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Hits and runs: Determinants of the cross-country variation in the severity of impact from the 2008–09 financial crisis

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ABSTRACT

Recent empirical work on the 2008–09 financial crisis has found mixed results on the usefulness of indicators to explain the cross-country variation in the incidence of the crisis in non-originating countries. While some authors have found success with various indicators, Rose and Spiegel (2009a,b) find that almost no indicators are robust. We employ Bayesian model averaging (BMA) to verify Rose–Spiegel's conclusions under model uncertainty, confirming their findings. We then employ latent class models (LCM) to check the data for parameter heterogeneity. We find that there is substantial evidence of heterogeneity in the relationship between various indicators and crisis impact, both across individual indicators as well as across financial crisis episodes. In particular, when using de-trended growth rates, a similar model fits the 1997 Asian financial crisis, although the coefficients change qualitatively in some cases. These results highlight the difficulty in employing simple linear models for early warning purposes, but demonstrate that there are robust indicators of cross-country variation in crisis impact across episodes, such as the pre-crisis growth in banking credit. A 2-class model explains the variation in crisis impact, where pre-crisis level of per-capita income assists in the prediction of membership in a particular class.

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1. Introduction

Since the onset of the financial crisis of 2008, researchers have been quick to begin developing empirical models to both explain the variation in the severity of the crisis across countries, and to assess the ability of empirical models to predict future crises.[1] Much work has been done identifying and assessing the empirical robustness of individual indicators in terms of their ability to explain the differential economic impacts of various sources of crisis contagion, particularly on countries outside of the epicenter. Identifying which indicators serve as important determinants of crisis severity, in terms of sources of crisis contagion and domestic fundamentals, is an important first step towards building a model to predict future crises; i.e., an early warning system. It is the hope of researchers that building such early warning models (EWM's) will allow more accurate prediction of future crises. This must be done along three dimensions, as pointed out in Rose and Spiegel (2009a), including the identification of the most appropriate measures of the crisis itself, identification of the relevant indicators, and the determination of the appropriate time horizons for which changes in indicators may be suggestive of a potential crisis. Here, like in Rose

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[1] The sources of the 2008 crisis are well documented, see Shoham and Pelzman (2011) and Claessens et al. (2010) for detailed reviews.

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and Spiegel (2009a,b), we are mainly concerned with the identification of relevant indicators, with a focus on the real costs of a crisis to economies.

A large body of literature exists regarding the development of EWM's in the context of previous crises.[2] Motivated by the latest crisis, a new body of literature reevaluating the usefulness of indicators has emerged. For example, Berkmen et al. (2012) provide one of the first attempts to empirically identify crisis correlates relevant to the 2008–09 crisis using cross-country regressions.[3] They find that a small set of variables can explain a large share of the variation in real economic impact, including cumulative credit growth, the degree of leverage, and exchange rate flexibility. They do not find a role for the level of international reserves, and mixed results for trade channels. Blanchard et al. (2010) examine a set of emerging market economies and use a simple theoretical model to characterize the potential role of trade and financial channels in transmitting the crisis. The authors employ simple cross-country OLS regressions and find evidence that short-term external debt and unexpected trading partner growth played a role in determining the severity of the crisis for emerging market countries. Somewhat weaker evidence is provided that the size of the current account also played a role. Similar to Berkmen et al. (2012), they were unable to find a role for international reserves.

Giannone et al. (2011), using various OLS specifications, examine the role of several measures of regulation in explaining variation in crisis severity across countries. They find evidence of a link between financial liberalization and vulnerability to shocks. Similarly, Lane and Milesi-Ferretti (2011) use cross-country regressions and find evidence of a link between pre-crisis domestic financial and macroeconomic factors and various measures of total output, domestic demand, and consumption growth during the crisis. Particularly, evidence is provided of a link between credit growth and current account deficits with output decline on the financial side, and trade openness and the manufacturing share with output decline on the real side.

The above works are intimately related to a branch of the existing literature that focuses on contagion in terms of equity market portfolios. This literature has been helpful in identifying channels of transmission in the context of different exposures. For example, Beltratti and Stulz (2009) examine the returns of large banks before and during the crisis, finding a role for country-level regulation and supervision in determining the impact of the crisis on returns. Ehrmann et al. (2009) find that portfolios with more integration with US markets performed worse during the crisis. They also find evidence of a role for country level risk, particularly in terms of macroeconomic fundamentals, including the level of foreign exchange reserves, sovereign ratings, and current account positions. This result is not unlike that found from cross-country regressions done in the works discussed above. Eichengreen et al. (2012) examine differences in bank credit default swap (CDS) spreads, looking for movements of common factors. The authors find that bank performance overall tends to move together in normal times, but that the role of the common factor was greatly increased at the height of the crisis.

Recent works have seen serious attempts to identify indicators that could be potentially considered to have a robust impact on crisis transmission across a range of regression specifications. These studies are motivated by the desire to build a form of empirical early warning model. For example, Rose and Spiegel (2009a,b) use a Multiple Indicator Multiple Cause (MIMIC) model to test the robustness of a vast array of potential crisis indicators, both in terms of domestic vulnerabilities and international contagion. A key feature of the model employed here is that the severity of the crisis is treated as a latent variable reflected through various indicators, including crisis period economic growth, the change in the SDR (Special Drawing Rights) exchange rate, the change in sovereign credit rating, and the change in the value of the national stock market. Through a simple system of equations, the latent 'crisis severity' variable is linked to a wide range of potential indicators or causes. Examining each potential cause one by one within the MIMIC framework, the authors find few variables to be statistically significant. After several robustness tests, the authors conclude that there is little evidence that any proposed indicators can be empirically linked to variation in crisis incidence in a robust manner, casting serious doubt about the ability to construct an effective EWM with readily available data.

In a similar study, Frankel and Saravelos (2011) provide an extensive review of the financial crisis literature that predates the 2008–09 crisis, in an effort to avoid inclusion bias. Carefully scrutinizing the earlier EWM literature, they take a tally of variables that have been found to be significant in over 80 relevant studies. They then proceed to use their findings as a guideline in their own empirical investigation of the 2008–09 crisis. Similar to Rose and Spiegel (2009a,b), the authors estimate a large number of bivariate regressions using a host of crisis causes proposed in the literature. They differ, however, in that simple OLS is employed, using a single dependent variable at a time (they use several different dependent variables reflecting real and financial crisis manifestations to check robustness across specifications). Contrary to the work of Rose and Spiegel (2009a,b), the authors found several variables to be significant and robust indicators, including the real effective exchange rate and the level of international reserves.

In light of many of the previous studies cited above, Rose and Spiegel (2010) revisit their previous analysis with up to date data and methods. Following the methodology found in many of the above studies, Rose and Spiegel (2010) employ simple OLS and a single dependent variable (various definitions of crisis period growth), and check the robustness of their results to this improved data and standardized methodology. They are able to confirm their previous findings that very few, if any, of around 100 empirical indicators can be linked to cross-country crisis incidence in a robust fashion. Notably, any variables that appear to be statistically significant in a bivariate regression are often insignificant when additional variables are included simultaneously, casting doubt on the evidence provided by many of the studies relying on this approach.

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[2] See Frankel and Saravelos (2011) for a broad survey of the results of earlier investigations into EWM indicators.

[3] The authors focused on revisions to growth forecasts rather than actual growth rates, in part due to lack of available data at the time.

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