

Learning from Historical Financial Crises

Centre for Risk Studies



Dr Andrew Coburn Dr Duncan Needham Dr Scott Kelly Centre for Risk Studies

Learning from Historical Financial Crises

Context: Financial Crisis Research Programme

- Dr Andrew Coburn
- Understanding Historical Financial Crises
 - Dr Duncan Needham
- Historical Crises in Context
 - Dr Scott Kelly



Research Objectives of Cambridge FinCat Project



Causes of Future Crises

 What might trigger future FinCats? Defining a full taxonomy; Developing an authoritative historical catalogue; How often and how bad?



Developing Stress Test Scenarios

 What toolkit do we need to model the impacts of potential events? Can we ensure 'coherence' in their effects?



Developing a Model of Global Financial System

 Understanding the structure of the financial universe and how crises propagate through it



Understanding Financial System Behaviour

- Understanding systemic contagion in financial networks, interconnectivity, behaviour, critiquing common modelling approaches, social behaviour



Cambridge Financial Stress Test Scenarios



Global Property Crash

Sudden collapse of property prices in China followed by many other emerging and developed markets triggers a cascading crisis throughout the global financial system



Eurozone Meltdown

Unexpected default of Italy is followed by a number of other European countries, leading to multiple cession from the Union and causing an extensive financial crisis for investors



High-Inflation World

A series of world events puts pressure on energy prices and food prices in a price increasing spiral, which becomes structural and takes many years to unwind



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Dollar Deposed

US dollar loses its dominance as the default trading currency as it becomes supplanted by the Chinese Renminbi, with rapid unwinding of US Treasury positions and economic chaos

We Don't Have Tools to Understand Financial Catastrophes

Mario Draghi: Grexit would lead to "uncharted territory"

European Central Bank governor Mario Draghi said that should Greece exit the eurozone, the European Union would be entering "uncharted territory".



"Should Greece exit the Eurozone, the European Union would be entering "uncharted territory". What will the consequences on the EU be? This we are unable to predict..."

Mario Draghi, Governor of the European Central Bank 15 June 2015



Understanding Contagion and Systemic Shock

- The financial system is increasingly interconnected and integral to the economic system
 - Understanding the structure of the financial system and all its connections is vital
 - 'Financial Cartography'
- Financial instability spreads through a variety of mechanisms
- Contagion amplifies:
 - severity of the shock impact
 - extent of who is affected
- It is behavioural
 - issues of trust, perception, and self-interest drive the collapse
 - Can we model 'confidence'?
- This is a key research field
 - Working with the community of researchers on networks in finance
- Cambridge is seeking to build a practitioner model of global financial system







2015 Conference on Financial Risk and Network Theory



- Wednesday September 9, 2015
- Registration now open at http://www.risk.jbs.cam.ac.uk/
- Venue: University of Cambridge, Judge Business School
- In collaboration with Journal of Network Theory in Finance
- Many papers from key players in the field presenting cutting-edge research
- Attendees include
 - Regulators
 - Financial practitioners
 - Academics
- Keynotes include central banks presenting their techniques for assessing systemic risk and capital requirements in their market









Learning from History

- A key component of understanding financial crises is the study of past events
- What happened, and what drove them?
- What-If... they were to happen today?
- Technologies have changed, but human behaviour remains
- What does it tell us about the past frequency and severity of crises?
- What might the future frequency and severity of crises be?
- Cambridge Seminar 8 December 2015
 Market Risk Understanding and Managing Tail Events



Publication in preparation



London Risk Briefing 12 August 2015

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Dr Duncan Needham Director, Centre for Financial History and Risk Researcher, Centre for Risk Studies

Definitions

- a disturbance to financial markets, associated typically with falling asset prices and insolvency amongst debtors and intermediaries, which ramifies through the financial system, disrupting the market's capacity to allocate capital'
 - Eichengreen and Portes, 1987, p. 10.
- 'bank runs, sharp increases in default rates accompanied by large losses of capital that result in public intervention, bankruptcy or forced merger of financial institutions'
 - Schularick and Taylor, 2012, p. 1038.
- 'the price of bank stocks relative to the market'
 - Turner, 2014, p. 55.



Recent Literature

- D. Aikman, A.G. Haldane and B.D. Nelson, 'Curbing the credit cycle', *Economic Journal*, vol. 125 (June, 2014), pp. 1072-1109.
- J.D. Turner, Banking in crisis: the rise and fall of British banking stability, 1800 to the present (Cambridge, 2014).
- M. Schularick and A.M. Taylor, 'Credit booms gone bust: monetary policy, leverage cycles and financial crises, 1870-2008', *American Economic Review*, vol. 102, no. 2 (April, 2012), pp. 1029-61.
- R.S. Grossman, Unsettled account: the evolution of banking in the industrialized world since 1800 (Princeton, 2010).
- C.M. Reinhart and K.S. Rogoff, This time is different: eight centuries of financial folly (Princeton, 2009).



Historical Catalogue of Financial Crises

- 1. 1720s Crises (South Sea, Mississippi Scheme, Windhandel)
- 2. 1825 UK Country Bank Crisis
- 3. 1857 Panic (USA)
- 4. 1866 Collapse of Overend and Gurney
- 5. 1873 Crisis (USA)
- 6. 1890 Baring Crisis
- 7. 1907 US 'Bankers' Panic'
- 8. 1914 Financial Crisis
- 9. 1931-33 and the Great Depression
- 10. Early 1980s Latin American Debt Crisis
- 11. 1997-99 Asia crisis,
- 12. 2008 Global Financial Crisis



What Causes a Banking Crisis?

- Crises are orphans right up to their inception, at which point they become the scions of new economic orthodoxies', Jordà et al, 2011
- Rapid credit growth over the business cycle
 - Asset/collateral price rises produce riskier lending
 - Asymmetric information
- Shocks
 - 'the contagion of fear', Friedman and Schwartz
- Structural weakness
 - Small, undiversified banks (USA)
 - No lender of last resort



Case Study No. 1: The 1825 UK Country Bank Crisis





Case Study No. 1: The 1825 UK Country Bank Crisis

Origins of the crisis

- 'its principal cause was widespread speculation, stimulated partly by a series of good harvests, partly by the low yields on Government securities, but especially by improvident finance on the part of the country banks', W.T.C. King, 1936, p. 35.
- 'any small tradesman, a cheesemonger, a butcher, or a shoemaker may open a country bank', Prime Minister Lord Liverpool
- The crisis
- 60 country banks and 10 London banks fail
- Short, sharp recession
- Consequences of the crisis
- Reshaped British financial system
 - -Bank of England, Discount Houses, Joint Stock Banks



Case Study No. 2: The 1907 US 'Bankers' Panic'



THE HAUNTED HOUSE.



Case Study No. 2: The 1907 US 'Bankers' Panic'

Origins of the crisis

- 10 years of rapid GDP and credit growth
- Liquidity squeeze following San Francisco earthquake

The crisis

- State-chartered trusts (quasi-Investment Banks) with just 5% currency reserves damaged by copper speculation
- New York Clearing House loans reduce distressed asset sales

Consequences of the crisis

- Sharp US recession, GDP contracts c.12%
- 1909 National Monetary Commission recommends 1913
 Federal Reserve system



Case Study No. 2: The 1907 US 'Bankers' Panic'





Case Study No. 3: 2008 Global Financial Crisis





Case Study No. 3: 2008 Global Financial Crisis

- Origins of the crisis
- Sub-prime lending, financial innovation, regulatory capture
- The crisis
- Bear Stearns and BNP funds
- Lehman and Washington Mutual
- Consequences of the crisis
- Emergency Economic Stabilization Act, 2008
- Exposed flaws in Euro-zone.



Summary Data – Three Case Studies

| | 1 UK 1825 | 2 US 1907 | 3 US 2008 |
|--------------------------------------|-----------------|-----------------|-----------------|
| Decline in output | 9% | 12% | 5% |
| Quarters to regain pre-crisis output | <4 | 9 | 12 |
| Peak rise in unemployment | n.a. | 5% | 5% |
| Stock market decline to trough | 24% | 49% | 57% |
| Consumer price decline to trough | 18% | 4% | 3% |



US Annual Real GDP and Bank Loan Growth



Source: Aikman et al, 2014, p. 1076.



UK Annual Real GDP and Bank Loan Growth



Source: Aikman et al, 2014, p. 1076.



14-Country Aggregate Financial Data



Source: Schularick and Taylor, 2012, p. 1035.



14-Country Annual Bank Loan and Asset Growth

| | Pre-WW2 | Post WW2 |
|-------------------------|---------|----------|
| Bank loans/broad money | 0.17% | 2.22% |
| Bank assets/broad money | 0.43% | 1.82% |



Banking Crises Through Time





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Conclusions

- 'it is the unwinding of *leverage-driven* asset bubbles that puts financial stability most at risk', Schularick and Taylor, 2012, p. 1057.
- Crises usually emerge in less-regulated 'secondary' banks
 - 1825: Country banks
 - 1907: State-chartered trusts
 - 2007-8: Shadow banks, SPVs.
- Financial crises deepen recessions by restricting investment credit.
 - Higher cost of credit intermediation
 - Falling asset prices weaken bank balance sheets
 - Banks restrict credit to rebuild capital
 - Banks increase liquid assets in anticipation of depositor withdrawals
 - Flight to liquidity restricts lending to new and small businesses



London Risk Briefing 12 August 2015

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Dr Scott Kelly

Senior Research Associate Cambridge Centre for Risk Studies

Four Key Messages



Frequency

Financial crisis happen regularly



Impact

Impacts are severe and destroy significant financial capital



Duration

Many crisis have taken multiple years to recover



Networks

Financial systems are heavily interconnected multiplying the frequency, impact and duration of financial crisis



Data Sources

Collected data over period 1800 - 2015 Data is problematic – sparse, inconsistent, unconnected, incomplete and sometimes dubious

| Source | Period |
|---|-----------|
| Hills, Thomas, and Dimsdale (2015) Website: | |
| http://www.centerforfinancialstability.org/hfs.php | 1830-2010 |
| Janssen et al (2002), Mitchell (1988). | 1703-1755 |
| Bank of England and ONS. | 1800-2012 |
| Schumpeter-Gilboy index from Mitchell(1988), 1750-1975 from ONS (O'Donoghue et al (2004)), 1975-2009 CPI (ONS and Bank of England) | 1000 1750 |
| Mitchell (1988) and ONS (series, code BKOK) | 1688-1750 |
| Eninstein (1972) ONS (code BC IE) | 1800-2010 |
| reinstein (1972), ONS (Code BCJE) | 1855-2010 |
| Mitchell(1988), Chapter XVI, Table 5 pages 831 to 8350 Sefton and | |
| Weale (1995), Table A2ONS: Series Code IKBI | 1830-2008 |
| Caple and Webber (1985) and Bank of England/ONS | 1870-2009 |
| BP Statistical Review of World Energy 2010 | 1861-2013 |
| Reinhart, Camen M. and Kenneth S. Rogoff, "From Financial Crash to Debt Crisis," NBER Working Paper 15795, March 2010. Forthcoming in | |
| American Economic Review. | 1800-2009 |
| www.measuringworth.com | 1800-2012 |
| Three Centuries of Data, Bank of England (2012) | 1700-2012 |

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Data Collected:

- GDP
- Inflation
- Unemployment
- Government Debt
- Bond interest rates
- Exchange rates
- HH consumption
- Exports / Imports
- Balance of payments
- Money Supply
- Equity Index
- Population
- Oil Price

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US and UK Equity Index (1800-2015)





Two Centuries of Financial Crises



Currency: 15% devaluation Inflation: 20% Increase in prices Asset bubble: 25% drop in returns

Sovereign crisis: Failure to make payment on loan Banking crisis: Bank run, bank failure

Source: Reinhart, Camen M. and Kenneth S. Rogoff, "From Financial Crash to Debt Crisis," NBER Working Paper 15795, March 2010. Forthcoming in American Economic Review.



Historical Severities of Crashes – Past 200 Years



Observed, last 200 years

| Crashes Greater Than | Number of Crises | Average Interval (Yrs) |
|-------------------------|---------------------|---------------------------|
| 10% | 12 | 16 |
| 20% | 9 | 21 |
| 40% | 6 | 32 |
| 50% | 1 | 190 |



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UK Stock Market Crashes



Stock Market Crash Peak to Trough

Observed, last 200 years

| Crashes Greater Than | Number of Crises | Average Interval (Yrs) |
|-------------------------|---------------------|---------------------------|
| 10% | 11 | 17 |
| 20% | 8 | 24 |
| 40% | 5 | 38 |
| 50% | 2 | 95 |

GDP Growth Rates





Peak to Parity Equity Index



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Equity and GDP at Risk



Stock Returns Value at Risk (1800 - 2010)

| | 1% | 5% | Mean |
|---------------|--------|--------|------|
| US Equity VaR | -35.7% | -23.6% | 5.7% |
| UK Equity VaR | -19.9% | -12.8% | 4.6% |



US Distribution of Returns



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GDP Growth at Risk (1800 - 2010)

| | 1% | 5% | Mean |
|----------------|--------|-------|------|
| US GDP at Risk | -12.7% | -7.4% | 5.3% |
| UK GDP at Risk | -5.1% | -3.0% | 2.0% |

Multiple Crisis Occur Simultaneously

| | | Peak | to | | C | Crisis Typ | e | |
|------|--------------------------------|--------|------|-----------------|---------------------|--------------------|---------------------|-------------------|
| | | Trough | Loss | | | | | |
| Year | Crisis | UK | US | Asset Bubble | Sovereign Crisis | Currency Crisis | Inflation Crisis | Banking Crisis |
| 1720 | South Sea Bubble | 80% | - | x | | | | x |
| 1825 | The Country Banking Crisis | 43% | 3% | x | x | | | X |
| 1845 | Railway Mania Bubble UK | 9% | 5% | x | x | | | |
| 1857 | Railroad Mania Bubble US | 13% | 23% | x | | | | X |
| 1866 | Collapse of Overend and Gurney | 7% | 6% | | | | | X |
| 1873 | Long Depression | 33% | 47% | | x | | | X |
| 1890 | Baring Bank Crisis | 9% | 42% | x | | x | | X |
| 1907 | US 'Bankers' Panic' | 19% | 26% | x | | | | X |
| 1929 | Wall Street Crash | 52% | 85% | x | | x | | X |
| 1983 | Latin American Debt Crisis | 5% | 20% | | x | x | x | X |
| 1987 | Black Monday | 31% | 30% | | | | | x |
| 1997 | Asian Crisis | 12% | 6% | x | x | x | x | X |
| 2008 | Great Financial Crisis | 44% | 48% | x | x | | | X |



Estimating GDP@Risk



GDP@Risk: Cumulative first five year loss of global GDP, relative to expected, resulting from a catastrophe or crisis



Modelling Historical Financial Crises





Historical: GDP@Risk

| GDP@Risk US\$ Trillion, 2010 prices | GDP@Risk |
|-------------------------------------|----------|
| 1893 Baring Bank Crisis | 5 |
| 1873 Long Depression | 7 |
| 1907 US 'Bankers' Panic' | 14 |
| 2007 Great Financial Crisis | 20 |
| 1929 Wall Street Crash | 30 |



Historical & Scenarios: GDP@Risk

| GDP@Risk US\$ Trillion, 2010 prices | GDP@Risk |
|-------------------------------------|----------|
| 1893 Baring Bank Crisis | 5 |
| 1873 Long Depression | 7 |
| 1907 US 'Bankers' Panic' | 14 |
| 2007 Great Financial Crisis | 20 |
| 1929 Wall Street Crash | 30 |
| CRS Dollar Deposed | 2-3 |
| CRS High Inflation World | 5-11 |
| CRS Eurozone Meltdown | 6-20 |
| CRS Global Property Crash | 11-23 |



