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The determinants of vulnerability to the global financial crisis 2008 to 2009: Credit growth and other sources of risk☆

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In this paper, we identify initial macroeconomic and financial market conditions that help explain the distinct response of the real economy of a particular country to the recent global financial crisis. Using four measures of crisis severity, we examine a data set with over 90 potential explanatory factors employing techniques that are robust to model uncertainty. Four findings are of particular note. First, we find empirical evidence for the pivotal role of pre-crisis credit growth in shaping the real economy's response to the crisis. Specifically, a 1% increase in pre-crisis lending translates into a 0.2% increase in the cumulative loss in real output. Moreover, the combination of pronounced growth in lending ahead of the crisis and the country's exposure to external funding from advanced economies is shown to intensify the real downturn. Economies with booming real activity before the crisis are found to be less resilient to the global shock. Buoyant growth in real GDP in parallel with strong growth of credit particularly exacerbated the effects of the recent crisis on the real economy. Finally, we provide empirical evidence on the importance of holding international reserves in explaining the response of the real economy to the

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crisis. The accumulation of international reserves mitigated the harmful effects of financial stress on the real economy, in particular when domestic funding via credit is abundant. The results are shown to be robust to several estimation techniques, including those allowing for cross-country spillovers.

1. Introduction

The global financial crisis originated in the US household sector around mid-2007. Cheap mortgage loans, systematic misvaluation of assets, and soaring household leverage put the American banking sector under severe stress. The financial effects spread internationally. Although problems were initially confined to the advanced economies, they spilled over to the emerging economies with the collapse of the Lehman Brothers investment bank. In 2011, the world economy was still wrestling with the consequences of the first global recession in decades (Imbs, 2010). Given that the recent global recession has been unlike anything seen for decades, economists have sought to tease out factors that made an essentially local financial crisis so contagious and understand what country-specific vulnerabilities might have acted as catalysts in spreading financial stress.

The findings of the *early empirical literature* have been rather muted. Rose and Spiegel (2010a, b, 2009) find that few, if any, pre-crisis variables are helpful in explaining differences in crisis severity caused by the global financial crisis 2008–09. This pessimistic finding has been contested by a fast growing literature that has emerged in the aftermath of the crisis. Against the backdrop of the crisis origin, with private debt exceeding private income by a great margin (Mian and Sufi, 2011), it comes as no surprise that leverage and credit can have firm repercussions on the real economy (Mian and Sufi, 2009). This finding has been corroborated on a global scale using different country samples, estimation techniques as well as measures of crisis severity (Berkmen et al., 2012; Lane and Milesi-Ferretti, 2011; Cecchetti et al., 2011; Caprio et al., 2010; Giannone et al., 2011).

Beyond a consensus on pre-crisis credit growth as factor in crisis severity, little else has been settled regarding factors that might have heightened exposure of a particular country. External imbalances, real exchange rate misalignments, and international reserves have all been cited as indicators of vulnerability. In their literature survey, Frankel and Saravelos (2012) examine about 80 historical crises and find strong evidence for levels of central bank reserves as predictive of crisis impact. They observed marginal evidence of large current account imbalances and low national savings as amplifiers of crisis effects on the real economy. Frankel and Saravelos (2012) assert these variables are relevant to the recent crisis. Jordà et al. (2011) provide the historical underpinning for the role credit plays in shaping the economy's response to a financial crisis. Examining historical data for developing countries, they find that loan growth is clearly elevated prior to national ("isolated") and global crises, while current account deterioration only shows up ahead of local crises.

Berkmen et al. (2012) note four determinants of the severity of the *recent financial crisis*. In addition to financial leverage and rapid credit growth as catalysts for financial stress, countries with flexible exchange rate regimes are reported to show greater resilience in the face of crisis. For a subset of developing countries, Berkmen et al. (2012) find that economies that export advanced manufacturing goods were harder hit than those exporting food products. Lane and Milesi-Ferretti (2011) focus on cross-country variations in output and consumption growth during 2008 and 2009. Their results, which are in line with Berkmen et al. (2012), indicate that pre-crisis level of development, increases in the ratio of private credit to GDP and current account deficit, and openness to trade can all be helpful in explaining differences in crisis intensity across countries. These results are further corroborated by Cecchetti et al. (2011), who construct a measure for economic output that controls for the global business cycle by means of factor analysis. Bolstering the findings of Lane and Milesi-Ferretti (2011), they report pre-crisis loan growth, financial openness, and a country's exposure to the US as factors that may affect the response of the real sector. In focusing on the role of market freedom indicators,