Debt maturity structure and the 1997 Asian financial crisis

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Abstract

The paper investigates the effects of firm-specific and country-specific characteristics, and the 1997 Asian financial crisis on the debt maturity structure of firms in the Asia Pacific region. The results indicate that firms in this region have a target optimal debt maturity structure, and the maturity structure decision of a firm is driven by both its own characteristics and the economic environment. They also reveal that the crisis had significant effect on firm's debt maturity structure and their determinants.

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1. Introduction

The seminal work of Modigliani and Miller suggests that debt maturity choice is irrelevant in efficient capital markets. However, short-term debt can reduce shareholder's risk if there is uncertainty of future interest rates, since investors cannot easily diversify away inter-temporal risk (Morris, 1976). Consequently, debt maturity can affect firm's value. Subsequent theoretical literature on the role of debt maturity structure on firm value offers arguments in support of several hypotheses, from tax (Brick and Ravid, 1985) and liquidity risk hypotheses (Diamond, 1991), to moral hazard (Myers, 1977; Barnea et al., 1980) and signalling hypotheses (Flannery, 1986; Diamond, 1991). A host of empirical studies, focusing mainly on firms operating in major developed markets, have assessed the validity of these hypotheses (Barclay and Smith, 1995).[1] On the strength of both theoretical and empirical results, it is now established that the choice of corporate debt maturity is one of the most important financing decisions, since an inappropriate choice can increase agency costs and lead to inefficient liquidation.

Despite this wealth of literature, the theoretical predictions and the supporting empirical evidence on the debt maturity decision of firms are mixed. More importantly, little is known about whether, to what extent and how the observed differences in corporate governance and institutional environment may affect the debt maturity choice of firms[2], and most studies analyse the experience of firms under 'normal' market conditions. This paper aims to further address the debt maturity decision and contribute to two new and important dimensions of the literature. Firstly, it investigates the potential effects of economic conditions, corporate governance and institutional set-up on the debt maturity structure of firms in both emerging and more developed economies in the Pacific Basin region. Secondly, it provides the first evidence on the effects of the 1997 Asian financial crisis on the determinants of corporate debt maturity choice of firms operating in the region. An improved understanding of these issues should help both financial

[1] An exception to this is Demirguc-Kunt and Maksimovic (1999), who analyse the choice of debt maturity structure in 30 countries, and show that there are many similarities in the determinants of firms' debt maturity choice across developed and developing markets.

markets and companies to identify the sources of financial risk and how to manage it in different, and changing, economic and institutional conditions.

The selection of the four sample countries, namely Thailand, Malaysia, Singapore and Australia, is based on three important considerations. First, the 1997 Asian crisis affected the chosen countries by different degrees. Thus, an investigation of the effects of the crisis on the corporate debt maturity structure of these nations can shed light on how changes in macroeconomic conditions may affect firm level decisions. Second, firms in these countries operate under different legal, corporate governance and economic settings, and thus the effects of these different environments can be directly addressed. Third, this study extends the current international evidence on corporate financial decisions in general and the sparse literature on the experience of firms from this region in particular.[3] To achieve these objectives the paper investigates: (i) firm-specific and country-specific determinants of corporate debt maturity structure in the Asia Pacific region; (ii) whether, and how, the Asian financial crisis of 1997 affected the corporate debt maturity choice of firms; and (iii) whether the determinants of corporate debt maturity structure are different across countries at different stages of economic and financial development.

2. Economic and Institutional Environment

Economic conditions, corporate governance and institutional environments may influence the relationship between managers, shareholders and creditors, as well as investors' behaviour. This may offer some explanations for the different patterns of financing behaviour observed across countries and regions. The indicators of economic and legal environment summarised in Table 1 show that there are variations across the sample countries, and that the ownership

[2] Exceptions include Demirguc-Kunt and Maksimovic (1999), Fan et al. (2004) and Antoniou et al. (2006).
[3] See Deesomsak et al. (2004) for a discussion of the different economic and legal environments in the sample countries and for references to other empirical investigations in this region.

structure of firms in this region tends to be highly concentrated leading to higher agency costs of debt. It is expected that this disparity in corporate governance and institutional environment affects the relevance of the different potential determinants of debt maturity structure, and contributes to explaining variations across sample countries.

[Insert Table 1]

Firm's financing decisions may also be affected by unforeseeable economic events, such as the Asian financial crisis of July 1997. The effects of this crisis on individual countries varied considerably and showed the vulnerability of the less developed economies in the region. The crisis originated in Thailand and Malaysia and quickly spread throughout the region. Singapore successfully averted the worst effects of the crisis and recovered quickly, while evidence suggests that Australia was not really affected. This is not surprising, because Australia had deeper and more mature financial markets as a consequence of the financial deregulation of the 1980s, and was not subject to the fatal combination of large volatile capital flows and a fragile domestic financial sector that characterised many East Asian countries.

It has been suggested that, in the period preceding the Asian crisis, asymmetric information problems worsened, and the deterioration of balance sheets eventually led to the crisis. Financial markets were no longer able to allocate funds efficiently. Firms became more concerned about their debt exposure and creditors more stringent in their lending. The 1997 Asian crisis emphasised the importance of a carefully chosen maturity-mix of debt to both firms and their lenders. It also highlighted the inefficiency of the corporate governance, legal and institutional environment in this region, and the consequences of unsound lending decisions and lack of transparency. It is therefore reasonable to expect that this economy-wide event may have had a significant impact on the debt maturity decision of firms.

3. Corporate Debt Maturity and Hypotheses Development

The main hypotheses identified by the literature on debt maturity structure relate to moral hazard, taxation, signalling, and liquidity risk.[4] The *moral hazard hypothesis* emphasizes the role of short-term debt in reducing agency problems, such as under-investment and asset substitution. Myers (1977) and Barnea et al. (1980) suggest that firms can control the under-investment problem by shortening the effective maturity of their debt, since when short-term debt matures before growth options are exercised there is an opportunity for firms to re-contract and for debt to be re-priced, so that gains from new investment do not accrue to debtholders. In addition, Barnea et al. (1980) propose that short-term debt can mitigate the adverse risk incentives of debt financing, or the asset substitution problem, because short-term debt is less sensitive to risk shifting. Thus, short-term debt reduces shareholders' incentives to engage in high-risk projects. In relation to the *tax hypothesis*, Brick and Ravid (1985) propose an irrelevance theorem and identify the specific conditions under which taxation can affect debt maturity. Kane et al. (1985) establish that the net benefit of tax, after allowing for the cost of bankruptcy, tends to be very small and thus not sufficient to offset the amortized transaction or floatation costs. In this context, firms should lengthen debt maturity only if the tax advantage is higher than the amortized floatation costs.

The *signalling* and the *liquidity risk hypotheses* were developed by Flannery (1986) and Diamond (1991). When there is asymmetric information between lenders and firms, and in particular managers have better or timelier information about firm's value than investors, the nature of equilibrium is determined by transaction or floatation costs. The market cannot distinguish between good and bad quality firms and a separating equilibrium ensues. Higher quality firms prefer short-term debt to avoid paying a market premium on long-term debt that is too high for their quality, and lower quality firms prefer long-term debt, because the market premium on long-term debt reflects a probability of default that is lower than their own. If firms

consider liquidity risk, they will trade off the benefits of short-term debt against their liquidity risk.

3.1. Firm-Specific Determinants of Debt Maturity Structure

The paper applies a the balance-sheet approach[5] and defines *debt maturity* (MAT) as the proportion of long-term debt to total debt, where long-term debt includes debt of more than one-year maturity. The firm-specific explanatory variables include leverage, firm size, growth opportunities, earnings volatility, liquidity, profitability, share price performance, and asset maturity. Table 2, Panel A, summarizes the relationship postulated by different theories between firm-specific variables and debt maturity, and specifies the proxy measures used. The liquidity risk hypothesis predicts that a firm lengthens its debt maturity as *leverage* (LEV) increases in order to offset the higher probability of a liquidity crisis, and thus delay exposure to bankruptcy risk. Therefore, leverage is expected to be positively correlated with debt maturity. On the contrary however, Myers (1977) suggests that the agency cost of under-investment can be mitigated by either reducing leverage or shortening debt maturity. If the former is used, there is less need for the latter. Thus, the moral hazard hypothesis predicts a negative relationship between leverage and debt maturity.

[Insert Table 2]

The moral hazard and the signalling hypotheses predict a positive relationship between *firm size* (SIZE) and debt maturity. In the presence of moral hazard, smaller firms are more likely to experience conflicts between shareholders and debtholders, leading to problems such as risk shifting, asset substitution and claim dilution. The signalling role of debt is also more important in smaller firms as they might communicate less information to outsiders leading to more informational asymmetries because of economies of scale in information production and distribution. This prediction is further strengthened by a number of other factors. First, managers

[4] See Ravid (1996) for an extensive survey of the theoretical studies on corporate debt maturity structure.
[5] Previous studies that applied this approach are Barclay et al. (2003) and Antoniou et al. (2006).

of small firms are more likely to hold a substantial amount of equity in the firms they manage, and thus will tend to be more risk seeking than managers of larger firms. Second, since small firms tend to have more growth options and thus higher agency costs than large firms, debt holders tend to reduce the risk of lending to smaller firms by restricting the length of debt maturity. Finally, large firms tend to issue more long-term debt because of easier access to capital markets, while smaller firms rely more heavily on bank debt. Therefore, a positive relationship is predicted between debt maturity and firm size.

Growth opportunity (GROW) is expected to be inversely related to long-term debt. The agency cost of debt is likely to be higher for high growth firms, as new investment can increase risk, and informational asymmetries also tend to increase with growth opportunities. Agency related under-investment problems can be mitigated by issuing short-term debt that expires before growth options are exercised. Issuing short-term debt also signals quality to the market and avoids the high information costs that come with long-term debt. However, the liquidity risk hypothesis predicts a positive relationship because firms can reduce the probability of inefficient liquidation of their risky growth opportunities by issuing long-term debt. Kane et al. (1985) argue that there is an inverse relationship between the optimal debt maturity and *earnings volatility* (VOL). Firms with low earnings volatility prefer longer debt maturity to avoid frequent re-balancing of their capital structure. On the contrary, firms with higher business risk are prone to higher agency costs, and thus they have an incentive to shorten debt maturity to lower agency costs. Therefore, a negative relationship between long-term debt and *liquidity* (LIQ) is expected.

Profitability (PROF) is likely to be positively related to debt maturity, because profitable firms have higher taxable income, and thus receive greater tax benefits from long-term debt. Taxability can influence firms' debt maturity because choosing long-term debt over short-term debt can create a tax timing option to repurchase and re-issue debt. Antoniou et al. (2006) link the positive relationship between *share price performance* (SPP) and debt maturity structure to

the signalling power of debt. For instance, if managers perceive that a drop in share price fails to reflect the 'true' (but unknown) value of the firm, they have a motivation to send a credible signal to the market. This can be done by issuing short-term debt, as it confirms that managers are prepared to be closely monitored and frequently assessed by lenders. Similarly, firms with favourable information tend to avoid long-term debt and issue short-term debt instead, because they hope to negotiate more favourable terms later. The relationship between *asset maturity* (AMAT) and debt maturity is expected to be positive, as firms tend to match the maturity structure of assets and liabilities to reduce the agency costs of debt.

Finally, several studies (Ozkan, 2000; Antoniou et al., 2006) show that firms tend to set a *target debt maturity ratio*. If any deviation from the target occurs, the speed at which firms adjust their debt maturity structure towards the target depends on the costs of adjustment versus the costs of remaining off the target. We test for the presence of a target ratio by incorporating the one-period lagged debt maturity in a partial adjustment model.

3.2. Country-Specific Determinants of Debt Maturity Structure

Recent studies show that corporate financing decisions are determined not only by firm-specific characteristics, but also by country-specific factors such as economic conditions, corporate governance and institutional environment (Demirguc-Kunt and Maksimovic, 1999); Fan et al., 2004; Deesomsak et al., 2004; Antoniou et al., 2006). Different market conditions can influence firm's borrowing decisions by affecting the level of long- and short-term debt and by creating incentives for firms to alter the debt maturity mix. We categorise the country-specific explanatory variables into two groups: (i) market-wide determinants, which include economic development, bank development, stock market development, term structure of interest rates, and inflation; and (ii) legal and corporate governance determinants, which include quality of legal enforcement, legal protection, ownership concentration, and information intermediary activity. Table 2, Panels B and C, summarizes the relationship postulated by different theories between

the variables in these two groups of country-specific determinants and debt maturity, and specifies the proxy measures used.

With respect to market-wide determinants, Fan et al. (2004) suggest that firms in developing countries tend to use far less long-term debt than firms in developed countries. To test for this, *a developing economy dummy variable* (EDEV) is used. *Bank development* (BKDEV) is expected to be inversely related to debt maturity, because short-term debt enables banks to use their comparative advantage in monitoring lenders. *Stock market development* (MKDEV) is expected to be positively related to debt maturity since market prices transmit information making lending to quoted firms less risky. However, there is also an incentive for firms in countries with developed stock markets to switch from long-term debt to equity, as the additional liquidity of the stock market encourages risk taking behaviour from well-informed investors. This could lead stock market development to be negatively related to debt maturity because firms may want to use more short-term debt to reduce agency costs.

The tax hypothesis predicts that firms should employ more long-term debt when the *term structure of interest rates* (TERM) slopes upward. Brick and Ravid (1985) show that different time patterns of interest payments can affect the choice of debt maturity of firms. They suggest that firms lengthen their debt maturity when the term structure is upward sloping, because the tax-shield value of long-term debt is higher and because the interest tax shield of debt is accelerated by increasing the proportion of debt payments. Thus, issuing long-term debt can increase firm's value. Graham and Harvey (2001) find that the yield curve influences the maturity of new debt. In this respect, market timing predicts that at times of high interest rates firms prefer to issue short-term debt while they are waiting for long-term interest rates to decline in future. Finally, there is some evidence that an increase in *inflation* (INF) tends to reduce the use of long-term debt by both large and small firms (Demirguc-Kunt and Maksimovic, 1999), since debt contracts are generally based on nominal terms and thus high inflation may increase the interest rate risk faced by firms.

The quality of legal enforcement is measured by the *level of corruption* (CORR), which is expected to be negatively related to corporate debt maturity. When the legal system has less integrity, or is inefficient, debt is used more than equity financing, and short-term debt more than long-term debt, since a shorter maturity limits the firm's opportunity to expropriate creditors. C*reditor rights* (CRR) and *shareholder rights* (SHR) indexes are used to measure legal protection. Diamond (1991) argues that lenders who engage in monitoring have incentives to lend short-term. Demirguc-Kunt and Maksimovic (1999) also suggest that strong creditor rights increase the incentive of banks to monitor firms. Shareholders' protection, on the contrary, decreases the agency cost of debt. Consequently, in countries with strong shareholder rights, firms should need less short-term debt to mitigate agency problems. Therefore, debt maturity is expected to be negatively (positively) related to creditor rights (shareholder rights). When *ownership concentration* (OWN) is high, the interests of shareholders and managers align, leading to higher agency costs of debt. Therefore, the moral hazard hypothesis predicts that firms in countries with high ownership concentration should issue more short-term debt in order to mitigate agency problems. This suggests a negative relationship between ownership concentration and debt maturity. Finally, since auditors enhance the credibility of public information by certifying the firm's accounts their presence should diminish the role of short-term debt in mitigating information problems and lead to a positive relationship between *information intermediary activity* (AUD) and debt maturity.

4. Data and Methodology

4.1. Data

The sample comprises of a panel of all firms in Thailand, Malaysia, Singapore and Australia, listed in the national stock exchanges over the period 1993-2001. Financial firms and firms with missing observations are excluded. Firm's financial data are obtained from Datastream. The final sample consists of 1,726 observations for Thai firms, 2,493 for Malaysian

firms, 1,164 for Singaporean firms, and 809 for Australian firms. Because of the requirement of the Generalised Method of Moments (GMM) methodology that firms with less than three consecutive observations are also excluded, fewer observations are used when using GMM.

Table 3 presents the averages of the variables used in measuring debt maturity, firm-specific and market-wide determinants. Countries are combined by how severely they were hit by the crisis, with Australia and Singapore being the least affected and more developed economies, and Malaysia and Thailand the most affected and emerging economies. Table 3 presents initial evidence of significant differences in debt maturity pattern and determinants between the two country groupings. Firms in developed economies have more long-term debts than firms in emerging economies. The financial crisis had several significant effects on most factors, more so in the countries most affected by the crisis. Overall, the crisis led firms in this region to issue higher debt on average, as equity issues became problematic in unstable markets. Growth opportunity and share price performance decreased significantly after the crisis, while asset maturity increased. Profitability changed significantly after the crisis in the countries most affected. Market-wide factors also changed considerably. For both country groupings, bank's assets became larger relative to GDP. Stock markets were most severely hit in the countries most affected. Short-term interest rates increased (decreased) relative to long-term rates for the countries most (least) affected by the crisis. For both country groupings, inflation decreased after the crisis, and volatility of earnings and liquidity of firms were affected significantly by the crisis. These initial observations further motivate an analysis of the changes in the determinants of debt maturity structure after the Asian crisis.

[Insert Table 3]

4.2. Methodology

To test for the existence of a target optimal debt maturity structure, lagged debt maturity is included in a partial adjustment model as in Ozkan (2000) and Antoniou et al. (2006). If a firm has a target debt maturity ratio, the coefficient of the one-period lagged debt maturity is between

0 and 1. If the cost of diverging from the target is higher than the cost of adjustment, then the speed of adjustment (measured by 1 minus the coefficient of the lagged debt maturity) is expected to be faster (higher).[6] To examine the role of firm-specific determinants of debt maturity, the individual firm's debt maturity structure is modelled as a function of *k* firm-specific factors and its one-period lag for each country as follows:

$$Y_{i,t} = \alpha_0 + \beta_1 Y_{i,t-1} + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + \alpha_i + \alpha_t + \mu_{i,t} \qquad (1)$$

where, $Y_{i,t}$ is firm *i's* debt maturity at time *t*; $FF_{k,i,t}$ is a vector of firm *i*'s *k* firm-specific factors; α_i and α_t represent time-invariant unobservable firm-specific effects and time-specific effects which are common to all firms at any one time but vary through time; and the disturbance term $\mu_{i,t}$ is time-varying and serially uncorrelated with mean zero and variance σ^2.

As shown in Antoniou et al. (2006), GMM-SYS is the most appropriate method to estimate equation (1).[7] Wherever appropriate, we use the more efficient two-step GMM estimator. The suitability of instruments is confirmed by the Sargan test. As shocks that affect debt maturity structure may also affect other firm-specific factors, all explanatory variables may not be strictly exogenous. Therefore, the dependent variable is treated as endogenous and the explanatory variables as weakly exogenous.

To test for the importance of economic conditions on corporate debt maturity structure, the data for the four sample countries are subsequently pooled to create one panel. Due to the nature of the data, equation (2) below is estimated using OLS instead of GMM-SYS:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + \sum_{m=1}^{N} \omega_m CD_{m,j,t} + \alpha_t + \mu_{i,t} \qquad (2)$$

where the notation is the same as in equation (1), and $CD_{m,j,t}$ refers to a vector of country *j*'s country dummy *m*, taking the value of 1 for Thailand (THDUM), Malaysia (MLDUM) and

[6] For a detailed discussion of the speed of adjustment model see Antoniou et al. (2006).
[7] Four different methodologies, OLS in levels, OLS-first differences, GMM-differences and GMM-SYS, were used to estimate Eq. (1) and GMM-SYS was confirmed to be the most appropriate methodology.

Singapore (SPDUM), and 0 otherwise. Country dummies are subsequently replaced firstly by an economic development dummy (EDEV), which takes the value of 1 for Thailand and Malaysia and 0 for Singapore and Australia, and secondly by the legal and governance variables identified in Section 3.3 above, one at a time.

Since the role of market-wide determinants may vary depending on how severely the crisis hit different countries, and thus estimating across all countries may be misleading as effects may cancel each other out, the data for the four sample countries are subsequently divided into two groups: countries least affected and countries most affected by the Asian crisis. Equation (1) is augmented with market-wide factors, one at a time, over the whole sample period, using GMM-SYS as the main estimation method. Finally, to further investigate the possible effects of the 1997 Asian crisis, equation (1) augmented by the market-wide determinants is re-estimated with GMM-SYS over two sub-sample periods, the pre-crisis period between 1993 and 1996, and the post-crisis period between 1998 and 2001. Wald-statistics are estimated to test for any significant change in the role of the identified variables due to the financial crisis.

5. Empirical Results

5.1. Debt Maturity Dynamics: Firm-specific effects on debt maturity

Table 4 (Panel A) presents the findings from estimating equation (1) using GMM-SYS for whole sample period. AR (1) suggests a negative first-order serial correlation, while AR (2) suggests the absence of second-order serial correlation, satisfying the assumption of no higher-order serial correlation. All Wald statistics of joint significance of the regressors (Wald Test 1) are significant. The Sargan test indicates that the instruments used are valid and not correlated with the error term. The coefficients of lagged debt maturity are positive. The findings are consistent with Ozkan (2000) and Antoniou et al. (2006) and suggest that firms in this region have a target optimal debt maturity structure. Australian firms have the highest adjustment speed (0.71), while Malaysian firms show a relatively slow adjustment (0.48).

Table 4 (Panel B) presents the findings by country groupings. The estimates confirm that firms have target debt maturity structure during both pre- and post-crisis periods. In the pre-crisis period, firms in the countries least affected by the crisis appeared to be able to adjust their debt maturity structure to the target level faster ($1-\beta \sim 0.70$) than firms in the countries most affected ($1-\beta \sim 0.40$). While the crisis did not have a significant impact on the speed of adjustment for firms in the countries most affected by the crisis, in the countries least affected the crisis substantially slowed down the speed of adjustment, suggesting that the adjustment process was relatively costly in the aftermath of the crisis.

[Insert Table 4]

The results for the whole sample period (Table 4, Panel A) show that l*everage*[8] is positively related to debt maturity, supporting the liquidity risk argument that higher leverage encourages firms to avoid short-term debt. It also implies that leverage and debt maturity are used as strategic complements to reduce the under-investment problem, as suggested by Barclay et al. (2003). The coefficients of *firm size* are positive and significant confirming the hypothesis that small firms are prone to higher agency costs of debt and thus tend to shorten their debt maturity to reduce these costs. The findings also support the signalling hypothesis, which stipulates that small firms have higher levels of asymmetric information, and thus they are more motivated to use short-term debt to signal their quality to the market. However, *growth opportunity* has no influence on the debt maturity structure of firms.[9] Debt maturity may not be used to reduce the under-investment problem, because firms, especially in Malaysia and Singapore, have highly concentrated ownership and a close relationship with their banks.

[8] To examine the sensitivity of the results to the definition of leverage, equation (1) was also estimated with leverage redefined as the ratio of total debt to total assets. The (unreported) results were statistically similar to those discussed in the paper. In addition, Barclay et al. (2003) point out that the regression coefficients can be potentially biased and inconsistent when both leverage and investment opportunities are included in the regression as independent variables. Thus, alternative formulations were estimated excluding leverage from the model. The (unreported) estimates were similar to those presented in the paper, confirming that the results are robust.

[9] Esho et al. (2002) obtain similar results for Australian firms. Deesomsak et al. (2004) also find that growth opportunity has no significant effect on the capital structure decision of Malaysian and Australian firms.

Earnings volatility has a negative effect on debt maturity only in Singapore. This is consistent with the findings of other studies (Guedes and Opler, 1996) and supports the bankruptcy cost argument. *Liquidity* is positively related to debt maturity in all countries. This suggests that firms in this region choose to issue more long-term debt when they are more liquid to avoid cash shortages and lower their probability of bankruptcy. Contrasting results between developed and emerging countries are found for the relationship between *profitability* and debt maturity. This relationship is positive and significant only for firms in emerging countries, supporting the tax hypothesis that highly profitable firms minimize their tax liability by choosing longer-term debt. Mixed results are also found for the relationship between *share price performance* and debt maturity. A positive and significant relationship is only observed in Australia, supporting the signalling hypothesis that firms whose shares are perceived to under-perform tend to issue shorter-term debt to signal their quality to the market, while firms whose shares are perceived to over-perform issue longer-term debt to exploit the market mispricing. Mixed support is shown for the maturity-matching hypothesis, as *asset maturity* is positively related to debt maturity only in Singapore.

The findings in Table 4 (Panel B) show three distinctive effects of the crisis on the role of firm-specific determinants. Firstly, the Asian crisis had different effects between country groupings on the relationship between debt maturity and leverage, earnings volatility, and profitability. The role of long-term debt in offsetting the higher liquidity risk and in delaying the exposure to bankruptcy, as proxied by *leverage,* reduced substantially after the crisis in the countries least affected. However, the opposite pattern is found for the countries most affected by the crisis, due to higher financial distress and expected bankruptcy costs following the crisis. *Earnings volatility* played no role in the most affected countries in either pre- or post-crisis periods, whereas it became a significant negative factor in the least affected countries after the crisis. This negative relationship implies a stronger agency effect in the more developed markets and is consistent with findings from developed markets (Guedes and Opler, 1996). The

relationship between *profitability* and debt maturity in the most affected countries became significantly positive in the post-crisis period, implying that the financial crisis might have raised firms' awareness of tax effects, but no significant effect is found for the countries least affected by the crisis. Secondly, the crisis appears to have had similar effects on the relationship between debt maturity and *liquidity* in both country groupings, regardless of how severely they were hit by the crisis. Although before the crisis *liquidity* played no role, after the crisis it became a significant positive factor in determining debt maturity. This implies that after the crisis firms with higher levels of liquidity chose to issue longer-term debt to avoid cash shortages. Thirdly, the results also reveal that the financial crisis did not alter the effects of *asset maturity*, *share price performance*, *firm size* and *growth opportunity*.

In summary, the findings presented in Table 4 show that some determinants were more powerful and consistent than others in explaining the choice of debt maturity of firms operating in the Asia Pacific region.[10] The results not only show how the crisis affected the firm's financing decision, but also show considerable variation in the importance of the determinants of debt maturity structure across sample countries, motivating further investigation into the effects of country-specific variables.

5.2. Country-specific effects on debt maturity

To investigate country-specific effects on debt maturity, equation (2) is estimated using panel data that combine all firms across all sample countries over the whole sample period.[11] All *country dummies* coefficients are highly significant, showing that country-specific factors play a part in the debt maturity choice of firms. To investigate this general finding further, country dummies are replaced with an economic development dummy and several legal and corporate

[10] As a robustness test, debt maturity was also modelled as a function of *k* firm specific factors for each country using pooled OLS. Industry dummies are included in the model to control for industry effects, but they were found to be statistically insignificant. Further robustness tests are conducted by using cross-sectional OLS analysis to preserve the dispersion across firms and eliminate the serial correlation problem in residuals that tends to inflate the t-statistics in pooled regressions (Rajan and Zingales, 1995). The results from pooled OLS and cross-sectional estimations are not qualitatively different from those presented in Table 4.

[11] In the interest of space results are not reported in tables.

governance factors considered in turn as discussed in Section 4.2. *Economic development* is found to have a highly significant and negative effect, implying that firms in developing countries tend to issue less long-term debt, a result that contradicts the findings of Fan et al. (2004). In terms of legal and corporate governance variables, as predicted and in line with Fan et al. (2004) and Demirguc-Kunt and Maksimovic (1999), the *corruption level* is negatively associated with debt maturity, implying a positive relationship between legal enforcement and debt maturity, and supporting the monitoring function of short-term debt. *Legal protection* is also found to be a significant factor in determining firm's debt maturity choice. In line with Demirguc-Kunt and Maksimovic (1999), firms in countries with superior *creditor rights* use relatively more short-term debt, implying that the ability of firms to use short-term debt is higher when creditors are better protected, as banks have more incentives to monitor borrowers. On the contrary, firms in countries with higher *shareholder rights* use more long-term debt since the agency cost of debt is lower and thus the need to use short-term loans to mitigate agency problems is reduced. *Ownership concentration* has a negative and significant relationship with debt maturity in support of the moral hazard hypothesis. Finally, a positive relationship is found between the *market share of the big-5 auditors* and debt maturity, highlighting the important role of auditors in facilitating the transmission of information.

Since the estimates show that economic development and country dummies play a significant role in explaining debt maturity patterns, this is investigated further by the inclusion of market-wide variables. In particular, given that the sample countries are at different stages of economic development and were hit by the crisis by different degrees, some of the true market-wide effects could have been averaged out if estimated over the full set of countries. It is an important question whether the identified market-wide determinants had a different impact on the sample countries depending upon their stage of development and vulnerability to the crisis. Equation (1) is augmented by market-wide factors for the pooled panels of the two country groupings, least and most affected by the crisis, as defined in Section 4.1, and is estimated by

using the GMM-SYS methodology. Further tests are conducted using pooled OLS and average cross-sectional framework to ensure the robustness of the results. The estimates based on GMM-SYS are consistent with those from pooled OLS. However, the latter show higher significance levels, leading to stronger contrasting effects of market-wide factors. Therefore, Table 5 presents the results of the pooled OLS estimations relating to firm-specific and market-wide determinants for the two country groupings identified.[12]

[Insert Table 5]

Estimates over the whole sample period show a negative and significant coefficient of *bank development* for the least affected countries, supporting the findings of Fan et al. (2004) that in developed economies banks are able to take full advantage of their monitoring power and act as information providers to other creditors. Thus, the larger the banking sector, the more firms are encouraged to issue short-term debt. On the contrary, in less developed countries a positive and significant relationship shows that a larger banking sector leads to more long-term debts. This is consistent with Demirguc-Kunt and Maksimovic's (1999) argument that in developing countries with weaker legal systems, a larger banking sector is associated with longer maturity debts, as creditor's rights are strengthen by the size of the banking sector. In addition, the closer relationship between firms and their banks in developing countries and the lack of an efficient equity market may also encourage banks to grant relatively more long-term debts.

The findings further reveal an opposite pattern in the relationships between *stock market development* and the *term structure of interest rates* and debt maturity between the two groups of countries. In the countries least affected by the crisis, where stock markets are relatively more developed and firms can more easily raise equity finance, firms are found to hold relatively

[12] The results based on the GMM-SYS estimation are not reported in tables. Previous studies have also found that the results may vary depending on the methodology applied. For example, Antoniou et al. (2006) find mixed effects of the term structure of interest rates on debt maturity, while Barclay and Smith (1995) find a negative and significant relationship when panel data are used in pooled OLS and fixed effects, but an insignificant relationship when cross-sectional data are used.

shorter maturity debt. The reverse is true for firms in the most affected countries, where stock markets are less developed. Consistent with the tax hypothesis, firms in countries most affected by the crisis employ more long-term debt when the term structure of interest rates has a positive slope. On the other hand, the market timing hypothesis dominates the effect in the least affected countries, in line with Guedes and Opler (1996). This latter finding shows some evidence of less than fully rational behaviour of managers (optimism) as discussed in Baker et al. (2007), namely that managers time their debt maturity choice by issuing short-term debt when the term spread is high, as they expect long-term rates to decline. Finally, consistent with the findings of Demirguc-Kunt and Maksimovic (1999), high *inflation* is negatively related to the use of long-term debt in the countries most affected by the crisis.

In relation to the effects of the financial crisis, market-wide factors appears to be generally highly significant in both country groupings in the pre- and post-crisis periods, and the direction of the effects is in line with the findings for the whole sample period. Thus, overall the crisis did not alter the contrasting effects of market-wide determinants observed earlier. However, it significantly changed the size of their impact, especially in the less developed countries. The coefficient of *inflation* is the only one that changes sign after the crisis and becomes positive for both country groupings. This may explain why inflation appeared insignificant in the previous aggregate analysis of the whole sample period. Over the pre-crisis period higher inflation appears to have been associated with reduced long-term debt to minimise the interest rate risk, consistent with Demirguc-Kunt and Maksimovic (1999).

In summary, the results confirm that market-wide variables are as important as firm-specific characteristics in determining debt maturity structure. These market-wide determinants not only influence the maturity of firm's borrowing, but they also appear to have different effects depending on the country's economic development.

6. Conclusions

The paper investigates the effects of firm-specific as well as country-specific factors, such as economic conditions, corporate governance and institutional set-up, on the debt maturity structure of firms. It also provides the first evidence on the effects of the 1997 Asian financial crisis on the determinants of corporate debt maturity choice of firms operating in the region. Several conclusions emerge. Firstly, firms appear to have a target debt maturity structure. The speed of adjustment is substantially reduced during the post-crisis period in the countries least affected by the crisis, suggesting that the costs of moving towards the target increased with the crisis. Secondly, the debt maturity structure of sample firms is strongly related to a number of firm-specific and market-wide factors, as well as the country's corporate governance, and the legal and institutional environments. These findings are consistent with a number of previous empirical studies, and offer further evidence for the Asia Pacific region. Thirdly, the evidence supports the view that the debt maturity structure decision can affect the cost of external finance and plays an important role in alleviating some capital market imperfections.

Fourthly, the results show that the debt maturity structure decision can also help to alleviate the shortcomings of the legal and corporate governance systems. Market-wide factors further appear to influence debt maturity, and this effect depends on the country's economic development. Fifthly, the Asian financial crisis of 1997 appears to have had several significant effects on both firm-specific and market-wide determinants of debt maturity structure, especially in Thailand and Malaysia where the crisis originated. However, effects were observed even in the countries least affected by the crisis. More specifically, the relationship between debt maturity structure and many of its determinants changed significantly after the crisis, both in size and/or direction. Finally, the crisis forced managers to recognise the importance of an appropriate debt maturity structure for their firms, in terms of both reducing funding costs and liquidity constraints, and improving the information flow to outside investors and thus agency problems.

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Table 1: Major indicators of economic condition, corporate governance and institutional environment in the sample countries.

	Thailand	Malaysia	Singapore	Australia	Source
Economic Condition					
Bank Development	5.0553	5.5927	8.0553	1.0101	Datastream
Stock Market Development	2.0826	5.1284	5.4856	0.8061	Datastream
Economic Development	Developing	Developing	Developed	Developed	Fan et al. (2004)
Term Structure of Interest Rates	1.1212	1.3610	2.0260	1.6790	Datastream
Inflation	4.58	3.41	5.70	1.74	Datastream
Rule of Law and Legal Protection					
Corruption	6.95	4.9	0.87	1.45	Fan et al. (2004)
Creditor Rights	3	4	4	1	La Porta et al. (1998)
Shareholder Rights	2	4	4	4	La Porta et al. (1998)
Ownership Concentration	0.47	0.54	0.49	0.28	La Porta et al. (1998)
Big-5 Auditors' Market Share	0.58	0.66	0.99	0.89	Fan et al. (2004)

Table 2: Expected relation between debt maturity structure and firm-specific and country-specific determinants.

Panel A: Firm-Specific Determinants

Determinants	Measurement	Positive	Negative	Expected relation
Leverage (LEV)	Debt to total capital = Total debt / (Total debt + MV of equity + BV of preference share)	Liquidity risk hypothesis	Moral hazard hypothesis	Positive
Firm Size (SIZE)	Natural logarithm of assets	Moral hazard hypothesis Signalling hypothesis Access to the market, Transaction cost	Liquidity risk hypothesis	Positive
Growth Opportunity (GROW)	(Total assets – Book value of equity + Market value of equity) / Total assets	Liquidity risk hypothesis	Moral hazard hypothesis Signalling hypothesis	Negative
Earnings Volatility (VOL)	Absolute value of $\{[(EBIT_t - EBIT_{t-1})] / EBIT_{t-1}\}$- average of $\{[(EBIT_t - EBIT_{t-1})]/EBIT_{t-1}\}$	Liquidity risk hypothesis	Moral hazard hypothesis Bankruptcy cost	Negative
Liquidity (LIQ)	Current assets/ Current liabilities	-	Capacity	Negative
Profitability (PROF)	Earnings before interest, tax and depreciation/ Total assets	Tax hypothesis	-	Positive
Share Price Performance (SPP)	Changes in share prices	Signalling hypothesis Market timing theory	Optimistic behaviour	Positive
Asset Maturity (AMAT)	Total fixed assets / Total assets	Moral hazard hypothesis Liquidity, financial distress, cash flow	Priority of claim	Positive

Panel B: Market-Wide Determinants

Determinants	Measurement	Positive	Negative	Expected relation
Economy Development (EDEV)	Dummy equal to 1 for developing economy and 0 otherwise	-	Maturity of the market	Negative
Bank Development (BKDEV)	Bank assets / GDP	Creditor rights	Monitoring system	Negative
Stock Market Development (MKDEV)	Market capitalization / GDP	Information	Other sources of finance	Positive
Term Structure of Interest Rates (TERM)	Government bond yield – Treasury Bill (3 month rate)	Tax hypothesis	Market timing theory Optimistic behaviour	Positive
Inflation (INF)	Changes in consumer price index	-	Uncertainty	Negative

Panel C: Legal and Governance Determinants

Determinants	Measurement	Positive	Negative	Expected relation
Quality of Legal Enforcement (CORR)	Corruption level (See Fan et al., 2004)	-	Moral hazard hypothesis	Negative
Legal Protection (CRR and SHR)	Creditor / Shareholder rights (See La Porta et al., 1998)	- Moral hazard hypothesis	Monitoring system -	Negative Positive
Ownership Concentration (OWN)	Ownership by the 3 largest shareholders of 10 largest non-financial domestic firms	-	Moral hazard hypothesis	Negative
The Presence of Information Intermediaries (AUD)	The share of assets of listed companies audited by the big-five auditors	Moral hazard hypothesis	-	Positive

Table 3: Averages of firm-specific and market-wide variables.

Variable	Panel A: Full Sample (1993 – 2001)			Panel B: Countries least affected by the crisis			Panel C: Countries most affected by the crisis		
	(1) Countries least affected by the crisis	(2) Countries most affected by the crisis	(3) t-statistics	(4) Pre-Crisis (1993 – 1996)	(5) Post-Crisis (1998 – 2001)	(6) t-statistics	(7) Pre-Crisis (1993 – 1996)	(8) Post-Crisis (1998 – 2001)	(9) t-statistics
MAT	0.5162	0.3000	27.7018 ***	0.4903	0.5290	-2.6283 ***	0.2801	0.3044	-2.7814 ***
LEV	0.2146	0.3342	-22.8519 ***	0.1685	0.2478	-10.5588 ***	0.1930	0.4247	-34.1152 ***
SIZE	12.1741	13.2509	-27.4032 ***	12.1175	12.2026	-1.1857	13.2692	13.2202	0.9552
GROW	-2.9056	1.7701	-9.2846 ***	-4.3510	-2.3118	-1.7544 *	2.4793	1.2652	16.6497 ***
VOL	3.4567	2.8833	1.6085	3.6560	3.2256	0.6078	2.7336	3.0501	-0.8973
LIQ	2.3815	1.7119	7.5631 ***	2.4432	2.3598	0.4531	1.7495	1.6901	0.8461
PROF	0.0789	0.0811	-0.3513	0.0713	0.0789	-0.4834	0.1274	0.0496	17.2047 ***
SPP	-0.0344	-0.1349	7.1901 ***	0.1201	-0.1101	10.8188 ***	0.0716	-0.1222	11.3368 ***
AMAT	0.3431	0.3995	-11.6291 ***	0.3311	0.3502	-2.2973 **	0.3897	0.4068	-2.6642 ***
BKDEV	5.3197	5.4288	-2.1736 **	4.7229	5.9479	-11.7609 ***	4.7038	5.9828	-128.7655 ***
MKDEV	3.6686	4.1985	-13.2042 ***	3.7920	3.6902	1.3760	5.3815	3.1652	61.8787 ***
TERM	1.8709	1.2936	20.7895 ***	2.1338	1.6628	16.6944 ***	0.9997	2.4561	55.1499 ***
INF	4.4598	3.3465	9.2681 ***	7.7899	2.0238	23.1601 ***	4.0405	2.4312	47.7391 ***

Debt maturity (MAT) is the proportion of long-term debt to total debt. Leverage (LEV) is the debt to capital ratio. Firm size (SIZE) is the natural logarithm of total assets. Growth opportunity (GROW) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Earnings volatility (VOL) is the absolute difference between annual percentage change in earnings before interest and taxes and the average of this change. Liquidity (LIQ) is the ratio of current assets to current liabilities. Profitability (PROF) is the ratios of earnings before interest, tax and depreciation to total assets. Share price performance (SPP) is the first difference of logs of annual share price. Asset Maturity (AMAT) is the ratio of total fixed assets to total assets. Bank development (BKDEV) is the ratio of bank assets to GDP. Stock market development (MKDEV) is the ratio of market capitalization to GDP. Term structure of interest rates (TERM) is the differences between government bond yield and Treasury bill (3 month rate). Inflation (INF) is changes in consumer price index.

The t-statistics reported in Column (3) are the comparisons of the differences in average values between countries least and most affected by the crisis over the full sample while the ones in Columns (6) and (9) are the comparisons across pre- and post-crisis periods for each country grouping.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 4: Dynamic debt maturity structure : System GMM estimation

Variable	Panel A: By country: 1993 - 2001				Panel B: By country groupings: Pre- and Post-Crisis					
	Thailand	Malaysia	Singapore	Australia	Countries most affected by the crisis			Countries least affected by the crisis		
					Pre-Crisis	Post-Crisis	Wald Test	Pre-Crisis	Post-Crisis	Wald Test
Constant	-0.6005**	-0.6105***	-0.8560**	-0.2231	-0.2612	-0.0646		-0.7642	-0.8152	
t-statistics	(-2.1900)	(-3.2700)	(-2.5500)	(-0.8110)	(-0.3490)	(-0.3390)		(-1.4000)	(-1.6000)	
MAT_{t-1}	0.4458***	0.5178***	0.3737***	0.2942***	0.5919***	0.5583***		0.2811*	0.4630***	
t-statistics	(6.9300)	(9.2100)	(5.5700)	(3.5000)	(3.0000)	(7.5700)	<0.2079>	(1.8000)	(3.8600)	<2.3021>**
LEV	0.2435***	0.0849	0.2478***	0.2749*	0.0809	0.1200*		0.6950**	-0.1155	
t-statistics	(4.2400)	(1.6200)	(2.7200)	(1.9200)	(0.5430)	(1.6600)	<2.7627>***	(1.9700)	(-1.3800)	<94.1953>***
SIZE	0.0401**	0.0507***	0.0735***	0.0385*	0.0423	-0.0004		0.0891*	0.0869**	
t-statistics	(2.1400)	(4.3700)	(2.7900)	(1.7400)	(0.9250)	(-0.0265)	<0.0007>	(1.8000)	(2.0100)	<0.0027>
GROW	0.0184	0.0117	-0.0072	-0.0001	-0.0072	0.0009		-0.0070	0.0004	
t-statistics	(0.8380)	(1.2800)	(-0.2700)	(-0.0643)	(-0.2970)	(0.0688)	<0.0047>	(-1.2800)	(0.2010)	<0.0402>
VOL	0.0003	0.0012	-0.0008**	-0.0003	0.0008	0.0004		-0.0009	-0.0008**	
t-statistics	(0.2920)	(1.0200)	(-2.5200)	(-0.7090)	(1.0300)	(0.3100)	<0.0959>	(-0.4720)	(-2.5600)	<6.5488>***
LIQ	0.0638***	0.0554***	0.0669**	0.0211***	0.0173	0.0670***		0.0120	0.0508***	
t-statistics	(3.9900)	(3.3300)	(2.4600)	(3.6900)	(0.7990)	(3.3900)	<11.5020>***	(0.7860)	(3.1700)	<10.0256>***
PROF	0.1088*	0.0840**	0.2663	-0.0614	-0.0383	0.0679**		-0.1615	0.0386	
t-statistics	(1.9300)	(1.9800)	(1.4500	(-0.5420)	(-0.1120)	(2.2700)	<5.1358>***	(-0.3750)	(0.3800)	<0.1443>
SPP	-0.0432***	-0.0044	-0.0117	0.0545***	0.0260	-0.0038		0.0373	0.0213	
t-statistics	(-4.1400)	(-0.5710)	(-0.6960)	(2.6200)	(0.4900)	(-0.3300)	<0.1086>	(0.5780)	(0.9300)	<0.8640>
AMAT	-0.1407	0.1640*	0.1682	0.1169	-0.4120	0.0906		-0.2954	0.0037	
t-statistics	(-1.1300)	(1.6700)	(1.1300)	(0.9600)	(-1.5400)	(0.7840)	<0.6152>	(-1.1700)	(0.0194)	<0.0004>
AR(1)	-6.038***	-6.544***	-4.797***	-0.306	-0.706	-7.326***		-1.478	-4.588***	
AR(2)	0.734	0.825	0.306	1.100	-	-		-	-	
Wald test1(df)	159.70 (9)***	223.10 (9)***	166.00 (9)***	51.85 (9)***	24.15 (9)***	97.93 (9)***		52.74 (9)***	99.07 (9)***	
Wald test2(df)	22.36 (7)***	34.25 (8)***	16.14 (7)**	12.77 (8)	1.26 (3)	2.38 (3)		4.13 (3)	7.33 (3)*	
Wald test3(df)	12.39 (6)*	7.63 (7)	7.61 (6)	11.17 (7)	0.43 (2)	1.94 (2)		2.43 (2)	5.01 (2)*	
Sargan test(df)	108.20 (107)	143.70 (134)	98.53 (116)	106.30 (125)	24.81 (44)	50.73 (35)**		44.87 (44)	40.83 (35)	
Obs	1412	1807	889	597	373	1758		301	760	
Firms	255	423	178	129	182	623		128	273	

$$Y_{i,t} = \alpha_0 + \beta_1 Y_{i,t-1} + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + \alpha_i + \alpha_t + \mu_{i,t} \qquad (1)$$

See Table 3 and Section 3 for the definition of the variables. Firms with less than three year consecutive observations are excluded. The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Six test statistics are reported. AR(1) and AR(2) are first and second order autocorrelation of residual, respectively, which are asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Wald Test 1 tests the joint significance of estimated coefficients, asymmptotically distributed as χ^2(df) under the null hypothesis of no relationship. Wald test 2 and 3 test the joint significance of time and dummies. Sargan Test is the test of over identifying restrictions, asymptotically as χ^2(df) under null hypothesis of instruments' validity. Wald test in Panel B are estimated to test for any statistically significant change in the role of the identified variables because of the financial crisis. Time dummies are included in all models.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5: Pooled time series and cross sectional analysis of the firm-specific and market-wide determinants by country groupings.

Variable	Panel A: Countries most affected by the crisis											
	Model-1			Model-2			Model-3			Model-4		
	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis
Constant	-1.0012***	-1.2801***	-1.2132***	-0.8071***	-0.5892***	-0.7396***	-0.3210***	-0.2976**	-0.3283***	-0.2833***	-0.2912**	-0.6368***
t-statistics	(-5.7400)	(-3.6600)	(-6.3000)	(-5.3500)	(-3.2000)	(-6.6000)	(-3.0000)	(-2.1400)	(-4.2100)	(-2.6300)	(-2.0000)	(-5.9800)
LEV	0.1227***	0.1587**	0.1280***	0.1600***	0.1798***	0.1536***	0.1028***	0.0845	0.1154***	0.1050***	0.1616***	0.1228***
t-statistics	(3.9700)	(2.4900)	(3.8100)	(5.0900)	(2.7900)	(4.5100)	(3.3100)	(1.3600)	(3.4900)	(3.3900)	(2.6000)	(3.7300)
Wald Test			<0.8303>			<0.5902>			<12.2122>***			<1.3944>
SIZE	0.0439***	0.0409***	0.0475***	0.0508***	0.0427***	0.0557***	0.0360***	0.0361***	0.0415***	0.0366***	0.0430***	0.0423***
t-statistics	(7.5800)	(4.3600)	(8.1100)	(7.5300)	(4.3500)	(8.3300)	(7.2400)	(4.2900)	(7.6800)	(7.2900)	(4.4100)	(7.7300)
Wald Test			<1.2940>			<3.8049>*			<0.9894>			<0.0130>
GROW	0.0051	0.0024	0.0039	0.0026	0.0025	0.0038	0.0036	0.0012	0.0036	0.0028	0.0021	0.0043
t-statistics	(1.5100)	(0.5870)	(0.5250)	(0.7710)	(0.6080)	(0.4980)	(1.0500)	(0.2810)	(0.4860)	(0.8100)	(0.4930)	(0.5630)
Wald Test			<0.2761>			<0.2476>			<0.2363>			<0.3171>
VOL	-0.0015**	-0.0011	-0.0015**	-0.0015***	-0.0011	-0.0015**	-0.0015**	-0.0011	-0.0016**	-0.0016***	-0.0009	-0.0015**
t-statistics	(-2.5300)	(-1.1800)	(-2.2200)	(-2.6700)	(-1.1100)	(-2.1900)	(-2.5700)	(-1.1700)	(-2.3600)	(-2.6400)	(-0.9460)	(-2.1200)
Wald Test			<4.9094>**			<4.7753>**			<5.5913>**			<4.5061>**
LIQ	0.0269***	0.0202*	0.0266***	0.0291***	0.0212*	0.0281***	0.0253***	0.0172	0.0252***	0.0256***	0.0203*	0.0253***
t-statistics	(3.7700)	(1.6500)	(3.4100)	(3.9600)	(1.7300)	(3.4800)	(3.7200)	(1.4200)	(3.4600)	(3.7500)	(1.7000)	(3.5300)
Wald Test			<0.6800>			<0.7321>			<11.9998>***			<0.4903>
PROF	0.0976***	-0.2091	0.1058***	0.1147***	-0.1759	0.1214***	0.0843***	-0.2935**	0.0966***	0.0816***	-0.2032	0.1089***
t-statistics	(4.7600)	(-1.5000)	(4.5800)	(5.4400)	(-1.2500)	(5.0300)	(4.0700)	(-2.0500)	(4.2500)	(3.9200)	(-1.4500)	(4.6700)
Wald Test			<21.0119>***			<25.2658>***			<294.1330>***			<21.8234>***
SPP	0.0088*	0.0363*	0.0015	-0.0142**	0.0242	-0.0097	0.0044	0.0754***	0.0066	0.0031	0.0489***	0.0047
t-statistics	(1.8300)	(1.9500)	(0.2270)	(-2.5000)	(1.2700)	(-1.3800)	(0.9020)	(3.9400)	(0.9380)	(0.6350)	(2.7900)	(0.6880)
Wald Test			<27.7734>***			<1.8983>			<94.9972>***			<42.4214>***
AMAT	0.1657***	0.2132***	0.1570***	0.1852***	0.2193***	0.1730***	0.1477***	0.1972***	0.1443***	0.1497***	0.2163***	0.1461***
t-statistics	(4.4600)	(3.5100)	(4.0900)	(5.0600)	(3.6100)	(4.5600)	(3.9300)	(3.2600)	(3.7400)	(4.0000)	(3.6000)	(3.7900)
Wald Test			<2.1527>			<1.4885>			<1.8773>			<3.3056>*
BKDEV	0.1206***	0.1925***	0.1181***									
t-statistics	(5.6500)	(3.2300)	(5.3800)									
Wald Test			<11.5138>***									
MKDEV				0.0429***	0.0281***	0.0511***						
t-statistics				(7.0800)	(3.3700)	(6.9300)						
Wald Test						<9.7510>***						
TERM							0.0043**	-0.0427***	-0.0240***			
t-statistics							(2.1700)	(-2.9000)	(-3.7200)			
Wald Test									<8.4191>***			
INF										-0.0121***	-0.0357***	0.0492***
t-statistics										(-3.3100)	(-4.1900)	(5.2800)
Wald Test												<82.8497>***
R^2	0.1432	0.1494	0.1590	0.1620	0.1526	0.1765	0.1309	0.1440	0.1490	0.1324	0.1561	0.1551
Adj^2	0.1381	0.1318	0.1527	0.1571	0.1351	0.1703	0.1258	0.1263	0.1425	0.1273	0.1387	0.1487
No. of Obs.	4794	1138	3063	4794	1138	3063	4794	1138	3063	4794	1138	3063

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + marketwidefactors_t + \alpha_t + \mu_{i,t} \qquad (2)$$

The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 1 and 3 and Section 3 for the definition of the variables. *, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5: Pooled time series and cross sectional analysis of the firm-specific and market-wide determinants by country groupings (continued).

Variable	Panel B: Countries least affected by the crisis											
	Model-1			Model-2			Model-3			Model-4		
	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis	Full Sample	Pre-Crisis	Post-Crisis
Constant	-0.2157**	-0.3640**	-0.1097	-0.2358**	-0.3795***	-0.1382	-0.1745	-0.5006***	-0.1235	-0.4022***	-0.4791***	-0.3982***
t-statistics	(-2.0800)	(-2.4800)	(-0.9310)	(-2.2700)	(-2.6100)	(-1.1800)	(-1.5200)	(-3.2400)	(-1.0300)	(-3.5200)	(-3.1900)	(-3.4000)
LEV	0.2868***	0.5145***	0.2127***	0.2655***	0.5108***	0.2027***	0.2379***	0.5348***	0.1773***	0.1823***	0.5235***	0.0954
t-statistics	(5.6300)	(5.0000)	(3.6100)	(5.2000)	(4.9600)	(3.4500)	(4.4400)	(5.0900)	(3.0100)	(3.3100)	(5.0200)	(1.5700)
Wald Test			<26.1745>***			<27.4486>***			<36.7579>***			<49.8199>***
SIZE	0.0523***	0.0635***	0.0518***	0.0541***	0.0639***	0.0522***	0.0585***	0.0670***	0.0566***	0.0639***	0.0669***	0.0615***
t-statistics	(7.6500)	(6.0100)	(6.3700)	(7.9400)	(6.0800)	(6.4300)	(7.7700)	(5.8700)	(6.9700)	(8.2700)	(5.9800)	(7.4200)
Wald Test			<2.0682>			<2.0700>			<1.6352>			<0.4176>
GROW	-0.0004	-0.0006	-0.0005	-0.0005	-0.0006	-0.0005	-0.0011	-0.0009	-0.0012	-0.0013	-0.0008	-0.0018
t-statistics	(-0.4980)	(-0.7780)	(-0.3460)	(-0.5700)	(-0.7760)	(-0.3450)	(-1.2300)	(-1.0700)	(-0.7920)	(-1.3800)	(-0.9960)	(-1.1100)
Wald Test			<0.1197>			<0.1192>			<0.6275>			<1.2213>
VOL	-0.0004	0.0011	-0.0014**	-0.0004	0.0011	-0.0013**	-0.0007	0.0007	-0.0017***	-0.0007	0.0008	-0.0017***
t-statistics	(-0.8640)	(1.4500)	(-2.2900)	(-0.8140)	(1.4300)	(-2.2500)	(-1.0500)	(0.8340)	(-2.8900)	(-1.0300)	(0.9890)	(-2.7000)
Wald Test			<5.2337>**			<5.0708>**			<8.3549>***			<7.2878>***
LIQ	0.0199***	0.0110	0.0289***	0.0198***	0.011	0.0292***	0.0208***	0.0121	0.0303***	0.0205***	0.0119	0.0275***
t-statistics	(2.8400)	(1.3700)	(4.4200)	(2.8000)	(1.3800)	(4.5100)	(2.8700)	(1.4700)	(4.7800)	(2.8300)	(1.4700)	(4.1000)
Wald Test			<19.5215>***			<20.3160>***			<22.8249>***			<16.7801>***
PROF	-0.0491	-0.0555	-0.0529	-0.0502	-0.0548	-0.0620	-0.0424	-0.0537	-0.0371	-0.0313	-0.0511	0.0059
t-statistics	(-1.6000)	(-1.2200)	(-0.7840)	(-1.6200)	(-1.2100)	(-0.9230)	(-1.1400)	(-1.0700)	(-0.5220)	(-0.8860)	(-1.0800)	(0.0777)
Wald Test			<0.6147>			<0.8520>			<0.2722>			<0.0060>
SPP	0.0261**	0.0387	0.0131	0.0386***	0.0457	0.0275**	0.0499***	0.0540	0.0363**	0.0431***	0.0488	0.0070
t-statistics	(2.4800)	(1.1700)	(1.0200)	(3.5700)	(1.3700)	(2.0600)	(4.2600)	(1.5800)	(2.5400)	(3.7300)	(1.4600)	(0.4960)
Wald Test			<1.0359>			<4.2288>**			<6.4459>**			<0.2462>
AMAT	0.1912***	0.0792	0.2395***	0.1878***	0.0804	0.2379***	0.1663***	0.0940	0.2122***	0.1615***	0.0874	0.2058***
t-statistics	(3.9000)	(0.9700)	(4.1700)	(3.8300)	(0.9810)	(4.1400)	(3.1100)	(1.0600)	(3.5800)	(2.9400)	(1.0000)	(3.4300)
Wald Test			<17.4244>***			<17.1412>***			<12.7825>***			<11.7431>***
BKDEV	-0.0337***	-0.0352***	-0.0332***									
t-statistics	(-10.5000)	(-5.9900)	(-9.3300)									
Wald Test			<0.2998>									
MKDEV				-0.0508***	-0.0410***	-0.0550***						
t-statistics				(-10.1000)	(-5.6300)	(-9.2500)						
Wald Test						<5.5115>**						
TERM							-0.0776***	-0.0007	-0.1177***			
t-statistics							(-6.3300)	(-0.0404)	(-7.7900)			
Wald Test									<60.6197>***			
INF										-0.0011	-0.0033**	0.0493***
t-statistics										(-0.7160)	(-2.2900)	(6.2800)
Wald Test												<44.8931>***
R^2	0.3180	0.3393	0.3238	0.3100	0.3337	0.3182	0.2538	0.2784	0.2839	0.2306	0.2842	0.2532
Adj^2	0.3089	0.3115	0.3119	0.3008	0.3057	0.3062	0.2439	0.2481	0.2713	0.2204	0.2540	0.2401
No. of Obs.	2129	570	1328	2129	570	1328	2129	570	1328	2129	570	1328

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + marketwidefactors_t + \alpha_t + \mu_{i,t} \qquad (2)$$

The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 1 and 3 and Section 3 for the definition of the variables. *, **, *** Significant at 10%, 5% and 1% level, respectively.