

## Banking industry volatility and banking crises<sup>☆</sup>

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### Abstract

While studies using balance sheet information of banks and macroeconomic indicators to forecast banking crises are prolific, empirical research using market information of banks is relatively sparse. We investigate whether banking industry volatility, constructed with the disaggregated approach from Campbell et al. [Campbell, J.Y., Lettau, M., Malkiel, B.G., Xu, Y., 2001. Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk? *The Journal of Finance* 56, 1–43] using exclusively publicly available market information of banks, is a good predictor of systemic banking crises in the analyses including data from 18 developed and 18 emerging markets. We find that banking industry volatility performs well in predicting systemic banking crises for developed markets but very poor for emerging markets, which suggest that the impact of market forces on the soundness of the banking system might be different for developed and emerging markets. We also find that those macroeconomic and banking risk management indicators have different impact on the probability of banking crises. Therefore, the traditional cross-country results of the studies on banking crises need to be interpreted cautiously.

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## 1. Introduction

Recent empirical research has strongly supported the theoretical view that a well-functioning banking system is important in a country's economic development. Banks have boosted growth at the country level (King and Levine, 1993; Levine and Zervos, 1998; Beck et al., 2000; Beck and Levine, 2004), at the industry level (Rajan and Zingales, 1998; Cetorelli and Gambera, 2001; Beck and Levine, 2002), and at the firm level (Demirguc-Kunt and Maksimovic, 1998, 2002). The positive effect of banks on economic development is robust to different econometric methods (Levine, 2005).

Since banks have played such an important role in economic development, banking crises can generate serious disruptions of a country's economic activity (Hoggarth et al., 2002). Therefore, to ensure the soundness of the banking system and prevent the occurrence of banking crises is undoubtedly a main concern of policy makers and regulators. The role of market discipline in ensuring financial stability is becoming so prominent that the New Basel Capital Accord developed by the Basel Committee on Banking Supervision (2003) has included market discipline as one of the three pillars<sup>1</sup> to recognize its importance in promoting safety and soundness in banks and financial systems. The strength of market discipline derives from the immense power of the price system to aggregate information (Crockett, 2002). There is extensive literature on the forecasting of banking crises using balance sheet information of banks as well as macroeconomic indicators. However, studies on the probabilities of banking crises using market information of banks are relatively sparse. This research contributes to the literature by using the publicly available market information of banks to predict the probability of systemic banking crises. Publicly traded banks are broadly representative of a country's banking sector, so that the stock prices of banks listed in the domestic exchanges will reflect the performance of a country's banking sector. A certain degree of price fluctuations is desirable since it reflects the information flows in an efficient market, while excessive changes of stock prices might signify uncertainty of the future economic status. Therefore banking industry volatility could indicate the stability of a country's banking sector performance. From this point of view, we investigate whether banking industry volatility, among those leading macroeconomic variables, is a useful predictor of systemic banking crises.

To address this issue, we first construct the portfolios of banks listed in domestic stock exchanges for 36 markets which consist of 18 developed markets and 18 emerging markets.<sup>2</sup> Secondly, we construct the value-weighted banking industry volatility using the unique disaggregated approach from Campbell et al. (2001). Thirdly, we construct the macroeconomic variables that are traditionally thought to be the leading indicators of banking crises for each of the 36 markets, including real GDP growth rates, real interest rates, inflation rates, changes of exchange rates, domestic credit growth rates, ratios of M2 against reserves, and the volatility of GDP growth rates. Finally we use a Logit econometric model to test whether banking industry volatility is a good predictor of banking crises with the controls of those macroeconomic indicators; we also test whether those banking institutional characteristics that affect the risk management of banks, including government ownership of banks, bank accounting disclosure standards, bank audit management, and the existence of deposit insurance scheme, would also affect the predictive power of

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<sup>1</sup> The other two pillars are minimum capital requirement (Pillar 1) and supervisory review power (Pillar 2).

<sup>2</sup> Traditional studies generally examine larger sample sizes by utilizing low-frequency macroeconomic data (e.g., Demirguc-Kunt and Detragiache, 1998 include 45–65 economies in their study). Studies using market information of banks are subject to the availability of high frequency data. To our knowledge, this is the first empirical research using market information of banks to predict banking crises for a large number of countries.

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