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Evidence from Asia's Financial Crisis***

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Abstract

This study examines the role of internal capital markets and diversification during normal and turbulent times. We hypothesize that internal markets are more valuable for firms in countries with less-developed financial markets and that diversification generally reduces risk. To conduct our tests, we study 3,000 East Asian corporations over the period before and during the 1997-1998 financial crisis. We find support for the internal market hypothesis during normal times. We find, however, that more diversified firms perform worse during a crisis, especially in less-developed countries. This suggests that more diversification and greater usage of internal markets is associated with higher risk-taking, especially when external markets are less developed.

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1. Introduction

There has been substantial research documenting the pattern of diversification among firms in the United States, e.g., Lamont (1997), Houston, James and Marcus (1997), and Scharfstein (1998). The evidence indicates that such diversification reduces firm value (see Lang and Stulz (1994), Berger and Ofek (1995), Comment and Jarrell (1995), Servaes (1996), Shin and Stulz (1998), Lins and Servaes, 1999a and 1999b, among others). The value discount has been attributed to poor resource allocation as diversified firms allocate capital to less profitable segments and increase risks. The question arises as to why corporations diversify.

One explanation pioneered by Williamson (1985) and extended by Gertner, Scharfstein, and Stein (1994), Harris and Raviv (1996), and Stein (1997), is that capital-constrained firms establish internal capital markets to allocate scarce capital within the firm. This is particularly the case for projects which are not inherently fundable by external markets. Internal markets can overcome informational asymmetries involved in the selection of valuable new projects more easily than can external markets. The more costly it is for firms to obtain external capital, the more valuable internal capital markets would be. One would also expect more diversification to lead to a reduction in firms' overall performance variability. This risk reduction presumably would be even greater when external financial markets are less developed, since internal diversification is an efficient means of reducing risk.

A test of the internal capital market hypothesis would therefore involve conditioning on a firm's access to external capital, which can be done by studying firms in countries which financial markets are at different levels of development.

Fauver et al. (1999) do so by investigating firm values across 35 countries. They document smaller diversification discounts for firms in less developed markets, consistent with the hypothesis. Khanna and Palepu (1999a,b) also argue that diversification is valuable in emerging markets since diversified firms mimic the beneficial functions of market institutions in more developed countries. They find supporting evidence for this hypothesis in the case of large business groups in India and, to a lesser extent, Chile.

While the benefits of internal markets may be higher in countries with less developed financial markets, so might be the costs. Investment projects funded by internal markets are not subject to the full degree of monitoring by external capital markets, which could mean that they are less profitable or riskier (Jensen (1986, 1989)). Rajan, Servaes, and Zingales (1999) and Scharfstein (1998) also argue that the more diverse and complex the investment opportunities available, the more pronounced this riskiness is. Diversified firms are especially likely to face higher agency costs as a consequence of their organizational form (see Scharfstein and Stein (1997), Denis, Denis, and Sarin (1997), and Scharfstein (1998)). Lins and Servaes (1999b) find discounts for diversification in less-developed countries and interpret this as evidence for higher agency costs.

The findings by Fauver et al. (1999) and Khanna and Palepu (1999a,b) nevertheless suggest that the relative benefits of internal markets offset the costs associated with diversification more so in less-developed countries. They study the period from 1992 to 1996, however, when globally capital markets were not very turbulent and when economic growth was high in emerging markets. It is possible that this sample period might have overstated the benefits of diversification and understated the risk factors, which would only surface during economic downturns. A

robustness test of the benefits of diversification could therefore be to investigate whether diversified firms performed better during economic downturns than non-diversified firms. And a test of the relative benefits of internal markets would be to investigate whether diversified firms were less affected by the economic downturn in less-developed countries because internal markets are more beneficial in such countries.

The objective of this study is to shed additional light on these questions associated with diversification and the use of internal markets. In particular, we test whether diversification leads to lower performance variability, whether greater use of internal capital markets is more valuable for firms in less-developed countries during good times—as it allows more investment in new activities, and whether greater use of internal capital markets is more valuable for firms in less-developed countries during bad times—as it reduces overall risk more than in countries with more developed financial markets.

We test these hypotheses by studying the performance of firms in East Asian countries over the 1992 through 1998 period. The selection of this sample offers several benefits. First, we study a period which comprises both economic booms and busts in the sample countries. Second, the sample spans countries with highly diverse levels of financial markets' development, thus allowing us to control for the development of external markets relative to internal markets. Third, all countries were affected by a downturn within a short window, thus limiting the influence of other variables on firm valuation. Finally, East Asian corporations have a record of significant use of internal markets when compared to companies in the United States, as documented in Fauver et al. (1999) and Lins and Servaes (1999b).

To conduct our tests, we collect panel data for almost 15,000 firm-year observations over the 1992-96 pre-crisis and the 1997-98 crisis periods. Consistent with the previous literature, we find a diversification discount. We also find support for the internal capital market hypothesis during the pre-crisis period as diversified firms in less-developed countries are valued relatively higher than in more developed countries. We find, however, that diversified firms perform worse than single-segment firms during the crisis and that diversified firms in less-developed countries perform even worse than those in more developed countries. While our results thus confirm the internal markets hypothesis during good times, we show that diversified firms take on more overall risks, a factor which only surfaces during economic downturns and is more severe in less-developed countries.

The paper proceeds as follows. Section 2 describes the data sample. Section 3 provides the performance and valuation measures we use. Section 4 documents our empirical evidence. Section 5 concludes.

2. The Data

We study firms in nine countries: Hong Kong, Indonesia, South Korea, Japan, Malaysia, Philippines, Singapore, Taiwan and Thailand. Our primary data source is the *Worldscope* database. *Worldscope* contains financial and segment information on companies from 49 countries and has been used in several international studies of corporate diversification, including Lins and Servaes (1999a,b) and Fauver et al. (1999).

We initially selected all companies from the nine countries covered by the June 1991-1999 CD-Rom version of the database. In each annual dataset, *Worldscope* provides historical financial data and current segment information. When *Worldscope* segment information is missing, we complemented the segment

data with data from the Autumn editions of the 1994-1999 *Asian Company Handbook* and *Japan Company Handbook*. All financial data are converted to US dollars using fiscal year-end exchange rates.²

In order to determine the degree of usage of internal markets, we group company segments according to the two-digit Standard Industry Classification (SIC) system. This procedure involves two steps. In the first step, we assign the appropriate four-digit SIC codes to each segment reported by Worldscope.³ In many cases we are able to obtain one-to-one matches between SIC codes and segments. For some companies, the number of reported SIC codes is not the same as the number of reported segments. If a segment is associated with multiple SIC codes, it is broken down equally so that each segment is associated with one SIC code. As the second step, we redefine segments at the two-digit SIC level and aggregate segment sales to that level. If a segment can not be associated with a reported SIC code, we determine the segment's SIC code according to its business description. In such cases, only a two-digit SIC code was assigned given the more general business description provided by Worldscope.

We classify firms as single-segment if at least 90 percent of their total sales are derived from one two-digit SIC segment. Firms are classified as multi-segment if they operate in more than one two-digit SIC code industries and none of their two-digit SIC code segments accounts for more than 90 percent of total firm sales. This

² Worldscope, the *Asian Company Handbook* and the *Japan Company Handbook* provide information on whether all subsidiaries are consolidated, whether consolidation covers only the most significant subsidiaries, or whether the report is on a cost basis (unconsolidated). If a company changes its consolidation practice, this change is also recorded in the data. To increase the sample size, we include all firms in the sample. Since non-consolidated companies are a relatively small fraction of all firms, 23% on average, similar results obtain if we exclude firms which have reported non-consolidated accounting data.

³ Worldscope reports SIC codes and segment information separately, hence we do a manual matching.

classification scheme is the same as in Lins and Servaes (1999a,b) and Fauver et al. (1999). We further define the primary segment of a multi-segment firm as the largest segment by sales. The remaining segment(s) are defined as secondary segments. In a very small number of cases two largest segments have identical sales. In such cases we select the segment with the lower two-digit SIC code as the primary segment. Our empirical results are robust if the alternative is chosen as the primary segment. We exclude multi-segment firms from the sample when they do not report segment sales and firms whose primary business segment is financial services (SIC 6000-6999).⁴

The Asian financial crisis started in mid-1997 in Thailand and spilled over to the other East Asian countries in the Fall of 1997. The beginning month of the crisis thus varies from country to country. Firms also use different fiscal years, varying from end-of-December to the middle-of-the-next-calendar year. To facilitate comparison, we define financial data reported prior to December 1997 as pre-crisis data. Since almost all firms have fiscal years ending before the middle-of-the-year, we *de facto* only include financial data up to mid-1997 in our pre-crisis sample. Accordingly, financial data reported on or after December 1997 are classified as crisis data and capture the period from mid-1997 to end-1998. To allow for a meaningful pre-crisis and crisis comparison of firms, we restrict our sample to those firms that survived in the crisis period. This survivorship bias means that the risks associated with internal markets are underestimated as non-surviving firms will likely have had lower market valuation.

The sample is described in Table 1. For the pre-crisis period (Panel A), the sample includes 7,616 (65%) multi-segment firm-year observations and 4,085 (35%)

single-segment firm-year observations. Japanese firms comprise the majority of the sample, as they account for 79 percent of the multi-segment firms and 71 percent of the single-segment firms. Across the nine countries, Hong Kong, Japan, Korea, Malaysia and Singapore have 64 to 69 percent of multi-segment firms, while Thailand, the Philippines, Taiwan and Indonesia have 27, 34, 35 and 42 percent, respectively.

The average asset size of multi-segment firms is US\$2,494 million and US\$1,846 million of single-segment firms. Across the nine countries, the average asset size of multi-segment firms is larger relative to those of single-segment firms, with the exception of South Korea and Singapore. In the case of both multi-segment and single-segment firms, Japanese firms have the largest average assets (US\$2,901 million and US\$2,279 respectively), followed by Korean and Hong Kong firms.

For the crisis period (Panel B), the sample covers 1,999 (65%) multi-segment firms and 1,094 (35%) single-segment firms. Japanese firms account for 68 percent of multi-segment firms and 56 percent of single-segment firms. Similar to the pattern in the pre-crisis period, Hong Kong, Japan, Korea, Malaysia and Singapore have between 63 to 69 percent of multi-segment firms, while Thailand, the Philippines, Taiwan and Indonesia have 27, 37, 35 and 47 percent, respectively.

Many countries in our sample experienced a sharp depreciation of their currency relative to the dollar in the crisis period. As a result, when measured in dollars, asset sizes and sales drop significantly between 1996 and 1997-98. The average asset size of multi-segment firms in the crisis period is reduced by 22 percent to US\$1,949 million and by 19 percent to US\$1,504 million for single-segment

⁴ We do not exclude non-finance firms with secondary segments in financial services. Since the secondary finance segments are typically small relative to the main segment, we do not expect significant estimation errors when we compute excess value.

firms.⁵ Similar to the pattern in the pre-crisis period, the average assets of multi-segment firms are mostly larger than those of single-segment firms, except for firms in South Korea and Singapore. Of the multi-segment firms, Japanese firms have the largest average assets (US\$2,357 million), followed by Korean firms. Of the single-segment firms, in contrast to the pre-crisis period, Korean firms have the largest average assets (US\$2,696 million), followed by Japanese firms.

3. Measuring Performance and Financial Development

3.1. Excess Value

In measuring corporate performance, we use the firm's market valuation and excess profit margin.⁶ In calculating valuation, we adopt the approach of Berger and Ofek (1995) by defining the excess value of a firm (EXV) as the natural logarithm of the ratio of the firm's actual market capitalization to its imputed capitalization. The actual market capitalization is the market value of common equity plus the book value of debt. The imputed capitalization is calculated following an industry-matching scheme. In particular, we first compute the median market-to-sales ratio, the market capitalization divided by firm sales, for each industry in each country using only single-segment firms. We then multiply the level of sales in each segment of a firm by its corresponding industry median market-to-sales ratio. The imputed value of the

⁵ This percentage decline is computed by comparing the 1997-1998 sample with the average of the 1992-1996 sample. Since, in local currency terms, the size of firms in the early 90s is smaller than in the late 90s, the exchange-rate adjusted total assets in 1997-1998 is not necessarily smaller for all East Asian countries than the exchange-rate adjusted total assets for the 1992-96 period, in spite of the large exchange rate depreciation for many countries.

⁶ Prior studies use excess valuation (EXV) as the sole measure of corporate performance since capital markets are assumed to be efficient in signaling long term corporate performance. In this study, we cover firms during Asian financial crisis when several stock exchanges saw large price falls and may not have measured long-term corporate performance efficiently. To avoid using EXV as the only measure of corporate performance during the crisis, we also use the excess profit margin (EPM) as a short-term performance measure. If East Asian stock

firm is obtained by summing the multiples across all segments. We also restrict the number of single-segment firms to at least three when computing the median market-to-sales ratio of an industry. When an industry has fewer than three single-segment firms, even defined broadly as Campbell (1996), we use the median of all firms in the country.

3.2. *Excess Profit Margin*

The profit margin is calculated as one minus the cost of goods sold over sales. Similar to the calculation of EXV, we first use the sub-sample of single-segment firms in each country to compute the median profit margin for each two-digit SIC code industry. We then multiply the sales share in each segment of a firm by the corresponding industry median profit margin. We sum the sales-weighted profit margin across segments to obtain the imputed profit margin of the firm. Lastly, we subtract the imputed profit margin from the actual profit margin to obtain the industry-adjusted excess profit margin (EPM).

In a manner similar to the computation of EXV, we restrict the number of single-segment firms in the computation of industry median profit margin to be at least three. In some cases, we do not have a sufficient number of firms to compute the median profit margin. In these cases, we use the median profit margin of broader industry groups as defined by Campbell (1996). This procedure avoids the loss of observations.

3.3. *Weighting Scheme*

We construct the crisis EXV and EPM measures using the pre-crisis weights and crisis period market-to-sales ratios and profit margins. In other words, we test how EXV and EPM behave in the crisis period relative to the pre-crisis period, using

markets were indeed less efficient in valuing long-term corporate performance during the

the pre-crisis corporate segment structure (or distribution of sales) to calculate the imputed values in the post crisis period. One advantage of using the same corporate segment structure for each firm is that we can focus on differences in valuation effects between the two periods, as the imputed values are not influenced by any segment change effects. At the same time, however, for those firms that change their segment composition between the pre-crisis and crisis period, we might have a bias if, across all firms, actual value changed due to the shedding or acquiring of business segments with relatively low or high values in a common pattern.

Our presumption is that any changes during the crisis will have led to a higher imputed valuation using the original segment structure compared to the new, actual structure as diversified firms would more likely have shed loss-making segments in the crisis period. For example, if a diversified firm sheds its car-factory during the crisis, and all car firms were valued lower during the crisis period, the imputed value of the firm using pre-crisis weights would be below the imputed value of the firm using the post-crisis weights. As a result, the ratio of actual to imputed values would be higher using pre-crisis weights compared to using the post-crisis actual weights. Since our method more likely assigns higher actual relative to imputed values in the crisis period, it implies we have a bias against finding lower values for diversified firms, which would strengthen our results if we still find a lower value for diversified firms in countries affected by the crisis.

3.4. *Measuring Financial Development*

In previous studies, financial development has been measured in several ways: using per-capita GNP and the World Bank classification of income groups (Fauver et al. 1999); the ratio of banking assets to GDP and the ratio of market capitalization to

crisis, we would expect to find weaker results using EXV than using EPM.

GDP (Demirguc-Kunt and Levine, 1999); and the number of initial public offerings, number of firms listed on the stock market as a share of total firms, and the ratio of external market capitalization to GDP (La Porta et al. 1997). In this study, we use all three sets of measures as alternative proxies for the level of development of financial markets. For the set of countries we study, however, these indicators are not perfectly correlated and we can thus expect different results of the effect of financial development on the degree of diversification discounts. A priori, we expect that the proxies related to capital market development will be less powerful for our sample of firms, as firms in East Asia traditionally have relied on bank financing rather than on financing from capital markets.

4. Empirical Analysis

Panel A of Table 2 compares the mean and median of the excess profit margin (EPM) measure between the pre-crisis and crisis periods for all multi-segment firms and for multi-segment firms in three groups of countries classified using the World Bank income data.⁷ Panel B of Table 2 compares the mean and median of the excess value (EXV) measure between the pre-crisis and crisis periods for all multi-segment firms by the same income group as in Panel A.⁸

⁷ The World Bank classifies countries into four categories, namely, high income, upper-middle income, lower-middle income, and low income. The lower-middle income group includes Indonesia, the Philippines and Thailand, the high income group includes Japan, Singapore, Hong Kong and Taiwan, while the higher-middle income countries include Korea and Malaysia. There are no low income countries in our sample.

⁸ Note that many firms in East Asian countries are affiliated with business groups. As suggested by Wolfenzon (1999), group structures can be associated with divergence of cash flow rights from voting rights, and allow expropriation. Claessens, Djankov, Fan and Lang (1999) document this divergence of voting from cash-flow rights in East Asian corporations and show that it is associated with expropriation of minority shareholders. Khanna and Palepu (1999b) in contrast argue that business groups can act as guarantors of property rights in an environment where enforcement is weak. As a result, business groups enjoy advantageous access to foreign capital and technology providers who seek to safeguard the

The results are consistent with the internal markets hypothesis during good times. The mean and median pre-crisis EPM (Panel A) and the mean and median pre-crisis EXV (Panel B) exhibit a monotonic increase in the level of development, i.e., diversified firms in lower income groups have higher performance in the pre-crisis period than diversified firms in higher income countries, confirming the predictions of the internal markets hypothesis that firms in less-developed countries gain more benefits from diversification during good times.

The overall pattern is inconsistent, however, with the hypothesis that more diversification reduces risks. For all countries combined, the mean and median excess profit margin and excess value are negative in both the pre-crisis and crisis period. In other words, multi-segment firms under-performed single-segment firms in both periods. If diversification would have led to a reduction in risks, one would have expected that more diversified firms would have experienced a less dramatic decline in performance during the crisis period, and would thus have outperformed single segment firms at least in the crisis period. We find the opposite result, i.e., multi-segment firms perform worse than single-segment firms in the crisis period, and even worse compared to the pre-crisis period using all four measures (mean and median EPM and EXV), with the difference statistically significant and negative for the mean EPM. A comparison for different groups of countries shows that multi-segment firms outperform single-segment firms during the crisis period only in terms of mean EPM in lower-income countries, and even then their performance is worse in the crisis period compared to the pre-crisis period.

property rights of their investments. These enhanced property rights in turn can increase value. Since there are no a priori reasons, however, to believe that the net effects of these factors would change during an economic downturn, we control for these factors by taking the differences between the crisis and pre-crisis values of EPM and EXV.

The results are also inconsistent with the internal markets hypothesis during bad times. The median differences of EPM and the mean and median differences of EXV exhibit a monotonic decline in the level of development as diversified firms in lower income groups experience a more dramatic decline in performance, contradicting the predictions of the internal markets hypothesis that firms in less-developed countries gain more benefits from diversification during crisis periods. The differences are statistically significant at least at the 10 percent level for lower-middle-income groups for the EXV measure (Panel B), while the difference is significant for higher-middle-income group for the EPM measure (Panel A). The mean differences of EPM exhibit a less clear pattern, with the most significant decline in the mean EPM for the higher-middle-income group. However, the results are inconsistent with the internal markets hypothesis as diversified firms in high income countries exhibit the least performance decline.

To further test the impact of the Asian financial crisis on EPM for different levels of diversification and across stages of economic development, we perform the following two regressions:

$$EPM = \alpha + \beta_1*CRISIS + \beta_2*SEG + \beta_3*SEG*CRISIS + \beta_4*Log(ASSETS) + (\text{Fixed effects}) + u \quad (1)$$

$$EPM = \alpha + \beta_1*CRISIS + \beta_2*GNP + \beta_3*SEG + \beta_4*SEG*CRISIS + \beta_5*SEG*GNP + \beta_6*SEG*GNP*CRISIS + \beta_7*Log(ASSETS) + (\text{Fixed effects}) + u \quad (2)$$

where CRISIS takes the value 1 for firms reporting after December 1997, and 0 otherwise. We include the number of segments, SEG, or a dummy for diversification (=1 if more than 1 segment and 0 otherwise). The explanatory variables also include, depending on the specification, several interactive variables: SEG*CRISIS,

SEG*GNP, where GNP is per capita income for each country, SEG*GNP*CRISIS, and the natural logarithm of firm assets in thousands of US dollars (Log(ASSETS)) to control for any size effect.⁹ Whenever we do not include per capita GNP (not interacted) in the above regressions, we also control for country effects by including country dummies. Note that we do not need to control for the size of the crisis by country or industry since, by construction, EPM and EXV already adjust for changes in country-specific industry median values, hence the impact of different degree of crisis for each country and each industry is already removed. The regression is performed on the pooled sample.

Similar regressions are performed for EXV. If financial markets reflected the long-term performance of East Asian corporations less efficiently during the crisis, we would observe similar but weaker results for EXV than for EPM.¹⁰

Table 3 reports the regression results for EPM. Regression 1 reports the results for equation (1) and regression 2 for equation (2). The results indicate that corporations in East Asian countries performed worse during the financial crisis—the variable CRISIS is statistically significant negative, which is hardly a surprise. The negative significance of the diversification dummy variable SEG suggests that diversified firms perform worse than single segment firms in normal times. However, diversified firms do not perform worse than single segment firms during the crisis, as

⁹ Morck, Shleifer and Vishny (1988) argue that firm size should be included as a control variable since it may be correlated with firm value.

¹⁰ Fauver et al (1999) also control for operating margin and capital expenditure over sales ratios in their regression analysis. If we include the capital expenditure over sales ratio in the EPM regressions (since excess operating margin is the dependent variable, we cannot further control for operating margin itself), the results remain the same. However, since the capital expenditure over sales ratio is never significant in the EPM regressions and since we lose more than one-third of the crisis sample firms, we omit it from the analysis. If we include both control variables in the EXV regressions, the operating margin is significantly positive, while the capital expenditure over sales ratio is not significant. For the other independent variables similar but weaker results are obtained (not reported).

shown by the insignificant coefficient for the interactive variable $SEG*CRISIS$. This suggests that we can not reject the hypothesis that diversification reduces risks. We need to be cautious in interpreting this result, since we do not yet consider the degree of development which has a significant impact on performance as shown in Table 2. In particular, the effect of the variable $SEG*CRISIS$ needs to be further decomposed to incorporate the effect of economic development.

In the second specification, per capita GNP itself is insignificant, but $SEG*CRISIS$ becomes significantly negative at the 5 percent level which indicates that diversified firms perform worse than single segment firms during the crisis. This evidence demonstrates that there are no risk reduction benefits from diversification. In fact, diversification lowers profitability during the crisis, a finding which has not been documented in prior studies. It may be that the agency costs of diversified firms are higher during the crisis. It is also likely that the effects of misallocation of capital associated with more diversification (e.g., Shin and Stulz (1998) among others) become more serious during a crisis. In terms of the test of the internal markets hypothesis, we find that the interactive term $SEG*GNP$ is negative but marginally insignificant. This evidence is weakly consistent with the internal capital market hypothesis as diversified firms in less-developed countries appear to perform relatively better than firms in more developed countries in normal times.

We argue that the evidence of increased diversification leading to lower profit margins during a period of economic downturn is consistent with the notion that risks increase with the greater use of internal markets, especially in less-developed countries. To further confirm this hypothesis, we examine the coefficient of $SEG*GNP*CRISIS$. The negative impact of the crisis on EPM appears higher for

diversified firms in less-developed countries as $SEG*GNP*CRISIS$ is significantly positive at the 1 percent level. This result suggests that greater use of internal markets allows firms in less-developed countries to take on more overall risks, possibly because of the lesser degree of monitoring on investment projects funded by internal markets. This risk factor only surfaces during the economic downturn.

We repeat the regressions using the number of segments a firm is active in instead of the diversification dummy. Similar results are obtained, while the t-statistics are generally higher. In regression 4, per capita GNP is still insignificant, but the interactive term $SEG*CRISIS$ is significantly negative at the 5 percent level. These results suggest that diversification does not reduce risks, i.e., in a crisis period diversification reduces profitability more. In terms of the tests of the internal markets hypothesis, we find that the interactive term $SEG*GNP$ is significantly negative at the 5 percent level. This evidence is consistent with the internal capital market hypothesis that diversification hurts performance, but less so in countries with less-developed financial markets during normal times. The coefficient for $SEG*GNP*CRISIS$ is significantly positive at the 1 percent level, suggesting that diversification is more harmful in a crisis in less-developed countries.

Table 4 reports the regression results for EXV. Regressions 1 and 2 use the diversification dummy while regressions 3 and 4 use the number of segments. The results confirm the previous findings for EPM. Diversification hurts market valuation, especially in a crisis, as evidenced by the negative and significant coefficients for SEG and $SEG*CRISIS$ in several specifications. The negative valuation effect of diversification in a crisis is even worse for countries with less-developed financial markets, as the coefficient for $SEG*GNP*CRISIS$ is significantly positive for both

specifications. We can not confirm the internal capital market hypothesis during good times, however, as the interactive variable $SEG*GNP$ is no longer significant.

Tables 5 and 6 report similar regressions, using the proxies for the depth of financial markets as suggested in Demirguc-Kunt and Levine (1999). The regression in Table 5 is as follows:

$$EPM = \alpha + \beta_1*CRISIS + \beta_2*FDEV + \beta_3*SEG + \beta_4*SEG*CRISIS + \beta_5*SEG*FDEV + \beta_6*SEG*FDEV*CRISIS + \beta_7*Log(ASSETS) + (Fixed\ effects) + u$$

(3)

Where FDEV is either the ratio of bank assets to GDP ratio in columns (1) and (3), or the ratio of market capitalization to GDP in columns (2) and (4). As before, we find that diversification is associated with lower performance during the crisis since the coefficient on $SEG*CRISIS$ is always negative and significantly so, with the exception of regression (2). The negative effect of diversification is again worse during a crisis and in countries with less-developed financial markets, as the coefficient on $SEG*FDEV*CRISIS$ is always positive. The effect is statistically significant for the banking sector proxy and marginally insignificant for the capital market proxy, the latter possibly because firms in East Asia generally rely more on bank than capital markets financing. The coefficients on $SEG*FDEV$ are generally inconsistent with the internal market hypothesis in good times as firms in countries with more developed financial markets have better performance.

The regressions using EXV show a similar pattern (Table 6), albeit the results are less strong than those for EPM. We find larger diversification discounts during the crisis period, and these discounts are more prevalent in countries with less developed financial markets. As in the previous tables, the coefficients on $SEG*CRISIS$ are always negative, and they are statistically significant in regressions

(1) and (3). The coefficients on $SEG * FDEV * CRISIS$ are always positive, but again only significant in regressions (1) and (3).

For robustness purposes, we also use as proxies for financial market development the variables suggested by La Porta et al. (1997), i.e., the ratio of external capital to GDP, the number of initial public offerings relative to the country's population, and the number of publicly traded firms relative to the total number of firms (not reported). For all three proxies, we find consistent results, i.e., diversification hurts corporate performance more during the crisis period, and this pattern is more pronounced in countries with less developed capital markets. Unlike the results we report, however, the coefficients are almost always insignificant.¹¹ This is not surprising, since many firms in East Asian countries rely mostly on banks for their financing needs, and capital markets indicators may not be good proxies for financial market development.

5. Conclusions

In the context of corporate diversification, one answer to the frequently asked question why corporations diversify is that capital-constrained firms use internal capital markets to more effectively allocate scarce capital within the firm. This argument would imply that diversification would reduce risks for all levels of development, and that internal capital markets are most valuable in countries with less-developed financial markets. Indeed, previous evidence has found smaller diversification discounts for firms in developing countries.

We argue, however, that because investment projects funded by internal markets are less subject to monitoring than those funded by external capital markets, diversified firms may allocate capital to riskier projects, especially in countries with

less-developed financial markets. Empirically, we find that, while internal markets are more valuable in less-developed countries during good times, diversification leads to lower profit margins and lower valuation for firms in less-developed countries during a period of economic downturn. This suggest risks increase with greater use of internal markets, especially in less-developed countries.

Our findings suggest that internal markets are not always used to overcome financial market imperfections, while at the same time keeping risks constant or decreasing risks. Instead, they are often used to fund high-risk activities, which are more difficult to finance outside the firm. This suggests that focussing on good times and ignoring crisis periods in an analysis can underestimate the costs of internal markets in any country and can overstate the relative benefits of internal markets in less-developed countries.

¹¹ The exception is the ratio of publicly-traded firms to the total number of firms interacted with SEG and CRISIS, which has a positive coefficient.

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Table 1: Summary Statistics of Single and Multi-Segment Firms

The primary data source is Worldscope, amended by the Asian and Japan Company Handbooks. The sample spans the period 1991-1998. Firms with missing segment sales data are excluded. Firms with their primary business in financial services (SIC 6000-6999) are also excluded. Company segments are defined at the two-digit SIC code level. Firms are classified as single-segment if at least 90 percent of their total sales are derived from one two-digit SIC code segment. The remaining firms are classified as multi-segment firms.

Panel A: Pre-crisis period (1992-1996)						
	Multi-segment firms			Single-segment firms		
	Number	(Percentage of total firms)	Average assets (Millions of US\$)	Number	(Percentage of total firms)	Average assets (Millions of US\$)
Hong Kong	383	66	1181	198	34	895
Indonesia	73	42	693	101	58	393
Japan	6053	67	2901	2919	33	2279
Korea (South)	254	64	1687	141	36	2212
Malaysia	434	69	641	199	31	550
Philippines	31	34	533	60	66	407
Singapore	249	68	528	115	32	747
Taiwan	33	35	830	61	65	625
Thailand	106	27	460	291	73	342
All countries	7616	65	2494	4085	35	1846

**Table 1: Summary Statistics of Single and Multi-Segment Firms
(continued)**

Panel B: Crisis period (1997 and 1998)						
	Multi-segment firms			Single-segment firms		
	Number	(Percentage of total firms)	Average assets (Millions of US\$)	Number	(Percentage of total firms)	Average assets (Millions of US\$)
Hong Kong	159	65	1157	84	35	931
Indonesia	34	47	899	39	53	583
Japan	1357	69	2357	614	31	1969
Korea (South)	113	63	2300	66	37	2696
Malaysia	169	67	678	82	33	575
Philippines	17	37	816	29	63	604
Singapore	97	66	595	49	34	618
Taiwan	12	35	1268	22	65	869
Thailand	41	27	538	109	73	402
All countries	1999	65	1949	1094	35	1504

Table 2: Comparison of Performance for Diversified Firms Pre-Crisis and During the Crisis

This table compares the performance of diversified East Asian firms before and after the 1997 Asian Crisis. The sample includes 1999 firms from nine economies. Data reported on or after December 1997 are classified as crisis data. Data reported prior to that are classified as pre-crisis data. Performance is measured by excess profit margin (Panel A) and excess market value (Panel B). The firms are classified into three groups according to the income levels of their country origins. According to the World Bank definition, the high-income group includes firms from Hong Kong, Japan, Singapore, and Taiwan. The higher middle-income group includes firms from Korea and Malaysia. The lower middle-income group includes firms from Indonesia, the Philippines, and Thailand.

Panel A: Excess profit margin								
	Mean				Median			
	Crisis	Pre-crisis	Difference	T-statistic	Crisis	Pre-crisis	Difference	Z-statistic
All countries	-0.0200	-0.0118	-0.0082	-2.08**	-0.0250	-0.0230	-0.0020	-0.64
Income group								
High-income	-0.0141	-0.0136	-0.0005	-0.13	-0.0230	-0.0240	0.0010	0.29
Higher Middle-income	-0.0637	-0.0074	-0.0563	-3.72***	-0.0435	-0.0210	-0.0225	-1.83*
Lower Middle-income	0.0079	0.0302	-0.0223	-0.72	-0.0425	0.0040	-0.0465	-1.24
Panel B: Excess market value								
	Mean				Median			
	Crisis	Pre-crisis	Difference	T-statistic	Crisis	Pre-crisis	Difference	Z-statistic
All countries	-0.0369	-0.0272	-0.0097	-0.56	-0.047	-0.0418	-0.0052	-0.33
Income group								
High-income	-0.0237	-0.0304	0.0067	0.36	-0.0408	-0.0444	0.0036	0.14
Higher Middle-income	-0.0507	-0.0165	-0.0342	-0.62	-0.0747	-0.0325	-0.0422	-0.68
Lower Middle-income	-0.2365	0.0434	-0.2799	-2.42**	-0.1358	0.0435	-0.1793	-1.79*

Table 3: OLS Regressions of Excess Profit Margin (EPM) on Diversification and Economic Development

The primary data source is Worldscope, amended by Asian and Japan Company Handbooks. The sample spans the period 1991-1998. Firms with missing segment sales data are excluded. Firms with their primary business in financial services (SIC 6000-6999) are also excluded. Company segments are defined at the two-digit SIC code level. Firms are classified as single-segment if at least 90 percent of their total sales are derived from one two-digit SIC code segment. The remaining firms are classified as multi-segment firms. The dependent variable, excess profit margin, is defined in the text. Regressions (1) and (3) include country dummy variables (not reported). All regressions include year-dummies (not reported). Significance levels at 1, 5 and 10 percent are denoted by ***, **, and * respectively.

	SEG=diversification dummy		SEG=segment number	
	(1)	(2)	(3)	(4)
INTERCEPT	-0.1283*** (-7.75)	-0.1216*** (-7.61)	-0.1273*** (-7.70)	-0.1219*** (-7.41)
CRISIS	-0.0122* (-1.72)	-0.0124* (-1.73)	-0.0148* (-1.78)	-0.0154* (-1.84)
GNP		-0.0118 (-0.48)		0.0371 (0.12)
SEG	-0.0206*** (-5.00)	-0.0076 (-0.74)	-0.0109*** (-7.97)	-0.005* (-1.63)
SEG*CRISIS	0.0074 (0.83)	-0.0376** (-2.41)	0.0031 (1.09)	-0.0094** (-2.19)
SEG*GNP		-0.5448 (-1.57)		-0.2450** (-2.30)
SEG*GNP*CRISIS		1.6610*** (3.43)		0.4817*** (3.78)
LOG(ASSETS)	0.0103*** (8.52)	0.0101*** (8.51)	0.0112*** (9.23)	0.0109*** (9.14)
Adj. R-square	0.0099	0.0074	0.0128	0.0108
Number of Obs.	14794	14794	14794	14794

Table 4: OLS Regressions of Excess Market Value (EXV) on Diversification and Economic Development

The primary data source is Worldscope, amended by the Asian and Japan Company Handbooks. The sample spans the period 1991-1998. Firms with missing segment sales data are excluded. Firms with their primary business in financial services (SIC 6000-6999) are also excluded. Company segments are defined at the two-digit SIC code level. Firms are classified as single-segment if at least 90 percent of their total sales are derived from one two-digit SIC code segment. The remaining firms are classified as multi-segment firms. The dependent variable, excess value, is defined in the text. Regressions (1) and (3) include country dummies (not reported). All regressions include year dummies (not reported). Significance levels at 1, 5 and 10 percent are denoted by ***, **, and * respectively.

	SEG=diversification dummy		SEG=segment number	
	(1)	(2)	(3)	(4)
INTERCEPT	-0.3307*** (-6.36)	-0.2032*** (-4.03)	-0.3342*** (-6.42)	-0.2108*** (-4.06)
CRISIS	-0.0164 (-0.72)	-0.0211 (-0.93)	-0.0335 (-1.27)	-0.0401 (-1.51)
GNP		-2.7917*** (-3.61)		-2.3776*** (-2.60)
SEG	-0.0506*** (-3.90)	-0.0759** (-2.34)	-0.0162*** (-3.78)	-0.0144 (-1.48)
SEG*CRISIS	0.0113 (0.40)	-0.0879* (-1.79)	0.0098 (1.10)	-0.0107 (-0.79)
SEG*GNP		0.8136 (0.74)		-0.0457 (-0.13)
SEG*GNP*CRISIS		3.8825*** (2.54)		0.8603** (2.14)
LOG(ASSETS)	0.0260*** (6.83)	0.0230*** (6.12)	0.0268*** (6.97)	0.0231*** (6.11)
Adj. R-square	0.0073	0.0043	0.0072	0.0034
Number of Obs.	14702	14702	14702	14702

Table 5: OLS Regressions of Excess Profit Margin (EPM) on Diversification and the Development of the Banking System and Capital Markets

The primary data source is Worldscope, amended by the Asian and Japan Company Handbooks. The sample spans the period 1991-1998. Firms with missing segment sales data are excluded. Firms with their primary business in financial services (SIC 6000-6999) are also excluded. Company segments are defined at the two-digit SIC code level. Firms are classified as single-segment if at least 90 percent of their total sales are derived from one two-digit SIC code segment. The remaining firms are classified as multi-segment firms. The dependent variable is excess profit margin (EPM). FDEV in equations (1) and (3) is the ratio of bank assets to GDP and the ratio of market capitalization to GDP in equations (2) and (4). The variables come from Demircuc-Kunt and Levine (1999). All regressions include year dummies (not reported). Significance levels at 1, 5 and 10 percent are denoted by ***, **, and * respectively.

	SEG=diversification dummy		SEG=segment number	
	(1)	(2)	(3)	(4)
INTERCEPT	-0.0991*** (-5.29)	-0.0814*** (-4.39)	-0.1129*** (-5.43)	-0.0881*** (-4.93)
CRISIS	-0.0136* (-1.89)	-0.0105 (-1.47)	-0.0144* (-1.72)	-0.0159* (-1.90)
FDEV	-0.0233** (-2.18)	-0.0354*** (-5.16)	-0.0084 (-0.59)	-0.0222** (-2.88)
SEG	-0.0196 (-1.04)	-0.0573*** (-6.24)	-0.0571 (-0.21)	-0.0172*** (-5.98)
SEG*CRISIS	-0.0659** (-2.49)	-0.0222 (-1.58)	-0.0236*** (-3.14)	-0.0078* (-1.74)
SEG*FDEV	-0.0022 (-0.18)	0.0388*** (4.25)	-0.0093* (-1.84)	0.0059** (2.38)
SEG*FDEV *CRISIS	0.0542*** (2.95)	0.0182 (1.48)	0.0219*** (3.83)	0.0043 (1.43)
LOG(ASSETS)	0.0104*** (8.79)	0.0093*** (7.89)	0.0110*** (9.34)	0.0096* (8.44)
Adj. R-square	0.0079	0.0089	0.0109	0.0104
Number of Obs.	14702	14702	14702	14702

Table 6: OLS Regressions of Excess Market Value (EXV) on Diversification and the Development of the Banking System and Capital Markets

The primary data source is Worldscope, amended by the Asian and Japan Company Handbooks. The sample spans the period 1991-1998. Firms with missing segment sales data are excluded. Firms with their primary business in financial services (SIC 6000-6999) are also excluded. Company segments are defined at the two-digit SIC code level. Firms are classified as single-segment if at least 90 percent of their total sales are derived from one two-digit SIC code segment. The remaining firms are classified as multi-segment firms. The dependent variable is excess value (EXV). FDEV in equations (1) and (3) is the ratio of bank assets and the ratio of market capitalization to GDP in equations (2) and (4). The variables come from Demirguc-Kunt and Levine (1999). All regressions include year dummies (not reported). Significance levels at 1, 5 and 10 percent are denoted by ***, **, and * respectively.

	SEG=diversification dummy		SEG=segment number	
	(1)	(2)	(3)	(4)
INTERCEPT	-0.1229** (-2.08)	-0.2345*** (-4.32)	-0.1353** (-2.05)	-0.2452*** (-4.36)
CRISIS	-0.0186 (-0.84)	-0.0097 (-0.43)	-0.0344 (-1.32)	-0.0274 (-1.08)
FDEV	-0.1044*** (-3.09)	-0.0283 (-1.28)	-0.0882** (-2.16)	-0.0312 (-1.42)
SEG	-0.1757*** (-2.92)	-0.1602*** (-5.07)	-0.0324 (-1.62)	-0.0362*** (-4.03)
SEG*CRISIS	-0.1692** (-2.12)	-0.0082 (-0.14)	-0.0424* (-1.79)	-0.0058 (-0.36)
SEG*FDEV	0.0987** (2.03)	0.1118*** (3.86)	0.0182 (1.20)	0.0181** (2.30)
SEG*FDEV *CRISIS	0.1619** (2.46)	0.0052 (0.16)	0.0444** (2.45)	0.0062 (0.26)
LOG(ASSETS)	0.0208*** (5.63)	0.0217*** (5.88)	0.0204*** (5.52)	0.0213*** (5.82)
Adj. R-square	0.0046	0.0052	0.0037	0.0039
Number of Obs.	14702	14702	14702	14702