



## The response of the external finance premium in Asian corporate bond markets to financial characteristics, financial constraints and two financial crises

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### ABSTRACT

Empirical investigation of the external finance premium has been conducted on the margin between internal finance and bank borrowing or equities but little attention has been given to corporate bonds, especially for the emerging Asian market. In this paper, we hypothesize that balance sheet indicators of creditworthiness could affect the external finance premium for bonds as they do for premia in other markets. Using bond-specific and firm-specific data for China, Hong Kong, Indonesia, Korea, Philippines, Singapore and Thailand during 1995–2009 we find that firms with better financial health face lower external finance premia in all countries. When we introduce firm-level heterogeneity, we show that financial variables appear to be both statistically and quantitatively more important for financially constrained firms. Finally, when we examine the effects of the 1997–1998 Asian crisis and the 2007–2009 global financial crisis, we find that the sensitivity of the premium is greater for constrained firms during the Asian crisis compared to other times.

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### 1. Introduction

The last decade and a half has seen phenomenal growth in the theoretical and empirical investigation of corporate financial decisions through imperfect credit markets. Building on the pathbreaking theoretical work of Stiglitz and Weiss (1981) on asymmetric information, Chari et al. (1995), Bernanke et al. (1999), Christiano et al. (2003, 2007, 2010) and Smets and Wouters (2003, 2007) provide an agency cost model of external borrowing from financial markets. Among the many implications of this literature is the observation that corporate financial structure will differ in relation to the observable characteristics used by lenders to determine their creditworthiness (Gertler and Gilchrist, 1994), and will be affected by constraints arising from the availability and cost of external finance to firms.

It is generally accepted that firms that are constrained on the financial markets, will face higher agency costs of borrowing – a higher ‘external premium’ – for raising capital from financial markets compared with the cost of internal finance funded from

retained earnings as explained by Bernanke and Gertler (1995) with subsequent effects on real activity.<sup>1</sup>

Furthermore, the external premium can vary with macroeconomic conditions that bring about sharp reductions in lending during credit crunches or recessions. Levin et al. (2004) measure expected default risk and credit spreads on publicly-traded debt for US non-financial firms, finding that financial market frictions exhibit strong cyclical patterns.<sup>2</sup> Our data show that Asian emerging markets saw the average spread on corporate bonds issued by all firms leap from 100–200 basis points to around 1200 basis points during the Asian crisis of 1997, followed by a persistent drop in volumes (also noted in Eichengreen et al. (2006)). We also show that in the recent global financial crisis the average spread rose less dramatically, from approximately 200 basis points to around 600 basis points. We are not aware of any studies that compare the effect of these crises on the external finance premium.

<sup>1</sup> A large and growing set of empirical studies has documented the extent to which the financing constraint dimension influences firms’ fixed investment and employment decisions under imperfect financial markets (see Fazzari et al., 1988; Guariglia, 2008 and Spaliara, 2009). The degree of sophistication of the relationship between financial variables and real activity is further reflected in papers by Levin et al. (2004), Covas and Wouter (2007) and Gilchrist et al. (2009).

<sup>2</sup> This result is also supported by Mody and Taylor (2004) and Gilchrist et al. (2009) who consider the movement of the external finance premium as a predictor for real economic activity.

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In this paper we analyze the influence of firms' financial characteristics, financial constraints and the impact of the 1997 Asian crisis and the recent global financial crisis on the external finance premium at the level of the individual firm. Much of the empirical investigation of the external finance premium has been conducted on the margin between internal finance and bank borrowing or on the margin for raising external finance through equity markets, but we focus on bond markets.<sup>3</sup> Bond financing appears to be increasingly important for firms in Asian economies since the ASEAN countries have encouraged deeper, more integrated sovereign and corporate bond markets through initiatives such as the Pan Asian Bond Index Fund (PAIF), the Fund of Bond Funds (FoBF) and the Asian Bond Market Initiative (ABMI) proposal.<sup>4</sup> At the end of 2007, the seven Asian economies included in this study – China, Hong Kong, Indonesia, Korea, Philippines, Singapore and Thailand – had foreign currency bonds outstanding of over \$324 billion. This figure stands in sharp contrast with \$77 billion outstanding in 1995. It represents a significant increase in foreign financing through bond markets following the Asian crisis, suggesting the Asian corporate bond market is better able to provide external finance to firms compared with a decade earlier.

The present study improves on the existing empirical studies in three important ways. First, we provide a firm-level study of the response of premia in emerging Asian bond markets that takes full account of the heterogeneity of Asian firms operating in China, Hong Kong, Indonesia, Korea, Philippines, Singapore and Thailand. We seek to determine whether the external finance premium, as measured by the credit spread, is inversely related to the strength of the balance sheet, and therefore whether firms with better financial health face lower external finance premia and vice versa.

Second, because there is considerably greater information asymmetry in Asian countries due to the limited engagement with internationally comparable ratings agencies and lower reporting requirements, we expect financing constraints to be more likely to affect pricing in the bond markets than in Western countries. Our work considers the external premium for financially constrained and unconstrained firms using criteria consistent with the literature on financing constraints (see Fazzari et al., 1988; Guariglia, 2008 and Spaliara, 2009).

Third, we document for the first time the differences in the responses to the Asian crisis and the recent global financial crisis for constrained and unconstrained firms in Asia. We find that constrained firms were more sensitive to financial variables than unconstrained firms, and that they were more sensitive during periods of financial crisis. In the Asian crisis these firms experienced higher premia when they had greater leverage or risk of bankruptcy. During the recent financial crisis the premium was more responsive to profitability and return on equity, and less responsive to leverage or risk.

The rest of the paper is organized as follows. Section 2 provides a brief theoretical framework for analysis of the external finance premium based on Bernanke et al. (1999). Section 3 describes the empirical specifications and econometric methodology. In Section 4 we document our data sources and provide some summary statistics. Section 5 presents the empirical evidence and Section 6 concludes.

<sup>3</sup> The bank borrowing literature includes papers by Kashyap et al. (1993) and Bernanke and Gertler (1995). Equity premia are investigated by Campello and Chen (2010) and Whited and Wu (2006). This strand of literature is concerned with questions central to finance such as the nature of equity returns and risk pricing rather than the implications of the scale of the external finance premium for the financial accelerator as such.

<sup>4</sup> According to Eichengreen et al. (2006), East Asian markets are larger when assessed relative to other emerging markets such as the Latin American economies.

## 2. Theoretical background

Theoretical models incorporating financial accelerator effects are particularly useful in demonstrating how balance sheet indicators influence access to external finance. The influential paper by Bernanke et al. (1999) provides the theoretical basis for our paper, but we could equally have taken one of the models by Chari et al. (1995), Christiano et al. (2003, 2007, 2010), or Smets and Wouters (2003, 2007).

The Bernanke et al. (1999) model incorporates the costly-state verification (CSV) debt contracting problem into an otherwise standard dynamic New Keynesian general equilibrium model. In the model there are three agents: households, entrepreneurs, and retailers. Entrepreneurs, who are assumed to be risk-neutral and have finite horizons, acquire physical capital  $K_{t+1}$  at a price  $Q_t$  at the end of period  $t$ , for use in production in period  $t+1$ . At the end of period  $t$  entrepreneur  $j$  has available net worth  $N_{t+1}^j$  and finances capital with internal funds supplemented by external borrowing from a financier:  $B_{t+1}^j = Q_t K_{t+1}^j - N_{t+1}^j$ . Ex ante, the expected revenue from the investment project is given by  $R_{t+1}^k Q_t K_{t+1}^j$ , where  $R_{t+1}^k$  is the aggregate gross rate of return on capital investment. The realized revenue in the next period is given by  $\omega^j R_{t+1}^k Q_t K_{t+1}^j$ , where  $\omega^j$  is a productivity disturbance which is i.i.d. across firms and time.

Adopting the CSV approach, an agency problem arises because financiers cannot observe  $\omega^j$  and need to pay an auditing cost if they wish to observe the outcome. The financial contract is a standard debt contract including the following bankruptcy clause:

If  $\omega^j \geq \bar{\omega}^j$  the entrepreneur pays off the debt in full from revenues and keeps the residual. The financier receives  $\bar{\omega}^j R_{t+1}^k Q_t K_{t+1}^j = Z_{t+1}^j B_{t+1}^j$ , where  $Z_{t+1}^j$  is the non-default rate on debt.

If  $\omega^j < \bar{\omega}^j$  the firm defaults on its loan. The lender pays an auditing cost  $\mu$  and receives what is found, namely  $(1 - \mu)\bar{\omega}^j R_{t+1}^k Q_t K_{t+1}^j$ . A defaulting entrepreneur receives nothing.

It is reasonable to assume that the financier will accept debt only if the expected gross return to the entrepreneur equals the financier's opportunity cost. Because the debt risk is perfectly diversifiable, the relevant opportunity cost to the financier is the risk-free rate  $R_{t+1}$ . Consequently, the financier's expected return is a function of  $\bar{\omega}^j$ , the default trigger. Higher levels of  $\bar{\omega}^j$  raise the non-default pay off to the financier, but also raise the probability of default ( $F(\bar{\omega})$ ).

The Bernanke et al. (1999) model is concerned with the entrepreneur's problem of demand for capital. In this model the cost of finance depends on the financial health of firms and is negatively associated with the level of internal funds (net worth,  $N_{t+1}$ ) relative to total financing requirements. Let  $s = E\left[\frac{R_{t+1}^k}{R_{t+1}}\right]$  be expected discounted return on capital.<sup>5</sup> Then

$$E_t[R_{t+1}^k] = s \left[ \frac{N_t}{Q_t K_{t+1}} \right] R_{t+1} \quad (1)$$

The above equation shows how the firm's return on capital depends inversely on the share of the firm's capital investment financed by its own net worth. If the firm can self finance its investment projects, there is no need for external financing and the equilibrium return to capital is equal to the risk-free rate. In this case the external finance premium is zero. Similarly, if the firm needs to borrow, the required return on capital will be higher reflecting expected agency costs faced by the financier, and the premium will reflect this. Thus, the initial financial position of the entrepreneur becomes a key determinant of the cost of external finance.

<sup>5</sup> As Bernanke et al. (1999) suggest, the ratio of the cost of finance to the risk-free rate may be equally well interpreted as the external finance premium.

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