



# Contagion risk for Australian banks from global systemically important banks: Evidence from extreme events<sup>☆</sup>



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## ABSTRACT

This paper presents evidence that extreme negative shocks for the global systemically important banks (GSIBs) are contagious to Australian banks. Our logit regression models predict transmission of adverse extreme shocks in the distance to default (DD) of GSIBs to the Australian banks. While most previous studies consider contagion across national stock markets, we investigate the degree of contagion risk for Australian banks spreading from GSIBs. Our results point to the critical importance for the [Australian Prudential Regulation Authority \(APRA\) \(2015\)](#) to closely observe and monitor developments across the major GSIBs and direct appropriate local policy measures accordingly.

## 1. Introduction and background

This paper investigates the degree of contagion risk facing Australian banks spreading from global systemically important US, European and Japanese banks. We define contagion risk for Australian banks as the transmission of extreme negative shocks from a group of global systemically important banks (GSIBs). Our definition of contagion is similar to that used by governments, citizens, and policy-makers as the fear that negative events in another country, outside of their regulatory controls, can spread and have deleterious effects for the home country. We identify extreme negative shocks by changes in the distance to default (DD), where DD measures the distance between the present value of a bank's assets and their liabilities (described in more details in the following section). Hence, a larger DD for a bank is indicative of a stronger financial position while a smaller DD indicates financial distress or weakness. We estimate DD for eight Australian owned banks and twenty GSIBs on a daily basis and compute the daily change in DD ( $\Delta DD$ ) over a seven-year timeframe. We then isolate all significant negative shocks from the time series for each bank's  $\Delta DD$  before proceeding to estimate the probability of these negative events spreading to Australian banks.

Historically, Australia's banks have maintained a relatively healthy and stable financial position compared to their overseas counterparts.

Whilst the 2007–08 global financial crises had a marked negative impact on GSIBs and Australia's banks, Australia's financial markets generally performed better than other developed countries markets. For example, a major trigger of the global financial crisis (GFC) was the widespread availability and use of sub-prime mortgages along with failures to correctly assess counterparty risk, both of which were controlled and monitored to a greater degree by Australia's regulatory authorities compared to other developed countries ([Guy 2009](#)).

Australian banks survived the GFC with no announced bank failures and only a slight increase in nonperforming loans (IMF 2012). The profitability and capital adequacy ratios (CAR) of Australia's authorized depository institutions (ADIs) experienced a steady increase over 2008–15. [Fig. 1](#) shows the CAR of ADIs rose from 11.4 percent in December 2007 to 13.1 percent in the quarter ending June 2015. Return on Equity (ROE) also increased after a decline during the GFC, with annualized after-tax return on equity recorded at 18.04 percent in June 2015 increasing from 4.5 percent in September 2009.

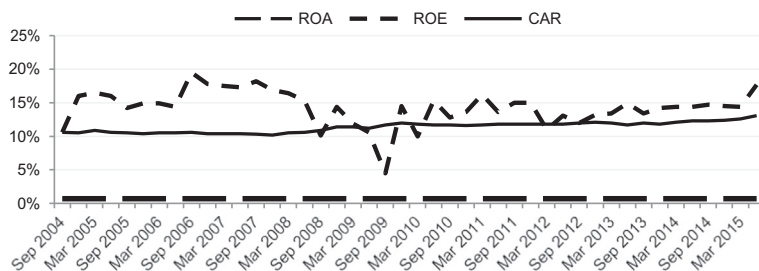
The strengths of the Australian financial environment do not however exclude future threats as rightly perceived by the [Financial System Inquiry \(FSI\) \(2014\)](#). Here the FSI observed that the Australian financial system has characteristics giving rise to particular risks, in particular its dependence on imported capital (FSI Final Report 2014:

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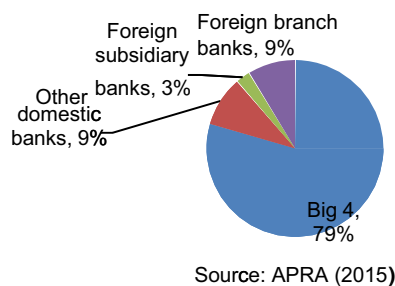
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<sup>1</sup> This author wishes to dedicate the paper to my co-author Dr Selim Akhter who suddenly passed away in September 2017, my sincere condolences to Selim's Family and Colleagues.



This Figure shows return on assets (ROA), return on equity (ROE) and capital adequacy ratio (CAR) of Australian ADIs including banks domestic and foreign banks, building societies and credit union.  
Source: APRA (2015)

**Fig. 1.** Profitability and Capital Adequacy of Australian ADIs During September 2004 to June 2015. This Figure shows return on assets (ROA), return on equity (ROE) and capital adequacy ratio (CAR) of Australian ADIs including banks domestic and foreign banks, building societies and credit union.  
Source: APRA (2015)



**Fig. 2.** Asset Holding by Banks Operating in Australia As on June 30 2015.  
Source: APRA (2015)

page xvii). In addition, a major concern facing Australia's financial system is the dominance of banking by four large banks popularly known as big-4 namely the ANZ, CBA, WBC and NAB. Fig. 2 depicts the strong position of these big four banks who along with their subsidiaries control 79% of Australia's total assets belonging to banks operating within Australia.

The business models of the big 4 Australian owned banks are similar, leaving them exposed to similar risks especially in regards to their dependence on offshore funding. This dependence exposes them to common shocks experienced by international financial centers (IMF 2012). Australian banks are equally not immune to contagion effects emanating from banks operating in other countries. Understanding how financial shocks abroad transmit to domestic banking systems is relevant both to the design and implementation of policies aimed at reducing the risks of contagion. While a financial system cannot fully protect itself to shocks which originated from overseas, early detection of the sources of these shocks can provide financial regulators with a vital window of opportunity to prepare contingency plans and focus attention on possible stress points. Researching the interdependencies between individual banks with similar exposures to economic and financial risks is therefore crucial (Bank of England, 2006). Furthermore, we believe that studies concerning contagion risk facing Australian banks have critical importance today especially in the context of the slow recovery experienced by the US economy and the unresolved debt crisis in Europe. Given this background we undertake this study with the objective of providing empirical modelling regards the likelihood of Australian banks experiencing financial distress given their strong linkages with overseas counterparts. Our study attempts to identify the GSIBs from which financial distress is likely to originate and impact Australian banking. Employing a logistic regression model to capture extreme events, we find that the probabilities of extreme events for the big Australian banks including Macquarie Bank are influenced by major globally systemically important banks (GSIBs) banks.

The paper is organized as follows: Section 2 presents a review of related studies. Here we highlight various approaches to studying

contagion and provide the rationale for using the EVT approach. Section 3 describes the methodology including details regards our sample framework and sources of data. Section 4 presents results with interpretations while Section 5 concludes the paper.

## 2. Review of literature

The principal motivation for this study is our concern regards the effect of an unexpected negative shock in one country spreading to others via numerous real and financial channels eventuating in a sharp decline in output and living standards. Financial crises which begin in one country and spread internationally, especially through banking, are not a new phenomenon. Examples of financial contagion date back 200 years (Forbes 2012)<sup>2</sup>, Kindleberger (1989), Bordo and Murshid (2001) document numerous examples of financial panics in one country spreading globally. Kenourgios and Dimitriou (2015) investigate the contagion effects of the Global Financial Crisis (2007–2009) by examining broad sectors of stock markets across both developed and emerging countries during different phases of the crisis. Their results suggest that the contagion effects of the GFC initially impacted the financial sectors before spreading to non-financial sectors. More recent examples of studies related to financial contagion include Ureche-Rangau and Burietz (2013) whose study investigates the links between the subprime crisis and the European sovereign debt crisis. Outside Europe and the US as study by Sahutand and Mili (2011) employed a nested logit model to investigate the likelihood of banking distress spreading across the Middle East and North Africa (MENA) countries. Other influential research papers focusing on financial contagion include Allen and Gale (2000), Van Rijckeghem and Weder (2001), Van Wincoop (2011), and Shin (2012).

Certain characteristics of banks such as their close relationship to the solvency of their sovereign, their high degree of leverage, and their extensive interconnections can aggravate contagion. For example, Acharya et al. (2011) study of banks in Ireland found that a shock to a country's banking system not only transmits financial distress directly through bank lending but also indirectly through increased risks to the country's solvency. Van Wincoop (2011) and Shin (2012) demonstrate that any negative shock to banks is magnified in the presence of leverage, causing an even greater reduction in loans and unwinding of positions. Allen et al. (2012) indicates that common asset holdings and similar funding maturities across banks can aggravate contagion and systemic risk. These experiences of contagion have given rise to policymakers concerns over contagion risk more generally and specifically with regards to the spread of banking distress across borders.

By comparison the numbers of studies addressing contagion risk for

<sup>2</sup> Forbes (2012) is a survey of academic literature on contagion. It presents a comprehensive list of definitions and measures of contagion and the various channels by which it can occur.

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