Institution: Brunel University London		
Unit of Assessment: 16 Economics and Econometrics		
Title of case study: Using Macroprudential Policies to reduce the risk of financial crises		
Period when the underpinning research was undertaken: 2013 - 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	**Role(s) (e.g. job title):**	**Period(s) employed by submitting HEI:**
E Philip Davis Dilruba Karim	Professor Senior Lecturer in Economics and Finance	10/2000 - present 09/2005 - present
Period when the claimed impact occurred: 2014 - Dec 2020		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact (indicative maximum 100 words)

Research on the use of cointegration in assessing tools' effectiveness has influenced the thinking and approach to research by Norges Bank, the Norwegian Central Bank. The development of a macroprudential sector for the National Institute Global Econometric Model (NiGEM) at the National Institute of Economic and Social Research (NIESR) has influenced macroeconomic and monetary policy for a range of global users including central banks and international organisations such as the European Central Bank and OECD. Work on concentration and distribution measures of key macroprudential indicator variables for the International Monetary Fund (IMF) in 2017 has helped them to gain approval to expand the list of financial soundness indicators to cover such measures.

2. Underpinning research (indicative maximum 500 words)

Macroprudential policy is an approach to financial regulation that aims to detect and mitigate risks to the financial system as a whole (or "systemic risk"). A variety of tools of macroprudential policy have become available to central banks and regulators since the subprime crisis in 2008, which may have cost the UK over 16% of GDP in terms of growth foregone. The eventual fiscal cost of the crisis could exceed GBP100,000,000,000. However, further research on economic outcomes from macroprudential policies is essential, given the recent introduction of macroprudential policy and the relative scarcity of existing studies of its effect on credit, asset prices and the wider economy. Accordingly, the appropriate macroprudential tools and the effectiveness of such tools remain open questions. These issues have been addressed by Prof Davis' and Dr Karim's research in this area.

Together with Dr Carreras and Dr Piggott from the NIESR, Prof Davis for the Horizon 2020 grant "Firstrun" notes that existing work on effectiveness of macroprudential policy may be vulnerable to bias due to omission of long run cointegration effects (Ref. 4). The paper offered a fresh baseline for work in this area by adopting a robust cointegration framework. Using data for up to 19 OECD countries, evidence was found that macroprudential polices remain effective in both short- and long-run at curbing house price and household credit growth even within a cointegration framework. However, some tools are more effective than others, such as taxes on financial institutions, general capital requirements, strict loan-to-value ratios and debt-to-income ratio limits.

Prof. Davis subsequently undertook additional research with Dr Liadze and Dr Piggott from the NIESR for “Firstrun,”as a development of the National Institute Global Econometric Model (NiGEM) (Ref. 5). NIGEM is used by central banks in most developed countries and international organisations. Detailed banking sectors and addition of a macroprudential block to the model, with a focus on country models for Germany, Italy and the UK, enabled effects of macroprudential policies to be captured.

Together with Dr Liadze from the NIESR and Prof. Davis and Prof. Barrell from Brunel, Dr Karim had earlier conducted research into a systemic risk index which tracks the likelihood of the occurrence of a banking crisis and establishes thresholds at which macroprudential policies should be activated by the authorities (Ref. 1). Using this index as part of the new banking and macroprudential blocks of NiGEM (Ref 5), it was found that capital adequacy impacts the economy by acting on the spread between borrowing and lending of corporates and households, while loan-to-value transmits through its impact on the housing market. Introduction of macroprudential policy prior to the crisis would have led to improvement in a number of key macroeconomic measures and might thus have reduced the incidence of the crisis.

Prof. Davis offered the first systematic approach to assessing the usefulness of Concentration and Distribution Measures (CDMs) of Financial Soundness Indicators (FSIs) as indicators in macroprudential surveillance for the IMF (Ref. 3). Examples of such CDMs are the skewness, standard deviation and interquartile range, while the FSIs are the leverage ratio (unweighted bank capital/assets); liquidity (banks’ liquid assets/short term liabilities); banks’ return on assets; banks’ return on equity; banks’ Tier 1 equity capital/risk weighted assets and the banks’ non-performing loans/gross loans. Prof. Davis’ research (Ref. 3) uses an experimental data collection by the IMF from 36 countries and shows that a range of these CDMs can help to predict system wide vulnerabilities, with appropriate control variables. Leverage and the Tier 1 ratio, which are both principal macroprudential tools to indicate banking sector financial stability, were key to the collection of those FSIs. Overall, the exercise suggests CDMs provide a valuable supplement to traditional average measures of macroprudential indicators and would accordingly allow regulators and policy makers to better identify potential build-up of systemic risks, thus providing additional inputs for macro-financial management.

Finally, Prof. Davis, Dr Karim and Dr Noel observe that extant research on credit-market effects of macroprudential policy focuses largely on bank credit and credit to households. Their research (Ref. 2) was to their knowledge the first paper to assess policy’s effects on the broader total non-financial private sector credit-to-GDP gap. Prof. Davis, Dr Karim and Dr Noel found that a number of macroprudential tools are effective in influencing the gap, notably when the gap is positive or growing. Focus of existing macroprudential policy - and most research - on bank and household lending, a subset of the total captured by the credit-to-GDP gap and Prof. Davis’, Dr Karim’s, and Dr Noel’s research, raises important issues. Their work shows economy-wide effect of macroprudential measures in a way that studies focused on narrower measures of credit, which may be subject to disintermediation, may not. Furthermore, neglect of types of lending such as to commercial property, which have been critical in past episodes of financial instability, implies a risk of excessive focus of researchers and policymakers on the most recent crisis. Further work by Prof. Davis, Dr Karim and Dr Noel (Ref. 6) has shown the negative effect of some macroprudential policies on bank profitability, a subject of potential concern if it limits banks’ scope for capital accumulation.

3. References to the research (indicative maximum of six references)

Ref. 1 Karim, D., Liadze, I., Barrell, R., Davis,E P (2013) ‘Off-balance sheet exposures and

banking crises in OECD countries', Journal of Financial Stability 9, 673-681
https://doi.org/10.1016/j.jfs.2012.07.001

Ref. 2 Davis, E P., Karim, D. and Noel, D. (2017) 'Macroprudential policy and financial imbalances', Brunel Economics and Finance Working Paper 17-22
https://www.brunel.ac.uk/__data/assets/pdf_file/0006/508353/1722.pdf

Ref. 3 Davis E P (2017), "Evaluating Concentration and Distribution Measures of IMF Financial Soundness Indicators", Brunel Economics and Finance Working Paper 17-23
https://www.brunel.ac.uk/economics-and-finance/research/pdf/1723.pdf

Ref. 4 Carreras O, Davis E P and Piggott R (2018), "Assessing macroprudential tools in OECD countries within a cointegration framework", Journal of Financial Stability 37, 112-130
https://doi.org/10.1016/j.jfs.2018.04.004

Ref. 5 Davis E P, Liadze I and Piggott R (2019), "Assessing the macroeconomic impact of alternative macroprudential policies", Economic Modelling 80, 407-428
https://doi.org/10.1016/j.econmod.2018.11.025

Ref. 6 Davis, E.P., Karim, D. and Noel, D. (2020), "The effects of macroprudential policy on banks' profitability", Brunel Economics and Finance Working Paper No. 20-08
https://www.brunel.ac.uk/economics-and-finance/research/pdf/2008-Mar-PD-MP-and-Bank-Profitability.pdf

4. Details of the impact (indicative maximum 750 words)

Financial crises cause major losses in economic output as well as imposing a sizeable burden on the public finances. The financial crisis between 2007 and 2008 may have cost the UK over 16% of GDP in terms of growth foregone, and the eventual fiscal cost of the crisis could exceed GBP100,000,000,000. The research conducted by Prof. Davis and Dr Karim has been adopted by the NIESR, Norges Bank, and the IMF. All 3 institutions subsequently expanded their assessments of macroprudential policy issues and developed new mitigation and detection tools which were previously inaccessible and which reduce financial risk significantly.

The underpinning research on the use of cointegration in assessing tools' effectiveness was firstly undertaken between 2016 and 2017 under a Horizon 2020 grant and has influenced the thinking and approach to research by Norges Bank, the Central Bank of Norway. [REDACTED]

[REDACTED] Indeed, in evaluating macroprudential policy on mortgage lending in 2019 the work was also shared by the Norges Bank with the regulator (Finanstilsynet) and the Ministry of Finance.

Meanwhile, the development of a macroprudential sector for the National Institute Global Econometric Model (NiGEM) at the National Institute of Economic and Social Research (NIESR) under the same grant between 2017 and 2018 influences macroeconomic and monetary policy for a range of global users including central banks and international organisations such as the European Central Bank and OECD. [REDACTED]

Prof Davis' work has had a direct impact as it serves as a forecasting and simulation tool of global economic trends by international organisations, regulators, central banks, financial institutions and research groups. Thus, the new NiGEM enables evaluation of macroprudential policy over the wider economy, which was not previously available. This means social costs of financial instability are mitigated by the use of this new NiGEM model. [REDACTED]

Acknowledging its benefit, the OECD has already commented that they would like these new NiGEM model extensions to be incorporated in more country models including the rest of G-7 countries: Canada, France, Japan and US (Source 3).

Prof Davis's research on macroprudential indicators for the IMF (Davis 2017) identifies variables which help to predict financial risk at the economy-wide level. IMF are seeking to influence its member countries to collect data on these indicators and provide the data to them, which would be beneficial for the countries themselves and IMF for their macroprudential surveillance.

In April 2017, the IMF's Statistics Department hosted 2 events: A *Workshop on Financial Soundness Indicators (FSIs): A Users' Perspective* and the *Meeting of the Financial Soundness Indicators Reference Group (FSIRG)* "to share experiences with the use of FSIs in financial surveillance and to collect feedback for the work program for the revision of the FSI Guide including the way forward with FSIs and CDMs" (Source 4). The IMF commissioned Prof. Davis to give a presentation on how well CDMs could be used to signal vulnerabilities in the financial system which are not captured otherwise, and encouraged him thereafter to publish it as a Brunel University Working Paper (Ref 3).

Prof. Davis presented his evaluations at the events and showed that CDMs provide indeed a valuable addition to traditional measures of macroprudential indicators, because they are able to predict system-wide vulnerabilities, which are otherwise left undetected. The usefulness of this was noted by members of staff at the IMF: "Mr. Davis did empirical work on the sample CDM data and preliminary descriptive and econometric analysis suggest that CDMs provide further insights for financial stability that would not have otherwise been identified using aggregated FSIs. These results provided support to the compilation of CDMs" (Source 5).

Prof. Davis' work has subsequently helped the IMF to gain approval to expand the list of financial soundness indicators to cover such measures. The impact is that with support from this research, the IMF has now formalised the requirement for the CDMs to be collected in the revised handbook for Financial Soundness Indicators (Source 6).

5. Sources to corroborate the impact (indicative maximum of 10 references)

Source 1. Corroborating letter from Norges Bank, 31 October 2019

Source 2. Norges Bank, Annual Report 2018

Source 3. Corroborating letter from the National Institute for Social and Economic Research, 11 March 2020

Source 4. Financial Soundness Indicators and the IMF, April 2019

Source 5. Summary of Key Points and Next Steps for STA Workshop on Financial Soundness Indicators – A Users' Perspective (April 26-27, 2017) and Meeting of the FSI Reference Group (April 28, 2017)

Source 6. Financial Soundness Indicators Compilation Guide, IMF, 2019