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Evolution of Capital Structure in East Asia - Corporate Inertia or Endeavours?

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Evolution of Capital Structure in East Asia – Corporate Inertia or Endeavours?

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Abstract: The present paper examines the capital structure adjustment dynamics of listed non-financial corporations in seven East Asian countries during 1994-2002. Compared to firms in the least affected countries, average leverages were much higher among firms in the worst affected countries while the average speeds of adjustment were lower. This general ranking is robust to various alternative specifications and sample selections. We argue that this pattern is closely linked to weaknesses in regulatory environment and lack of access to alternative sources of finance in the worst affected countries.
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Evolution of Capital Structure in East Asia – Corporate Inertia or Endeavours?

1. Introduction

Recent Asian crisis literature has attributed the problems of over-borrowing and over investment among the East Asian corporations to the moral hazard of bad loans in capital markets (e.g., see Corsetti et al. 1999a). These issues have primarily been analysed in the context of an aggregate economy (that sometimes relied on anecdotal evidence as well); there is however little, if any, micro-economic firm-level evidence to corroborate these views. While the existing corporate finance literature (e.g., Claessens, et al., 2000; Driffield and Pal, 2001, Driffield, Mahambare and Pal, 2007) highlights aspects of excessive leverage and overinvestment, separation of control from management, weak legal rules and enforcement that left East Asian corporations vulnerable to an economic downturn, there is little/no understanding as to how these East Asian corporations have chosen, and subsequently adjusted (partially/fully) their debt ratios during this period. It is still not clear as to how behaviour of firms in Singapore, Taiwan or Hong Kong differed in this respect from their counterparts in Indonesia, Korea, Malaysia or Thailand or for that matter whether these firms learnt from their mistakes during the crisis period and altered their adjustment behaviour subsequently. This paper is an attempt to respond to some of these unanswered questions. The paper investigates the choice of capital structure and also its evolution among large non-financial East Asian corporations in a group of seven countries (incorporating the worst and the least affected countries) during 1995-2002, which included the last Asian crisis of 1997-98. It is an important exercise because it could improve our understanding of the crisis. A slow pace of adjustment (even in the face of over-borrowing and deteriorating assets position) could, for example, lend support to the moral hazard view of the crisis being the result of lack of monitoring and/or prudential regulation of bank dominated system of finance in the region. Our choice of sample countries also allows the comparison of corporate behaviour in the least and the worst affected countries, and thus identify ways to avert the worst of the crisis. Our choice of sample period also allows us to compare and contrast the corporate behaviour, especially those financially distressed before, during and after the crisis and thus to detect signs of recovery, if any.

While there is very little understanding of optimal capital structure and its dynamics in developing and transition countries (with the exception of Booth et al. 2001), there is a rather well-developed literature on the dynamics of capital structure adjustment among the US corporations. A common theme in this strand of the literature is that if a firm's actual leverage deviates from the desired (or optimal) leverage, it will undertake some adjustment process to attain the optimal leverage. However, capital market imperfections may prevent an instantaneous adjustment of the actual leverage to the desired level, (for example, see Fischer, et al, 1989; Leyland 1998). This highlights the controversy about the speed of adjustment, much of which could be attributed to methodologies employed. For example, Baker and Wurgler (2002) used OLS and Fama-McBeth methods to obtain average adjustment rates across various sub-samples employed (which clearly ignores the impact of firm-level heterogeneities) and found firms typically close less than 12% of the gap between the actual and the target leverage each year. Flannery and Rangan (2006) used panel data to analyse the adjustment behaviour of firms using standard fixed effects estimates though their analysis did not appropriately address the endogeneity problems. They argued that a typical firm converges on its long run target at more than 30% a year, a speed that is more than double than the previous estimates. In contrast, Lemmon et al.

(2006) found that capital structure is remarkably stable over time for both publicly traded and privately held firms and argue that high speed of adjustment in Flannery and Rangan may be attributed to firm entry and exit.

Our study focuses on large listed non-financial firms in Indonesia, Korea, Malaysia and Thailand over a period of 1995-2002, the countries worst affected by the last crisis of 1997-98, compared with Hong Kong, Singapore and Taiwan that were relatively unaffected by the crisis. Clearly these Asian countries are different from the US where bank-based system of finance still predominates. There is however little understanding of the operation of credit markets and adjustment of corporate capital structure in these countries, and this paper aims to fill in this gap of the literature. The sample countries included are not only at different stages of capital market developments (see for example Demirguc-Kunt and Maksimovic, 1995; 1999), but are also sufficiently different in terms of the institutional environment (see Table 1 and further discussion in section 1). As such the choice of the sample countries offers interesting contrasts and thus justifies our approach of analysing corporate behaviour separately for each country rather than pooling them together.

We use Worldscope firm-level data from listed non-financial firms in the selected countries over a period of 1994-2002 that has been used elsewhere (e.g., see Claessens et al. 2000). As we explain later (see section 2), the choice of the sample period 1995-2002 has been dictated by the missing observations for a number of years that we could not retain in a dynamic analysis of this type. Although in view of the longer time span used in the related capital structure literature pertaining to the US corporations, sample period 1995-2002 appears to be a relatively short, this eventful period allows us to analyse the corporate capital structure behaviour of East Asian corporations before, during and after the last Asian crisis of 1997-98. As such, the analysis offers an explanation of the crisis and also recovery in its aftermath.

Existing capital structure literature while quite well-developed, tend to predominantly assume that all firms have a common speed of adjustment (with the exception of Jalivand and Harris, 1984). Our analysis in stead highlights aspects of heterogeneity among sample firms, based for example on different sizes, leverage and debt composition. As such, we allow firms to have firm- and time-varying speeds of adjustment, and compare these flexible estimates with estimates of more conventional models commonly available in the literature. Unlike OLS and SUR estimates on pooled data used by Jalivand and Harris (1984), we employ Generalised Methods of Moments (GMM) to estimate firm and time-varying speeds of adjustment from panel data; GMM takes account of the endogeneity bias arising from the inclusion of lagged dependent variable. Third, the previous work seeking to determine speed estimates generally assumes a smooth optimal adjustment mechanism over the period of adjustment, in that a firm will adjust to target leverage only when the benefits of doing so exceeds the costs involved. However, this type of optimal adjustment may not be possible for financially distressed firms during the crisis time; the latter may require sudden (as opposed to smooth) adjustment. In the light of the available information, we use liquidity ratios (ratio of cash flow to current liability) to identify the financially distressed firms and examine if their adjustment behaviour has been different from the full sample, which remains hitherto unexplored in the crisis literature. Finally, we compare the firm- and time-varying speed estimates with alternative estimates available in the literature and also check the robustness of these estimates by considering its variation across firm size, leverage size, composition of debt. We also provide alternative estimates using net leverage (i.e., leverage net of cash flow); the advantage of the latter is that it allows us to distinguish the behaviour of financially constrained firms from others and is also nicely linked to the measure of financial distress that we use.

While the average leverages were much higher among firms in the worst-affected countries, there is evidence from our analysis that their average speeds of adjustment were lower than those in the least affected countries. This general ranking is robust to various alternative specifications of the sample and also the leverage measures used. We argue that this pattern is closely related to weak institutional framework for debt issuance, monitoring and recovery in the worst affected countries. However, even in a given institutional set-up, more prudent behaviour paid off, in that firms with zero/lower debt (relative to their assets) or those with more cash flow could adjust faster and thus avoid the worst of the crisis. Access to market-based finance was also important, especially for firms in Hong Kong, Singapore and Taiwan, who could adjust more speedily and could thus avert the worst of the crisis. While better institutions and access to market-based finance helped Malaysian firms to maintain relatively lower leverages, it was not effective enough to ensure speedy capital structure adjustment. The paper concludes with a summary of our findings.

2. DATA AND INITIAL ANALYSIS

The analysis is based on the Worldscope firm-level data for all listed non-financial firms in the sample countries, which has been widely used (e.g., see Claessens et al. 2000; Ulbricht and Weiner, 2005). The number of firms and total observations in each country over the sample period 1995-2002 are summarised in Table 3.

2.1. Financial Crisis and Capita Structure in East Asia

There is now a growing consensus that the financial fragility in these economies was one of the main factors for the last Asian crisis of 1997-98. This has been highlighted in ineffective financial supervision and regulation in the context of countries' financial sector liberalizations. Capital account liberalization was poorly sequenced, encouraging short-term borrowing, while limited exchange rate flexibility led borrowers to underestimate the exchange rate risk. Monetary policies allowed domestic credit to expand at a breakneck pace. But if banks and corporations in these countries borrowed imprudently, foreign lenders also lent imprudently, possibly reflecting sloppy risk management, perceptions of implicit government guarantees, and the incomplete information available. To a large extent, this was the result of a long spell of unprecedented economic growth in East Asia in the 1980s and early 1990s. Strong growth and generally prudent macroeconomic management, as seen in continuous public sector fiscal surpluses over the same period, had attracted large capital inflows, much of them being short-term.

In the light of our available data, we experimented with various leverage measures. First we tried to construct a ratio of total debt to market value of equity (as we did not have book value of equity); this was however problematic for the estimation of the dynamic model as many firms had negative equity values during the crisis period. So the capital structure in our analysis is measured by the ratio of total debt (short and long-term) to total assets. Following Almeida, Campello and Weisbach (2004) we also construct a net leverage (leverage net of cash flows) measure. Given that Almeida, Campello and Weisbach (2004) found that cash flows are sensitive to cash savings only for financially constrained firms, it is expected that net leverage could be more relevant for financially constrained firms during the crisis period. This allows us to examine the robustness of our speed estimates using alternative leverage measures. Similar measures are used in Rajan and Zingales (1995), though they considered a group of firms in the west. Booth et al. (2001) included some of the countries used in our study though they used debt-equity ratio as the relevant measure of leverage (see Table 1).

A comparison of mean leverages across the sample countries (see Table 1) is quite revealing. Among the worst affected countries, Malaysia has the lowest mean leverage (0.37) while the other three countries have comparable figures (around 0.47). In contrast, the average is about half in the least affected countries (Hong Kong: 0.24, Singapore: 0.22 and Taiwan: 0.26). To a large extent, these differences are consistent with the underlying differences in the institutional characteristics, especially those relating to legal/monitoring environment in the region (Table 1). Malaysia had developed more effective bankruptcy and foreclosure laws, as well as stronger supervisory capacity even before the crisis and the banking sector was also well capitalized compared with the other affected countries. This is reflected in the better scores for the rule of the law, creditors' rights, and shareholders' rights in Malaysia (compared to other sample countries). In contrast, Indonesia seems to be at the bottom end of the scale in all these respects. As a result, Indonesia's progress in corporate restructuring has been disappointing. The three least affected countries have comparatively well functioning institutional frameworks, more comparable with the developed countries, and firms in these countries had significantly lower leverages. Lower leverages in all the least affected countries and Malaysia among the worst affected countries could also be a reflection of access to alternative market based financings. This is reflected in higher scores of market capitalisation and total value traded (as shares of GDP) in Hong Kong, Malaysia and Singapore (we could not find the comparable figure for Taiwan though).

2.2. Evolution of capital structure

It is also important to examine the evolution of capital structure over time. In order to do this we characterise our time frame as three sub-periods: (a) pre-crisis period 1994-96; (b) crisis period 1997-98 and (c) post-crisis period 1999-02. Average total debt, total assets and debt ratios over these sub-periods across small, medium and large firms in the sample countries are shown in Table 2. A few observations are noteworthy: (i) larger sample firms tend to have more debt, on an average, in all the sample countries across all three sub-periods. This is also reflected in significant and positive correlation between firm size and leverage in four out of seven sample countries (with the exception of Malaysia, Singapore and Taiwan where the correlation coefficients are positive, but not significant). (ii) There are some zero-debt firms in each of the sample countries. While the proportion of firms with zero debt is fairly limited across the sample countries, the relative proportion is the highest in Malaysia (7%) and lowest in Korea (1%). Correlation between firm size and leverage holds even if we exclude the zero-debt firms (with the exception of Malaysia). (iii) For firms of a given size, average leverages are generally stable across the sub-periods among firms in the least affected countries while these increased significantly during the crisis period for firms in the worst affected countries (Malaysia being an exception). (iv) Increases in leverages in the crisis period are generally associated with an increase in average leverage, but decrease in assets among firms in the worst affected countries, thus highlighting the aspect of imprudent debt management.

We also examine the quartile distribution of leverage for each year during the sample period. In particular, we focus on the period 1995-2002 (see Table 3), as this is used for our dynamic estimation (see sections 3 and 4). This allows us to classify firms into four quartiles of leverages. Clearly debt ratios fluctuate somewhat for firms in the worst affected countries over this period, especially among those in the top quartile and in all these cases there has been a peak in the crisis years 1997-98. More interestingly, firms in the top leverage quartiles in the worst affected countries tend to experience higher fluctuation (i.e., standard deviation) over the sample period.

Taken together there is evidence that larger firms tend to be more leveraged, especially in the worst affected countries (with the exception of Malaysia). The latter seems to highlight their easier access to capital. Effective interest rates (i.e., total interest expenses as a ratio of total debt) are potentially important determinants of the firm's ability to continue borrowing, and thus to engage in further investment projects. The difference in the mean effective interest rate between firms in the top leverage quartile and all other firms (see Appendix Table A2) is significant for all the countries; note however that the difference is the smallest for Taiwan and Singapore (two of the least affected countries in our sample). This observation is in line with Kurshev and Strebulaev (2006). However unlike Kurshev and Strebulaev (2006), the relationship between firm size and leverage remains positive and significant for all sample countries except Malaysia (where the relationship turns out to be significantly negative), as we exclude the zero-debt firms.

Table 4 shows the average share of long-term to total debt in the sample countries which in turn reflects the implicit share of short-term debt to total debt. Clearly, the average share of long-term (short-term) debt is the highest (lowest) in Korea and the country had also the lowest proportion (3%) of firms relying only on short-term debt. These rates are however quite comparable among the other sample countries (ranging between 0.60-0.65). In section 4, we shall analyse the implications of the composition of debt on the average speed of adjustment.

Claessens et al. (2002) highlight the aspects of ownership and its link to firm value. Elsewhere (Driffield et al. 2007) we have shown that the link between ownership and firm value in East Asian corporations is closely linked to the link between ownership and leverage. However this ownership information is available only for the year 1996 and there have been significant changes in ownership in the sample countries, especially after the crisis. Consequently, we cannot use this information in the present context.

3. Methodology

We start with the simple partial adjustment model that assumes a common speed of adjustment for all firms, used by Flannery and Rangan (2006) and Lemmon et al. (2006), among others. However, in view of the restriction of common speed first noted by Jalivand and Harris (1984), we extend theses conventional models and estimate partial adjustment models with (a) firm-specific and (b) firm- and time-varying speeds of adjustment.

3.1. Partial adjustment models

Let the optimal leverage of a firm i at time t be L_{it}^*. In the absence of any market imperfection, and with instantaneous adjustment, the observed leverage L_{it} of firm i at time t would be equal to its optimal, i.e. $L_{it} = L_{it}^*$. If, however, adjustments are costly, for example, due to agency and/or transaction costs, $L_{it} < L_{it}^{*}$; alternatively, if loans are cheap and easily available, adjustment would be relatively costless (e.g., for many East Asian corporations in our sample), $L_{it} > L_{it}^{*}$. In either case, firms may fail to adjust completely to the optimal level within one period of time.

In these circumstances, the movement of leverage over time becomes a partial adjustment process, of the form:

$$\Delta L_{it} = L_{it} - L_{it-1} = \alpha + \beta(L_{it}^{*} - L_{it-1}) + \varepsilon_{it} \qquad \text{(Model 1)}$$

Thus changes in leverage depend on its adjustment from period t-1 towards the optimum in period t, where β is the speed of adjustment. If β = 1, any firm will adjust its leverage fully to its optimum from period t-1 to period t (i.e., within one period). If, however, β <1, then the adjustment from year t-1 to t falls short of the adjustment required to attain the target. In contrast, β > 1 would indicate evidence of over-adjustment within the period. The most apparent effects of adjustment costs would therefore be periods of inactivity as agents wait for the benefits of adjustment to outweigh the costs (for example, firms wait until the increased tax benefits offset the debt issuance costs in Fisher et al. ,1989), thus resulting in slower speed of adjustment (β <1).

With the optimal level of leverage, L_{it}^{*} determined by a vector X_{it} such that $L^{*}_{it} = \theta X_{it-1}$. Then model (1) could be rewritten in level form as follows:

$$\begin{aligned} L_{it} &= \alpha + \beta L_{it}^{*} + (1-\beta)L_{it-1} + \varepsilon_{it} \\ &= \alpha + \beta\theta X_{it-1} + (1-\beta)L_{it-1} + \varepsilon_{it} \end{aligned} \qquad \text{(Model 2)}$$

Instead of estimating the *first difference* model (1), following Flannery and Rangan (2006), for example, we employ model (2) to estimate a model of the *level* of debt ratios. This model assumes that the optimal debt ratio L^* is determined by including a set of lagged explanatory variable X_{it-1}. The vector of explanatory variables includes a number of firm characteristics commonly used in the literature (e.g., Rajan and Zingales, 1995; Flannery and Rangan, 2006). Thus in addition to the lagged leverage, we include firm size measured by the log of total assets (larger firms tend to operate with more depreciation), share of fixed assets in total assets (firms with greater tangible assets tend to have higher debt capacity), depreciation as a proportion of total assets (firms with more depreciation have less need for the interest reductions associated with debt financing), Tobin's Q (i.e., a ratio of firm's market value to total assets as a proxy for more attractive future growth options which in turn may lower leverage) and research and development expenses as a share of total assets (firms with more intangible assets may prefer to have more equity rather than debt, though this variable is missing for two countries). We however did not include the share of EBIT in total assets because it is likely to be endogenous, and collinear with Q. We also include firms' lagged industry median debt ratio to control for industry characteristics not captured by other explanatory variables. The analysis of capital structure dynamics focuses on the coefficient of lagged dependent variable and obtaining the speed of adjustment β from the estimate of $(1-\beta)$. This allows one to compare estimates of models (1) and (2). Means and standard deviations of all explanatory variables for the full sample are summarised in the Appendix Table A1.

Lemmon et al. (2006) employ a partial adjustment model similar to (2), but instead of lagged leverage as an explanatory variable, they include firm's *initial* leverage as the relevant model. We replicate this model with our data, based on the initial year of 1995.

$$L_{it} = \alpha + \beta L^*_{it} + (1-\beta)L_{i,1995} + \varepsilon_{it}$$
$$= \alpha + \beta X_{it-1} + (1-\beta)L_{i,1995} + \varepsilon_{it} \quad \text{(Model 2a)}$$

Flannery and Rangan (2006) however are concerned with explaining changes in leverage within a relatively static model, where changes in leverage are related to a set of explanatory variables in levels. We extend this in two ways. Firstly, as explained in detail below, we allow the speed of adjustment to vary across firms, and also over time. Secondly, we also incorporate the dynamics of the explanatory variables. There has been a debate in recent years concerning the extent to which firms do indeed target their leverage, see for example Welch (2004). However, what is clear from this literature, is that the extent to which the evidence from work such as Flannery and Rangan (2006) supports a partial adjustment process in leverage, such that leverage responds to not only the difference between the actual and optimal levels, but also to changes in the observed long run fundamentals. Firstly, firms, perceiving themselves in disequilibrium will adjust, in any situation where the benefit exceeds the cost. This can be captured by the lagged difference between optimal and actual leverage. However, these models ignore a second point, which is that leverage may also move if there are contemporaneous changes in the explanatory variables. Most work in this area finds that Q ratios are inversely related to leverage. If therefore a firm undertook a series of investments and if it subsequently were well regarded by equity markets, then the firm may well find it optimal to reduce leverage. This is independent of the difference between L and L* in the previous period, but is determined by movements in L* in the current period. Ignoring this second stimulus for adjustment may cause bias in any estimate of the speed of adjustment attributed to the first form of adjustment alone. This then leads to a class of models that are common in factor demand modelling (see for example Hamermesh, 1995) that has this additional adjustment term.

We therefore consider an extended version of (1) as well that includes a second adjustment parameter γ measuring the response of the debt ratio to the annual change in the optimal leverage over the current period (ΔL_{it}^{*})

$$\Delta L_{it} = L_{it} - L_{it-1} = \alpha + \beta(L_{it}^{*} - L_{it-1}) + \gamma(L_{it}^{*} - L_{it-1}^{*}) + \varepsilon_{it} \qquad \text{(Model 3)}$$

It is clear therefore that there is a crucial difference between models (1), and (3); the standard model (1) ignores the effects of changes in the optimal leverage from the previous to the current period and only focuses on the adjustment of lagged leverage towards the previous optimal level. Thus Model 3 is an augmented version of Model 1. The significance or otherwise of the additional term is then an empirical issue that we explore here.

Note however that estimating the speed of adjustment using a common β for all firms over a period of time 1995-2002 is potentially problematic because it imposes a restriction that all sample firms (with different characteristics) tend to adjust with the same speed, even when firms are clearly heterogeneous in terms of its characteristics. Perhaps this explains why firm-specific unobserved factors play such an important role in Lemmon et al. (2006), and in general why much of the literature discussed above finds such varying results in identifying any adjustment process and the implied speed. We therefore seek to capture this heterogeneity with a vector of firm specific characteristics, and to allow for the possibility that $\beta_{it} \neq \beta$ and test the validity of alternative hypotheses in our samples: (a) $\beta_{it} = \beta_i$ for all i, so that in stead of a common speed of adjustment, there is a firm-specific (but time invariant) speed of adjustment – in other words, for any firm i, the speed β_i does not change from one year to the next during the sample period 1995-2002. Based on the wider literature of firm level adjustment of activities such as capital investment as well as leverage, the variables included are stock returns, debt coverage, firm size and Q ratio. In addition, we also include a firm-specific binary variable D_i that takes a value 1 if $L_{it} < L^*_{it}$ for at least 5 of the sample years and zero otherwise. Crucially, this incorporates some non linearity into the model, identifying whether the adjustment speed is higher or lower among firms who tend to borrow more or less than the optimal. Accordingly, we modify model (3) as follows:

$$\Delta L_{it} = \alpha + \beta_i (L^*_{it} - L_{it-1}) + \gamma \Delta L^*{}_{it} + \varepsilon_{it}$$

$$\textit{where} \qquad \text{(Model 4)}$$

$$\beta_i = \beta_0 + \beta_1 D_i + \beta_2 Q_i + \beta_3 Size_i + \beta_4 DC_i + \beta_5 SR_i$$

Thus, we estimate a partial adjustment model where the firm-specific speed of adjustment β_i depends on *firm-level average values* of Tobin's Q, firm size, debt coverage ratio and stock returns over the sample period.

(b) Finally we allow for the possibility that the speed of adjustment β_{it} would vary not only across firms, *but also over time*, thus giving rise to a fully flexible model as follows:

$$\Delta L_{it} = \alpha + \beta_{it} (L^*_{it} - L_{it-1}) + \gamma \Delta L^*{}_{it-1} + \varepsilon_{it}$$

$$\textit{where} \qquad \text{(Model 5)}$$

$$\beta_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 Q_{it-1} + \beta_3 Size_{it-1} + \beta_4 DC_{it-1} + \beta_5 SR_{it-1}$$

In contrast to model (4), variables explaining β_{it} vary across firms and also over time; note also that D_{it} takes a value of 1 if $L_{it} < L^*_{it}$ and zero otherwise.

Thus, model (5) allows for the possibility that the potential speed of adjustment will differ among firms and also over time, depending on whether the leverage is more or less than its equilibrium level (D_{it}) and the vector of other firm- and time-specific variables, including the distress it is operating under. Both models (4) and (5) assume that the possible determinants of the speed of adjustment (β_i, β_{it}) include firm size (SALES) and profitability (Q) of sample firms. Larger and more profitable firms are more likely to have more flexibility in adjusting the actual leverage towards the optimal leverage and therefore may have a higher speed of adjustment. It is expected that firms with higher stock returns may find it easier to adjust DE towards the optimum because they could substitute equity finance for debt finance. In order to control for this financial effect, we include annual stock returns (SR). Finally, we experiment with some conventional measures of distress that the firm is operating under, namely, cash flow as a share of current liability, interest coverage (interest payments as a share of cash flow) as well as debt coverage ratio (DC) defined as current total debt as a share of cash flow and include debt coverage in the final specification as this yields the best set of estimates (see Appendix Table A1 for descriptive statistics).

Thus our methodology goes beyond the existing empirical literature on capital structure dynamics; this approach not only allows us to derive firm and/or time-specific speed of adjustment, but also to identify the factors determining the speed of adjustment.

3.2. Estimation method

In this subsection, we discuss the estimation method used for various models (1)-(5) described in section 3.1.

3.2.1. Determination of optimal leverage

Much of the previous literature in this area derives an estimate for the long run, or optimal level of leverage, typically based on a static version of (2). Typically these employ simple cross sectional analysis, or panel data with fixed effects. This ignores the importance of past levels in explaining the current level, and therefore we employ a dynamic specification, employing the Blundell-Bond method discussed below.

If leverage levels are relatively stable over time, then a simple average of the fitted values for each firm across time may provide the best estimate of optimal leverage. However, if the data are more volatile (as in our case), and firms are responding to changes in the explanatory variables, or to other shocks, then allowing the optimal level to vary year to year, and using the fitted values on an annual basis is more appropriate, and this is what we do here. Once one allows for this, the best estimate of "optimal leverage" is the fitted value derived from this estimation, rather than a more standard least squares fixed effect model. These results from the estimation of the optimal leverage model are presented in Table 3, and discussed in detail below.

As Strebulaev (2007) points out, models seeking to explain optimum levels of leverage may be biased if a high proportion of firms are a long way away from their optimal level. This argument is similar to that made by Welch (2004) in that identifying any such target or optimal leverage can be problematic. Dynamic panel models can to an extent address this, but as the referee points out, there is no definitive test for this, or the parsimonious form of the final model. However, the fit of our models is good; in general the lagged dependent variable is significant. In addition, it is encouraging that testing the models for various sub-samples, based on levels of leverage, firm size, amount of debt, value of assets etc. offers robust results; so it appears that this is not a significant problem.

3.2.2. Level estimates

Flannery and Rangan (2006) estimated model (2) using fixed effects with various instrumental variable estimates. However, as indicated by Lemmon et al. (2006), one needs to use a GMM estimator such as the one developed by Blundell-Bond (B-B hereafter) to address the endogeneity problem. The final consideration with panel data is that the standard errors are potentially biased downwards if the data are correlated through time. As such one has to allow for this "clustering" on individuals to allow for otherwise downward bias on the standard errors. For further discussion see Wooldridge (2002) or Froot (1989).

A consideration with data and models such as the one presented here is the extent to which lags (and particularly lags of differences) are valid instruments, particularly when considering lags of 5 years or more. The use of "initial" variables – i.e., the first year for which one has data, are designed to reflect long run differences between firms. Indeed some have argued that these variables are determined outside of the model, and are therefore exogenous. This can be applied where one has a very long panel, and as such the time differences between the period under consideration and the initial period is very long. However, in shorter panels, one still has the possibility of this being a pre-determined variable a la Arrellano and Bond (1988, 1992), and therefore must be tested at least for weak exogeneity. We do this, and the hypothesis of exogeneity is strongly rejected. Indeed, given that Flannery and Rangan (2006) obtain t values of over 100 for the significance of this variable, this may be a common problem in such data. As such, we are left with three alternatives: (a) assume this variable reflects merely firm level differences, treat it as exogenous and proceed with caution. (b) Shorten the time period under review, and instrument with additional lags. (c) Find an alternative instrument. We employ the third option; we use the fitted value from the levels regression for the initial year. This is only done for model 2 – the model with the initial conditions variable. For all other models, we proceed in a relatively standard manner. We simply use all available lags within the GMM framework. It is therefore crucial to be careful in testing for instrument validity in each of the models, and Sargan tests for instrument validity are presented in the results tables. However, during the crisis period, the data are quite volatile, and the standard test of instrument validity rejects their use. As a result, all available lags are used for all years except for the crisis period where the values of leverage are not valid instruments for the final year of the samples.

There remains the possibility that the estimate of the coefficient on the lagged dependent variable has an upward bias if the panel data exhibits significant heterogeneity (Pesaran and Smith, 1995). There is no definitive test for this, but a reasonable test with these data is to allow for interaction dummies with the lagged dependent variable. Interacting the lagged dependent variables with a vector of industry level dummy variables allows the parameter on the lagged dependent variable to vary across industries. However, standard specification tests reject the inclusion of such variables, suggesting that heterogeneity is not a problem in these data. We also test for 1st and 2nd order serial correlation: (Doornik *et al*. 2002). The appropriate AR1 and AR2 tests are then based on average residual autovariances, which are asymptotically distributed N(0,1). Finally, as a further test of the GMM system estimator, we report the Sargan difference test. In none of our regressions are the additional moment conditions suggested by the GMM systems estimator rejected.

3.2.3. First difference estimates

Note however that models (1) and (3-5) all have the changes in leverage as the dependent variable. We use a simpler generalised method of moments instrumental variable (GMM-IV) to estimate these equations. This employs the estimation procedure outlined in some detail by Sevestre and Trognon (1996). This approach is common for example in labour demand modelling, where a non-linear adjustment process is assumed. For further discussion of this, see Hamermesh (1995). Again a crucial issue is the validity of instruments, and the question of whether lags are valid instruments in periods of volatility, especially with differenced data. In general, all available lags are used as instruments, with the exception of Malaysia where this is rejected, and the lag length was limited to two years, and for Indonesia where the crisis period values are not used as instruments. The Sargan tests for instrument validity as well as the AR1 and AR2 tests are presented in the tables. The methodology is similar for equation (4) though in this case as the firm specific variables take the value of their long run levels, these are treated as exogenous.

There is a good deal of heterogeneity across countries, particularly in terms of capital market liberalisation and institutional development (see Table 1), and relationships between the corporate and financial sectors. The results also highlight significant differences in our results across countries. We experimented with pooled cross country models, but on both empirical and theoretical grounds these are unsatisfactory.

4. Analysis of Results

4.1. Level estimates of model 2 and 2a

The results shown in Table 5 reveal that firms with higher lagged leverage tend to have higher current leverage. There is also indication that relative to the existing US evidence, the underlying speed of adjustment is high, especially in all the worst affected countries including Korea (0.81), Indonesia (0.90), Malaysia (0.87) and Thailand (0.77). The estimated coefficient remains insignificant for Taiwan while speed estimates are respectively 0.87 and 0.81 in Hong Kong and Singapore, two of the least affected countries.

Effects of historical leverage

Next, following Lemmon et al. (2006), we replace the lagged dependent variable by its initial value in the year 1995 and estimate model (2a). These estimates are presented in Table 6. Note that the coefficient of the initial debt ratio is not significant for Indonesia, Korea and Singapore. For the rest of the countries however the coefficient of initial leverage is significant and positive (as in Lemmon et al., 2006) so that firms with higher initial leverage tend to be associated with higher speed of adjustment. As with estimates of model (2), coefficient estimates of industry median leverage are positive for 6 out of 7 sample countries, again exhibiting some evidence of industry effects.

4.2. Estimates of first differences models 1 and 3

Estimates in panel b of Table 7 (extended model 3) suggest that firms do respond to disequilibrium in the short term in that the coefficients on β are large; but that changes in the contemporaneous long run level of leverage only feed through to changes in the observed level of leverage in four of the seven countries. It is perhaps significant that the 3 countries most heavily hit by the crisis do not adjust if the long run level changes, suggesting that changes in the level of debt are not sensitive to changes in the underlying conditions of the economy.

It is also informative to test whether $\beta \neq 1$. Tests for this illustrate that the speed of adjustment is significantly less than one for Korea and Malaysia, while the value for Hong Kong is just over 80% but not significantly different from 1. The value for Thailand is close to 1, and it is borderline significantly different from 1, at least in the more restricted model. Thus among the worst affected countries, Malaysia and Korea have lower speeds (i.e., higher costs) of adjustment; while there is evidence of near instantaneous adjustment in Thailand (within one calendar year). It is also imperative to compare the level (Table 5) and first difference estimates (Table 7) in this context. Clearly these two sets of estimates are somewhat different (the difference being minimum for Taiwan and maximum for Malaysia); the difference could perhaps be attributed to the natural elimination of the unobserved firm-level heterogeneity in first difference estimates presented in Table 7.

What is striking however are the very high rates of adjustment among East Asian firms (compared with those available from some recent US studies). These differences may highlight the low costs of adjustment in East Asia where bank-based financing dominates. A comparison of effective interest rate (Table A2) however suggests that it is only true for larger firms with very high leverage thought not for all firms in our sample. In order to examine the robustness of these speed estimates, we relax the common speed assumption of conventional partial adjustment models, and in stead examine the nature of speed estimates in more flexible models (4) and (5).

4.3. Beyond common speed of adjustment: Estimates of models 4 and 5

We now consider the estimates of speed of adjustment obtained from the more flexible partial adjustment models (4) and (5) that allow for heterogeneity in the speed of adjustment among firms and also over time. These estimates are summarised in

Tables 8 and 9 respectively. The results across tables 8 and 9 are relatively similar, though not surprisingly the standard errors are larger for the time invariant firm specific estimates of model 4.

An important variable here is the D term. If $L_{it}^{*} > L_{it}$, then one would expect that the adjustment process should be faster, in that firms with excess debt should adjust more quickly. However, among the worst affected countries, this is found to be so only for Malaysia (the country with the most rigorous institutions in place), while the process is slower for firms in Korea and Thailand. Higher average Q tends to increase speed of adjustment in Indonesia, Korea and Malaysia, 3 out of four of the worst affected countries. Also, the estimate of γ is significant in three out of four worst affected sample countries and in all cases the estimates are positive (also note that estimates of γ are different from those in the common speed model, see Table 7).

Finally, we consider the estimates of the fully flexible model (5) presented in Table 9. Compared with results presented in Table 8, estimates in Table 9 highlight some important differences. First, the coefficient estimate of D_i is negative and significant for all the worst affected countries, thus suggesting slower movement towards the optimum even among firms with excessive debt. Second, unlike firm-specific estimates (Table 8), estimates from model (5) in Table 9 identify significance of sales, debt coverage and stock returns for at least three out of the seven sample countries. Also coefficient of Q turns out to be positive when significant.

4.4. Comparison of alternative models

Allowing the speeds to differ firstly across firms, and then also across time, significantly improves the fit of model 5. This is perhaps not surprising, but an issue seldom discussed elsewhere in the literature. In order to facilitate this comparison, we employ the most reliable measure of goodness of fit for GMM models, which is the square of the correlation between the actual and fitted values. For a first difference model, these are very high, indicating that these models explain a high proportion of the variation in the *change* in leverage.

There are no formal "goodness of fit" tests for the GMM estimator, though the crucial comparison here from an empirical perspective is the comparison of model 5 and model 3, that is, the addition of the $\gamma\Delta X$ term. Formally, the appropriate test for this is simply the t test on the γ term. This term is significant in 4 cases, suggesting that overall the change in the underlying determinants of leverage does impact on changes in leverage directly. There are however clearly differences across countries, suggesting that the addition of the terms remains an empirical issue. The extent to which the significance of this term differs is indicative of the extent to which firms adjust to changes in long run fundamentals. Clearly, in the case of Malaysia, there is no such effect, while the effect is weak for Indonesia and Thailand. While it may be argued that model (5) is the most appropriate general specification, some firms (or indeed countries) are unable to respond to changes in this manner.

Finally, we compare the residual sum of squares of the estimates obtained from models 3, 4 and 5 (see Appendix Table A3). While none of the estimations presented here are designed to minimise the sum of squares as part of the estimation, it is still informative to compare the extent to which the various models used here explain the speed of adjustment of the firms concerned. Columns (3) and (5) summarise the percentage reduction in residual sum of squares (SSR) for models 4 and 5 (relative to benchmark case model 3) for all the sample countries. Clearly the differences across firms in different sample countries are big, but the general trend is quite pronounced: the average percentage reduction (for all countries taken together) is about 12.8% when we consider model (4), but it is almost double (nearly 22%) when we use firm- and time- varying speed model (5).

4.5. Inter-country differences in the speed of adjustment

Table 10 summarises the full sample average estimates of speed of adjustment obtained from alternative models. In particular, we now compare the common speed estimates β (obtained from estimation of model 3) with the corresponding estimates of β_i obtained from model 4 and β_{it} obtained from model 5. Clearly, firm-specific average speed estimates β_i's (derived from model 4) are lower than the corresponding firm and time-varying average speed estimates of β_{it}. But a comparison with the benchmark common speed model 3 suggests that the firm- and time- varying speed estimates of model 5 tend to lie in between those obtained from the common speed model (model 3) on the one hand and firm specific speed model (4) on the other. Note also that these time- and firm-varying speed estimates are more in line with Jalivand and Harris (1984) who found relatively higher adjustment rates for US manufacturing firms (56% for long-term and 61% for short-term debt). Given that we identify model (5) to be our preferred model, our analysis in this subsection is couched in terms of the average speed estimates β_{it} obtained from the most flexible model 5.

Estimates of β_{it} vary across the sample countries and here we summarise our primary observations. First, while the average leverages are higher among firms in the worst affected countries, the latter tend to have lower average speeds of adjustment (relative to those in the least affected countries). Given that the institutions are weaker in the worst affected countries (see Table 1), this result could be taken as evidence of bad loans in the worst affected countries in our sample. Second, these speed estimates vary among the worst affected countries; Malaysia has the lowest average speed of

0.23 followed by Indonesia (0.42) and Thailand (0.50), while the estimate is much higher, e.g., 0.67 for the Korean firms. These inter-country differences in the average speeds of adjustment reflect the differences in the costs of adjustment among these countries. The average speed estimate increases somewhat as we exclude the zero-debt firms (see further discussion below). The case of Malaysia is interesting to note here. While tighter institutional environment and greater access to market based finance have resulted in generally lower leverage (relative to other worst affected countries), the speed of adjustment in Malaysia falls significantly short of all other sample countries, thus questioning the effectiveness of debt recovery in the country.

It is also important to highlight the differences in the adjustment behaviour of firms in the comparator countries, especially Singapore and Taiwan, countries those were least affected by the last crisis. Model (5) speed of adjustment turns out to be much higher for firms in these countries, suggesting lower costs of adjustment. Note also that the difference in speed estimate for more and less leveraged firms is minimum in these countries, thus suggesting a better allocation of credit in these countries (the contrast with Hong Kong is noteworthy though). To some extent, relatively higher speeds of adjustment in the least affected countries may also reflect their greater access on equity financing (see Table 1).

Presence of Zero-debt firms

There are some zero-debt firms in each of the sample countries (see Table 4). As expected, the average speed estimates for non-zero debt firms tend to be somewhat higher than the corresponding full sample estimates (see Table 10). Note also that the difference is highly significant among firms in Indonesia (20 percentage points) among the worst affected countries; in comparison, the difference is rather marginal (1-5 percentage points) among firms in other sample countries.

Effect of debt composition

Some may argue that a greater use of short-term debt could be one important reason as to why average speed estimates are generally higher in East Asia than elsewhere. In order to check the validity of this proposition, we next examine the average speed estimates for firms with (a) short-term debt less than 5% and also (b) zero short-term debt (see columns (7) and (8) of Table 10). While this brings down the average Korean speed from 0.67 to 0.52 (similar effect is observed in all the least affected countries) as expected, the implied speed of adjustment barely changes in the other three affected countries, despite having high share of short-term debt.

Effect of firm and leverage size

Finally we compare the full sample speed estimates with those for firms in the top leverage quartile (Table 11). Indonesian and Korean firms have higher than full sample average speeds; Malaysian high debt firms however have significantly lower speeds of adjustment than the average, thus questioning the effectiveness of institutional regulations for debt payment and recovery.. In contrast, higher speeds of adjustments among Indonesian and Korean firms in the top leverage quartiles signify their lower cost of adjustment, as reflected in the comparison of effective interest rates in Table A2. The adjustment pattern is very similar when we compare speeds based on firm size.

Speed estimates using net leverage

In an attempt to understand the implications of financial constraint on the speed of adjustment, we shall finally use leverage net of cash flows as an alternative measure of leverage and estimate the average speed of adjustment (full estimates are shown in Appendix Table A4). A comparison of columns (4) and (5) in Table 10 suggests that the two sets of model (5) average speed estimates using total and net leverage measures are quite comparable. Note however that the speed estimates using net leverage are somewhat higher, especially for the worst affected countries, the difference being largest in Indonesia and smallest for firms in Malaysia. In other words, the latter would highlight the case of relieving financial constraint for firms in the worst affected countries, as we take a/c of cash flow. The effect is however really marginal for firms in Singapore and Taiwan.

4.6. Financial distress and sudden adjustment

So far we have considered the case of smooth (optimal) adjustment process (a la Fisher Heinkel and Zechner, 1989; FHZ afterwards): firms deviating from lower/upper threshold of their target optimal leverage will adjust only when the marginal benefit of restructuring and getting back to the optimal leverage is equal to the marginal cost of restructuring. Clearly, the process of adjustment may not always be smooth and optimal for the financially distressed firms. In FHZ, Goldstein, Ju, and Leyland (2001; GJL afterwards) and Strebulaev (2007) firms restructure by levering up when they reach an upper threshold. In GJL and Strebulaev, the lower threshold is equated with default; at the time of restructuring firms' leverage jumps back to the optimal leverage and this is what we label as "sudden adjustment". Aspects of sudden adjustment could particularly be important in a situation of unexpected crisis as in the sample countries during the period of study, when things deteriorated suddenly; whether this sudden crisis could force distressed/defaulting firms to restructure immediately, would also depend on the institutional arrangements, among other things.

Worldscope firms' balance sheet data does not allow us to directly identify a defaulting firm or cases of bankruptcy. So we adopt an indirect approach to identify the financially distressed firms. A common measure of a firm's financial distress is the ratio of cash flow (CF) to current liability (CL), which is one type of liquidity ratio, linked directly to a firm's financial constraints discussed earlier (see section 2). Provided creditors and debtors are paid at approximately the same time, the ratio suggests whether the business has sufficient liquid resources to meet its current liabilities. Using this liquidity ratio, one can classify sample firms into three types as follows:

(type a) $CL>CF$ and $CF <=0$ so that CF/CL is $<=0$

(type b) $CL>CF$ and $CL>CF>0$ so that $0<CF/CL<1$

(type c) $CL<=CF$ so that $CF/CL>= 1$

A summary of characteristics for these three types of firms are shown in Table 11, which highlights a number of important observations. (i) Dependence on debt (relative to assets) is particularly high for type 'a' and 'b' firms, but especially so for the former. Similar trend is found for firms in the worst and the least affected countries; but the average leverage ratios for type a firms in the worst affected countries are almost double than those in the least affected countries. (ii) In contrast, a higher proportion of type c firms tend not to have any debt (compared to type 'a' and 'b' firms in a given country), which in turn highlights their reliance on other source of funding among these firms (see Table 4). The proportion of zero debt type c firms is particularly high in Malaysia (37%) followed by Singapore (27%), Indonesia and Hong Kong (each 15%). (iii) Clearly 'type a' firms are not the most profitable ones as reflected in their negative profit rates (defined as earnings before interest and taxes as a share of total assets) in all countries except Malaysia (which has a very low but still a positive profit rate). In contrast, profit rates for type 'b' and 'c' firms tend to be positive with type c firms being the most profitable ones in any given country.

In general, we expect that financially distressed firms will be forced to adjust quicker, if adequate legal/institutional environment is in place. Table 12 reports the model 5 average speeds of adjustment estimates for type a, b, c firms, obtained using model 5 estimates presented in Table 9. While type a firms in all three least affected countries have higher than their full sample average speed of adjustment, the picture is rather mixed among the worst affected countries. In particular, type a firms in Malaysia and Thailand have less than their full sample average speeds while it is opposite in Korea and Indonesia (more in line with the firms in least affected countries). The contrast between Malaysia and Korea, for example, is worth highlighting here. Despite having better institutional framework in place, distressed Malaysian firms too tend to adjust its capital structure slower than those in Korea. The fact that financially distressed firms do not always have higher speeds of adjustment even in the worst affected countries highlights the lack of adequate regulatory environment in this region. In the post crisis period however type a firms in all sample countries tend to have higher than the full sample average speeds of adjustment (the difference being minimum in Taiwan and maximum in Hong Kong); nevertheless, this seems to be a movement in the right direction.

5. Concluding Comments

In the context of spectacular growth in the 80s and early 90s in East Asia, many firms in the worst affected countries indulged in some reckless capital structure behaviour. In this context, the present paper analyses the dynamic adjustment of corporate capital structure among the listed non-financial East Asian corporations during 1995-2002. Our analysis highlights some important features of credit markets in East Asia that remains little understood.

In order to understand the adjustment behaviour of the sample firms, we not only use the conventional partial adjustment models (with a common speed of adjustment for all firms and over time), but allow the speed of adjustment to vary both across firms as well as over time, using GMM on panel data. There is evidence that firms in the worst affected countries not only have higher leverages (being the result of high debt even in a situation of deteriorating assets), but also tend to have lower speed of adjustment than their counterparts in the least affected countries. This general ranking is robust to various alternative specifications and sample selections. The case of Malaysia is particularly interesting in this context: while by virtue of its rigorous institutional and legal environment and also access to market based finance, the country was successful to restrict leverages to a generally lower level, it was not so successful to ensure speedy adjustment of capital structure and was among the worst affected countries hit by the crisis.

This analysis also identifies some important adjustment mechanisms: (a) adjustment speeds are greater for larger firms and firms in the top leverage quartile who tend to have access to cheaper credit, as reflected in a comparison of effective interest rates. (2) Firms with more cash flow tend to have faster speed of adjustment. (3) Firms with only long-term debt however have lower speed of adjustment. (4) Firms in countries with tighter regulations and access to equity finance tend to have lower leverage and higher speed of adjustment (with the exception of Malaysia). (5) In general financially distressed firms in most countries tend to have higher speed of adjustment, revealing cases of sudden adjustment; the latter is especially evident in the post-crisis period, highlighting the fact that lessons have been learnt after the crisis.

REFERENCES

Almeida, H, M. Capello and M. Weisbach. (2004) 'Cash Flow Sensitivity of Cash', Journal of Finance.

Arellano, M. and Bond, S. (1988) 'Dynamic Panel Data Estimation using DPD, A Guide for Users', Institute for Fiscal Studies Working Paper.

Arellano, M. and Bond, S. (1991) 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations', *Review of Economic Studies*, 58, 277-97.

Baker, M. and J. Wurgler, (2002) Market timing and capital structure. *Journal of Finance*, 57 (1) pp. 1-30.

Berglof, E. and S. Pal. (2007) Symposium on Corporate Governance, *Economics of Transition* 15(3), July.

Benninga, S. and Z. Wiener. 1998. 'Term Strcuture of Interest Rates', *Mathematica in Education and Research* 7(2).

Booth, L., V. Aivazian, A. Demirguc-Kunt and V. Maksimovic. 2001. Capital Structure in Developing Countries, Journal of Finance, 56.

Chang, H. (2000). 'The Hazard of the Moral Hazard: Untangling the Asian Crisis', *World Development* 28(4) pp.775-788.

Claessens, S., P. Bongini and G. Ferri. (2001) The Political Economy of Distress in East Asian Financial Institutions', *Journal of Financial Services Research* 19(1) pp. 5-25.

Claessens, S, S. Djankov, J. and Larry H.P. Lang (1999). 'Who Controls East Asian Corporations? Policy Research Working Paper 2054, World Bank, Washington DC.

Claessens, Stijn; Djankov, Simeon; Xu, Lixin Colin. (2000) 'Corporate Performance in the East Asian Financial Crisis', *World Bank Research Observer* 15 (1), pp. 23-46.

Claessens, S, S. Djankov, J.Fan, P.H. and Larry H.P. Lang (2002) Disentangling the Incentive and Entrenchment Effects of Large Shareholdings, *Journal of Finance*, 57, 2741-71.

Corsetti, G., P. Pesenti and N. Roubini. (1999a) 'Paper Tigers: A Model of the Asian Crisis', *European Economic Review* 43(7), pp. 1211-1236.

Corsetti, G., P. Pesenti and N. Roubini. (1999b) 'What Caused the Asian Currency and Financial Crisis?' *Japan and the World Economy*, 11(3), pp. 305-373.

Demirgür-Kunt, A. and V. Maksimovic. (1995) 'Stock Market Development and Firm Financing Choices', Policy Research Working Paper 1461, The World Bank, Policy Research Department, Finance and Private Sector DevelopmenDivision, Washington.

Demirgür-Kunt, A. and V. Maksimovic. (1999) 'Bank-based and Market-based Financial Systems – Cross-country Comparisons', World Bank Policy Research Working Papers 2143.

Doornik, J., Bond, S. and M. Arellano, (2002) 'Panel data estimation using DPD for Ox.' Available at http://www.nuff.ox.ac.UK/users/doornik/papers/dpd.pdf.

Driffield, N.L. (2001) 'Inward investment and host country market structure: The case of the UK'. *Review of Industrial Organization*, 18(4) pp.363-378.

Driffield, N.L., V. Mahambare and S. Pal. (2007) 'How Does Ownership Structure Affects Capital Structure and Firm Value? Recent Evidence from East Asia', *Economics of Transition* 15(3).

Driffield, N.L. and Pal, S. (2001) 'The East Asian Crisis and Financing Corporate Investment: Is There A Cause for Concern?' *Journal of Asian Economics*, 12 (4) pp. 507-527.

Driffield, N.L. and Pal, S. (2006) 'Do External Funds Yield Lower Returns? Recent Evidence from East Asian Economies', *Journal of Asian Economics* 17(1) pp.171-88.

Fischer, E.O., Heinkel,R., Zechner,J. (1989) 'Dynamic capital structure choice: theory and tests'. *Journal of Finance*, 44, pp. 19 –40.

Flannery, M.J. and K. Rangan. (2006) 'Partial Adjustment Toward Target Capital Structures', *Journal of Financial Economics* 79, 469-506.

Froot, K. A. (1989) Consistent covariance matrix estimation with cross-sectional dependence and heteroskedasticity in financial data. *Journal of Financial and Quantitative Analysis* 24: 333–355.

Goldstein, R., N. Ju and H. Leland. (2001) An EBIT based Model of Dynamic Capital Structure', Journal of Business 74(4).

Graham, J.R. and C.R. Harvey. (2001) The Theory and Practice of Corporate Finance: Evidence from the Field', *Journal of Financial Economics* 61

Jalivand, A. and R. Harris. 1984. 'Corporate Behaviour in Adjusting to Capital Structure and Dividend Targets: An Econometric Study'*, Journal of Finance* 39, 127-45.

Hall, B. H. (1992) Investment and Research and Development at the Firm Level: Does the Source of Financing Matter? National Bureau of Economic Research, Working Paper 4096, Cambridge, Massachusetts.

Hamermesh, D.S. (1995) 'Labour demand and the source of adjustment costs.' *Economic Journal*, 105 (430) pp. 620-634.

Hovakimian, A., G. Hovakimian., and H. Tehranian (2004) 'Determinants of target capital structure: The case of dual debt and equity issues'. *Journal of Financial Economics*, Volume 71 (3), pp 517-540.

Kurshev and Strebulaev. 2007. 'Firm Size and Capital Structure', working paper, University of California.

Krugman P (1998), 'What Happened to Asia*?*' (January) MIT, Cambridge. Available at *http://web.mit.edu/krugman/www/disinter.html*.

La Porta, R., Florencio Lopez-de-Silanes, and A. Shleifer, 1999. Corporate Ownership Around the World, *Journal of Finance* 54, 471-517.

Leary, M. and Roberts, M. R., (2005) 'Do Firms Rebalance Their Capital Structures?' *Journal of Finance*, forthcoming manuscript 1206.

Leland, H. E., (1998) 'Agency costs, risk management, and capital structure', *Journal of Finance*, 53, pp 1213-1244.

Lemmon, M.L., M.R.Roberts and J.F. Zender (2006) 'Back to the Beginning: Persistence and the Cross-section of Corporate Capital Structure', mimeo, University of Utah.

Myers, S.C. (1977) 'Determinants of Corporate Borrowing', *Journal of Financial Economics*, 5, pp. 147-175.

Myers, S.C. (1984) 'Capital Structure Puzzles', *Journal of Finance*, 39, pp. 575-92.

Myers, S.C. and N. Majluf. (1984). 'Corporate Financing and Investment Decisions when Firms Have Information Investors do not Have, *Journal of Financial Economics*, 13, pp. 187-221.

Pesaran, H and R.J. Smith. (1995) 'A generalized R^2 criterion for regression models estimated by the instrumental variables method.' *Econometrica*, 62 pp.705-710.

Rajan, R. and L. Zingales. (1995) 'What Do We Know About Capital Structure? Some evidence from international data,' *Journal of Financ*e, 50 pp. 1421-1460.

Sargan, J. D. (1976) 'Econometric estimators and the Edgeworth approximation,' *Econometrica*, 44, pp 421-448.

Sevestre, P. and A. Trognon. (1996) 'Linear models with random regressors.' In Laszlo Matyas and Patrick Sevestre (eds.) The econometrics of panel data. Kluwer Academic Publishers.

Shyamsunder, L. and S.C.Myers (1999) 'Testing Static Trade-off against Pecking Order Models of Capital Strcuture', *Journal of Financial Economics*, 51 pp. 219-44.

Strebulaev, I. 2007. 'Do Tests of Capital Structure Theory Mean What They Say?', *Jounral of Finance* 62, p. 1747-1788.

Ulbricht, N. and C. Weiner. 2005. 'Worldscope Meets Compustat: A comparison of Financial Databases', SSRN working paper series.

Welch, I. (2004) 'Capital Structure and Stock Returns.' *Journal of Political Economy*, 112(1), pp 106-131.

Wooldridge, J. M. (2002) *Econometric Analysis of Cross Section and Panel Data.* Cambridge, MA: MIT Press.

Tables

Table 1. A Comparison of Institutional Environment in East Asia

Country	(1) Accounting standard [1]	(2) Rule of the law (0-10)	(3) Creditor's rights (0-4)	(4) Efficiency of judicial system (0-10)	(5) Risk of exproprtn (0-10)	(6) Share-holders rights (0-5)	Sample mean leverage	net leverage	Booth et al. DE ratio	1990-95 [2] Market capital/ GDP	Total value traded/ GDP
Indonesia		3.98	4	2.5	7.16	2	0.47	0.46	-	0.28	0.08
Korea	2	5.35	3	6	8.31	2	0.46	0.46	3.449	0.37	0.44
Malaysia	2	6.78	4	9	7.95	3	0.37	0.31	1.111	2.01	1.14
Thailand	1	6.25	3	3.25	7.42	3	0.47	0.45	2.332	0.57	0.40
HongKong		8.22	4	10	8.29	4	0.24	0.24	-	1.96	1.08
Singapore		8.57	4	10	9.3	3	0.22	0.17	-	1.37	0.70
Taiwan		8.52	2	6.75	9.12	-	0.26	0.02	-		-

[1] 1: Adequate; 2: Good (compatible with international standard). Source: Booth et al. 2001.
[2] Market capitalisation and total values traded (as shares of GDP) are taken from Demirguc-Kunt and Maksimovic (1999).
Columns (2)-(6) are taken from Driffield et al. (2007).

Table 2: Composition of Leverage

Period	Size (ta)	Total debt	Total assets	Lev	Total debt	Total assets	Lev	Total debt	Total assets	Lev	Total debt	Total assets	Lev
		Korea			**Indonesia**			**Malaysia**			**Thailand**		
1994-96	Small	106.52	230.65	0.45	16.11	61.83	0.25	14.91	61.01	0.24	16.93	45	0.35
	Medium	402.24	812.95	0.47	105.87	260.28	0.39	48.2	212.81	0.21	79.03	181.68	0.42
	Large	2422.93	4954.06	0.5	595.81	1558.4	0.37	336.35	1279.1	0.22	527.25	1083.4	0.46
1997-98	Small	74.77	158.44	0.45	20.48	40.49	0.48	18.89	59.46	0.35	14.55	30.51	0.47
	Medium	395.46	686.15	0.58	129.62	197.55	0.66	60.98	196.38	0.34	70.55	129.11	0.54
	Large	2476.3	4281.28	0.58	731.53	1330.3	0.63	553.23	1608.8	0.31	685.86	1049.6	0.74
1999-02	Small	58.56	189.99	0.35	15.83	39.63	0.43	17.73	50.63	0.66	10.16	29.62	0.36
	Medium	309.23	704.95	0.43	94.36	164.21	0.57	54.59	186.26	0.34	46.23	111.86	0.49
	Large	2722.96	6583.14	0.47	606.27	1181.5	0.61	550.7	1552.7	0.33	581.33	982.02	0.62
Period		**Hong Kong**			**Singapore**			**Taiwan**					
1994-96	Small	10.3	38.98	0.24	4.94	23.27	0.23	17.21	101.77	0.17			
	Medium	27.97	104.85	0.24	16.1	77.06	0.19	44.51	199.84	0.21			
	Large	350.24	1482.57	0.24	135.22	697.41	0.2	260.71	929.8	0.27			
1997-98	Small	13.07	40.88	0.29	3.94	21.72	0.18	19.48	106.58	0.17			
	Medium	25.43	97.8	0.26	18.5	73.51	0.24	57.6	229.68	0.23			
	Large	383.84	1498.66	0.25	203.06	857.6	0.25	353.59	1109.1	0.3			
1999-02	Small	3.64	20.74	0.23	3.41	20.93	0.17	18.87	91.43	0.19			
	Medium	15.83	86.17	0.22	14.89	66.04	0.23	68.16	242.84	0.28			
	Large	461.44	1647.43	0.26	268.29	965.34	0.27	476.21	1537	0.33			

Table 3. Evolution of leverages across quartiles, worst affected countries

	Leverage quartiles															
	Indonesia				Korea				Malaysia				Thailand			
YEAR	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
1995	.09	.27	.41	.54	.18	.37	.50	.71	.02	.18	.35	.53	.14	.36	.53	.67
1996	.10	.28	.41	.56	.18	.37	.51	.70	.02	.19	.35	.55	.11	.37	.53	.69
1997	.08	.29	.42	.68	.16	.38	.51	.69	.02	.19	.37	.61	.07	.38	.55	.89
1998	.07	.28	.42	.86	.13	.36	.49	.84	.02	.19	.36	.79	.10	.38	.55	.95
1999	.04	.28	.42	.80	.15	.35	.49	.96	.02	.19	.36	.83	.09	.35	.54	1.00
2000	.06	.27	.42	.92	.13	.36	.50	.94	.03	.18	.35	.93	.09	.36	.53	1.01
2001	.06	.28	.42	.88	.14	.36	.50	.95	.02	.19	.36	1.17	.09	.34	.55	1.04
2002	.07	.27	.40	.78	.13	.35	.49	.68	.02	.18	.36	1.54	.10	.36	.55	.86
Mean	.07	.28	.42	.75	.15	.36	.50	.81	.02	.19	.36	.87	.10	.36	.54	.89
St.dev	.02	.01	.01	.15	.02	.01	.01	.13	.00	.00	.01	.35	.02	.01	.01	.14

	Hong Kong				Singapore				Taiwan			
YEAR	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
1995	0.03	.13	.25	.42	0.02	.12	.26	.44	0.07	.20	.32	.49
1996	0.02	.12	.24	.45	0.02	.13	.26	.44	0.07	.20	.32	.47
1997	0.02	.12	.25	.47	0.03	.13	.26	.44	0.06	.20	.32	.46
1998	0.02	.12	.24	.55	0.02	.13	.27	.46	0.05	.20	.31	.49
1999	0.02	.12	.25	.82	0.02	.12	.27	.51	0.05	.20	.32	.51
2000	0.02	.12	.25	.72	0.02	.13	.25	.48	0.04	.19	.32	.48
2001	0.01	.12	.25	.57	0.02	.13	.26	.51	0.04	.20	.33	.50
2002	0.01	.13	.24	.60	0.02	.12	.26	.56	0.05	.20	.32	.50
Mean	0.02	.12	.25	.57	0.02	.13	.26	.48	0.05	.20	.32	.49
St.dev	0.00	.00	.00	.14	0.00	.00	.00	.04	0.01	.00	.01	.01

Note: Four leverage quartiles are denoted respectively by Q1, Q2, Q3 and Q4. St. Dev denotes the standard deviation of the quartiles.

Table 4. Distribution of firms with short-term debt and zero debt across the sample countries

	Mean Leverage		Long term debt as a share of total debt			firms with zero debt				
	All firms	Excluding zero-debt firms	Mean	Median	% of firms with only short-term debt	% of obs.	External finance	Average group size (1-3)	Profit rate	Firms (obs)
Indonesia	0.47	0.50	0.3998	0.3916	24	4.	0.09	1.2	0.20	107 (963)
Korea	0.46	0.46	0.4584	0.4553	3	1	0.33	1.15	-0.01	196 (1764)
Malaysia	0.37	0.40	0.3773	0.3300	18	7	0.14	1.65	0.10	269 (2421)
Thailand	0.47	0.48	0.3526	0.2728	22	2	0.03	1.37	0.08	189 (1701)
Hong Kong	0.24	0.26	0.3757	0.3296	19	4	4.23	1.8	-0.01	608 (5472)
Singapore	0.22	0.24	0.3747	0.3290	16	3	0.56	2	0.11	367 (3303)
Taiwan	0.26	0.27	0.3840	0.3602	15	2	0.10	1.5	0.13	429 (3861)

Table 5. Blundell-Bond level estimates of leverage (model 2)

	Korea	**Taiwan**	**Malaysia**	**Indonesia**	**Thailand**	**Hong Kong**	**Singapore**
	Coeff (T-stat)	Coeff (T-stat)	Coeff (T-stat)	Coeff (T-stat)	Coeff (T-stat)	Coeff (T-stat)	Coeff (T-stat)
Lagged leverage	0.1904 (2.47)	-0.0368 (0.82)	0.1322 (2.25)	0.0955 (2.11)	0.1184 (1.68)	0.1252 (5.31)	0.1947 (2.62)
Industry Median leverage	0.3130 (3.91)	0.2411 (3.98)	0.2880 (2.47)	0.2816 (5.14)	0.2140 (4.88)	0.1825 (0.45)	0.2580 (1.89)
R&D	0.0015 (0.559)	0.0017 (1.99)	-0.3448 (5.34)	-		0.0289 (0.69)	-0.0020 (0.88)
Size (total sales)	0.0678 (1.45)	-0.0083 (0.412)	-0.0564 (1.16)	-0.0567 (1.41)	0.0045 (0.42)	-0.0072 (0.02)	-0.0464 (0.528)
Depreciation	0.5986 (2.98)	-0.1218 (0.674)	0.5746 (1.71)	0.0310 (0.153)	-0.4428 (2.69)	-2.4841 (1.11)	-0.2094 (1.67)
Fixed assets	-0.0400 (0.261)	0.0929 (2.89)	0.0708 (1.13)	0.0610 (1.17)	0.1503 (5.32)	0.3188 (1.53)	0.1587 (1.30)
Q	-0.4869 (4.97)	-0.7312 (23.9)	0.1322 (2.25)	-0.7008 (19.7)	-0.5472 (9.87)	0.2163 (2.48)	-0.6051 (5.37)
Intercept	-0.5243 (0.62)	0.2374 (4.19)	0.3276 (2.07)	0.5284 (4.34)	0.2202 (3.69)	0.0477 (0.36)	0.6107 (2.12)
Sargan [*p value*]	0.185	0.311	0.246	0.209	0.400	0.247	0.361
Sargan difference test [p value]	13.6123 (0.48)	17.4663 (0.23)	13.6346 (0.48)	12.7030 (0.55)	15.0202 (0.38)	11.5984 (0.64)	11.4532 (0.65)
AR(1), [*p value*]	1.5272 (0.22)	1.6714 (0.20)	1.4614 (0.23)	1.7975 (0.18)	1.0590 (0.30)	1.4090 (0.24)	1.1590 (0.28)
AR(2), [*p value*]	2.5042 (0.11)	2.4132 (0.12)	1.6758 (0.20)	2.2378 (0.14)	1.6091 (0.21)	2.1954 (0.14)	1.8410 (0.18)
Corr $(Y, \hat{Y})$	0.78	0.68	0.59	0.70	0.68	0.74	0.59

Note: Numbers in the parentheses denote the corresponding t-statistics.

Table 6. GMM Levels Estimates with Initial Leverage (Model 2a)

	Korea	Taiwan	Malaysia	Indo	Thai	Hong Kong	Singapore
Variable	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**
Initial leverage	2.8701 (1.15)	0.2638 (4.83)	0.568469 (1.81)	-0.0507 (0.84)	0.3780 (5.29)	0.1736 (2.33)	0.0476 (0.37)
Industry Median leverage	0.2939 (3.59)	0.2442 (3.76)	0.2712 (2.40)	0.2811 (5.49)	0.2427 (4.70)	0.1966 (4.47)	0.2279 (1.94)
R&D	0.0014 (0.64)	0.0019 (1.82)	-0.3580 (5.18)			0.0307 (0.71)	-0.0023 (0.89)
Size (total sales)	0.0721 (1.28)	-0.0084 (0.39)	-0.0548 (1.26)	-0.0499 (1.43)	0.0044 (0.41)	-0.0072 (0.20)	-0.0483 (0.53)
Depreciation	0.6690 (2.74)	-0.1246 (0.66)	0.6024 (1.72)	0.0292 (0.17)	-0.4656 (2.62)	0.1032 (2.88)	-0.2255 (1.74)
Fixed assets	-0.0390 (0.25)	0.0905 (2.90)	0.0674 (1.22)	0.0526 (1.23)	0.1682 (5.53)	0.3064 (1.76)	0.1782 (1.33)
Tobin's Q	-0.4520 (5.59)	-0.6498 (23.93)	0.1170 (2.16)	-0.7004 (22.06)	-0.5777 (11.72)	0.1918 (2.14)	-0.5493 (5.02)
intercept	-0.5272 (0.65)	0.2576 (4.78)	0.3339 (1.97)	0.5547 (3.83)	0.2408 (0.33)	0.0486 (0.33)	0.5532 (2.09)
Sargan [p value]	0.113	0.140	0.111	0.197	0.131	0.203	0.167
Sargan difference test [p value]	16.2131 (0.18)	10.9974 (0.53)	17.0098 (0.15)	18.8305 (0.09)	15.998 (0.19)	12.4246 (0.41)	17.4219 (0.13)
AR(1), [p value]	0.7659 [0.44]	-1.671 [0.09]	1.941 [0.05]	-2.605 [0.01] -	2.873 [0.00]	-3.770 [0.000]	1.629 [0.10]
AR(2), [p value]	0.7635 [0.45]	0.9481 [0.34]	1.964 [0.05]	1.476 [0.14]	0.1003 [0.92]	1.452 [0.15]	2.115 [0.03]
Corr $(Y, \hat{Y})^2$	0.70	0.67	0.53	0.66	0.67	0.67	0.53

Note: Numbers in the parentheses denote the corresponding t-statistics. Note that some of the AR tests here fail - this is due to the lack of the lagged dependent variable in the model.

Table 7. GMM Estimates (first difference) of Partial Adjustment Model 1

	Korea	Taiwan	Malaysia	Indonesia	Thailand	Hong Kong	Singapore
Variable	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)
α	-0.0011 (0.16)	0.0098 (4.38)	0.0023 (0.50)	0.0372 (3.10)	0.0257 (4.83)	-0.0195 (1.49)	0.0056 (.88)
β	0.7914 (17.76)	0.95 (26.17)	0.4308 (5.35)	1.008 (6.51)	0.9066 (20.23)	0.8131 (5.03)	0.9225 (7.21)
AR1	1.8778 (0.17)	1.9944 (0.16)	1.4278 (0.23)	1.9372 (0.16)	1.8964 (0.17)	1.8826 (0.17)	1.4177 (0.23)
Sargan P value	0.1829	0.2099	0.2191	0.1888	0.1117	0.3558	0.0875
Corr (Y, $\hat{Y}$)	0.37	0.38	0.10	0.29	0.40	0.06	0.19

Note: Numbers in the parentheses denote the corresponding t-statistics.

denoted estimates of the speed of adjustment that are significantly different from 1.

Table 7 (continued). GMM Estimates (first difference) of extended Model 3

	Korea	Taiwan	Malaysia	Indonesia	Thailand	Hong Kong	Singapore
Variable	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff. (t-stat)**	**Coeff (t-stat)**
α	0.0014 (0.31)	0.013 (6.70)	0.005 (1.12)	0.027 (2.14)	0.028 (4.88)	-0.018 (1.51)	-0.005 (0.88)
β	0.88\ (29.42)	1.032 (30.73)	0.406\ (5.27)	0.983 (6.25)	0.951 (19.63)	0.833 (6.21)	0.957 (8.67)
γ	0.32 (13.09)	0.171 (7.93)	0.009 (0.17)	0.072 (0.79)	0.001 (0.014)	0.231 (5.37)	0.190 (3.70)
AR(1)	1.0241 (0.31)	1.2267 (0.27)	1.7199 (0.19)	1.6072 (0.21)	1.8627 (0.17)	2.0523 (0.15)	1.4498 (0.23)
Sargan P value	0.1648	0.4968	0.1510	0.0692	0.0812	0.1660	0.3409
Corr $(Y, \hat{Y})^2$	0.47	0.55	0.10	0.30	0.43	0.23	0.34

Note: Numbers in the parentheses denote the corresponding t-statistics.
\ denoted estimates of the speed of adjustment that are significantly different from 1.

Table 8. GMM Estimates of Firm-varying Speed Model 4

	Korea	Taiwan	Malaysia	Indonesia	Thailand	Hong Kong	Singapore
Variable	**Coefficient (t-stat)**	**Coefficient (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**	**Coeff (t-stat)**
α	-.020 (2.84)	.139 (0.39)	.00969 (0.85)	.0287 (0.70)	.0047 (0.42)	.01543 (1.11)	-.0084 (0.86)
β_0	0.176 (1.22)	0.806 (5.79)	0.6645 (0.25)	3.605 (0.97)	1.070 (1.61)	4.9864 (5.04)	2.393 (0.85)
D[1]	-.515 (6.34)	-.557 (5.67)	.9766 (1.68)	1.0683 (0.82)	-.679 (2.54)	1.6609 (2.40)	.1757 (0.27)
Average Q	.178 (4.10)	.224 (3.33)	-1.9583 (0.86)	2.629 (2.21)	-.570 (1.12)	2.9127 (4.88)	-.9213 (0.38)
Average sales	-.057 (2.37)	.0022 (0.09)	.1891 (0.31)	.3952 (0.49)	.0144 (0.10)	.2853 (1.43)	.1317 (0.29)
Average DC	-.0011 (0.95)	.0001 (1.79)	-.0066 (0.27)	.0194 (0.20)	.0002 (0.14)	.0221 (0.16)	-.0259 (1.02)
Average SR	.0000 (0.28)	-.0002 (0.27)	.0112 (0.94)	-1.676 (0.24)	-.001 (0.46)	-.5857 (0.49)	.0294 (1.34)
γ	.293 (11.29)	.248 (12.79)	.0836 (0.77)	.1301 (0.93)	.2403 (2.47)	.0879 (2.31)	.0569 (0.57)
Sargan p value	0.3053	0.2041	0.4461	0.0939	0.0654	0.1191	0.0920
AR(1)	1.63 (0.20)	1.88 (0.17)	1.68 (0.20)	1.50 (0.22)	1.92 (0.17)	1.33 (0.25)	1.21 (0.27)
$corr(Y,\hat{Y})^2$	0.48	0.54	0.13	0.69	0.44	0.32	0.36

Note: Numbers in the parentheses denote the corresponding t-statistics. DC is the debt-coverage ratio while SR is the annual stock returns. D_i is a binary variable that takes a value 1 if $L_{it} < L_{it}^*$ for at least 5 sample years and zero otherwise.

Table 9. GMM Estimates of Firm- and Time- varying Model 5

	Korea	Taiwan	Malaysia	Indonesia	Thailand	Hong Kong	Singapore
Variable	Coeff (t-stat)	Coeff (t-stat)	Coefficient (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coefficient (t-stat)	Coeff (t-stat)
α	-0.020 (3.62)	0.003 (0.92)	-.0024 (0.35)	0.003 (0.10)	-0.001 (1.31)	-0.009 (0.70)	-0.011 (1.56
β_0	0.177 (1.16)	0.862 (5.57)	.586 (1.42)	0.403 (3.30)	0.540 (3.33)	1.622 (4.89)	0.929 (1.94)
D	-0.495 (6.51)	-0.468 (4.87)	-.437 (1.79)	0.141 (0.19)	-1.002 (8.04)	0.011 (0.033)	0.265 (0.49)
Q	0.184 (4.97)	0.232 (2.97)	.296 (0.753)	0.223 (3.78)	0.140 (1.03)	1.423 (6.87)	0.339 (0.96)
Sales	0.058 (2.29)	0.002 (0.07)	.063 (1.12)	0.489 (1.77)	0.061 (1.66)	0.088 (1.47)	-0.014 (0.15
DC	0.0001 (0.95)	0.001 (1.78)	-.001 (1.52)	0.079 (1.77)	0.0003 (1.08)	0.046 (1.71)	0.005 (0.63)
SR	0.0000 (0.23)	0.001 (1.25)	-.007 (2.08)	0.125 (0.035)	0.0002 (0.23)	2.72 (3.78)	0.010 (1.70)
γ	0.281 (10.24)	0.202 (9.23)	.0004 (0.01)	0.116 (1.00	0.026 (0.71)	0.077 (1.99)	0.187 (3.61)
Sargan	0.159	0.393	0.085	0.143	0.368	0.342	0.222
AR(1)	1.015 (0.32)	1.380 (0.24)	1.002 (0.32)	1.410 (0.24)	1.912 (0.17)	1.663 (0.20)	1.750 (0.19)
$corr(Y,\hat{Y})^2$	0.52	0.56	0.14	0.74	0.56	0.46	0.36

Note: Numbers in the parentheses denote the corresponding t-statistics. DC is the debt-coverage ratio while SR is the annual stock returns. D_{it} takes a value of 1 if $L_{it} < L_{it}^*$ and zero otherwise.

Table 10. Comparison of Speeds of Adjustment in Alternative Models

	Full sample estimates				Selected sample estimates					
					net leverage	Non-zero debt	STD<5%	STD=0	Top leverage quartile	Largest firms by assets
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Model2	**Model3**	**Model4**	**Model5**	**Model5**	**Model5**	**Model5**	**Model5**	**Model5**	**Model5**
Indonesia	0.90	0.98	0.06	0.42	0.54	0.62	0.44	0.44	0.55	0.40
Korea	0.81	0.88	0.32	0.67	0.72	0.66	0.57	0.52	0.77	0.80
Malaysia	0.87	0.406	0.74	0.23	0.27	0.28	0.25	0.24	0.05	0.22
Thailand	0.77	0.951	0.782	0.50	0.53	0.52	0.54	0.55	0.46	0.39
HK	0.87	0.83	1.09	0.95	0.92	0.99	0.52	0.59	0.99	0.55
SPore	0.81	0.96	1.06	0.81	0.80	0.82	0.97	0.67	0.95	0.83
Taiwan	-	1.032	0.783	0.86	0.87	0.83	0.85	0.84	0.92	0.87

Table. 11. Selected Characteristics of Type a, b, c firms

			Mean values					% of
Country	**Type**	**% of obs.**	**Size group**	**CF/CL**	**Lev.**	**SD/TD**	**Pft rt.**	**Zero Debt firms**
Indonesia	a	24	1.9	-0.36	0.80	0.63	-0.12	2
	b	69	1.75	0.34	0.39	0.59	0.12	4
	c	7	1.85	1.76	0.22	0.39	0.23	15
Korea	a	21	1.8	-0.60	0.69	0.54	-0.13	1
	b	75	1.9	0.20	0.40	0.55	0.08	1
	c	3	1.5	3.11	0.28	0.45	0.54	8
Malaysia	a	20	1.6	-0.26	0.92		0.02	2
	b	71	1.95	0.32	0.25		0.08	6
	c	9	2.01	1.72	0.08		0.12	37
Thailand	a	20	1.9	-0.45	0.77	0.73	-0.13	1
	b	70	1.8	0.31	0.41	0.32	0.09	2
	c	9	1.7	2.13	0.21		0.17	9
Hong Kong	a	26	2.00	-17.94	0.39	0.73	-0.50	10
	b	45	2.5	0.46	0.24	0.38	0.07	2
	c	29	2.2	60.24	0.11		0.20	15
Singapore	a	17	1.9	-0.36	0.36		-0.16	4
	b	78	2.2	0.33	0.20		0.07	5
	c	5	2.2	1.57	0.06		0.19	27
Taiwan	a	16	2.0	-0.55	0.38		-0.07	2
	b	51	2.3	0.45	0.30		0.05	1
	c	32	2.1	3.7	0.14		0.14	8

Note: Type a: CF/CL<=0; Type b: 0<CF/CL<1; Type c: CF/CL>=1.

Table 12. Sudden adjustment?

	Average speeds of adjustment						
	Korea	**Indo**	**Malay**	**Thai**	**HK**	**SPore**	**Tai**
Full sample	0.67	0.42	0.23	0.50	0.95	0.81	0.87
Type a	0.68	0.55	0.16	0.47	1.19	1.21	0.90
Type a pre crisis	0.76	0.44	0.24	0.67	0.96	1.00	0.79
Type a crisis	0.64	0.48	0.21	0.55	0.85	0.99	0.89
Type a post crisis	0.69	0.57	0.34	0.36	1.45	0.95	0.92
Type b	0.65	0.42	0.24	0.53	0.69	0.75	0.87
Type c	0.60	0.33	0.19	0.45	0.23	0.45	0.82

Note: Type a: CF/CL<=0; Type b: 0<CF/CL<1; Type c: CF/CL>=1.

<u>Appendix 1</u>

Table A1. Descriptive Statistics (Means and standard deviations) of dependent and independent variables, full sample

	Indonesia	Korea	Malaysia	Thailand	Hong Kong	Singapore	Taiwan
Leverage	0.487 (0.454)	0.467 (0.295)	0.337 (0.634)	0.452 (0.407)	0.241 (0.494)	0.225 (0.260)	0.270 (0.173)
Net leverage	-79.71 (151.29)	-113.13 (293.28)	-60.294 (108.65)	-60.294 (108.65)	-105.45 (283.77)	-53.82 (283.77)	-78.02 (127.57)
D_{it}	0.323 (0.147)	0.366 (0.481)	0.522 (0.221)	0.160 (0.367)	0.555 (0.288)	0.511 (0.234)	0.264 (0.441)
Q	0.277 (0.539)	0.244 (0.411)	0.365 (1.182)	0.357 (0.577)	0.494 (0.642)	0.507 (0.300)	0.547 (0.441)
Sales (size) $US ‘000	189.58 (382.66)	1670.63 (4567.62)	239.36 (462.12)	154.82 (355.73)	460.07 (1222.37)	279.53 (735.29)	438.12 (752.65)
Debt Coverage (DC)	9.853 (92.28)	1.375 (26.65)	2.343 (18.75)	0.433 (18.57)	3.603 (43.971)	5.258 (50.189)	10.26 (321.25)
Annual stock returns % (SR)	15.300 (18.20)	28.642 (574.60)	23.873 (802.75)	9.361 (167.36)	25.000 (125.24)	16.966 (152.78)	15.752 (32.244)

Note: Standard deviations are shown in the parentheses. Leverage is defined as the ratio of total debt to total assets while net leverage is the ratio of total debt net of cash flow to total assets. DC is the debt-coverage ratio (defined as Net Operating Income / Total Debt service.) while SR is the annual stock returns. D_{it} takes a value of 1 if $L_{it} < L^*_{it}$ and zero otherwise. Q is Tobin’s Q defined as the firm’s market value as a proportion of total assets.

Table A2. Mean Comparison of Effective Interest rate (%)

Countries	Groups	Mean	T-statistic
Indonesia	Top leverage quartile	10.5	-2.329*
	others	30.3	
Korea	Top leverage quartile	11.19	3.197*
	others	26.46	
Malaysia	Top leverage quartile	8.9	-2.942*
	others	45.7	
Thailand	Top leverage quartile	9.1	-2.380*
	others	25.2	
Hong Kong	Top leverage quartile	8.01	-2.851*
	others	34.36	
Singapore	Top leverage quartile	5.24	-4.700*
	others	16.36	
Taiwan	Top leverage quartile	6.12	-2.568*
	others	10.34	

Note: * denotes the level of significance at 10% or lower level.

Table A3. Comparison of Residual Sums of Squares (SSR) in Alternative Models

Countries	(1) SSR for model 3 (common speed)	(2) SSR for model 4 (firm-specific speed)	(3) % Reduction in model 4 SSR (1)-(2)	(4) SSR for model 5 (firm- and time varying speed)	(5) % Reduction in model 5 SSR (1)-(4)
Korea	28.85	26.18	9.25	27.17	5.82
Taiwan	3.41	3.26	4.40	3.23	5.27
Malaysia	1.23	1.18	4.07	0.85	30.89
Indonesia	1.32	0.678	48.68	0.51	61.39
Thailand	8.88	7.75	12.73	7.7	13.29
Hong Kong	9.66	8.99	6.94	6.67	30.95
Singapore	0.84	0.81	3.46	0.804	4.17
All			12.79		21.69

Note: SSR is the abbreviation for residual sum of squares. Columns (3) and (5) calculate the % reduction with respect to column (1).

Table A4. Estimates using net leverage as a measure of leverage

Variable	Indonesia	Korea	Malaysia	Thailand	Hong Kong	Singapore	Taiwan
α	0.003	-0.019	-0.002	-0.001	-0.009	-0.011	0.003
(t-stat)	-0.10	-3.78	-0.34	-1.37	-0.71	1.52	-0.96
β_0	0.695	0.121	0.176	0.22	1.89	1.11	0.38
(t-stat)	1.05	2.07	1.72	1.66	2.03	3.1	2.4
D	0.246	0.879	0.174	0.762	0.067	0.1542	0.423
(t-stat)	1.47	5.56	0.28	2.6	1.45	0.48	4.76
Q	0.0627	0.293	0.573	0.078	1.116	0.166	0.086
(t-stat)	2.12	1.19	2.56	3.47	4.55	0.93	2.74
Sales	0.477	0.095	0.1007	0.06	0.131	0.014	0.005
(t-stat)	1.82	1.28	1.68	1.25	1.74	0.51	0.081
DC	0.0721	0.002	0.075	0.00025	0.059	0.021	0.005
(t-stat)	2.56	7.42	2.08	3.75	1.32	0.47	3.81
SR	0.073	0.091	0.002	0.0001	0.511	0.018	0.001
(t-stat)	0.64	2.73	0.39	1.12	1.64	1.895	0.422
γ	0.33	0.067	0.24	0.038	0.063	0.09	0.22
(t-stat)	1.37	6.66	1.38	0.8	1.688	3.89	6.19
Sargan	0.203	0.266	0.225	0.262	0.430	0.249	0.317
AR(1)	1.248	1.159	1.037	1.169	1.082	1.023	1.215
(p value)	0.263	0.281	0.308	0.280	0.298	0.312	0.270
$corr(Y,\hat{Y})^2$	0.88	0.61	0.09	0.37	0.323	0.47	0.5

Appendix 2

Definitions of Institutional Variables Used in Table 1

Rule of the law indicates an assessment of the law and order tradition in the country. This is an average of the month of April and October of the monthly index between 1982-1995. The index ranges between 0-10 with lower score for less tradition for law and order.

Risk of expropriation: ICR's assessment of the risk of outright confiscation. This is an average of the month of April and October during 1982-1995. The value of the index ranges between 1 and 10 with lower scores for higher risks.

Creditor's rights: This is an index aggregating creditor's rights. The index is formed by adding 1 when (1) the country imposes restrictions such as creditors' consent or minimum dividends to file for reorganisation; (2) secured creditors are able to gain possession of their securities once the reorganization petition has been approved;. (3) the debtor does not retain the administration of its property pending the resolution of the reorganisation; or (4) secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm. The index ranges between 0-4 with higher scores for higher rights.

Shareholder's rights: The index is formed by adding 1 when (1) the country allow the shareholders to mail their proxy vote; (2) shareholders are not required to deposit their shares prior to the General Shareholders Meeting; (3) cumulative voting is allowed; (4) an oppressed minorities mechanism is in place or (5) when the minimum percentage of share capital that entitles the shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10% (the sample median). The index ranges between 0-5 with higher scores for higher rights.

Efficiency of the judicial system: This provides an assessment of the efficiency and integrity of the legal environment as it affects Business particularly foreign firms produced by the country risk rating agency Business International Corporation. It may be taken to represent investors' assessment of conditions in the country in question. The index ranges between 0-10 with higher score for higher efficiency.