The future of US housing finance

BARCLAYS

Also available in the

Equity Gilt Study 2014

BARCLAYS

The future of US housing finance

Ajay Rajadhyaksha
Sandeep Bordia
Jasraj Vaidya
Dennis Lee

- **Even as the US housing market has rebounded sharply in the past three years, housing finance has not. The extent of government involvement in mortgage lending poses unacceptable risks to the taxpayer. Bank portfolio lending, private-label securitizations, covered bonds, and public/private partnership models offer alternatives to reduce reliance on the government guarantee, but they all come with their own limitations.**
- **Among existing legislative proposals, the Corker-Warner bill is the most promising, and will likely be the template for any final legislation. It requires the first-loss piece to be backed by private capital but also provides an explicit government backstop in extraordinary circumstances. We estimate that $400-450bn of private capital is needed to absorb the credit risk of all $4-4.5trn in government-guaranteed GSE mortgages, assuming a 10% first-loss piece. The private markets cannot raise this amount easily. In our view, a government retreat will need to be spread over at least 10-15 years, not the five years proposed by Corker-Warner.**
- **In addition to legislation, new Qualified Mortgage (QM) rules will make lending to lower-credit borrowers more challenging. Overall, in a new housing finance system, we expect rates to rise only marginally for clean credit borrowers, who currently account for more than three-quarters of originations. But lower credit borrowers could see rates rise by 50bp or higher. Mortgage credit availability is unlikely to worsen from current levels, even with new lending rules.**
- **Passage of housing finance legislation might take a few more years. The longer it takes to pass a bill, the greater the likelihood that some version of the status quo will prevail. But even if the status quo does prevail, the market is likely to move to a situation similar to that envisioned by the Corker-Warner bill, assuming recent risk transfer initiatives[1] and QM lending rules stay in place. The difference will be in the level of private sector involvement and extent of taxpayer protection (both higher with legislation). In sum, a smooth transition to a new housing finance system (with lower government involvement) is possible as long as the transition occurs over an extended period and with a government backstop. But if Congress insists on a purely private solution, or a compressed timeframe for transition, mortgage credit and the US housing market could be impaired**

Housing finance reform is a complex topic; hence, we divide this article into six parts:

Part I shows that even as housing has rebounded, housing finance remains dependent on the US government. We also look at the policy goals behind government involvement and compare the US system with those in other countries.

Part II looks at the various options that the US government has to reduce its footprint in housing finance. We emphasize the need for any transition to be orderly and gradual.

Part III looks at the various legislative solutions being proposed. We identify Corker-Warner as the legislation that is most likely to resemble an eventual bill.

Part IV looks at the amount of private capital that will ultimately be required and various ways in which it can be raised. We also discuss the new credit risk transfer deals from Fannie Mae and Freddie Mac.

Part V discusses the recently issued rules for qualified mortgages and analyzes how these will interact with housing finance legislation.

Part VI takes a longer-term look at how mortgage credit availability and mortgage rates may be affected in various housing finance scenarios.

[1] For example, the STACR/CAS credit risk transfer deals, which are explained later in the article.

Part I: Housing has rebounded but housing finance has not

More than seven years have passed since home prices peaked and the mortgage credit crisis began to unfold in 2006. Since 2011-12, there has been a sustained recovery in the housing market. Prices have risen by 20-25% since bottoming in Q1 12 (Figure 1). After peaking during the crisis years, existing and new home sale inventories (in terms of months of supply) have also fallen below pre-crisis levels (Figure 2). Although there are still borrowers at risk of default, loan modifications have markedly reduced the pressure of foreclosure supply. Overall, the market has recovered strongly in the past 18-24 months.

During this period, the US home-ownership rate has given back almost all of the gains made during the mortgage credit boom of the 2000s. Home ownership has dropped from its peak of around 69% to the mid-60% area, which is close to levels last seen in 1996 (Figure 3). The numbers are even lower once we strip out seriously delinquent and foreclosed mortgages (shadow inventory). At that point, the real homeownership rate falls to the low 60% range, which we believe is more sustainable.

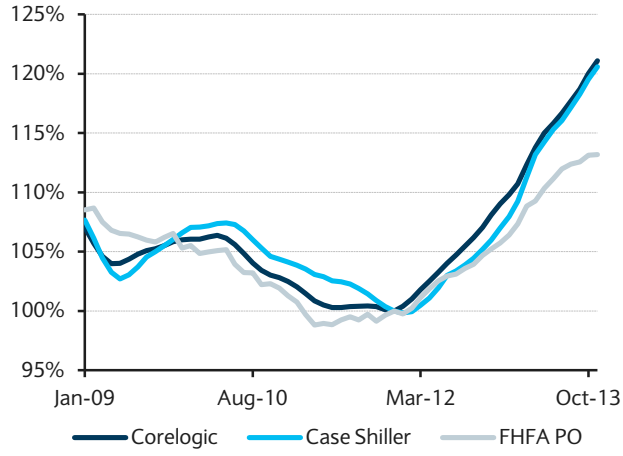
Despite housing recovery, housing finance still dependent on government

Although the housing market has rebounded after working through the excesses prevalent prior to 2008, mortgage finance has not. Over the past 4-5 years, the share of government guaranteed mortgages (FHA, Fannie Mae, and Freddie Mac) has remained above 80% (Figure 4). This level has persisted even as the government has pushed up the price of its guarantee: the mortgage insurance premium (MIP) for FHA loans has risen by almost 80bp, while average guarantee fees for the GSEs have risen by 30-35bp. Meanwhile, the private securitization market has remained mired in legacy issues, and increasing bank capital charges and rep and warranty put-back concerns have restricted the ability of private capital to compete with government-backed loans.

Mortgage underwriting standards remain fairly tight

Mortgage underwriting standards remain near historical tights, with the average credit scores of loans originated by the GSEs near all-time highs. For loans made by the GSEs in 2009-12, average credit scores (FICOs) peaked at 760, from 720-730 pre-crisis; average combined loan-to-value ratios (CLTVs) dropped to 67-70%, from the low-mid 70s in 2007; and front-end debt to income ratios (DTIs) plunged to 32% from the high 30% range in 2007 (Figure 5). Although greater involvement by private-sector mortgage insurers has recently reduced down-payment requirements (especially for purchase loans), mortgage credit availability remains depressed, with the FHA the only source of credit for poor-credit-quality borrowers. The GSEs continue to keep mortgage underwriting standards tight, especially in terms of DTI and FICO. For example, >43% DTI loans now represent only 15% of GSE purchase originations, down from 30-35% pre-crisis. Similarly, low FICO originations remain virtually non-existent among GSE pools.

FIGURE 1
National HPI since 2009

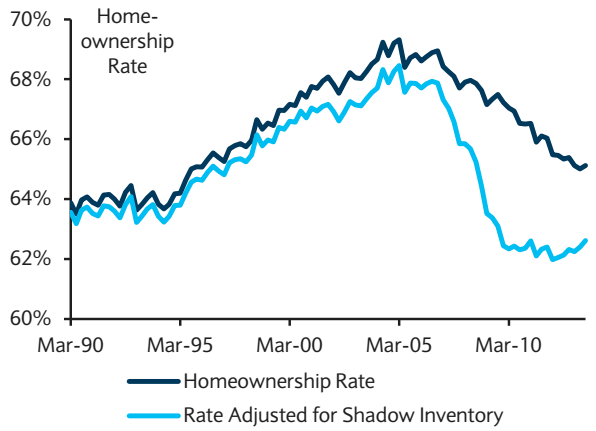


Source: CoreLogic, FHFA, S&P, Bloomberg, Barclays Research

FIGURE 2
New and existing homes months of supply since 2000

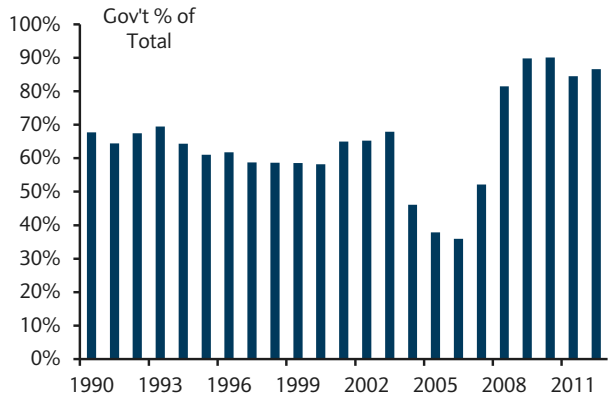
Source: National Association of Realtors, US Census Bureau, Barclays Research

FIGURE 3
Homeownership rate continues to fall



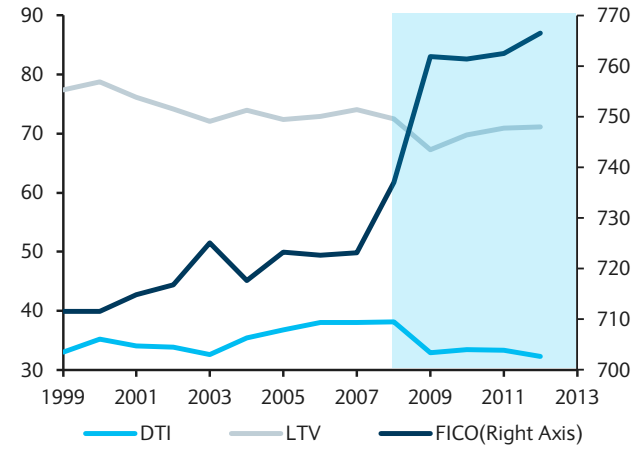
Note: Homeownership rate shown is the seasonally-adjusted rate. Source: MBA, US Census Bureau, Barclays Research

FIGURE 4
Despite unprecedented government support in the mortgage market



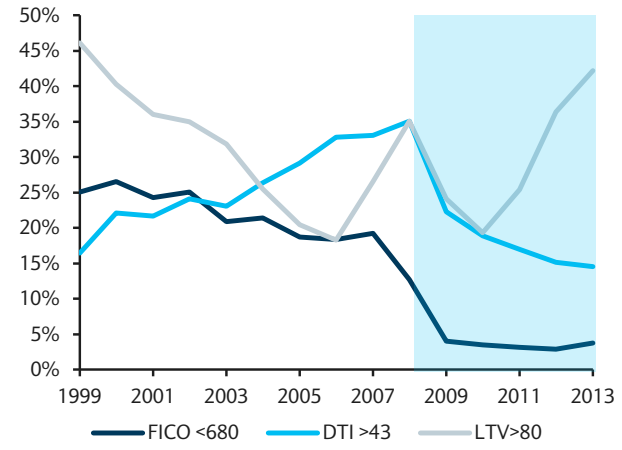
Source: Inside Mortgage Finance, Barclays Research

FIGURE 5
Freddie Mac – Average characteristics for all loans



Source: Freddie Mac, Barclays Research

FIGURE 6
Freddie Mac – Proportion of higher-risk loans among purchase owner occupied loans



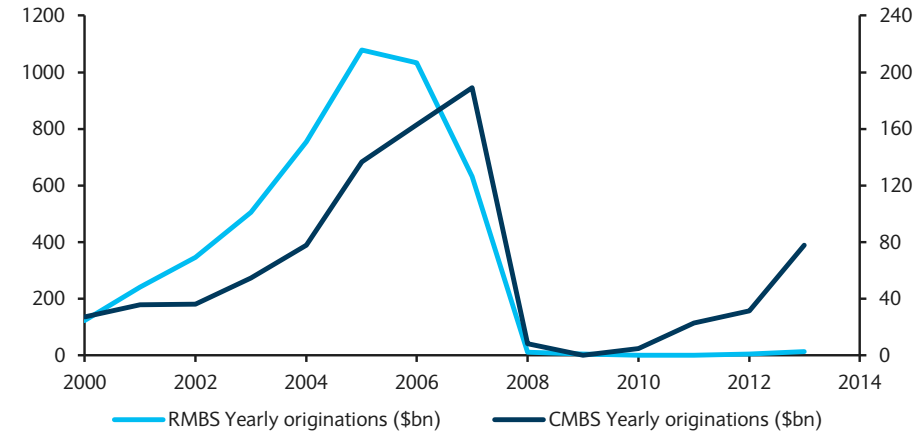
Source: Freddie Mac, Barclays Research

Private securitization markets remain dormant

Private securitization markets remain uncompetitive, primarily because the senior portion of a new-issue private-label securitization trades significantly worse than agency MBS. Recently issued non-agency AAAs with 7% credit support are currently trading 3-4 points below their agency MBS counterparts. As a result, despite their cleaner credit profiles and possibly lower credit costs, these deals cannot compete with the execution available in the agency MBS markets. In contrast, the commercial mortgage market has experienced renewed origination and securitized issuance. CMBS issuance levels are now approaching almost half of their 2005-07 levels. Meanwhile, private-label RMBS[2] issuance today stands at less than 2% of 2005-07 issuance levels.

[2] Mortgage loans that are not guaranteed by the government.

FIGURE 7
RMBS/CMBS issuance over time



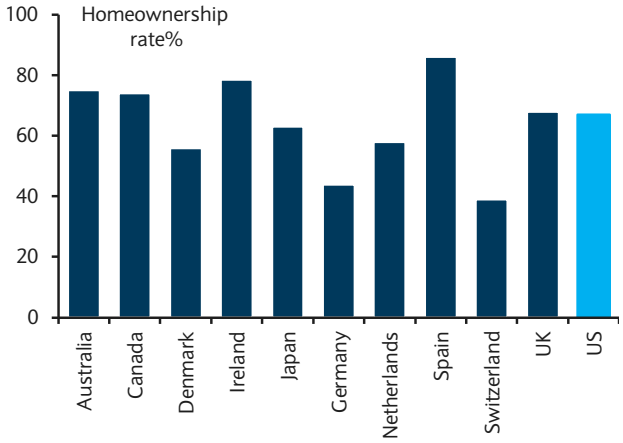
Source: Trepp, LoanPerformance, Inside Mortgage Finance, Barclays Research.

Government role in housing finance: Goals vs reality

Government involvement in US housing finance is different from that of most other countries (see *US housing finance: No silver bullet*). The countries shown in Figure 8 have home ownership rates similar to those in the US, despite little to no government involvement in housing finance. And although making homes affordable has long been a goal of US housing policy, the truth is more complicated. As affordability goals (among other factors) caused down-payment requirements to be reduced over the past decade, the net result was that home prices were pushed up. Consequently, housing became *less* affordable; lower down-payments were offset by higher home prices (Figure 9). And as 2008 showed, a system that keeps housing affordable by lowering down-payments can become unsustainable.

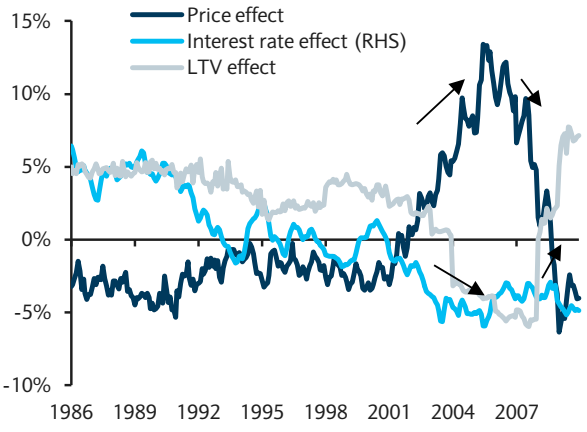
Admittedly, none of these issues was of concern prior to 2007. The GSEs rarely reported any losses, while the FHA/VA never had to draw liquidity from the US Treasury to keep its Mutual Mortgage Insurance (MMI) Fund above required levels. By 2005-06, a combination of lax lending standards and significant leverage in the financial system had driven housing prices to unsustainable levels. As borrower defaults began to rise in 2007

FIGURE 8
Home-ownership rates across countries



Source: MBA, Barclays Research

FIGURE 9
Lower down payments offset by home prices



Note: The figure shows decomposition of our enhanced affordability metric into changes driven by home prices, down payments and interest rates. While higher LTVs helped affordability, it may have also resulted in higher prices. Please see *US housing finance: No silver bullet* for more details.
Source: Barclays Research

and 2008, home prices steadily declined, resulting in further defaults and creating a vicious cycle in the US housing market. These mortgage defaults eventually led to massive losses for the GSEs and, given their *de minimis* capital levels, Fannie Mae and Freddie Mac were placed into conservatorship by the US government. The government – and, by extension, the US taxpayer – eventually provided almost $200bn of capital injections into the GSEs via purchases of senior preferred equity to keep the two entities solvent. Even more striking, the combined losses of Fannie Mae and Freddie Mac between 2008 and 2011 offset all of the net income the two entities had generated since at least 1990.

The amount of risk that the taxpayer is taking on remains a concern

The current situation, with either an explicit or implicit government guarantee covering more than 80% of all originated mortgages, is even more problematic from the taxpayers' perspective. Mortgages originated today are much safer than those originated in 2005-07 and g-fees charged by the GSEs and the FHA are significantly higher, but the amount of risk that the taxpayer is taking on remains problematic. A related problem is the lack of market pricing on the credit risk of GSE-guaranteed mortgages. Although the GSEs – and, to a lesser extent, the FHA – use some form of risk-based pricing, this approach is still not based on the market price of risk. As a result, there is potential for the GSEs to misprice credit risk when credit conditions change.

Part II: Any government retreat needs to be orderly

Given that other countries boast similar homeownership rates without government involvement, and given that affordability goals can have unpleasant side-effects, the case for reducing government involvement in housing finance seems straightforward. But it is critical that any government retreat be orderly and spread out over several years. For example, in *US housing finance: No silver bullet*, we showed (hypothetically) that transferring all existing government guaranteed mortgages to the balance sheets of the US banking system would result in two consequences:

- Good-credit-quality borrowers would get rates similar to existing government guaranteed rates. Borrowers with slightly lower credit quality would see slightly higher mortgage rates.
- Poor-credit-quality borrowers would see very high mortgage rates. In fact, they probably would not get mortgages at all, causing credit availability to contract sharply.

Credit availability, more than simply the level of mortgage rates, is the key to a functioning housing market. Consider the experience of Q1 07, when home prices began to fall and defaults to spike. The catalyst was not job losses; the unemployment rate was below 5%. The marginal source of credit availability at that point was the non-agency (or private) mortgage market. As stretched non-agency MBS prices began falling in the secondary markets, lenders stopped making new loans in the primary markets[3]. And as mortgage credit availability suddenly tightened, home prices started falling and defaults rising.

Government can act as a countercyclical backstop to ensure that credit availability does not disappear during periods of financial/economic stress

Besides an orderly transition, there is another reason to keep the government involved. We believe that government can act as a countercyclical backstop to ensure that credit availability does not disappear during periods of financial/economic stress. Initially, this will mean that while the private market can be encouraged to take on a larger share of credit risk, the government will likely continue to take on tail risk. As long as the first loss piece is held by longer-term mortgage credit investors and the risk is not allowed to be obfuscated, as it was by the ABS CDO market[4] in 2006 and 2007, the market's self-regulatory instincts should kick in before any real excesses take hold. In such circumstances, we believe it is unlikely that taxpayers would be called upon to bear the burden of mortgage credit losses.

[3] New Century, one of the largest sub-prime lenders in the country, went out of business in February 2007.
[4] The CDO market enabled some originators and lenders to transfer all economic risk from the mortgages they originated and securitized, at times without investors in the MBS deals being aware of this fact.

What are the various options for reducing government involvement?

Two broad approaches can be taken to reduce government involvement in housing finance. The first is a complete privatization of the market; this can be accomplished via the following methods, either in isolation or together:

- Private-label securitizations involve pooling together a large number of mortgages into a securitization trust, which is then tranched into multiple classes of varying maturities and credit profiles, each of which is sold off to different groups of investors.
- Covered bonds involve banks pledging a pool of mortgages (the "cover pool") against their issued bonds, such that the bonds are guaranteed by both a general claim against the issuing financial institution and the cover pool of assets.
- Portfolio lending involves banks' originating mortgage loans and holding them directly on their balance sheets, typically in held-to-maturity accounts.

The second approach is to include greater private market participation in the mortgage markets without completely eliminating the government's role, via a public-private partnership that transfers the bulk of mortgage credit risk to private entities but preserves the government's provision of a catastrophic backstop. Private entities would be exposed to a first-loss credit piece on a pool of mortgages, while the government would explicitly guarantee all losses beyond a certain threshold.

FIGURE 10

Various options for reducing government involvement in the mortgage space

Type of housing finance system	Form of system	Benefits	Problems	Possible size
Complete privatization	Securitization	Wide dispersion of risk transfer to multiple parties, market forces dictate pricing on new mortgages, the infrastructure to issue private-label MBS is already in place.	Regulatory hurdles under new QRM* requirements and Basel III capital and leverage ratio rules may limit the potential size of this market. Memories of the 2007-09 recession, driven by non-traditional and subprime securitizations, make it unlikely that policymakers would wholeheartedly adopt this approach.	Prior to the significant run-up in home prices that started in 2004, non-agency securitizations represented 5-10% of total mortgage originations. We believe that private-label securitizations can eventually return to these normalized levels ($500bn - $1trn in outstandings).
	Covered bonds	Issuers of covered bonds (ie, banks) retain "skin in the game" and, thus, are more likely to originate high-quality loans.	Legislative and regulatory framework for covered bonds not yet in place; many US banks do not have the infrastructure to issue covered bonds; mortgage credit and convexity risk will be concentrated among a handful of large financial institutions; there is likely to be a greater asset/liability mismatch for issuing banks.	While covered bonds are unlikely to become the dominant source of mortgage financing over the next decade, they could still represent a healthy portion of the overall mortgage market, perhaps eventually helping to fund $200-300bn in mortgages.
	Portfolio lending	Since banks have full exposure to the credit risk on these loans, they are likely to utilize very prudent underwriting standards. Whole loans held on balance sheet are not subject to the same capital and regulatory rules as private-label securitizations.	Banks are likely to concentrate their underwriting on only the cleanest-credit borrowers, locking out weaker-credit ones from owning homes; larger financial institutions will likely have an unfair advantage, as they have the lowest-cost liabilities via retail deposits and wholesale funding; banks may have more asset/liability mismatches when originating fixed-rate mortgages using short-term deposits.	Portfolio lending has typically represented 40-50% of total mortgages outstanding and can likely represent around the same percentage in the future (~$4trn in outstandings).
Public-Private Partnership	Credit risk shedding transactions	The structure and liquidity benefits of the agency TBA program can continue in its current form.	Finding investors for all of the first-loss credit risk may be difficult: the government is still subject to losses under catastrophic scenarios; selling the first-loss credit tranche in a deep recession could become prohibitively expensive.	Difficult to gauge, though the size of the market utilizing credit risk transfer transactions could approach that of the agency MBS market, at about $4-4.5trn.

Note: Qualified Residential Mortgage, explained later in the article. Source: Barclays Research

Goals for a future housing finance system

If US policymakers ultimately decide that the government needs to play a role in housing finance, they will need to determine what kind of role. The options range from full nationalization of the mortgage market to a completely private model. Whatever the outcome, policymakers will want to reach a housing finance system that meets the following goals in a balanced fashion:

- The system must protect the taxpayer.
- There are advantages to having a countercyclical component to the housing system so that mortgage finance is expanded during recessionary environments and contracted when the economy is on stronger footing.
- There is likely a role for the housing system to provide social benefits to low and moderate income households.

A long-term housing finance system in the US requires a combination of substantial participation from private entities and some level of government support

Full nationalization would probably meet the second and third policy goals, but it would not protect the US taxpayer. Similarly, the government would have no credit risk under a fully private mortgage market, but this model would fall short on the second and third policy goals. As such, we believe that a long-term housing finance system in the US requires a *combination of substantial participation from private entities and some level of government support*.

Part III: Legislative solutions – Corker-Warner looks most likely

Over the past few years, there has been no shortage of legislative proposals to address the future of the US housing finance system. Most policymakers appear to be focused on reducing the government's role in supporting the mortgage market, although ideas about how to extricate government support differ from proposal to proposal. In most cases, the GSEs are either completely dissolved or have their responsibilities significantly reduced. Figure 11 summarizes the key elements of each bill.

FIGURE 11
Summary of recent legislative proposals to reshape the US housing finance system

Legislative proposal	Level of gov't involvement	What happens to the GSEs?	Credit risk sharing	Status
Corker-Warner Bill	Limited: Only under catastrophic scenarios where losses on a pool of mortgages exceeds 10%	Completely wound down over 5 years	10% first-loss piece is sold to private entities	Corker-Warner is under committee discussion but not yet put to vote. Either one of these may become the front runner from the Senate side but both will likely have private capital in the first loss place with several mechanisms for risk sharing
Crapo-Johnson Bill	Unclear: reforms the FHA/VA but maintains explicit government guarantee of all FHA/VA insured loans	Not addressed yet. Might add the GSE portion in coming months	None as of now but may resemble Corker-Warner when the GSE portion is included	
The PATH Act	Very limited: dissolves the GSEs completely and reduces the scope of the FHA/VA guarantee	Placed into receivership and completely liquidated within 5 years	Initially, there will be a 10% risk-sharing program on new GSE and FHA business, although private market securitization is intended eventually to replace the GSEs	The Path Act seems to be the clear front-runner on the House side. The final housing finance reform, if it happens, could be a compromise between the PATH Act and whatever comes out of the Senate
Delaney-Carney-Himes Proposal	Limited: Ginnie Mae is required to provide an explicit government guarantee once the 5% risk slice is eroded or when one of the private monoline insurers defaults	GSEs will be slowly wound down and eventually converted into private reinsurers with limited capacities to take on mortgage credit risk	5% first-loss piece on each new Ginnie Mae securitization, as well as a 10% pro -rata risk slice on the top 95% of each Ginnie Mae securitization	

Source: House of Representatives, Senate bills, Barclays Research

The Corker-Warner bill comes closest to our goals

We believe that the Housing Finance Reform and Taxpayer Protection Act (aka the Corker-Warner bill to replace/wind down the GSEs) and the FHA Solvency Act of 2013 (aka the Crapo-Johnson Bill to reform the FHA and shore up the Mutual Mortgage Insurance Fund) proposed in the Senate come closest on the three major policy goals we outlined above. The Corker-Warner bill protects the taxpayer by requiring a 10% privately held first-loss piece. It also establishes a separate Mortgage Access Fund that would be responsible for providing affordable housing to low and moderate income borrowers, so that these responsibilities would not conflict with the objective of the GSEs (or their proposed replacements) to maintain a liquid and healthy US mortgage market. Together with the reformed FHA, as envisioned under the Crapo-Johnson Bill, the new GSE entities would also provide a countercyclical government backstop to mortgage credit, though at a reasonably high guarantee fee.

The Corker-Warner bill aims to create a new, privately capitalized securitization platform to replace Fannie Mae and Freddie Mac (Figure 12). It would also continue to wind down the existing retained portfolios of the GSEs, reduce conforming loan limits, and transfer some mortgage credit risk to private entities.

The new securitization platform, the Federal Mortgage Insurance Corporation (FMIC), would provide explicit government guarantees on conforming loans, charging a guarantee fee to originators who sell the loans into the platform. These insurance premiums would then be placed into a mortgage insurance fund (MIF) that would be used to cover losses on the mortgage pools that exceed the risk-transferred thresholds. FMIC would also be given other regulatory responsibilities, including setting standards for eligible loans, creating a standard securitization platform, and approving credit risk-sharing programs.

Insures against catastrophic risk

One of the key features of the Corker-Warner legislation is the presence of an explicit government backstop in the event that private guarantors are unable to cover all losses. In this case, FMIC essentially provides a "full faith and credit" guarantee of the principal and interest of the FMIC security, in a similar fashion that GNMA does.

Guarantee fees fund a mortgage insurance fund

In exchange for providing a government guarantee on the security, FMIC is authorized to charge securitizers a guarantee fee to defray the cost to taxpayers of providing such insurance and the costs of any operating expenses. FMIC has the discretion to modify these fees to keep its reserves in excess of 2.5% of all insurance-in-force (ie, guarantee fees could be increased during times of housing market or economic weakness). That said, FMIC may not charge different fees for different lenders or loans from different geographic areas. In the event that the mortgage insurance fund is unable to satisfy its guarantee obligations through its mortgage guarantee fund, the bill establishes authority for FMIC to borrow up to $100bn from the US Treasury.

Proposal puts private capital in the first-loss position

One of the key tenets of the Corker-Warner bill is that it requires private investors to be in a first-loss position: the credit piece borne by private investors must be at least 10% of the principal amount. Furthermore, as a guideline, the first-loss piece should be large enough to cover losses associated with previous periods of economic and home price weakness experienced during the past 100 years.

The bill requires the development and implementation of various risk-sharing mechanisms within five years of the date of enactment. Specifically, it calls for examining senior-subordinated structures, credit-linked notes, and the use of regulated insurers to absorb any expected losses. FMIC will be required to submit a report annually to the House Financial Services Committee and the Senate Banking Committee during the first five years after enactment on the benefits and drawbacks of each credit-sharing mechanism.

The housing finance system proposed by Senators Corker and Warner resembles characteristics of the GNMA model; specifically, the explicit government backstop, as well as the establishment of a reserve fund to cover future mortgage losses as determined on an actuarial basis. However, the introduction of a risk-transfer mechanism should further alleviate the risk to the government and also provides a method by which market forces can influence credit underwriting standards, as well as provide signals to government regulators on impending defaults.

Although we believe that the housing finance system ultimately adopted by policymakers will strongly resemble the template established by the Corker-Warner bill, the timeframe required for the current system to evolve into this model is likely to be lengthy. Legislative and implementation issues will likely weigh on progress that can be achieved on shifting to this type of mortgage finance system in the near term.

Part IV: Raising private capital

The key challenge in any proposal to replace the GSEs with a private/public-private alternative is going to be how much new capital needs to be raised. Currently, the GSEs back about $4trn in mortgages (down slightly from $4.8trn at the end of 2009). Assuming that this portfolio stays at $4-4.5trn over the coming years and there is a 10% private ownership first-loss piece, as proposed by the Corker-Warner bill, this would translate into $400-450bn of new capital (if the government winds down the GSEs and keeps the excess cash flows from the GSEs).

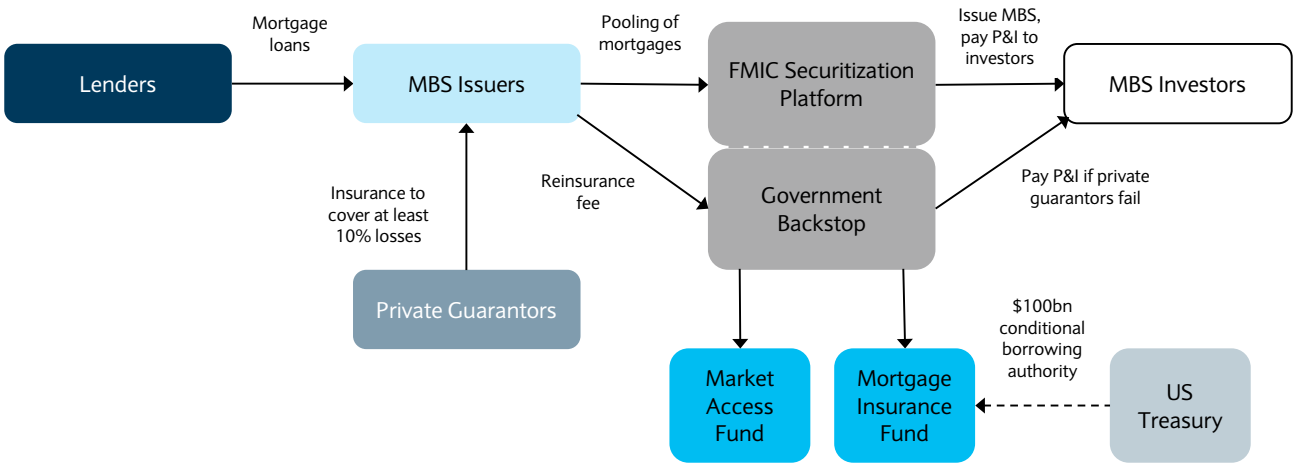
How does $450bn compare in the context of mortgage capital?

We believe that the amount of new capital required is much larger than what can be expected of the private market in the short term and will likely determine the pace of transition. The initial reaction to selling mortgage credit owned by the GSEs has been positive and deals have been oversubscribed. But so far, GSEs have only sold about 0.5% of the total that would be needed under a Corker-Warner-type bill requiring 10% private capital. We doubt that the market would be able to adapt to a scale of that magnitude in a hurry. So the question is: from where would the demand for mortgage credit risk come?

Can existing non-agency holders provide this capital?

One source of potential demand would be investors in legacy non-agency MBS. There is currently about $850bn (face value) outstanding in the non-agency market. This is paying down at the rate of $60-70bn annually. Given strong mortgage credit expertise among many of these investors, some of the pay-downs they are receiving would likely be reinvested in these securities. There could also be additional interest from money

FIGURE 12
Illustration of the Corker-Warner housing finance template



Source: Corker-Warner bill, Barclays Research

managers and REIT-like entities. It could be argued that the bulk of this $850bn is non-AAA and, thus, that the current holders of these securities represent a large set of investors interested in such credit profiles. However, that comparison would be wrong for two reasons. First, many investors are legacy holders who bought these bonds when they were AAA rated are not necessarily seeking to replace their existing positions with similar non-AAA risk. Second, those who bought these securities in the past few years invested in these securities at much higher yields than their levels today and the securities themselves were less leveraged to risk than a 10% first-loss piece would be. So while we could expect some demand from the hedge funds/money managers and insurance companies and, over time, they could potentially supply a large part of the capital needed, we believe it is unlikely they can take on the entire $450bn over a short period (3-5 years).

What about legacy non-AAA buyers in the private label securitization market?

Rather than look at current holders of non-agencies, how does the $450bn of new capital needed compare if we look at legacy buyers of non-AAA assets? The total outstanding private label non-AAA bonds peaked at just above $350bn in 2007 (Figure 13). That may look encouraging at first glance, but about $180bn of that was owned by CDOs, which obfuscated their true risk and likely overstates the true amount that could be sold in this market. Again, this hints at the fact that the securitized market is unlikely to provide anywhere close to $450bn of capital, except over a very long horizon.

How long will it take to fill the gap?

Another possible source of new capital is the equity market. Figure 14 shows equity raises (IPOs, additional raises and rights issues) by financial companies (excluding non-mortgage REITS and closed-end-funds) over time. There has been a surge in equity raises during and since the crisis. Banks raised about $220bn of new capital to shore up balance sheets that were hit hard by the credit crisis, as well as in response to higher capital standards. Still, the pace has, on average, been about $35bn per year for banks and about twice that when combining other financials such as insurance companies or mortgage REITs. Even assuming that capital raises continue at such a pace and most of it gets allocated to absorbing mortgage credit risk, it would take at least 5-10 years to get to $450bn in capital. And this is by no means assured. For example, if the $450bn is raised as equity capital, which demands a higher rate of return, mortgage rates would be significantly higher (100-150bp, assuming 10-15% required return on capital), something that would be politically unacceptable.

We came to a similar conclusion in *US housing finance: No silver bullet*, where we estimated that it would require 15-20 years for all government guaranteed mortgages to be funded on private sector balance sheets. While housing has improved greatly since that piece, 10-15 years will probably still be needed for a smooth transition.

We conclude that no single source will be able to provide $400-450bn of capital to transfer credit risk on close to $4.5trn of mortgages over a short time span of a few years. As such, if the capital requirement is 10%, new capital will have to be sought from other possible sources and over an extended time. That begs another question: is 10% capital the right size, or are there better ways to size the first-loss piece?

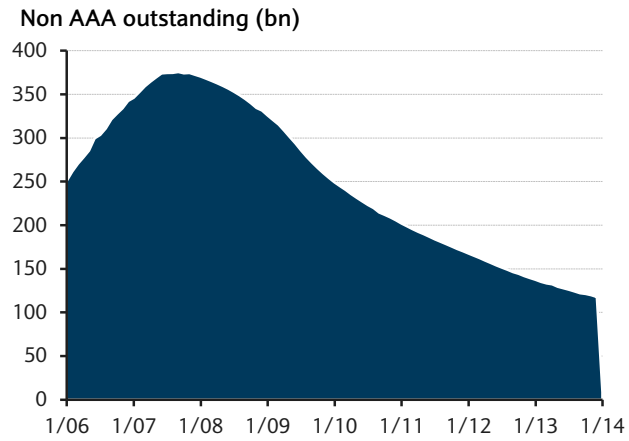
Is 10% the right size? Are there better options for sizing the first-loss piece?

A bigger capital requirement provides greater protection to the taxpayer but also makes capital raises more unmanageable. As we have shown in the previous section, 10% capital to support the $4.5trn or so of mortgages backed by the GSEs is a fairly large number in the context of the likely demand for such capital. So it begs the question of whether there are better options to size this piece.

Does a single number engender adverse selection?

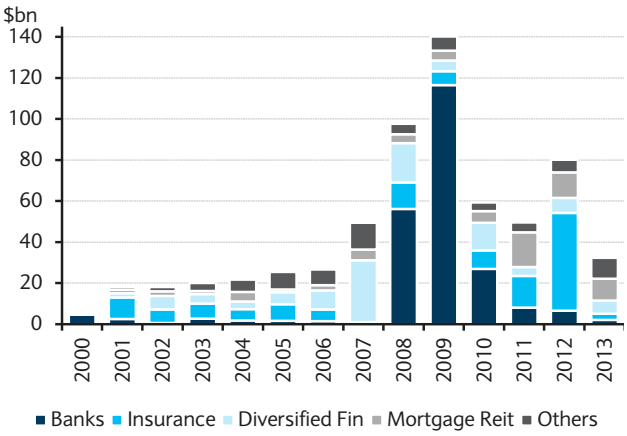
By specifying a single number such as 10%, the FMIC risks adverse selection on its portfolio. For clean collateral, where losses in excess of 10% are very unlikely, the value of the FMIC wrap may be minuscule. While the pricing of a FMIC wrap is still unclear, it would be hard to justify paying a significant amount for this wrap, and such cleaner

FIGURE 13
Total outstanding private label below AAA bonds over time, $bn



Source: Bloomberg, Barclays Research

FIGURE 14
Financial equity raises (excluding non-mortgage REITs and CEFs)



Source: Bloomberg, Barclays Research

collateral would likely be placed by the market without an FMIC wrap or find better bid from bank portfolios. The collateral that would gravitate towards an FMIC guarantee may in fact be adversely selected and/or barbelled so that in the base case scenario, it generates outsized yields for the bottom 10% piece, but in a somewhat unlikely scenario, it could breach the 10% equity buffer and possibly pass losses to the FMIC. In general, any constant number on the first-loss piece will face this problem to varying degrees.

Variable sizing may lead to uncertainty and illiquidity

The alternative to a fixed number is to use some form of sliding scale based on the risk in the loans. However, this introduces further subjectivity and raises the question of how this scale will be determined (models, rating agencies) and whether and how it would be adjusted over time. It may also create problems with a future TBA-type market that trades the wrapped top pieces. With a fixed slice, cash flows on the top-wrapped pieces across collateral are more comparable. If the size of the top-wrapped piece varies by collateral and/or over time, the TBA pools would not be comparable in terms of cash flows.

Political realities could drive this number

Economics apart, political realities are likely to drive this number. At the moment, there is still a fair amount of opposition to any taxpayer support of the housing finance system in Congress, especially among the "Tea Party" Republicans in the House. As a result, we believe that any compromise bill would have to include a high (say, 10%) private first-loss piece with as little subjectivity as possible.

Credit risk transfer deals are an efficient way to raise 10% fixed capital

We do not believe that the final legislation will require the first-loss piece to be fully equity funded. In that case, the market is likely to demand different returns on the 10% piece, depending on the risk of the pool of loans it backs. One efficient way to raise such capital is likely to be in a fairly disaggregate form, which allows the market to price the risk on the 10% private piece appropriately. The 10% would be funded with the right combination of equity and debt for that particular type of collateral risk. This would hint at some benefits to a credit risk transfer deal-type structure, something we examine in the next section.

What forms can private participation take?

The transfer of credit risk under the new model could use various structures to sell the credit risk.

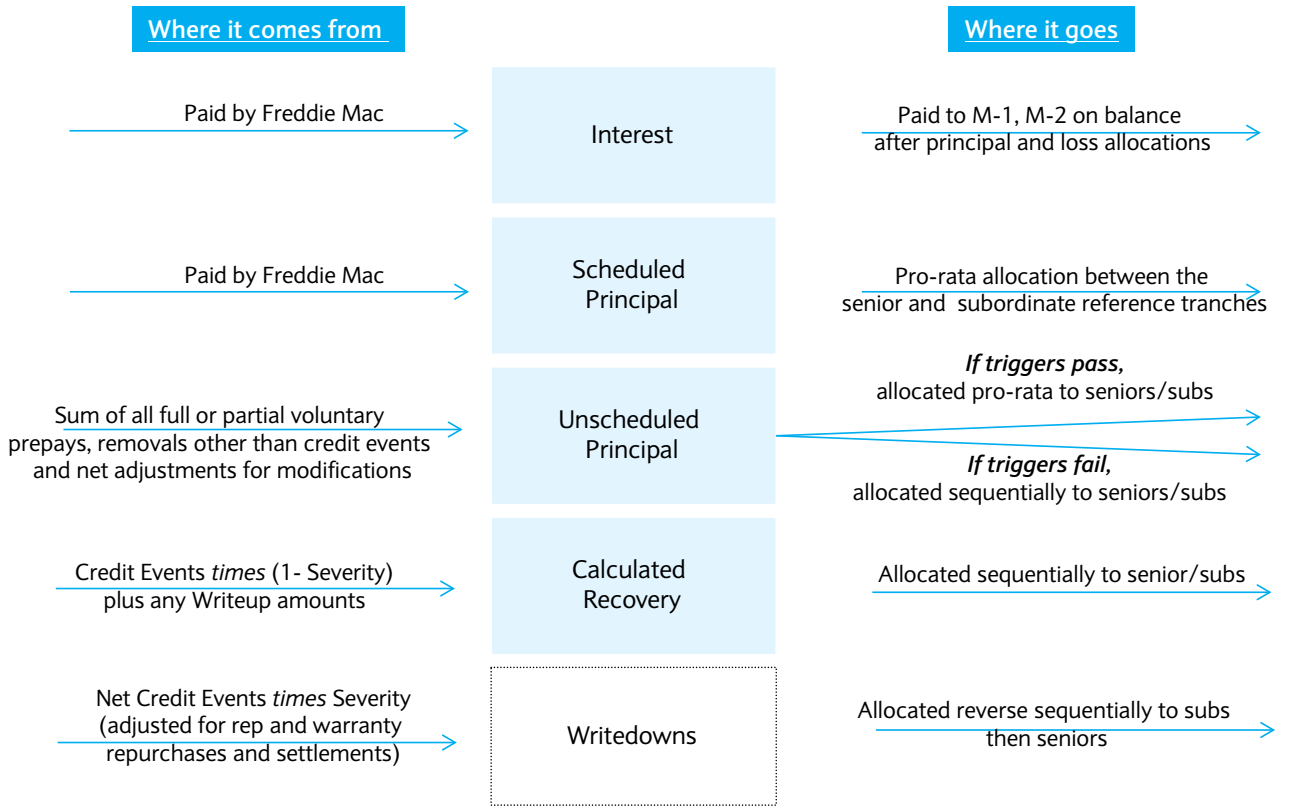
STACR/CAS[5]-like bonds or credit-linked notes are our preferred option

This structure relies on a securitization-like structure that sells the risk on a bottom first-loss piece to the market and retains the top portion of the risk at the GSEs. It can easily be adapted to do this in the FMIC structure proposed under the Corker-Warner bill by letting FMIC take on the role of Fannie/Freddie in the STACR/CAS deals. We discuss the structure in detail in *Introduction to GSE risk transfer deals* and show the sources and uses of cash flows in brief in Figure 15. This structure requires the FMIC first to issue a temporary guarantee on the entire mortgage and then sell the bottom piece to the private markets. The advantages are that the bottom loss piece is fully funded and the structure maintains the current TBA market and fully collateralizes the credit support used to absorb losses on the mortgage pool.

Such a structure also allows originators to continue to provide mortgages in more or less the same way they have for the GSEs. Currently, they have a good sense of what they can get paid for a particular GSE loan at the time of origination. The STACR/CAS-like solution first warehouses the risk at the FMIC and then sells it in the market. The FMIC will have enough scale across all originators to ensure that this warehousing period is fairly short and does not raise the overall risk it takes on. Furthermore, the FMIC will be entitled to the entire coupon on the loans for the warehousing period, which should compensate it adequately for any risk. A maximum limit can be imposed on the warehousing capacity to limit risk for the FMIC. Another alternative would be to create a separately capitalized utility to warehouse this risk. We think such a warehousing facility at FMIC is essential to ensure that smaller originators can compete on a more equal footing with larger ones.

FIGURE 15

Cash flows and losses, sources and allocation for the STACR 2013-DN1 deal



Source: Barclays Research

[5] STACR and CAS are Freddie Mac's and Fannie Mae's credit risk transfer deals. For details on how these structures work, please see *Introduction to GSE risk transfer deals*.

Senior-sub structure can also work

A senior-sub structure is also workable where the FMIC guarantees the top 90% piece for a guarantee fee and originators/aggregators sell/buy guarantees on the bottom piece separately. While it would be possible to create a liquid market for the top 90% (similar to the existing agency TBA market), this structure could lower overall competition in the origination business.

A senior and sub piece sold separately by an originator means that the originator has to warehouse the credit risk until it can sell it or aggregate enough scale to get reasonable execution on the credit piece. For example, an originator with $1bn of annual origination volumes originates about $83mn in mortgages and creates an $8.3mn credit piece in a month. This may not give it enough scale to sell the credit deal on a monthly basis and it may need to aggregate 3-6 months of originations before it can sell the credit piece without paying a size penalty. This would mean that the originator would not have certainty on its loan pricing for about 3-6 months. This would put it at a disadvantage to larger originators, which could do this monthly or at even shorter periods. As such, while the senior sub structure is workable, we still prefer the credit risk transfer structure because it allows more competition in the mortgage market.

Pool policies from mortgage insurers lead to counterparty risk for FMIC

This structure is similar to how pools of mortgages were insured prior to 2008, whereby insurers are exposed to a pre-specified loss amount on a pool of mortgages. This form of insurance may result in some counterparty credit risk. The STACR/CAS deals provide the GSEs with cash equal to the face value of the first-loss piece sold. This can be set aside to provide the GSEs with an actual cash capital cushion in case losses exceed the threshold that the GSEs have chosen. In the insurance/guarantee transaction, the insurer does not have to pay this cash up front but only if losses exceed a certain level. While the Corker-Warner bill requires guarantors to hold capital equal to at least 10% of the guaranteed balance, this works as a safeguard only if the guarantor's only business is to provide insurance on these pools. If it is involved in other lines of business, unless the capital is held in a separate account for the benefit of the enterprises or their successor, the taxpayer still takes on some counterparty credit risk. For example, if in certain extreme situations the losses on the guarantor's other lines of business exceed the capital set aside for those lines, there is some risk that the insurers will have to pay out using the capital otherwise required to be held to cover mortgage losses. This could lead to a situation where some part of the 10% is not covered and the taxpayer is exposed to the risk. Stronger oversight and regulations separating the capital held for guaranteeing MBS could mitigate this risk, but would not eliminate it completely.

The pool guarantee structures would not be as transparent in pricing as the STACR/CAS deals since there would be no secondary market to provide liquidity/ pricing information on an ongoing basis. The secondary market would provide more immediate feedback to guarantee fee pricing than a guarantee transaction could. A fully functional secondary market in these credit tranches also provides useful information that could allow a fully private market to price credit risk in a more transparent manner and help foster a fully private market. This solution also requires the FMIC to warehouse the risk first before selling it; due to the counterparty credit risk, we believe that the credit risk tranching solution is a superior method of selling risk than this.

Monoline guarantors as providers of first loss

A way to alleviate the counterparty credit risk that the FMIC takes on in the mortgage insurance structure is to build on the senior sub structure. As in the latter the top piece is directly guaranteed by the FMIC. The bottom piece is wrapped by a monoline guarantor and then sold to investors or held by originators. This allows the FMIC to be better protected from counterparty credit risk but shifts it to the holder of the wrapped bottom 10% slice. If the bottom 10% is sold in wrapped form in a senior sub structure, the buyer now takes on this credit risk and would charge a higher spread. Overall, this structure has the same drawbacks as the senior sub structure in terms of warehousing

but could provide better execution by separating the funding of the bottom 10% piece from the credit risk of the piece. However, the trade-off between funding/credit can also be achieved by tranching the 10% piece into a higher piece that is mostly credit risk free and a bottom locked-out piece that takes on most of the credit risk. As such, we would expect this to be a part of the solution if a senior sub market does crop up in response to a Corker-Warner type legislation.

A wide mix of the structures is likely required

Overall, although we favor the credit-linked structure, given the size of credit risk transfer required over the long run, it might be preferable to have multiple exit options, including through pool/bond guarantors. We believe that it might be useful to allow the market to evolve using all these possible avenues to sell credit risk. This would allow investors with various risk profiles and return objectives to come up with the required capital and potentially create a system that is not reliant on any single source.

Part V: Interplay of reform legislation with QM rules

The evolution of housing finance over the longer term will be driven not only by the reform legislation, but also by its interplay with existing rules. The most prominent of these are the Qualified Mortgage (QM) rules that went into effect on January 10, 2014. These impose additional costs on originating non-QM loans by creating potential liability for the lenders or the assignee/eventual owners of these mortgages. Qualified Residential Mortgage (QRM) rules, which are still in the proposal stage, could also be finalized this year. While the current proposal seems to point to fairly benign rules and may not affect any significant part of the mortgage market, they could, if adopted in a form that affects a wider swathe of mortgages, reduce the flexibility that originators have in securitizing these deals by imposing a risk retention requirement.

FIGURE 16
Additional liabilities in a QM world

	Low Priced QM	High Priced QM	Non QM
Level of Protection	Safe harbor	Rebuttable presumption	No presumption
What does the borrower need to prove to establish that the loan does not meet ATR?*	Needs to prove that the loan is not a QM loan based on information available to the lender at the time the loan was made, to remove ATR presumption and then contest that loan did not meet ATR requirements.	Needs to show that borrower would not have enough residual income after paying mortgage and other debts to meet living expenses based on information available to the lender at the time the loan was made.	No presumption of compliance, so lender may need to show that the loan satisfies ATR requirements. However, this could be fairly subjective.
Maximum liability if loan does not meet ATR	• Actual damages (extent unspecified) • All finance charges paid by borrower (up to a maximum of three years) • Statutory damages in individual or class actions with some limitations ($400- $4000) • Court costs and attorney fees (could be fairly high for long drawn out legal battles)		
What can lenders/assignees do to prevent a successful ATR claim?	Ensure minimum errors in the underwriting process	Conduct a residual income assessment prior to origination to ensure that they have documented evidence of the borrowers' residual income in relation to their living expenses	Have well-established underwriting guidelines that meet the broad ATR specifications. Modify/use short sales to prevent an actual foreclosure (so it cannot be contested).

Note: *Ability to Repay. Source: CFPB, Barclays Research

Do QM/ATR rules constrain mortgage credit availability?

With mortgage credit still at historically tight levels and the housing market continuing to normalize, we see scope for expansion in mortgage credit over the coming years, even with the QM rules. That said, the ATR/QM requirements imposed by the Dodd-Frank Act will make it harder for credit to expand to pre-crisis levels. In particular, the rules will affect loans with interest only/negative amortization or balloon features, greater than 43 debt-to-income ratio (DTI), high points and fees or limited documentation. At present, the majority of new originations have a GSE/FHA guarantee and receive temporary QM status. These loans comply with most parts of QM, but about 15% of current GSE production have DTIs exceeding 43% and would not be QM under the general rules. However, for the next seven years, even these loans are covered by a GSE-specific exemption, and we do not expect the rules to have any immediate effect on credit availability.

If the entity that succeeds the GSEs (such as the FMIC) does not receive the same temporary QM treatment, we believe that the effect on current production of mortgages will be manageable, although the 15% of mortgage originations that would be non-QM under the general definitions would likely see additional ATR liability-related costs.

Additional costs on loans typically limited to foreclosures

As Figure 16 shows, non-QM loans have additional litigation risk. Borrowers faced with a foreclosure can attempt to show that the loan was made without consideration to their ability to repay the loan. However, a non-QM loan does not automatically mean a loan that does not meet the ATR standards required by the law. Still, if the borrower can prove this to be the case, he or she can receive up to three years of finance charges (mostly interest payments) as statutory damages, in addition to legal costs/lawyer fees and possible actual damages (which are somewhat open ended). These could add significant uncertainty to the costs that lenders have to bear for delinquent/defaulting loans. They are borne by the eventual assignee of the mortgage at the time of the litigation, imposing additional costs on securitizing these loans.

ATR costs scale with defaults, limiting credit for medium to worse credit borrowers

Since these costs scale with the absolute level of delinquencies/defaults (borrowers are unlikely to claim this while continuing to make payments), we believe that this will have the biggest effect on medium-to-worse credit quality borrowers. For cleaner-credit borrowers, the likelihood of defaults will be very low; hence, the incremental ATR costs will also be minimal. However, as default likelihood increases, these ATR costs also go up, likely making it costlier to originate these loans.

For example, Figure 17 shows the incremental costs of originating IO loans (non-QM) vs non-IO loans (which are QM). The total cost is made up of two parts. The first is the credit cost associated with the higher expected defaults/losses on IO loans. To this we must add the likely cost of ATR claims (equal to the *expected ATR loss x total defaults x likely rate of successful claims*) to arrive at a fully loaded breakeven spread at which the lender should be agnostic between an IO/non-IO loan.

Overall, we find that the credit cost of originating clean IOs and the ATR cost are close to 0 in our base case. In a severe stress scenario, the credit cost is 35-40bp for clean loans, with an additional 10-12bp of ATR costs. As we go to worse collateral (lower FICO/higher LTV), the credit cost increases to 80-120bp and the incremental ATR cost is 30-40bp.

Higher rates could disproportionately affect weaker credit borrowers

For cleaner credit loans, the additional cost of originating non-QM loans will remain small and will not affect the availability of credit to such borrowers. However, as rates rise, all else equal, the DTIs of new originations should trend higher and increase the demand for more affordable non-QM IO loans. As such, we believe that while the availability of this credit for cleaner credit borrowers will remain, the rules will reduce the availability of this credit on weaker credit borrowers since originators will likely charge an extra 50-100bp for these loans.

FIGURE 17
Likely breakeven spread for IO/non-IO

		2000-2002 Perf. (Base Case)		2006 Perf. (Sev. Stress Case)	
	LTV Buckets	700-740 FICO	>740 FICO	700-740 FICO	>740 FICO
Difference in Loss IO vs Non IO (ex advances) assuming 0% ATR Claims	70-80	0.1%	0.0%	3.5%	2.3%
	60-70	0.0%	0.0%	2.7%	1.1%
Difference in Loss IO vs Non IO (ex advances) assuming 50% ATR Claims	70-80	0.1%	0.1%	4.8%	3.1%
	60-70	0.0%	0.0%	3.5%	1.5%
Breakeven Spread IO vs no IO 0% successful QM Claims (bp)	70-80	2	1	118	78
	60-70	0	0	89	37
Breakeven Spread IO vs non IO 50% successful QM Claims (bp)	70-80	4	2	161	103
	60-70	1	0	116	48

Note: For owner occupied jumbo loans. Lifetime cumulative defaults are extrapolated from current numbers. For the stress case, we assume that forward defaults are at about 75% of the pace of what we have seen, given some burnout. Similarly, we assume that forward severities ex-advances are about 75% of severities seen to date. Source: Barclays Research

QRM unlikely to matter, given the 10% private ownership

Although all closed-end residential mortgage loans need to meet the QM requirements, the proposed QRM rules apply only to mortgages that are eventually securitized. The QRM rules as currently proposed would mimic the QM requirements and, as such, any loan that meets the QM criteria would also meet the QRM criteria. Loans that do not meet the QM criteria would also fail to be a QRM, and any securitization on such a loan would trigger risk-retention requirements (see *Effect of revised risk retention rules on securitized products*, 30 August 2013 for additional details). However, if the new legislation requires more than a 5% first-loss piece with private ownership, that should satisfy the risk retention requirements and the effect of the QRM rules should be minimal.

Credit availability will also be driven by various implementation issues

Away from the housing reform legislation and QM rules, the all-in cost of mortgages would also depend on various other implementation issues. While there are many such nuances, we focus on two.

TBA market transition

The current agency TBA market is one of the most liquid fixed income markets in the world, as reflected in lower mortgage costs. The transition of the TBA market or the creation of a new one would have mortgage rate implications. A smooth transition, whereby the future TBA market or its replacements retain the high liquidity, would keep mortgage costs lower. It would require selling the bottom piece in a way that does not affect the liquidity of this top government guaranteed piece. Given that the bottom pieces could be of various sizes, it would help if the eventual solution can effectively treat the private-first loss piece as a black box and ensure a consistent cash flow structure for the senior piece.

Control of loss mitigation and servicing

Under the current setup, GSEs retain control on the entire servicing and loss mitigation issues. This allows them to protect themselves from losses and implement other policy goals. However, if the plan is to sell the 10% bottom piece, this responsibility will have to be devolved to someone lower down in the capital structure. In the absence of this control over the loss mitigation process (say, because of policy goals), investors in the first-loss piece will not be in a position to mitigate these losses and, as a result, will price the bottom piece to somewhat worse assumptions.

From our standpoint, the first-loss holder should be given control of the loss mitigation and servicing responsibilities. The various servicer settlements and the rules following those should be enough to prevent any abuses of the system by servicers in general and protect borrowers from mistreatment in most cases. The FMIC could retain some mechanism to wrest back this control failing certain loss or delinquency triggers.

Part VI: Implications on the availability and cost of mortgage credit

It is possible that on a contentious issue such as housing reform, new legislations emerge that are much different in form and character from the existing ones. That said, we would argue that two scenarios are most likely several years from now.

- **Status quo**: Given the political gridlock in Washington DC, impending elections, complexity of the housing finance reform, transition and complications around the GSE junior preferred issue, housing finance legislation may take several years to become law. And the longer it takes to pass a bill, the greater the likelihood that some version of the status quo will prevail. But, assuming the GSEs continue with their current risk transfer initiatives, even the status quo should get the market to a situation somewhat similar to the one envisioned by the Corker-Warner bill. Admittedly, the level of private sector involvement should be lower than if legislation similar to Corker-Warner is passed. But unless housing finance regulators completely reverse course, a progression of the status quo should still lead to improved taxpayer protection from current levels.
- **Corker-Warner style legislation goes through:** Even if a 10% first-loss piece has to be sold for each type of collateral, FMIC could cut up the piece into safer and riskier bonds (as the STACR/CAS deals do with the M1 bonds, which are rated as investment grade, and M2 bonds, which are unrated). Under such a system, the bottom 10% would require different yields based on the underlying risk of the mortgages, with lower risk cohorts selling at a lower required yield than higher risk cohorts. As such, even with a 10% capital requirement, we would expect this variable pricing to make the FMIC structure somewhat competitive with banks.

Under both scenarios, there would be three different possible exits for an originator: risk transfer, bank portfolio bid and private securitization. Below, we compare the execution of these outlets in an environment where a Corker-Warner-like bill (or significant GSE risk shedding deals) has been in force for five years. The analysis is stylized but hopefully gives a flavour of what the implications would be for the availability and cost of mortgage credit.

Comparing execution for different outlets

We can measure the effect of all these changes on the housing finance system as a combination of the credit availability and cost of credit in the mortgage finance system. To gauge these differences, we measure the likely effect on mortgage rates for various cohorts. We split the mortgage universe into six stylized risk buckets across FICO (high >700, med 620-700 and low <620) and CLTVs (low <= 80% and high > 80%). We also assume that economic conditions are relatively normal and that the QM/QRM guidelines do not go through any drastic changes. These are purely illustrative and the effect on the mortgage market will obviously be much more nuanced. To illustrate the range on outcomes, we compute the likely mortgage rate for four possible execution scenarios.

1. **Bank portfolio bid:** Banks are always a prominent source of mortgage credit. To calculate the required rate on mortgages for a bank bid, we assume that banks hold the extreme case expected loss as capital and that they are required to earn 15% ROE on this. We also assume that they want to earn a spread that compensates them for the expected case loss over 4 years and add 100bp to the rate to account for servicing costs and compensation for broker/other upfront origination costs. On the rest of the mortgage, we assume they are fine with earning the yield equal to the current coupon mortgage rate (as a proxy for funding and convexity costs). So the mortgage rate shown for bank bid equals:

   (extreme loss x 15%)+ ((1-extreme loss) x CC mortgage rate) + (base case loss/4) + 100bp

2. **Corker-Warner (or risk transfer) with tranching**: If a Corker-Warner like bill is passed, the all-in mortgage rate would have to account for the required rate of return on the first-loss piece, as well as the guarantee fee charged by the FMIC. We assume that the guarantee fee charged by the FMIC on the top 90% is 15bp. This could be higher for worse collateral. Assuming a higher guarantee fee for the worse collateral should not change the overall economics much. We further assume that the bottom 10% can be sold with a fair amount of flexibility on tranching. This assumes that a structure similar to the credit risk-sharing deals is used on fairly disaggregate collateral. As a result, the bottom 10% should price with different yields based on the difference in expected losses on the underlying collateral. We compute the required mortgage rate by adding up the FMIC guarantee fee (assumed to be 15bp), the contribution of the required yield, a compensation for base case loss, servicing/origination costs and the cost of funding and convexity risk on the top 90% piece. So the total WAC is equal to:

   FMIC gfee x 90% + (10% x required yield) + (90% x CC mortgage rate) + (base case loss/4) + 100bp

Furthermore, we compute the variable required yield as the weighted average of 15% on the true equity component and 5% on the rest of the first loss piece, which will trade more like debt. If we assume that the extreme case loss is the true equity required for the various cohorts, the required yield is:

*((min(10%,extreme loss)) x 15% + (10% – min(10%,extreme loss))*5%)/10%*

3. Corker-Warner (or risk transfer) with minimal tranching: We assume that the bottom 10% can be sold only with minimal tranching, for example, with 5% held as equity capital requiring 15% yield and the other 5% in debt form at 5% yield. We assume the required yield on the bottom 10% to be about 10% (average of 5% equity at 15% yield and 5% debt at 5% yield). This would be close to what a pool/bond guarantor model would entail, assuming that the pool/bond guarantor was forced to hold 10% capital with 5% in equity form and another 5% in debt form. It is possible that given the uncertainty about the collateral that would back such pool/bond guarantees and the possible adverse selection in these, equity/debt holders could demand higher rates. If this happened, the execution for such guarantees would suffer. As above, we calculate the mortgage rate assuming that the required yield is equal to 10%:

FMIC gfee x 90% + (10% x required yield) + (90% x CC mortgage rate) + (base case loss/4) + 100bp

4. **Private Label Securitization:** Execution in this market for the bottom 10% should be very close to the "Corker-Warner with tranching" scenario since the bottom 10% slice will price in a similar way. For the top 90% piece, execution should be worse than the "Corker-Warner with tranching" scenario because the credit and liquidity costs likely charged by the private market would be higher than the FMIC guarantee fees (we assume 15bp). If the FMIC guarantee fees are excessively high, then it is possible to imagine a scenario where private securitization is better than a Corker-Warner exit. However, Corker-Warner does envision that after an initial transition period the FMIC fund will be dissolved. In such an outcome, the FMIC guarantee fees could be raised slowly until the private market becomes competitive on the top 90% piece. In the medium term, however, if a Corker-Warner-like solution is available, we believe that private securitization will exist but be restricted to non-conforming and non-QM collateral.

Cleanest credit borrowers least affected; weaker-credit spreads could widen

Figure 18 shows the results of these computations across the execution scenarios. For the cleanest collateral, bank execution is likely to be better than a Corker-Warner-style execution, assuming that banks are allowed to hold capital based on the expected losses on the underlying mortgages. This will likely be true for the largest banks (which make up

FIGURE 18
Bank portfolio vs Corker-Warner execution

	% GSE/Non Agency Originations		Average Expected Losses For QM Loans across Scenarios		Approximate WACs				
Credit Bucket	2004-2007	2013	Base	Extreme Stress	Current	Bank Portfolio @15% equity yield	Corker Warner with 10% yield on bottom 10%	Corker Warner with variable yield on bottom 10%	Increase from current WACs(bp)
High FICO Low LTV	54%	78%	0	2	4.7	4.7	5.3	4.9	0-20
High FICO High LTV	7%	6%	2	7	5.5	5.7	5.6	5.9	10-40
Med FICO Low LTV	19%	10%	1	6	5.0	5.4	5.5	5.6	40-60
Med FICO High LTV	7%	1%	5	16	6.3	7.6	6.5	7.0	20-130
Low FICO Low LTV	9%	4%	2	8	5.1	5.9	5.6	5.9	50-80
Low FICO High LTV	4%	0%	9	21	6.8	9.4	7.4	7.9	60-260
2004-2007 Mix			1.5	5.2	5.1	5.4	5.5	5.5	30-40
2013 Mix			0.7	2.9	4.8	4.9	5.3	5.1	10-50

Note: We assume that banks are required to hold capital equal to losses expected in an extreme stress scenario. We further assume that all private participants require full compensation for base case losses for each collateral type over a 4 year assumed duration. We require bank capital to earn 15% yields and Corker-Warner capital to earn 10% yields. We assume that FMIC charges a flat 15 bp gfee across all collateral types. We use the following aggregations: Low LTV(<=80%), High LTV(>80%), High FICO (> 700), Med FICO(620-700), Low FICO(<620). Source: Barclays Research

more than 55% of originations), which will be able to use model-based capital charges on these loans. For the cleanest loans, the combination of the 10% first-loss piece (even assuming that a lower weighted average yield is required on this piece) and the FMIC guarantee fee will result in a loan that is more expensive to make than the bank portfolio bid. In the best case execution scenario for high-FICO low-LTV borrowers, there could be very little change in overall rates. However, banks could widen pricing to match the best Corker-Warner execution or even more if raising the large amount of capital widens the required ROE from the 15% that we have assumed. As such, we expect banks and Corker-Warner structures to be competitive in the cleaner cohort, which represents the largest fraction of the overall mortgage origination universe.

As we move to lower credit quality loans and the economic capital required to be held by banks approaches 10%, the Corker-Warner execution becomes better than the bank bid. This is again indicative of one of the problems with the fixed 10% first-loss piece noted earlier. Even with tranching, the fixed first-loss piece and the FMIC guarantee are subject to some adverse selection. If we increase the FMIC guarantee fee, it could prevent some of this, but that would come at a higher mortgage rate on these borrowers. Overall, we would expect the WACs on these borrowers to increase 50-100bp, possibly even more if FMIC guarantee fees are made to scale with the credit risk of the loans. Unless the MI premiums charged by the FHA are increased to match these costs, there could be an even bigger shift into FHA lending, especially for weaker-credit borrowers.

We expect credit conditions to loosen incrementally

Although the cost of credit will increase because of the returns required on the private capital, we believe that a higher share of worse-credit loans will be made. For instance, the share of medium/low FICO low LTV originations in 2013 non-FHA space was 1%, compared with 11% in 2004-07. So, while the nominal WAC for these loans is low today in the GSE world, these loans are not being made. However, we believe that over the coming years, as the housing market normalizes and the recency effect on housing credit decreases, there should be incremental loosening in credit standards. Over time, we believe this will lead to a higher share of worse-credit mortgages being made, despite the higher credit costs charged by private capital. If this process of credit normalization

remains slow, we would also expect the pace of GSE reform to slow. We believe that policymakers will remain concerned about the health of the housing market for the next few years and, as such, will not allow a significant tightening of credit standards.

Appendix: Housing finance reform legislation

Below, we list some of the highest-profile legislative proposals:

- **Corker-Warner bill (Housing Finance Reform and Taxpayer Protection Act)**: The proposal completely winds down Fannie Mae and Freddie Mac over five years, transferring their functions to a new government entity called FMIC that provides catastrophic loss protection on a pool of mortgages once credit losses exceed 10%. Private entities, including bond insurers, investors, and mortgage insurance companies, would incur the risk on the first 10% slice. Issuers/originators would pay FMIC a guarantee fee in return for the government backstop, which would be held in a reserve fund to be used to pay catastrophic claims. Loan limits would be gradually reduced on the size of loans eligible for an FMIC guarantee.

- **Crapo-Johnson bill (The FHA Solvency Act of 2013):** This bill is meant primarily to stabilize and strengthen the existing FHA/VA infrastructure. The capital reserve ratio for the Mutual Mortgage Insurance Fund would be increased to 3% from 2% within 10 years. The Secretary of HUD would also be required to charge a minimum annual insurance premium of at least 55bp and re-evaluate it every year to ensure that the premiums paid by borrowers are sufficient to maintain the 3% capital reserve ratio. The secretary is also given authority to terminate a lender's license to originate FHA/VA loans on a national basis if it is unable to meet certain HUD performance standards. The secretary is also required to revise the FHA's underwriting standards as necessary to better define borrower credit risk.

- **Protecting American Taxpayers and Homeowners (PATH) Act**: Under this proposal, the GSEs would be placed into receivership and completely wound down over five years, their guarantee fees would be reviewed each year to ensure that adequate compensation is paid for the mortgage credit guarantee, and loan limits would be reduced in high-cost areas. With respect to the FHA, down-payment requirements would be raised from 3.5% to 5%, the FHA's loan-level insurance coverage would gradually be reduced from 100% to 50%, and the FHA would be required to charge a minimum annual premium on all loans and offer risk-based pricing. A credit risk-sharing program would be established whereby at least 10% of the credit risk on the GSEs' and the FHA's new business every year would be sold to private investors. The bill would also provide regulatory relief for banks engaged in originating mortgages, including by delaying implementation of Basel III rules for two years, providing regulatory exemptions for mortgages meeting certain qualifications, and repealing QRM requirements. Finally, a common platform would be established (National Mortgage Market Utility) that would develop common standards for the origination, servicing, pooling, and securitization of mortgages.

- **Delaney-Carney-Himes proposal**: This envisions a public-private partnership whereby a first-loss piece of 5% on each securitized mortgage pool is required to be sold to private monoline insurance companies, with Ginnie Mae providing a reinsurance guarantee on the remaining 95% of each pool. Private reinsurers would contract with Ginnie Mae to share the reinsurance risk using market-based pricing, with the private reinsurer absorbing at least a 10% pro rata share of the 95% top slice. Ginnie Mae and the private reinsurer would receive the same terms and price for the risk that is shared so that the reinsurance fee is dictated by market forces. Fannie Mae and Freddie Mac would be slowly wound down and converted into one of the several private monoline insurers and reinsurers providing protection on the Ginnie Mae securities. The issued Ginnie Mae securities would be standardized so that a liquid TBA market could develop.

Analyst Certification
We, Sandeep Bordia, Dennis Lee, Ajay Rajadhyaksha and Jasraj Vaidya, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

Each research report excerpted herein was certified under Reg AC by the analyst primarily responsible for such report as follows: I hereby certify that: 1) the views expressed in this research report accurately reflect my personal views about any or all of the subject securities referred to in this report and; 2) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

Important Disclosures:
Barclays Research is a part of the Corporate and Investment Banking division of Barclays Bank PLC and its affiliates (collectively and each individually, "Barclays"). For current important disclosures regarding companies that are the subject of this research report, please send a written request to: Barclays Research Compliance, 745 Seventh Avenue, 14th Floor, New York, NY 10019 or refer to http://publicresearch.barclays.com or call 212-526-1072.

Barclays Capital Inc. and/or one of its affiliates does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that Barclays may have a conflict of interest that could affect the objectivity of this report. Barclays Capital Inc. and/or one of its affiliates regularly trades, generally deals as principal and generally provides liquidity (as market maker or otherwise) in the debt securities that are the subject of this research report (and related derivatives thereof). Barclays trading desks may have either a long and / or short position in such securities, other financial instruments and / or derivatives, which may pose a conflict with the interests of investing customers. Where permitted and subject to appropriate information barrier restrictions, Barclays fixed income research analysts regularly interact with its trading desk personnel regarding current market conditions and prices. Barclays fixed income research analysts receive compensation based on various factors including, but not limited to, the quality of their work, the overall performance of the firm (including the profitability of the investment banking department), the profitability and revenues of the Fixed Income, Currencies and Commodities Division and the potential interest of the firm's investing clients in research with respect to the asset class covered by the analyst. To the extent that any historical pricing information was obtained from Barclays trading desks, the firm makes no representation that it is accurate or complete. All levels, prices and spreads are historical and do not represent current market levels, prices or spreads, some or all of which may have changed since the publication of this document. Barclays produces various types of research including, but not limited to, fundamental analysis, equity-linked analysis, quantitative analysis, and trade ideas. Recommendations contained in one type of research may differ from recommendations contained in other types of research, whether as a result of differing time horizons, methodologies, or otherwise. Unless otherwise indicated, Barclays trade ideas are provided as of the date of this report and are subject to change without notice due to changes in prices. In order to access Barclays Statement regarding Research Dissemination Policies and Procedures, please refer to https://live.barcap.com/publiccp/RSR/nyfipubs/disclaimer/disclaimer-research-dissemination.html. In order to access Barclays Research Conflict Management Policy Statement, please refer to: http://group.barclays.com/corporates-and-institutions/research/research-policy.

The MSCI sourced information is the exclusive property of MSCI Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, redisseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI and the MSCI indexes are services marks of MSCI and its affiliates.

Disclaimer:
This publication has been prepared by the Corporate and Investment Banking division of Barclays Bank PLC and/or one or more of its affiliates (collectively and each individually, "Barclays"). It has been issued by one or more Barclays legal entities within its Corporate and Investment Banking division as provided below. It is provided to our clients for information purposes only, and Barclays makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to any data included in this publication. Barclays will not treat unauthorized recipients of this report as its clients. Prices shown are indicative and Barclays is not offering to buy or sell or soliciting offers to buy or sell any financial instrument.
Without limiting any of the foregoing and to the extent permitted by law, in no event shall Barclays, nor any affiliate, nor any of their respective officers, directors, partners, or employees have any liability for (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified of the possibility of such damages, arising from any use of this publication or its contents.
Other than disclosures relating to Barclays, the information contained in this publication has been obtained from sources that Barclays Research believes to be reliable, but Barclays does not represent or warrant that it is accurate or complete. Barclays is not responsible for, and makes no warranties whatsoever as to, the content of any third-party web site accessed via a hyperlink in this publication and such information is not incorporated by reference.
The views in this publication are those of the author(s) and are subject to change, and Barclays has no obligation to update its opinions or the information in this publication. The analyst recommendations in this publication reflect solely and exclusively those of the author(s), and such opinions were prepared independently of any other interests, including those of Barclays and/or its affiliates. This publication does not constitute personal investment advice or take into account the individual financial circumstances or objectives of the clients who receive it. The securities discussed herein may not be suitable for all investors. Barclays recommends that investors independently evaluate each issuer, security or instrument discussed herein and consult any independent advisors they believe necessary. The value of and income from any investment may fluctuate from day to day as a result of changes in relevant economic markets (including changes in market liquidity). The information herein is not intended to predict actual results, which may differ substantially from those reflected. Past performance is not necessarily indicative of future results.
This communication is being made available in the UK and Europe primarily to persons who are investment professionals as that term is defined in Article 19 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005. It is directed at, and therefore should only be relied upon by, persons who have professional experience in matters relating to investments. The investments to which it relates are available only to such persons and will be entered into only with such persons. Barclays Bank PLC is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority and is a member of the London Stock Exchange.
The Corporate and Investment Banking division of Barclays undertakes U.S. securities business in the name of its wholly owned subsidiary Barclays Capital Inc., a FINRA and SIPC member. Barclays Capital Inc., a U.S. registered broker/dealer, is distributing this material in the United States and, in connection therewith accepts responsibility for its contents. Any U.S. person wishing to effect a transaction in any security discussed herein should do so only by contacting a representative of Barclays Capital Inc. in the U.S. at 745 Seventh Avenue, New York, New York 10019.

Non-U.S. persons should contact and execute transactions through a Barclays Bank PLC branch or affiliate in their home jurisdiction unless local regulations permit otherwise.
Barclays Bank PLC, Paris Branch (registered in France under Paris RCS number 381 066 281) is regulated by the Autorité des marchés financiers and the Autorité de contrôle prudentiel. Registered office 34/36 Avenue de Friedland 75008 Paris.
This material is distributed in Canada by Barclays Capital Canada Inc., a registered investment dealer and member of IIROC (www.iiroc.ca).
Subject to the conditions of this publication as set out above, the Corporate & Investment Banking Division of Absa Bank Limited, an authorised financial services provider (Registration No.: 1986/004794/06. Registered Credit Provider Reg No NCRCP7), is distributing this material in South Africa. Absa Bank Limited is regulated by the South African Reserve Bank. This publication is not, nor is it intended to be, advice as defined and/or contemplated in the (South African) Financial Advisory and Intermediary Services Act, 37 of 2002, or any other financial, investment, trading, tax, legal, accounting, retirement, actuarial or other professional advice or service whatsoever. Any South African person or entity wishing to effect a transaction in any security discussed herein should do so only by contacting a representative of the Corporate & Investment Banking Division of Absa Bank Limited in South Africa, 15 Alice Lane, Sandton, Johannesburg, Gauteng 2196. Absa Bank Limited is a member of the Barclays group.
In Japan, foreign exchange research reports are prepared and distributed by Barclays Bank PLC Tokyo Branch. Other research reports are distributed to institutional investors in Japan by Barclays Securities Japan Limited. Barclays Securities Japan Limited is a joint-stock company incorporated in Japan with registered office of 6-10-1 Roppongi, Minato-ku, Tokyo 106-6131, Japan. It is a subsidiary of Barclays Bank PLC and a registered financial instruments firm regulated by the Financial Services Agency of Japan. Registered Number: Kanto Zaimukyokucho (kinsho) No. 143.
Barclays Bank PLC, Hong Kong Branch is distributing this material in Hong Kong as an authorised institution regulated by the Hong Kong Monetary Authority. Registered Office: 41/F, Cheung Kong Center, 2 Queen's Road Central, Hong Kong.
Information on securities/instruments that trade in Taiwan or written by a Taiwan-based research analyst is distributed by Barclays Capital Securities Taiwan Limited to its clients. The material on securities/instruments not traded in Taiwan is not to be construed as 'recommendation' in Taiwan. Barclays Capital Securities Taiwan Limited does not accept orders from clients to trade in such securities. This material may not be distributed to the public media or used by the public media without prior written consent of Barclays.
This material is distributed in South Korea by Barclays Capital Securities Limited, Seoul Branch.
All equity research material is distributed in India by Barclays Securities (India) Private Limited (SEBI Registration No: INB/INF 231292732 (NSE), INB/INF 011292738 (BSE), Registered Office: 208 | Ceejay House | Dr. Annie Besant Road | Shivsagar Estate | Worli | Mumbai - 400 018 | India, Phone: + 91 22 67196363). Other research reports are distributed in India by Barclays Bank PLC, India Branch.
Barclays Bank PLC Frankfurt Branch distributes this material in Germany under the supervision of Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin).
This material is distributed in Malaysia by Barclays Capital Markets Malaysia Sdn Bhd.
This material is distributed in Brazil by Banco Barclays S.A.
This material is distributed in Mexico by Barclays Bank Mexico, S.A.
Barclays Bank PLC in the Dubai International Financial Centre (Registered No. 0060) is regulated by the Dubai Financial Services Authority (DFSA). Principal place of business in the Dubai International Financial Centre: The Gate Village, Building 4, Level 4, PO Box 506504, Dubai, United Arab Emirates. Barclays Bank PLC-DIFC Branch, may only undertake the financial services activities that fall within the scope of its existing DFSA licence. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.
Barclays Bank PLC in the UAE is regulated by the Central Bank of the UAE and is licensed to conduct business activities as a branch of a commercial bank incorporated outside the UAE in Dubai (Licence No.: 13/1844/2008, Registered Office: Building No. 6, Burj Dubai Business Hub, Sheikh Zayed Road, Dubai City) and Abu Dhabi (Licence No.: 13/952/2008, Registered Office: Al Jazira Towers, Hamdan Street, PO Box 2734, Abu Dhabi).
Barclays Bank PLC in the Qatar Financial Centre (Registered No. 00018) is authorised by the Qatar Financial Centre Regulatory Authority (QFCRA). Barclays Bank PLC-QFC Branch may only undertake the regulated activities that fall within the scope of its existing QFCRA licence. Principal place of business in Qatar: Qatar Financial Centre, Office 1002, 10th Floor, QFC Tower, Diplomatic Area, West Bay, PO Box 15891, Doha, Qatar. Related financial products or services are only available to Business Customers as defined by the Qatar Financial Centre Regulatory Authority.
This material is distributed in the UAE (including the Dubai International Financial Centre) and Qatar by Barclays Bank PLC.
This material is distributed in Saudi Arabia by Barclays Saudi Arabia ('BSA'). It is not the intention of the publication to be used or deemed as recommendation, option or advice for any action (s) that may take place in future. Barclays Saudi Arabia is a Closed Joint Stock Company, (CMA License No. 09141-37). Registered office Al Faisaliah Tower, Level 18, Riyadh 11311, Kingdom of Saudi Arabia. Authorised and regulated by the Capital Market Authority, Commercial Registration Number: 1010283024.
This material is distributed in Russia by OOO Barclays Capital, affiliated company of Barclays Bank PLC, registered and regulated in Russia by the FSFM. Broker License #177-11850-100000; Dealer License #177-11855-010000. Registered address in Russia: 125047 Moscow, 1st Tverskaya-Yamskaya str. 21.
This material is distributed in Singapore by the Singapore branch of Barclays Bank PLC, a bank licensed in Singapore by the Monetary Authority of Singapore. For matters in connection with this report, recipients in Singapore may contact the Singapore branch of Barclays Bank PLC, whose registered address is One Raffles Quay Level 28, South Tower, Singapore 048583.
Barclays Bank PLC, Australia Branch (ARBN 062 449 585, AFSL 246617) is distributing this material in Australia. It is directed at 'wholesale clients' as defined by Australian Corporations Act 2001.
IRS Circular 230 Prepared Materials Disclaimer: Barclays does not provide tax advice and nothing contained herein should be construed to be tax advice. Please be advised that any discussion of U.S. tax matters contained herein (including any attachments) (i) is not intended or written to be used, and cannot be used, by you for the purpose of avoiding U.S. tax-related penalties; and (ii) was written to support the promotion or marketing of the transactions or other matters addressed herein. Accordingly, you should seek advice based on your particular circumstances from an independent tax advisor.