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Business cycle effects on commercial bank loan portfolio performance in developing economies☆

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Abstract

This paper studies the effects of business cycles on the performance of commercial bank loan portfolios across major developing economies in the period 1996–2008. We measure loan performance via loan loss provisions (that is, recognized expenses related to expected losses in bank income statements). Our results indicate that while economic growth is the main driver of loan portfolio performance, interest rates have second-order effects. Furthermore, we find the relationship between loan loss provisions and economic growth to be highly non-linear only under extreme economic stress: GDP growth needs to decline by more than 6 percentage points (pp, in absolute terms) in order to generate an increase in loan loss provisions equivalent to median emerging market bank profits; while a decline of more than 10 pp in growth implies significant capital losses, of at least 20 percent, for the median emerging market bank. In addition, we find higher loan loss provisions are associated with private sector leverage, poor loan portfolio quality, and lack of banking system penetration and capitalization.

JEL classification: E44; G21; O16

Keywords: Bank loan portfolio; Loan loss provisions; Loan loss reserves; Lending rate; Developing economies; Business cycle

1. Introduction

Understanding bank performance gains renewed interest with every financial crisis and the 2009 global financial crisis was no exception. Although banks across industrialized countries captured most of the attention owing to their leading role in the origins of the crisis, they were not the only ones under scrutiny. Given the increasing importance of developing countries in the global economy and memories of the emerging market crises of the 1990s, regulators, analysts and investors expressed concern about the strength of developing world banking systems in the face of global recession. In the aftermath of last year's crisis, except for the particularities of foreign currency lending across eastern European countries, the banking systems across most of the remaining major emerging economies were in general resilient to the global downturn even though GDP growth rates in many of these countries dropped significantly. For instance, data from the IMF Global Financial Stability Report (April 2010) shows that while the level of non-performing loans (NPLs, measured as a percentage of total loans) in 2009 was more than 3.5 times larger than the level observed in 2007 for the U.S. and the U.K.; that ratio was less than 1.5 times larger in the case of Brazil, China and India. Moreover, 90 percent of (reported) developing economies across Asia, Latin America, Middle East and Africa experienced an increase in the level of NPLs in 2009 less than two times the level in 2007.[1]

☆ The views expressed in this paper are those of the authors and do not necessarily represent those of the IFC, IFC Management or the World Bank Group. All errors and omissions are sole responsibility of the authors.

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[1] Loan performance deterioration was significantly higher across Emerging Europe. While only one quarter of countries saw their NPL ratio increasing by less than two times between 2007 and 2009, 60 percent of countries saw increases between two and ten times in that period. For a simulation model on NPLs for Emerging Europe see Box 1.2 and Annex 1.6 in IMF's Global Financial Stability Report (April 2010).

There are alternative explanations for recent banking performance across the developing world. One explanation points to an underlying governing relationship between loan portfolio performance and the business cycle; in most countries declines in GDP were significant though not extreme given that most developing countries (except Emerging Europe) faced the indirect effects of global recession rather than a domestic crisis. An alternative explanation focuses on the importance of stronger institutional frameworks reflecting past reforms and the lessons learned from past crisis episodes. Most surely, both explanations are relevant.[2] However, this paper focuses on the first explanation by studying the effects of economic growth and interest rates on the performance of commercial bank loan portfolios across major developing economies during the period 1996–2008.[3] Given the short time series of this sample, we exploit cross-sectional variation in the data to characterize an *average relationship* between bank loan portfolio performance and the business cycle across the developing world.[4] Understanding these dynamics and quantifying the underlying relationship between loan performance measures and key macroeconomic indicators is of particular importance for risk analysis tools, including VaR (Value at Risk) and stress testing. Furthermore, such an estimate becomes critical to investors and analysts that do not have full access to detailed information about the structure and historical performance of bank loan portfolios by providing a simplified (though structured and statistically supported) approach to modeling loan performance sensitivities to macroeconomic scenarios and generating top-down analysis to flag potential vulnerabilities going forward.[5]

There is a large literature looking at macroeconomic determinants of bank loan portfolio performance. Most of these studies are country specific, many of which are focused on particular crisis episodes with a wide coverage across the industrialized world. The work can be grouped into three main methodological approaches. First, some authors use reduced-form linear models. Among this group Arpa et al. (2001) work with a sample of Austrian banks, Gerlach et al. (2005) uses data from banks in Hong Kong and Quagliariello (2004) studies the case of Italy. A second group uses VAR (Vector Auto Correlation) models. This group includes Babouček and Jančar (2005) who work with data from the Czech Republic, and Hoggarth et al. (2005) for the case of England. A third group of studies focuses on the transmission mechanisms through the impacts on default and loss given default. For this literature see Altman et al. (2002), Pesaran et al. (2006), Segoviano (2006a,b); and Padilla and Segoviano (2006) for an application to stress testing. However, there is relatively little research looking at emerging markets overall. Aside from the cross-country estimations presented in the 2003 IMF Financial Soundness Indicators background paper and Annex 1.6 in the 2010 IMF Global Financial Stability Report, which presents a simulation of NPLs in Emerging European countries, to the best of our knowledge there is no other documented characterization of the relationship between loan performance and the business cycle for developing countries. In addition, the literature discussed above usually relies on linear relationships (or impulse response functions from linear VAR structures) between NPLs and macroeconomic determinants such as GDP, inflation, interest rates or exchange rates. However, data from past banking and financial crisis episodes across developing countries suggest the possibility of non-linearity under high economic stress (closely related to the so-called *tail effects* in the VaR, default and loss given default literature). Thus, the nature of the underlying relationship between loan performance and the business cycle remains an open question. It is worth noting that the dynamics of this relationship imply a series of two-way causalities. It is usually the case that initially a negative (positive) economic shock impacts loan portfolios of diverse qualities across the banking system. This is then followed by a contraction (expansion) of credit growth by banks, which in turn affects economic growth, jump-starting a new round of effects. Along these lines, the estimates documented in this paper pretend to capture the observed overall effects.

We test alternative models to characterize this relationship, which include linear and non-linear specifications at the individual bank and banking system levels. In addition, we offer an alternative measure of loan portfolio performance through the use of loan loss provisions. As recently stated by John C. Dugan, U.S. Comptroller of the Currency, loan loss provisioning "*allows banks to recognize an estimated loss on a loan or a portfolio of loans when the loss becomes likely, well before the amount of loss can be determined with precision and is actually charged off*".[6] Given loan loss provisions are recognized expenses to increase loan loss reserves on the balance sheet, they provide a potentially valuable measure of bank reassessments about expected losses in their loan portfolio. Furthermore, while loan loss provisions and reserves are related to an assessment on the entire loan portfolio, not all NPLs may generate future losses (although the assigned probabilities of doing so are higher for these in the calculation of loan loss provisions and reserves). Section 2 describes the data and discusses relevant issues of using loan loss provisions as a measure of loan portfolio performance. We combine bank level data from the commercial database Bankscope with macroeconomic and banking system level data from the World Bank and the IMF. The Bankscope database contains financial statement information for more than 29,000 private and public banks globally over more than 15 years. We restrict the sample to 22 major developing economies for which there is available information on a diverse and representative group of banks. This group of countries accounts for 85% of the developing world's GDP, as well as more than 80% of the developing economies commercial banking assets available in Bankscope. The sample

[2] For an analysis of emerging markets during the 2009 financial crisis see Llaudes et al. (2010).

[3] The period of analysis is dictated by data availability as of December 2010.

[4] We define developing economies as those classified as Low Income, Low Middle Income and Upper Middle Income countries by the World Bank.

[5] See Hoggarth et al. (2005) for details on *top-down* versus *bottom-up* stress test frameworks.

[6] Remarks by John C. Dugan, Comptroller of the Currency before the Institute of International Bankers, March 2, 2009. "Loan Loss Provisioning and Procyclicality".