Institution: University of Reading		
Unit of Assessment: 13 Architecture, Built Environment and Planning		
Title of case study: Improving Global Financial Stability through Changing Policy and Practice on the Valuation of Commercial Real Estate		
Period when the underpinning research was undertaken: 2000–2020		
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:**
Neil Crosby	Professor	1994 - present
Cathy Hughes	Research officer; Lecturer; Associate Professor	2002 - present
Steven Devaney	Lecturer; Associate Professor Associate Professor	2007 – 2015; 2016 - present
Period when the claimed impact occurred: 2014–20		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact

Overvaluing and over-lending by banks on commercial property played a major role in catalysing the Global Financial Crisis (GFC). In order to prevent a repeat of this, research at the University of Reading has underpinned the Bank of England's (BoE) and UK commercial real estate (CRE) industry's policy and practice response through the adoption of long-term value modelling. The BoE has used the modelling to stress-test the UK economy, and in the reporting of CRE markets within its Financial Stability reports. Internationally, the research has informed the International Monetary Fund's (IMF) assessment of CRE markets for financial stability. The European property industry has adopted the research and produced the leading professional guidance (that of the Royal Institution of Chartered Surveyors – RICS) on valuation practice. The research is now driving the response of all three international valuation regulatory bodies to the EU on its planned implementation of long-term valuation methodology based on the Basel III accord. Stress-testing using this modelling has shown that the lending to CRE is not at levels to create a financial crisis in the event of a CRE market downturn in the UK and some other international markets.

2. Underpinning research

The focus of the research is the role property valuations play in the commercial property lending process and the identification of under- and over-pricing in CRE markets. Building on previous research at Reading on property valuation models and an academic framework for appraising CRE assets [Section 3, refs 2 and 3], Crosby and Hughes [ref 1] compared the ability of different valuation models to predict over-pricing in the commercial property market, a feature of the cyclical price boom period in the run-up to the GFC (as seen in 2007). They compared the economic fair value or Investment Value (IV) cashflow-based model with the normal valuation approach to secured lending valuations, namely the assessment of the likely exchange price, known as market value. They also examined an alternative valuation methodology used in some European countries for secured lending purposes, called Mortgage Lending Value.

Using aggregated market data, they identified a mismatch between the market value and the IV through the cycle and concluded that IV-based models would have identified the CRE market downturn in good time (most losses are made on loans that originated in the last two years of a CRE up-cycle) for regulators to curb excessive lending in the major boom period before the crash in 2007. They therefore demonstrated the potential for IV based long-term valuation methods to play a part in the prevention of future banking crises by signalling the impending CRE market downtown well before it occurred.

This work was disseminated to industry and government during the GFC post-mortem period in 2012/13/14 (see Section 4). Crosby and Hughes's research for the article in *Journal of European Real Estate Research* [ref 1] had tested the period around the GFC. From 2014 to 2017, Crosby, working both within the BoE as a consultant, and with an alliance of UK CRE professional institutions and industry bodies (The Property Industry Alliance Long-term Value Working Group), collated the necessary datasets and extended the analysis of the different valuation approaches backwards to the previous property crash, in 1990, to see if the results for the GFC could be replicated. As a result of this subsequent research, Crosby identified some significant differences, with the 1990 downturn being an occupier (rental) market crash, and 2007 being an asset market crash based on capitalisation rate movements. Because of this, some aspects of the previous modelling were not so successful in giving early warning signals for the 1990 crash. This finding led to a further research programme, in partnership with Cambridge University, funded by the CRE industry and supported by the BoE (Reading's share was £36,000), the output of which was published in 2020. Investigating the reason for the differing results between the 1990 and 2007 crashes, Reading's contribution to this research (Crosby and Devaney) focused on rental markets [ref 5]. This research tested various econometric models of equilibrium rent, constructed some major supply-side databases for the UK and was able to recommend to government and industry a revised modelling process for testing mismatches between CRE prices and long-term value.

The Reading research programme has led UK industry responses to the impact of CRE markets on the financial stability of the UK economy since 2014. It has also been disseminated to international organisations, including the IMF, and has influenced their processes. In particular, it has been used by the BoE since 2015, where the initial IV model [ref 1] has underpinned Financial Stability Reports and stress tests of the UK economy. The revised recommendations [ref 5] have been included in the BoE's latest modelling of UK CRE markets and are a major part of the CRE industry response (lead author Crosby) to the proposed introduction of the new Basel III basis of property valuation into the EU's Capital Requirements Regulations in 2021.

3. References to the research

1. Crosby, N. and Hughes, C. (2011) 'The basis of valuations for secured commercial property lending in the UK'. *Journal of European Real Estate Research*, 4 (3). pp. 225–242. doi: https://doi.org/10.1108/17539261111183425
2. Crosby, N., French, N. and Oughton, M. (2000) 'Bank lending valuations on commercial property: Does mortgage lending value add anything to the process?' *Journal of Property Investment and Finance*, 18 (1). pp. 66–83. doi: https://doi.org/10.1108/14635780010316663
3. Baum, A.E. and Crosby, N. (2007) *Property investment appraisal.* 3rd edition. Wiley.
4. Carduso, C., Crosby, N., McTique, J. and Clarke, R. (2017) *Long Term Value Methodologies and Real Estate Lending.* Report. Investment Property Forum/CREFC Europe, London. pp28.
5. Crosby, N., Devaney, S., Lizieri, C., Mansley, M. and Wang, Z. (2020) *Long-Term Value Methodologies in Commercial Real Estate Lending Analysis*. Research Report for the Investment Property Forum

Crosby and Hughes's article [ref 1] was identified by the BoE and industry as the driver of its policy and practice initiatives; it is the first paper to test "through the property cycle" long-term valuation models in the context of bank lending and financial stability issues rather than market values or "under the cycle" lending models. It also creates a new valuation database, collating information from a wide variety of sources, in order to accomplish a 3* criterion. Crosby et al.'s article (2000) [ref 2] is the first academic paper to critique long-term valuation models, and Baum and Crosby's book [ref 3] summarises a significant quantity of underpinning research for the article in ref 1. The reports listed in refs 4 and 5 are from industry-funded research which have had wide dissemination in practice and the latter and is currently under review for a high-quality academic journal. Both of these included some major construction of longer-term value and supply-side databases, and the research report for the *Investment Property Forum* [ref 5] contains some rigorous theoretical and quantitative analysis of different equilibrium value models. In addition to the development and consolidation of some significant new datasets (3*), the adoption of the results by the UK central bank and the current development of a periodic series of indicators for the property industry, are testament to the significance being attached to the findings.

4. Details of the impact

In recognising the influence of CRE valuations on financial stability after the GFC, the impact of Reading research into different valuation models on both UK government and industry policy and practice, and on the wider international community has been significant. The research set out in Section 2 has been used by the UK central bank to underpin its regulatory policy and practice concerning CRE markets, by the IMF in its financial stability assessments at an individual country level, by the RICS for its European Guidance Note on how to undertake long-term bank lending valuations, by the major Global valuation regulatory bodies in drafting evidence to the EU, and by a number of organisations both nationally and internationally concerned with CRE lending and appraisal. Such a global response, underpinned by the research, has been crucial in aiming to avoid a future financial crisis catalysed by CRE-secured lending.

Bank lending on CRE is underpinned by property valuations and CRE lending has been identified as a major causal factor of the GFC. For example, over-lending by banks, secured on valuations of commercial property in the UK, was identified as a major cause by the chair of the Independent Commission for Banking in the UK, who cited the inability of the UK banking system to weather the 2007 CRE market crash. Prior to the GFC, CRE had not featured in global financial stability thinking or debate and did not feature in early responses to the crisis concerned with bank structures and processes.

The impact of the GFC on the world economy was significant. The cost of the GFC to the UK was estimated to be between GBP1,800,000,000,000 and GBP7,400,000,000,000 in lost output, with a direct cost of GBP50,000,000,000 to bail out the banking system (BoE, 2010)). Globally, they estimated lost output at between USD60,000,000,000,000 and USD200,000,000,000,000. The UK economy took until the middle of 2013 to return to its pre-downturn size.

CRE is used to secure lending. The total value of CRE-secured lending peaked at about GBP250,000,000,000 around the GFC. Clarke (2018) identified end-of-cycle losses in the UK CRE market to be nearly GBP20,000,000,000,000, and all of those losses came from loans made in the last two years of the cycle. The Reading research findings that – the modelling identified the downturn over two years before it occurred – are therefore crucial, giving time for regulators and lenders to react to lending levels during the crucial period.

Initial engagement with industry

In 2014, as a result of his long-term engagement with the UK property industry, including membership of the RICS Global Valuation Standards Board, Crosby was invited to a consultation meeting to discuss a draft industry report “A Vision for Real Estate Finance in the UK”. His initial observations were included in the revised final report. This report was the first industry response to the part CRE played in the GFC. One of the recommendations was to develop a long-term valuation (LTV) model, and an industry LTV Working Group was established to take this forward, with Crosby as the academic member. His appointment to this group was endorsed by RICS (the leading professional organisation for valuers), who, describing his “academic rigour … had no hesitation in supporting [Crosby’s] appointment to the working group in 2014” [Section 5, source 5]. The Bank of England was observing this process with representation on the project steering group.

Crosby drove the initial agenda on which models (including the IV model) should be investigated by the working group. Crosby was therefore "influential in driving the … project to a successful conclusion" (RICS Head of Global Valuation and steering group member, testimonial letter) [source 5].

Mitigating risks to UK financial stability through changes in the UK central bank policy and practice

The industry-led LTV project was being monitored closely by the BoE, which regulates around 1,500 banks, building societies, credit unions, insurers and investment firms operating in the UK. In 2015 it appointed Crosby as a consultant to develop the modelling confidentially within the Bank based on his 2011 co-authored paper (Section 3, ref 1). This work was carried out in parallel with the industry LTV project but nuanced in a slightly different direction. The results were first published by the BoE in its Financial Stability Report (FSR) 2015 [source 1], which cited Crosby and Hughes's modelling as the basis for the work. This followed a speech in October 2015 given by the Executive Director for Financial Stability Strategy and Risk (Alex Brazier) on 'Nurturing resilience to the financial cycle', where Crosby was acknowledged for his contribution in preparing the speech [source 2]. The modelling has been cited in each of the biannual FSRs since 2015, thus demonstrating how the research drives the CRE commentary within the FSR.

The same model is also used as the basis for the annual stress-testing of UK banks, specifically the impact of various real estate market crash scenarios on the financial stability of the banking system and its exposure to CRE lending. The testimonial letter, dated September 2019, from the BoE states: "Crosby and Hughes (2011) was influential on Bank thinking as it provided a framework and some quantification of the types of issues that need to be considered to rigorously monitor risks in the CRE market. With [Crosby]'s assistance we built a version of the model … that we have used to help assess risks of overvaluation in the market. The outputs of the model have been shown to and used by the Bank's Financial Policy Committee (FPC) which is the statutory body tasked with overseeing and mitigating risks to financial stability in the UK, which is chaired by the Governor of the Bank of England" [source 3].

The testimonial therefore evidences these two basic uses to which the model is put – assessing where CRE prices appear above or below long-term equilibrium values (over- and under-pricing), and the annual stress tests of the major banks. The model underpins both aspects of this work. In 2016, the BoE stress tests led to RBS, Barclays and Standard Chartered Banks all having to strengthen their capital positions (Bank of England: 'Stress testing the UK banking system: 2016 results'). Subsequent stress tests have not revealed capital inadequacies in any of the regulated banks. These results, which include the modelling of CRE markets, illustrate that the conditions regarding CRE markets before the GFC are not being replicated. This is further evidenced by the CASS Bank Lending Survey, which shows that loan to value ratios have been kept much lower than in previous property market cycles.

The BoE helped guide the most recent industry-funded research [ref 4] and, in August 2019, the preliminary results were disseminated to the Head of Financial Stability and his team at the bank. The BoE testimonial letter confirms that the "Bank is supportive of the follow up work and we intend to update our model to take account of the findings of the research and use it to inform monitoring of risks in the UK CRE market and to calibrate policy tools like the stress test" [source 3].

Improving international financial stability assessments conducted by the IMF

Beyond the UK, the research has underpinned a number of individual country financial stability assessments conducted by the IMF; these include for example Norway, Sweden and the US [source 6]. This followed Crosby's invitation to present his work to the IMF in Washington, DC in December 2018. The IMF had already been replicating the modelling in Crosby and Hughes (2011) and required further insights to develop this framework for their own use. "Your help with explaining your methodology and your subsequent visit to Washington, DC, provided very useful guidance on incorporating commercial real estate valuations in the IMF's surveillance." [source 6].

Changing global real estate industry policy and practice to prevent over-lending on CRE

Research carried out at Reading provides the basis for the first RICS Guidance Note on long-term valuations published in 2018 [source 4] authored by Crosby. RICS are the largest global valuers' institution. The head of Global Valuation at RICS stated: "This guidance has made a significant impact on the transparency of secured lending across Europe and is the document that underpins the application of Mortgage Lending Value for the 35,000 RICS valuation surveyors world-wide. It is particularly relevant for valuers in Europe including the UK, of which there are 20,000" [source 5]. The impact of this Guidance Note and the Reading research on valuation practice is supported by the global valuation consulting firm Jones Lang Lasalle [source 8].

During 2020, Crosby led a coalition of the three leading international valuation standard setting organisations, the International Valuation Standards Committee (IVSC), the European group of valuers (TEGoVA) and the RICS, with encouragement from major lenders such as the German Pfandbrief Banks (VDP) and the Federation of German Mortgage Lending Valuers (HypZert [source7]). The coalition was brought together by Crosby [source 9] to provide advice to the European Banking Authority and the EU on the planned implementation in 2021 of the new long-term valuation definition from the Bank of International Settlements within its Basel III capital requirements regulations. The IVSC's research agenda consultation on LTV is underpinned by Crosby's research [source 10] and the joint regulatory bodies' evidence paper is drafted and planned to be submitted to the EU early in 2021. This work, along with industry plans to develop a bi-annual UK "Mispricing Index", based on the latest Reading and Cambridge work, shows that the significance of the impact, and its reach, is set to continue after 2020.

Summary of the impact

Continued over-lending on CRE puts global financial stability at risk of another GFC. The research has been used extensively to drive the policy response of the BoE to mitigate against this threat, and has been used by other international regulatory bodies to influence their thinking and modelling. Industry has also used the research extensively to drive its own response, where it has underpinned the main Guidance Note for the valuation industry on undertaking long-term valuations for secured lending. The reach of the impact is evidenced by the breadth of the influence internationally. In terms of significance, the value of international asset and lending markets are vast, as are the potential costs of another GFC. In order to avoid a repeat of the cycle of over-lending precipitating banking crises, this work represents the main academic research base underpinning international improvements to CRE financial stability policy and practice.

5. Sources to corroborate the impact

[S1] BoE Financial Stability Report 2015, Issue No 28 Page 32. London. Subsequent FSRs continue to cite Crosby and Hughes (2011) as the basis for their model.

[S2] Named contribution to the drafting of the speech given by Alex Brazier, 'Nurturing resilience to the financial cycle', the Executive Director of the BoE responsible for Financial Stability, at the Mansion House on 19 October 2015.

[S3] Testimonial – Bank of England Commercial Property Financial Stability Section Lead.

[S4] Crosby, N. (2018) *Bank Lending Valuations and Mortgage Lending Value, (1e).* Valuation Guidance Note. RICS Europe: London.

[S5] Testimonial – RICS

[S6] Testimonial – IMF

[S7] Testimonial – HypZert

[S8] Testimonial – Jones Lang LaSalle

[S9] Testimonial from International Valuations Standards Council (IVSC)

[S10] International Valuations Standards Council Agenda Consultation (16 October 2020)