12	5460079007	2.12	7621097591	2.95	2077894727	0.81
2003	1483651243	92.94	4013458816	2.51	5511992313	3.45	174817387	1.10
2004	1000145123	89.23	5504453016	4.91	4879501196	4.35	1688619957	1.51
2005	1286931954	89.96	6417876829	4.49	6078431399	4.25	1864084625	1.30
2006	7071946195	83.11	6796277538	7.99	6011658414	7.07	1561979006	1.84
2007	9090347725	83.92	8731068165	8.06	6872172828	6.34	1812220253	1.67
2008	8199048396	80.51	1002964433	9.85	8219149485	8.07	1603452426	1.57
2009	1182922668	85.97	7767374087	5.64	9823113372	7.14	1721910695	1.25
2010	9585735936	81.80	1002031175	8.55	9420137743	8.04	1883421882	1.61
Average	1136465852	86.69	6320293358	5.37	758383073	6.47	1770522045	1.47