Institution: The University of Edinburgh

Unit of Assessment: 18 Economics and Econometrics

Title of case study: Insights from and Response to the Financial Crisis

1. Summary of the impact

John Moore's Edinburgh-based research (1993-) on the role of trust and liquidity in the amplification and propagation of business cycles has informed both the understanding of, and the policy response to, the recent financial crisis in central banking circles around the world. His insight into the self-reinforcing effect of a decline in asset prices via the *collateral multiplier* has been instrumental in making sense of the crisis. Moore's work has also provided intellectual underpinning for the unconventional monetary policy – *quantitative easing* – that central banks, including the Federal Reserve (over US$1.5 trillion) and the Bank of England (over £375 billion) have undertaken in response to the crisis.

2. Underpinning research

Context: *Moore's research on trust, liquidity and the aggregate economy evolved out of a longstanding collaboration with Nobuhiro Kiyotaki (now at Princeton University). It started during Moore's first spell at The University of Edinburgh as a part-time Professor in 1993-95. He returned in 2000 as the* George Watson's and Daniel Stewart's Professor of Political Economy*, a full-time position he continues to hold. This case study is based on two, closely related, pieces of research both of which were predominantly produced in Edinburgh.*

Moore's first paper with Kiyotaki, "Credit Cycles", was originally published as a University of Edinburgh Department of Economics Discussion Paper in 1995. It subsequently appeared in the *Journal of Political Economy* in 1997. This paper developed the idea that, in the presence of financial frictions that limit the amounts that economic agents can credibly borrow, collateral acts as a key lubricant to the financial system. Kiyotaki and Moore show that there is a powerful interaction between these credit constraints and aggregate economic activity over the business cycle. In particular, since collateral sustains borrowing, and thereby investment, changes in the price of collateralized assets can have a profound effect on the ability of economic agents to borrow and invest. In an economy in which debt sustains debt, a downward spiral can emerge following a recessionary shock: in a downturn asset prices fall, which reduces collateral values, suppresses investment and asset demand, thus reducing asset prices still further. Moreover, the future knock-on effects of falls in net worth and investment make matters even worse because they too are reflected in reductions in today's asset prices. Through this new channel, the collateral multiplier, small temporary shocks – such as those that accompany business cycles – can be amplified and propagated through the economy.

Kiyotaki and Moore resumed their research agenda on trust and liquidity at the time of Moore's return to Edinburgh. The initial thoughts on their follow-up project – part funded by Moore's Leverhulme Research Professorship – "Liquidity, Business Cycles, and Monetary Policy" were first put on paper in 2001 when they formed the basis of one of the prestigious *Clarendon Lectures* given by Moore at Oxford University. This paper presents a theory of the aggregate economy in which fiat money has value because of its liquidity. When economic agents cannot completely trust each other to repay their debts, money can allow them to borrow and lend across time, financing investments that otherwise would not happen. Thus, even though money is intrinsically valueless as an asset, its liquidity has value in a world of limited trust. Kiyotaki and Moore show that, in this environment, government policies that change the mix of assets held in the economy can help to alleviate the amplitude of business cycles. They show, in particular, that a policy that exchanges illiquid private assets for liquid fiat money will stimulate the economy, a policy considered unconventional at the time of the paper's writing.

3. References to the research

Kiyotaki, N. and Moore, J. (1995) "Credit Cycles", Department of Economics Discussion Paper, University of Edinburgh.
Available as a scanned PDF. The original is in UoE Main Library. http://tinyurl.com/o7yrm5e

Kiyotaki, N. and Moore, J. (1997) "Credit Cycles", *Journal of Political Economy*, Vol. 105, No. 2, pp. 211-248. (Awarded the *Stephen A. Ross Prize in Financial Economics* in 2010)
DOI: 10.1086/262072

Kiyotaki, N. and Moore, J., "Liquidity, Business Cycles, and Monetary Policy". Moore's 2nd *Clarendon Lecture*, Oxford University (27 November, 2001). Available from HEI

Kiyotaki, N. and Moore, J. (2012) "Liquidity, Business Cycles, and Monetary Policy," NBER Working Paper No. 17934. (Extensively rewritten, with significant added material relative to the *Clarendon Lecture*. Revision invited by the *Journal of Political Economy*)
http://www.nber.org/papers/w17934

4. Details of the impact

The collateral multiplier channel, first identified in the paper "Credit Cycles", foreshadowed important aspects of the chain of events witnessed recently. The amplification and propagation of business cycles through the feedback mechanism in asset prices via the collateral resembles the sharp deterioration in financial intermediaries' balance sheets during the crisis. For that reason, this insight was an important input into policymaking discussions within central banks during the crisis.

In order to maximise the impact of his work, Moore gave a series of invited lectures in the Bank for International Settlements (2008), Banque de France (2008), Bundesbank (2008), Sveriges Riksbank (2009), Banco Central de Uruguay (2009) and the Bank of England (2011). The insights presented in these talks, as well as direct access to his written work, have had considerable influence on their audience. For example, in an email to Prof Michael Elsby (UoE), an economist at the Federal Reserve Bank of New York explicitly notes that he was invited to participate in policy discussions in the Bank as a result of his familiarity with Kiyotaki and Moore's work:

> "In the policy work that I've done last year, the reason why I was involved was that I was working on Kiyotaki-Moore. So, it definitely had a policy impact." [see 5.1 below]

Closer to home, an Executive Director of the Bank of England certifies that

> "Moore's papers, "Credit Cycles" (…) and "Liquidity, Business Cycles and Monetary Policy" (...) are both seminal pieces of work which have influenced the thinking of the Bank of England and other central banks in operating monetary and macroprudential policy during the crisis and beyond." [5.2]

The influence of the paper was a key factor in its being awarded the prestigious Ross Prize in Financial Economics ($100 000) in 2010. The citation, entitled "The Impact of "Credit Cycles" by Kiyotaki and Moore", notes in particular that:

> "This is a landmark paper for the literature… The insights of this literature have been essential in understanding the current crisis and the "lost decade" in Japan." [5.3]

This influence has also percolated into the public debate. An article in *The Economist* criticising economists for the inability of their models to engage with the crisis triggered a debate initiated by Nobel Laureate Robert Lucas. In a piece by Markus Brunnermeier, Kiyotaki and Moore are cited as economists who have provided useful models:

> “Research by Ben Bernanke and Mark Gertler, Nobu Kiyotaki and John Moore, Rick Mishkin and other macroeconomists provided helpful policy guidance, exactly because their models emphasise the importance of financial frictions for the macroeconomy.” [5.4]

Similarly, in a prominent article criticising the economics literature for its irrelevance to the crisis, Nobel Laureate Paul Krugman highlights the Kiyotaki-Moore agenda as an important exception:

> “There were some exceptions. One line of work, ... A related line of work, largely established by my Princeton colleague Nobuhiro Kiyotaki and John Moore …, argued that prices of assets such as real estate can suffer self-reinforcing plunges that in turn depress the economy as a whole.” [5.5]

This view was echoed by David Romer at a 2011 conference organised by the International Monetary Fund on post-crisis macro policy:

> "I am not claiming that modern macroeconomics in general has not been valuable. To give just one example, empirical and theoretical work on credit-market imperfections (for example, Bernanke, 1983, Bernanke and Gertler, 1989, and Kiyotaki and Moore, 1997) offers important insights into financial crises and very likely informed the policy response." [5.6]

Beyond enriching our understanding of the financial crisis, Moore’s research also presaged policy responses that could counteract the severe recessions exacerbated by financial frictions. Kiyotaki and Moore showed that an injection of liquidity into the economy can help mitigate the adverse effects of a financial crisis. From this insight emerged a highly unconventional piece of policy advice: conduct open market operations that exchange illiquid assets for liquid ones. This policy resembles important aspects of the “quantitative easing” conducted by the Federal Reserve (and the Bank of England) during the crisis. The impact of “Liquidity, Business Cycles, and Monetary Policy” was acknowledged by Charles Evans, President of the Federal Reserve Bank of Chicago (reinforcing the comment from the Bank of England above). In a speech, delivered at the peak of the crisis, he makes frequent reference to the paper, noting in particular that:

> “[O]ur Term Securities Lending Facility, which the Fed implemented in mid-March, roughly corresponds to the Kiyotaki and Moore recommendations.” [5.7]

5. Sources to corroborate the impact

Archived links available at www.wiki.ed.ac.uk/display/REF2014REF3B/UoA+18

5.1 Research economist, Federal Reserve Bank of New York. Corroborates the quote in Section 4, full statement on file.

5.2 Executive Director, Bank of England. Corroborates the quote in Section 4, full statement on file.

5.3 Kiyotaki, N. and Moore, J., “The impact of “Credit Cycles” *FARFE Citation.* http://tinyurl.com/o957sfx

5.4 Markus Brunnermeier, (Princeton, advisor to the Bundesbank, IMF and NY Fed) “Lucas roundtable: Mind the frictions”, *The Economist* Free Exchange, August 6 2009. http://www.economist.com/blogs/freeexchange/2009/08/markus_brunnermeier_is_edward or http://tinyurl.com/lq2aaw3

5.5 Paul Krugman “How did economists get it so wrong?” *New York Times*, September 2, 2009. http://www.nytimes.com/2009/09/06/magazine/06Economic-t.html?pagewanted=all&_r=0 or http://tinyurl.com/kz8y3xm

5.6 David Romer (UC Berkeley) “What Have We Learned about Fiscal Policy from the Crisis?” IMF Conference on Macro and Growth Policies in the Wake of the Crisis, March 2011.

http://tinyurl.com/oo4opla or http://tinyurl.com/kckuk6c

5.7 Charles Evans, President of the Federal Reserve Bank of Chicago "Challenges that the Recent Financial Market Turmoil Places on our Macroeconomic Toolkit" Swiss National Bank Research Conference Zurich, Switzerland, September 19, 2008. http://www.chicagofed.org/webpages/publications/speeches/2008/9.19_snb_speech.cfm or http://tinyurl.com/nxhpadg