

HOUSING RESEARCH REPORT

Mortgage Downpayment and Borrower Behaviour: Literature Review and Assessment

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Mortgage Downpayment and Borrower Behaviour: Literature Review and Assessment

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Executive Summary

This research was commissioned by CMHC to develop a better understanding concerning recent trends and evolving international practice in mortgage loan downpayment, associated consumer behaviour, and default risk. CMHC is particularly interested in recent trends in the use of borrowed funds as one component of the downpayment and how this might impact mortgage default risk. This review examined the international literature with a focus on English-speaking countries: Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States of America. It is noted that Canadian research is very sparse while the US literature is the most extensive.

Findings

The extensive review of literature uncovered very little discussion specific to the core research question: *whether there is empirical evidence of any association between borrower downpayment sources (and borrowed portion) and subsequent credit performance (default and delinquency).*

There is limited literature explicitly examining the form and source of downpayments and how this relates to risk (Delgadillo 2006; Kelly 2008, Freeman and Harden 2015). There is also empirical analysis on the tangential issue of whether smaller (as distinct from the source of) downpayments contributes to greater risk and a higher rate of delinquency.

It is posited that while minimal initial equity may contribute, its effect is indirect as a cause of default. Default is more often associated with key trigger events such as unemployment, illness, and divorce (which eliminates one of the incomes that initially established the debt to income ratio, Demiroglu 2014).

Kelly et al (2008) reconfirmed that borrowers that provide even a modest downpayment from their own sources (savings) have substantially lower default propensities than do borrowers who access gifts and assistance programs (and thus have little or no skin in the game). Mayer et al (2009) found that the “share of subprime originations with a piggyback second lien at origination increased from 7% in 2003 to 28% in 2006”. Acknowledging and then controlling for the importance of higher loan to value ratios in mortgage default, the authors found that borrowers with second liens defaulted at higher rates without such levered sources.

Implications for Canada

This review has found research that identified recent macro prudential reforms and tightening access to credit and has cautioned that this may be creating a barrier to accessing ownership (Wood et al 2006, Milligan et al 2010, Quercia and Ding 2012, Arregui 2013, Jaffee 2015, Horvath 2016). With Canada already implementing a number of revised and constraining macro-prudential policies, it is important that any effects – intended and unintended be carefully monitored.

The review has not uncovered evidence that constraints on access to financing or more rigorous LTV and equity requirements are generating a new form of consumer behavior in which erstwhile buyers seek to manage larger down payment by borrowing some portion of the required equity. That is not to say that some consumers are not resorting to such practice, but the research literature has neither identified this as an issue nor has it examined any potential impact on risk of loan default.

It is clear from the review of the literature undertaken that the source of down payment – internal savings by the borrower versus borrowed down payment or gifted down payment – is a potentially important variable. In particular, as older households have benefited from significant appreciation and may be more able to provide purchasing support to their children, it is conceivable that gifts or loans from parents may feature more prominently in emerging mortgage underwriting.

Future research

If information on source of downpayment is not collected and explicitly reported by mortgage lenders, further study should include a specialized customized “poll” that surveys a sample of first-time mortgage borrowers to empirically ascertain the percentage of downpayment actually generated by the borrower versus percentage borrowed or gifted by family members.

The research reviewed has shown the interconnectedness of certain of the borrower related variables including income, first-time buyer, stability of employment income, overall indebtedness and FICO/Credit score; versus mortgage related variables including the amount of the downpayment, source of the downpayment, loan to value ratio, interest rates and real estate annual increases. A future research program must try to control for these variables in order to further examine the issue of the size of the downpayment relative to the purchase price and the source of funds for the down payment (from borrower’s own resources versus outside funding) in order to address the issue of how much “skin in the game” is required and how the relative size of this impacts mortgage default during different market cycles (much of the literature reflects a period of rising prices, followed by a collapse).

The literature of practice and behaviour in the Canadian context is very limited. The proliferation of US research is partly a function of the volume of institutions and researchers in that country but also strongly abetted by HUD and others making data files on loan characteristics publicly available for research and analysis. Perhaps this is something that CMHC might consider as a way to stimulate academic research and policy discourse.

Résumé

La SCHL a commandé cette recherche pour mieux comprendre les récentes tendances et l'évolution des pratiques internationales concernant la mise de fonds sur les prêts hypothécaires, les habitudes de consommation qu'on y associe, ainsi que le risque de défaut. La SCHL s'intéresse particulièrement aux récentes tendances d'utilisation d'un emprunt pour constituer la mise de fonds, ainsi qu'à l'incidence éventuelle de cette pratique sur le risque de défaut hypothécaire. La documentation internationale consultée dans le cadre de cette recherche provenait principalement de pays anglophones : Australie, Canada, Irlande, Nouvelle-Zélande, Royaume-Uni et États-Unis. On a constaté que les recherches au Canada sont très peu nombreuses, tandis que c'est aux États-Unis qu'on trouve la documentation la plus complète.

Résultats

En examinant la documentation de fond en comble, on constate qu'on ne répond pas vraiment à la principale question à laquelle les recherches doivent donner suite : *existe-t-il des preuves empiriques d'un lien quelconque entre la source (et le pourcentage) de la mise de fonds versée par l'emprunteur et son risque de crédit (prêt en souffrance et défaut de paiement) par la suite?*

Très peu d'études portent explicitement sur la forme et la source de la mise de fonds, et le lien entre cette dernière et le risque (Delgadillo 2006; Kelly 2008; Freeman et Harden 2015). Il existe par ailleurs des analyses empiriques sur une question accessoire, soit de déterminer si une mise de fonds inférieure (indépendamment de la source) contribue à faire augmenter le risque et le taux de prêts en souffrance.

On constate qu'une mise de fonds minimale peut être un facteur, mais que son effet sur le défaut de paiement est indirect. Celui-ci est plus souvent le résultat de déclencheurs clés, par exemple, une perte d'emploi, une maladie ou un divorce (où l'un des revenus qui ont servi à établir le ratio de la dette au revenu initial est éliminé, Demiroglu 2014).

Kelly et coll. (2008) ont reconfirmé que les emprunteurs qui versent une mise de fonds – aussi modeste soit-elle – provenant de leurs propres économies risquent nettement moins de se retrouver en défaut que les emprunteurs dont la mise de fonds provient d'un don ou d'un programme d'aide (peu ou pas d'intérêts en jeu). Mayer et coll. (2009) ont évalué que « la part de prêts à risque élevé accompagnés d'un prêt de second rang à l'initiation était passée de 7 % en 2003 à 28 % en 2006 ». Après avoir observé puis neutralisé l'importance d'un rapport prêt-valeur élevé dans les défauts hypothécaires, les auteurs ont constaté que les emprunteurs ayant eu recours à un prêt de second rang présentaient un taux de prêts en souffrance supérieur sans ces sources de crédit supplémentaires.

Conséquences pour le Canada

Dans le cadre de cette analyse, on a répertorié des recherches dans lesquelles il était question de tendances récentes comme les réformes macroprudentielles et le resserrement

de l'accès au crédit. Les auteurs préviennent que ces tendances peuvent créer un obstacle à l'accession à la propriété (Wood et coll. 2006, Milligan et coll. 2010, Quercia et Ding 2012, Arregui 2013, Jaffee 2015, Horvath 2016). *Comme le Canada met déjà en place un certain nombre de politiques macroprudentielles révisées et limitatives, il y a lieu de surveiller attentivement toute conséquence, intentionnelle ou non.*

Cette analyse n'a pas permis de recenser des preuves selon lesquelles le resserrement de l'accès au crédit ou les exigences plus strictes en matière de RPV et de mise de fonds modifient le comportement des consommateurs, où les acheteurs autres que les accédants à la propriété cherchent à verser une mise de fonds supérieure en empruntant une partie de la mise de fonds exigée. Cela ne veut pas dire qu'aucun emprunteur n'a recours à cette pratique, mais les études qu'on a examinées n'indiquent pas qu'elle représente un problème, pas plus qu'elle n'influe sur le risque de défaut.

Selon l'examen de la documentation, il est clair que la source de la mise de fonds – les économies personnelles de l'emprunteur plutôt qu'une mise de fonds provenant d'un emprunt ou d'un don – constitue une variable potentiellement importante. D'ailleurs, comme les ménages plus âgés ont vu leur logement s'apprécier considérablement et sont plus en mesure d'aider leurs enfants à faire des achats, il est concevable que les dons ou les prêts des parents soient plus nombreux dans le marché des nouvelles souscriptions d'assurance prêt hypothécaire.

Recherches futures

Si les prêteurs hypothécaires ne recueillent et ne publient pas de données portant explicitement sur la source des mises de fonds, il faudrait à l'avenir que les recherches s'appuient sur un sondage spécial personnalisé auprès d'un échantillon d'emprunteurs qui contractent un premier prêt hypothécaire pour déterminer empiriquement le pourcentage de mise de fonds qui provient véritablement des emprunteurs, par rapport au pourcentage provenant d'un don ou d'un prêt d'un membre de leur famille.

Les recherches examinées montrent l'interdépendance entre certaines variables liées à l'emprunteur, notamment le revenu, le statut d'accédant à la propriété, la stabilité du revenu d'emploi, l'endettement général et le pointage de crédit (FICO), et les variables liées au prêt hypothécaire, notamment le montant et la source de la mise de fonds, le rapport prêt-valeur, et la fluctuation annuelle des taux d'intérêt et de la valeur des biens immobiliers. Il faudra à l'avenir qu'une recherche neutralise ces variables pour qu'on puisse isoler davantage la question du montant de la mise de fonds par rapport au prix d'achat, ainsi que la source de la mise de fonds (économies de l'emprunteur c. financement extérieur) pour déterminer « l'ampleur de l'intérêt à mettre en jeu » et comment l'ampleur relative de cet intérêt agit sur les défauts hypothécaires selon les différents cycles du marché (une bonne partie des études actuelles se fondent sur une période de hausse des prix, suivie d'une baisse rapide).

Les études sur les pratiques et les comportements dans le contexte canadien sont très limitées. La prolifération des études américaines s'explique en partie par le grand nombre d'établissements et de chercheurs qu'on y dénombre, mais aussi beaucoup par le travail

du Département du logement et du développement urbain (HUD) et de ses collaborateurs, qui produisent des données sur les caractéristiques des prêts accessibles au grand public à des fins de recherche et d'analyse. Peut-être que la SCHL pourrait s'aventurer dans ce domaine pour stimuler le discours politique et la recherche dans le milieu universitaire.



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1. Introduction

This research was commissioned by CMHC to develop a better understanding concerning recent trends and evolving international practice in mortgage loan downpayment, associated consumer behaviour, and default risk.

CMHC is particularly interested in recent trends in the use of borrowed funds as one component of the downpayment and how this might impact mortgage default risk. This was designed primarily as a review of international literature to determine the extent to which home purchasers have used borrowed sources as part of their downpayment and to what degree this has increased the risk of default or delinquency.

This review examined the international literature with a focus on English-speaking countries: Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States of America. The review of both academic and institutional literature (focusing on housing finance and economic research) was undertaken to determine the extent and depth of analysis concerning these issues.

Over 100 articles, published since 2000, were initially identified covering various aspects of mortgage lending, affordable ownership, downpayment and default risk. A more detailed review and identification of additional studies, as referenced in the initial articles, was then completed. The review found frequent analysis on the issue of downpayment and often the comingled issues of debt servicing ratios, the loan to value ratio and the consequent default risk, however, references to borrowed funds was more limited. It is also notable that Canadian research is very sparse while the US literature is the most extensive.

Structure of the report

This report first provides a context to help frame comparisons and relevance of any findings across different countries, which have different residential mortgage financing laws, regulations, or practices.

It then explores recent trends in home prices levels of mortgage credit and associated regulatory regimes. In particular, it seeks to identify if the global trend of rising home prices both before and after the 2008 Global Financial Crisis (GFC) has resulted in increasing challenges for first time home buyers. To what degree have regulators in each country reacted in terms of more cautionary macro-prudential policies and practices? And, has the combination of rising prices (especially relative to incomes) and tighter credit regulations (e.g. reduced loan-to-value and increased downpayment requirements) acted to further constrain access to ownership?

The review then explores how consumers and erstwhile homebuyers (especially first-time buyers without accumulated equity from earlier appreciating home values) have reacted: to what extent have they adapted and sought alternate ways to qualify for financing? And, in particular, have they resorted to using borrowed funds to make up some of the larger downpayment?

Finally, the review examines empirical evidence to determine if any association between borrower downpayment sources (and borrowed portion) and subsequent credit performance (default and delinquency).

The report then concludes with some discussion concerning how CMHC might quantitatively implement a study of downpayment and borrower credit behaviour using Canadian data.

Appendix A provides an annotated bibliography of the more limited set of research that specifically discusses source and impact of downpayment.

2. *Setting the context*

The broader context is a global trend of strong economic expansion at the turn of the millennium with strong income growth, and declining interest rates (McCarthy 2013, Badev 2014, Wachter, 2016).

Demographic factors, as well as targeted policies to support and encourage ownership (especially in the-US during the Clinton Administration and then the GW Bush Administration), have also contributed albeit with differing impacts across countries (Andrews and Sanchez 2011). Together these factors created strong consumer demand and continued rise in homeownership rates across the countries reviewed. Between 2004 and 2008 homeownership rates reached a new peak in the US, UK, Ireland, and Canada (OECD 2011, Bouyan 2015). This was followed by a global financial crisis and broad economic correction with dramatic reductions in home prices, accompanied in some countries (US, UK, Ireland) with declining homeownership rates.

From the mid-1990's through 2008, strong economic growth, widespread deregulation of financial markets and increased access to credit, especially prior to 2009, enabled a rise in ownership rates and concurrently caused the upward pressure on home prices (Andrews and Sanchez, 2011, Bream et al 2011 Schembri 2014). Andrews and Sanchez (2011) suggest that relaxation of downpayment constraints on mortgage loans was an abetting factor in the rise in homeownership rates over the prior two decades.

Strong consumer demand, migration, and economic fundamentals, together with an easing trend in mortgage rates also contributed to the upward trend in home prices in all countries through to 2008 (Exhibit 1). The rise was evidently unsustainable and was followed by a decline, especially pronounced in Ireland, although also acute in the UK and US (Fuller 2015, William 2016). Upward strength in home prices was also influenced to varying degrees by migration and muted supply responses, especially in NZ and UK (Reserve Bank NZ 2016).

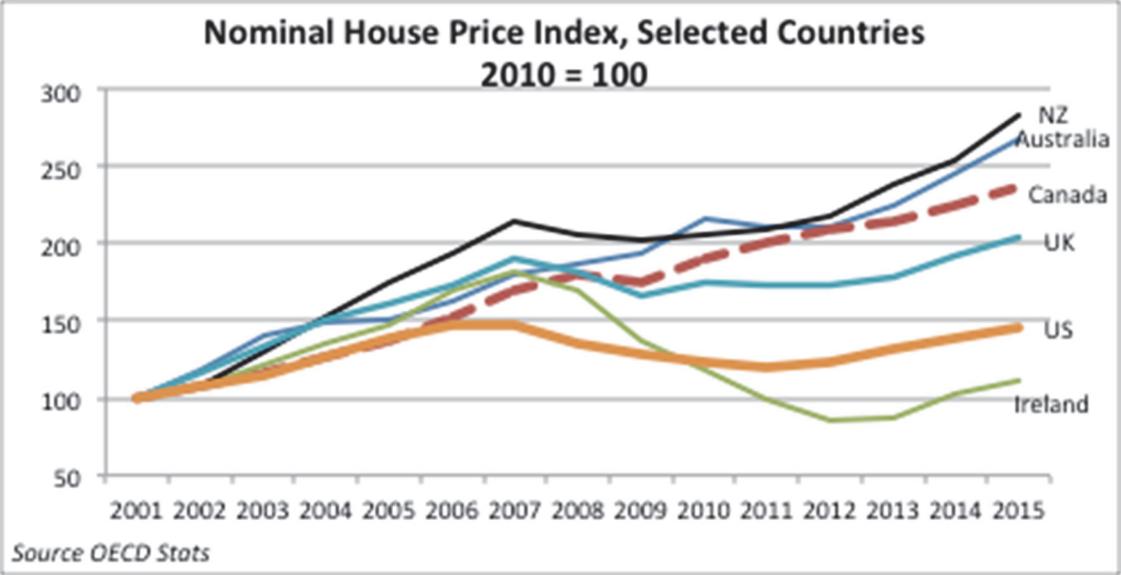


Exhibit 1: Home prices indices, selected countries

Concurrent with rising home values, the relationship between incomes and prices diverged, although this was strongly influenced by interest rate declines that had the effect of increasing leverage potential for each dollar of earnings. Perhaps surprisingly, the largest gap between income growth and home prices was in NZ and Australia, followed by Canada (Exhibit 2). Yet compared to the US, UK, and Ireland, the impact of the GFC and collapse of the real estate market was much less severe in the former group. This suggests that differing regulatory and institutional frameworks may have either exacerbated or protected against systemic impacts in residential real estate and mortgage markets across different countries.

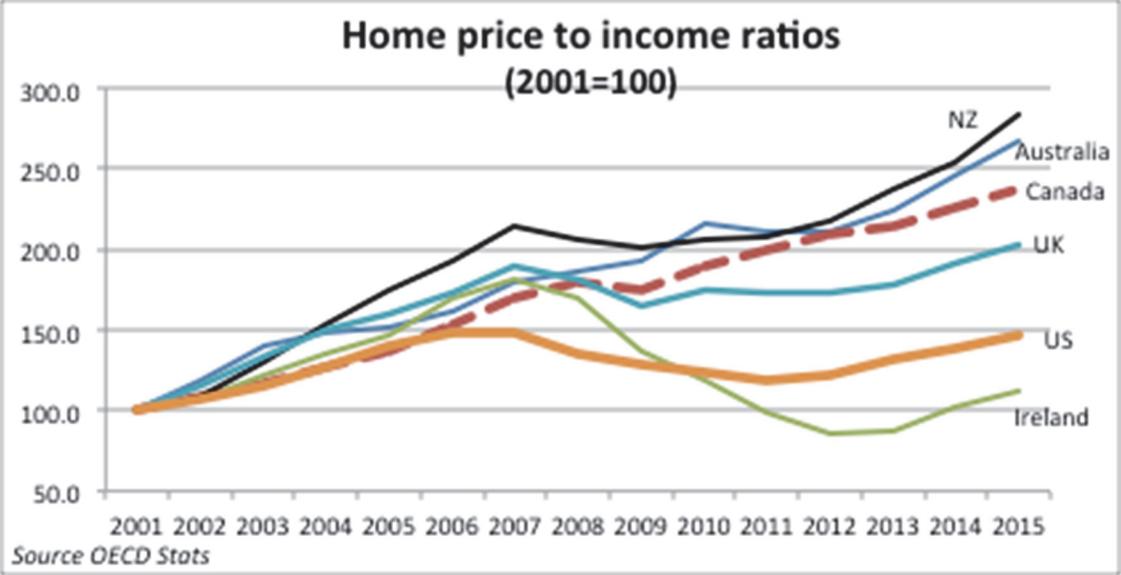


Exhibit 2: Indexed price: income ratio, selected countries

Differing regulatory context

Mortgage originating entities in most countries are typically regulated under the prudential regulation of financial institutions, intended to protect depositor funds as well as to ensure financial soundness of the institution.

The context for mortgage lending varies considerably across countries (Dungey 2015, Fuller 2015). Notably, countries with more regulated housing systems that pursued less aggressive deregulation appear to have weathered the GFC much better (notably Australia Canada and NZ); others that significantly expanded access to credit bore the brunt of the GFC, and arguably, contributed to it (UK, Ireland, and the US) (FSB 2011, Wachter 2016).

For example, Ireland, stimulated and abetted by entry into the EU in 1994 and enabled by a rapidly expanding economy and related migration, saw considerable innovation and expansion in mortgage products and access to credit. This included mortgages with terms longer than the traditional 30 years. Loan-to-value ratios began to increase and borrowers were able to obtain 100 per cent mortgages compared to the previous maximum of 92 percent for most borrowers and lending criteria moved from income multiples to a limit based on the ratio of mortgage service cost to income. In addition, interest only mortgages were introduced (Duffy 2013).

Canada stands out for a statutory based regulation system, under which the Bank Act of Canada regulates all chartered banks while all banks and federally incorporated financial institutions are regulated by the Office of the Superintendent of Financial Institutions (OSFI) that requires mortgage lenders to manage risk by requiring that high ratio loans above 80% loan to value (LTV) secure credit enhancement in the form of mortgage default insurance from third party corporations that are not themselves mortgage lenders. Separately, the National Housing Act and the CMHC Act impose regulations on the federal agency that provides mortgage insurance in response to this requirement. While private mortgage insurers also operate in Canada the lending criteria tend to be set by CMHC practice (Krnzar 2014, Mohsni 2015). Australia similarly requires mortgage insurance for loans exceeding 80% LTV (RBA 2015), but Australia relies entirely on private mortgage insurers.

As residential mortgage originators have expanded from deposit taking institutions, such as the building societies of the UK and Australia, and the US savings and loans entities in the 1980's, the regulatory coverage has been less even. In the US, and partially in the UK, there has been an increasing reliance on mortgage brokers who source funds largely by securitizing and selling mortgage assets, post origination, as distinct from drawing on internal deposit funds as the source of capital and holding loan assets on their own books. Most significantly, these new entities tended not to be as prudently regulated, at least prior to 2010 (Solomon 2016).

The US housing finance system is dominated by a larger secondary market (HUD 2004, Lam 2013). In the US, rather than a single regulator, a number of federal and state institutions have regulatory roles. Former government agencies, now private but implicitly backed by the federal government, called Government Sponsored Enterprises (GSE's), facilitate liquidity in housing finance markets through the purchase and securitization of loans (e.g. Fannie Mae, Freddie Mac). Few lenders in the US hold their mortgage assets in-house; instead individual mortgages are bundled into a security package and sold into the secondary market. Restated, mortgage-

originating institutions do not retain the individual mortgages on their own books. Instead, they originate and sell pursuant to the standards established by the GSEs. Prior to 2010 the GSE's operated under a relatively weak supervisory structure and promulgated low underwriting standards (James, 2010, Schembri, 2014). Demyanyk and Van Hemert (2009) have documented that mortgage underwriting standards declined steadily over many years before the beginning of the crisis.

In the US, underwriting practice is largely influenced and controlled by the GSE's who set the underwriting standards and criteria for the loans they are prepared to purchase. This has created a high degree of standardization (although not necessarily with strong underwriting standards) in single-family loans across the US housing finance system. The US also widely uses mortgage insurance with a large number of private mortgage insurers servicing the requirements for insurance in order to facilitate securitization.

In addition, some lower quality so-called sub-prime loans, called "Alt-A" mortgages, were ineligible for underwriting by the GSE's, usually due to lack of documentation, high debt-to-income, or high LTV (it is these characteristics that typically define Alt-A loans). These too were pooled and privately securitized. Research into the cumulative loss rates found higher default in such Alt-A pools and more so when the loan originators are unaffiliated with the derivative (James 2010).

As part of the ongoing federal policy to encourage and enable access to ownership, the Federal Housing Agency (FHA) focuses on insuring lower value loans directed to low-moderate income households. This has generated a pool of loans characterized by higher risk borrowers, many with minimal equity and down payments (FHA loans prior to 2008 required only 3% down, plus coverage of closing costs estimated at another 2-3%). As noted later, this book of high ratio loans has been a useful source of data of mortgage delinquency and default.

While the US and a number of European countries (especially UK, Ireland) experienced a price boom, and subsequent bust (Exhibit 2), there are substantial differences in how mortgage loans are funded across countries and this is reflected in subsequent default rates (Fuller 2015, Wachter 2016).

In Australia, securitization plays a minimal role in sourcing funds for major banks, there is strong prudential regulation, but no public mortgage insurance scheme and no government deposit guarantee existed prior to the impact of the global financial crisis in 2008–9 (Dungey 2015). The Australian mortgage market (as with the Canadian mortgage market) is highly concentrated, with the four largest banks holding more than 60 percent of owner-occupied loan approvals. Importantly, and somewhat different than Canada, the Australian mortgage market is dominated by variable rate mortgages (VRMs), compared to the dominance of fixed rate 30-year loans in the US.

In Europe, while securitization has expanded, the underlying loans remained as bank held obligations, compared to the US where they were more often offloaded to the capital markets. Moreover, the loan funding mechanism in Europe is primarily through covered bonds, which remain on the balance sheet of the originating institution and the bank retains first loss position

for all default risk. This creates an incentive for strong underwriting practice, especially in contrast to the US (Fuller 2015).

The European story was much more of a bank led expansion of leverage. This was especially true in Ireland, with their post-1994 access to Eurozone banks. Jaffee (2015) also identified a significant difference in mortgage default and foreclosure in Europe compared to the US and attributes this to a substantially stronger system of lending and regulation, compared to the US.

Another factor in the US is the absence, in roughly one-quarter of US states, of recourse in the event of default, a situation dating back to the Great Depression. Unlike other countries, mortgage loans in the US are typically non-recourse. This means that legislation precluded lenders from pursuing defaulted borrowers to recover losses due to foreclosure (Demiroglu 2014). Ghent and Kudlyak (2011) compared default in recourse and non-recourse states and found that default rates on homes values above \$250,000 were 30 per cent to 50 per cent higher than in non-recourse states. However, where assessed values were less than \$200,000 (at origination, in real 2005 terms), they found no difference between the probability of default in recourse and non-recourse states.

To some degree, non-recourse creates a moral hazard for borrowers – they are more immune to the consequences of foreclosure than is the case in other states and countries, where the borrower may be pursued and be liable for losses incurred by lenders (James 2010, Jaffee 2015, Solomon 2016).

With respect to moral hazard and strategic default, a lack of detailed information about borrowers' circumstances (income and assets) at the time of default makes it more difficult to discern the importance of negative equity vs. liquidity factors in the borrower default decision. A number of authors discuss the concept of strategic default, in which borrower weighs a number of factors and consequences (Demiroglu 2014, Solomon 2016). While negative equity is a necessary condition for strategic default, it is not sufficient. Even in non-recourse states, there are frictions that make defaulting less appealing (Guiso et al 2013).

Ireland, New Zealand, and the UK have consumer protection legislation that in some cases extends into the mortgage lending area. They do not have mortgage insurance systems and thus less impetus for standardized regulated underwriting. Their regulation derives mainly from consumer protection of depositors whose capital is used in funding residential mortgages.

An additional indirect influence is the impact of the Bank for International Settlements (BIS) risk weighting framework, which dictates reserve ratios for various financial liabilities. Loans that have guarantees or mortgage default insurance carry lower risk-weight and therefore require institutions to hold lower loan-loss capital reserves, thereby reducing their cost of capital. Thus when available, lenders may prefer loan insurance even when the LTV is not high.

For the most part, in most countries home mortgage underwriting criteria were left to lenders to self-regulate and have evolved mainly as a form of best practice, as distinct from a regulated system, as in Canada. That said, there is a critical influence on such best practice when loans remain on the lender's books (more often the case in the reviewed countries, except the US).

Hindsight being 2020 there has been a flurry of activity to establish stronger “macro prudential” regulation and institutional frameworks, especially across the group of 20 that formed the Financial Stability Board (FSB) (FSB 2011, Brean et al 2011, Bouyan 2015, Keenan 2016, Bank of England 2015, Reserve Bank of NZ).

3. *Impact of recent home price trends on affordability and access*

As home prices evolved on an upward trajectory, both pre GFC and during post-2009 recovery, these had some effect in constraining access to ownership. Prior to the 2008 global financial crisis (GFC) a number of countries (Canada, US, Ireland UK) responded by easing access to credit. This included various measures, such as longer amortization, reduced downpayment, and alternate loan products.

In Ireland, the response to increasing prices and associated increases in down payment was to introduce new mortgage products with longer amortization, higher LTV (including up to 100% loans, and interest only loans (Duffy 2013). These policy changes offset constraints on access to ownership and also relieved the pressure to accumulate a larger downpayment.

Reduced downpayments did, however, contribute to greater risk. One UK study that examined an Irish data set (including pre and post GFC loans) found that default risk is correlated with lending policy: delinquencies increase with higher LTV (reduced downpayment) and fall with original rent coverage (i.e. DCR; Kelly & O’Toole 2015).

Canada initially eased its underwriting requirements in 1998 when Finance Minister Paul Martin reduced the down payment required for a conventional mortgage from 25% to 20% as well as reducing the downpayment for a high ratio mortgage (that required third party insurance against default) from 10% to 5%.

After the election of the new Conservative Government in 2006, Finance Minister Flaherty further eased access to mortgage credit in 2006 by extending the maximum amortization period on insured loans (LTV greater than 80%) to 40 years, and reducing minimum down payments (for qualified borrowers) to zero % (IMF 2014). However, commencing in 2008 due to increased concerns of growing housing risk of overextended homeowners, this easing was gradually reversed with a series of changes increasing minimum downpayment (initially to 5% and subsequently 10% above prescribed price benchmarks and reducing amortization back to maximum 25 years for LTV over 80%.

In Australia, there was also some easing in qualifying for loans. Financial deregulation has resulted in a noticeable increase in high LTV loans. Prior to deregulation, it was typical for lenders to require a 20% deposit; however recent data suggest that the number of loans with LTV in excess of 90% has risen to over 15% of new mortgage originations (RBA 2015). This has acted to partially offset the impact of rising prices on the capacity of first buyers to access ownership, although there has been a longer term (since 1980’s) decline in ownership rates

generally in Australia as well as among young households (under 35). Dungey et al (2011) identify the emergence of a broader range of mortgage products, aimed at sustaining access to marginal borrowers. These include zero payment interest only loans, negative amortization and variable and adjusted rate loans, including those with low introductory teaser rates.

A key feature of the Australian housing market is the significant role of small individual investors that purchase homes as investment properties. Compared to first-time buyers, both these investors and move-up buyers are less constrained by LTV and downpayment requirements, as they tend to have more accumulated equity. The ongoing access and demand from these buyers creates the demand that has sustained house price increases, despite a declining ownership rate.¹

NZ similarly has an active investor market competing for detached homes and this segment has expanded from 28% to 36% of new mortgage lending over the 2014-15 period. Many investor loans are also interest only. In efforts to manage financial system risks, the government of New Zealand, though the Reserve Bank has introduced more restrictive prudential policies with a focus on the largest city Auckland, which has experienced the most acute price rise. These limit the percentage of high ratio loans that each lender can originate as well as increasing the LTV ratio (Reserve Bank NZ 2016).

In the US as prices rose through the 1990's, low-moderate income families faced a challenge in accessing ownership, with ability to accumulate a sufficient downpayment identified as a key constraint (Quercia et al 2003; Herbert 2007). Quercia et al (2003) examined the impact of the downpayment constraint and estimated that reducing down payment requirements could dramatically increase access and help to increase the ownership rate. Fully eliminating the downpayment was found to potentially raise ownership rates by 7-9 percentage points. This research supported the expansion of various HUD programs to facilitate access to ownership via downpayment assistance programs (DAP).

Prior research has documented the correlation between income, capacity to save and access to ownership. Herbert and Tsen (2007) found that the introduction of low down payment high ratio loans contributed significantly to the increasing ownership rate, offsetting the absence of wealth and minimal savings among these marginal buyers. Their empirical analysis explored the efficacy of DAP in increasing access to ownership; it did not explore the risk and any subsequent delinquency or default in this pool of loans.

It should be noted that default and foreclosure were not necessarily a consequence of extending credit to low-income borrowers. Mortgage failure is more a consequence of the agency originating and processing the loan. Failures were much more strongly associated with brokers. Mortgage failure was lower for loans processed and approved by local depository institutions with strong local knowledge and capacity to collect and assess more detailed information, including soft information (Ergungor 2014).

¹ Recognizing the impact of investors and associated risks to the housing and finance markets, the Australian Prudential Regulation Authority has imposed limits on the volume and share of investor mortgages. Once such loans grow beyond 10% the lender is subject to increased supervision.

The acute nature of the mortgage market collapse in the US in 2009 attracted the attention of a large group of academic researchers that generated considerable examination in efforts to understand and explain the reasons for this system-wide failure, as well as the effectiveness of potential prudential reforms intended to avoid a recurrence of those circumstances (Demiroglu 2014, Jaffee 2015, Palmer 2015, Wachter 2016). As noted in the context section, the practice of non-recourse loans has emerged as one of the areas for examination in the US, alongside discussion of LTV limits on new mortgage loans.

New regulations were implemented in the US in 2008 to curtail the practice of seller-funded purchase assistance. This typically involved a non-profit intermediary providing assistance, by seeking a contribution from the seller (typically added to the price). This resulted in little or no direct contribution from the borrower. In an analysis of so-called seller-funded assistance, Kelly et al (2008) identified a relatively higher rate of delinquency and default compared to other FHA loans for comparable borrowers.

Broad distress and failures in financial and capital markets initiated a new series of regulatory reforms in the US (Quercia and Ding 2012, Freeman and Harden 2015; Goodhart 2015). These commenced with revisions to the Truth in Lending rules that imposed much more stringent requirements to obtain information and validation on borrowers and their capacity to carry debt. These regulations were further strengthened under Dodd –Frank Act in 2010 with the creation of a new Consumer Financial Protection Bureau.

Additional measures were introduced by the Obama Administration to expedite mortgage loan modification and refinancing as an alternative to foreclosure. These latter measures have however not been as extensively utilized as anticipated, reflecting a reluctance among lenders. GOA research suggests lender reluctance was premised on three factors: (1) many owners remain current, despite negative equity, (2) complex loan ownership complicates the modification and refinancing process and (3) a significant number of borrowers default even after modifications (Jaffee 2015, GAO 2005).

Compared to Australia, NZ, and Canada the US market has been much slower to recover and there has not until recently been a sustained recovery in home prices. In the context of slow recovery and weak new demand, the impact of more stringent lending and underwriting regulations was minimal. However, the economy has recovered and is now generating new demand with an increase in both housing starts and prices. This demand now faces a more rigorous regulated home mortgage finance system, with broad Macro Prudential policies enacted under the Dodd-Frank Act in 2010 (Goodhart 2015).

A key focus on this new regulatory regime is to manage system-wide risk among participating financial institutions. The regulatory framework and macro prudential policies accommodate expansion by elevating levels of supervision and by placing limits on the firm's capital. As the market recovers and values increase, institutions are able to increase mortgage lending while sustaining imposed capital ratios. It is not yet clear how much of this regulatory framework may be rolled back under the new US administration, but early pronouncements suggest that it will be reviewed.

4. Borrower downpayment sources and default risk

The primary research question in this study is whether there is empirical evidence of any association between borrower downpayment sources (and borrowed portion) and subsequent credit performance (default and delinquency).

The extensive review of literature uncovered very little discussion specific to this core research question. There is limited literature explicitly examining the form and source of downpayments and how this relates to risk (Delgadillo 2006; Kelly 2008, Freeman and Harden 2015). However, this does not explicitly distinguish when the borrower has used borrowed funds as distinct from gifts or seller-funded assistance programs. Nor does the literature examine the extent to which borrowers have resorted to using borrowed funds as a way to offset or satisfy more recent requirements for larger down payments and lower LTV conditions.

It appears that lending policies initially eased (prior to 2009), and this acted to offset any potential impact of larger downpayments associated with higher prices. Post-2009, there has been increasing attention given to managing risks and macro prudential policies, partly in response to the GFC but also as prices in many countries have returned to an upward trajectory. These are now raising concerns about potential price bubbles, corrections, and risks both to the housing system and the broader financial system in each country.

The experience prior to the GFC was largely one of deregulation and easing of credit conditions. This included higher LTV (so reduced down payment). As such, newer buyers have less equity and “skin in the game” than earlier cohorts of first-time buyers (Kelly 2008, James 2010). In addition to the characteristics of borrowers, the practice in the US of securitizing loans via MBS have also been an important contributor to mortgage default as the loan originator also has less skin in the game (James 2010, Ergungor 2014).

4.1. Impact of small down payment and high LTV

There is empirical analysis on the tangential issue of whether smaller (as distinct from the source of) downpayments contributes to greater risk and a higher rate of delinquency.

Kelly and O’Toole (2016) review the historical body of literature that provides longstanding support and evidence of higher default and delinquency associated with lower levels of equity. Prior literature distinguishes between two types of equity: initial equity (down payment) and contemporaneous equity, which reflects the effect of ongoing appreciation of the home and growth in equity (Kelly et al 2008).

The trajectory of price appreciation across the selected countries both prior to the GFC and to varying degrees during the subsequent period (more so in Australia, Canada, NZ, and since 2013 recovery evident in Ireland, UK, and US) suggest that over time price appreciation has contributed to growing contemporaneous equity, creating a cushion against modest price corrections.

Palmer (2015) supports this notion, drawing on an empirical study to show that later cohorts of sub-prime borrowers with loans originating in 2006-2007 defaulted at higher rates than those originated in 2003-04. In part, this is attributed to deterioration in underwriting and lending standards, but it also reflects the positive effects of earlier appreciation and shallower levels of negative equity among earlier sub-prime borrowers.

4.2. Multiple factors and trigger events

It is further posited that while minimal initial equity may contribute, its effect is indirect as a cause of default. Default is more often associated with key trigger events such as unemployment, illness, and divorce (which eliminates one of the incomes that initially established the debt to income ratio, Demiroglu 2014).

The literature suggests that households better able to save and accumulate a down payment by increasing their labour earnings or more effectively saving may be better positioned or more capable of withstanding an unforeseen or trigger event. Thus, the association between initial down payment and default. For this reason, along with downpayment amounts, credit scores have been identified as one of the key drivers of default risk (Lam 2013).

While there is a strong evidence base supporting the conventional wisdom that associate high LTV to higher default, this is not always the case. Harrison et al 2004 examined consumer behavior to explore whether higher risk consumers migrate to higher ratio loans. They found a process of self-selection related more to the cost of default. When default costs are high (including for example when in recourse states), lower risk borrowers tend to self-select into high LTV, and conversely higher risk less qualified buyers select lower LTV. However, when default costs are low, riskier borrower tend to self-select into high LTV. The key finding from Harrison et al (2004) is that perceived default cost is a more important factor than LTV alone.

4.3. Effects of downpayment assistance

Source of down payment is related to default risk; especially the difference between requiring the borrower to provide self-generated equity versus accessing third party sources (relatives, down payment assistance, seller take-back, or secondary loans).

The need to accumulate a substantial down payment has the effect of influencing consumer earnings and saving behavior, with enduring effects that are absent for those for whom access to credit is made easier by flexible equity terms. Kelly et al (2008) reporting on earlier research drawing on a portfolio of 2,000 FHA loans compared unassisted loans with loans in which the borrower was assisted with the downpayment. They found that seller-assisted loans had double the 90-day delinquency rate compared to unassisted loans.

Research from 2003 (Reznick, Fedder and Silverman, 2003, cited in Kelly 2008) examined a broad range of loans where the borrower was assisted and also revealed higher delinquencies across various forms of down payment assistance. This research has been challenged for not differentiating other important factors, such as LTV and lack of data on borrower credit scores.

Arrears, delinquencies, and defaults may be associated more strongly with the capacity to maintain mortgage payments in the context of weakening employment and income. In the US, the default factors also included unique payment structure with variable rate mortgages starting out with a low “teaser rate” which subsequently increased to double or triple monthly payments, a drastic jump in payments at a time of economic weakness (employment and income losses).

Empirical research in the US has examined a large dataset of FHA and GSE loans that were originated between 1995 and 2008 to explore the relationship between increasing LTV (smaller downpayment) and both delinquency rates (90 days) and foreclosure (FHA 2013). This research did identify a correlation between higher LTV and higher delinquency and default rates. However, the relationship was non-linear and not consistent across data sets. It also did not distinguish based on the source of downpayment.

In the FHA data segment (which tends to target lower income borrowers) delinquencies and foreclosures did rise, and rose more steeply, once original LTV moved up from 90%; however, the slope of the curve declined as LTVs exceeded 95%. Another important finding was that the relationship between foreclosure and LTV varies by the borrower’s original credit score (FICO). As LTV increased from 80% to 90% foreclosure rates for those with low FICO scores (620) rose by 4.46 percentage points; meanwhile, borrowers with stronger FICO (700) rose by only 2.23 percentage points.

These research findings suggest that credit worthiness as reflected in FICO scores was an important factor, possibly moreso than higher LTV or source of downpayment (Harrison et al 2004, Kelly et al 2008, Lam 2013). A counter view is presented by Mayer et al 2009, who noted that reported credit scores were stable from 2003 to 2007, which suggests that deterioration in credit scores was not a factor in the rise in defaults.

Others argue that low or no downpayment loans in the US are also influenced by the non-recourse nature of the loan (and associated state regulation related to foreclosure). It is the two factors acting together that may have contributed to the housing boom and bust of the early millennium. Solomon (2016) asserts that speculative and poorly qualified borrowers could externalize the risk of default to third parties, such as investors in MBS and more broadly the taxpayer (to the extent that government stepped in to save the financial sector).

Effects of negative equity and strategic default

Defaults in the US were also abetted by system issues of negative equity brought about by an initial round of foreclosures, which flooded the market and thereby exacerbated reduction in values.

Examining a pool of adjustable rate mortgages (ARMs) over a period of declining rates, Fuster (2015) found that threshold levels at which negative equity causes default is highly sensitive to the size of the monthly payment. Fuster’s findings are consistent with other research that discussed strategic default, wherein borrowers evaluate a range of factors including the degree of negative equity, capacity to sustain payments, options to reschedule and reduce payments and expectations about price recovery. (Demiroglu 2014; Fuster 2015; Guiso, Sapienza, and Zingales, 2013).

Bhutto, Dokka and Shan (2010) analyzed the impact of negative equity on mortgage default to ascertain the relationship, if any, between negative equity and a borrower's decision to default. They posited two important findings. First, the median borrower did not default until the equity declined to -62% equity in the home. Secondly, they found that 80% of the defaults in their sample were due to *both* negative equity and income shocks, thereby validating two theories of mortgage default: "strategic default" (due to negative equity) and "double trigger" (negative equity and events such as loss of job). They conclude that the high rate of negative equity *without default* suggests there are barriers or transaction costs that mitigate against "strategic default" by the borrower calculating the self-interest in defaulting.

In a recent article, Corbae and Quintin (2015) developed a sophisticated model to explain the mortgage market in the US in the last 15 years. They found that from 1998 to 2006, when mortgage approval standards were liberalized, average home prices increased substantially and home ownership rates increased in the US. They found that the home price collapse accounted for 275% increase in mortgage default rates with the relaxed or liberalized approval standards responsible for 62% of the increase in foreclosures. Most importantly, they found that the increased use of high-leverage mortgages brought about due to liberalized approval standards, magnified the impact of the housing price collapse for two reasons. First, more borrowers found themselves "underwater" with negative equity than before due to increased leverage and decreased downpayment equity. Second, reduced approval standards permitted borrowers with lower income and assets to enter the mortgage market and these borrowers are inherently more risky. This finding is consistent with earlier observations concerning the value of FICO as a qualifying criteria.

Demiroglu (2014) utilized a hazard model with data from 2005 to 2008 to estimate the difference in default likelihood of mortgages for various levels of home equity in states with strong versus weak borrower protection (resource vs. non-recourse). He found that the impact of state foreclosure laws increase with the amount of negative equity. Furthermore, he found that during the financial crisis defaults occurred at relatively low levels of negative equity. In part, this may be a consequence of rapidly tightening access to credit and inability to refinance. But it also reflects the circumstances and capacity of the borrower to sustain payments. These findings suggest that in states with creditor-friendly foreclosure laws, borrowers are more likely to use alternative protective mechanisms such as personal bankruptcy to shield their homes and other personal assets from possible seizure by the lenders (Demiroglu 2014).

Homeowners in financial distress can use bankruptcy to avoid defaulting on their mortgages, by setting aside other financial obligations. Li et al (2011) examined 2005 bankruptcy reform that made bankruptcy less favorable to homeowners. They argue that this caused mortgage defaults to rise. Li et al (2011) determined that the reform caused prime and subprime mortgage default rates to rise by 23% and 14%, respectively.

Overall, these results (Li et al 2011, Demiroglu 2014) suggest that default costs are an important factor affecting whether borrowers will exercise their default option.

In Ireland, citing Foote, Gerardi, and Willen (2008), Duffy 2013 contends that negative equity does not automatically lead to default, especially if the owners can still afford the mortgage payment. It is only when the owner suffers from employment or income loss (including due to

family separation) that this tends to translate into default. It is the shock to mortgage affordability measured by the debt service ratio (DSR) compared to the DSR at loan origination that is the more important factor (Kelly et al 2016). Negative equity may also have other broader economy effects, such as reduced consumer spending as well as constrained labour market mobility (Duffy 2013).

4.4. *Minimal discourse outside of the US*

Despite the dramatic collapse in the residential mortgage markets in Ireland and UK, and new regulatory regimes that have imposed lower LTV and larger downpayment requirements, there is very little discussion of borrowed funds and only minimal loan default (repossessions in UK jargon). There is discussion on repossessions as a result of economic contraction and employment loss. Notably, however, this did not translate in the UK and Ireland into high levels of loan default and repossessions.

Many households experienced negative equity, however direct intervention by government with income support to mortgagors and lenient re-amortization and rescheduling by lenders (forbearance) abetted by the BoE low interest rate monetary policy helped to minimize foreclosures and defaults (Aron and Muellbauer 2016, Waldron and Declan 2016). Compared to the earlier UK experience in 1990-92 when mortgages twelve months in arrears exceeded 3.5% and repossessions were 0.8%; following the GFC twelve-month arrears peaked at 1.5% in 2009 and repossessions at 0.5% (Duffy 2013, Aron and Muellbauer 2016). These authors also observe that in comparison to an extensive empirical literature in the US, the set of empirical studies on defaults in the UK is strikingly limited.

A notable feature of loan default is the role played by investor's loans, especially in NZ, Australia, Ireland, and the UK. The RBNZ (2016) reports that studies of the post-GFC experiences of Ireland (Kelly (2014) and the UK (McCann (2014) have found significantly higher default rates on loans to investors than owner-occupiers. This differential remains significant even after controlling for other relevant characteristics, such as LVR, loan vintage, and regional unemployment. The Central Bank of Ireland (2014) and the UK Treasury (HMT (2015)) have drawn the same conclusion from these studies. RBNZ (2016) also cite studies that found sharply higher default rates on commercial properties, once these fall into negative equity (a phenomenon that is less prevalent among home occupiers).

5. *Borrower downpayment sources and default risk*

This section focuses more narrowly on research work that more directly addressed the primary research question concerning empirical evidence of any association between borrower downpayment sources (and borrowed portion) and subsequent credit performance (default and delinquency).

5.1. To what extent does literature distinguish different forms and sources of down payment?

The previously reviewed literature presents strong evidence that lower levels of borrower equity (especially initial equity) are a key determinant of mortgage default (Brean et al 2011, Lam 2013, Campbell 2014). In addition, the current research seeks to explore whether and how the form and nature of this equity affects the broader relationship. And, in particular, whether borrowed funds have any significant impact on both in terms of frequency, whether recent regulatory reform and price rises are causing buyers to now seek borrowed funds in order to accumulate a sufficient down payment.

Kelly (2006) identifies sources such as gifts or loans from parent or relative, gifts from employer or union and various forms of downpayment assistance from non-profits often delivering federal programs (such as Nehemiah or AmeriDream), generally referred to as seller-funded assistance. He also noted a trend of increasing use of gift and program assistance in FHA loans over the 1999-2004 period (Kelly 2006).

Subsequent research (Kelly et al 2008) further examined the risk and consequences of minimal or zero downpayment loans, which proliferated prior to 2008 under an array of programs as a way to enable low-moderate income earners to access ownership (a federal policy priority). Focusing primarily on a data set of loans that involved seller-funded downpayment assistance Kelly et al (2008) reconfirmed that borrowers that provide even a modest downpayment from their own sources (savings) have substantially lower default propensities than do borrowers who access gifts and assistance programs (and thus have little or no skin in the game). Delgadillo (2006) explores and notes sources such as gifts, but her empirical and statistical analysis did not specify source, only size of downpayment as an independent variable

Examining multiple possible explanations for the rise in mortgage defaults Mayer et al (2009) examined “combined loan-to-value ratios and second liens”. Although never using the phrase, “source of downpayment”, the authors were referring to the apparent practice of borrowing the downpayment and financing with a second lien on the home. They found that the “share of subprime originations with a piggyback second lien at origination increased from 7% in 2003 to 28% in 2006”. Acknowledging and then controlling for the importance of higher loan to value ratios in mortgage default, the authors found that borrowers with second liens defaulted at higher rates without such levered sources.

The Mayer article is important if only for this one segment for it expressly addresses the issue of the impact of borrowed downpayments on mortgage default rates, showing there is a correlation.

It is important in the context of our current research issue to distinguish the source of downpayment and size of any indirect assistance relative to borrowers own contribution. It is not simply that gifted funds were used, it is the fact that as a result, the borrower has minimal direct equity in the loan (and less skin in the game).

5.2. *Is there any analysis of risk (default arrears etc.) associated with non-direct sources?*

One piece of research that directly addressed this issue was undertaken by Austin Kelly, then a Director with the US Federal Housing Finance Agency. In his Skin in the Game articles (2006, 2008) he showed the clear causal relationship between a lack of downpayment from one's own resources and increased delinquency. In his words, "borrowers who provide downpayments from their own resources have significantly lower default propensities than do borrowers whose downpayments come from relatives, government agencies or nonprofits". See Exhibit 3 below, extracted from Kelly (2006).

Kelly reports on a detailed analysis of a pool of 5,000 FHA loans which originated between 1999 and 2002 in which gifted downpayment (parental as well as program-related or non-profit) were used. This data set was augmented by a further 1,000 FHA loans from three larger metropolitan areas over the same period in which there was a high proportion of seller-funded assistance. All were high ratio (above 95% LTV), so with the gift, the purchaser's own contribution was typically less than 2%.

- When the dependent variable was 90 day delinquency, the GIFT variable indicated that serious delinquencies were about 16% to 19% higher for loans with gift down payments, relative to comparable loans with down payments from the buyers' own funds.
- When a default and insurance claim were the dependent variable the results were similar: gift assistance raising claims by 38% to 41%, and DAP adding a further 16% to 27%. These findings are presented in the graph from Kelly's report, reproduced below (Exhibit 3).

This research confirmed that borrowers with no cash invested in the transaction have higher credit risk than comparable buyers who bring cash to the transaction.

Delinquency - National Sample

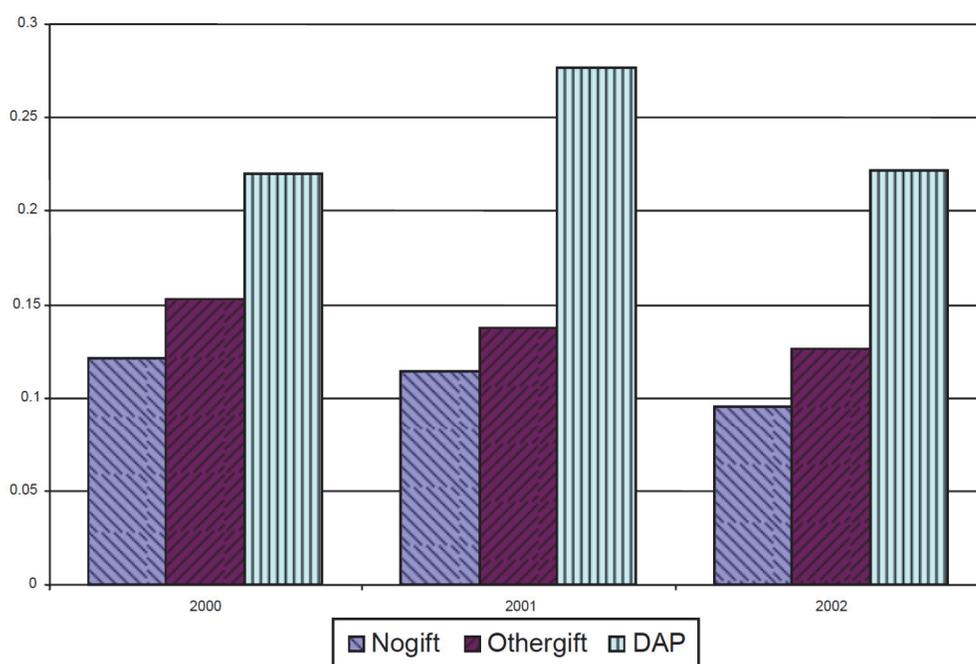


Exhibit 3: From Austin Kelly (2006), Gifts, Downpayments and Mortgage Default, p.26

Freeman and Harden (2015) were skeptical about the findings from the GAO research as reported in Kelly (2006, 2008), mainly due to the heavy inclusion of seller-funded assistance, as distinct from a broader range of downpayment assistance.

To address this deficiency they examined a longitudinal dataset from the Community Advantage Panel Study (CAPS), which included almost 50,000 loans made between 1998 and 2009. Their research identified five forms of downpayment assistance: (1) assistance of any kind, (2) assistance from a family member, (3) a second mortgage, (4) a community grant, or (5) assistance from a seller or real estate agent (Smith 2016). These were each set as the dependent variable in five separate equations with an array of independent variables including socio-economic and demographic factors, credit scores, and debt to income ratios. They found that the CAP loans outperformed conventional loans issued to comparable borrowers during the GFC related housing crisis in the US. As others (Quercia et al 2003, Herbert and Tsen 2007) have observed, this may in part be a consequence of pro-active pre and post purchase financial counseling, often a feature under assisted ownership programs that has resulted in much lower delinquency.

Freeman and Harden (2015) concluded: “The most important finding from our research is the lack of a statistical and substantive difference in mortgage performance between those who do and those who do not use any form of downpayment assistance.” This is in contrast to Kelly (2006, 2008), who argued that a lack of skin in the game contributes to higher default.

5.3. Potential impact of recent macro prudential policy changes

Quercia and Ding (2012) at the Center for Responsible Lending at UNC provide compelling empirical research that shows the significant impact of various regulatory changes: increasing the amount of downpayment; higher credit score or debt serving; and adjusting the loan to value ratio. In a series of graphs from their research, they demonstrated the significant reduction in access to homeownership as a result of more stringent underwriting and macro prudential policy.

While they concluded that constraining access could reduce access to ownership, Quercia and Ding (2012) did not differentiate the source of downpayment, or use of borrowed funds as part of the purchaser equity contribution. However, by inference, restricting use of borrowed or gifted funds may have a similar effect as these other measures.

Their analysis included comparisons of default rates by type of loan and year of origination. These included loans with a minimal downpayment. Including FHA, Alt-A (lack documentation), prime and subprime as well as loans which for their research were retroactively categorized as “QM loans”. The Dodd Frank bill and the Consumer Protection Act of 2010 established the notion of a “qualified mortgage” (QM). The Consumer Financial Protection Bureau (CFPB) was then given the mandate to provide a definition of QM which was developed in 2013 and became operational in 2014.

(Default Rate: Percent of Loans 90+ Delinquent, in the Foreclosure Process, or Foreclosed Upon by February 2011, 2000 – 2008 Originations, All Loans²⁰)

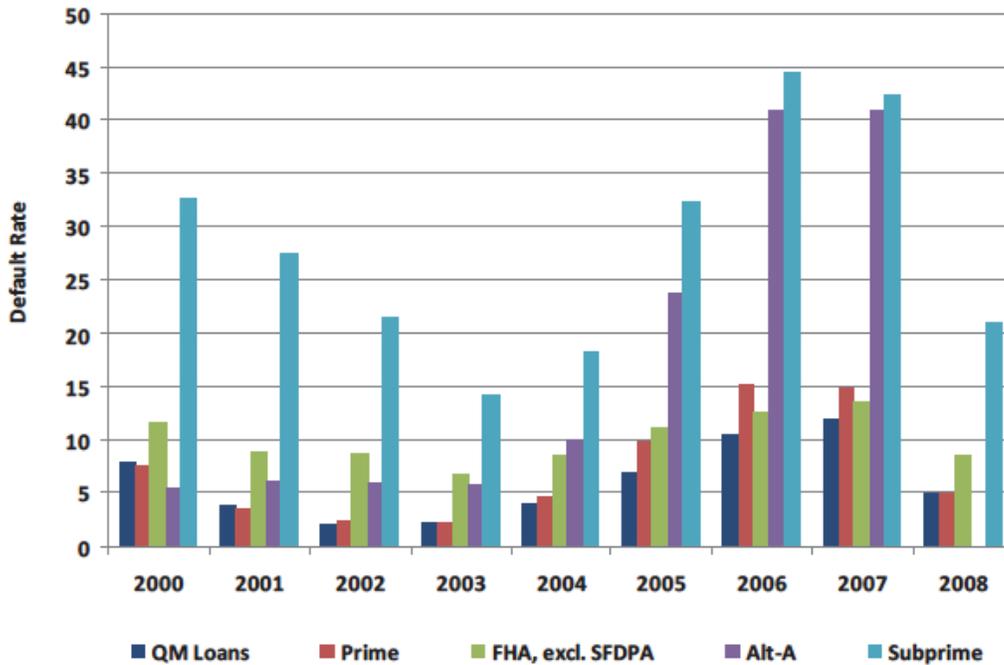


Exhibit 4: Default rate by loan type and year of origination (from Quercia and Ding, 2012)
 (Percent of Loans 90+ Days Delinquent, in the Foreclosure Process, or Foreclosed upon by February 2011, 2000 – 2008 Originations)

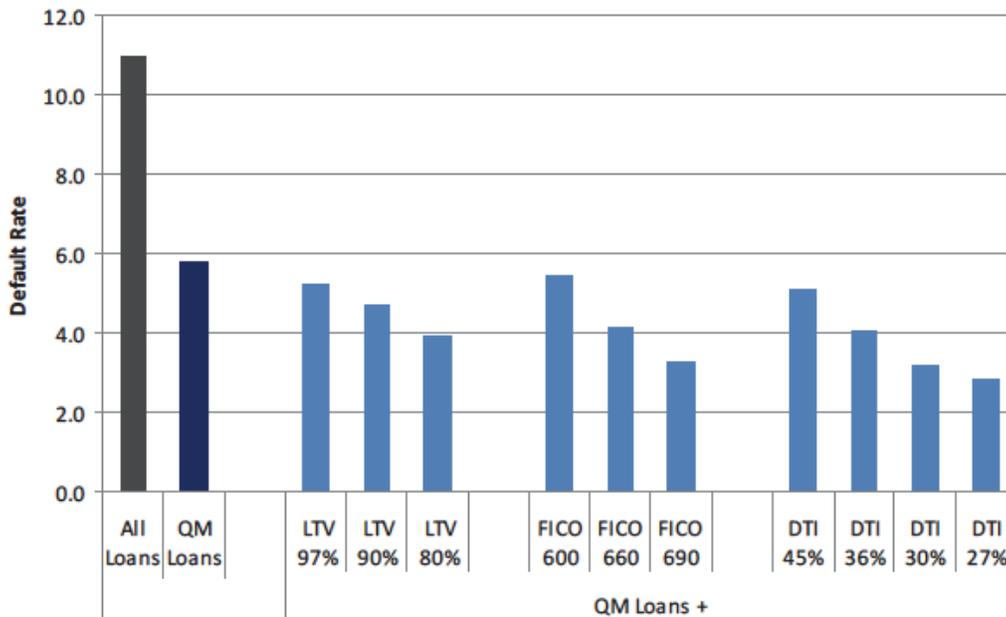


Exhibit 5: Effect of alternative definitions on the default rate (Quercia and Ding 2012)

The definition includes the following:

- No excessive upfront points and fees no greater than 3%
- No toxic loan features including banning interest only loans, no negative amortization loans, no mortgages with amortization greater than 30 years, no balloon mortgages
- Limits on debt to income ratios allowing no greater than 43%
- Mortgage Originators must retain a minimum of 5% “skin in the game” in securitized packages.

As shown in Exhibit 4, the application of QM standard to loans written in 2002-2008 produces startling reductions in delinquency.

Exhibit 5 then shows what would happen if the QM definition (i.e. standards) were tightened further.

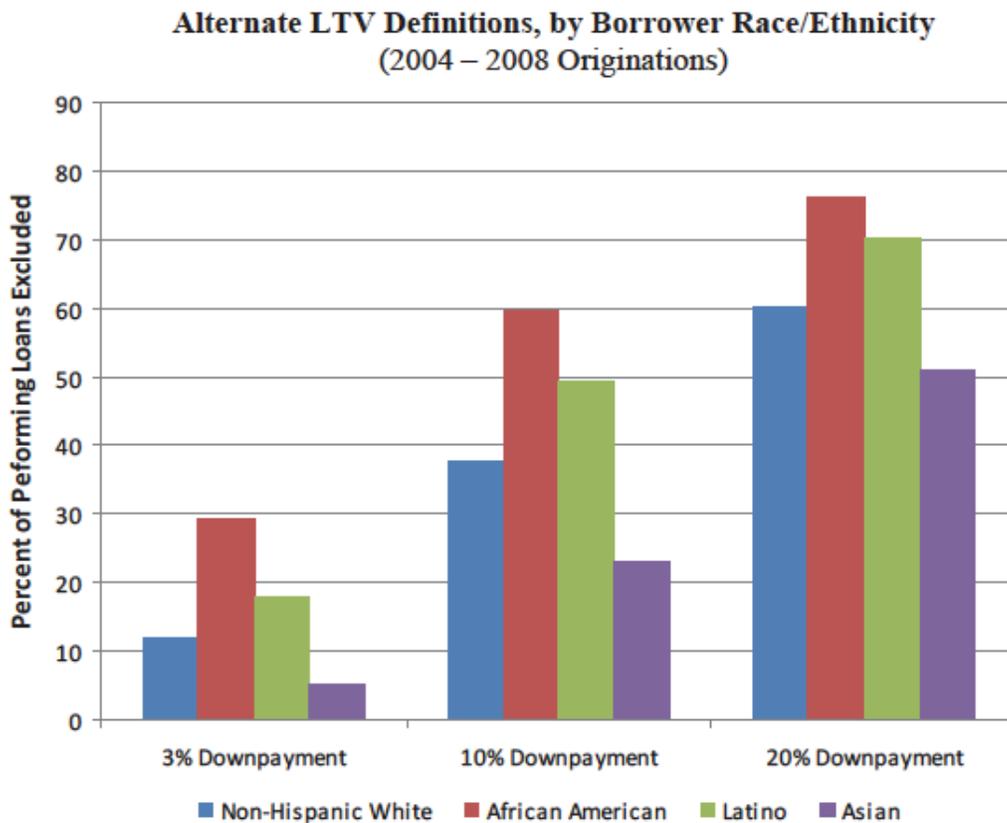


Exhibit 6: Percentage of performing loans excluded from qualifying mortgage market (Quercia and Ding, 2012)

The Center for Responsible Lending makes very clear there is a price to be paid for increasing restrictions concerning LTV ratios or credit scores or income to debt capacity. They acknowledge that mortgage delinquency ratios decline but at a cost of excluding minorities from the mortgage market. Indeed, the Center argues that the costs of exclusion outweigh the benefits of reduced delinquencies and foreclosures.

The numbers of minorities excluded from tightening mortgage underwriting standards are captured in Exhibit 6. These empirical graphs reveal difficult policy choices between increasing

mortgage underwriting standards at the price of decreasing access by minorities to the mortgage market. This dilemma has been characterized as the “efficiency versus equity tradeoff”.

6. Summary observations

With Canada already implementing a number of revised and constraining macro-prudential policies, it is important that any effects – intended and unintended be carefully monitored.

This review has found research that identified recent macro prudential reforms and tightening access to credit and has cautioned that this may be creating a barrier to accessing ownership (Wood et al 2006, Milligan et al 2010, Quercia and Ding 2012, Arregui 2013, Jaffee 2015, Horvath 2016).

The review has however not uncovered evidence that constraints on access to financing or more rigorous LTV and equity requirements are generating a new form of consumer behavior in which erstwhile buyers seek to manage larger down payment by borrowing some portion of the required equity. That is not to say that some consumers are not resorting to such practice, but the research literature has neither identified this as an issue nor has it examined any potential impact on risk of loan default.

It is unclear whether as prices have risen and accordingly larger savings for downpayment are required that homebuyers have augmented savings or gifts from family with borrowed funds as one element of the downpayment.

However, it is clear from the review of the literature undertaken that the source of down payment – internal savings by the borrower versus borrowed down payment or gifted down payment – is a potentially important variable. In particular, as older households have benefited from significant appreciation and may be more able to provide purchasing support to their children, it is conceivable that gifts or loans from parents may feature more prominently in emerging mortgage underwriting.

If this information is not collected by mortgage lenders, further study should include a specialized customized “poll” that surveys a sample of first-time mortgage borrowers to empirically ascertain the percentage of downpayment actually generated by the borrower versus percentage borrowed or gifted by family members.

Such data could be readily collected for CMHC insured high ratio loans and the Mortgage Insurance Portfolio likely has data to undertake such an assessment. This empirical data is necessary to guide possible future CMHC policy concerning the source of the downpayment for first-time homebuyers.

In a consideration for future research, one comprehensive model was provided by Delgadillo and Gallagher (2006) as follows. It is useful in separating borrower-related variables from mortgage-related variables.

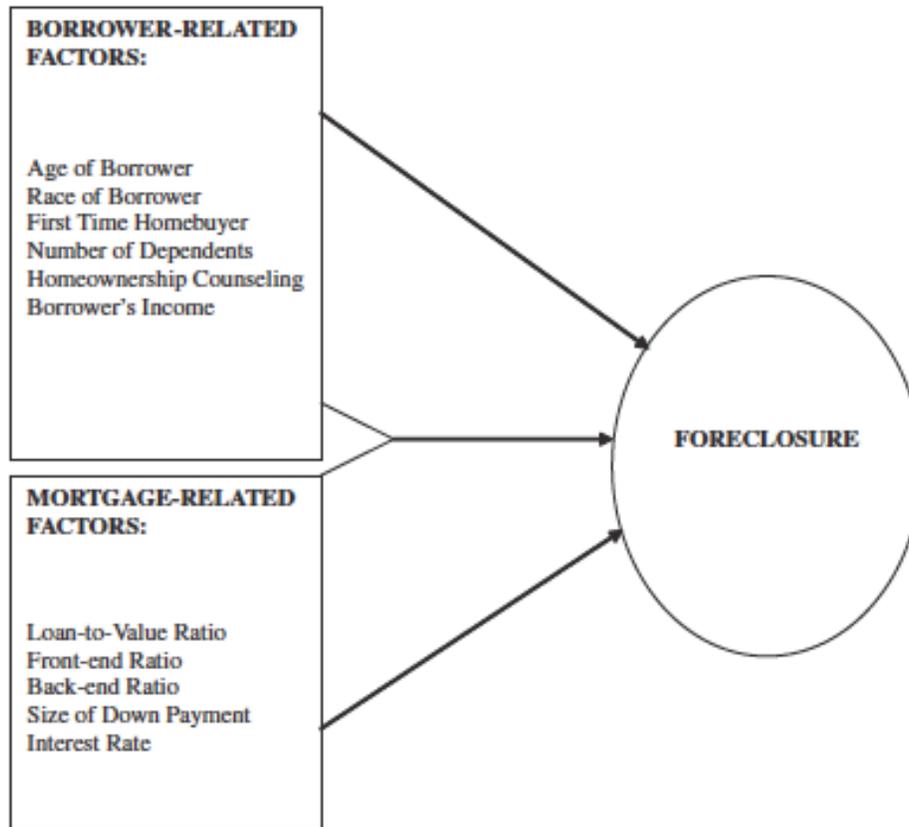


Exhibit 7: Framework for assessing risk (from Delgadillo and Gallagher, 2006)

The authors classified relevant variables that affected and influenced the increased risk of mortgage foreclosure into two categories:

1. Borrower-related factors including the age of the borrower, income of the borrower, first-time borrower or not, number of dependents (less relevant in this context is race of borrower or counseling available) and source of downpayment
2. Mortgage-related factors including the loan to value ratio, size of downpayment, interest rate, and the Gross Debt Service Ratio (front end ratio) and Total Debt Service ratio (back end ratio)

This is a useful model than can be modified for the purposes of further research by CMHC. The research reviewed has shown the interconnectedness of certain of the borrower related variables including income, first-time buyer, stability of employment income, overall indebtedness and FICO/Credit score; versus mortgage related variables including the amount of the downpayment, source of the downpayment, loan to value ratio, interest rates and real estate annual increases.

A future research program must try to control or remove those variables in order to further examine the issue of the size of the downpayment relative to the purchase price and the source of funds for the down payment (from borrower's own resources versus outside funding) in order to

address the issue of how much “skin in the game” is required and how the relative size of this impacts mortgage default during different market cycles (much of the literature reflects a period of rising prices, followed by a collapse).

The literature of practice and behaviour in the Canadian context is very limited. The proliferation of US research is partly a function of the volume of institutions and researchers in that country but also strongly abetted by HUD and others making data files on loan characteristics publicly available for research and analysis. Perhaps this is something that CMHC might consider as a way to stimulate academic research and policy discourse.

References

- Australian Prudential Regulation Authority. APRA increases capital adequacy requirements for residential mortgage exposures under the internal ratings-based approach. 20 Jul 2015.
- Aron, Janine, John Muellbauer. Modelling and forecasting mortgage delinquency and foreclosure in the UK. *Journal of Urban Economics*, 2016, Volume 94.
- Arregui, Nicolas, Jaromir Benes, Ivo Krznar, Srobona Mitra, and Andre Santos. "Evaluating the Net Benefits of Macroprudential Policy: A Cookbook." *IMF Working Papers* 13, no. 167 (2013)
- Badev, Anton, Thorsten Beck, Ligia Vado and Simon Walley (2014) *Housing Finance Across Countries New Data and Analysis*. World Bank Global Capital Markets Dept
- Bank of England, February 2015 *The Financial Policy Committee's powers over housing tools A draft Policy Statement*.
- Bouyan, Sylvain (2015) *Recent trends in EU home ownership*. ECRI Commentary No. 15, 16 June 2015
- Brean, Donald J.S., Lawrence Kryzanowski, and Gordon S Roberts. "Canada and the United States: Different Roots, different routes to financial sector regulation." *Journal of Business History* 53, no. 2 (April 2011): 249-269.+
- Campbell, John Y., Joao F. Cocco. How do house prices affect consumption? Evidence from micro data. *Journal of Monetary Economics*, 2007, Volume 54, Issue 7.
- Campbell, J. Y., & Cocco, J. F. (2011). *A Model Of Mortgage Default*. National Bureau Of Economic Research
- Corbae, D and Erwan Quintin (2015). *Leverage and the Foreclosure Crisis*, National Bureau of Economic Research Working Paper 19323
- Delgadillo, Lucy, and Amber Gallagher (2006). "Borrower- and Mortgage-Related Factors Associated with FHA Foreclosures." *Family and Consumer Sciences Research Journal* 34, no. 3 (March 2006): 204-222.
- Demiroglu, Cem, Evan Dudley, and Christopher M James. "State Foreclosure Laws and the Incidence of Mortgage Default." *Journal of Law and Economics* 57, no. 1 (February 2014): 225-280.
- Bhutta, Neil Jane Dokko, and Hui Shan 2010. *The Depth of Negative Equity and Mortgage Default Decisions*, Federal Reserve Board of Governors working Paper 2010-35
- Duffy, David. *Negative Equity in the Irish Housing Market*. *Economic and Social Review*, 2010, Volume 41, Issue 1.

Dungey, Mardi, Firmin Doko Tchatoka, Graeme Wells, and María B. Yanotti. "Mortgage Choice Determinants: The Role of Risk and Bank Regulation." *Economic Record* 91, no. 295 (2015): 417-37.

Dungey, Mardi, Graeme Wells, and Sam Thompson. "First Home Buyers' Support Schemes in Australia." *Australian Economic Review* 44, no. 4 (2011): 468-79.

Ergungor, O. Emre, and Stephanie Moulton. "Beyond the Transaction: Banks and mortgage default of low-income homebuyers." *Journal of Money, Credit and Banking* 46, no. 1 (November 2014): 1721-1752

Freeman, Allison, and Jeffrey J Harden. "Affordable Homeownership: The Incidence and Effect of Down Payment Assistance." *Journal of Housing Policy Debate* 25, no. 2 (April 2015): 308-319.

FSB 2011, Thematic Review on Mortgage Underwriting and Origination Practices Peer Review Report

Fuller, G.W (2015). Who's Borrowing? Credit Encouragement vs. Credit Mitigation in National Financial Systems, *Politics and Society* 43, Issue 2, 2015

Fuster, A., & Willen, P. S. (2015). Payment Size, Negative Equity, and Mortgage Default. Federal Reserve Bank of New York.

GAO (US Government Accountability Office.) (2005). Mortgage financing: Additional action needed to manage risks of FHA-insured loans with down payment assistance (Report No. GAO-06-24). Washington, DC

Ghent and Kudlyak, 2011 Recourse and Residential Mortgage Default: Evidence from US States. *Review of Financial Studies* 24 (9): 3139-3186

Goodhart, Lucy M. "Brave New World? Macro Prudential policy and the new political economy of the federal reserve." *Review of International Political Economy* 22, no. 2 (May 2014): 280-310.

Guiso, Sapienza, and Zingales, (2013) The Determinants of Attitudes toward Strategic Default on Mortgages *Journal of Finance*, Volume 68, Issue 4 August 2013.

Herbert, C. E., & Tsen, W. (2007). The potential of downpayment assistance for increasing homeownership among minority and low-income households. *Cityscape*, 9, 153 – 183.

Horvath, Balint, and Wolf Wagner (2016). "Macprudential Policies and the Lucas Critique - Bis.org." September 2016. Accessed December 11, 2016.

U.S. Department of Housing and Urban Development. (2004). *Fitting the Pieces Together: Using Public and Private Financing Tools with HOME-Assisted Homebuyer Programs*

Jaffee, D.W. (2015). An International Perspective for Mortgage Market Reform. *Journal of Money, Credit and Banking*, Supplement to Vol. 47, No. 1

- James, Christopher, M (2010). Mortgage-Backed Securities: How Important Is “Skin in the Game”? FRBSF Economic Letter, December 13, 2010.
- Keenan, Enda, Christina Kinghan, Yvonne McCarthy, Conor O’Toole (2016). Macroprudential Measures and Irish Mortgage Lending: A Review of Recent Data. Central Bank of Ireland, 2016. Vol 2016, No.3.
- Robert Kelly (2011). The Good, The Bad and the Impaired A Credit Risk Model of the Irish Mortgage Market. Central Bank and Financial Services Authority of Ireland. 2011.
- Kelly, Robert, Fergal McCann (2016). Some defaults are deeper than others: Understanding long-term mortgage arrears. Journal of Banking & Finance, 2016. Volume 72
- Kelly, Robert, Terry O’Malley, Conor O’Toole (2015). Designing Macro-prudential Policy in Mortgage Lending: Do First Time Buyers Default Less?, Central Bank of Ireland, 2015.
- Kelly, Austin. (2006). Gifts, Down Payments and Mortgage Default. Federal Housing Finance Agency - US Government Accountability Office
- Kelly, Austin. (2008). “Skin in the game”: Zero down payment mortgage default. Journal of Housing Research, 17, 75 – 99.
- Kelly, Robert and Conor O’Toole (2016) Lending Conditions and Loan Default: What Can We Learn From UK Buy-to-Let Loans? Research Technical Paper, Central Bank of Ireland
- Krnzar, I and James Morsink (2014). With Great Power Comes Great Responsibility: Macroprudential Tools at Work in Canada IMF Working Paper WP 14/83
- Lam, K., Dunsky, R. M., & Kelly, A. (2013). Impacts of Down Payment Underwriting Standards on Loan Performance – Evidence from the GSEs and FHA portfolios. Federal Housing Finance Agency, Office of Policy Analysis and Research
- Li, Wenli, Michelle J White, and Ning Zhu. "Did Bankruptcy Reform Cause Mortgage Defaults to Rise." American Economic Journal: Economic Policy 3, no. 4 (November 2011): 123-147.
- Mayer Christopher, Karen Pence, and Shane M. Sherlund 2009, The Rise in Mortgage Defaults Journal of Economic Perspectives—Volume 23, Number 1—Winter 2009—Pages 27–50
- McCarthy, Yvonne and Kieran McQuinn, Credit Conditions in a Boom and Bust Property Market," Research Technical Papers 08/RT/13, Central Bank of Ireland 2013.
- Mohsni, Sana and Isaac Otchere (2015) Does regulatory regime matter for bank risk taking? A comparative analysis of US and Canada.
- OECD Stats http://stats.oecd.org/Index.aspx?DataSetCode=HOUSE_PRICES
- Palmer, Christopher (2015) Why Did So Many Subprime Borrowers Default During the Crisis: Loose Credit or Plummeting Prices. University California Berkley

Quercia, R. G., Ding, L., & Reid, C. (2012). *Balancing risk and access: Underwriting standards and qualified residential mortgages*. Chapel Hill, NC: Center for Community Capital; Durham, NC: Center for Responsible Lending

Quercia, R. G., McCarthy, G. W., & Wachter, S. M. (2003). The impacts of affordable lending efforts on homeownership rates. *Journal of Housing Economics*, 12, 29 – 59.

Reserve Bank of Australia (2015). *Submission to the Inquiry into Home Ownership*

Reserve Bank of New Zealand. “Consultation Paper: Adjustments to restrictions on high-LVR residential mortgage lending”. July 2016

Reserve Bank of New Zealand. Box A: Assessing the impact of LVR restrictions. November 2013

Ringo, N. B. (2016, November). Residential Mortgage Lending from 2004 to 2015: Evidence from the Home Mortgage Disclosure Act Data. *Federal Reserve Bulletin*, 102(6)

Schembri, Lawrence (2014). *National Institute Economic Review No. 230* November 2014

Solomon, Dov (2016) *From the Great Depression to the Great Recession: On the Failure of Regulation in the Mortgage Market*, 42 *J. Legis.* 162(2016).

Wachter, Susan (2016) *The Housing and Credit Bubbles in the United States and Europe: A Comparison*. *Journal of Money, Credit and Banking*, Supplement to Vol. 47, No. 1 (March–April 2015)

Richard Waldron, Declan Redmond. (For)Bearing the costs of reckless lending: examining the response to the Irish mortgage arrears crisis. *International Journal of Housing Policy*, 2015. Volume 16, Issue 3.

Williams, Brendan Zorica Nedovic-Budic. *The real estate bubble in Ireland. Policy context and responses*. *Urban Research & Practice*, 2016, Issue 2 – Volume 9.

Wood, Gavin, Richard Watson, and Paul Flatau. "Microsimulation Modelling of Tenure Choice and Grants to Promote Home Ownership." *The Australian Economic Review* 39, no. 1 (2006): 14-34.

Appendix A: Selected annotated bibliography of key studies

Aron, Janine and John Muellbauer (2016). Modelling and forecasting mortgage delinquency and foreclosure in the UK. *Journal of Urban Economics*, 2016, Volume 94

This paper discusses the proportion of mortgages in negative equity as a key driver of aggregate repossessions and arrears. The focus is on the UK and the research develops new aggregate models for the UK's mortgage repossessions and arrears using quarterly data over 1983–2014, motivated by a conceptual double trigger framework for foreclosures and payment delinquencies.

An innovation to improve on the flawed but widespread use of loan-to-value measures is to estimate difficult-to-observe variations in loan quality and access to refinancing, and shifts in lenders' forbearance policy, by common latent variables in a system of equations for arrears and repossessions. We introduce, for the first time in the literature, a theory-justified estimate of the proportion of mortgages in negative equity as a key driver of aggregate repossessions and arrears. This is based on an average debt–equity ratio, corrected for regional deviations, and uses a functional form for the distribution of the debt–equity ratio checked on Irish micro-data from the Bank of Ireland, and Bank of England snapshots of negative equity.

Highly significant effects on aggregate rates of repossessions and arrears are found for the aggregate debt–service ratio, the proportion of mortgages in negative equity and the unemployment rate. Economic forecast scenarios to 2020 highlight risks faced by the UK and its mortgage lenders, illustrating the usefulness of the approach for bank stress-testing. For macroeconomics, our model traces an important part of the financial accelerator: the feedback from the housing market to bad loans and hence banks' ability to extend credit.

Bhutta, Neil Jane Dokko, and Hui Shan (2010). *The Depth of Negative Equity and Mortgage Default Decisions*, Federal Reserve Board of Governors working Paper 2010-35

A central question in the literature on mortgage default is at what point underwater homeowners walk away from their homes even if they can afford to pay. We study borrowers from Arizona, California, Florida, and Nevada who purchased homes in 2006 using non-prime mortgages with 100 percent financing. Almost 80 percent of these borrower's default by the end of the observation period in September 2009.

After distinguishing between defaults induced by job losses and other income shocks from those induced purely by negative equity, we find that the median borrower does not strategically default until equity falls to -62 percent of their home's value. This result suggests that borrowers face high default and transaction costs. Our estimates show that about 80 percent of defaults in our sample are the result of income shocks combined with negative equity. However, when equity falls below -50 percent, half of the defaults are driven purely by negative equity. Therefore, our findings lend support to both the “double-trigger” theory of default and the view that mortgage borrowers exercise the implicit put option when it is in their interest.

Brean, Donald J.S., Lawrence Kryzanowski, and Gordon S Roberts. (2011) "Canada and the United States: Different Roots, different routes to financial sector regulation." *Journal of Business History* 53, no. 2 (April 2011): 249-269.

This paper explores the lessons to be learned from why the neighbouring banking systems of Canada and the United States, that share numerous commonalities fared so differently during two major financial crises. The explanations are deeply rooted in different tolerances for industry concentration and state involvement, and the divergent routes of the development of their financial systems, founding institutions, on-going governance and regulation, and competitive structures.

Canada's success during the more recent 2007–09 financial crisis is attributed to more effective regulation and conservative banking practices, including (self-) imposed stricter limits on bank leverage, much stricter limits on unconventional mortgages, and less reliance on the use of more 'creative' investment types (e.g. subprime lending) and structured products.

Campbell, J. Y., & Cocco, J. F. (2011). *A Model Of Mortgage Default*. National Bureau Of Economic Research

Heterogeneity in borrower's labor income risk is important for explaining the higher default rates on adjustable rate mortgages during the recent US housing downturn, and the variation in mortgage premia with the level of interest rates. Highlights that default depends on extent borrowers have negative home equity and are constrained. The survey in the study omits information on second mortgages however they note that second mortgages were more common during the 2000s.

In this model mortgage default is triggered by negative home equity. However, households do not default as soon as equity becomes negative, households wait it out in hopes that house prices will rise again. Houses that are more constrained are more likely to default sooner. ARM defaults tend to occur when interest rates and inflation increase, driving up required payments on ARMs, while FRM defaults tend to occur when interest rates and inflation decrease. For this reason, ARM default risk is highest for mortgages originated at low rates, while FRM default risk is highest for mortgages originated at high rates. Another explanation for higher default risk in ARMs is that they are more attractive to households with higher labour income risk. Labor income growth has an effect on default rates: research found that the higher the growth rate of a specific job market results in less incentives to save which increases default probabilities.

Corbae, D and Erwan Quintin (2015). *Leverage and the Foreclosure Crisis*, National Bureau of Economic Research Working Paper 19323

How much of the recent rise in foreclosures in the US can be explained by the large number of high-leverage mortgage contracts originated during the housing boom? We present a model where heterogeneous households select from a set of mortgage contracts and choose whether to default on their payments given realizations of income and housing price shocks.

The set of mortgage contracts consists of loans with high downpayments and loans with low downpayments. We run an experiment where the use of low downpayment loans is initially limited by payment-to-income requirements but then becomes unrestricted for 8 years. The

relaxation of approval standards causes homeownership rates, high-leverage originations and the frequency of high interest rate loans to rise much like they did in the US between 1998-2006.

When home values fall by the magnitude observed in the US from 2007-08, default rates increase by over 180% as they do in the data. Two distinct counterfactual experiments where approval standards remain the same throughout suggest that the increased availability of high-leverage loans prior to the crisis can explain between 40% to 65% of the initial rise in foreclosure rates. Furthermore, we run policy experiments which suggest that recourse could have had significant dampening effects during the crisis

Delgadillo, Lucy, and Amber Gallagher (2006). "Borrower- and Mortgage-Related Factors Associated with FHA Foreclosures." *Family and Consumer Sciences Research Journal* 34, no. 3 (March 2006): 204-222.

Data for this study were drawn from an inventory of active and foreclosed FHA homes in the state of Utah. The inventory consisted of mortgage insurance applications from both current home loans and foreclosed homes. The original sample consisted of a total of 394 cases that had origination dates between January 1, 1994, and December 31, 2001. This study revealed that among the mortgage and borrower-related factors race, front-end ratio and interest rates were statistically significant factors associated with the probability of foreclosure. This article talks mainly about borrower-related factors such as age, job, race etc. but also touches on mortgage-related factors including downpayments and sources of borrowed funds. Constrained buyers are more likely to turn to sources other than savings, such as gifts, to obtain down payments, which has some implications on their future susceptibility to default and foreclosure. First time home buyers are turning to gifts rather than their own personal savings. Those who use gifts are more likely to default. Gifts are usually given by parents to children who do not have the funds or want to make sure their child has enough for 20% to avoid premiums. Although not much is mentioned on borrowed funds for downpayments it is clear that assisted homeownership programs reducing the downpayment requirement have increase default and foreclosure risk.

Demiroglu, Cem, Evan Dudley, and Christopher M James (2014). "State Foreclosure Laws and the Incidence of Mortgage Default." *Journal of Law and Economics* 57, no. 1 (February 2014): 225-280.

This paper examines how differences in state foreclosure laws influence the incidence of default in the residential mortgage market. In particular, it examines how judicial review requirements, lenders' recourse rights (deficiency judgments), and state assistance programs for distressed borrowers affected the likelihood of default during the recent U.S. housing crisis. We argue that state foreclosure laws should have little effect on the likelihood of liquidity events (for example, shocks to borrowers' ability to make payments) and thus provide a good instrument for identifying borrowers' costs of default. We find that borrowers with negative home equity are significantly more likely to default in states with borrower-friendly foreclosure laws. Finally, we examine how recent state and federal loan foreclosure prevention programs affected the likelihood of default. Overall, we find a significant decline in the effect of judicial review requirements but not deficiency judgments on default after 2008.

Freeman, Allison, and Jeffrey J Harden (2015). “Affordable Homeownership: The Incidence and Effect of Down Payment Assistance.” *Journal of Housing Policy Debate* 25, no. 2 (April 2015): 308-319.

Using data from a relatively large panel study of low- and moderate-income homeowners, we assess the determinants of the use of several types of downpayment assistance and the effect of using assistance on mortgage performance. Although we find differences in reliance on types of assistance, we find no difference in mortgage performance between those who used assistance and those who did not. Based on these findings, we urge caution in imposing downpayment requirements that disproportionately restrict access to mortgage credit. The study included a database of FHA loans exceeding 50,000 across a wide range of states. Only 2% of all owners in this study used a second mortgage (a proxy for borrowed downpayment).

Fuster, A., & Willen, P. S. (2015). *Payment Size, Negative Equity, and Mortgage Default*. Federal Reserve Bank of New York

Surprisingly little is known about the importance of mortgage payment size for default, as efforts to measure the treatment effect of rate increases or loan modifications are confounded by borrower selection. We study a sample of hybrid adjustable-rate mortgages that have experienced substantial rate reductions over the past years and are largely immune to these selection concerns.

We find that payment size has an economically large effect on repayment behavior; for instance, cutting the required payment in half reduces the delinquency hazard by about 55 percent. Importantly, the link between payment size and delinquency holds even for borrowers who are significantly underwater on their mortgages. These findings shed light on the driving forces behind default behavior and have important implications for public policy.

Harrison, David M., Thomas G. Noordewier, and Abdullah Yavas (2004) "Do Riskier Borrowers Borrow More?" *Real Estate Economics* 32, no. 3 (2004): 385-411. Based on US experience this paper focuses on why the correlation between LTV ratios and default risk is contingent on the default costs of the borrower. LTV is positively correlated to mortgage default rates. Mortgage defaults occur due to drops in the value of the asset or income level. When default costs are high, risk borrowers are less likely to borrow a home with a high LTV ratio to reduce the probability of a costly default. Therefore, when default costs are low-risk borrowers will borrow more. Paper does not focus on default, only on borrower attitudes towards default costs.

Jaffee, D.W. (2015). *An International Perspective for Mortgage Market Reform (2015)*. *Journal of Money, Credit and Banking*, Supplement to Vol. 47, No. 1

The US and certain European countries (e.g., Ireland and Spain) have recently experienced serious distress in their residential mortgage markets. It has become especially clear that significant deadweight costs accompany mortgage foreclosures. These deadweight costs arise when families are forced to move from their homes, lenders must sell foreclosed properties under firesale conditions, and foreclosed property sales have negative effects on the prices of adjacent properties. Borrowers, lenders, and governments have all experienced at least some part of the

deadweight costs, thus creating a consensus to carry out major mortgage market reforms to avoid future replays.

The proper reforms, of course, must take into account the market features that created the failures. Mortgage markets are, however, complex enterprises, so identifying the dysfunctional elements is easier said than done. In this paper, I make use of the important differences that exist between U.S. and European mortgage markets to help identify those aspects of residential mortgage markets that are most in need of reform.

James, Christopher, M (2010). *Mortgage-Backed Securities: How Important Is "Skin in the Game"?* FRBSF Economic Letter, December 13, 2010.

Financial reform legislation passed by Congress in 2010 requires mortgage originators to retain some loss exposure on the mortgages they securitize. Recent research compares the performance of mortgage-backed securities for different types of issues in which originators retain different degrees of loss exposure. The findings suggest that retention of even modest loss exposure by originators reduces moral hazard and is associated with significantly lower loss rates on these securities. This paper summarizes the recent (pre-2010) literature. It does not undertake primary empirical research.

Kelly, Austin. (2006). *Gifts, Down Payments and Mortgage Default.* Federal Housing Finance Agency - US Government Accountability Office.

Discusses the direct impact of differing downpayment sources, backed up by empirical data from a large dataset of FHA loans. This report examines the relationship between borrowed funds as down payments and the likelihood of mortgage delinquency later on.

A continuous time hazard model is used to estimate the conditional probability of a serious delinquency, or a claim, as a function of a host of standard control variables, and indicators for the source of the down payment. The data consist of a nationally representative random sample of about 5,000 FHA insured single family mortgages endorsed in Fiscal Years 2000, 2001, and 2002, observed through January 31, 2006, and samples of about 1,000 FHA loans each from the Atlanta, Indianapolis, and Salt Lake City MSAs in the same time period.

Concludes that borrowers who provide down payments from their own resources have significantly lower default propensities than do borrowers whose down payments come from relatives, government agencies, or non-profits

Kelly, Austin. (2008). "Skin in the Game": Zero Downpayment Mortgage Default. *Journal of Housing Research*, 17(2), 75-99

This report builds on the 2006 paper and extends analysis to loans that required no downpayment from the purchaser (obtain all from other sources including seller-funded) and compared these to those with small purchaser contributions. Again, using a broad FHA loan dataset, with a sample of 5,000 loans drawn from 1999 to 2002. The dataset included FICO scores, initial LTV (selecting only those above 95%), original loan amount, term, interest rate and address. The file was updated in 2006 with the dates of 90-day delinquencies and claim and non-claim terminations.

The research generates empirical evidence demonstrating that personally generated down payments create fewer defaults than do any sort of borrowed down payment mechanisms. In the national sample, relieving the buyer of the need to contribute cash to the purchase via a gift from an uninvolved party raises claim rates by 40% to 50%. Relieving need for purchaser cash by a “gift” from the seller results in a higher purchase price and raises claims by a further 38%. The research makes it clear that borrowers with no skin in the game have higher credit risk than comparable buyers who bring cash to the transaction.

Robert Kelly, Fergal McCann (2016). Some defaults are deeper than others: Understanding long-term mortgage arrears. *Journal of Banking & Finance*, 2016. Volume 72

The 2007–2008 financial crisis yielded a significant number of delinquent mortgage loans, which ordinarily would have faced foreclosure and repossession. However, given the negative externalities of repossession, policy response has shifted towards forbearance and mortgage modification, which has led to longer spells in default for delinquent mortgage holders. It is, therefore, imperative to move beyond binary models of default towards an understanding of the factors that drive the depth of default spells.

Exploiting a highly detailed dataset on financially distressed households in Ireland in 2012 and 2013, we are able to identify the impact of a range of current household-level factors, generally not available in loan-level studies of mortgage default, on the probability of entering early and deep states of mortgage default.

Our results suggest that high loan-to-value ratios, consumer credit growth, shocks to mortgage affordability and unemployment should all trigger serious concerns among policy makers regarding subsequent stability in the mortgage market, with these measures all shown to have differentially large impacts on entry to deep, relative to early-stage arrears.

Lam, K., Dunsky, R. M., & Kelly, A. (2013). *Impacts of Down Payment Underwriting Standards on Loan Performance – Evidence from the GSEs and FHA portfolios*. Federal Housing Finance Agency, Office of Policy Analysis and Research

This study explores the relationship between downpayment (loan-to-value ratio or LTV) requirements and loan performance of GSE and FHA mortgages, controlling for borrower characteristics and housing market conditions. Loan performance models are estimated based on cohorts of loans originated between 1995 and 2008.

Model parameters are then used to conduct simulations to estimate the marginal or incremental impact of adjusting the downpayment requirements on cumulative delinquency and foreclosure rates. Default and prepayment equations are estimated simultaneously using large samples of loans drawn from the universe of loans from the GSE and FHA origination data, which yield parameter estimates that are precise and robust. Serious delinquencies and foreclosures are analyzed separately for different segments of the mortgage market.

The study sheds important light on the policy question regarding how downpayment requirements should be understood in conjunction with other underwriting guidelines. Specifically, we present simulation results that demonstrate the relationship between downpayment standards and loan performance by borrower credit score category and debt-to-income ratio category.

We found that the lifetime delinquency and foreclosure rates increase monotonically and nonlinearly as original LTV rises. The magnitude of the impacts is sensitive to the borrower's credit score and debt-to-income levels. Furthermore, there are appreciable differences across the GSE and FHA segments of the mortgage market in terms of borrower responses.

Mayer Christopher, Karen Pence, and Shane M. Sherlund (2009). The Rise in Mortgage Defaults *Journal of Economic Perspectives*—Volume 23, Number 1—Winter 2009—Pages 27–50

This paper begins by looking at the various attributes of sub-prime and near-prime mortgages: what types of loans were used; how they compare on standard measures of risk such as loan-to-value ratios and credit scores; and whether the loans were originated to purchase homes or to refinance existing mortgages. We then examine what shares of these loans were relatively novel and complicated products: for example, some had interest rates that adjusted in potentially confusing ways; did not require full documentation of income and assets; allowed borrowers to postpone paying off mortgage principal; or imposed fees if borrowers prepaid their mortgages within a certain period of time. The patterns of mortgage delinquency varied across these characteristics, sometimes in unexpected ways.

We next investigate why delinquencies and defaults increased so substantially. We first consider the proliferation of the novel products mentioned above. We find little evidence that the rise in delinquencies through mid-2008 was linked to these products, although they may cause problems in the future.

We then consider incentives in the mortgage market, which during the 2000's shifted to an "originate-to-distribute" model, under which mortgage brokers originated loans and then sold them to institutions that securitized them. As brokers did not bear the ultimate costs of default, they may have had a lower incentive to screen applicants carefully.

We find that underwriting deteriorated along several dimensions: more loans were originated to borrowers with very small down payments and little or no documentation of their income or assets, in particular. The final culprit we consider is changes in underlying macroeconomic conditions such as interest rates, unemployment, and house prices.

We find substantial evidence that declines in house prices are a key factor in the current problems facing the mortgage market.

Palmer, Christopher (2015) Why Did So Many Subprime Borrowers Default During the Crisis: Loose Credit or Plummeting Prices. University California Berkley

The surge in subprime mortgage defaults during the Great Recession triggered trillions of dollars of losses in the financial sector and accounted for more than 50% of foreclosures at the height of the crisis. In particular, subprime mortgages originated in 2006–2007 were three times more likely to default within three years than mortgages originated in 2003–2004. In the ensuing years of debate, many have argued that this pattern across cohorts represents a deterioration in lending standards over time.

I confirm this important channel empirically and quantify the relative importance of an alternative hypothesis: later cohorts defaulted at higher rates in large part because house price

declines left them more likely to have negative equity. Using comprehensive loan-level data that includes much of the recovery period, I find that changing borrower and loan characteristics can explain up to 40% of the difference in cohort default rates, with the remaining heterogeneity across cohorts caused by local house-price declines.

To account for the endogeneity of prices—especially that price declines themselves could have been caused by subprime lending—I instrument for house price changes with long-run regional variation in house-price cyclicalities. Control-function results confirm that price declines unrelated to the credit expansion causally explain the majority of the disparity in cohort performance. Counterfactual simulations show that if 2006 borrowers had faced the price paths that the average 2003 borrower did, their annual default rate would have dropped from 12% to 5.6%

Quercia, R. G., Ding, L., & Reid, C. (2012). Balancing risk and access: Underwriting standards and qualified residential mortgages. Chapel Hill, NC: Center for Community Capital; Durham, NC: Center for Responsible Lending

As policymakers develop underwriting guidelines for qualified residential mortgages (QRM)—which are exempt from risk retention requirements for privately securitized mortgages under the Dodd-Frank Wall Street Reform and Consumer Protection Act—both consumer and industry groups have raised concerns about the disproportionate impact that restrictive QRM guidelines may have on low-income, low-wealth, minority, and other households traditionally underserved by the mainstream mortgage market.

In this study, we examine the way different QRM guidelines may affect access to mortgage credit and loan performance, with a special focus on historically underserved households. More narrowly, we estimate the additional impacts on defaults and access resulting from setting QRM underwriting guidelines over and above the proposed product restrictions for qualified mortgages (QM), which exclude loans with features associated with higher default rates such as lack of income documentation, hybrid adjustable-rate mortgages with teaser payments, interest only and balloon payments and negative amortization.

To estimate the relative changes in mortgage default and access that would occur under different QRM underwriting thresholds, we use a unique, nationally-representative database on loan performance that includes information on loan characteristics and borrower demographics.

We find that the added benefits of reduced foreclosures resulting from restrictions beyond the QM product requirements do not necessarily outweigh the costs of reducing borrowers' access to QRM mortgages. In particular, loan-to-value (LTV) requirements of 80 or 90 percent produce a smaller benefit when the resulting reductions in defaults are weighed against the number of borrowers excluded from the market.

The results for debt-to-income (DTI) and borrower credit scores similarly show that the most restrictive thresholds are less effective because they exclude a larger share of borrowers in relation to percent of defaults they prevent. In addition, we find that more stringent LTV, DTI, and credit score requirements could disproportionately deny low-income borrowers and borrowers of color access to QRM mortgages.

This research suggests that the QM loan term restrictions on their own would curtail the risky lending that occurred during the subprime boom and lead to substantially lower foreclosure rates without overly restricting access to credit. Based on this analysis, we believe that policymakers should not impose additional LTV, DTI and credit score requirements on QRM mortgages, especially given the potential disproportionate impact of these thresholds on persons of colour.

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