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# Firm survival and financial development: Evidence from a panel of emerging Asian economies

Serafeim Tsoukas *

*School of Economics, University of Nottingham, Nottingham NG7 2RD, UK*

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ABSTRACT

Using a panel of five Asian economies – Indonesia, Korea, Malaysia, Singapore and Thailand – over the period 1995–2007 we analyze the links between firm survival and financial development. We find that traditionally used measures of financial development play an important role in influencing firm survival. When stock markets become larger or more liquid firms' survival chances improve. On the contrary, we show that higher levels of financial intermediation can increase firm failures. We also find that the beneficial effects of stock market development are more pronounced during the later years of our sample, while the adverse effects of bank intermediation have declined over time. Finally, large firms are more likely to benefit from developments in financial markets compared to small firms.



## 1. Introduction

Does it matter for firm survival whether a country's financial system is more or less developed? The idea that the financial system has a central role to play in economic fluctuations is an old one (see Gertler, 1988). Following the seminal work of Goldsmith (1969), several empirical studies have documented the existence of a strong positive link between the functioning of the financial system and various aspects of economic activity such as investment, employment and economic growth (see for instance, King and Levine, 1993; Rajan and Zingales, 1998; Levine, 2006). These studies, however, remain largely silent about the role of financial development in firms' survival prospects. Such evidence is important for understanding the mechanism by which financial development affects survival and can better inform policy makers, especially in the context of emerging Asian economies that are undergoing periods of deregulation and redesign (see Hasan et al., 2009).

The purpose of this paper is to provide, for the first time a systematic empirical analysis of the impact of financial development on firm survival by looking at the direct effect of financial development indicators on firm survival after controlling for firm, industry and macroeconomic effects. Our empirical approach focuses on two of the most important aspects of financial development – banking development and stock market development. The motivation to do so stems from two important considerations. First, in the Asian region banks dominated the financial markets for many years, but recently Asian economies have become less bank centered and large strides were taken to develop equity and bond markets. Second, emerging East Asian economies are characterized by a highly volatile environment and high risk of bankruptcy making therefore the analysis of corporate failures very relevant.[1] To this end, we analyze the survival prospects of 2892 listed firms from five Asian economies (Indonesia, Korea, Malaysia, Singapore and Thailand) that experienced significant failure rates over the last decade.

Corporate failures can be affected directly by the development of the financial system for a number of reasons. To begin with equity markets, at higher levels of equity development corporate failures should be reduced. Larger equity markets with greater liquidity reduce investment risk and the cost of accessing the paper market thereby providing a workable alternative to meet firms'

* Tel.: +44 (0) 115 95 66129; fax: +44 (0) 0115 95 14159.
*E-mail address:* serafeim.tsoukas@nottingham.ac.uk

[1] Compared to Western economies, emerging Asian countries experience significantly higher corporate failure rates: according to our dataset, failure rates in Indonesia, Korea, Malaysia, Singapore and Thailand are respectively 9%, 9%, 10%, 6% and 15%, compared to only 1.5% in the UK (Bridges and Guariglia, 2008; Görg and Spaliara, 2009).

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external funding requirements.[2] Therefore, gaining access to an alternative source for external financing can shield firms against failures, particularly when banks decide to interrupt lines of credit. Moving to banking development, increased levels of bank lending might adversely affect firm survival since emerging Asian markets are inherent to bank runs and therefore higher levels of banking intermediation could impede firms' performance and survival prospects. Furman and Stiglitz (1998) suggest that Asia's dependence on banks was important for the 1997–1998 financial crisis, while (Beck et al., 2006) show that financial intermediary development can magnify the impact of macroeconomic shocks if there is limited access to external financial markets.[3] In our paper we also recognize that the effect of institutional development on firm failures has evolved over time due to recent East Asian efforts to strengthen their financial markets. In addition, growth in stock markets and banks may not influence all firms in the same way. Therefore, we allow for the fact that firms of different sizes might respond to the growth of equity size, liquidity and banking intermediation differently.

The value added of the present paper is threefold. First, we consider a direct role for financial development in influencing business failures. In addition to the firm-specific and financial indicators previously considered (i.e. leverage, profits, collateral, size and age), this study also considers the impact of different measures of financial development. This approach complements the existing empirical and theoretical literature on firm survival and borrowing constraints (see Zingales, 1998; Bunn and Redwood, 2003; Clementi and Hopenhayn, 2006; Farinha and Santos, 2006; Bridges and Guariglia, 2008; Görg and Spaliara, 2009), which highlights the role of financial condition in firm survival.

The second main contribution of the paper is that, using comparable multi-country data made up by firm-level panels, we are able to assess whether the financial development-survival nexus has changed over time since the recent developments in the Asian financial markets. The financial system in Asia has undergone significant changes and developments over the past decade and it may be possible that the role of financial development in firm survival has become more (or less) pronounced. The most prominent initiative towards the development of a regional financial market has been the establishment of the Asian Bond Fund, which was initiated in 2003 and extended in 2005.

Finally, we are able to identify which firms are more likely to benefit from the financial development with respect to corporate failures. Intuitively, we do not expect all firms to be equally affected by financial development since large firms are able to tap financial markets, while small firms are more likely to be financially constrained and may be unable to access financial services due to significant fixed costs. Thus, large firms may be better equipped to take advantage of developments in financial markets and consequently improve their performance. Attempts to identify groups of companies that are financially constrained using criteria such as the firm size (Carpenter and Guariglia, 2008; Spaliara, 2009) or firm age (Guariglia, 2008; Spaliara, 2009) have been found to play an important role in various aspects of firm behavior (e.g. investment and employment). Bridges and Guariglia (2008) found that financial constraints are important in firm survival but their effect can be mitigated with global engagement. In this paper we will test whether there is a differential effect of financial development indicators on the failure probabilities of small and large firms.

The remainder of the paper is laid out as follows. Section 2 illustrates the baseline specification and econometric methodology. In Section 3 we describe our data and provide some summary statistics. Section 4 presents the empirical evidence. In Section 5 we check the robustness of our findings. Section 6 concludes the paper.

## 2. Empirical methodology and baseline specification

We use the theoretical analysis by Clementi and Hopenhayn (2006) as a starting point for our empirical analysis. In their model borrowing constraints affect firm survival and this generates a role for capital structure in an asymmetric information setup. In our empirical analysis we take on board these predictions and we also consider the effects of financial development on firm survival. In order to establish whether financial development changes firms' survival prospects, we model the determinants of firm survival and check whether the indicators of financial development are statistically significant determinants of firms' hazard of failure. We define a firm as failed in a given year when its company status is that of dead.[4] Following the recent literature on firm survival (for example Görg and Spaliara, 2009; Görg and Bandick, 2010) our empirical models are estimated with the complementary log–log model (cloglog) which is equivalent to the discrete time version of the proportional hazard model. Given that our data are collected on a yearly basis, the cloglog model is more appropriate compared to the Cox model.[5] Estimating the models with the proportional hazard model will allow us to capture the exact time of failure and the potential right censoring bias. The baseline proportional hazard of a firm failing at time $t$ is formulated as:

$$h(t) = h_0(t)exp(\alpha' FD + \beta' X + \gamma' Y + \delta' Z) \quad (1)$$

where $h(t)$ is the rate at which firms fail at time $t$ given that they have survived in $t-1$, for a given number of covariates. $h_0(t)$ is the baseline hazard function at time $t$ when all of the covariates are set to zero. To test whether firm exit is affected by *country-level financial development*, we include the term *FD*, which denotes the vector of financial development measures such as stock market size (*Market Capitalization*), the liquidity of the stock market (*Stock* Market Value Traded), the size of the banking system (*Private* Bank Credit) and the importance of deposit-money banks (*Bank Assets*), respectively. $X$ comprises a vector of financial variables assumed to capture the effect of financial health on the likelihood of survival. $Y$ is a vector of firm-specific, industry-specific characteristics and macroeconomic control variables. Lastly, $Z$ is a set of industry dummies (calculated at the 4-digit level) that control for fixed effects across industries and country dummies accounting for institutional differences between countries.

To incorporate a role for finance in the survival model, as suggested by the theoretical model of Clementi and Hopenhayn (2006), vector $X$ considers three dimensions of financial health from the balance sheet, namely leverage, profitability and collateral assets.[6] We define leverage (*LEVERAGE*), as total debt over total assets, to measure the firm's overall indebtedness. Higher levels of existing debt are often associated with a poorer balance sheet, and thus firms with higher levels of debt face greater difficulties

[2] If there is a large volume of trading, it may be possible for brokers to spread their fixed costs more widely and thus reduce transactions costs.

[3] The issue of economic growth, macroeconomic shocks and banking systems is highlighted in Hasan et al. (2009) and Dovern et al. (2010).

[4] The Thomson Financial database reports firms as 'dead' but it does not distinguish whether firms in liquidation or receivership are included in this category. However, to ensure that the definition of 'dead' firms does not include takeovers we have employed the Zephyr database. Details on the construction of our dependent variable are provided in the next section. Also note that we use the terms failure and survival interchangeably.

[5] In addition, the cloglog model has the same assumptions on the coefficient vector â, which denotes failure times, as the continuous-time version of the proportional hazard model (Prentice and Gloeckler, 1978).

[6] Our firm-specific financial indicators are lagged one period to mitigate potential endogeneity concerns and have been deflated using the GDP deflator for the relevant country.