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The effect of firm size on the leverage–performance relationship during the financial crisis of 2007–2009



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ABSTRACT

We draw on a comprehensive set of data of all registered firms in Thailand to examine whether firm size affects the relation between leverage and operating performance during the global financial crisis of 2007–2009. From a data set of 496,430 firm-year observations of a sample of 170,013 mostly private firms, we find that the magnitude of the effect of leverage on operating performance is non-monotonic and conditional on firm size. While our panel regression results indicate that leverage has a negative effect on performance across firm size subsamples, our year-by-year cross-sectional regression results show that the effect of leverage on performance is positive for small firms and is negative for large firms. Our findings show that about 75% of Thai firms in our sample appear to have managed to get through the global financial crisis on the basis that they do not have to simultaneously deleverage and liquidate their assets.

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1. Introduction

Motivated by recent studies on the leverage–performance relationship, such as that of [Margaritis and Psillaki \(2010\)](#), who show that financial leverage has a positive effect on firm performance, [Cai and Zhang \(2011\)](#), who show that a change in financial leverage is related to future operating performance, [Xu \(2012\)](#), who find that profitability negatively affects leverage, and [Faulkender and Petersen \(2006\)](#), who report that larger firms tend to be more leveraged, we attempt to examine whether the leverage–performance linkage is influenced by firm size.² While there is a growing body of empirical evidence for the leverage–performance linkage for publicly traded firms, there is limited understanding of such a relationship for small and medium-sized private firms. However, small and medium-sized firms in almost all countries contribute significantly to economic growth. We use a unique set of data on all firms in Thailand to examine the linkages between leverage and operating performance. As publicly listed firms constitute an extremely small proportion of the sample (i.e., the average number of listed firms in Thailand is smaller than 600 firms during the sample period; our sample consists of 170,013 firms), this study can alternatively be considered as an analysis of private firms in an emerging market country, thereby making this study potentially one of the first studies on the leverage–performance relation using a very large sample of private firms. And as we will show, firm size affects the leverage–performance relation.

Several scholars, such as [Paulson and Townsend \(2004\)](#), show that small firms are typically very small, that similarities between small entrepreneurial firms in the US and Thailand are very striking, and that small, entrepreneurial firms are a key source of jobs and economic growth. They show that small firms in Thailand are more likely to pass up a profitable investment opportunity because they do not have sufficient funds to exploit them, suggesting that financial constraints are a key determinant of entrepreneurial activities of small firms. Traditionally, it would be argued that financial constraints affect future investment of small firms by limiting the extent to which the small firms finance potentially profitable investments through borrowing when internal and/or equity financing is limited. Prior studies, such as [Denis and Sibilkov \(2010\)](#), [Li \(2011\)](#), and [Chen and Chen \(2012\)](#), show that financial constraints affect investment (e.g., capital expenditure and/or R&D investment).

This paper focuses on the main idea that firm size³ moderates the relation between leverage and performance. In particular, we conjecture that as firm size increases (i.e., moving from a small firm category to a medium-sized firm category), an additional debt capacity provided by financial intermediaries (e.g., banks) allows firms to invest more in new projects that should subsequently result in an improvement in performance, which in turn increases the firms' additional debt capacity. Thus, for small and medium-sized firms, leverage has a positive effect on performance and vice versa. It is important to note that while our prediction of a positive effect of leverage on performance for small and medium-sized firms is consistent with the agency cost hypothesis as in, for example, [Margaritis and Psillaki \(2010\)](#), our prediction is rather based on the dynamic performance–leverage–performance effect that channels through firm size. Due to (1) past jumps in leverage ratios potentially above the long-run optimal target level, (2) limited investment opportunities for large firms, and/or (3) organizational complexity (as discussed by several scholars such as [Miller and Friesen \(1983\)](#), [Fredrickson and Iaquinto \(1989\)](#), [Huff et al. \(1992\)](#), and [Audia et al. \(2000\)](#) that large firms have to encounter with greater demands for well-developed administrative systems to maintain creativity, innovativeness and entrepreneurship to overcome an impediment to growth), good firm performance should subsequently lead to a reduction in leverage ratios. Accordingly, for large firms the effect of performance on leverage is negative, while the effect of leverage on performance is either negative or insignificant.

² While prior studies, such as [Antoniou et al. \(2008\)](#), examine the effect of firm size on leverage or performance, they generally do not investigate the possible interactive effect between leverage and firm size on operating performance.

³ It should be noted that firm size has been often used as a proxy for financial constraints and could be correlated with other firm characteristics, such as firm age; we find that the correlation between firm size and firm age is statistically significant but small in magnitude ($r=0.30$, p -value <0.001 , $N=496,430$) in our panel sample. As we include firm age as a control variable in our regressions, we test the influence of firm size on the relation between leverage and performance, after controlling for firm age.

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