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Early warning indicators of banking crisis and bank related stock returns☆

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ABSTRACT

This study examines whether early warning indicators of banking crisis can predict the U.S. bank related stock returns in credit tightening periods. We use the credit-to-GDP gap and the credit growth as the early warning indicators of banking crisis. Using bank stock returns and stock returns of bank dependent firms, we find the credit growth forecasts both of the bank related stock returns better than the credit-to-GDP gap in periods of tightened credit conditions. Our results suggest that the credit growth is more informative in predicting bank sector crisis than the credit-to-GDP gap.

1. Introduction

Finding early warning indicators of banking crisis is crucial for bank risk management. The Basel Committee on Banking Supervision (BCBS) (2010) proposes the deviation of the credit-to-GDP ratio from trend (credit-to-GDP gap) for an early warning indicator and it has been shown to be useful to set counter-cyclical bank capital buffers. However, a debate has recently arisen whether the credit-to-GDP gap is a pertinent indicator of banking crisis. In particular, Repullo and Saurina (2012) argue that there is a delay to the warning signals of the banking crisis by the credit-to-GDP gap and propose the credit growth as an indicator which would not show the delay. This paper contributes to the debate by providing evidence that the credit growth predicts the U.S. bank related stock returns better than the credit-to-GDP gap in periods of worsened credit conditions.

This paper is motivated by research that examines whether banking crisis affects the bank related stock returns. We use bank stock returns and stock returns of bank dependent firms as the bank related stock returns. A number of researchers

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have shown that the banking crisis closely relates to drop of bank related stock returns. For example, Fahlenbrach et al. (2012) show that the bank stocks perform very poorly during banking crisis and Chava and Purnanandam (2011) find that the bank dependent firms lose significantly higher equity value during the banking crisis. However, past work of the early warning indicator of the banking crisis has not considered the direct influence of the indicator changes on bank related stock returns. In this paper, we examine whether the credit-to-GDP gap and the credit growth are closely related to the future bank related stock returns to show that they are appropriate indicators of banking crisis.

Moreover, we analyze the predictability of the early warning indicators for the bank related stocks under tightened credit conditions. To measure the credit conditions, we use bank lending standards from the Federal Reserve Board's Senior Loan Officer Opinion Survey on Bank Lending Practices. The bank lending standards has been widely employed as a measure of the credit conditions. Lown and Morgan (2006) show that the changes in the bank lending standards are strongly correlated with real output and bank loan changes and Chava et al. (2015) find the bank lending standards has a strong forecasting power of the aggregate stock market returns. For the measure of the tightened credit conditions, we employ a dummy variable that equals one if bank lending standards are reported in tightening and zero otherwise.

This paper joins literature to explain relationship between credit cycle and time-varying risk of asset prices. A number of research including Bernanke and Gertler (1989) and Kiyotaki and Moore (1997) suggests that the credit cycle is important in explaining evolution of business cycle. Gorton and He (2008) find that relative performance of commercial and industrial loans leads to endogenous credit cycles and it is a crucial factor of various asset prices. Gilchrist et al. (2009) use a wide range of credit spread measures to capture credit cycles and find that the credit cycle shocks significantly influence economic fluctuations. Longstaff and Wang (2012) show that variation in credit market size is related to variation in expected stock returns. Gilchrist and Zakrajšek (2012) show that their constructed credit spread index forecasts real activity with various measures. In this paper, we use the credit-to-GDP gap and the credit growth as the indicators of the credit cycle and examine whether the credit-to-GDP gap and the credit growth co-vary with the bank related stock returns.

Empirically, we find that the credit growth is a strong predictor of U.S. bank stock returns during the periods of the worsened credit conditions, while the credit-to-GDP gap has no predictability for the bank stocks with the tightened credit conditions. It is robust to the case of the stock returns of the bank dependent firms. These results suggest that the credit growth is more informative in predicting bank sector crisis than the credit-to-GDP gap.

The rest of the paper is organized as follows. Section 2 describes the early warning indicators of banking crisis in the paper. Section 3 presents evidence on bank related stock return predictability, while Section 4 concludes.

2. The credit-to-GDP gap and credit growth

The goal of this study is to test if well-known early warning indicators have their predictability of bank related stock returns in periods of tightened credit conditions. As the early warning indicators, we use the credit-to-GDP gap and the credit growth. The Basel Committee on Banking Supervision (BCBS) (2010) proposes using the gap between the credit-to-GDP ratio and its long-term trend as an indicator for setting counter cyclical bank capital buffers and much research provides evidence that the credit-to-GDP gap plays a important role to predict banking crisis (Drehmann et al., 2011 and Borio, 2014). According to the literature, we apply the filter developed by Hodrick and Prescott (1997) to the natural logarithm of the aggregated data series of the credit-to-GDP ratio to estimate the credit-to-GDP gap.[1] To compute the credit-to-GDP ratio, the credit is the quarterly volume of credit market debt outstanding of the non-financial corporate business sector and household and non-profit organization sector as reported by the Federal Reserve Board in the flow of Funds Accounts and the GDP is the quarterly measure by the Bureau of Economic Analysis in the National Income and Product Accounts.

Recently, several papers have raised questions about the reliability of the credit-to-GDP gap as an early warning indicator of banking crisis (Repullo and Saurina (2012) and Shin (2013)). In particular, Repullo and Saurina (2012) find that the credit growth performs better than the credit-to-GDP gap as the early warning indicators of banking crisis. Thus, we use the credit growth as another early warning indicator of banking crisis. For our comparative analysis, we use cyclical components of the credit growth series from the Hodrick and Prescott (1997) filter as the measure of the credit growth. The credit growth series is calculated the year-over-year growth rate of the logarithm of the level of the quarterly volume of credit market debt outstanding of the non-financial corporate business sector and household and non-profit organization sector in the flow of Funds Accounts.

Our paper explores the role of the early warning indicators of the banking crisis on the bank related stock returns during the periods of the worsened credit conditions. To identify the periods of the tightened credit conditions, we use bank lending standards from the Federal Reserve Board's Senior Loan Officer Opinion Survey on Bank Lending Practices. The survey question on the bank lending standards deals with supply conditions of Commercial and Industrial (C&I) Loans. For the question, bank senior loan officers answer using 5 ratings on the current C&I loans conditions from considerably tightening to considerably easing. Lown and Morgan (2006) measure the bank lending standards as the number of bank tightening minus the number of bank easing divided by total number of banks and the range of the bank lending standards

[1] Unlike the guidance by Basel Committee on Banking Supervision (BCBS) (2010), We use the λ value of 1600 in the Hodrick and Prescott (1997) filter to estimate cycle components of the credit-to-GDP gap and the credit growth, since many macro studies find that the λ value of 1600 fits for quarterly time-series analysis.