Report to the Federal Housing Finance Agency: Housing Finance Reform in the Multifamily Mortgage Market

Submitted by:
Freddie Mac
McLean, Virginia

December 2012

Abstract

To advance housing finance reform, can the multifamily market attract more private capital and correspondingly reduce the government's market footprint and risk exposure to U.S. taxpayers? That is the general question that our regulator and conservator, the Federal Housing Finance Agency (FHFA), asked of Freddie Mac in early 2012. Namely, can Freddie Mac's multifamily business remain viable if it were restructured into a stand-alone entity without access to a government guarantee? If so, what would change as a result, both in our business as well as the broader marketplace?

This report addresses these questions in depth. Our key findings: 1) without access to a government guarantee, our multifamily business could attract private investment and produce net income; 2) our business would look and operate very differently; 3) withdrawing government support would have a negative impact on the broader multifamily market; 4) we are prepared to implement changes to our structure; and 5) structural changes could be made in steps and over time, which would allow policymakers to address adverse market impacts as well as create policymaker optionality for long-term reform of the U.S. housing finance system.

These findings reflect extensive analysis and original research performed by a cross-corporate working group within Freddie Mac, led by David M. Brickman, senior vice president of the multifamily business. For added perspective, we commissioned studies by financial advisers, Barclays Capital Inc. and Morgan Stanley, which developed financial forecasts and valuations for a prospective new business entity. We also contracted with economic research consultants, CBRE Global Research and Consulting and Moody's Analytics, which estimated how the broader multifamily market would be affected by removing access to a government guarantee, an area where Hartrey Advisers also provided counsel.

This report was reviewed by Donald H. Layton, chief executive officer, Ross J. Kari, chief financial officer, and Jerry Weiss, chief administrative officer. Freddie Mac's board of directors was briefed on the contents of this report.

We have structured this report in several sections. An executive summary reviews key findings. We describe our current business model and its recent results. We review estimates for a financial forecast and market valuation regarding a new business model operating without access to a government guarantee. (For comparison purposes, we include estimates of a limited government guarantee model.) We estimate impacts of this new business model, and a similar change to Fannie Mae's multifamily business, on multifamily housing and mortgage markets. We then describe how we could implement structural change. Lastly, we include appendices that discuss methodologies and elaborate on subject matter. We hope this report advances the process to reform the housing finance market. And we await further direction from FHFA and policymakers.

Table of Contents

1. EXECUTIVE SUMMARY

In its strategic plan published in early 2012, the Federal Housing Finance Agency (FHFA) established a framework regarding the future state of Freddie Mac and Fannie Mae. Notably, FHFA articulated the many distinctions between our single-family and multifamily businesses, and how those differences might shape their respective futures. FHFA stated: "Generating potential value for taxpayers and contracting the Enterprises' multifamily market footprint should be approached differently from single-family, and it may be accomplished using a much different and more direct method."

FHFA then followed-up with a conservatorship scorecard objective for us: "Undertake a market analysis by December 31, 2012, of the viability of multifamily business operations without government guarantees. Review the likely viability of these models operating on a stand-alone basis after attracting private capital and adjusting pricing if needed."

This document represents Freddie Mac's response to this scorecard item. Our response examines the impact of operating our multifamily business without a government guarantee on: 1) the economics and business model of our multifamily business; 2) the broader multifamily marketplace; and 3) the operational preparedness of our organization.

To develop estimates contained in our response, we enlisted several external parties: Barclays Capital Inc., CBRE Global Research and Consulting, Ernst & Young, Hartrey Advisers, Moody's Analytics, and Morgan Stanley. We conducted original research. We interviewed a wide range of market participants. And we leveraged related internal work that evaluated possible future states for Freddie Mac's multifamily business.

Importantly, our analysis identifies impacts to the multifamily market that affect public policy, such as the availability of mortgage funding, value of housing stock, and access to affordable housing. We do not take a position on these issues; the Obama Administration and Congress are the rightful places to address these issues.

Our Multifamily Business Today

Since one-third of U.S. residents rent rather than own their homes, Freddie Mac has a multifamily business ("Multifamily"). It is a business that is profitable, supports affordable rental housing, and transfers risk, both credit and interest rate, to private capital markets.

In some ways, Multifamily looks like our single-family business. For instance, Multifamily operates in the secondary mortgage market that supports housing in the United States. We purchase loans originated by lenders, package loans into mortgage-backed securities, issue our securities to institutional investors, and provide a counter-cyclical source of mortgage liquidity.

Compared to single-family, Multifamily has lower loan volumes, a higher-quality portfolio and a smaller market footprint. For instance, while our single-family business holds roughly 20 percent of outstanding mortgage debt in that market, Multifamily holds 13 percent in its market. Another difference: Multifamily has a disproportionately larger impact on affordable housing. In any given year, Multifamily loans can represent roughly five percent of Freddie Mac's total loan volume, but as much as one-third of our affordable housing units.

But that is where comparisons to single-family end. Multifamily loans finance new or rehabilitated apartment buildings, have an average loan size of $17 million, and are sourced by a small, closed network of lending institutions. Because every property and deal are unique, we require credit underwriting that involves on-site inspections, analyses of current and projected operating income statements of properties, and screening of property owners and building management. Thus, Multifamily is a form of commercial lending.

Since 2010, Multifamily has produced earnings approaching $4 billion. We produce revenue by creating securities based on loans we purchase, as well as realizing net interest income on loans and securities we hold in portfolio. Our value is driven, in part, by economies of scale (compared to other multifamily financiers) and access to a government guarantee. Our size enables us to issue large volumes of mortgage-related securities on a regular and predictable schedule, a feature embraced by capital markets. And the guarantee ensures our continuous market presence, another feature valuable to investors, lenders and borrowers.

Another driver of securities value: credit risk management. We strive to adhere to a conservative risk management position in all business cycles. Currently, Multifamily has very low loan delinquency rates (24 basis points, as of October 2012) and credit losses (less than one basis point relative to the size of our portfolio, year to date).

As a government-sponsored enterprise (GSE), our business operates in all business cycles. In many ways, Multifamily operates like an accordion, expanding when private capital sources are diminished and contracting when private capital is abundant. For instance, when the financial crisis began in 2008, many private sources of multifamily funding exited the market. In response, our business expanded its operational capacity and roughly doubled its market share. As private capital reentered the market, our market share declined.

Is It Viable to Operate the Multifamily Business without A Government Guarantee? Economically, Yes

Absent access to a government guarantee, our business would look and operate differently than it does today. Multifamily would no longer be a line of business within Freddie Mac. Instead, it likely would be a private, monoline financial firm, operating on a stand-alone basis, attracting private capital from equity and debt investors, and complying with all applicable regulations in areas such as capital levels and taxation. As such, our investment advisers believe that a stand-alone Multifamily would have a market valuation similar to that of other large multifamily conduits or lenders. Here, we would rely on our operating platform, capital markets expertise, risk-management approach, staff knowledge, and long-standing stakeholder relationships.

Multifamily would operate more like a true conduit – i.e., purchasing and securitizing loans -- have a smaller market footprint, charge higher mortgage interest rates, and produce net income, although less than today. The business would experience less favorable pricing on securities, higher cost of funds on corporate borrowings, and a smaller market presence.

Capitalizing monoline financial firms can be difficult; investors view the lack of diversification to pose more risk. Thus, to minimize the initial capitalization needs of a stand-alone entity, Multifamily likely would propose to treat its existing loan and securities portfolio -- which is still very profitable but capital intensive to operate – as legacy and leave it with Freddie Mac, perhaps with an agreement to service the portfolio for a fee.

Multifamily would be free to integrate vertically within the multifamily market and horizontally within commercial real estate, should profitable opportunities arise. At the same time, the business likely would withdraw from unprofitable niches such as affordable housing for some lower-income renters -- to date, access to a government guarantee has made that segment a relatively break-even business for us – and otherwise contract operations to fit a lower-volume business.

Further, our investor base would be smaller and different than today. With lower volumes and fewer issuances, our securities would be less liquid and less attractive to investors. And, rather than maintaining a constant market presence, we would be incented to behave like other private entities, entering and exiting markets as profitable opportunities dictate. The business would be rebranded and marketed as a new entity distinct from Freddie Mac.

In the following chart, we provide a 10-year range (2013-2022) of estimated financial measures for a stand-alone business, determined by Freddie Mac and our investment advisers, which operates without access to a government guarantee and sheds much of its existing loan portfolio. For comparison purposes, we have modeled a similar stand-alone entity that has access to a limited government guarantee for our senior securities only, pays a guarantee fee to its provider, but otherwise enjoys no other privileges commonly

associated with GSEs (e.g., implied government guarantee on debt, exemption from state and local income taxes, etc.).

Key Metric	Stand-Alone Multifamily without Access to Government Guarantee	Stand-Alone Multifamily with Access to a Limited Government Guarantee
Entity net valuation	$100-500 million	$1.7-3.2 billion
Net income, annual	$100-150 million	$350-775 million
Purchase volume, annual	$6-18 billion	$24-31 billion
Market share, annual	5-14 percent	16-19 percent
Initial equity investment	$500-600 million	$1.4-2.8 billion
Cost of debt: Repurchase agreements Warehouse lines of credit	 LIBOR + 50 bps LIBOR + 200-250 bps	 LIBOR + 50 bps LIBOR + 125-225 bps
Cost of equity	9-17 percent	7-14 percent
Market capital	$380-730 million	$1.4-8.2 billion
Regulatory capital	$100-160 million	$0.7-$4.7 billion

Note – Key financial information provided by our financial advisers and incorporated into their earnings projections. Our financial advisers used projected earnings in years 1 and 3 to derive their respective entity net valuation ranges.

Would Withdrawing A Government Guarantee Affect the Broader Marketplace? Yes

Much like how our business would look very different without access to a government guarantee, the broader marketplace also would be affected.

For instance, there likely would be a funding gap where demand for multifamily rental financing exceeds available sources. A no-guarantee business model likely would result in a reduction in annual purchase volumes purchased by successor entities to Freddie Mac and Fannie Mae's multifamily businesses. Freddie Mac and our economic research consultants estimate that, once converted into private entities without access to a government guarantee, post-GSE multifamily businesses would purchase $39 billion less in loans annually in the near term, compared to current activity. The resulting gap would have to be absorbed by other market participants.

Freddie Mac and our economic research consultants estimate that conduits, banks and life insurers likely would fill $18-29 billion of this gap, leaving a net funding gap of $10-21 billion annually in the near term. Conduit market share through the commercial mortgage-backed securities would increase, but growth would be affected by investor confidence in CMBS, regulatory uncertainties and operational considerations. Portfolio lenders would return to historical levels, but Basel III capital rules likely would limit further growth. Life insurers would increase their market share as well, but they would be unlikely to venture outside

their niche of the highest-quality loans and Cadillac-style properties known as Class A, which are newer and larger, charge higher rents, and are typically located in large urban centers along the east and west coasts.

Moreover, funding demand likely would increase over time, as demographic changes and consumer preference for rental housing pressure the multifamily market to expand. With less debt funding available, mortgage interest rates and rents likely would increase, and property values and housing supply would decline.

Affordable housing would be another impacted area. In analyzing Freddie Mac's current loan purchases, the vast majority of Multifamily loans support lower-income households residing in Class B properties, which are generally older and smaller properties, with more affordable rents and located in less-populated markets throughout the country. To the extent that other market participants expand their businesses to partially offset a funding gap, Freddie Mac and our economic research consultants believe that much of this volume would focus on higher-income households in Class A properties along the coasts.

Lastly, withdrawing a government guarantee would affect the ability of the multifamily market to sustain boom-and-bust cycles. In short, the market would not have access to a counter-cyclical source of funding as it does today (i.e., the GSEs) and, as a result, operate much like other forms of commercial real estate. In this scenario, we expect that boom-and-bust cycles would become more frequent and severe.

The following chart summarizes key findings.

Key Market Metric	Direction of Impact	No-Guarantee Impact on Multifamily Market
Mortgage debt availability	Decrease	- 10-20 percent
Mortgage interest rates	Increase	+ 50-150 bps
Property values	Decrease	- 4-16 percent
Capitalization rates	Increase	+ 30-120 bps
Real rent	Increase	+ 0.2-2.1 percent
Rental housing supply (units)	Decrease	- 4-27 percent

Can Multifamily Transition into A Stand-Alone Structure?
Yes

Should policymakers change our operating structure, we have developed a work plan to implement a transition. The volume of transition work would not be insignificant. In brief, we would have to arrange for new structures for corporate governance, capital management, regulatory compliance, financial reporting, human resources, and business operations. We would have to do this knowing that benefits of a GSE would end as private equity takes ownership.

We estimate that it would take roughly 24 months to fully complete a transition to a stand-alone entity outside of Freddie Mac. The FHFA would have to determine whether and at what stage legislative approval is necessary. For our part, certain factors could make any transition somewhat easier to implement.

First, Multifamily is relatively distinct within Freddie Mac today. For instance, the business has dedicated support for capital markets, portfolio management, production and sales, underwriting, asset management, business operations and, indirectly, finance, credit risk management, technology, legal, human resources, and communications. Roughly 400 employees work in the multifamily division and 100 in other areas within the line of business.

Second, Multifamily already has performed extensive research on the practical issues involved in creating an alternate operating structure. We have reviewed the potential effects on our legal structure, taxation, governance, parent relationship, financial reporting and related systems, internal controls, human resources, and more.

Should FHFA direct a restructuring of Multifamily, industry best practices suggest a phased approach. For instance, initial work could establish Multifamily as a stand-alone entity within Freddie Mac. This would allow Freddie Mac to determine the core parts of operating infrastructure that the business requires. From there, FHFA and policymakers could choose to move Multifamily outside of Freddie Mac and seek to raise private equity, or leave Multifamily within Freddie Mac and/or its successor. Policymaker decisions on access to a government guarantee could be made at different phases of restructuring.

Summary

As you will read, Freddie Mac, investment advisers and economic research consultants have performed research on whether and how our multifamily business might be able to operate on a stand-alone basis. Absent access to a government guarantee, the business would be economically viable. But it would operate and interact with the market differently than today. We attempt to paint a clear picture for what that business might look like. And we attempt to quantify how removing government guarantees would affect the broader market.

We also have performed some of the legwork to prepare our business for change. We have developed operational designs that are flexible enough to work in various outcomes, inside and outside Freddie Mac, with and without access to a government guarantee. And we look forward to continue working with FHFA and policymakers to help shape the future of the housing finance market for rental housing.

2. BACKGROUND: THE MULTIFAMILY BUSINESS TODAY

Freddie Mac's multifamily business operates in the secondary market for multifamily housing finance within the United States. Multifamily today is a profitable business that relies, in part, on securitization, credit risk management, a loan sourcing network, and employee expertise. The vast majority of Multifamily's loan purchases support rental housing for lower-income households. And the business operates as a counter-cyclical source of mortgage financing.

To provide context for evaluating a change in Multifamily's structure, let's briefly review the distinguishing features of our business, along with recent results.

Securitization. One main feature of our business model is securitization. Here, we offer a branded version of structured pass-through certificates, known as K-deals, to capital market investors. These securities are based on loans that are sourced from our network of lenders and directly underwritten by Freddie Mac staff. Loan quality, the size of annual purchase volumes, and investor interest affect Multifamily's ability to issue certificates on a regular, predictable schedule. We typically conduct K-deals monthly through a securities offering that is backed by roughly $1 billion in multifamily loans recently purchased by Freddie Mac. Currently, our business is the largest issuer of multifamily structured debt in the U.S. capital markets.

Our securities are structured in a way in which private investors, not U.S. taxpayers, bear most of the losses that might come in any one security. We do this by including a non-guaranteed portion, a subordinate bond, which assumes a first-loss position borne by private investors. The remaining portion, a senior tranche rated AAA, is guaranteed by Freddie Mac. To date, our K-deal securities have not experienced any losses.

Credit Risk Management. Multifamily underwriting is different than that for single-family. Every apartment building is unique and the typical size of a Multifamily loan is $17 million. Because of these and other differences, Multifamily directly underwrites every loan that we finance. We do so on a prior-approval basis, meaning that lenders cannot commit loan terms to a borrower until Freddie Mac has completed its underwriting process. For our evaluation of its risk-based terms, we rely on an in-house staff of underwriters, attorneys and capital market staff.

We also rely on credit policies that we communicate to lenders and borrowers. We strive to make these policies conservative in their risk position and sustainable across varying economic environments. We also rely on asset management staff to ensure appropriate and consistent loan servicing. Our loan portfolio currently has very low loan delinquency rates (24 basis points, as of October 2012) and credit losses (less than one basis point of our loan portfolio, year-to-date).

We apply the same credit underwriting and servicing standards to loans whether we invest in them directly through our investment portfolio or securitize them through K-deals. This consistency and loan quality enables us to attract a high demand for our securities, which in turn allows us to provide a reliable flow of liquidity to our lenders and borrowers.

Loan Sourcing. Because multifamily financing is a specialty, we purchase loans only from a small network of lenders. These lenders, known as Program Plus lenders, have demonstrated experience in multifamily lending, knowledge of local market conditions, and close relationships with borrowers. Our lenders also may service loans if they so choose. We work together with our lenders to allocate specific geographic regions in which they can specialize and source loans eligible for sale to Freddie Mac. The majority of our loan purchases come from repeat borrowers.

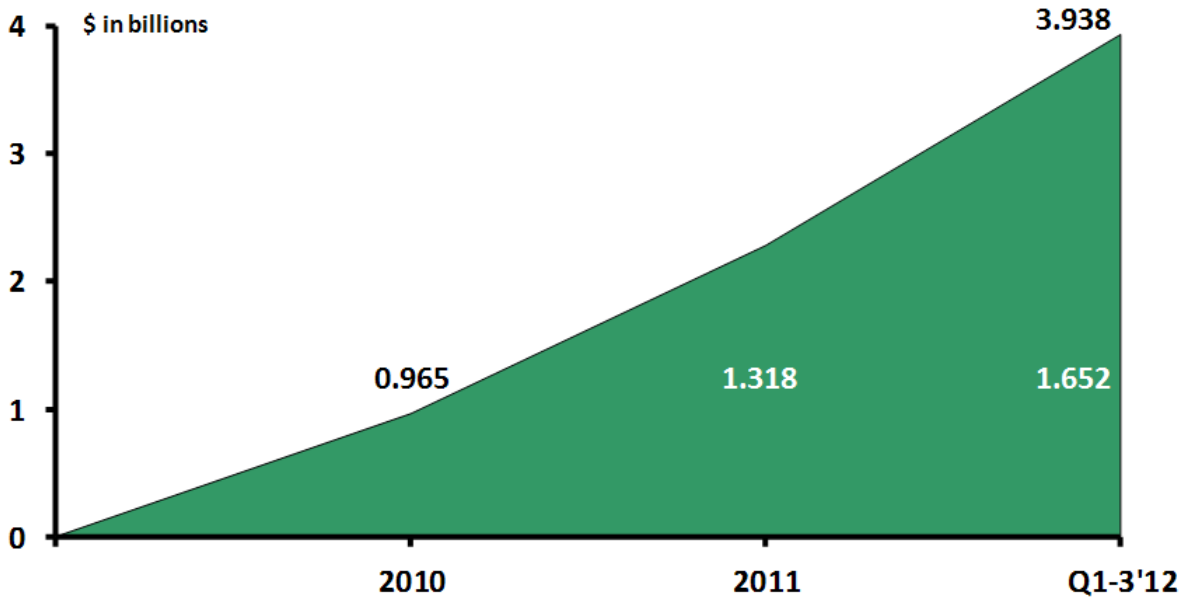
To serve lower-income renters and other underserved segments, we also have a similar network of lenders in our Targeted Affordable Housing program. Here, these lenders specialize in financing apartments where a majority of units are reserved for renters with low and very low incomes. Together, we structure deals that involve available government incentives as well as our own direct financing.

Employees and Operations. Because our business model is relationship-oriented, we rely on staff with extensive knowledge of the multifamily marketplace. These staff analyze markets, develop credit policies that balance the needs of maintaining a competitive position in the market while protecting the Multifamily franchise, work with our lenders and borrowers to identify and underwrite appropriate deals, and structure securities that meet investor needs.

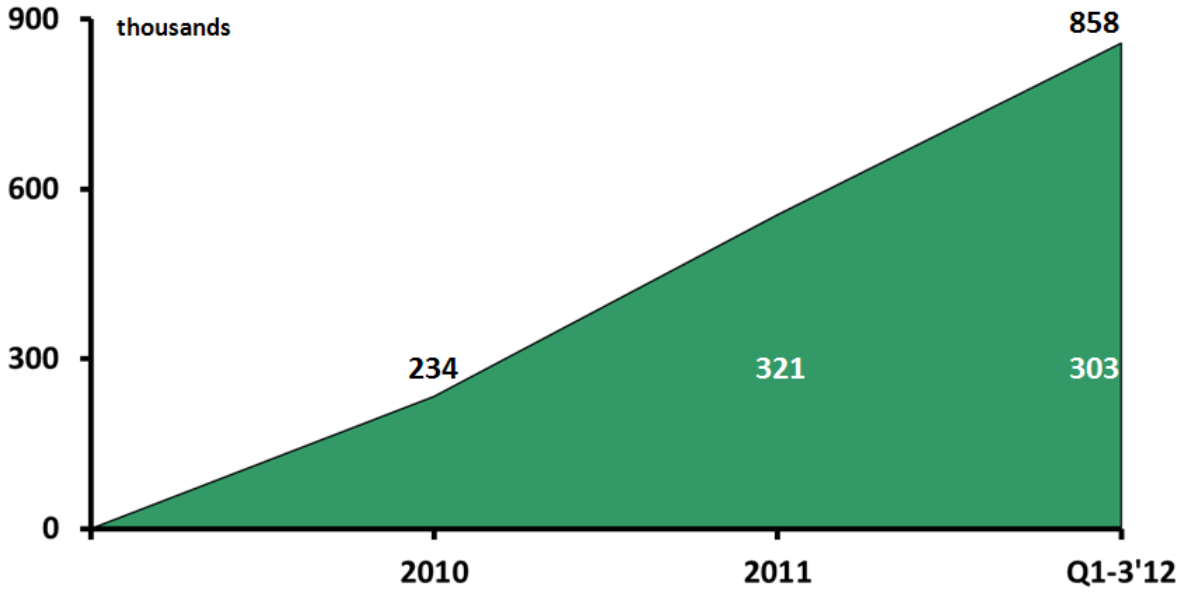
Multifamily also has a significant number of information systems that support the business. These systems are designed to enable Multifamily to process large volumes of transactions, simplify the customer experience, comply with corporate policies and practices, and improve loan quality. Today, roughly 500 employees work in the Multifamily line of business, with 400 currently working in the Multifamily division and another 100 in other divisions that support the line of business.

Recent Results

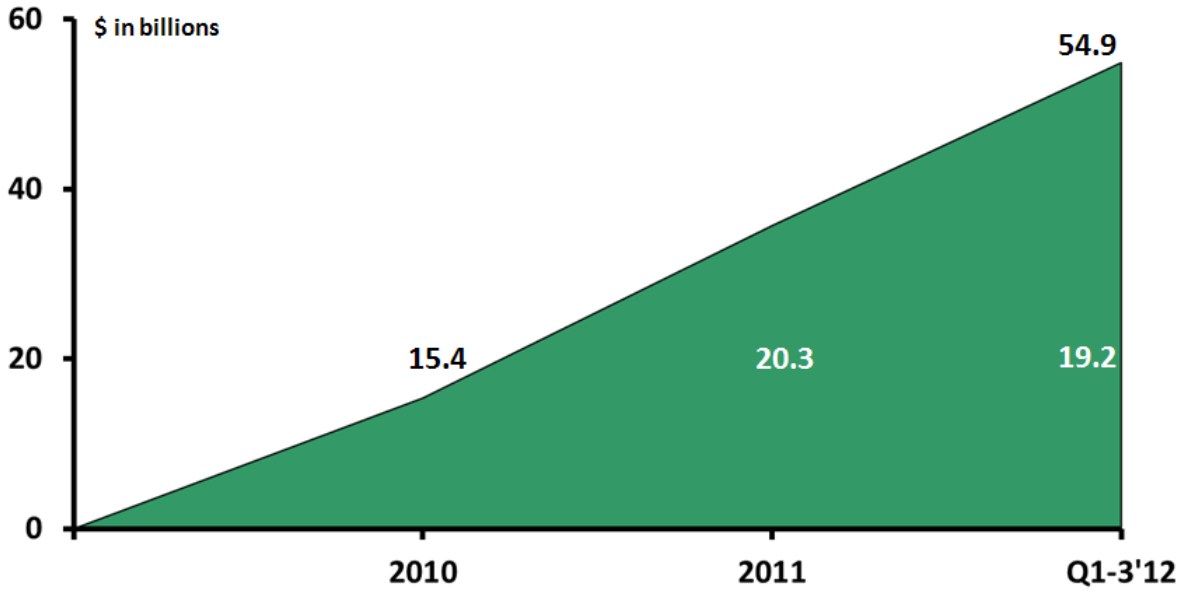
Net Income. At $1.65 billion, Multifamily earnings accelerated during the first three quarters of 2012, already eclipsing full-year 2011. Since 2010, Freddie Mac's multifamily business has produced almost $4 billion in net income for taxpayers.



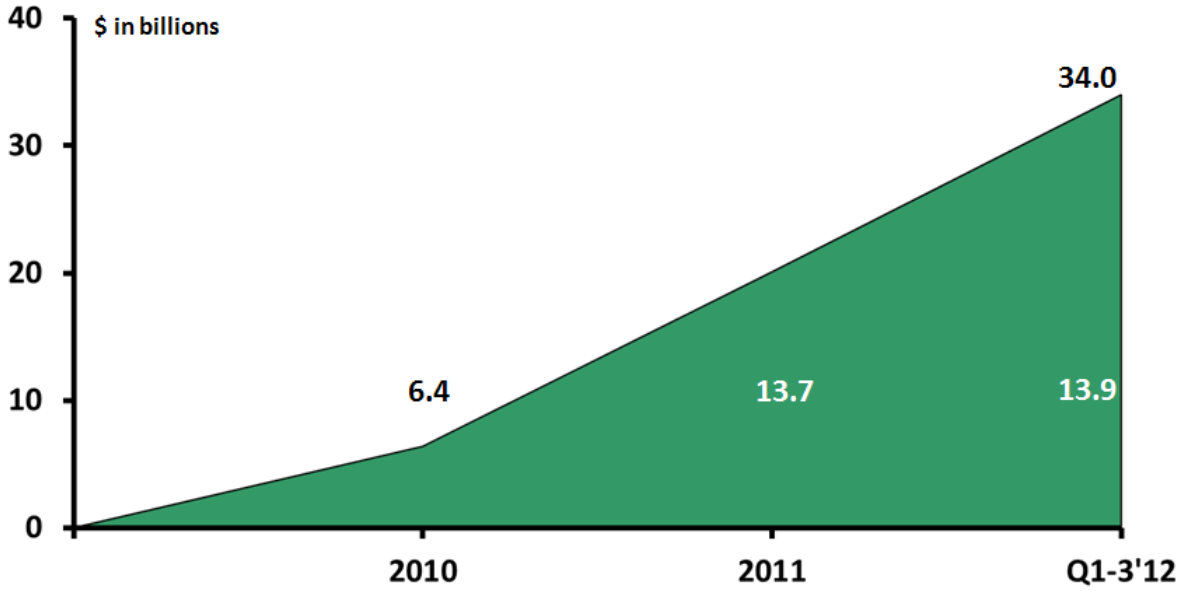
Affordable Housing. During the first three quarters of 2012, Multifamily financed 303,000 apartment units. The vast majority of our loans supported affordable housing for people at or below the local area median income. Since 2010, Freddie Mac's multifamily business has financed 858,000 apartment units.



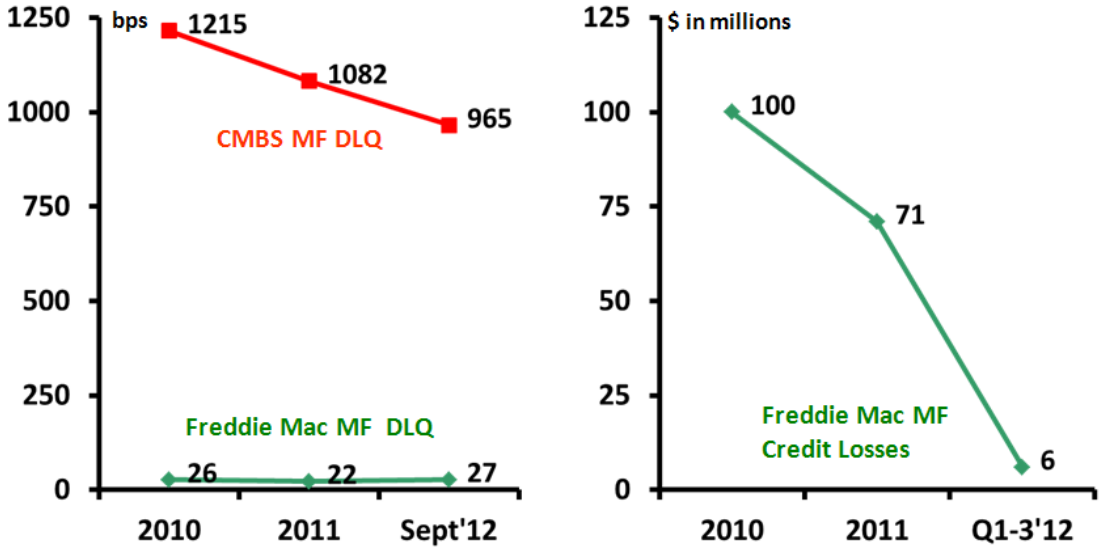
Loan Sourcing. At $19.2 billion, Multifamily loan purchases in the first three quarters of 2012 enabled borrowers to finance new loans for apartment buildings and refinance existing loans at lower rates. Since 2010, Freddie Mac's multifamily business has funded $54.9 billion in loans. We estimate that our share of total multifamily mortgage debt outstanding is 13 percent.



Securitization. During the first three quarters of 2012, Multifamily settled $13.9 billion in Freddie Mac multifamily securities, known as K-deals. Since 2010, we have settled 29 K-deals totaling $34 billion. Our securities transfer risk to private investors.



Credit Risk Management. As of September 2012, Multifamily's loan delinquency rate was 27 basis points. In contrast, the delinquency rate on multifamily commercial mortgage-backed securities was 965 bps – or 35 times worse. On a loan portfolio of $126 billion, Freddie Mac's multifamily credit losses during first three quarters of 2012 were $6 million, a loss rate of less than one basis point.



3. NEW ENTITY FINANCIAL FORECAST AND VALUATION

Operating Freddie Mac's multifamily business as a stand-alone entity without access to a government guarantee is an economically viable option. The new entity would have a market valuation similar to that of large conduits and lenders, up to $500 million. The business would look and function differently than today and operate without all the privileges of a GSE (e.g. implied government guarantee of debt, exemption from state and local income taxes, etc.).

Presumably no longer in conservatorship, the entity would be in a position to expand its products and services into areas previously untapped or constrained. It would be free to exit unprofitable businesses. And the existing people, processes and infrastructure would enable the business to occupy a niche in the marketplace. But the entity would lose the advantages of favorable pricing on securities and a low cost of funds on corporate borrowings, which are the key advantages of a government guarantee. Further, the entity would not have the scale and deep investor base that it currently enjoys.

To assist in assessing the proposed new entity's viability, Freddie Mac retained two financial advisory firms, Barclays Capital Inc. and Morgan Stanley, to provide analysis and guidance regarding the structure, profitability and valuation of such an entity. Projections reflect the general assumption that the new entity would be independent of Freddie Mac on a pro forma basis, effective January 1, 2013.

This section examines various aspects of the proposed new entity, such as business model, potential opportunities, capital and funding, projected financial results, and valuation. For comparison purposes, Freddie Mac and its financial advisers also analyzed a scenario in which the entity would have access to a limited guarantee. Additional information that discusses financial methodologies and assumptions is contained in Appendix I.

New Business Model

What would our multifamily business look like without access to a government guarantee?

Freddie Mac and our financial advisers believe that Multifamily would employ a conduit-like business model with a market value of $100-500 million, which is similar to other large conduits and lenders. The new entity would attract private debt and equity investors and be required to comply with applicable regulations on capital levels. The new entity would leverage existing processes, infrastructure, customer relationships, and expertise in underwriting, credit management, portfolio management, capital markets, and other related functions to continue to operate profitably in the multifamily housing finance market.

The new entity would operate like other commercial mortgage-backed securities (CMBS) conduits in the marketplace, including the bank-owned conduit operations of JP Morgan, Goldman Sachs, and Morgan Stanley, as well as independent real estate investment trusts (REITs), such as Starwood Property Trust, CreXus Investment, and Colony Financial. A larger financial firm, seeking to expand its presence in the multifamily market, might wish to acquire the new entity.

In the new entity, we would continue to rely on securitization. For instance, the new entity would purchase mortgage loans from sellers in its network after underwriting them in-house; loans would be aggregated for a short period of time (generally, less than six months); pools of loans would be structured into securities with various risk-based tranches; and the securities would be sold into the marketplace to third-party investors. Upon securitization, loans in the pool would be serviced by third parties, and be monitored by the new entity. Like Freddie Mac's current K-deals, the new entity's securities would be structured to achieve AAA credit ratings on senior tranches we guarantee.

The new entity would maintain a smaller portfolio, and take a different approach to making purchases held in portfolio for investment (HFI) through maturity. In addition, the new entity likely would continue our current practice of purchasing certain non-subordinated tranches of its own securities to support markets and make the most of profit opportunities.

Perhaps the biggest economic change would involve our existing loan portfolio. As of September 30, 2012, the Multifamily retained portfolio contained about $123 billion in assets, including CMBS and whole loans being held to maturity. However, Freddie Mac and our financial advisers believe that it would be economically infeasible for the new entity to take with it the existing portfolio; the levels of capital required to support such a large portfolio could not be readily raised in private-equity markets.

Rather than conducting bulk sales, which would overload capital markets and negatively affect pricing, Multifamily would explore entering an agreement with Freddie Mac to assume the assets as a liquidating legacy portfolio, perhaps coupled with a separate arrangement to manage and service the legacy portfolio until it runs off. We estimate that about 90 percent of the current portfolio will run off by the end of 2019. Such arrangements between the new entity and Freddie Mac would create profitable opportunities for Freddie Mac, which would benefit from net interest income, and the new entity, which would benefit from servicing fees.

To help FHFA understand how a new entity might function, we have identified other key areas where we believe the new business would be materially different than the current one.

Key Differences from Our Current Business Model

A Smaller Investor Base and Lower Business Volumes. In our current state, one segment of investors is attracted to the government guarantee on our securities. Investors in the senior tranches of Freddie Mac K-deals tend to be large, risk-averse institutional money management firms that seek attractive yields for minimal risk. However, in a new entity without access to a government guarantee, many current investors would be prohibited by their portfolio charters from purchasing unguaranteed securities. Thus, our investor base would be redefined and likely smaller as a result.

Another feature of today's K-deal program is its reliability and dependability. Investors like knowing when the next K-deal will be issued, its size, and other key characteristics. Building securities with predictable collateral characteristics, and having investors consistently purchase these securities, promotes liquidity and competitive pricing and enables the business to be a reliable outlet for loans. But the new entity would be unable to sustain this pattern, given its reduced purchase volumes and access to economical funding.

Without the expected regularity and frequency of issuances, on top of the lack of a guarantee, demand for our securities would decline. In turn, the entity's ability to purchase loans and issue securities similarly would fall. We believe that our purchase volumes would decline from more than $25 billion in 2012 to roughly $6-18 billion annually in a new entity without access to a government guarantee. For securities issuances, which will exceed $21 billion in 2012, we would expect a commensurate decline as well.

Less Consistent Market Presence. Currently, Multifamily is able to scale up (or down) its business to meet market demands for mortgage financing and our products. That is because our investor base is deep, securities liquid, and operations robust. But the new entity would have smaller operations and portfolios. And our securities would be more sporadic in issuance and less liquid.

These differences would remove the expandability feature of our current business. As a fully private enterprise without a public mission, we would be incented to operate in economic periods when profitable opportunities arise; and we would be similarly incented to exit these same markets when such opportunities do not present themselves. This would be most evident during periods of market crisis, which can last for days, months or years. Private firms tend to exit markets until a crisis is resolved, and we likely would operate similarly.

Diminished Support for Affordable Housing. Today, the vast majority of properties we finance are affordable to households earning the local area median income (AMI) or less. However, a new entity could not afford to sustain a similar level of support for affordable housing in a no-guarantee scenario. Specifically, we likely would discontinue the business

segment that finances properties containing a majority of lower-income renters, defined as earning 60 percent or less of AMI.

Currently, access to a government guarantee allows us to operate this business segment roughly on a breakeven basis from a profitability perspective. The guarantee allows us to quote lower mortgage rates, which in turn enables the multifamily industry to build and rehabilitate properties for lower-income renters. Freddie Mac's affordable housing goals also require our market presence in this segment. Because loans made on these properties are lower in volume and differ in other ways from our conventional loans, we currently do not finance the majority of our purchases through securitization and, instead, hold them in portfolio.

By losing the funding advantage of a GSE, a privately capitalized, monoline entity without a guarantee could not break even or profit on these same loans. The interest rate that the new entity would need to charge, along with other loan terms, would be unattractive to borrowers providing affordable housing so as to discourage their interest.

Another element of our current business, credit enhancement for tax-exempt bonds, also likely would be abandoned. Currently, Multifamily guarantees the mortgages backing state and local tax-exempt bonds that finance affordable properties within their communities. Our current access to a government guarantee for the mortgages underlying these bonds allows the bond issuer to obtain favorable interest rates that facilitate lending. Without the guarantee, this segment would be infeasible.

Potential Opportunities. Restructuring Multifamily into a stand-alone entity without access to a government guarantee presumably would release the new entity from conservatorship and certain regulatory restraints, thereby opening it to new opportunities. Thus, in addition to a core conduit business, it might be feasible for the new entity to enter other lines of business in which we currently do not engage.

For example, we might leverage the existing asset management function to manage third-party multifamily portfolios for a fee, including our own legacy portfolio. We might offer investment advisory services. And we might manage a small trading security portfolio that is designed to take advantage of market movements. Note that the analysis presented in this report includes assumptions around portfolio management for the legacy portfolio, but not around any other potential new business lines. Any new business possibilities would have to be evaluated before they could be implemented and, as such, have not been incorporated into this analysis.

The new entity also would operate its core business more efficiently, with lower operating costs. In part, process improvements and technology implementations, either already under way or planned in our underwriting and asset management areas, aim to increase efficiency and reduce costs. These gains would be realized regardless of any potential

restructuring. Moreover, the shift to a conduit business model, and its expected reduction on business volume, would reduce staffing needs and general and administrative expenses.

Capitalizing and Funding a New Business Entity

Monoline financial institutions such as the potential new entity typically are difficult to finance, given their perceived risk and lack of diversification. This is reflected particularly in rating agency views of similar entities, the most highly regarded of which generally are capped at BBB levels. These factors lead to a high cost of equity (nine to 17 percent), which would impact the pricing levels the entity could charge on its loans. Accordingly, debt funding and overall equity of the new entity would be adversely affected.

From a debt funding perspective, the entity likely would be funded by two primary sources, based on its asset composition: repurchase agreements to finance any trading securities and a warehouse line of credit to fund loans purchased for aggregation and securitization (held-for-sale, or HFS). As shown in the following table, these arrangements likely would have floating rates and be indexed to LIBOR, with advance rates around 75-95 percent.

Debt Funding Assumptions (No Guarantee)				
Assets Financed	**Financing Arrangements**	**Terms**	**Advance Rates ***	**Debt Ranges over Forecast Periods ****
Trading securities	Repurchase agreements	LIBOR + 50 bps	95 percent	$250-375 million
Retained mortgages (HFS)	Warehouse lines	LIBOR + 200-250 bps	75 percent	$650 million-$1.1 billion

** Advance rate is the percentage of the value of an asset collateralizing a loan that a lender will utilize to determine the loan amount for a borrower.*
*** Forecast period is 2013-2022. Debt ranges reflect annual period end balances.*

Equity was assessed to determine a level that could meet regulatory and market requirements. Regulatory capital levels were determined by applying a Basel III framework. Market capital levels were determined as the level of funding required to cover assets that have not been met by debt funding. Capital levels included in the financial projections presented in this report would be sufficient to cover both requirements.

Capital Assumptions (No Guarantee)	
Metric	**Capital Ranges over Forecast Period ***
Regulatory capital	$100-160 million
Market capital	$380-730 million

** Forecast period is 2013-2022. Equity capital ranges reflect annual period end balances.*

Projecting Our Financial Results

The financial results of the new entity would look very different from those of our current business. For instance, our current financial results still reflect a fair measure of our past emphasis on portfolio lending. (Our current business has shifted to a securitization model.) Also, there would be other differences between our business today and that of a new entity, including the management fees associated with a legacy portfolio. Below, we review our estimates for earnings, assets and liabilities, and market valuation of the new entity. For detailed financial statements, as well as the assumptions we used in determining the financial results, sensitivities and analysis, see Appendix I.

Earnings. The new entity's earnings primarily would consist of net interest income on loans awaiting securitization, gains on the sale of the loans upon securitization, and portfolio management fees earned on the legacy portfolio. Annual net income would range from about $150 million down to $100 million over a 10-year period, which is significantly lower than the estimated $2 billion projected for the current business in 2012. Lower purchase volumes would reduce net interest income and gains on sale of loans via securitization. Portfolio management fees earned on legacy assets would be a primary contributor to income, providing approximately 40 percent of revenues in early years but decreasing significantly over time due to portfolio runoff.

Assets and Liabilities. Assets of the new entity would consist of loans held on balance sheet awaiting securitization, trading securities resulting from retained components of securitization transactions, and operating cash. Debt would comprise repurchase agreements and warehouse lines of credit, as previously stated. Total entity assets at start up would be up to $1.8 billion. This would be in contrast to the existing $140 billion Multifamily balance sheet, which includes portfolio loans and CMBS that would not be part of the new entity.

Valuation. Our analysis suggests that there would be value in an entity without a government guarantee. Valuation levels can be subjective. For instance, our brand, operating platform and people have built equity in the marketplace. So we applied various assumptions to key metrics such as net income, capitalization levels and cost of equity. Again, we assumed that income would be derived, in part, from managing legacy assets not included within the new entity. And we used multiple methods to produce a range of possible values, including public comparables, discounted cash flow, dividend discount, price to earnings, price to book, and other methods.

Given that net income is a significant input into the valuation methods, the drivers to income -- including net interest income, gain on sale, and portfolio management fee income -- heavily influenced those valuations. The following table summarizes the ranges for these key drivers and the entity's valuation provided by our financial advisers. See Appendix I for more details.

Valuation Estimates (No Guarantee)				
Annual Purchase Volume *	Earnings	Cost of Equity	Initial Capital Required	Valuation (net of initial capital) **
$6-18 billion	$100-150 million	9-17 percent	$500-600 million	$100-500 million

** Forecast period is 2013-2022. Volume and earnings ranges reflect annual cumulative balances.*
*** Our financial advisers used projected earnings in years 1 and 3 to derive their respective entity net valuation ranges.*

How do these results compare? Put another way, how much value is there in a government guarantee? To answer that question, business models need to be compared in an apples-to-apples manner. The current Multifamily financial statements do not offer a valid comparison because they include legacy assets and funding advantages that the proposed entity would not have, as well as other benefits of being a GSE.

To gain a more thorough understanding of the financial and market effects of operating without access to a government guarantee, Multifamily and its financial advisers analyzed a scenario in which the entity would have access to a limited guarantee on the senior components of its securities, but not on its debt. The new entity would pay for the guarantee and not benefit from any other aspect of a GSE.

Alternative Scenario: A Hybrid Conduit and Credit Guarantee Business Model

A new stand-alone entity with a limited guarantee on senior securities would operate within a business model containing conduit and credit guarantee components. Most loans would be aggregated, securitized and serviced, as described earlier.

Because the guarantee would enable the new entity to continue some of Multifamily's traditional niche business, the model includes additional aspects. For instance, certain loans that do not meet securitization guidelines, such as those for properties housing renters with low or very low incomes, could be held through maturity. Also, the new entity could offer credit enhancement of tax-exempt bonds, further supporting affordable housing. (While we have not explicitly imposed an affordable housing goal or Community Reinvestment Act target in the new entity, this would be implicitly included as we manage these business lines.)

In this scenario, the new entity would purchase a limited guarantee on the senior tranches of its securities from Freddie Mac or a specified government agency for a fee. In turn, the entity would charge investors a guarantee fee, which might range from 10-30 basis points, depending on the type of security being guaranteed. The revenue would be apportioned

between the entity and the specified government provider, which would compensate the government provider for any assumed risk. See Appendix I for details on the proposed guarantee-fee levels and how they were calculated.

This approach would reduce and change the federal government's current role in the multifamily mortgage market, with compensation for any perceived risk it assumes. Moreover, the government would be protected from potential losses by an additional layer of private capital currently contained in our K-deals, where non-guaranteed tranches are in a first-loss position.

This scenario would insert the new entity's equity as an additional layer of credit protection. In addition, before the government guarantee provider would be asked to cover any losses a new fund that the government would maintain with the guarantee fees it receives would be tapped, similar to Federal Deposit Insurance Corporation models. In other words, the limited government guarantee would work more like catastrophic insurance, called upon in rare and extreme situations. See Appendix I for a depiction of how the proposed guarantee structure would work.

Since inception, Multifamily has not experienced any losses in the K-deal program. As the senior tranches are paid down, the unguaranteed tranches, which are paid out after the senior pieces and are first to absorb any losses, become a larger percentage of the K-deal securitization and provide even greater cushion against losses.

Alternative Scenario:
Capital and Funding, Projected Financial Results, and Valuation

The following table provides a side-by-side comparison of key financial aspects of the new entity and its valuation, developed by our financial advisers under the limited guarantee and no-guarantee scenarios over a 10-year forecast period.

Metric *	New Business Model A No Access to Government Guarantee	New Business Model B Access to Limited Government Guarantee
Loan purchase volume (annual)	$6-18 billion	$24-31 billion
Net interest income (annual)	$20-65 million	$60-430 million
Net income (annual)	$100-150 million	$350-775 million
Loan portfolio	$900 million-1.5 billion	$2.4-9.3 billion
Total assets	$600 million-1.8 billion	$1.4-15 billion
Total equity	$380-730 million	$1.4-8.2 billion
Cost of equity	9-17 percent	7-14 percent
Entity net valuation **	$100-500 million	$1.7-3.2 billion

** Forecast period is 2013-2022. Loan purchase volume, net interest income and net income reflect the range of annual cumulative balances. Loan portfolio, total assets and total equity reflect annual period end balances.*
*** Our financial advisers used projected earnings in years 1 and 3 to derive their respective entity net valuation ranges.*

The financial results of the new entity with access to a limited guarantee would come closer to those that Multifamily currently achieves through its K-deal securitization model, with differences attributable to the scope of the guarantee.

The cost of equity would be lower with a limited government guarantee based on the premise that the entity will trade at some premium relative to peer companies, given its market position, the market value placed on a government guarantee, and a greater level of liquidity than what peer companies can achieve.

The new entity in this alternative scenario would produce higher volumes because the demand for regularly issued and guaranteed securities would enable the entity to purchase more loans. This would allow the new entity to keep the market more liquid and help finance more construction. The higher volumes, in turn, would create higher net income and equity. As a result, the entity would demand a higher valuation. For a detailed explanation of financial results, assumptions, and valuation, see Appendix I.

With access to a limited government guarantee, the entity would be able to provide market liquidity in all economic conditions. That is because demand for K-deals would remain high and large, risk-averse investors would be allowed to continue to buy the entity's securities.

As a result, the entity would be able to keep purchase volumes similar to existing levels and, in turn, aggregate and securitize more loans. This would allow for regular K-deal issuances and maintain liquidity in the securities.

The limited government guarantee also would enable the new entity to support affordable housing for more lower-income renters and other underserved segments. The entity would be able to guarantee the mortgages backing state and local tax-exempt bonds that finance affordable properties within their communities. It also would have the wherewithal to hold loans for such properties in portfolio. And it would operate with affordable housing goals, either explicit or implicit, in its normal business. An entity with access to a government guarantee would have to address much stricter regulatory requirements and oversight, due to the government's continued role.

From the government's perspective, it would gain a new revenue source: the guarantee fees that the new entity would pay for access to a limited guarantee on the senior tranches of securities. We estimate these fees would produce between $80-160 million annually over a 10-year forecast period.

Thus, government exposure to potential credit losses would be lessened by a privately-capitalized rainy day fund, the private equity backing the new entity, and the first-loss position that private investors occupy in subordinate bonds.

Summary

Our analysis supports the economic viability of a stand-alone multifamily business operating without access to a government guarantee. Multifamily's market valuation would be similar to that of other conduits and large lenders. And we would operate the business much like other conduits do today. The new entity would be able to raise capital, produce net income, and occupy a niche in the multifamily marketplace.

At the same time, there would be substantial differences in key aspects of our business. Our investor base would be smaller. Our securities would be less liquid. Our purchase volumes would be lower. Our costs would be higher, as would our pricing to lenders and borrowers. Our operations would not include support for affordable housing for some renters with low or very low incomes. And we would enter and exit markets as profitable opportunities dictate.

To help FHFA and policymakers determine the value of the government guarantee, we have constructed an alternative scenario that includes a stand-alone multifamily business model, attracts additional private capital into the market, and performs many of the mission-related functions of our current business model. The alternative scenario represents our attempt to perform a post-GSE comparison for FHFA and policymakers.

4. MARKET IMPACT ANALYSIS

Since the GSEs were created, the multifamily housing market has enjoyed secondary market financing support. This support has stemmed from the readiness of Freddie Mac and Fannie Mae to purchase or guarantee mortgage loans that are secured by multifamily rental housing properties and originated by a nationwide network of primary-market lenders.

What enables GSEs to consistently provide liquidity to the multifamily mortgage market? In part, it is the favorable prices we command on our securities and the low cost of funds on our corporate borrowings. These advantages have enabled GSEs to offer multifamily borrowers a reliable source of liquidity, predictable executions, and attractive financing terms and interest rates, which translate into lower rents for renters. What is more, our constant market presence has contributed to market stability through various economic cycles, while supporting continued growth of rental housing throughout the United States.

A modern-day market of multifamily housing finance operating without GSEs would be unprecedented; the GSEs' presence and benefits have been embedded into multifamily housing and shaped market norms. For this reason, withdrawing the GSEs would redefine the market structure for multifamily housing. To quantify this impact, we do not have the benefit of a comparable past period from which we could infer. As a result, primary research was conducted to assess the potential impact of a post-GSE market.

Key findings:

- Multifamily mortgage rates would increase by 0.50-1.50 percent
- Multifamily debt availability and origination volumes would decline by 10-20 percent
- Multifamily property values would decline by 4-16 percent, and capitalization rates increase by 0.3-1.2 percent
- The supply of multifamily rental housing units would decrease by 4-27 percent
- Real rents on multifamily properties would increase by 0.2-2.1 percent
- Market impacts would be more severe than the ranges above for smaller markets and older multifamily properties

These impacts could be similar to other structural changes in key economic sectors caused by a significant change in public policy. Examples might include the deregulation of the banking sector or tax law changes in the 1980s that resulted in a commercial real estate recession.

Our Research Approach

To quantify the impact of a post-GSE multifamily housing finance market, Freddie Mac mobilized its Multifamily research team. We also contracted with independent third-party experts: CBRE Global Research and Consulting; Moody's Analytics; and Hartrey Advisers (hereafter referred to as research consultants). We asked the research consultants to focus

on: a) impact on market, supply of units, types, etc.; b) impact on market participants (i.e., who fills the void); c) impact on affordable and underserved rental housing markets; and d) impact on multifamily financing during abnormal market conditions. The research consultants also were asked to consider the state of the multifamily housing market and its likely supply and demand conditions in the near term, and to review the history of the U.S. housing market.

Key findings are listed below. We elaborate on the findings in Appendix II, "Freddie Mac Study: Economic Impacts on the Multifamily Rental Housing Market of Removing the Government Guarantee."

What We Found

The research agenda comprised of quantitative and qualitative inquiries, guided by the overarching question of, "What is the impact to the multifamily housing market should GSE multifamily businesses lose access to their federal government guarantees?" Our assumptions: a) there is no contemporaneous withdrawal of government guarantee on the GSEs' single-family businesses; b) federal and state housing agencies maintain respective market shares; c) GSE multifamily businesses become private commercial mortgage enterprise; and d) the overall economic environment, and therefore, capital market conditions remain stable.

Estimated Impact on the Multifamily Market from Removing Government Guarantees from GSE Multifamily Businesses				
Market Metric	**Direction of Impact**	**Freddie Mac**	**CBRE**	**Moody's**
Mortgage Interest rates	Increase	+ 0.75-1.50 %	+ 0.50-1.00 %	+ 0.75-1.50 %
Debt availability	Decrease	- 10-20 %	NA	- 10-17 %
Property values	Decrease	- 10-16 %	- 4-12 %	- 6-11 %
Rental housing supply (units)	Decrease	- 4-11 %	- 16-27 %	- 15-26 %
Real rent	Increase	+ 0.6-2.1 %	+ 0.6-0.9 %	+ 0.2-0.3 %

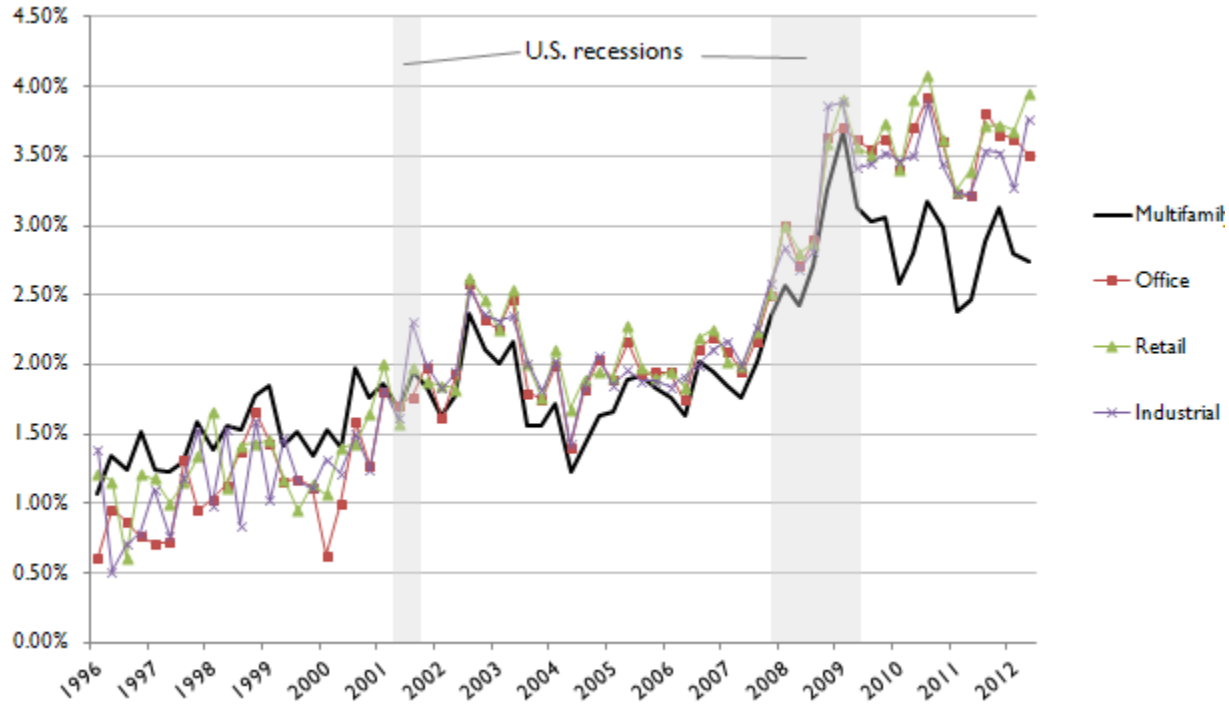
Multifamily Mortgage Rates Would Increase by 0.50-1.50 Percent

The GSE multifamily businesses provide liquidity to the multifamily housing sector by purchasing mortgage loans that were originated by primary-market lenders. The GSEs not only establish the mortgage underwriting and purchase criteria, but also determine mortgage interest rates on the loans they purchase.

The GSEs' progressively dominant role in mortgage credit provision, particularly since the 2007-09 economic recession, implies that Freddie Mac and Fannie Mae exert an increasing influence over the level of multifamily mortgage interest rates. That influence could be partially inferred from the widening interest rate differentials between multifamily mortgage loans and other commercial mortgage loans (see chart below).

The lower mortgage interest rates on multifamily loans compared to other commercial loans are frequently attributed to the perceived relative safety of the asset class, and the counter-cyclical role played by the GSEs. The latter characteristic is unique to the multifamily property asset class. No other commercial property asset class enjoys such a reliable source of debt capital. Hence, the impact on multifamily mortgage interest rates in a post-GSE market could be comparatively analyzed vis-à-vis mortgage interest rate behavior of other commercial property asset classes.

Average Mortgage Interest Rate Spreads on Commercial Mortgage Loans



Source: DebtX

Two approaches were devised to estimate the potential impact on multifamily mortgage interest rates. The first utilized econometrics to analyze the empirical relationship between mortgage interest rates of agency multifamily loans and other non-agency multifamily and commercial loans. Using proprietary loan-level data, both CBRE and Moody's independently specified econometric models to estimate the "GSE multifamily effect."

CBRE's econometric model compared the average mortgage spread of agency and non-agency multifamily loans as a function of loan characteristics (e.g., loan maturity term, loan size, loan-to-value ratio, etc.). A statistical relationship was found to exist between the average mortgage spread and whether a loan was purchased by the GSEs. CBRE found that, all else being equal, the model-estimated "GSE multifamily effect" is 0.61 percent. CBRE then generalized that a post-GSE market could result in overall multifamily mortgage interest rates rising by 0.50-1.00 percent.

Moody's econometric model compared the average mortgage spread of multifamily loans as a function of general underwriting and credit conditions, and GSEs' implied market share. Results indicated that a one-percent decrease in GSE market share corresponded to an increase in the average mortgage spread of multifamily loans by between 0.018-0.033 percent. Given the current combined GSE market share of approximately 40 percent, Moody's estimated a post-GSE market could result in an increase of overall multifamily mortgage interest rates by between 0.72-1.32 percent, which Moody's generalized to estimate a 0.75-1.50 percent impact.

The second approach to estimate the potential market impact utilized transaction information related to Freddie Mac's multifamily securitization program (i.e., the K-deal). A typical K-deal finances a portfolio of Multifamily loans via the issuance and sale of Freddie Mac-guaranteed and non-guaranteed commercial mortgage backed securities. The Freddie Mac-guaranteed securities are sold at favorable prices relative to other comparably rated securities because investors value the federal government's guarantee of Freddie Mac's obligations.

Without the federal government's guarantee, the price of those "guaranteed" securities would increase, causing the price (i.e., mortgage interest rate) of the underlying multifamily loans to increase commensurately. Analysis by Freddie Mac suggested that the average mortgage interest rates on multifamily loans could rise by between 0.75-1.00 percent.

The approaches described above captured the static impact of a post-GSE market on mortgage interest rates. The higher mortgage interest rates estimated above, coupled with lower multifamily origination activity, could produce an even greater increase in mortgage interest rates, which implies that the range estimates in the table above are conservative. The research uniformly suggested that a post-GSE market would feature higher multifamily mortgage interest rates, all else being equal, by between 0.50-1.50 percent.

Importantly, the estimated impact on mortgage rates assumed a normal functioning capital market upon the removal of the GSEs. Discussions with our research consultants and market experts indicated that the estimated impact on mortgage interest rates could be greater than the aforementioned range, particularly under stressed market conditions. In fact, it is likely that the flow of debt capital to the multifamily asset class would become less predictable, a characteristic resembling other commercial property asset classes.

Available Mortgage Debt Would Decline by 10-20 Percent

The GSEs have been one of the most consistent sources of capital liquidity for multifamily properties. Multifamily mortgage debt attributed to the GSEs represented an average of eight percent of total outstanding debt during the 1970s, 1980s and 1990s. The most recent decade saw a dramatic rise in GSE share of total multifamily debt outstanding, with most of that increase occurring during and after the 2007-09 economic recession. By the end of 2010, GSE share of the total multifamily debt outstanding rose to 41 percent. As of the end of second quarter of 2012, GSE share rose to 44 percent.

Analysis of the annual volume patterns further confirmed the relative dominance of the GSEs. Prior to the 2007-09 recession, GSEs purchased roughly 22 percent of annual multifamily mortgage originations. That share rose to more than 80 percent during the recession, but decreased to about 50 percent in recent periods as other participants re-entered the market.

Estimating the potential impact of a post-GSE market on multifamily mortgage debt availability required analyses of key competitors: commercial banks and savings institutions (the Banks); conduit companies (the Conduits); and life insurance companies (the Insurers). We assume that federal and state housing agencies maintain their respective market shares. Moreover, we include expected responses by the prospectively privatized GSE multifamily businesses.

The Banks, historically the largest source of multifamily mortgage debt, would respond by increasing their market share. The Banks' higher share would be limited by the gradual adoption of new capital requirements by the financial industry. Basel III is expected to be relatively stringent with respect to long-term commercial real estate mortgage loans (i.e., the high asset risk-weights would require the banks to hold large amount of capital).

The recent financial market crisis also would cause the Banks to have heightened sensitivity to commercial real estate concentration risk. While a short term (2-3 years) expansion in multifamily share is likely in a post-GSE market, the Banks' appetite for continued expansion of their commercial lending portfolio would be constrained over the longer term.

Moody's estimated that the combination of higher capital requirements and long-term funding constraints facing the Banks imply that mortgage interest rates would need to be one-to-three percent higher before multifamily mortgage loans become economically attractive. Still, it is reasonable to expect that the Banks' short-term response to a post-GSE market would be to increase share by $5-10 billion annually.

The Conduits, similar to the Banks, would increase their market share. Unconstrained by new capital rules and their relatively competitive cost of funds structure suggest that the Conduits could be a significant source of replacement capital in the post-GSE market. Historical analysis of CMBS issuance suggested that the Conduits multifamily mortgage

purchases could increase by $7-9 billion annually over the short term. Conduit growth likely would be affected by investor confidence in CMBS, regulatory uncertainties, operational considerations (e.g., expanding balance sheets to warehouse inventory), and macroeconomic trends that dictate spread volatility.

Insurers have been a relatively small source of multifamily capital, with highly selective criteria that targets large, high credit quality multifamily mortgages for properties located in prime rental markets. The mortgages are held on the Insurers' balance sheets rather than sold to investors. Further, the Insurers generally adhere to strict asset allocation policy that limits the amount of commercial mortgage debt that the Insurers could own.

Analysis of the financial statements of top Insurers suggests that their multifamily mortgage debt as a percentage of total mortgage portfolio rarely exceeded 10 percent. An informal survey of three Insurers actively lending in the multifamily housing sector confirmed our research findings with respect to the Insurers' asset quality and asset allocation preferences. With the Insurers currently under-allocated to the multifamily housing market, a portfolio rebalancing by the Insurers in the post-GSE market would imply an incremental multifamily mortgage origination of about $6-10 billion annually over the short term.

The loss of the government guarantee would convert GSEs into privately-capitalized businesses similar to the Conduits. The non-guaranteed entities would face higher cost of funds, increased competition, and a commensurate contraction of their ability to originate multifamily mortgage debt. Mortgage fundings by these privatized multifamily businesses would decline and – assuming federal and state housing finance agencies keep their market share the same – they would leave an estimated $39 billion annual funding gap.

This $39 billion annual funding gap would be partially offset by $18-29 billion growth from Banks, Conduits and Insurers combined. Thus, Freddie Mac and Moody's estimated that a post-GSE market would result in a decrease of $10-21 billion annually, or 10-20 percent, in less available mortgage debt over the short term. Given rising demand for rental housing and ongoing refinancing needs of the multifamily market, the loss of a large source of liquidity would lead to a shortfall of multifamily mortgage debt capital that could not be easily substituted. The excess demand for multifamily mortgage debt would put further upward pressure on mortgage interest rates.

Multifamily Property Values Would Decline by 4-16 Percent

Research suggests that the relative liquidity of a property's lending market could be a significant explanatory variable for its capitalization rate. A capitalization rate is a common measure of relative valuation for commercial properties that incorporates views about future cash flow growth and volatility rates. Realized capitalization rate, a ratio of the property's net operating income to the property's price, follows a trend in which the

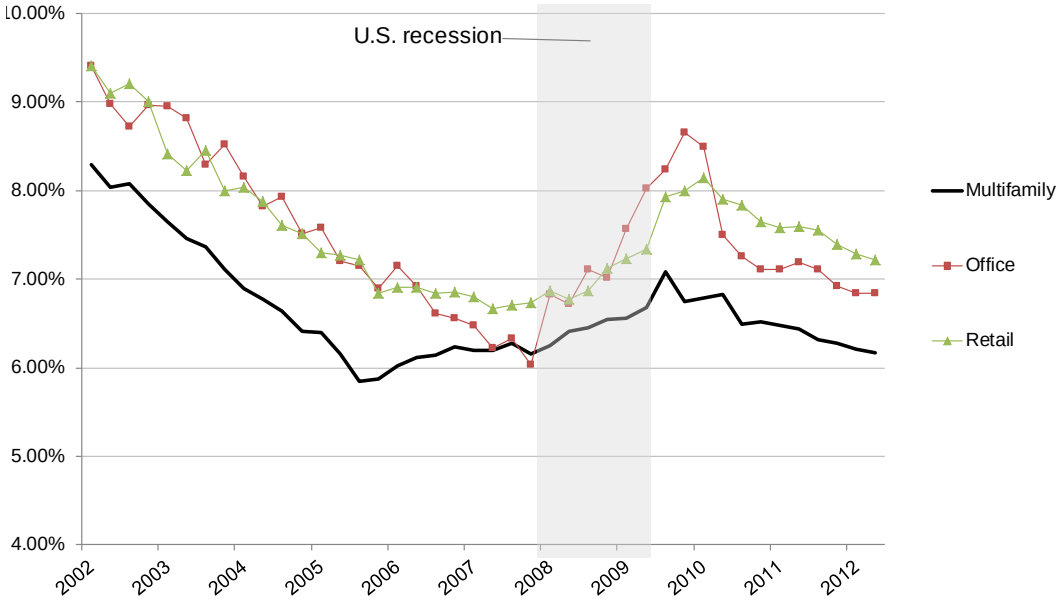
property's price tends to increase (decrease) relative to its fundamental value when credit availability is abundant (in short supply).

Other factors of the realized capitalization rate include Treasury index, risk premium, and real estate fundamentals. As noted above, GSE multifamily businesses are a significant and consistent source of debt capital for the multifamily rental housing market. The resulting counter-cyclical stability of the multifamily finance market contributes to lower average return volatility for the multifamily asset class compared to other commercial property types. Hence, historical realized capitalization rates for multifamily are relatively lower (see chart below).

To estimate the potential impact on multifamily capitalization rates in a post-GSE market, economic models based on interest rate, risk premium, real estate fundamentals, and market liquidity were constructed. Model results suggest that multifamily capitalization rates could shift up by 0.70% to 1.20% from current levels if GSE liquidity is removed.

That capitalization rate rise would correspond to a valuation decline of between $150 billion and $245 billion, or equivalently, a 10-16 percent decline in aggregate multifamily property market value. The research consultants' estimated impact on multifamily property values in a post-GSE market is in the range of a 4-12 percent decline.

Historical Property Capitalization Rates and Descriptive Statistics by Property Types



	Multifamily	Retail	Office
Average Cap Rate	6.7%	7.6%	7.5%
Income Return	1.38%	1.65%	1.70%
Income Volatility	0.18%	0.29%	0.24%

Source: Freddie Mac

The Supply of Multifamily Units Would Decline by 4-27 Percent

Unlike the severe house price correction in the single-family housing market, the multifamily rental housing market has recovered quickly since the 2007-09 economic recession. Continued strong demand for rental housing has spurred the construction of new units after a decade of relatively low supply of new multifamily rental housing units. Freddie Mac and the research consultants believe that the pace of construction in the multifamily rental housing market will accelerate over the coming years as developers and investors seek to capitalize on the favorable fundamental outlook in the sector.

The decision process that guides the construction of new multifamily housing units is a complex one. Developers of multifamily properties weigh a multitude of factors ranging from construction costs to local market conditions such as rents, vacancy rates and the expected exit capitalization rates (i.e., the expected sale price upon completion of the units).

The capital-intensive nature of construction often necessitates third-party debt financing that is typically provided by the Banks. Once the new units are built, the developer might sell the property, with the buyer/investor financing the property purchase with equity and a long-term permanent mortgage. Mortgage debt is the primary source of financing. The availability of mortgage credit and the mortgage interest rate are critical drivers of the buyer/investor's cost of capital and of the supply of new multifamily rental housing units.

Two econometric models were constructed to estimate the potential impact of a post-GSE market on the supply of new multifamily rental housing units. The first model, constructed by Freddie Mac, builds upon the specifications suggested by a standard stock-flow model of the multifamily property market developed by leading real estate economists. The model relates the change in the supply of multifamily rental housing units to the changes in the buyer/investor's cost of capital, construction cost, rent, and vacancy rates.

The expected increase in mortgage interest rates and contraction of mortgage credit availability in a post-GSE market would raise the buyer/investor's cost of capital that, in turn, leads to potential short term reduction in the supply of multifamily rental housing units of 4-11 percent on a nationwide basis.

Moody's econometric model dynamically derives the impact of a post-GSE market on the supply of multifamily rental housing units via supply-side and demand-side changes. Supply-side changes such as an increase in the mortgage interest rate would increase developers' costs, reduce multifamily building permit issuances, housing starts and hence, completions. In contrast, demand-side changes such as an improving unemployment rate would increase housing starts and hence, completions. Moody's estimates that a post-GSE market would be tantamount to a supply shock and could result in a short term reduction in the supply of multifamily rental housing units by 15-26 percent on a nationwide basis.

Renters Would Experience Higher Rents by 0.2-2.1 Percent And More in Certain Markets

The continued strong demand for rental housing and the accelerating but modest pace of new rental housing supply has led to robust multifamily rent growth, which is likely to persist over the short term. Rising rents improve the property's economic returns and put downward pressure on the buyer/investor's cost of capital. From the discussion above, a lower cost of capital tends to lead to a higher supply of multifamily rental housing units. However, the rent increase would need to be significantly above reasonable expectations before the buyer/investor's lowered cost of capital leads to an increase in the supply of new units that would offset the supply shock, caused by rising mortgage rates, in a post-GSE market.

Freddie Mac's research suggests that a non-GSE multifamily housing market would lead to a net reduction in the supply of new multifamily rental housing units that, in turn, causes real rents to increase by 0.6-2.1 percent over the short term. (See chart below). The research consultants' estimates of the impact of a post-GSE market on rent growth rates suggest that rents nationally would be higher by about 0.2-0.9 percent over the short term.

Freddie Mac and the research consultants believe that the impact on rent growth rates would be larger in secondary and tertiary multifamily housing markets. Freddie Mac estimated that three years into a post-GSE market, real rent of multifamily housing in secondary and tertiary markets could increase by 0.5-2.1 percent and 1.5-3.6 percent, respectively (see chart below). The absence of GSEs would affect these markets longer. The projected five-year impact on real rents in secondary and tertiary markets is 0.8-3.1 percent and 2.5-5.9 percent, respectively.

Estimated Short-Term (3 Years) Impact on Industrywide Supply of New Multifamily Units and Real Rent in a Post-GSE Market, by Market Segment

Market Segment	Number of Markets	Number of Units *	Average Real Rent	Impact on Supply of New MF Units	Impact on Real Rent of MF Units
Primary	9	7.7	$1,480	0% to -2%	0% to +0.9%
Secondary	36	7.1	$1,006	-2% to -7%	+0.5% to +2.1%
Tertiary	326	7.0	$822	-11% to -26%	+1.5% to +3.6%
Total/Avg.	*371*	*21.8*	*$1,309*	*-4% to -11%*	*+0.6% to +2.1%*

** 5+ multifamily units only, in millions*

Affordable Housing Markets Would Be Among Those More Adversely Affected

The market impacts described above are likely to be distributed unevenly across different multifamily markets and property types. The lack of consistent data at the submarket- and

property-level precludes robust empirical analysis. Nonetheless, an analysis which overlays Freddie Mac's Multifamily production history and the multifamily housing landscape offers insights to the potential distribution of the market impacts described above.

Freddie Mac defines an "affordable multifamily mortgage loan" as a secured loan whereby the majority of the units in the property are leased to households with annual gross incomes that are equal to, or lower than, the area median income ("AMI"). In other words, if 51 percent or more of the rental units are leased to renters with annual incomes that do not exceed the AMI, then a mortgage loan on that property is defined as an affordable multifamily mortgage loan.

Applying this definition to our production between 2005 and 2011, we found that more than 90 percent of the Multifamily units we financed were "affordable." Mortgage credit extended to properties that were majority leased to households with very low incomes (i.e., 50 percent or less of AMI) consistently constituted about 13 percent of Freddie Mac's Multifamily business. The affordable mortgage loan production dropped slightly in 2009 due to the severe economic recession, but rebounded in 2010 and 2011.

Freddie Mac's Affordable Multifamily Mortgage Loan Production, by Percentage of Total Unit Count at Various AMI Levels, by Book Years			
Book Year	**50% of AMI "Very Low Income"**	**80% of AMI "Low Income"**	**100% of AMI "Moderate Income"**
2005	11%	82%	95%
2006	13%	82%	93%
2007	19%	80%	94%
2008	10%	73%	90%
2009	7%	64%	83%
2010	14%	76%	91%
2011	12%	80%	94%

In terms of geographic distribution, our Multifamily affordable mortgage credit primarily flowed into secondary and tertiary multifamily housing markets such as Austin, Tex., Las Vegas, Nev., Phoenix, Ariz., Williamsport, Penn., Westwego, La., and Salinas, Cal. to name a few.[1] More than 50 percent of the total affordable units financed by Multifamily were made to properties located in over 300 secondary and tertiary rental housing markets.

[1] We consider the following rental housing markets to be primary markets, i.e., the top-tier markets with the most attractive rental housing stock and strong market fundamentals: Atlanta, Boston, Chicago, Dallas, Houston, Los Angeles, New York, San Francisco, and Washington DC.

Freddie Mac's Affordable Multifamily Mortgage Loan Production, Calculated as a percentage of the Number of Unit Count at Various AMI Levels, by Market Types									
Book Year	50% of AMI "Very low income"			80% of AMI "Low income"			100% of AMI "Moderate income"		
	Primary Markets	Secondary Markets	Tertiary Markets	Primary Markets	Secondary Markets	Tertiary Markets	Primary Markets	Secondary Markets	Tertiary Markets
2005	41%	36%	24%	28%	42%	30%	29%	42%	29%
2006	26%	42%	32%	31%	40%	29%	31%	40%	29%
2007	44%	27%	29%	32%	34%	33%	32%	35%	32%
2008	18%	40%	42%	27%	38%	35%	28%	37%	34%
2009	15%	54%	31%	30%	41%	29%	34%	40%	26%
2010	20%	40%	40%	26%	38%	36%	26%	40%	34%
2011	24%	38%	37%	25%	40%	35%	27%	40%	33%

Rental cost burden is high particularly for low- and very low-income renter households (the "underserved"). We estimated that more than two-thirds of the underserved experience housing expenses that exceeded 30 percent of household incomes. Further exacerbating the rental cost burden is the persistent lack of affordable rental housing. Our research suggested that the lack of suitable affordable rental housing for the underserved is severe across all markets, a situation that will not reverse in the foreseeable future.

Industrywide Supply Gap of Multifamily Affordable Housing, in Thousands of Units, by AMI Levels, by Market Types *						
Year	50% of AMI "Very Low Income"			80% of AMI "Low Income"		
	Primary Markets	Secondary Markets	Tertiary Markets	Primary Markets	Secondary Markets	Tertiary Markets
2005	1,480	1,608	2,269	973	757	856
2006	1,420	1,527	2,247	947	690	856
2007	1,377	1,503	2,200	845	630	770
2008	1,444	1,553	2,273	916	723	839
2009	1,489	1,698	2,526	986	787	1,080
2010	1,581	1,842	2,727	1,190	1,019	1,336
2011	1,649	1,967	2,839	1,347	1,228	1,578
2012 est.	1,746	2,065	2,940	1,510	1,381	1,673
2013 est.	1,771	2,088	2,945	1,553	1,415	1,627
2014 est.	1,781	2,091	2,915	1,561	1,408	1,543
2015 est.	1,779	2,089	2,901	1,558	1,384	1,469

** Supply gap is the difference between the number of renters and the number of affordable, available, and adequate units for very low- and low-income renters. Affordable units have gross rents up to 30% of the household income threshold of the category.*

In addition to the above classification, we decomposed Freddie Mac's Multifamily mortgage loan production by property classes (e.g., A, B and C).[2] It is evident from the production data that more than two-thirds of the total Freddie Mac Multifamily mortgage loan volumes were secured by Class B and Class C rental housing properties. While mortgage loans secured by Class A properties had increased as a percentage of total annual production in recent book years (e.g., since 2009), the majority of the annual mortgage loan production was still secured by Class B and Class C properties.

Freddie Mac's Multifamily Mortgage Loan Production, by Property Classes and by Book Years			
Book Year	**Class A**	**Class B**	**Class C**
2005	18%	80%	2%
2006	21%	77%	2%
2007	23%	75%	3%
2008	27%	70%	3%
2009	37%	62%	2%
2010	31%	67%	2%
2011	26%	73%	1%

The above charts illustrate the flow and distribution of our Multifamily business' mortgage credit. Our purchasing activity benefits lower-income renters residing in secondary and tertiary rental housing markets around the nation. Additionally, our fundings accrue to the benefit of the underserved, and to Class B and Class C property types – the segments of the rental housing market that are relatively less attractive to most private capital providers. The loss of the government's guarantee could result in meaningfully lower mortgage credit that is available for those segments of the rental housing market. Unless substitute capital sources replace the void, the outlook for lower income renter households and non-Class A multifamily properties in a post-GSE marketplace would be negative.

Summary

The broad issue we address is whether the loss of the government's guarantee for GSE multifamily businesses would impact the multifamily housing market. Research results suggest that a post-GSE market would experience an increase in multifamily mortgage

[2] According to Harvard University's Joint Center for Housing Studies, multifamily industry participants generally distinguish market-rate rental properties in three class categories. Class A is synonymous with "investment grade" and refers to properties that are new (no more than 10 years old), located in a primary market (population of at least 2 million), include 200 units or more, and have finish quality that represents the top of their markets. Class B refers to properties that are older than Class A properties, located in secondary market areas (with population of 500,000 to 2 million), include 100-200 units, and/or may have typical rather than top-of-market finish quality. Class C refers to properties that have one or more of the following flaws: more than 20 years old, located in a tertiary market (with population below 500,000), and/or finish quality reflecting more than 20-year-old standards.

rates, decrease in property valuations and mortgage debt available, fewer new multifamily units, and an increase in rents.

The impact of a post-GSE market would be felt disproportionately across different multifamily markets and properties. In general, smaller and older multifamily properties located in secondary or tertiary rental housing markets would be more negatively affected than larger and newer multifamily properties located in the top tier rental housing markets. The findings critically assume the capital market functions normally, and that federal and state housing finance agencies neither expand nor contract their multifamily operations. During times of market crisis, the impacts we have estimated here would be greater.

Freddie Mac's multifamily business benefits lower-income renters residing in secondary and tertiary markets across the nation. A post-GSE market could result in meaningfully lower mortgage credit available for segments that are less attractive to most private capital providers. Unless substitute capital sources replace the void left by GSE multifamily businesses, the outlook for lower-income renters and non-Class A multifamily properties would be negative.

5. OPERATIONAL ANALYSIS

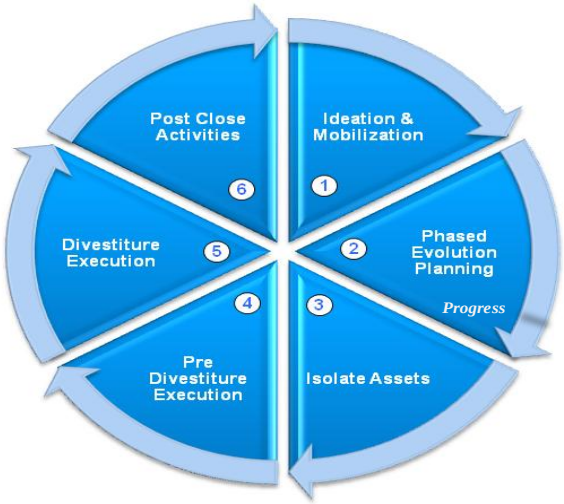
Freddie Mac assessed the operational readiness of its Multifamily business becoming a stand-alone entity without access to a government guarantee. Based on the analysis completed to date, we concluded that the business could be restructured within a reasonable amount of time, effort and cost. Multifamily's relative separateness within Freddie Mac today would simplify things. We believe that full divestiture from Freddie Mac could be accomplished with 20-27 months and cost roughly $16-19 million.

In developing an operational readiness plan, we used a standard divesture methodology, with a focus on people, processes and technology, to achieve two main goals: 1) determine Multifamily's degree of integration within, and dependence on, Freddie Mac; and 2) develop a roadmap toward restructuring Multifamily. High-level estimates of activities, time frames and costs are included here. Additional information is contained in Appendix III.

Our operational readiness plan makes one key observation, derived from industry best practices: that structural change be made in phases. This approach would increasingly aggregate key functions within Multifamily while creating optionality for policymakers. For instance, structural change could begin with Multifamily becoming a wholly-owned subsidiary of Freddie Mac, which could be accomplished within roughly three months. From there, policymakers could choose to include a self-contained Multifamily business within Freddie Mac and/or its successor, transition Multifamily into a distinct, new entity owned by private shareholders, and operate with or without access to a government guarantee. FHFA would determine what changes require legislative approval.

Operational Separation Lifecycle

A standard divestiture approach focuses our attention on identifying gaps—in terms of people, processes, and technology—between Multifamily's current and potential future state. The methodology's lifecycle, depicted in the following graphic, could be used to complete tasks all the way through divestiture and post-close activities, if needed.



The following chart better details the key steps in the operational separation lifecycle. Steps marked in bold text reflect discrete steps that we have completed to date.

OPERATIONAL FOCUS	PHASES 1 & 2	PHASE 3	PHASES 4 & 5	PHASE 6
People	**Determine:** • **Direct v. indirect employees** • **Transfer approach** • **Impact on compensation and benefit contracts**	• Execute secondment agreements • Modify comp/benefit plans • Update service legal agreements with indirect employees	• Execute transfers • Create employee comm. plan • Design, negotiate, execute new comp/benefit plans • Finalize org changes • Obtain EIN number	• Assess talent gaps and adjust, if needed
Technology	• **Complete data flow analysis** • **ID integration dependencies** • **Size infrastructure outsourcing** • **Review non-personnel contracts**	• Execute simplification efforts • Update non-personnel contracts	• Conduct build v. buy analysis • Execute separation plans for infrastructure, apps, network, telecomm, shared services	• Review, modify transitional service agreements
Process	**Complete legal review:** • **Potential term sheets** • **Legal entity structure** • **Governance structure** • **State of incorporation** **Complete financial reporting analysis:** • **General ledger** • **SOX impact** • **Materiality** • **SEC reporting** • **Examine tax implications**	• Transfer assets from parent to subsidiary • Initiate new financial reporting structure • Obtain tax rulings	• Establish corporate governance • Implement service fulfillment plans for external reporting and filings, treasury services, security issuance, and other shared services • Secure external auditor • Execute separation agreements • Modify 3rd party contracts	• Update business plans and metrics • Monitor ongoing operations
Facilities	**Determine:** • **Physical allocation requirements** • **Changes to service level agreements**		• Implement physical plant approach • Finalize security protocols	

Phase 1 - Ideation and mobilization. Encompasses defining the strategic concept, defining project scope, identifying key stakeholders, and defining project governance.

Phase 2 - Phased evolution planning. Involves analyzing gaps in terms of people, process, technology, facilities, and third-party contracts between the current and future states as well as planning for separation into a stand-alone entity.

Phase 3 - Asset isolation. Involves the activities necessary to implement the initial structural change of isolating assets (i.e., becoming a wholly-owned subsidiary of Freddie Mac), including the following:

- Determine asset / liability contribution
- Review financial reporting structure and related system impacts
- Assess internal controls changes
- Conduct 50-state tax analysis and assessing tax liability
- Analyze potential term sheets
- Establish the legal entity and its governance
- Allocate human resources to the entity

The analysis and evaluation component of this phase is complete. About 500 Freddie Mac staff support Multifamily. About 400 are direct employees within the Multifamily division. Another 100 work in other divisions within the company, but are either fully or partially dedicated to supporting Multifamily. All staff members are based either in Freddie Mac's McLean, Va., headquarters or a regional office.

During this phase, direct employees would be "seconded" in the new subsidiary. In this arrangement, affected staff would remain Freddie Mac employees, with all the legal protections, privileges and benefits thereof, but are leased to the subsidiary. Seconding would the quickest and least disruptive option to execute; it would require no payroll or benefits changes. Language would be added to employee benefits plans to reflect this arrangement. This work would take about one month to complete. Regulatory reporting processes also would need to be established, including developing, testing, and implementing the new reports. Legacy Multifamily and new entity data would need to be differentiated.

Phase 4 - Pre-divestiture execution. Assessments and plans completed to date would need to be reviewed and revised as needed to account for operational or structural changes implemented. Further, critical-path activities would be updated and a schedule set for achieving full separation from Freddie Mac. Specific activities would include finalizing the future-state business model and completing all transition service agreements (TSAs) and third-party contracts.

Direct and indirect personnel would need to be transferred to the new entity in this phase. Based on discussions with Freddie Mac's human resources department and outside advisers, developing new total compensation plans (i.e., compensation, benefits) for the transferring personnel would take between six to nine months. Benefits costs might rise for the new entity and Freddie Mac because the separation of employees into two companies would reduce some of the economies of scale that is currently enjoyed by a single, larger company.

Also during this phase, an analysis would need to be completed to decide whether the entity should build corporate functions in-house or buy them through an outsourcing arrangement. These contracts would be renegotiated so that they also could apply to a fully separated entity. In addition, the information technology (IT) framework would be further defined. An operational assessment would be defined, service-level agreements refined, and plans developed around separating Multifamily's technology from Freddie Mac.

Phase 5 - Divestiture execution. Here, the subsidiary would transition to a new entity operating outside of Freddie Mac. Key activities during this phase:

- Move personnel to the new entity; complete necessary human resources documentation
- Move equipment to the new entity; install and/or upgrade the systems infrastructure, as required
- Clone applications to the new systems environment
- Separate and migrate any shared data
- Contract services, such as cash management, securitization, and clearing processes
- Execute new third-party contracts
- Implement a branding campaign
- Develop and execute internal and external communications plans

At the time of separation, fully executed agreements and all legal documentation would need to be completed. Continuing operations within the new entity, as well as within Freddie Mac, would be reorganized to minimize additional costs to both. Also during this phase, FHFA would determine whether legislative approval is required to separate Multifamily, then operating as a corporate subsidiary, to an entity outside of Freddie Mac.

From a technology perspective, we would need to: purchase and transfer necessary infrastructure to support the future state; segregate legacy and new-entity data; establish separate wide-area and local-area networks; and transfer necessary communications networks to the new entity.

Phase 6 - Post-close activities. Here, Multifamily's separation from Freddie Mac would be finalized. Activities would center on helping to ensure the new entity's stability through the transition. For instance, we would communicate frequently with key stakeholders, including employees, debt and equity investors, seller/servicers, borrowers, policymakers,

housing and industry groups, and the media. Multifamily would obtain contractual independence from Freddie Mac by moving away from TSAs and toward bringing personnel into the new entity. We would implement individual business plans, including key metrics**.** And we would plan to optimize opportunities as a separate company.

To establish an operating subsidiary within Freddie Mac and then fully separate from the parent, there would be certain areas of operational readiness that warrant further elaboration. We review them now.

Systems Implications

Financial systems. Most key Multifamily processes and supporting data are contained within the business, which would ease Multifamily's separation from Freddie Mac. Processes that continue in the new entity would be unchanged. Processes related to corporate shared support services, however, would require attention. The key external interfaces are treasury services, security issuance, and financial and SEC reporting. In addition, we would need to consider securities trading and Sarbanes-Oxley (SOX) impacts.

For instance, the new entity's access to the Federal Reserve for clearing services would need to be determined since the new entity would no longer have the direct access it currently has through Freddie Mac. Options for clearing services would include outsourcing and leveraging banking relationships, such as those with lenders.

We identified two main options for handling security issuances. The new entity could use Ginnie Mae's model of using Bank of New York Mellon for this function. Based on costs, another option would be to rent or buy back internal services.

Financial reporting would be an important step in establishing a new entity. Internally, a separate business unit exists within Freddie Mac's PeopleSoft General Ledger that could capture the financial assets, liabilities, and earnings of a prospective new subsidiary. Multifamily already has a sub ledger that serves as a consolidation point for the segment's financial data.

SEC reporting for the separate entity would be determined by whether Multifamily operates inside or outside of Freddie Mac. A new entity outside Freddie Mac would be subject to SEC reporting. In this event, PeopleSoft would be utilized for the report creation, resources would be hired to complete the associated tasks, and an external auditor would have to be retained. SEC reporting would not be required if the new entity were bought by a private company.

For Investment and Capital Markets operations, the middle office and trading activities would leverage our existing system as long as Multifamily remains part of Freddie Mac. However, a new book would need to be created for Multifamily. Operations and accounting would leverage either a TSA with Freddie Mac or be outsourced to a firm like

JPMorgan or Bank of New York. Based on similar requests-for-proposal made in the past, these activities might be suitable to outsourcing.

In identifying SOX-related impacts, we performed a review of the isolated assets and determined the potential impacts from a SOX compliance perspective. Here, what might be material to a stand-alone new entity would be different than within our current state. Today, materiality thresholds are based on Freddie Mac's entire business. As a stand-alone, though, these same thresholds would be applied just to Multifamily.

Existing staff likely would be able to absorb the impact of increased controls and tests related to SOX. The controls process would be revisited during a pre-divestiture execution phase once the extent of the applicable assets and liabilities, financial systems and processes are fully understood.

Other systems implications. Findings from Multifamily's data repository retirement planning and analysis were used to assess the technology-related aspects of creating a stand-alone entity. The repository would facilitate a separation because it holds all Multifamily data in one central location. More than 98 percent of Multifamily's reporting data elements reside in the central repository, and the remainder is sourced from the general ledger.

In our current-state footprint, Multifamily has 50 applications, of which 38 exclusively support Multifamily and 12 are shared across Freddie Mac. Interdependencies of shared applications would have to be addressed. We also identified eight customer-facing applications within Multifamily. To the extent that we might choose to outsource certain systems, such migration would take between 12 and 18 months.

Summary

Based on current-state assessments, shared services gap analysis, and reviews and guidance from outside experts, completing a full divestiture would take a total of about 20 to 27 months, if FHFA decides to proceed. The asset allocation phase could be completed in roughly three months, with minimal organizational disruption and no adverse effects on Freddie Mac. The pre-divesture execution, divesture execution, and post-close phases would take between about 18-24 months to complete. Efforts of similar size and scope have cost between $16 million and $19 million.

Multifamily's people, processes, and technology are substantially isolated from the corporate infrastructure and rely only to a limited extent on corporate shared services. This level of separation would facilitate Multifamily's restructuring as a stand-alone entity. Most of the effort would focus on addressing matters related to human resources, technology, financial reporting, legal issues, and taxation. Other key focus areas will include functions such as treasury and cash management, security clearing, and corporate shared services.

All this points to the same conclusion: Transitioning our current Multifamily business into a stand-alone entity is operationally feasible. We have conducted high-level analytics and developed a preliminary roadmap. We stand ready to implement structural changes that FHFA and policymakers might ask of us.

6. CONCLUSION

In our report, Freddie Mac addresses a specific question from FHFA, contained in its 2012 conservatorship scorecard; namely, whether our Multifamily business would be a viable entity if it were backed by private capital and had no access to a government guarantee. After seeking opinions from independent financial advisers, we conclude that Multifamily could be economically viable in these circumstances, with a market valuation between $100-500 million, which is similar to that of large conduits and lenders today.

Our business would look very different without access to a government guarantee. It likely would operate as a conduit-like entity in the secondary market for multifamily housing finance, purchasing and securitizing multifamily loans. But it would occupy a smaller niche than today. Annual volumes of loan purchases and securities issuances would be lower. Our market presence would be less consistent. And our support for certain kinds of affordable housing would be diminished. The business would be less profitable than today, but presumably able to explore other profitable opportunities within the multifamily and commercial real estate markets.

For comparison purposes, and to help FHFA and policymakers determine the value of the government guarantee, Freddie Mac and our financial advisers have attempted to model an alternative scenario. Here, the Multifamily business could be restructured into a new entity with limited access to a government guarantee but no other benefits of a GSE. This structure could attract additional private capital into the market and perform many of the mission-related functions of our current business model.

We also describe an operational roadmap by which Multifamily could be restructured. Industry best practices suggest that any restructuring be conducted in phases – beginning as a stand-alone entity within Freddie Mac -- which would simplify operational decisions as well as create optionality for FHFA and policymakers. Namely, Multifamily's ultimate structure could operate inside or outside Freddie Mac and/or its successor, with or without access to a government guarantee.

In addition to describing the impact on Freddie Mac, this report also estimates the impact on the broader multifamily housing finance market from restructuring our Multifamily business as well as that of Fannie Mae. Here, we heavily rely on independent economic research consultants, as well as our own internal research, to estimate these impacts.

Our findings suggest a negative impact on the market, in which there likely would be a funding gap between market needs for multifamily debt financing and available resources, after adjusting for an estimated expansion among other market providers. We also estimate that property values and housing supply would decrease and mortgage interest rates and rents would increase, with affordable housing properties in secondary and tertiary markets the most affected.

Following are several appendices which are intended to provide FHFA and policymakers with further information on the assumptions and methodologies that have been used to determine the qualitative and quantitative impacts we have included in this report.

Freddie Mac, our financial advisers and economic research consultants would be glad to discuss the key findings of our report. And we stand ready to act on further direction from FHFA and policymakers.

APPENDIXES

The following appendixes contain the research that supports the findings presented in sections 3, 4, and 5 of this report. They are organized by section, as shown:

Appendix I: New Entity Financial Forecast and Valuation

a. No Guarantee Scenario - Detailed Assumptions, Financial Forecasts, Sensitivities, and Valuation
b. Portfolio Management Fee
c. Valuation Approach and Cost of Capital
d. Guarantee Fee
e. Alternative Scenario - Detailed Assumptions, Financial Forecasts, Sensitivities, and Valuation

Appendix II: Market Impact Analysis

a. Freddie Mac Study: "The Economic Impact on the Multifamily Rental Housing Market of Removing the Government Guarantee"

Appendix III: Operational Analysis

a. Asset Isolation Timeline
b. Current-state Systems and Application Overview
c. Technology Phase Road Map
d. Operational Separation Road Map

APPENDIX I: NEW ENTITY FINANCIAL FORECAST AND VALUATION

Additional information related to Section 3, New Entity Financial Forecast and Valuation, of Freddie Mac's "Report to the Federal Housing Finance Agency: Housing Finance Reform in the Multifamily Mortgage Market" appears in this appendix.

Contents:

a. No Guarantee Scenario – Detailed Assumptions, Financial Forecasts, Sensitivities, and Valuation

Financial Statement Assumptions

To forecast the potential financial results and related valuation of a new stand-alone entity without access to a government guarantee, we developed key assumptions based on inputs from our financial advisers as well as our own knowledge and experience of the multifamily and debt capital markets. An overarching assumption is that the new entity would remain relevant in the multifamily marketplace in terms of providing liquidity through new mortgage loan purchases and security issuance volumes coupled with our ability to attract and retain cost-effective private capital and debt to fund the new entity through various business cycles, especially during times of significant market stress. The stand-alone entity would use a conduit business model. Primary assumptions about the model affect projected earnings and resulting valuation, and include new purchase and securitization volumes, gain on sales of mortgage loans in securitizations, net interest income, and general and administrative expenses associated with the entity.

Purchase and Securitization Volumes. We project total origination volumes for the entire multifamily market to decline between 10 and 20 percent in the first year without the government guarantee currently afforded the GSEs, as described in the Market Impact Analysis section of this report. After the market absorbs the policy change and stabilizes, the forecast long-term market growth rate is around 2 percent. Without a debt-financing advantage over competitors, the new entity would charge higher prices and, therefore, lose market share.

We estimated that, as a result, the new entity's annual purchase volumes would range from $6 billion to $7 billion over the 10-year forecast period. Market share would range from 5 to 6 percent, significantly less than our current market share of approximately 20 percent.

Gain on Sale of Mortgage Loans Held-for-Sale. We estimated that the gain on sale for mortgage loans securitized into a non-guaranteed structure with subordination could range from 1 to 3 percent of loan amounts over the forecast period, with an average of approximately 2 percent. We would expect the gain on sale to be modestly higher (2.5 to 3 percent) in the first few years, reflecting the initial market disruption from eliminating the credit guarantee. This assumption considered the unrealized gain or loss the entity would recognize while the mortgage loan is held on our balance sheet as well as the realized gain or loss at securitization. Our assumption was based on our historical K-deal transactions and the observed profit margin targets of commercial mortgage-backed securities (CMBS) conduits issuing non-guaranteed securities in the market today. CMBS conduits generally seek to achieve a 2 percent profit margin on conduit loans but have recently realized profit margins as high as 3 to 5 percent. Before the

market crash in 2008, targeted profit margins were often 1 to 2 percent. At the market peak, when competition was especially aggressive and the bond market highly liquid, margins sometimes slipped below 1 percent. Future realized gains on the sale of mortgage loans may be significantly higher or lower than our current assumption, depending on the competitive factors and capital market conditions at the time.

Net Interest Income and Margin. Our projected financial results reflected a reduction in net interest income compared to our current-state results as a business segment within Freddie Mac. The reduced net interest income would result from incurring higher borrowing costs from private-debt providers as a non-guaranteed entity than we do for current funding. We would be unable to pass along all of this additional cost to our borrowers through higher mortgage loan rates, which would negatively affect net interest income. Our ability to raise the borrower's mortgage loan rate would be limited, given the range of competitors in the marketplace and financing options available to borrowers. Our analysis led us to conclude that the new entity should be able to obtain financing at a credit spread over the London Interbank Offered Rate (LIBOR) of 50 to 250 basis points (bps), depending on the financing facility.

Projected net interest income and margin, compared to the current business segment results, also would be impacted by a change in the composition of portfolio earning assets because the new entity would be unable to purchase and hold mortgage loans on-balance-sheet for investment; the cost of equity and debt financing associated with these long-term, illiquid assets would be prohibitively high. Today, mortgages held-for-investment benefit from the government guarantee of the GSEs' debt, which supports marginally higher net interest margins on these mortgages compared to mortgages held-for-sale pending securitization. Our analyses, and those of our financial advisers, supported our assumption that the new entity would not be able to purchase mortgages held-for-investment.

Based on these considerations, we concluded that new purchases would be directed to trading securities and retained mortgages held-for-sale pending securitization with credit spreads over LIBOR of approximately 50 to 250 bps, respectively. Using these funding rates, projected net interest margins averaged 3 to 5 percent over the forecast period, reflecting the high level of equity financing required as well as the mix of higher-yielding interest-only trading securities.

General and Administrative Expenses. Our general and administrative (G&A) expense assumptions were based on knowledge of our existing operating expense structure. In a No Guarantee environment, areas of our current business would be significantly reduced, including Targeted Affordable Housing and Asset Management. Expected lower purchase volumes would also lead to reductions across the business, including the production, underwriting, and portfolio management areas. The G&A reductions directly linked to expectations of lower purchase volumes, coupled with technology and

process improvements that are in process within our business, support our assumptions of a significantly reduced operating expense base.

We assumed that G&A expenses would decline by approximately 25 to 30 percent in the initial year without access to a government guarantee, followed by four years of incremental decreases of 13 to 17 percent as technology and process improvements are realized and headcount is adjusted to reflect the lower annual purchase volumes. For subsequent years, we assumed normalized growth of approximately 2 percent that is tied to overall purchase volume growth.

Portfolio Management Fee. We considered the potential need for portfolio management services for the existing CMBS securities and multifamily whole loans (legacy portfolio). This could be an opportunity for the new entity to engage the unique skill sets of our Multifamily Asset Management staff and could provide a considerable revenue stream in the early years of the new entity; the benefit would diminish over time as the legacy portfolio runs off. For purposes of the pro forma analysis, we assumed that the entity would have the opportunity to manage the legacy portfolio for an appropriate fee.

To determine a reasonable portfolio management fee, we looked at three data points: internal cost analysis, comparable portfolio management transactions, and third-party mortgage servicing fees, including master, primary, and special servicing. Based on our internal analysis and guidance from our financial advisers, we determined that a reasonable fee for the portfolio management services to be provided should be based on a combination of our existing cost structure and the fee structure of collateralized debt obligations (CDOs). As a result, we assumed a flat portfolio management fee of 2 bps on the outstanding unpaid principal balance (UPB) of the CMBS securities portfolio and 25 bps on outstanding UPB for the whole-loan portfolio. This portfolio management fee would decline significantly over the next six to seven years, consistent with our internal runoff projections for the legacy portfolio. Beyond this, no other ancillary income was included in our assumptions or financial projections. This assumption differs from that of our financial advisers, who have assumed for their projections that legacy portfolio runoff would partially be replaced by new third-party mortgage servicing assets.

Tax. For all forecast periods, we assumed an effective tax rate of 35 percent, based on the applicable federal corporate tax rate. The potential impact of state income, franchise, and other taxes were reviewed at a summary level as part of the operational analysis but were excluded from our tax assumption for forecast simplicity.

Forecast Financial Results

The Multifamily segment's 2012 forecast information is provided here to highlight the scale of the new entity relative to the current Multifamily business segment as reported within Freddie Mac.

Income Statement Forecast.

	($ Millions)	Multifamily Segment 12/31/12	New Entity Yr. 1 12/31/13	New Entity Yr. 3 12/31/15	New Entity Yr. 5 12/31/17	New Entity Yr. 10 12/31/22
Inputs	**Purchase volumes**	$ 25,659	$ 5,888	$ 6,095	$ 6,311	$ 6,882
	Securitization volumes	21,895	6,041	6,224	6,311	6,882
	- Gain on sale %	**3.1%**	**2.8%**	**1.8%**	**1.9%**	**1.9%**
Summary Income Statement	**Interest income**	$ 7,246	$ 89	$ 93	$ 103	$ 116
	Interest expense	(5,970)	(31)	(32)	(39)	(53)
	Net interest income	1,276	57	61	64	63
	(Provision) benefit for credit losses	96	-	-	-	-
	Net interest income after provision	1,372	57	61	64	63
	Guarantee fees	150	-	-	-	-
	Gain (losses) on sale of mortgages	680	167	113	117	129
	Gain (losses) on trading securities	60	3	3	4	4
	Portfolio management fees	-	160	100	50	2
	Other non-interest income	180	6	6	6	7
	Total non-interest income	1,070	335	222	177	142
	Total revenues	2,442	393	283	240	204
	Other non-interest expense	(106)	-	-	-	-
	General and administrative expense	(242)	(173)	(119)	(87)	(96)
	Pretax income	2,104	220	164	153	108
	Net income	**$ 2,094**	**$ 143**	**$ 107**	**$ 100**	**$ 70**
	- Return on Assets	***NA***	***8.0%***	***6.8%***	***7.0%***	***5.0%***
	- Return on Equity	***NA***	***28.6%***	***24.1%***	***25.2%***	***18.5%***

The new entity would use a conduit business model, as previously stated. Primary net income drivers would include new loan purchase and securitization volumes, gain on sale of mortgages in securitizations, net interest income, portfolio management fees, and G&A expenses.

We forecast that net income would decrease approximately 51 percent, or $72 million, over the 10-year forecast period, primarily because of lower portfolio management fees and gains on the sale of mortgages. These decreases would be partially offset by significantly lower G&A expenses and higher net interest income.

Portfolio management fees would decline over the forecast period as the underlying legacy portfolio assets run off and are not replaced with either new retained portfolio assets or third-party mortgage servicing assets. As previously described, the new entity may have an opportunity to provide multifamily mortgage servicing to third parties, including master, primary, and special servicing, given the specialized skills of

Multifamily's Asset Management staff. However, this potential revenue source has not been included in this forecast.

Gains on the sale of mortgage loans would decline an estimated 23 percent, or $38 million, over the forecast period, reflecting a decrease in the gain on sale assumption from 2.8 to 1.9 percent as the market stabilizes after the removal of the GSEs, offset partially by a 14 percent increase in new securitization volumes. We anticipate that the profit margin realized on securitizations would contract over time as the multifamily mortgage securitization market stabilizes, which would encourage competition for mortgage loan borrowers and, thereby, reduce spread gains realized on securitization. In developing the gain-on-sale assumption, we considered the unrealized gain or loss the entity would recognize while the mortgage loan is held on our balance sheet as well as the realized gain or loss at securitization.

Net interest income represents income earned from trading securities and mortgage loans held on-balance-sheet prior to securitization. Trading securities include senior tranches of the securities issued by the entity as well as interest-only (IO) securities from these securitizations. We assumed that the entity would continue to purchase these securities throughout the forecast period and based our assumptions regarding coupon rates on existing K-deal securities. The increase in net interest income would be driven by increasing outstanding balances of trading securities and a higher relative proportion of IO securities with higher yields in the trading-securities portfolio.

Other non-interest income primarily comprises loan application fees. Its growth is directly linked to annual purchase volumes. Other non-interest items, including derivative gains and losses, were not forecast because they are generally insignificant.

G&A expenses would decrease 45 percent, or $77 million, over the forecast period as the operating expense base is adjusted to support lower annual purchase and securitization volumes. Initial reductions would focus on business areas that would have a reduced role in the new entity, including Targeted Affordable Housing and Asset Management, either because of product elimination or service-level reduction. Subsequent G&A reductions would stem from technological and process improvements.

Balance Sheet Forecast.

Summary Balance Sheet ($ Millions)	Multifamily Segment 12/31/12	New Entity Yr. 1 12/31/13	New Entity Yr. 3 12/31/15	New Entity Yr. 5 12/31/17	New Entity Yr. 10 12/31/22
Cash & cash equivalents	$ 238	$ 98	$ 102	$ 105	$ 96
Available-for-sale securities	55,136	-	-	-	-
Trading securities	1,600	304	381	395	400
Consolidated trusts	448	-	-	-	-
Retained mortgage loans held-for-investment, net of reserve	66,122	-	-	-	-
Retained mortgage loans held-for-sale, at fair value	10,400	1,340	1,057	924	901
Guarantee asset, at fair value	887	-	-	-	-
Real estate owned, net	50	-	-	-	-
Other assets	1,210	7	7	7	8
Total Assets	**$ 136,091**	**$ 1,749**	**$ 1,547**	**$ 1,432**	**$ 1,405**
Repurchase agreements	-	279	350	364	368
Warehouse line of credit	-	965	761	665	649
Long term financing	-	-	-	-	-
Debt securities of consolidated trusts	448	-	-	-	-
Freddie Mac internal debt funding	128,922	-	-	-	-
Total Debt	129,370	1,244	1,112	1,029	1,017
Guarantee obligation	780	-	-	-	-
Other liabilities	1,217	7	7	7	8
Total Liabilities	131,367	1,252	1,119	1,037	1,025
Stockholders equity	4,724	498	428	396	380
Total Liabilities & Stockholders Equity	**$ 136,091**	**$ 1,749**	**$ 1,547**	**$ 1,432**	**$ 1,405**
Guarantee Portfolio $UPB	***$ 51,672***				
- Dividends	**NA**	***$ 145***	***$ 137***	***$ 99***	***$ 70***
- Dividend Yield @ 1.0 Book Value	**NA**	***29.2%***	***32.1%***	***25.0%***	***18.4%***
- Equity / Assets	**NA**	***28%***	***28%***	***28%***	***27%***
- Debt / Equity	**NA**	**2.5x**	**2.6x**	**2.6x**	**2.7x**

The new entity's forecast balance sheet reflects a conduit business model, where loans are purchased from sellers, aggregated on balance sheet for a short period (usually less than six months), and subsequently structured into securities that are sold into the marketplace. The entity's trading securities and mortgage loans generally would be financed through some form of wholesale funds, including repurchase agreements and warehouse lines of credit.

Trading securities would increase by 32 percent, or $96 million, over the 10-year forecast period, assuming that the entity would purchase approximately $50 million of senior certificates and $15 million of IO securities for each $1 billion in securities issued. It was assumed that senior certificates and IO securities would be held for short periods, generally less than one to two years. These assumptions were based on our actual experience with the existing K-deal portfolio and reviewed with our financial advisers to ensure reasonability and comparability with similar public companies.

Retained mortgage loans held-for-sale at fair value represent multifamily mortgage loans purchased from sellers and retained on-balance-sheet prior to securitization. While these loans are on the entity's balance sheet, they would be marked to fair value at the end of each accounting period; these marks would flow directly through the entity's income statement. Once securitized, a realized gain or loss on the sale of mortgage loans would be recognized, representing the difference between cash proceeds received and the fair value of the mortgage loans. These loans are less liquid than trading securities and are normally funded through a warehouse line of credit based on an agreed-upon advance rate.

Retained mortgage loans held-for-sale balances would decrease by 33 percent, or $438 million, over the forecast period, based on our assumption that the aggregation and securitization process would become even more efficient and faster. By reducing the time a mortgage loan is "aggregated" on the balance sheet, the entity would incur less borrowing costs and more quickly realize the gain or loss on sale of mortgage loans. The outstanding UPB of these loans shown on the forecast balance sheet was calculated based on our assumptions around the level and timing of mortgage loan purchases and securitizations; these were based on our actual experience since 2008 with the existing K-deal portfolio.

The analyses performed by Freddie Mac and our financial advisers to determine the appropriate level of debt and equity financing based on anticipated asset levels and funding needs suggested that repurchase agreements and secured warehouse lines of credit generally would be the most appropriate financing alternative for the proposed new entity.

The balance of stockholders' equity represents the market-based minimum capital requirement for the new entity. We assumed that earnings in excess of the minimum capital requirement would be disbursed via a dividend to the equity investors. As a result, the equity-to-assets ratio would remain relatively constant over the forecast period.

Valuation

In assessing the stand-alone entity's value, multiple valuation methodologies were considered – among them, public comparables, discounted cash flow, dividend discount, price to earnings, price to book, and others – to produce a range of possible values. The valuation is sensitive to a variety of factors, including earnings, capitalization levels, and cost of capital. Values were first determined on a gross, overall basis, and then net of Freddie Mac's original equity investment in the entity. Freddie Mac's total investment in the entity would include mortgage loans held for securitization (assumed to be approximately $1.5 billion), debt funding, and equity capital.

Based on extensive analyses and discussions, our financial advisers determined the potential valuations for the new entity (net of the initial required capital contribution) would range from approximately $100 million to $500 million, based on their estimate of future annual earnings of $100 million to $150 million.

Annual Purchase Volumes *No Guarantee*	Earnings	Cost of Equity	Initial Required Capital	Valuation, net of Initial Capital
$6B - $18B	**$100M - $150M**	**9-17%**	**$500M - $600M**	**$100M - $500M**

Note: The ranges were provided by our financial advisers and incorporated into their earnings projections. Our financial advisers used projected earnings in Years 1 and 3 to derive their entity net valuation ranges.

Sensitivities

Minor changes in certain assumptions can have a material impact on earnings and, ultimately, the resulting valuations. The sensitivity analysis in following table illustrates how changes in key financial assumptions can affect earnings forecasts. It reflects the impact caused by changing one input assumption by a specified percentage.

Earnings Sensitivity Analysis ($ millions)

No Guarantee Key Drivers		% Change	Year 1 2013	Year 3 2015	Year 5 2017	Year 10 2022
	Current forecast Net Income		**$ 143**	**$ 107**	**$ 100**	**$ 70**
			Incremental impact to Net Income			
1	**Purchase volumes $**	**10%**	**$ 6**	**$ 7**	**$ 6**	**$ 11**
	- % Net Income change		**4%**	**6%**	**6%**	**15%**
2	**Gain on sale of mortgages %**	**10%**	**$ 11**	**$ 7**	**$ 8**	**$ 8**
	- % Net Income change		**8%**	**7%**	**8%**	**12%**
3	**Net interest margin %**	**10%**	**$ 4**	**$ 4**	**$ 4**	**$ 4**
	- % Net Income change		**3%**	**4%**	**4%**	**6%**
4	**Portfolio management fee bps**	**10%**	**$ 10**	**$ 6**	**$ 3**	**$ 0**
	- % Net Income change		**7%**	**6%**	**3%**	**0%**
5	**G&A expense**	**10%**	**$ (11)**	**$ (8)**	**$ (6)**	**$ (6)**
	- % Net Income change		**(8%)**	**(7%)**	**(6%)**	**(9%)**

% Changes (positive or negative) are linear.

b. Portfolio Management Fee

Freddie Mac and our financial advisers leveraged industry experts and various sources and methodologies to determine an appropriate fee for managing Multifamily's legacy portfolio. For the earnings forecast, we used a portfolio management fee of 25 basis points (bps) for retained mortgages and 2 bps for CMBS to reflect our estimate of the internal CMBS management costs.

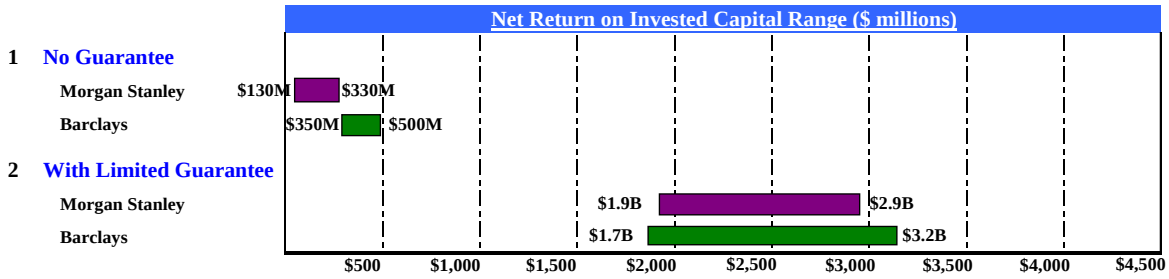
The table below summarizes the factors that each party used to calculate the portfolio management fee and results of their analyses.

	Barclays	Morgan Stanley
Retained Mortgage Loans Held-for-Investment	25 bps	25 bps
CMBS Portfolio	2 bps	25 bps
Key Considerations	• Static pool collateralized debt obligations (CDOs) – Assessed fees charged by CDOs including Wrightwood Real Estate, Gramercy Real Estate, FMC Real Estate, among others • Externally managed real estate investment trusts (REITs) – Assessed management fees charged by Ellings Financial, Invesco Mortgage Capital, PennyMac	Assumed an average portfolio management fee of 25 bps on all legacy assets

c. Valuation Approach and Cost of Capital

The valuation ranges that our financial advisers calculated for the No Guarantee and With Limited Guarantee scenarios heavily depended on the projected earnings for each scenario and key valuation assumptions. As shown in the following chart:

- **No Guarantee net valuation (return to Freddie Mac)** - $130 million to $500 million
- **With Limited Guarantee net valuation (return to Freddie Mac)** - $1.7 billion to $3.2 billion



Valuation Approach

Our financial advisers determined valuation ranges based on certain key assumptions, including cost of equity, borrowing costs, volume, and earnings growth rates. These were benchmarked against public comparables, prior actual results, or existing industry and internal forecasts. Various valuation methods were employed, as shown in the following table.

No.	Valuation Methods	No Guarantee		With Limited Guarantee	
		Barclays	Morgan Stanley	Barclays	Morgan Stanley
1	**Public comparables:**				
2	Cost of equity	5% - 13%	7.2% - 10.5%	5% - 13%	7.2% - 10.5%
3	Price / earnings	7.7x - 11.9x	6x - 23x	7.7x - 11.9x	6x - 23x
4	Price / book value	0.82x - 1.77x	0.8x - 4.6x	0.82x - 1.77x	0.8x - 4.6x
5	Return on total common equity vs. Price / book value regression	3.1X - 3.2X	--	1.6X - 1.7X	--
6	**Other methods:**				
7	Sum of the parts analysis	$430M - $640M	--	$1.7B - $2.4B	--
8	Capital asset pricing model	13.9%	--	8.5%	--
9	Implied cost of equity	16.6%	--	13.5%	--
10	Regression analysis	3.1x - 3.2x	--	1.6x - 1.7x	--
11	**Precedent transactions:**				
12	Value / book value	2.4x	--	2.4x	--
13	Value / earnings	20.9x	--	20.9x	--
14	Premium / managed receivables	1.1%	--	1.1%	--

Valuation Assumptions – Variations Between Financial Advisers

Assumptions made by our financial advisers in developing their projections varied in a few areas, including the following:

- **Assets transferred at inception**
  - **Barclays** - Retained mortgages held-for-sale, trading securities, and existing guarantee portfolio (With Limited Guarantee scenario) would be transferred to the new entity at inception to support a "fully operational" Year 1 earnings run rate.
  - **Morgan Stanley** - The new entity would be capitalized *only* with cash and equity (start-up). Stabilized run-rate would be achieved in Year 3.
- **New mortgage purchase and securitization volumes for the No Guarantee scenario**
  - **Barclays** - Significant market disruption and sustained impact on the overall market. Volume projected at $6 billion in Year 1, growing to $7 billion in Year 10.
  - **Morgan Stanley** - Market disruption for two to three years, dissipating thereafter and returning to a normalized growth rate; however, Morgan Stanley anticipates a much smaller impact on Freddie Mac's volume than does Barclays. The new entity would continue to lose share to competitors that operate more efficiently and/or have lower funding costs. Volume projected at $18 billion in Year 1, declining to $14 billion.
- **Purchases of retained mortgages held-for-investment in the With Limited Guarantee scenario**
  - **Barclays** - A small volume of new purchases would be retained on balance sheet, increasing debt and equity capital required and reducing financial returns.

    - **Morgan Stanley** - A small volume of new purchases would be sold to a new stand-alone real estate investment trust (REIT) in return for an ongoing management fee. The REIT would obtain separate private capital to finance the portfolio.
- **Guarantee fee charged for the With Limited Guarantee scenario**
    - **Barclays** - A 25 bps guarantee fee, with 10 bps payable to the government guarantee provider.
    - **Morgan Stanley** - A 24 bps guarantee fee, with 12 bps payable to the government guarantee provider.

Valuation Results

Valuation outcomes are driven by projected earnings, cost of equity, and other factors reflected in market comparables. Barclays based its No Guarantee valuation on a multiple of price to book value and its With Limited Guarantee valuation on the sum-of-the-parts analysis. Morgan Stanley based its valuation for both scenarios on discounted cash-flow analysis using price-to-earnings multiples and cost of capital for peer companies.

No.	Valuation Summary	No Guarantee		With Limited Guarantee	
		Barclays	Morgan Stanley	Barclays	Morgan Stanley
	Results				
1	**Net valuation[(a)]**	**$350M - $500M**	**$130M - $330M**	**$1.7B - $3.2B**	**$1.9B - $2.9B**
2	**Gross valuation**	**$850M - $1.0B**	**$730M - $930M**	**$4.5B - $6.0B**	**$3.3B - $4.3B**
3	**Initial equity capital**	**$500M**	**$600M**	**$2.8B**	**$1.4B**
4	**Multiple on invested capital**	**1.7x - 2.0x**	**1.6x - 2.0x**	**1.6x - 2.1x**	**3.1x - 3.8x**
	Key Drivers:				
5	**Cost of equity**	**13.9% - 16.6%**	**9.0% - 11.0%**	**8.5% - 13.5%**	**7.0% - 9.0%**
6	**Price / earnings**	**6.0x - 8.0x**	**7.0x - 9.0x**	**9.0x - 11.0x**	**9.0x - 11.0x**
7	**Price / book value**	**1.25x - 1.5x**	**1.2x - 1.6x**	**1.5x - 2.0x**	**2.4x - 3.1x**
8	**Sum of the parts analysis**	**$430M - $640M**	**--**	**$1.7B - $2.4B**	**--**
9	**Valuation year net income**	**$142M**	**$109M**	**$450M**	**$477M**
10	**Valuation year**	**2013**	**2015**	**2013**	**2015**

[(a)] Gross valuation less initial equity capital

Debt Financing

Our financial advisers suggested a mix of debt financing and its expected cost, shown in the following table, based on public comparables as well as on discussions with experts from their mortgage trading, securitization, and other relevant areas.

Freddie Mac reviewed the suggested debt-financing mix and cost for reasonableness with experts from our Corporate Forecasting and Multifamily Capital Markets areas.

No.	Debt Financing Assumptions	No Guarantee		With Limited Guarantee	
		Barclays	Morgan Stanley	Barclays	Morgan Stanley
1	**Cost of funds:**[(a)]				
2	**Repurchase agreements** (trading securities)	L+50 bps	(b)	L+50 bps	(b)
3	**Warehouse line** (retained mortgages held-for-sale)	L+250 bps	L+200 bps	L+225 bps	L+125 bps
4	**Long term financing** (retained mortgages held-for-investment)	--	--	L+400 bps	(e)
5	**Backup liquidity facility**	L+50 bps	--	L+50 bps	--
6	**Asset-backed commercial paper**	--	--	--	(c)
7	**Unsecured facility**[(d)]	--	--	--	T+300 bps
8	**Advance rates:**				
9	**Repurchase agreements** (trading securities)	95%	(b)	95%	(b)
10	**Warehouse line** (retained mortgages held-for-sale)	75%	75%	85%	75%
11	**Long term financing** (retained mortgages held-for-investment)	50%	(e)	50%	(e)
12	**Backup liquidity facility**	--	--	95%	--
13	**Asset-backed commercial paper**	--	--	--	(c)
14	**Unsecured facility**[(d)]	--	--	--	--
15	**Credit rating** [(f)]	B - BB	BBB	B - BB	BBB

(a) Morgan Stanley assumes 1 month LIBOR. Barclays assumes 3 month LIBOR. All facilities subject to annual rollover requirements.

(b) Morgan Stanley assumes trading securities and trading assets funded by equity, not debt.

(c) Asset-backed commercial paper considered but not forecast due to complicated structuring required and government involvement in the guarantee needed.

(d) Assumes 5 year Treasury note. Unsecured funding unnecessary in No Guarantee and With Limited Guarantee scenarios but included in other alternative scenarios.

(e) New purchases of retained mortgages held-for-investment are funded via a real estate investment trust (REIT) structure, not maintained on new entity's balance sheet.

(f) Morgan Stanley states that A rating is possible but that it may not be achieved due to concerns with monoline business model and need to demonstrate profitability to attract private capital.

d. Guarantee Fee

Freddie Mac and our financial advisers leveraged industry experts and various sources and methodologies to determine the appropriate guarantee fee that the new stand-alone entity would pay a guarantor, if available. A guarantee fee of 25 basis points (bps) for K-deals was used for the earnings forecast, with 10 bps paid to the government entity and 15 bps remaining with the new entity.

Guarantee Fee Characteristics and Considerations

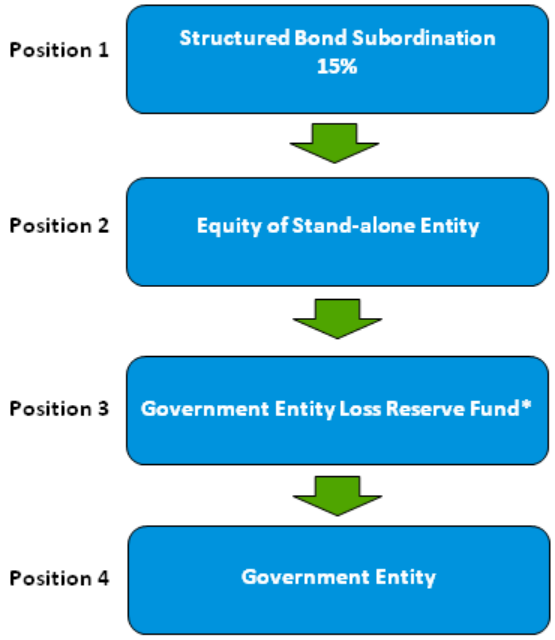
Table below summarizes the financial advisers' key considerations in calculating the guarantee fee and the results of their analyses.

	Barclays	Morgan Stanley
Total "Gross" Guarantee Fee Received by Multifamily Entity • **K-deals** • **Other Guarantees (CE Bonds, TEBS, etc.)**	 • 25 bps • ~70 bps	 • 24 bps • ~97 bps
Guarantee Fee Paid to Government Guarantee Provider • **K-deals** • **Other Guarantees**	 • 10 bps • 30 bps	 • 12 bps • 30 bps
Net Guarantee Fee Retained by Multifamily Entity • **K-deals** • **Other Guarantees**	 • 15 bps • ~40 bps	 • 12 bps • ~67 bps
Key Considerations	• Modeled guarantee business to achieve market return (double-digit return on equity (ROE) target) • Sensitized ROEs for guarantee business to inform a range of potential prices to meet return hurdle rates	• Modeled guarantee business to achieve market return for Multifamily entity and government guarantee provider • Used Freddie Mac's recent K-20 transaction as benchmark

How the Limited Guarantee Could Work, If Needed

If the stand-alone entity has access to a limited government guarantee as described in the New Entity Financial Forecast and Valuation section, the guarantor would step in only if potential losses exceed the non-guaranteed amounts of the stand-alone entity's securities and the equity in the new entity itself. The following illustration shows the order in which potential losses would be absorbed in the proposed limited-guarantee structure, including the level of credit protection provided by each layer.

For this analysis, the average modeled gross expected losses in K-deals was 3 bps. However, historical average losses in K-deals to date have been zero to Freddie Mac as guarantor.



*The Government Entity Loss Reserve Fund would be set up and maintained with fees received from the stand-alone entity and effectively would serve as an insurance fund against potential losses.

e. Alternative Scenario - Detailed Assumptions, Financial Forecasts, Sensitivities, and Valuation

Financial Statement Assumptions

The business model for the new stand-alone entity with access to a limited government guarantee would have components of a conduit and credit guarantee business. From the conduit business model perspective, earnings drivers would include new loan purchase and securitization volumes, gain on sales of mortgages in securitizations, net interest income, portfolio management fees, and related general and administrative (G&A) expenses. The credit guarantee business model adds another earnings driver: guarantee fees on securitizations, offset by credit expenses, including provision for credit losses.

Purchase and Securitization Volumes. As described in the Market Impact Analysis section of this report, we expect that the overall multifamily market and annual purchase volumes would be slightly lower in this scenario than our existing Multifamily segment forecast. We assumed that the stand-alone entity would incur higher borrowing costs due to the loss of the government guarantee on outstanding debt. This would reduce, to a limited extent, the entity's new purchase volume capacity. We project overall annual market origination growth of 4 to 7 percent over the next five years based on the strong demand for multifamily housing and attractive long-term borrowing rates currently available. We estimated the market's long-term growth rate at approximately 2 percent, which is generally consistent with the rate of gross domestic product (GDP) growth.

Based on these factors, we estimated that a stand-alone entity with access to a limited government guarantee would attain annual purchase volumes between $24 billion and $30 billion over the forecast period, resulting in a market share ranging from 16 to 18 percent, significantly higher than the No Guarantee scenario forecast of $6 billion to $7 billion and a market share of 5 to 6 percent.

Partially offsetting new loan purchase growth would be the effect that eliminating the government guarantee on the entity's debt would have under either scenario. As debt financing costs increase because of higher private-market borrowing costs and lower advance rates, less funding would be available for new purchases. Market share for the new entity or any related GSE entity would decline; they would need to charge higher prices to maintain profitability and, therefore, lose purchase volume to market competitors with lower funding costs, such as banks. This assumption is consistent under both scenarios.

Gain on Sale of Mortgage Loans Held-for-Sale. Similar to the No Guarantee scenario, we anticipate that the gain on sale for mortgage loans securitized into a guaranteed structure would average approximately 2 percent over the forecast period; this is

generally consistent with our K-deal experience and that of CMBS conduits. Our assumption takes into account the unrealized gain or loss the entity would recognize while the mortgage loan is held on balance sheet as well as the realized gain or loss at securitization. Future realized gains on the sale of mortgage loans may differ significantly from our current assumption, depending on competitive factors and capital market conditions at the time.

Net Interest Income and Margin. Our projected financial results reflected a reduction in net interest income compared to our current results as a business segment within Freddie Mac. The reduced net interest income would result from higher borrowing costs and constraints on raising interest rates to borrowers. Based on guidance from our financial advisers and our own analysis of funding costs, we assumed a credit spread over the London Interbank Offered Rate (LIBOR) of between 50 and 400 basis points (bps), depending on the financing facility.

Projected net interest income and margin also would be affected by a change in the composition of portfolio earning assets. The new entity would purchase a limited amount of mortgage loans held-for-investment, and these products are expected to have lower net interest income, given higher borrowing costs.

Based on these considerations, we concluded that new purchases would be directed primarily to trading securities and retained mortgages held-for-sale pending securitization with credit spreads over LIBOR of approximately 50 to 225 bps, respectively. A relatively lower level of annual purchase volume for retained mortgages held-for-investment was also forecast, with credit spreads over LIBOR of 400 bps. Using these projected funding rates, we expect net interest margins to average 3 to 4 percent over the forecast period.

General and Administrative Expenses. In this scenario, we assume that the new entity's purchase volumes would increase over the 10-year forecast period and there would be new affordable housing business. These factors would contribute to an increase in the overall expense base over the forecast period. However, without incremental business pursuits, our Asset Management area would continue to experience lower demand for its services over time as the legacy portfolio shrinks through normal runoff and new purchase volumes are directed to securitization products that are serviced by third parties. Because of this, as well as the previously described technology and process improvements that are in process within our business, we forecast that G&A expenses would decrease from 2 percent to 7 percent each year between 2013 and 2016, with a normalized growth rate of approximately 5 percent each year thereafter.

Portfolio Management Fee. As in the No Guarantee scenario, we considered the potential need for portfolio management services for the existing legacy portfolio. This could be an opportunity for the new entity, based upon the unique skill sets of Multifamily Asset Management staff. We assumed that the portfolio management fee would be the same in both scenarios.

Guarantee Fee. If the new entity has access to a limited government guarantee, it would be one of a very few firms authorized to purchase a guarantee from a government agency and, therefore, allowed to issue agency-backed securities. In return for the guarantee, the entity would pay a guarantee fee to the government agency. To determine a reasonable range of guarantee fees that the entity could be charged, we leveraged our internal guarantee-fee analyses and experience as well as our financial advisers' analyses to determine potential pricing levels and their impacts on volumes, profitability, and return on equity (ROE).

Our analysis focused on determining a reasonable range of guarantee fees that could be charged for the transfer of credit risk from the new entity to the government guarantee provider after considering the level of subordination and the capital adequacy of the new entity. This analysis included reference to reinsurance premiums currently charged in the market for similar transactions and the economic capital required to be held by the first-loss guarantor after subordination (the new entity) as well as the catastrophic-loss guarantor (the government agency). In addition, our financial advisers conducted their own analyses of the guarantee fee necessary for the entity and the government guarantee provider, taking into consideration the level of market-based capital necessary and minimum return thresholds required by each party.

Based on the results of our analyses, future guarantee-fee increases might be necessary in a With Limited Guarantee scenario. However, any guarantee-fee increase would be subject to market pricing and competitive factors at the time, which might limit the extent of fee increases.

For purposes of our financial forecast, we assumed that the total guarantee fee for AAA-rated K-deal senior tranches would be 25 bps; this is consistent with our financial advisers' views. Freddie Mac's existing market pricing for our K-deal product is 16 bps. However, our own analysis and that of our financial advisers suggested a range of up to 50 bps. Our assumption of a higher guarantee fee reflects a market return on the credit guarantee for both the new entity and the government guarantee provider. Of this amount, 10 bps would be paid to the government guarantee provider. For other guarantee transactions, such as bond guarantees, we used our existing market pricing (ranging from approximately 50 bps to 110 bps) and assumed that 30 bps would be paid to the government guarantee provider. We estimated that the annual guarantee fees payable to the government guarantee agency would range from about $80 million to $160 million over the 10-year forecast period.

Tax. For all forecast periods, we assumed an effective tax rate of 35 percent, based on the applicable federal corporate tax rate. The potential impact of state income, franchise, and other taxes were reviewed at a summary level as part of the operational analysis but were excluded from our tax assumption for forecast simplicity.

Forecast Financial Results

The Freddie Mac Multifamily segment's 2012 financial forecast is provided in the following table to highlight the relative scale of the new entity to the current Multifamily business as reported within Freddie Mac.

Income Statement Forecast.

	($ Millions)	Multifamily Segment 12/31/12	New Entity Yr. 1 12/31/13	New Entity Yr. 3 12/31/15	New Entity Yr. 5 12/31/17	New Entity Yr. 10 12/31/22
Inputs	**Purchase volumes**	$ 25,659	$ 24,168	$ 25,519	$ 27,144	$ 30,411
	Securitization volumes	21,895	23,530	24,728	25,759	28,859
	- Gain on sale %	**3.1%**	**1.7%**	**1.7%**	**1.8%**	**1.8%**
Summary Income Statement	**Interest income**	$ 7,246	$ 450	$ 543	$ 663	$ 900
	Interest expense	(5,970)	(192)	(232)	(315)	(468)
	Net interest income	1,276	258	311	349	432
	(Provision) benefit for credit losses	96	(5)	(6)	(11)	(32)
	Net interest income after provision	1,372	253	305	338	399
	Guarantee fees	150	85	140	190	244
	Gain (losses) on sale of mortgages	680	395	431	460	523
	Gain (losses) on trading securities	60	13	15	16	19
	Portfolio management fees	-	160	100	50	2
	Other non-interest income	180	34	29	29	31
	Total non-interest income	1,070	687	715	744	819
	Total revenues	2,442	940	1,020	1,081	1,218
	Other non-interest expense	(106)	(15)	(6)	(5)	(2)
	General and administrative expense	(242)	(234)	(207)	(203)	(261)
	Pretax income	2,104	691	806	873	955
	Net income	**$ 2,094**	**$ 449**	**$ 524**	**$ 568**	**$ 621**
	- Return on Assets	**NA**	***4.0%***	***4.3%***	***4.4%***	***4.3%***
	- Return on Equity	**NA**	***14.6%***	***13.1%***	***12.1%***	***10.9%***

The new entity with access to a limited government guarantee would have components of a conduit and a credit guarantee business model, as stated earlier. The conduit business model earnings drivers would be new loan purchase and securitization volumes, gain on sales of mortgages in securitizations, net interest income, portfolio management fees, and related G&A expenses. The credit guarantee business model earnings would be driven by guarantee fees post-securitization, offset by credit expenses, including provision for credit losses.

In this scenario, net income would increase approximately 38 percent, or $172 million, over the 10-year forecast period, primarily reflecting strong growth in net interest income, guarantee fees, and gains on the sale of mortgage loans. These revenue

increases would be offset by a significant drop in portfolio management fees as the legacy portfolio assets liquidate and by modestly higher G&A expenses resulting from higher purchase and securitization volumes.

Net interest income would increase $174 million, or approximately 67 percent, over the 10-year forecast period, reflecting a higher level of interest-earning assets, including trading securities, retained mortgage loans held-for-sale prior to securitization, and retained mortgage loans held-for-investment. Trading securities would include senior tranches of the securities issued by the entity as well as interest-only (IO) securities from these securitizations. We assumed that the entity would continue to purchase these securities throughout the forecast period and based our assumptions regarding coupon rates on existing K-deal securities. A higher relative proportion of IO securities with higher yields in the trading securities portfolio also would have a favorable effect on net interest income.

Guarantee fees would increase $159 million, or approximately 188 percent, over the forecast period, reflecting the impact of a growing guarantee portfolio driven primarily by K-deal securitizations. As stated earlier, for purposes of our financial forecast, we assumed that the total guarantee fee for K-deals would be 25 bps. Of this amount, 10 bps would be paid to the government guarantee provider. For other guarantee transactions, we used our existing market pricing (ranging from approximately 50 bps to 110 bps) and assumed that 30 bps would be paid to the government guarantee provider. Guarantee fees are shown net in the table above.

Gains on the sale of mortgage loans would rise $128 million, or 32 percent, reflecting increasing securitization activity over the forecast period, supported by increasing annual purchase volumes. We assumed a flat gain on sale of mortgage loans of approximately 2 percent which is consistent with our actual results in 2011 and 2012 on our K-deal securitizations.

Portfolio management fees would be identical under the No Guarantee and With Limited Guarantee scenarios. Portfolio management fees essentially would be eliminated over the forecast period as the underlying legacy retained portfolio assets run off and are not replaced with new retained portfolio assets or third-party mortgage servicing assets. The new stand-alone entity might have an opportunity to leverage existing Asset Management skills to provide multifamily mortgage servicing to third parties, including master, primary, and special servicing. However, for purposes of this forecast, this potential revenue source was not included.

Other non-interest income primarily comprises loan application fees. Its growth is directly linked to annual purchase volumes. Other non-interest items, including derivative gains and losses, were not forecast because they are generally insignificant.

G&A expenses would increase $27 million, or approximately 12 percent, over the 10-year forecast period. The initial reduction would reflect reductions in the expense base from 2013 to 2016, primarily through rationalization of the Asset Management area as demand for its services diminishes with the legacy portfolio runoff. We assumed that cost savings would also be realized from technology and process improvements currently under way within our business. For years beyond 2016, G&A expense growth was forecast in a normalized range of approximately 5 percent.

Balance Sheet Forecast.

Summary Balance Sheet ($ Millions)	Multifamily Segment 12/31/12	New Entity Yr. 1 12/31/13	New Entity Yr. 3 12/31/15	New Entity Yr. 5 12/31/17	New Entity Yr. 10 12/31/22
Cash & cash equivalents	$ 238	$ 1,661	$ 2,084	$ 2,408	$ 2,680
Available-for-sale securities	55,136	-	-	-	-
Trading securities	1,600	1,441	1,564	1,656	1,900
Consolidated trusts	448	-	-	-	-
Retained mortgage loans held-for-investment, net of reserve	66,122	606	1,709	2,569	3,840
Retained mortgage loans held-for-sale, at fair value	10,400	7,225	6,087	5,535	5,398
Guarantee asset, at fair value	887	518	758	863	843
Real estate owned, net	50	-	-	1	16
Other assets	1,210	90	81	77	71
Total Assets	**$ 136,091**	**$ 11,540**	**$ 12,282**	**$ 13,109**	**$ 14,747**
Repurchase agreements	-	1,325	1,439	1,523	1,748
Warehouse line of credit	-	5,924	4,991	4,539	4,427
Long term financing	-	285	805	1,212	1,819
Debt securities of consolidated trusts	448	-	-	-	-
Freddie Mac internal debt funding	128,922	-	-	-	-
Total Debt	129,370	7,534	7,234	7,275	7,993
Guarantee obligation	780	540	770	870	850
Other liabilities	1,217	83	94	105	116
Total Liabilities	131,367	8,157	8,098	8,249	8,960
Stockholders equity	4,724	3,382	4,183	4,860	5,788
Total Liabilities & Stockholders Equity	**$ 136,091**	**$ 11,540**	**$ 12,282**	**$ 13,109**	**$ 14,747**
Guarantee Portfolio $UPB	***$ 51,672***	***$ 67,996***	***$ 104,800***	***$ 130,633***	***$ 144,498***
- Dividends	**NA**	***$ 17***	***$ 130***	***$ 213***	***$ 433***
- Dividend Yield @ 1.0 Book Value	**NA**	***0.5%***	***3.1%***	***4.4%***	***7.5%***
- Equity / Assets	**NA**	***29%***	***34%***	***37%***	***39%***
- Debt / Equity	**NA**	**2.2x**	**1.7x**	**1.5x**	**1.4x**

The forecast balance sheet reflects a hybrid conduit and credit guarantee business model, similar to the existing Multifamily segment business model. Assets arising from the conduit business model would include trading securities and retained mortgages held-for-sale pending securitization. We also assumed that a retained mortgage portfolio held-for-investment would be maintained to support borrowers requiring loans that do not meet securitization-market guidelines and for affordable-housing business. Financing for the trading securities and mortgage loans generally would be provided through some form of wholesale funds, including repurchase agreements, warehouse lines of credit, and long-term financing arrangements.

The credit guarantee business model would include a guarantee asset and liability associated with the credit guarantee business. There are generally no ongoing funding requirements for the credit guarantee business model.

Cash and cash equivalents would increase significantly over the 10-year forecast period, based on the assumption that a cash balance would be maintained to support regulatory capital requirements for the guarantee portfolio. In addition, an operating cash balance would be maintained based on a number of days of expected new mortgage purchases.

Trading securities would increase 32 percent, or $459 million, over the forecast period, based on our assumption that the entity would purchase approximately $50 million of senior certificates and $15 million of IO securities for each $1 billion in securities issued. It was assumed that senior certificates and IO securities would be held for short periods, generally less than one to two years. These assumptions were based on our actual experience with the existing K-deal portfolio and were reviewed with our financial advisers to ensure reasonability and comparability with similar public companies.

The retained mortgage loan held-for-sale balance would be retained on-balance-sheet, as in the No Guarantee scenario, and represents loans awaiting securitization. Retained mortgage loans held-for-sale would decrease by 25 percent, or $1.8 billion, over the forecast period, based on our assumption that the entity would become even more efficient at securitizing mortgage loans held-for-sale and be able to reduce the average aggregation period from approximately six to nine months to three to six months. This would reduce borrowing costs and increase the speed of recognizing gain or loss on the sale of mortgages. The difference from the No Guarantee scenario in the outstanding balance of retained mortgage loans held-for-sale results from our assumptions regarding the entity's annual purchase and securitization volumes.

Retained mortgage loans held-for-investment would increase significantly over the 10-year forecast period, to $3.8 billion, based on our assumption of held-for-investment purchase volumes of between $600 million and $800 million per year. These mortgages would be held on balance sheet through maturity. Historically, they have had contractual maturities of seven to 10 years.

Guarantee asset at fair value (GA) represents the present value of the projected remaining guarantee fee to be received by the entity over the estimated life of the guaranteed security. The GA would be marked to fair value each period with any gains or losses (normally losses or expense) recognized immediately into earnings. The offsetting guarantee obligation (GO), which would represent the entity's estimated credit loss liability associated with the guaranteed security, would be accreted into income over the contractual life of the guaranteed security using the effective yield method. GO is shown in the liabilities section of the balance sheet above.

For purposes of the forecast, we assumed that the GA expense would be offset almost entirely by the GO income and, therefore, would have minimal net income impact.

The analyses performed by Freddie Mac and our financial advisers to determine the appropriate level of debt and equity financing based on anticipated asset levels and funding needs suggested that repurchase agreements, secured warehouse lines of credit, and long-term financing facilities generally would be the most appropriate financing alternative for the proposed new entity in the With Limited Guarantee scenario.

Stockholders' equity would equal the market-based minimum capital requirement plus earnings during the period, less any dividend payments to the equity investors.

Valuation

Valuation of the entity in this scenario was performed in a similar manner as in the No Guarantee scenario. Multiple valuation methodologies were used to produce a range of potential values. Earnings ranges were based on our financial advisers' earnings forecasts. The valuations were presented gross and net of original contributions from Freddie Mac.

Annual Purchase Volumes *With Limited Guarantee*	Earnings	Cost of Equity	Initial Required Capital	Valuation, net of Initial Capital
$24B - $31B	**$350M - $775M**	**7-14%**	**$1.4B - $2.8B**	**$1.7B - $3.2B**

Note: The ranges were provided by our financial advisers and incorporated into their earnings projections. Our financial advisers used projected earnings in Years 1 and 3 to derive their entity net valuation ranges.

Sensitivities

Minor changes in certain assumptions can have a material impact on earnings and, ultimately, the resulting valuations. The sensitivity analysis in the following table illustrates how changes in key financial assumptions can affect earnings forecasts. It reflects the impact caused by changing one input assumption by a specified percentage.

Earnings Sensitivity Analysis ($ million)						
With Limited Guarantee			Year 1	Year 3	Year 5	Year 10
Key Drivers			2013	2015	2017	2022
	Current Forecast Net Income		$ 449	$ 524	$ 568	$ 621
		% Change	Incremental impact to Net Income			
1	Purchase volumes $	10%	$ 27	$ 43	$ 52	$ 65
	- % Net Income change		6%	8%	9%	10%
2	Gain on sale of mortgages %	10%	$ 26	$ 28	$ 30	$ 34
	- % Net Income change		6%	5%	5%	5%
3	Guarantee fee bps	10%	$ 6	$ 9	$ 12	$ 16
	- % Net Income change		1%	2%	2%	3%
4	Net interest margin %	10%	$ 18	$ 21	$ 23	$ 29
	- % Net Income change		4%	4%	4%	5%
5	Portfolio management fee bps	10%	$ 10	$ 6	$ 3	$ 0
	- % Net Income change		2%	1%	1%	0%
6	G&A expense	10%	$ (15)	$ (13)	$ (13)	$ (17)
	- % Net Income change		(3%)	(3%)	(2%)	(3%)
	% Changes (positive or negative) are linear.					

APPENDIX II: MARKET IMPACT ANALYSIS

The study that was summarized in Section 4, Market Impact Analysis, of Freddie Mac's "Report to the Federal Housing Finance Agency: Housing Finance Reform in the Multifamily Mortgage Market" appears in full in this appendix.

Contents:

Table of Contents

The Economic Impact on the Multifamily Rental Housing Market of Removing the Government Guarantee

1. Overview

To meet the objective laid out in the Federal Housing Finance Agency's (FHFA's) 2012 Conservatorship Scorecard, Freddie Mac undertook "a market analysis of the viability of multifamily business operations without government guarantees" and reviewed "the likely viability of these models operating on a stand-alone basis after attracting private capital and adjusting pricing if needed." Engaging Freddie Mac's subject matter experts and industry-leading third-party consultants, we conducted research using the best available information on the multifamily rental housing market to evaluate the potential market impact, if any, that would result from operating Freddie Mac's and Fannie Mae's multifamily businesses absent a government guarantee. This document contains our analysis and findings.

Since the U.S. Congress created Freddie Mac and Fannie Mae, the government-sponsored enterprises (GSEs), the multifamily rental housing market has consistently enjoyed secondary market financing support. The GSEs readily purchase or guarantee qualified mortgage loans secured by multifamily rental housing properties that are originated in the primary market by a nationwide network of lenders, thereby helping to keep the multifamily mortgage market liquid. The GSEs can provide such capital-market liquidity because of the favorable prices and cost of funds accorded to their securities and corporate borrowings, respectively. The GSEs' privileged market access indirectly enables their multifamily businesses to offer multifamily borrowers a consistent source of liquidity, predictable executions, and relatively attractive financing terms and interest rates. Better financing terms and interest rates also benefit renter households in the form of lower rents. Overall, the GSEs' participation in the multifamily rental housing market has contributed materially to market stability through all economic cycles and enabled the continued growth of an important aspect of the American dream.

A multifamily housing finance market without the GSEs is without recent precedent. Losing the GSEs through a housing policy change would redefine the multifamily rental housing market structure, with market effects reminiscent of those experienced in other industries that underwent major economic policy changes, such as the banking sector's deregulation during the 1980s and 1990s. The current dominant positions of the GSEs' multifamily businesses imply that removing them, in effect, from the multifamily rental housing market would have substantial impact on that marketplace. Without a comparable past period from which we could infer, Freddie Mac conducted primary research to assess the potential market impact of the loss of the GSEs. We also considered the research performed by our third-party advisers, CBRE Global Research and Consulting and Moody's Analytics.

Key research conclusions:

- Multifamily mortgage rates would increase by 0.75 to 1.5 percent.
- Multifamily mortgage origination volumes would decline by 10 to 20 percent.
- Multifamily property values would decline by 10 to 16 percent, and implied capitalization rates would increase by 0.7 to 1.2 percent.
- Supply of multifamily rental housing units would decrease by 4 to 11 percent.
- Real rents for multifamily rental housing properties would increase by 0.6 to 2.1 percent.
- The impacts would be more severe than the stated estimates in secondary and tertiary rental markets (i.e., smaller markets not located in major, urban centers) and for older multifamily properties in all markets.
- The loss of the GSEs likely would exacerbate housing supply gaps across all market segments, with low- and very low-income renters bearing a disproportionate share of the rent burden.

The remainder of this study describes how operating the GSEs' multifamily businesses absent a government guarantee would affect various aspects of the multifamily market:

- Mortgage rates
- Housing mortgage debt market and origination volumes
- Property values
- Housing supply and rental growth
- Affordable rental housing

We also included supplemental data for reference at the end of the document.

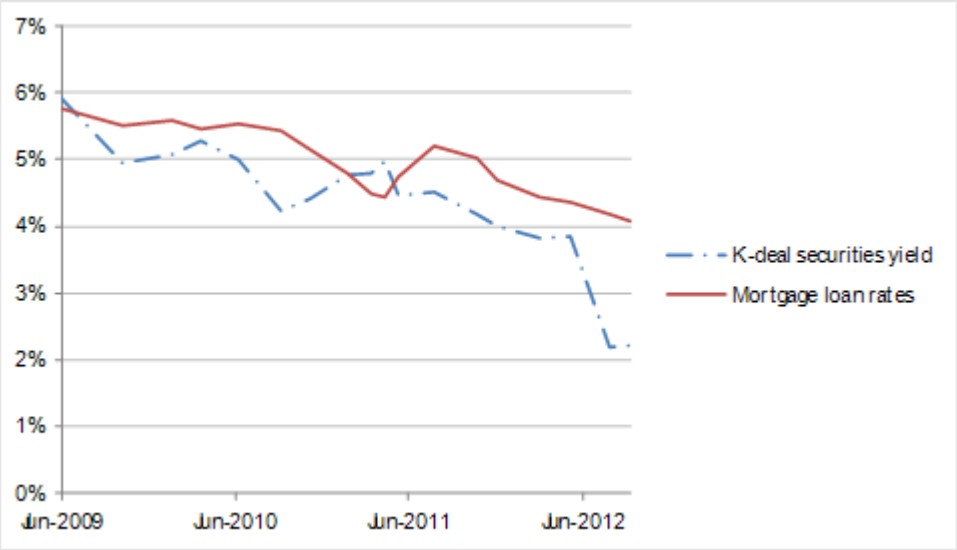
2. How Would Multifamily Mortgage Rates Be Affected?

Currently, the mortgage interest rates on Freddie Mac's multifamily mortgage loans are directly influenced by the expected securities prices of our related securitization transactions, called K-deals. Investors bid up securities prices on K-deals relative to comparable securities offered by the private conduits. They are willing to pay more for the Freddie Mac credit guarantee, which is an effective obligation of the federal government. K-deal prices would be lower if the government no longer guaranteed the Freddie Mac Multifamily business. Additionally, removing the government guarantee for Freddie Mac Multifamily would increase the business's cost of funds. The combination of the lower K-deal prices and the higher cost of funds would lead to higher interest rates on Freddie Mac's multifamily mortgage loans.

2.1. K-deal Securities Prices Move in Relation to Underlying Mortgage Interest Rates

The level of mortgage interest rates on Freddie Mac's multifamily mortgage loans is a direct function of the expected securities prices of the related K-deals. When investors require lower yields, prices on the K-deals increase, and vice versa. Higher securities prices, or, equivalently, lower securities yields, are passed through to multifamily borrowers via lower mortgage interest rates (see Exhibit 2.1). The correlation coefficient between K-deal securities yields and the related underlying mortgage loan interest rates is 0.75, indicating a close relationship between the two.

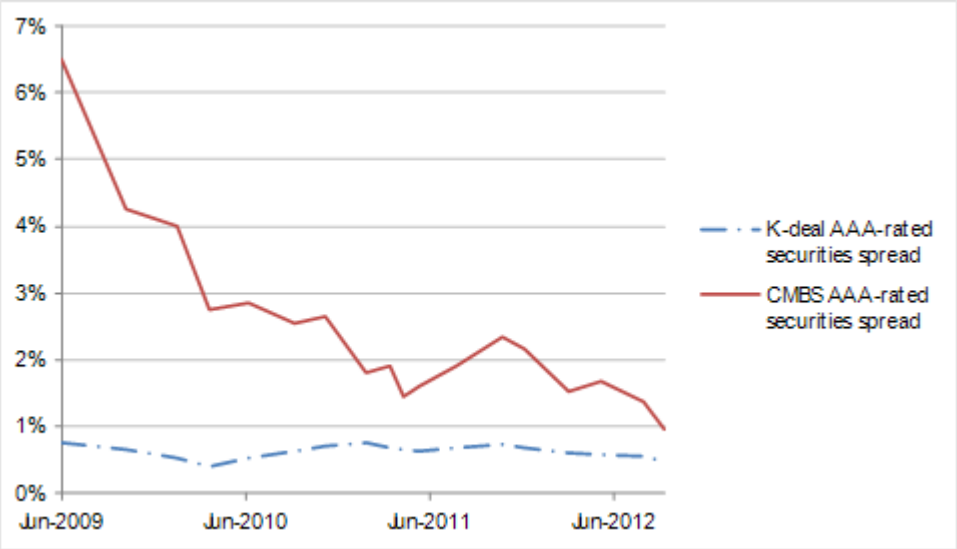
Exhibit 2.1: K-deal securities yield vis-à-vis mortgage interest rates of the underlying mortgage loans



Source: Freddie Mac

The spreads charged by investors on AAA-rated K-deal securities are lower than on comparable securities issued by the private conduit companies. The lower spreads and, hence, higher prices, of K-deals reflect the benefit of the government guarantee. During the aftermath of the 2007-09 economic recession, the spread differential between conduit securities and K-deals was in the range of 3.5 to 5.5 percent. As the credit market stabilized during 2010 and 2011, that spread differential narrowed to a range of 1 to 2 percent. More recently, the spread differential between conduit securities and K-deals was about 1 percent (see Exhibit 2.2).

Exhibit 2.2: Comparison of spreads on comparable AAA-rated securities: K-deal vs. CMBS



Source: Freddie Mac, Bloomberg

Without any government guarantee on K-deals (versus today's structure, which guarantees the senior tranches), we expect that the required spread on AAA-rated securities would increase to a level that more closely resembles spreads required on comparable commercial mortgage-backed securities (CMBS). Assuming no change in the subordination level for K-deals in the No Guarantee environment, required spreads on subordinated securities would likely rise, too. Investors would require higher spreads (or yields) on subordinated securities.

Discussions with Freddie Mac's Capital Markets group and our financial advisers revealed that spreads on K-deals could increase by a minimum of between 0.7 and 0.8 percent, absent a government guarantee on the senior tranches. That incremental required spread could be even higher during periods of capital market stress. Without appropriate comparables, we could not directly ascertain the incremental spread required on K-deals during stress conditions. We believe that the required risk premium on K-deals without any government guarantee could widen dramatically – to levels similar to those experienced by the CMBS market during the 2007-09 financial market crisis.

2.2. Loss of the Guarantee Would Raise Multifamily Mortgage Interest Rates

The lower prices expected on fully non-guaranteed K-deals would reduce overall deal proceeds. To compensate for this, mortgage interest rates on the underlying mortgage loans would be raised to increase the expected future cash flow to securities holders and, thus, increase the securities' present value (i.e., proceeds). The required mortgage interest rate increase would be computed iteratively such that the present value of a representative fully non-guaranteed K-deal would equal the present value of a guaranteed K-deal, all else being equal. Mortgage interest rates on the underlying mortgage loans would need to

increase by 0.75 percent (e.g., from 4.45 to 5.2 percent) to compensate for the higher required spreads on the fully non-guaranteed securities (see Exhibit 2.3).

In this simple example, the estimated increase in the mortgage interest rate of 0.75 percent in the post-GSE market represents an average across typical multifamily mortgage loans purchased by Freddie Mac. Variations would be expected, depending on a variety of risk factors, such as the size of the mortgage loan, credit characteristics, property location, and others. Given that the majority of Freddie Mac's multifamily mortgage purchases are credited to Class B and Class C properties[1] in secondary and tertiary rental housing markets, we expect that mortgage interest rates on some loans would need to increase by 1 percent or more to compensate for the associated risks.

[1] According to Harvard University's Joint Center for Housing Studies, multifamily industry participants generally distinguish market-rate rental properties in three class categories. Class A is synonymous with "investment grade" and refers to properties that are new (no more than 10 years old), located in a primary market (population of at least two million), include 200 units or more, and have finish quality that represents the top of their markets. Class B refers to properties that are older than Class A properties, located in secondary market areas (with population of 500,000 to two million), include 100 to 200 units, and/or may have typical rather than top-of-market finish quality. Class C refers to properties that have one or more of the flaws: more than 20 years old, located in a tertiary market (with population below 500,000), and/or finish quality reflecting more than 20-year-old standards.

Exhibit 2.3: Impact of higher securities spreads on multifamily mortgage interest rate

Panel A - Execution with Govt. Guarantee

Bond	Balance	Spread	Proceeds
AAA	1,120,000,000	60	1,140,000,000
Subordinate	230,000,000	900	160,000,000
		Total Proceeds	1,300,000,000
		Mortgage Interest Rate	4.45%

Panel B - Execution without Govt. Guarantee

Bond	Balance	Spread	Proceeds
AAA	1,120,000,000	135	1,130,000,000
Subordinate	230,000,000	980	110,000,000
		Total Proceeds	1,240,000,000
		Mortgage Interest Rate	4.45%

Total proceeds are lower than Panel A because the higher spreads required on the non-government guaranteed

Panel C - Execution without Govt. Guarantee

Bond	Balance	Spread	Proceeds
AAA	1,120,000,000	135	1,130,000,000
Subordinate	230,000,000	980	170,000,000
		Total Proceeds	1,300,000,000
		Mortgage Interest Rate	5.20%

Total proceeds are now the same as those in Panel A because the higher mortgage interest rate on the underlying multifamily loans increases the cash flow available to the non-

Source: Freddie Mac

The loss of the government guarantee for Freddie Mac Multifamily would lead to a higher cost of funds. Currently, Freddie Mac finances the purchase of multifamily mortgage loans at our funding cost, which is relatively lower than comparable private-sector lenders' cost of funds. Without the government guarantee, Freddie Mac Multifamily would become a privately capitalized conduit enterprise. Analysis by our financial advisers suggested that the new entity's cost of funds could rise by an average of 1.5 percent, absent the government guarantee (see Exhibit 2.4). Based on our experience with the K-deal securitization platform, we estimated that the rise in the cost of funds would further contribute an incremental 0.1 to 0.15 percent to the mortgage interest rate. A fully privatized multifamily housing finance market would be more competitive and a new stand-alone entity might not be able to fully pass through the higher cost of funds to multifamily borrowers. The fact remains that the removal of the government guarantee for Freddie

Mac Multifamily would lead to a higher cost of funds which would, in turn, increase multifamily mortgage interest rates further.

Exhibit 2.4: Impact on Freddie Mac Multifamily cost of funds with and without the government guarantee

Average estimate	Guarantee	No Guarantee	Difference
Cost of equity	9.25%	12.25%	3.00%
Cost of debt, LIBOR plus	1.75%	2.25%	0.50%
Advance rate	20%	25%	5.00%
Wt. avg. cost of funds	3.25%	4.75%	1.50%

Sources: Barclays, Morgan Stanley, and Freddie Mac

In taking the aforementioned factors into consideration, we estimated that mortgage interest rates on our multifamily mortgage loans could increase by 0.75 to 1.5 percent if our Multifamily business operated as a stand-alone entity without a government guarantee.

3. How Would the Multifamily Mortgage Debt Market and Origination Volumes Be Affected?

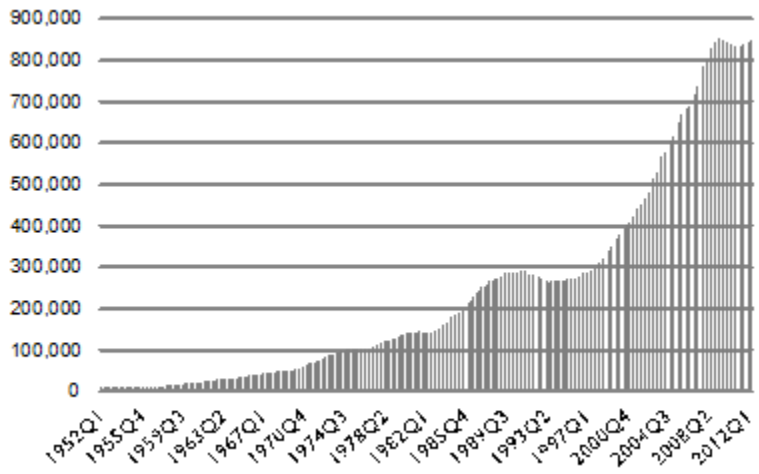
What ramifications would the potential rise in multifamily mortgage interest rates have on the mortgage debt market and multifamily mortgage loan originations? This section describes the state of the U.S. multifamily mortgage debt market and Freddie Mac's Multifamily mortgage purchasing profile. It also offers an estimate of the total multifamily mortgage debt origination market with and without government guarantee as well as an estimate of Freddie Mac Multifamily's mortgage purchase volume without a government guarantee.

3.1. State of the Multifamily Mortgage Debt Market

The Flow of Funds Accounts published by the Federal Reserve provides the historical view of the multifamily mortgage debt market. Multifamily mortgage debt outstanding (MDO), which refers to loans secured by properties with five or more rental units, has grown substantially throughout the last several decades (see Exhibit 3.1). At the end of 1960, multifamily MDO was $21 billion, representing almost 4 percent of the U.S. gross domestic product (GDP). With the exception of brief contractions during the 1990s' commercial real estate crisis and the financial market crisis during the late 2000s, the multifamily mortgage debt market has experienced uninterrupted growth. As of the end the second quarter of 2012, the multifamily MDO has grown to almost $850 billion, representing 5.5 percent of the U.S. economy. In other words, the cumulative annual growth rate of the multifamily MDO was a robust 6 percent per annum.

The broad growth trend in the multifamily MDO conceals pronounced shifts in the sources of multifamily debt financing. The "traditional" sources of multifamily mortgage debt capital – banks, life insurance companies, and other non-financial entities – have experienced steady declines in their market shares over the past decades. These sources represented 80 percent of the total MDO market during the 1970s, before multifamily borrowers had access to broader capital markets, but they now account for only 38 percent. In contrast, the "new" sources of multifamily debt capital – GSEs and private conduits – have increased their shares of the multifamily housing finance market. These sources were immaterial prior to 1970 but they now account for 52 percent of the total multifamily MDO (see Exhibit 3.2). The gradual standardization of mortgage loan terms, underwriting standards, and the growth of the structured finance market are some of the factors contributing to the shift.

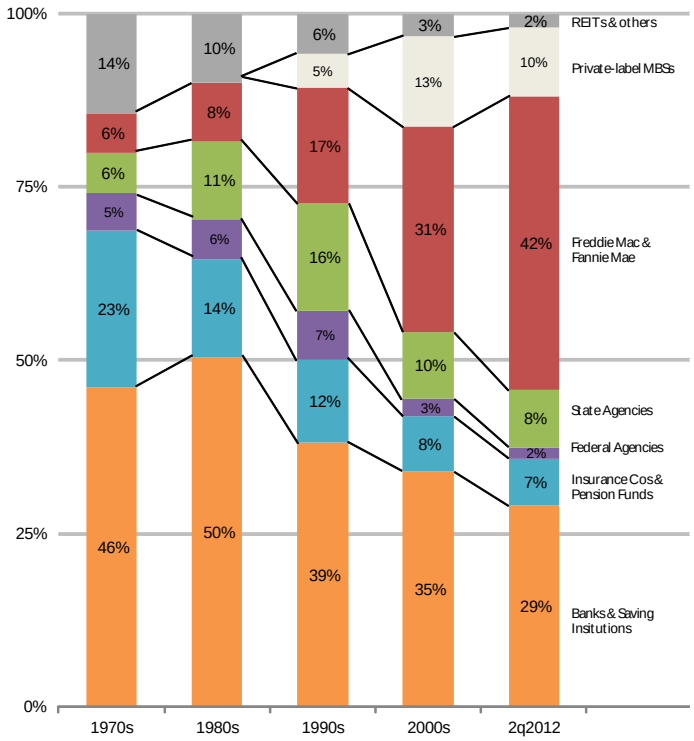
Exhibit 3.1: Multifamily MDO, in $ millions



End of	Multifamily mortgage debt outstanding (in millions)
1960	20,786
1970	60,129
1980	142,526
1990	287,424
2000	402,072
2010	837,772
2011	844,214
2Q 2012	849,700

Source: Federal Reserve Flow of Funds, Table L.219 Multifamily Residential Mortgages, various years

Exhibit 3.2: Share of multifamily MDO



Source: Federal Reserve Flow of Funds, Table L.219 Multifamily Residential Mortgages, various years

Similarly, the steady shift in the debt capital sources conceals the behavioral characteristic of those capital sources. In particular, further analysis of Flow of Funds Accounts revealed insights to the stability and availability of each debt capital source during periods of economic stress. For a given capital source, an increase or a decrease in the size of its multifamily MDO during an economic recession indicates either an expansion or a contraction, respectively, of its capital allocation preference for the multifamily asset class. Private-capital sources, such as banks and saving institutions, insurance and pension funds, conduits, and real estate investment trusts (REITs), tended to exhibit relatively small increases in their levels of total multifamily MDO during past periods of economic recession. The average net change was about +1 percent, compared to +11 percent growth attributed to the government and GSE capital sources. In particular, the net change in the GSEs' share of the multifamily MDO has tended to exceed those of other sources during past periods of economic stress. The data show that the GSEs have been consistent net-positive contributors of mortgage debt capital to the multifamily housing market through past periods of economic contractions (see Exhibit 3.3). In other words, the GSEs provide a consistent counter-cyclical source of funds to the multifamily housing market.

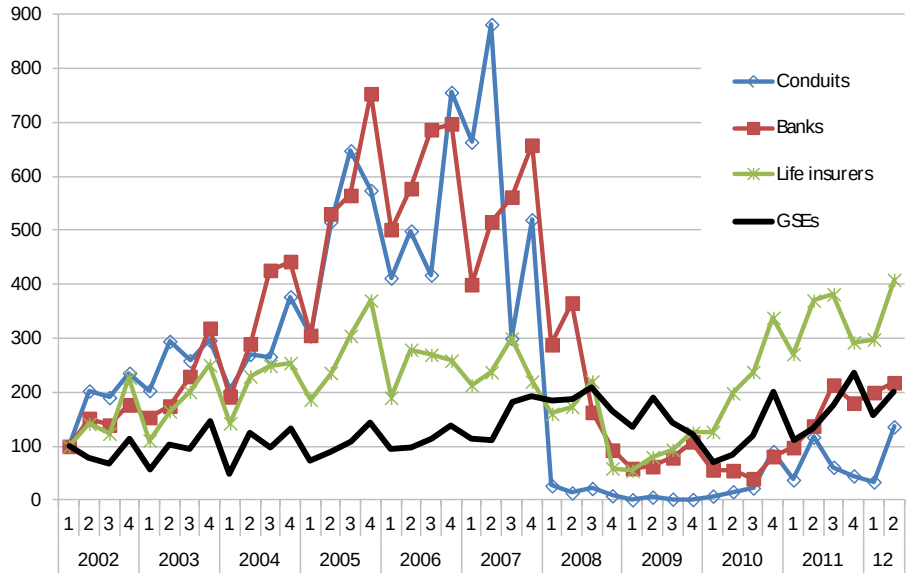
Exhibit 3.3: Change in multifamily MDO through prior economic recessions, by capital sources

	Private sector capital sources				Nonprivate sector capital sources		
Recession Period	Banks & Saving inst.	Insurance & Pension funds	Conduits	REITs & others	Federal agencies	State agencies	Enterprises
2q60 -1q61	9%	8%	..	9%	7%	147%	..
4q69-4q70	11%	10%	..	15%	20%	36%	477%
4q73-1q75	5%	7%	..	-9%	26%	32%	59%
1q80-3q80	1%	1%	..	2%	11%	9%	4%
3q81-4q82	3%	1%	..	1%	2%	15%	-32%
3q90-1q91	-4%	4%	4%	-3%	25%	2%	1%
1q01-4q01	5%	6%	11%	2%	3%	0%	20%
4q07-2q09	8%	-2%	-10%	-10%	0%	0%	26%
Average (exclude periods prior to 4q73 to improve comparability)	3%	3%	2%	-3%	11%	9%	13%

Source: Freddie Mac's analysis of the Federal Reserve Flow of Funds, Bureau of Economic Analysis

The GSEs' historical role as the counter-cyclical liquidity provider can also be illustrated by examining the origination patterns of the major capital sources. Changes in the annual mortgage loan origination volumes indicate the flow of credit during a given period, whereas changes in the MDO capture past origination activities that influence repayments. Unlike the GSEs, the private-sector capital providers are highly sensitive to general economic conditions, and their originations of multifamily mortgage debt capital are relatively more volatile and contingent on the macroeconomic environment. Multifamily mortgage debt originations from the banks, life Insurers, and conduits declined precipitously during the recent economic recession, from fourth quarter 2007 to second quarter 2009 (see Exhibit 3.4). In fact, debt capital availability from those sources continued to languish at decade-low levels for many quarters even after the recession was officially over. In contrast, the GSEs continued to provide debt capital steadily to the multifamily housing market, roughly doubling their purchase volume since 2002.

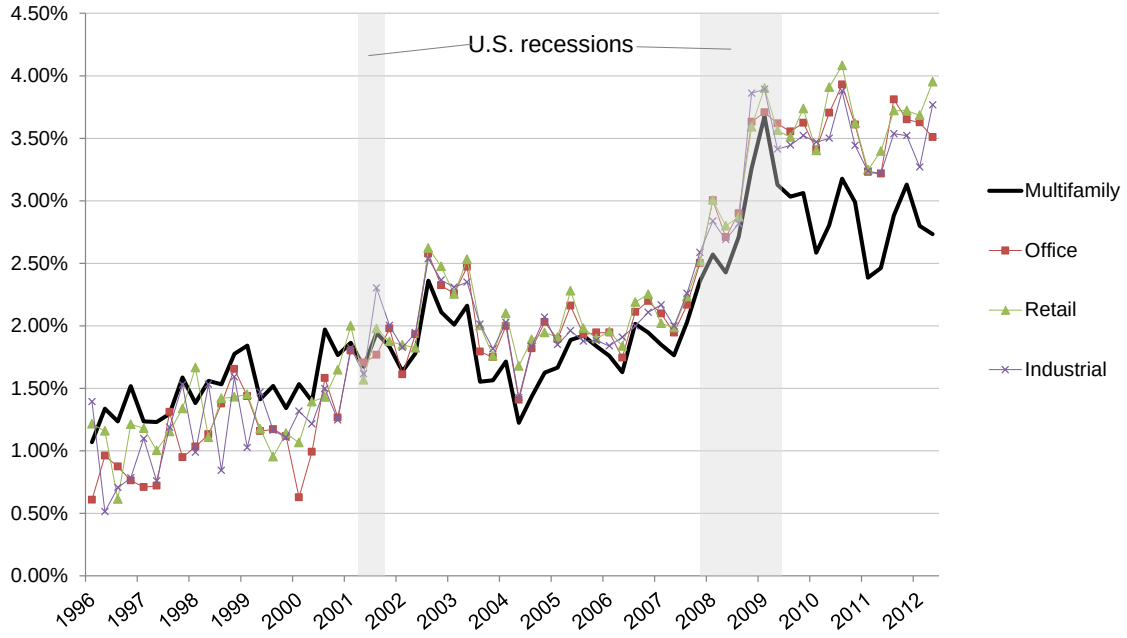
Exhibit 3.4: The MBA Multifamily Origination Index (rebased 1Q02=100), 1Q02-2Q12



Source: Mortgage Bankers Association of America

Further, the growing role of the GSEs' multifamily operations in mortgage credit provision implies that the GSEs exert an increasing influence over multifamily mortgage interest rates. That influence could be partially inferred from the widening interest rate differentials between multifamily mortgage loans and other commercial mortgage loans (see Exhibit 3.5).

Exhibit 3.5: Average mortgage interest rate spreads on commercial mortgage loans

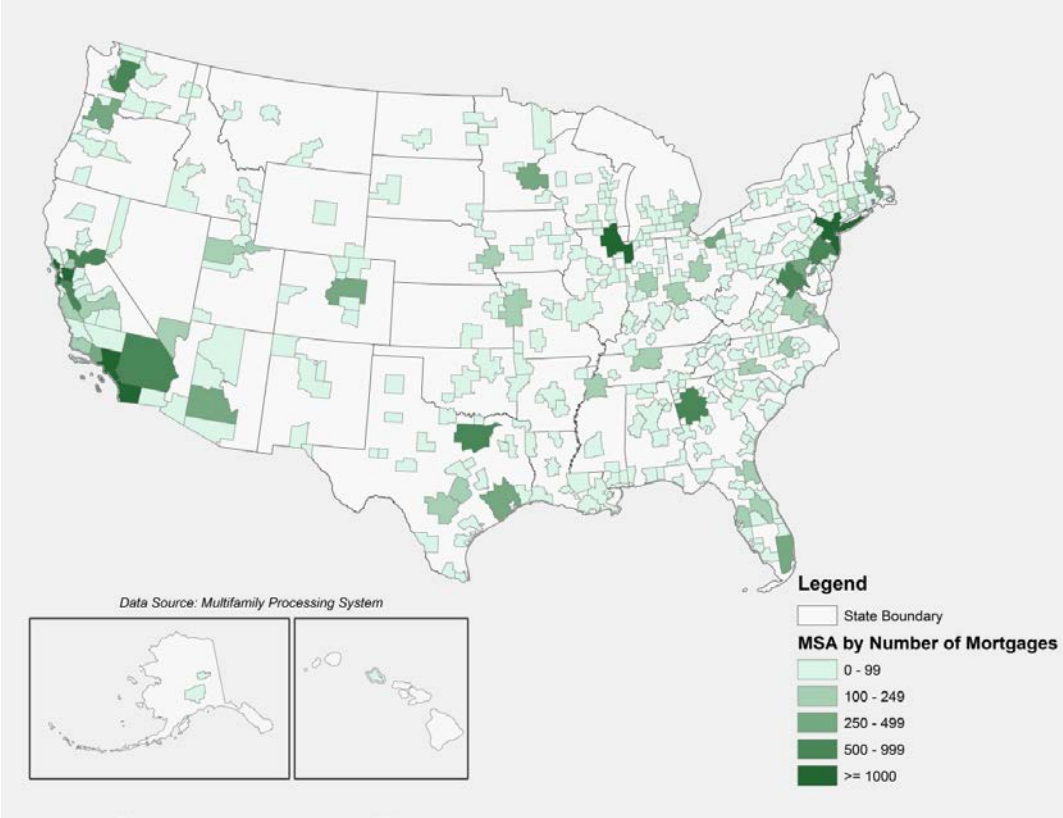


Source: DebtX

3.2. Freddie Mac's Multifamily Mortgage Purchasing Profile

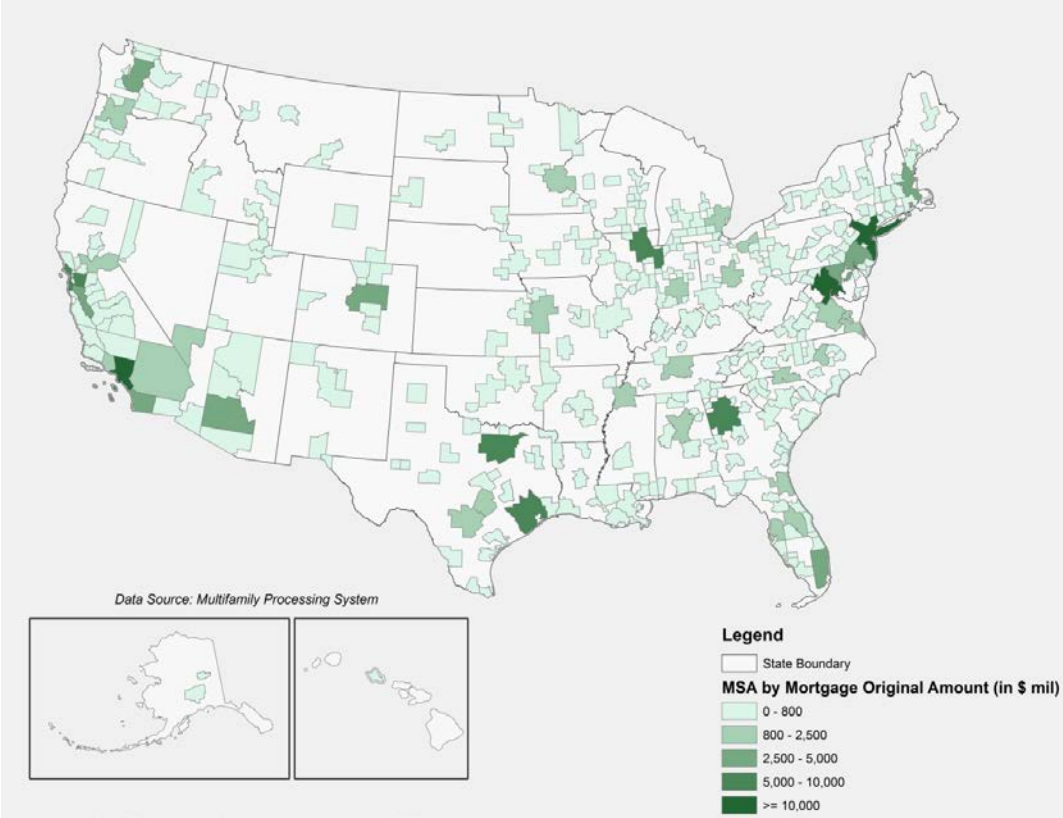
Freddie Mac Multifamily provides liquidity to the multifamily rental housing sector by purchasing qualified mortgage loans that are originated by a select network of lenders in the primary market. Freddie Mac not only establishes the mortgage underwriting and purchase criteria, but also determines mortgage interest rates on the loans we buy. The economy of scale of the Freddie Mac Multifamily business enables our lending activities to benefit multifamily borrowers and renter households across the United States. While much of our business is in the biggest metropolitan areas, Freddie Mac also serves smaller metropolitan and non-metropolitan housing markets in all 50 states (see Exhibits 3.6 and 3.7).

Exhibit 3.6: Geographic distribution of Freddie Mac's multifamily mortgage loans, by loan count



Source: Freddie Mac

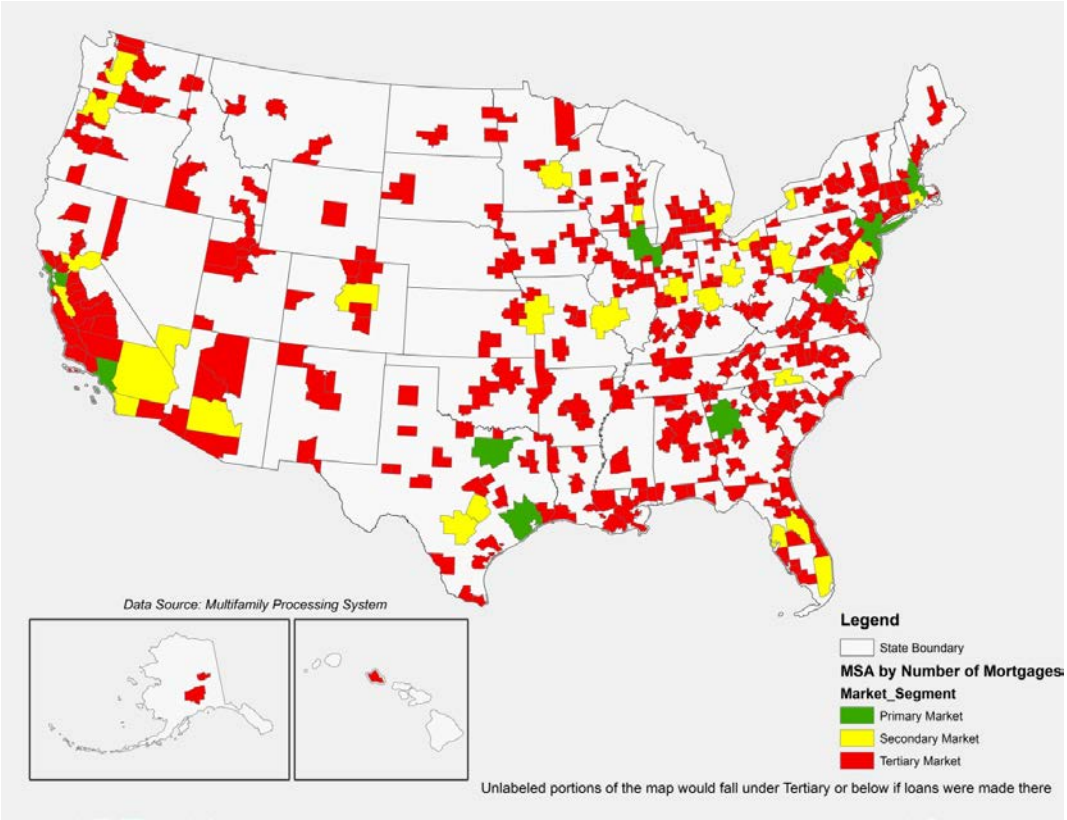
Exhibit 3.7: Geographic distribution of Freddie Mac's multifamily mortgage loans, by original unpaid principal balance



Source: Freddie Mac

For purposes of this study, we considered the following rental housing markets to be primary markets (i.e., the top-tier markets with the most attractive rental housing stock and strong market fundamentals): Atlanta, Boston, Chicago, Dallas, Houston, Los Angeles, New York, San Francisco, and Washington, D.C. A majority of Freddie Mac's multifamily mortgage credit flowed into secondary and tertiary multifamily housing markets. To name a few: Austin, Texas; Las Vegas; Phoenix; Williamsport, Pennsylvania; Westwego, Louisiana; and Salinas, California. Since 1993, when Freddie Mac Multifamily re-entered the market, our multifamily mortgage purchases in secondary and tertiary markets have represented an average of 40 percent and 25 percent, respectively, of the total mortgage purchase volume (see Exhibits 3.8 and 3.9).

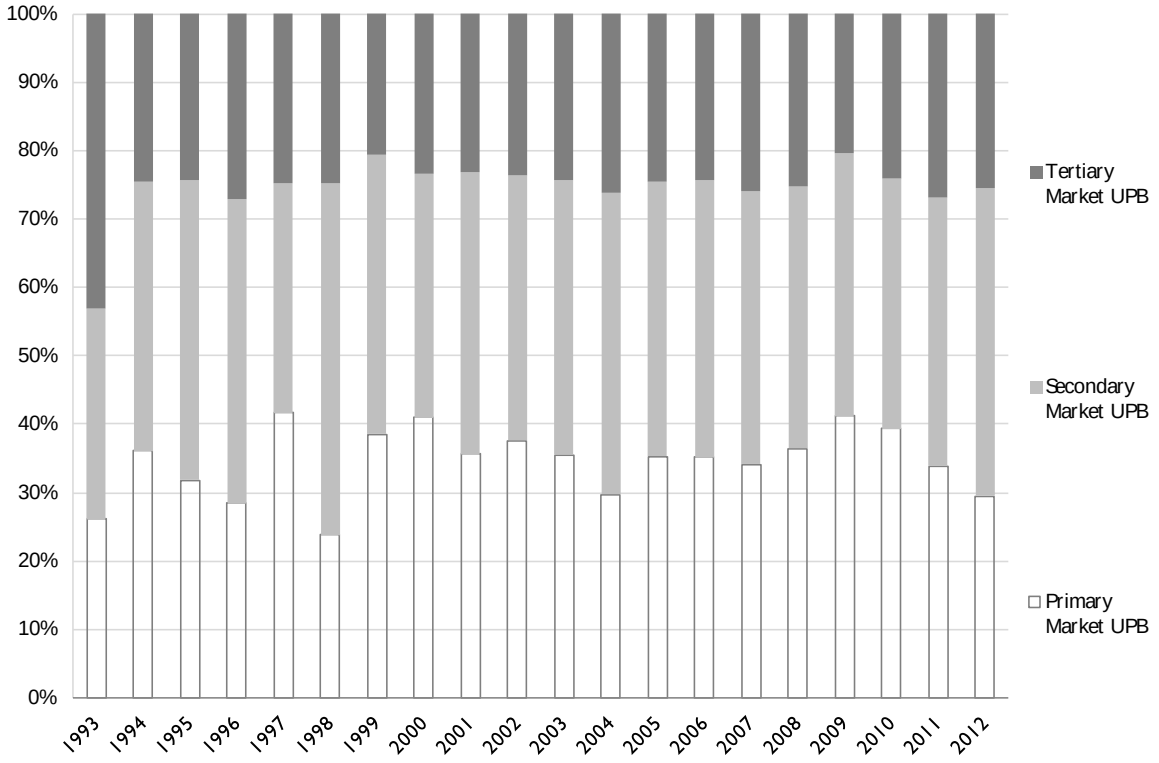
Exhibit 3.8: Geographic distribution of Freddie Mac's multifamily mortgage loans, by market segments, by loan count



Source: Freddie Mac

Compared to private conduit companies especially, Freddie Mac's multifamily mortgage purchases remained steady through the recent economic cycles. As an example, when we examined a decade's worth of data on mortgage debt origination activity in Atlanta, we found that private conduits' lending virtually stalled during the 2007-09 recession. In contrast, Freddie Mac's market presence in Atlanta remained almost unchanged through that period of stress (see Exhibit 7.1 in Section 7 of this study, References and Supplemental Exhibits).

Exhibit 3.9: Distribution of Freddie Mac's multifamily mortgage loans, by market segment, by percentage of total unpaid principal balance



Source: Freddie Mac

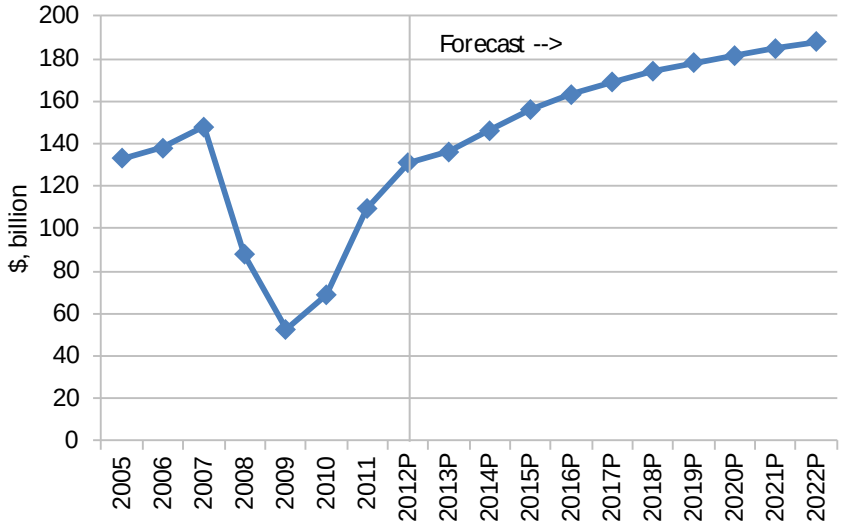
The analysis of Freddie Mac's multifamily mortgage purchase data showed that our purchase activity is broadly distributed across geographic space and consistently available across time. Our significant market presence, together with that of Fannie Mae's multifamily business, is a significant characteristic of the multifamily housing finance landscape today. The removal of the guarantee for the GSEs' multifamily businesses would redefine the financing market structure.

3.3. The Potential Size of the Multifamily Mortgage Debt Market With and Without the Government Guarantee

To estimate the potential impact on mortgage debt origination of operating the GSEs' multifamily businesses absent a government guarantee, we first estimated the potential size of the origination market assuming no change to the status quo. Based on Freddie Mac's multifamily management analysis, annual mortgage debt origination in the multifamily housing market would likely continue to increase at a steady rate in line with consensus estimates of the nominal U.S. GDP growth rate. We expect the annual multifamily origination volume to be around $131 billion and $136 billion for calendar years

2012 and 2013, respectively. By 2015, multifamily MDO would surpass $150 billion per annum – a level not reached since the pre-recession peak of 2007 (see Exhibit 3.10).

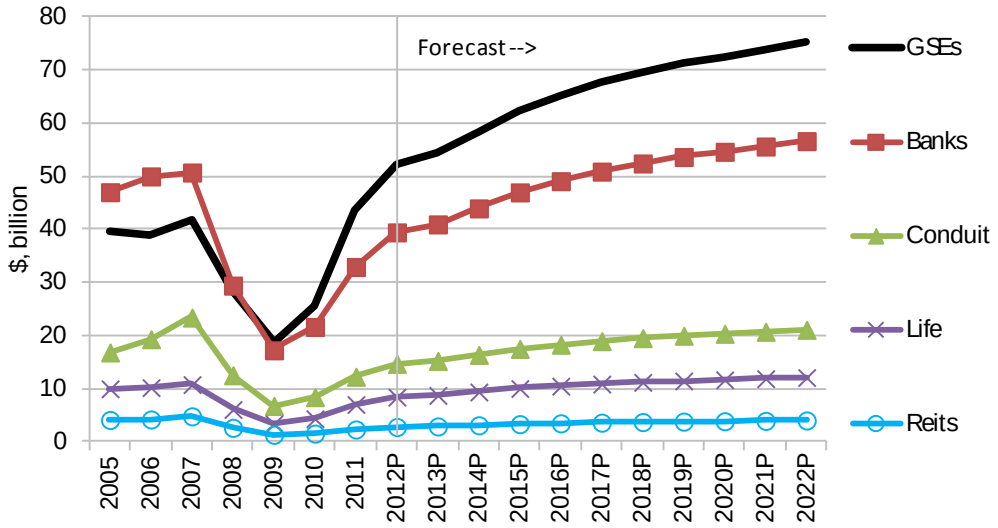
Exhibit 3.10: Total multifamily MDO, 2005-2022



Source: Freddie Mac

Our estimates of the future annual multifamily mortgage debt origination by capital sources were based on the historical share of the total multifamily MDO of each capital source. The GSEs and the banks would continue to be the largest sources of mortgage debt capital by absolute volume, followed by the conduits, the life insurance companies, and the REITs (see Exhibit 3.11).

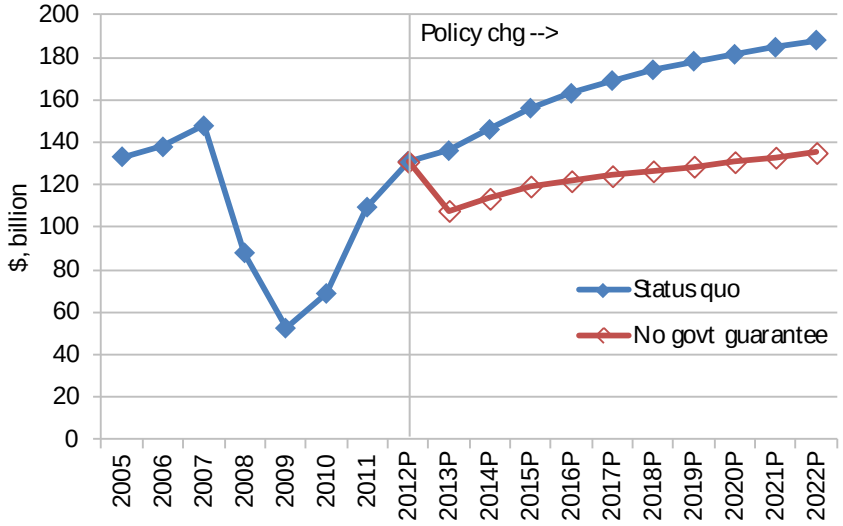
Exhibit 3.11: Total multifamily MDO, by capital source, 2005-2022



Source: Freddie Mac

The loss of the government's guarantee for the GSEs' multifamily businesses could result in a significant reduction in the supply of multifamily mortgage debt in the future (see Exhibit 3.12 and the detailed description later in this document).

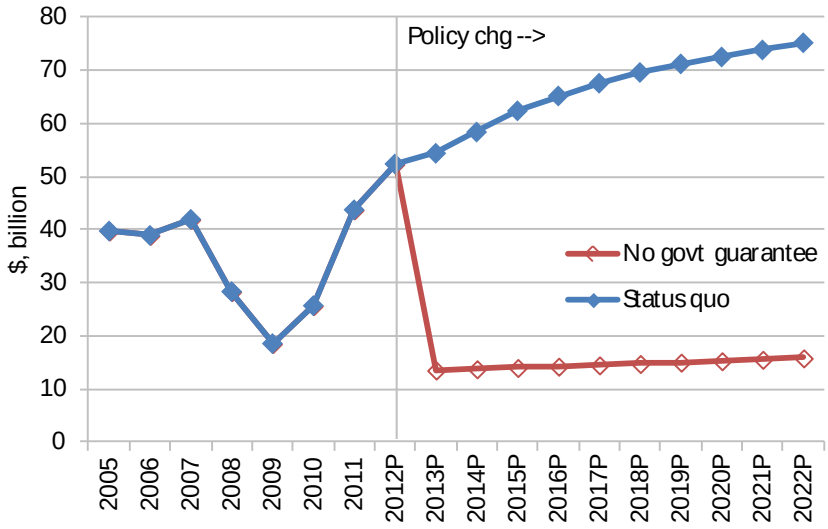
Exhibit 3.12: Total multifamily MDO with and without the GSEs



Source: Freddie Mac

The GSEs' multifamily mortgage loan purchase volume could decrease by as much as $40 billion; this would be equivalent to a 75 percent drop from the $54 billion in purchase volume expected with no change to the housing policy (see Exhibit 3.13). The sharp reduction in the GSEs' multifamily purchase volumes would be attributed to higher cost of funds, increased competition, and reduced scale of operations, which would constrict our ability to issue large volumes of mortgage-related securities on a regular and predictable schedule.

Exhibit 3.13: GSEs' multifamily MDO with and without the government guarantee



Source: Freddie Mac

The short-term (one to three years) of the removal of the GSEs on mortgage debt origination would likely be a material contraction; the longer-term market impact is less certain due to complex market dynamics of competition and privatization.

3.4. Freddie Mac's Multifamily Mortgage Purchase Volume Without a Government Guarantee

The potential market impact of a shock in the multifamily market structure, as a potential policy change would be, is a broad and subjective inquiry. Freddie Mac made five assumptions to confine the scope of our study:

- There would be no contemporaneous withdrawal of government guarantee on the GSEs' single-family businesses.
- Federal and state housing finance agencies (HFAs) would maintain their current market shares.
- Freddie Mac's Multifamily business would become a private commercial mortgage enterprise.

- The overall economic environment and, therefore, capital market conditions would remain stable.
- The withdrawal of the government guarantee for the GSEs' multifamily businesses would occur during 2013.

We constructed three analytical methods to estimate Freddie Mac's multifamily mortgage purchase volume without a government guarantee.

- The first method takes a top-down approach using Freddie Mac's historical market share in the multifamily mortgage debt market as the basis for estimating our future market share.
- The second method takes a comparative view of our competitors and attempts to estimate the likely incremental capacity of the private-sector capital sources to take up any market demand that the new Freddie Mac Multifamily entity could no longer meet.
- The third approach examines Freddie Mac's product mix without the government guarantee from the bottom up.

From these three analyses, we concluded that a new entity operating without the government guarantee could expect to purchase between $5 billion and $7 billion of multifamily mortgage loans in 2013 (see Exhibit 3.14). We have judgmentally lowered the average estimated range from $6 billion to $10.3 billion; an entity that purchases almost $10 billion per annum in multifamily mortgage debt would imply a market share of almost 10 percent – a level that, according to our discussions with independent investment bankers, is not well supported by the historical experience of the private sector.

Exhibit 3.14: Annual multifamily MDO

Estimation Method	Estimated 2013 Freddie Mac Multifamily Volume Assuming No Government Guarantee
1. Market share analysis (top-down)	$5.4B to $10.2B
2. Competitor analysis (comparative)	$5.8B to $12.3B
3. Product line analysis (bottom-up)	$6.8B to $8.4B
Average	$6B to $10.3B
Recommended range estimate	**$5B to $7B**

Source: Freddie Mac

3.4.1 Method 1: Market Share Analysis (Top-down Approach)

Freddie Mac Multifamily's share of annual multifamily mortgage loan origination has grown from about 8 percent in 2005 to about 20 percent since the recent financial market crisis. Without the government guarantee, the Multifamily entity would operate in a competitive environment that more closely resembles the pre-crisis multifamily market (i.e., pre-2008), where private-capital providers supplied the majority of the multifamily rental housing market's annual funding needs. Hence, we expect that a new Multifamily entity without access to a government guarantee would command a *maximum* market share of between 8 and 15 percent. This range corresponds to our actual market share between 2005 and 2007 (see Exhibit 3.15).

Exhibit 3.15: Freddie Mac Multifamily market share of annual multifamily MDO, 2005-2013

Year	Total Multifamily Mortgage Origination Volume, $ Billion	Freddie Mac Multifamily Purchase Volume, $ Billion	Freddie Mac Multifamily Purchase Volume, % Of Total
2005	133	11	8.3%
2006	138	13	9.4%
2007	148	22	14.9%
2008	88	24	27.3%
2009	52	17	32.7%
2010	69	15	21.7%
2011	109	20	18.4%
2012 (est.)	113	25	22.1%
2013 (est.)	136	25	18.4%

Source: Freddie Mac

Because the loss of the government guarantee for Freddie Mac Multifamily would lead to execution uncertainty (e.g., higher yields required by securities investors), the new entity's market share would likely be less than 8 to 15 percent. Execution uncertainty (or operational disruption) would arise from the higher cost of funds, the increased challenges that surround human resources and customer retention, the lack of funding for capital expenditures, and other factors. Those uncertainties could constrain the new entity's market share to a range of 4 to 7.5 percent. This market share would correspond to annual multifamily mortgage purchase volume of between $5.4 billion and $10.2 billion, respectively, given the current size of the market.

3.4.2 Method 2: Competitor Analysis (Comparative Approach)

The contraction of the former GSE multifamily businesses following the loss of their government guarantee would encourage the private-sector capital sources to step in to

help fill the gap. Our primary competitors in the private sector are private conduits, banks, and life insurance companies. We assessed each type of competitor's incremental funding/take-up capacity, using informed judgments on market shares, portfolio allocations, and aggregate lending capacities.

Private conduits. We examined the origination characteristics of the U.S. CMBS market between 1985 and 2011 (see Exhibit 7.2). Historically, the private conduit market originated an average of $47 billion per annum in commercial real estate mortgage debt, of which about 7 percent ($3.3 billion) is multifamily mortgage debt. At the peak of the conduit market in 2007, a year before the insolvency of two prominent conduit companies (Bear Stearns and Lehman Brothers), the private conduits originated $226 billion of commercial real estate mortgage debt consisting of $36 billion in multifamily mortgages. It is reasonable to assume that the private conduit market would not regain that peak origination capacity in the near future because of the continued deleveraging and industry consolidation. Analysts from investment banks, including Barclays and Citigroup, expect private conduit origination in 2013 to be in the range of $40 billion to $50 billion. The contraction of the former GSE multifamily entities could imply that multifamily mortgage debt's share of total commercial real estate debt would remain at or above the 16 percent share during the peak years. The short-term elevated market share is likely as the existing conduit companies respond to the higher mortgage interest rates by expanding their trading activities. Therefore, the private conduits could potentially absorb about $7 billion to $9 billion of multifamily mortgage origination volume during 2013, the assumed first year of the potential housing policy change. Conduit growth likely would be affected by investor confidence in CMBS, regulatory uncertainties, operational considerations (e.g., expanding balance sheets to warehouse inventory), and macroeconomic trends that dictate spread volatility.

Banks. The banks' take-up capacity would be a function of two considerations:

- The potential impact of the Basel III proposed capital framework on commercial mortgage lending
- The sector's historical market share of total multifamily mortgage loan origination

The Basel III capital requirement is expected to be relatively stringent with respect to long-term commercial real estate mortgage loans. The high asset risk-weights that are expected to be assigned to long-term commercial real estate mortgage loans would require the banks to hold relatively larger amounts of capital against their commercial lending activities. While there may be a short-term expansion of the banks' share of multifamily mortgage loan origination caused by the expected higher mortgage interest rate that follows the GSEs' exit, the banks' appetite for continued expansion of their commercial lending portfolio would likely be constrained over the medium- to long-term. We expect the banks' short-term incremental take-up not to exceed their long-term historical market share of about 42 percent. In other words, at the current market share of about 30 percent, a shift

in the banks' market share to 42 percent implies that the banks' incremental multifamily origination could be about $5 billion during 2013.

Life insurance companies. Life insurance companies are highly selective when originating multifamily mortgage loans. Specifically, the insurers have historically preferred to finance Class A apartments (so-called "trophy assets") in the top-tier rental housing markets. In addition to asset quality considerations, the insurers' take-up capacity would be subject to their asset allocation policies. An analysis of 10-years of balance sheets from the top five life insurance companies that are active multifamily originators (MetLife, Prudential, Genworth, AIG, Manulife) suggested that multifamily mortgage loans averaged about 10 percent of their total mortgage portfolios in any given year (see Exhibit 7.3 in Section 7 of this study). An informal survey of our contacts at three large life insurance companies also confirmed our analytical assumptions with respect to the insurers' asset quality and asset allocation preferences. Our research suggested that the large life insurance companies currently have about 7 percent of their mortgage portfolios allocated to apartment mortgage loans. Accordingly, the 3 percent "excess capacity" would imply that the insurers' incremental multifamily origination could be $6 billion per annum.

We also examined the potential origination responses from our secondary competitors: the Federal Housing Administration (FHA), state HFAs, and REITs. Our analytical assumption that the federal and state HFAs would maintain their respective market shares is consistent with the spirit of a housing policy that removes the government guarantee for the GSEs' multifamily businesses. Hence, the FHA and the state HFAs would not be meaningful sources of take-up capacity in the post-GSE marketplace. Interviews with economists at the National Association of Real Estate Investment Trusts revealed that the REIT sector would need to grow from current low levels of investment in multifamily debt and overcome business model and leverage constraints before becoming a meaningful part of the market; therefore, they are not expected to step in to fill the large funding gap. Because the overall multifamily origination market is expected to experience a net contraction upon the GSEs' exit, the market-share-neutral assumption for the FHA, HFAs, and REITs would imply a net reduction of $3.3 billion in their multifamily mortgage originations.

Our analysis suggested that our primary and secondary competitors are capable of incrementally absorbing about $19 billion during Year 1 of the potential housing policy change. Adding the incremental capacity to the base case origination forecast yields the following origination volume forecast for each sector:

- **Conduits** - $23.3 billion ($15.3 billion base plus $8 billion incremental)
- **Banks** - $46 billion ($41 billion base plus $5 billion incremental)
- **Life insurance companies** - $14.8 billion ($8.8 billion base plus $6 billion incremental)
- **FHA, HFAs, and REITs** - $13.3 billion ($16.6 billion base *minus* $3.3 billion incremental)

Market analyses by Barclays and Morgan Stanley suggested that 2013 total multifamily origination could decrease by 10 to 20 percent due to the removal of the government guarantee for the GSEs. Given that the base case 2013 expected total multifamily origination is $136 billion, a 10 to 20 percent reduction implies an origination volume in the range of $109 billion to $122 billion. Because our competitors could account for $97.4 billion, the net origination attributable to the GSEs would be about $11.6 billion to $24.6 billion (i.e., $109 billion minus $97.4 billion, to $122 billion minus $97.4 billion). Assuming that our new entity's share of the total GSE multifamily purchase volume would remain at the current level of 50 percent, then our estimated 2013 volume could be in the range of $5.8 billion to $12.3 billion.

3.4.3 Method 3: Product Line Analysis (Bottom-up Approach)

For purposes of this analysis, Freddie Mac Multifamily's product lines can be grouped into two categories: mortgages (including whole loans purchased for the investment portfolio and securitization) and bond credit enhancements. The bond credit enhancement business grew during the housing boom but has diminished substantially since Freddie Mac launched its K-deal securitization program in 2009 (see Exhibit 3.16).

Exhibit 3.16: Freddie Mac Multifamily mortgages vs. bond credit enhancements, 2005-2011

Book Year	Mortgage Volume (%)	Credit Enhancement Volume (%)
2005	87	13
2006	93	7
2007	84	16
2008	80	20
2009	96	4
2010	94	6
2011	96	4
Average 2005-2011	90%	10%

Source: Freddie Mac

Without a government guarantee, the new entity would exit the bond credit enhancement business because the entity would lack the financial wherewithal to be a highly rated guarantor. This would decrease the new entity's volumes by about 10 percent compared to our current state (based on the historical average, as shown in Exhibit 3.16). And we would transform the business into an unrated private conduit enterprise. We also estimated that, in this new environment, about 25 to 30 percent of the volume we currently purchase would be absorbed by life insurance companies (see Exhibit 3.17). These represent large-balance loans (i.e., greater than $25 million in unpaid principal balance) secured by Class A properties in the top-tier rental housing markets.

This would leave approximately 60 to 65 percent of our current-state purchase volume that would be subject to competitive forces, meaning it could be purchased by the new entity or other market players. The private conduits and banks with lower cost of funds would compete aggressively for a share of this volume. We expect the new entity would be able to retain half of this volume, with the remainder (equal to about 30 to 32.5 percent of our current-state purchase volume) being absorbed by private conduits and banks.

To estimate the new entity's purchase volume, we can apply these adjustments to our estimated current-state volume for 2013, which is $25 billion. This would imply that the estimated 2013 purchase volume for the new entity operating without a government guarantee would be in the range of $6.9 billion to $8.8 billion (i.e., $25 billion less 10 percent due to withdrawal from the bond credit enhancement market, less 25 to 30 percent absorbed by life companies, less 30 to 32.5 percent absorbed by other market participants).

Exhibit 3.17: Share of multifamily MDO

Book Year	Original Unpaid Principal Balance, $ Million: Large Loans (>$25M) Secured by Properties in the Top 25 Markets	Original Unpaid Principal Balance, $ Million: All Loans in All Markets	Percentage of Large Loans in Top 25 Markets to All Loans
1995	44	1,500	3
1996	34	2,216	2
1997	258	2,226	12
1998	365	3,910	9
1999	1,566	7,123	22
2000	1,440	5,878	25
2001	1,954	8,666	23
2002	1,554	8,382	19
2003	1,624	6,843	24
2004	1,926	9,820	20
2005	2,542	11,148	23
2006	2,913	12,644	23
2007	6,089	21,768	28
2008	7,964	24,656	32
2009	6,619	16,722	40
2010	4,647	14,973	31
2011	6,057	20,430	30

Source: Freddie Mac

4. How Would Multifamily Property Values Be Affected?

This section presents our framework for estimating the impact of the presence of the GSEs on capitalization rates (cap rates) and asset values in the multifamily market.

Using historical data for multifamily and other commercial property types, we developed an econometric model to estimate the potential impact on cap rates of a market structure change due to the loss of the government guarantee for the GSEs' multifamily businesses. Additionally, we undertook a pro forma property financial analysis to illustrate the related impacts on property values. In this section, we present scenarios to demonstrate the expected impact on property values at the national level as well as for smaller markets.

Overall, our analysis suggested that the removal of the government guarantee from GSEs' multifamily businesses would increase multifamily cap rates in the range of 70 to 120 basis points (bps), and would push down multifamily property market value by $150 billion to $245 billion.

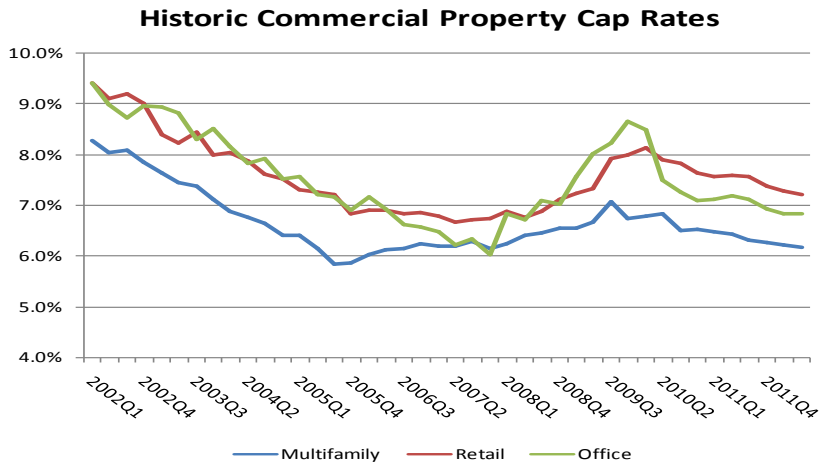
4.1. Cap Rate History, Drivers, and Forecasting

Real estate appraisers and other market participants use the cap rate – defined as the ratio of the property's net operating income to the property's market value – to value income-producing real estate assets. At the property level, dividing net operating income by a market-justified cap rate produces a property value. Significant academic research has been conducted to better understand market cap rates, which encapsulate investors' views on future income expectations and market conditions. In a recent research paper, the market cap rate was modeled using interest rates as well as measures for a risk premium, real estate fundamentals, and market liquidity (Chervachidze, Costello and Wheaton, 2009). An important finding of that paper is that when market liquidity is low, real estate transactions and financing slow down and property prices might fall. In contrast, abundant liquidity encourages property prices to increase. Our first approach to measuring the effect of the government guarantee on multifamily cap rates and property values builds on a framework similar to the one presented in the Chervachidze *et al* article.

The GSEs are significant sources of liquidity to the multifamily mortgage debt market, but their continuous market presence has broader market implications (such as counter-cyclical stability) that are difficult to measure. In the earlier sections in this study, we illustrated the GSEs' consistent market presence through all economic cycles, such as the economic recession of 2007-09, as well as during previous stress periods, such as the 1997 Russian sovereign debt crisis and the failure of Long Term Capital Management in the late 1990s. Other commercial real estate asset classes, such as office or retail, do not benefit from the GSEs' market-stabilizing role. As a result, the non-multifamily commercial real estate markets and their consequent property valuations are more volatile.

Exhibit 4.1 shows that cap rates, average return, and income volatility are lower for multifamily than for the other income-producing property types. The relatively lower income volatility of the multifamily asset class is also driven by the relatively shorter apartment lease structures and the stable renter household demand.

Exhibit 4.1: Historical cap rate and descriptive statistics by asset class



	Multifamily	Retail	Office
Average Cap Rate	6.7%	7.6%	7.5%
Income Return	1.38%	1.65%	1.70%
Income Volatility	0.18%	0.29%	0.24%

Sources: Real Capital Analytics, National Council of Real Estate Investment Fiduciaries (NCREIF)

4.2. Model, Data, and Results

While these statistics in Exhibit 4.1 are informative, they do not allow the impact of the GSEs' market presence on multifamily cap rates to be isolated. Therefore, we developed an econometric model that controls for the variations due to non-GSE factors to measure the impact of the GSEs on multifamily property cap rates (see Exhibit 4.2).

Exhibit 4.2: Cap Rate Model

[Equation 1] $Log(Cap\_Rate_t) = a_0 + a_1 Rent\_Return_t + a_2 Log(Income\_Volatility_t) + a_3 Treasury\_Rate_t + a_4 AAA\_Sprd_t + a_6 GSEs\_Share\_Index_t + a_6 Log(Origination\_Volume_t) + a_7 Qtr1_t + a_8 Qtr2_t + a_9 Qtr3_t + a_{10} Multifamily\_Indicator + a_{11} Retail\_Indicator$

[Equation 2] $Log(Cap\_Rate_t) = a_0 + a_1 Rent\_Return_t + a_2 Log(Income\_Volatility_t) + a_3 Treasury\_Rate_t + a_4 AAA\_Sprd_t + a_6 GSEs\_Share\_Index_t + a_6 Log(Origination\_Volume_t) + a_7 Qtr1_t + a_8 Qtr2_t + a_9 Qtr3_t$

Variable	Source	Description
Rent Income Return	Moving average of rent income return (NCREIF) in the past 10-year period	Proxy for investment returns
Income Volatility	The volatility of rent income return (NCREIF) in the past 10-year period	Proxy for investment risks
Treasury Rate	10-year Treasury rate (Federal Reserve)	Proxy for the risk-free rate and inflation expectation
AAA spread	AAA corporate bond spread over 10-year Treasury rate (Moody's)	Proxy for credit risk spread premium
GSE share index[2]	Fannie/Freddie share index of the total multifamily origination (2001 index = 1), zero for both retail and office sectors (MBA)	Proxy for the GSEs' market presence
Origination volume	Total origination volume index with 2001 base index=100 (MBA)	Proxy for investment activities
Qtr(i)	The historical quarter indicator	Seasonality factor
Multifamily/Retail indicators	Indicator variables for multifamily sector or retail sector	Proxy for asset-class-specific characteristics

In the Cap Rate Model, the dependent variable (cap rate) was obtained from sales transactions tracked by the data provider Real Capital Analytics (RCA). The quarterly national-level data contain 126 observations covering 10 years of transactions history, from first quarter 2002 to second quarter 2012. The three major commercial property types – multifamily, office, and retail – are represented in the analysis. Descriptive statistics on the data are presented in Exhibit 7.4 in Section 7 of this study.

We used a backward-selection analysis to select independent variables for the model specification. Variables that are statistically insignificant at the 10 percent confidence threshold were dropped.

The multifamily/retail indicators in Equation 1 of the model not only allowed us to separate the unique characteristics of each asset class (e.g., difference in lease structures, tenant concentration and rollover risks, etc.), but also the unique market structure effect of the multifamily market. As described in detail later in this document, the behavior of real

[2] The current GSEs share index is about 1.18, which implies the current GSE share is 18 percent higher compared to the share in 2001. The historic average of this index is about 1.09 from 2002 to 2012.

estate investors is closely related to their expectations of cost of funds. The presence of the GSEs reduces the liquidity uncertainty associated with an unexpected disruption in the capital market, particularly at loan maturity. That distinction is particularly important because most commercial real estate mortgage loans do not fully amortize during the term of the loans. A sizeable principal repayment is often due at the end of the loan term and fulfilled by either refinancing or selling the property. The presence of the GSEs in the multifamily asset class reduces the investment risk of loan-maturity failures, a unique stabilizing factor absent for the other commercial real estate classes.

Equation 1 potentially understates the "GSE effect" on cap rates because the GSEs' unique market characteristics associated with it are simultaneously captured by the multifamily indicator and the GSEs' share index. On the other hand, dropping the multifamily indicator, as represented by Equation 2, potentially could overstate the GSE effect on cap rates. Despite data limitations that preclude further refinements to the model specification, both equations provide reasonable range estimates for the impact of the loss of GSEs on multifamily cap rates.

Applying Equation 1, where both the multifamily indicator and the GSEs' share index are present, the removal of the GSEs from the multifamily market would cause multifamily cap rates to increase by about 25 basis points (bps) or about 4.1 percent[3]. Equation 2, where the multifamily indicator is removed, the model estimates that the removal of the GSEs would cause cap rates to increase by about 60 bps.

Equations 1 and 2 further provided insights to the potential impact of the lower expected mortgage origination volume on multifamily cap rates. When the estimated 10 to 20 percent decrease in annual origination volume was factored into both equations, all else being equal, we found that the multifamily cap rates could increase by 5 to 7 bps.

4.3. Pro Forma Financial Analysis

The econometric analysis allowed us to estimate the broad effect of the loss of the GSEs on multifamily cap rates based on historical data, even though a multifamily housing market without the GSEs is without recent precedence; hence, the available historical data do not contain any period of time where the multifamily market operated without the GSEs. The loss of the GSEs caused by a potential housing policy change would redefine the market structure for multifamily rental housing, with market effects that could parallel economic policy changes experienced when other industries underwent major policy changes, such as the deregulation of the banking sector during the 1980s and 1990s. The current dominant market positions of the GSEs' multifamily businesses imply that their exits could have implications for mortgage interest rates (as previously described) and underwriting criteria (as described in Section 5.3 of this study).

[3] We used the current multifamily cap rate of 6.2 percent and the GSE share index of zero in the calculation.

Changes in mortgage interest rates and underwriting standards affect the fundamental value of multifamily properties because they affect the future cash flows investors that expect to receive. Higher mortgage interest rates or stricter underwriting criteria (e.g., lower loan proceeds) lower an investor's internal rate of return (IRR). To restore the IRR to the prior level, the property's acquisition value must be lowered to improve the transaction's overall financial leverage. To illustrate that impact on property cap rates, we constructed a hypothetical property financial statement (see Exhibit 4.3).

Exhibit 4.3: Pro forma financial analysis: The sensitivity of property value to changes in mortgage interest rate

	Scenario 1	Scenario 2	Scenario 3
Mortgage rate	5.0%	4.0%	4.0%
Cap rate	5.5%	5.5%	5.1%
Property value	18,197,048	18,197,048	19,562,832
IRR	12.0%	13.2%	12.0%

The hypothetical property was assumed to have a $1 million net operating income and a loan-to-value (LTV) ratio of 80 percent. Holding property cash flow constant, the table shows sensitivity to changing the mortgage rate. In Scenario 1, the mortgage interest rate is 5 percent and the property is valued at $18.2 million using a 5.5 percent cap rate, and the investor IRR is 12 percent. If the mortgage interest rate decreases to 4 percent, as presented in Scenario 2, then the net cash flows to the investor rises higher than those from Scenario 1 because of the lowered debt expense. Not surprisingly, the investor IRR in Scenario 2 is now higher, at 13.2 percent, all else being equal. In a competitive market, the investor might need to bid up the property's price to clinch the deal. Suppose an IRR of 12 percent is a competitive yield for investors in that lower interest rate environment. Then, all else equal, the property value would need to increase to $19.6 million from $18.2 million. As a result of the higher bid, that cap rate decreases by 40 bps to 5.1 percent, as in Scenario 3.

The reverse is true, whereby an increase in mortgage interest rates would lead to higher property cap rates and, thus, lower property value. If Scenario 3 is representative of the current multifamily housing market operating with the GSEs, then the loss of the GSEs would resemble the environment depicted by Scenario 1. Property values would decline and cap rates could rise by some 40 bps in response to a higher-interest-rate environment.

The pro forma financial analysis can also be used to consider the potential cap rate and value impacts across different markets of the GSEs' removal. Discussions with Freddie Mac Multifamily underwriting professionals suggested that removing the guarantee for the GSEs' multifamily businesses would result in more conservative loan underwriting standards for non-prime rental housing markets, with LTV ratios generally lower (see Section 5.3 for details). Underwriting standards for primary rental markets would be relatively unaffected by the loss of the GSEs. Using the pro forma financial model, lowering the LTV ratio from 80 to 75 percent would cause the property cap rate to increase another 15 bps. In smaller

markets, the LTV change would likely be larger. Therefore, the loss of the GSEs would have a disproportionate valuation impact across multifamily markets.

In summary, using quantitative approaches based on econometric analysis of historical commercial real estate data and on pro forma financial analysis, the results show that the loss of the GSEs would lead to lower property values in the multifamily housing market, particularly those located in secondary and tertiary markets. Overall, multifamily cap rates could rise by 70 to 120 bps; in a $1.5 trillion multifamily market, that equals a value reduction of $150 billion to $245 billion (see Exhibit 4.4).

Exhibit 4.4: Estimated national multifamily market value change upon loss of a government guarantee

	Lower Bound	Upper Bound
GSE effect (from statistical models)		
Cap rate change	25 bps	60 bps
Origination volume	5 bps	5 bps
Other market factors (from pro forma analysis)		
Mortgage interest rate	40 bps	40 bps
LTV ratio	0 bps	15 bps
Total change in cap rate	70 bps	120 bps
Multifamily market value change (billion)	$150	$245

5. How Would Multifamily Housing Supply and Rental Growth Be Affected?

This section describes the impact of the loss of the GSEs on multifamily construction and rents. The key input in this study was the cost of capital for multifamily property investors, which is a function of multifamily mortgage rates, mortgage terms (including leverage and amortization term), property valuations, expected capital returns and cash flows, income and property taxes, and other factors. The time series of the cost of capital metric was measured using historical values of the constituent inputs. The inputs that are tied to the economy (e.g., inflation) and fiscal policies (e.g., tax) may or may not change in conjunction with the loss of the government guarantee for the GSEs. However, the inputs that are tied to real estate fundamentals, such as mortgage interest rates, loan terms, property values, etc., would change.

Expected increases in mortgage rates and tightening of mortgage terms would cause the cost of capital to increase. The expected magnitude of changes in these inputs, however, would vary across market segments. For large metropolitan areas (metros) with healthy and diversified economies and established connections to the broader capital markets, the impact from the loss of the GSEs on mortgage terms is not expected to be high. In smaller markets the impact on mortgage terms and property values are expected to be significant.

As the cost of capital increases as expected, profit margins from operating a multifamily property would narrow. Consequently, the incentives to own, operate, and build multifamily properties would decline. To estimate the effect of the investor cost of capital on multifamily construction, we developed an econometric model fitted to historical data.

Changes in the supply of multifamily units affect market rents. When new supply is needed but there is a disruption in the construction of new properties, rents tend to increase as demand outpaces supply. Using historical data, we developed another econometric model that estimates the effect of new supply on real rent.

In this section, we introduce the concept of the cost of capital and the relationship between it and its constituent inputs. We then describe the econometric models of the rental housing market that allowed us to examine the effect of the changes in the investor cost of capital on multifamily housing starts and rents. The analysis is extended over the short- to medium-term horizon based on the market model. The distributional impact of the loss of the GSEs across market segments also is covered.

5.1. Cost of Capital

This analysis considers investor cost of capital (ICC) and homeowner cost of capital (OCC). Both are functions of mortgage interest rates, loan terms, tax rates, property growth rates, inflation rates, and other factors. ICC is a key predictor in the econometric models that estimate the impact of the loss of the GSEs on the supply of multifamily units and real rents. We assumed throughout this study that the removal of the government guarantee pertains strictly to the GSEs' multifamily businesses. Hence, OCC would be unaffected. Nonetheless, the relative variations between ICC and OCC would affect the rent-or-own decision; thus, OCC is a predictor in the Real Rent econometric model.

The calculations of ICC and OCC were based on formulae suggested by two relevant academic papers: Hendershott and Shilling (1980) and DiPasquale and Wheaton (1992). The DiPasquale and Wheaton construct assumed that the investor required equity return equals the after-tax cost of debt. In other words, financial leverage is assumed to have no impact on the cost of capital. In practice, financial leverage is a crucial driver of the cost of capital. Hence, our model specifications more closely resemble the construct of Hendershott and Shilling.

5.1.1 Financial Model for Investor Cost of Capital

ICC measures the real price an investor will pay to rent one unit of real capital. The assessment was conducted in equilibrium; that is, by equating the investment made at the time of property acquisition to the expected present value of cash flows from holding and managing the property. At equilibrium, the real price of one unit of capital should be equal to the expected present value of the income stream produced by that investment. Exhibit 5.1 illustrates the financial model for the investor cost of capital. We assumed that the

input factors, with exception of the rent-to-property-value ratio, are exogenous to the formula. Thus, the equilibrium price for one unit of rental capital was derived by calculating the rent-to-property-value ratio as a function of exogenous terms.

Evaluating the expected income stream from a multifamily rental property is not a trivial process. Net cash flow to the investor is subject to complex rules around taxation and depreciation, and to assumptions related to revenues, expenses, and holding periods. For example, interest payments on mortgage loans and property taxes are tax deductible items that need to be accounted in the calculation.[4]

Exhibit 5.1: Financial model for the derivation of investor cost of capital

Down Payment Amount = Present value of
[After-tax rental income
- Property taxes net of property tax deductions
- Scheduled mortgage payments net of tax deductions on mortgage interest
+ Tax deductions from property depreciation
+ Net income from property sale
- Capital gains tax paid at disposition]

ICC is driven by numerous factors. The directional relationships between ICC and its driving factors are summarized in Exhibit 5.2. Over time, some of the factors, such as tax rates, remain relatively unchanged, while others factors, such as mortgage rates fluctuate. Thus, while the level of ICC was determined based on all of the input factors, its variations were most closely related to the changes in mortgage interest rates and property values.

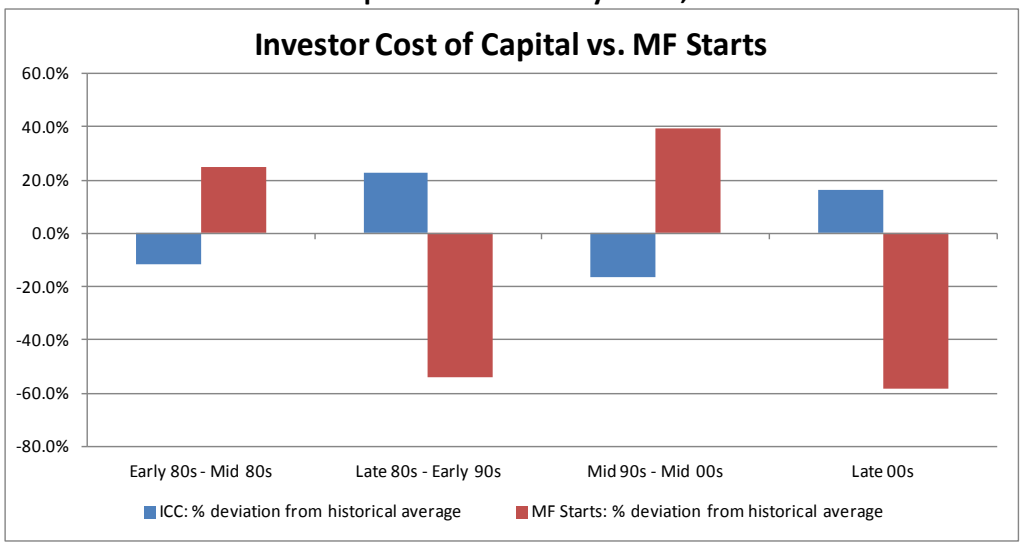
[4] The computations of ICC (and OCC) require the collection and transformation of large datasets not presented in the report, but they can be provided upon request from Freddie Mac.

Exhibit 5.2: Directional relationships between ICC and its input factors

Exogenous Variable	Correlation Direction With Investment Cost of Capital
Debt-related Terms	
Mortgage note rate	+
Leverage	–
Mortgage amortization term	–
Equity-related Terms	
Expected appreciation in property value	–
Investor required equity return	+
Property depreciation rate	+
Fees paid at the time of asset disposition	+
Property holding period	ambiguous
Rental Economy Fundamentals	
Expected increase in rental income	–
Expected inflation	–
Policy-related Terms	
Applicable income tax rate	+
Property tax rate	+
Capital gain tax rate	+
Depreciation life	+

Fluctuations in ICC from historical averages are relatively tightly banded over time compared to multifamily starts, but there is clearly a negative correlation between the two (see Exhibit 5.3). As the capital for investment became costly relative to historical values, investors were less willing to invest in multifamily properties. As a result, multifamily starts historically tended to decline below the historical average starts. Conversely, as investment capital became relatively cheaper, investments in new multifamily units rose, resulting in higher-than-average new supply.

Exhibit 5.3: Investor cost of capital vs. multifamily starts, deviation from historical averages



Sources: Freddie Mac, U.S. Census Bureau

The cost of capital can change because of changes in any of the factors, individually or in combination. ICC prior to the Tax Reform Act of 1986 was relatively low and the construction of multifamily units was more than 20 percent above the historical average. After the Tax Reform Act of 1986, ICC rose above its historical average. At that time, construction of new multifamily units dropped more than 50 percent below the historical levels. Investment capital again became relatively cheap between the mid-1990s and mid-2000s. The decline in ICC was associated with price increases. As property prices grew, so did the expectations of future prices. Multifamily construction grew again. Multifamily construction was steady at sustainable levels until the mid-2000s. As the economy headed into recession during 2007-09, multifamily and single-family property prices declined significantly. Despite the lower mortgage rates that partially offset the impact of low property prices on the capital cost, ICC was more than 15 percent higher relative to the pre-recession level. New multifamily construction fell to historic lows, dropping nearly 60 percent below the historical average.

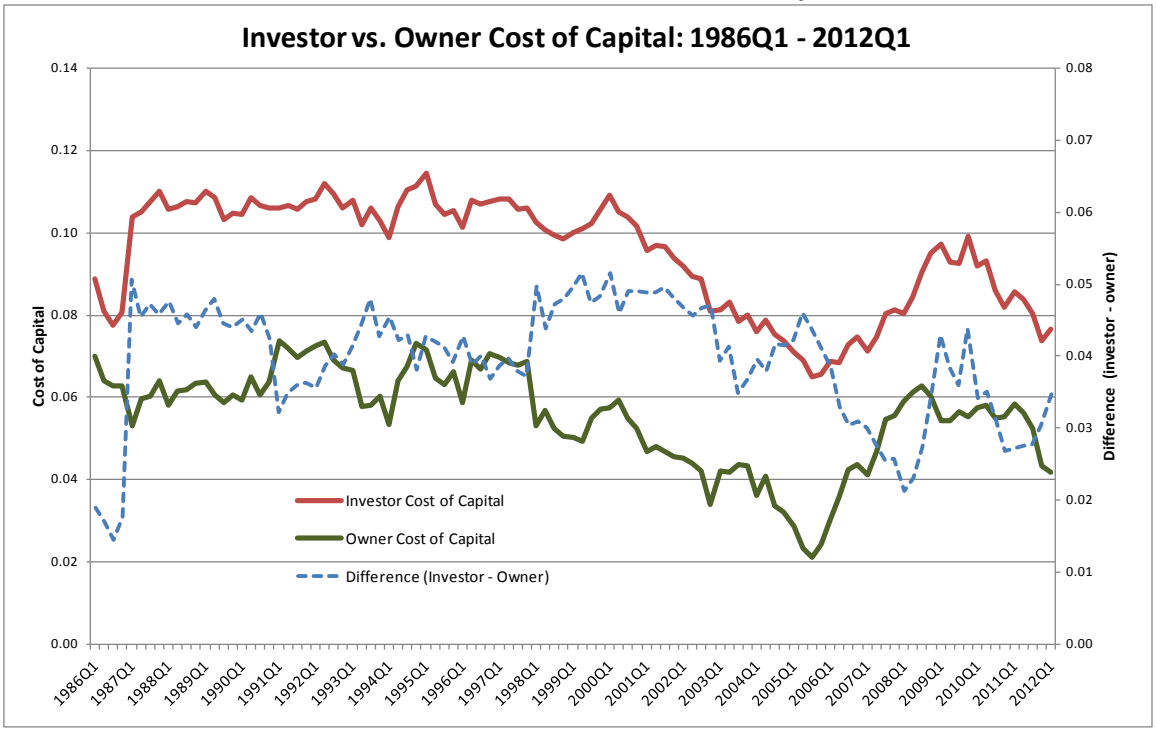
5.1.2 Financial Model for Homeowner Cost of Capital

Most of the factors affecting OCC, and the directional impact of those factors, were similar to the results we found for ICC. But there were some differences between ICC and OCC. One obvious difference was that the income tax rates applicable to homeowners could be different from those for investors. Also, unlike investors, homeowners do not deduct property depreciation from their taxes and they usually do not incur capital gains tax on the sale of their properties if certain conditions are met.

Since 1986, OCC generally has been lower than ICC, reflecting that almost twice as many people own their homes as rent them (see Exhibit 5.4). It is important to note that neither

ICC nor OCC are sole determinants of the investment decision. Other considerations, such as location, credit availability, property condition, and personal preferences, affect the real estate investment decision process, too.

Exhibit 5.4: Time series of the investor and homeowner cost of capital



Source: Freddie Mac

5.2. Multifamily Supply and Rent Models

We used two econometric models to estimate the impact of ICC on the supply of multifamily units and real rents. We built a model of the rental housing market that captures the relationship between ICC, multifamily starts, and real rents.

5.2.1 The Multifamily Starts Model

In this model, multifamily starts were used to measure new supply. The construction of multifamily units is a lengthy process. It begins with the permit application. Once the permit is granted, projects could still be postponed or cancelled. However, once the construction has begun, it is very likely that the project will be completed. As such, construction starts are a reliable indicator of new multifamily supply.

Changes in ICC impact construction decisions. If ICC increases, then the supply of new multifamily units is likely to fall, and vice versa (see Exhibit 5.3). The negative relationship between ICC and multifamily starts is highly correlated, with the correlation coefficient close to -0.65.

Factors other than ICC impact the construction of new multifamily units, too. In general, a developer decides to start a new construction project if the constructed property price exceeds the construction cost (including taxes, cost of debt, and other factors). Incentives to build can fall if economic conditions deteriorate, construction costs increase, or rental vacancy rate increases. The structural model for multifamily starts is shown in Exhibit 5.5 and the estimated parameters from the regression model are presented in Exhibit 5.6 (see exhibits 7.5 and 7.6 in Section 7 of this study, References and Supplemental Exhibits, for the regression summary statistics and the variable descriptions, respectively).

Exhibit 5.5: Multifamily Starts Model

Percent change in multifamily supply relative to the historical average =
Intercept
+ α1 * Lag starts
+ α2 * Percent deviation in ICC from historic average
+ α3 * Percent change in real construction Cost
+ α4 * Percent change in real rent
+ α5 * Vacancy
+ Error term

Exhibit 5.6: Estimated coefficients of the Multifamily Starts Model

Variable	Coefficients
Intercept	-0.571
Lag starts	0.003
% Change in ICC relative to historical average	-0.866
% Change in real construction cost	-2.714
% Change in real rent	2.503
Vacancy	-0.073

Overall, the model fits the data well, as indicated by the high value of the R-squared statistic (0.85). Similarly, the estimated coefficients have low p-values, indicating that individual variables are statistically significant in explaining the historical construction of multifamily units.

Based on the model results, a 1 percent increase in ICC from its baseline level would result in a 0.87 percent decline in multifamily starts. That is, if ICC were to increase by 10 percent relative to its historical average, then multifamily starts would fall by about 8.7 percent. Similarly, if real rents were to rise by 1 percent, then multifamily starts would increase by 2.5 percent, as shown in Exhibit 5.6.

The model used national-level data. Estimating model parameters at the market or market-segment level is challenging because market-level historical data for some of the independent variables are not available. However, it is reasonable to expect that the model estimated parameters can inform relationships between supply and the factors across market segments.

5.2.2 The Multifamily Real Rent Model

At the micro level, multifamily rents are set by property managers and determined based on property characteristics and local demand. Factors influencing the demand for a specific property include local competition (other multifamily properties and single-family homes), location, and the local employment market. In this study, we modeled aggregate real rent at the national level. Our model captured market fundamentals and did not consider property-level characteristics.

Employment and household income have positive impacts on real rents because increases in those factors reflect a strong economy; therefore, they drive the demand for housing. New multifamily construction, on the other hand, would negatively affect real rents because it leads to a higher supply of new units. Lastly, as the cost of homeownership increases, the relative cost of renting decreases, which, in turn, increases the demand for multifamily units.

Similar to the Multifamily Starts Model, the estimated coefficients of the econometric model for real rent allowed us to estimate percentage changes on real rent as a result of percentage changes in any of the predictors included in the model (see Exhibits 5.7 and 5.8). (See exhibits 7.7 and 7.8, respectively, in Section 7 of this study for more detailed summary statistics from the regression and the variable descriptions.)

Exhibit 5.7: Multifamily Real Rent Model

Percent change in real rent =

Intercept
+ β1 * Percent change in mean real household income
+ β2 * Percent change in multifamily completions
+ β3 * Percent change owner cost of capital
+ β4 * Percent change in non-farm employment
+ Error term

Exhibit 5.8: Estimated coefficients of the multifamily Real Rent Model

Variable Description	Coefficients
Intercept	-0.003
% Change in mean real household income (annualized)	0.407
% Change in multifamily completions	-0.106
% Change in OCC	0.103
% Change in non-farm employment	0.592

As indicated by the R-squared statistic (0.60), the predictors included in the model explain most of the variations in historical real rent, while the p-values of individual predictors indicate that all of them are statistically significant.

The coefficient for multifamily completions indicates that a 1 percent change in multifamily completions would result in about a 0.1 percent change in real rents, all else being equal.[5] For example, if completions decline by 10 percent, then real rents would increase by 1 percent.

Consistent with the Multifamily Starts Model, the Real Rent Model was estimated based on national-level data. As such, the estimated coefficients reflect the expected impact from changes in predictors on national-level aggregate rent[6].

5.3. The Framework for Assessing the Impact on the Supply of Multifamily Units and Real Rents

With the structural relationships between the cost of capital and the supply of multifamily units and rents established, we analyzed the impact of the loss of the GSEs on multifamily supply and rents.

We expect that the loss of the GSEs would result in a tighter debt market and lower availability of mortgage credit. That, in turn, could result in tighter underwriting standards

[5] We used completions in the Real Rent Model instead of starts because completions have stronger statistical relationship with real rents. Nevertheless, multifamily starts and completions are tightly linked. As shown in Exhibit 7.9, while there is a time lag between starts and completions, it appears that most started multifamily projects eventually are completed. The adjustment in timing of the impact, described in next section, offsets most of the difference in timing gap between starts and completion.

[6] While market-level data for full model estimation are not available, simple correlations between changes in real rents and multifamily completions revealed that the strength of the relationship varies across the market segments (described in the subsequent section), with correlation coefficients of 61 and 60 percent in the primary and secondary markets, respectively. As the market segment becomes smaller, the correlation becomes weaker; the correlation coefficients are 57, and 48 percent for tertiary and quaternary markets, respectively. To account for the differentiation in sensitivities, we adjusted the coefficients for completions. In primary markets the coefficient was adjusted to -0.15. The coefficient for secondary markets is close to the national-level estimation at -0.10. The coefficient for tertiary and quaternary markets were adjusted to -0.06 and -0.04, respectively.

that would be reflected in higher mortgage rates, stricter LTV requirements, and shorter amortization terms. In prior sections of this study, we concluded that the mortgage rates will rise and property values will drop as a result of the loss of GSEs. Furthermore, Freddie Mac Multifamily's underwriting professionals estimated that LTV ratios would decline in the range of 10 percent on average as mortgage investors faced more uncertainty about loan refinancing at balloon maturity.

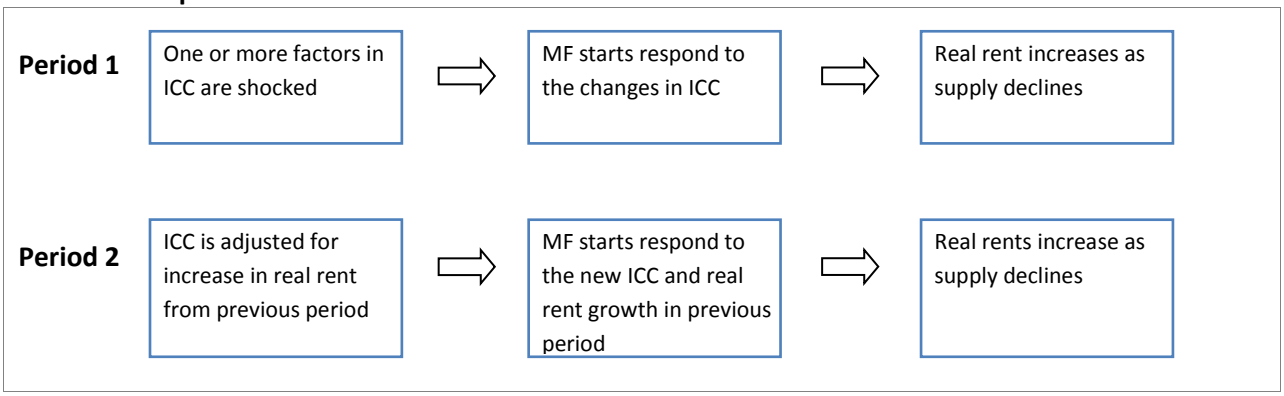
The evaluation framework that we developed for this study used the financial and econometric models described earlier and allowed us to focus on the short- to medium-term impact of the loss of the GSEs on multifamily rents and starts.

The removal of the government guarantee for the GSEs is expected to cause the mortgage interest rate to rise and mortgage loan origination volume to decline, which, in turn, would lead to lower property values. Those estimated economic impacts would be transmitted through the cost of capital models that drive changes in the supply of multifamily units and real rents.

For each period we looked at, we began the assessment with the level of ICC relative to its historical average. While the higher mortgage rates, tighter mortgage terms, and higher cap rates continued to push up ICC, the higher real rent from the previous periods put downward pressure on ICC (see Exhibit 5.9). Model results showed that the higher real rents do not fully offset the increase in ICC due to changes to mortgage terms and cap rates. Therefore, the Period 2 ICC remained high relatively to its historical average. Consequently, the supply of new units continued to be depressed during the early years of the post-GSE regime, and converged toward equilibrium in later years. In general, the rate of convergence depended on the level of the initial shocks to the market. The greater the shocks to mortgage interest rates and property values, for example, the longer it would take for the market to return to equilibrium.[7]

[7] It is likely that the loss of the GSEs might not change the ICC immediately because of the time it takes to go from permit, to construction, to delivery of a new property. It is reasonable to assume that it would take between one and two years before the market fully would internalize the market structure change. To account for the time lag, we shifted the impact curve so that the largest impact would take place in the second and third years of the loss of the GSEs. Although the shift would affect the timing of the impact, the cumulative effects on real rents and multifamily supply would be unaffected.

Exhibit 5.9: Impact Assessment Framework



5.4. Market Impact of the Loss of the GSEs at the National Level

To begin evaluating the impact of the shocks that likely would occur because of the removal of a government guarantee for the GSEs, we explored the impacts at a national level. Under our base assumptions, the cost of capital for multifamily property investment would be 8 percent (see Exhibit 5.10).

Exhibit 5.10: Mortgage terms and cap rate assumptions under the base scenario

Mortgage rate	4.3%
Leverage	70%
Mortgage amortization term	30 years
Cap rate	6.4%
Investor cost of capital	8%

With the loss of the GSEs, the mortgage interest rate would increase, property valuation would decline, and mortgage loan terms would be more conservative (see Exhibit 5.11).[8]

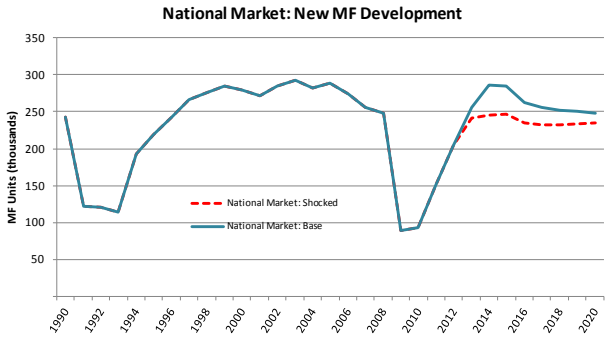
Exhibit 5.11: National market assumptions

	National Market	
	Assumed Change	Value
Mortgage rate	+40 to 120 bps	4.7 to 5.5%
Leverage	-2 to -8%	62 to 68%
Mortgage amortization term	-1 to -3 years	27 to 29 years
Cap rate	+20 to 60 bps	6.6 to 7%

As a result, the new supply of multifamily units is expected to decline and real rents to increase. The highest impact would occur during the first three years after the shock and gradually diminish as the markets reach a new equilibrium (see Exhibit 5.12).[9] The supply of multifamily rental housing units would decrease by between 4 and 11 percent, while real rents would increase by between 0.6 percent and 2.1 percent in the next three years.

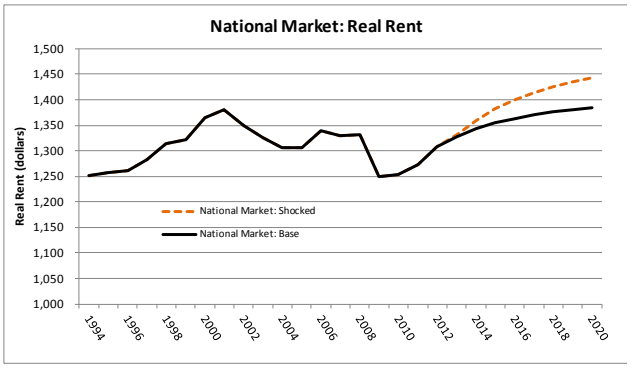
Exhibit 5.12: Multifamily starts and real rents at national level

Multifamily Starts: National Market



Sources: U.S. Census Bureau, Moody's Economy.com, Freddie Mac

Multifamily Real Rent: National Market



Sources: CBRE, Bureau of Labor Statistics, Moody's Economy.com, Freddie Mac

[8] Note that we make more conservative assumptions in national level analysis than what we concluded in other sections. See Section 5.5 for more details.

[9] Baseline projections for multifamily starts were sourced from Moody's Analytics, and projections for multifamily rents were sourced from CBRE.

Extending the view, Exhibit 5.13 shows the expected five-year impact on supply and real rents.

Exhibit 5.13: Impact on multifamily supply and real rent at the national market level (five-year projection)

New multifamily starts (average annual change)	-4 to -10%
Impact on multifamily starts (units)	53,000 to 146,000
Real rent cumulative change	1 to 3.2%

5.5. Market Impact of the Loss of the GSEs on Various Market Segments

The loss of the GSEs would not have the same effect on rent and supply in every market. The impact would be small in larger markets that have historically been well served by private-capital providers, and greater in smaller markets. The GSEs deliver a significant volume of multifamily mortgage credit to smaller markets. As such, many investors would experience greater difficulty in finding a source of funding for the multifamily property investments in smaller markets.

For this study, we analyzed four market segments: primary, secondary, tertiary, and quaternary. [10] There is no universally accepted definition for market segments. We chose the multifamily stock approach in defining the market segments but we also examined other approaches, such as the market-level personal income. Both approaches yield similar segmentation and do not affect our conclusions. Exhibit 7.11 in Section 7 of this study shows representative markets in each segment.

While there are only nine markets in the primary market segment, they collectively account for more than 30 percent of the total multifamily rental housing stock. In contrast, the quaternary market segment contains more than 60 percent of all metropolitan areas but it represents only 11 percent of the total multifamily rental housing stock (see Exhibit 5.14).

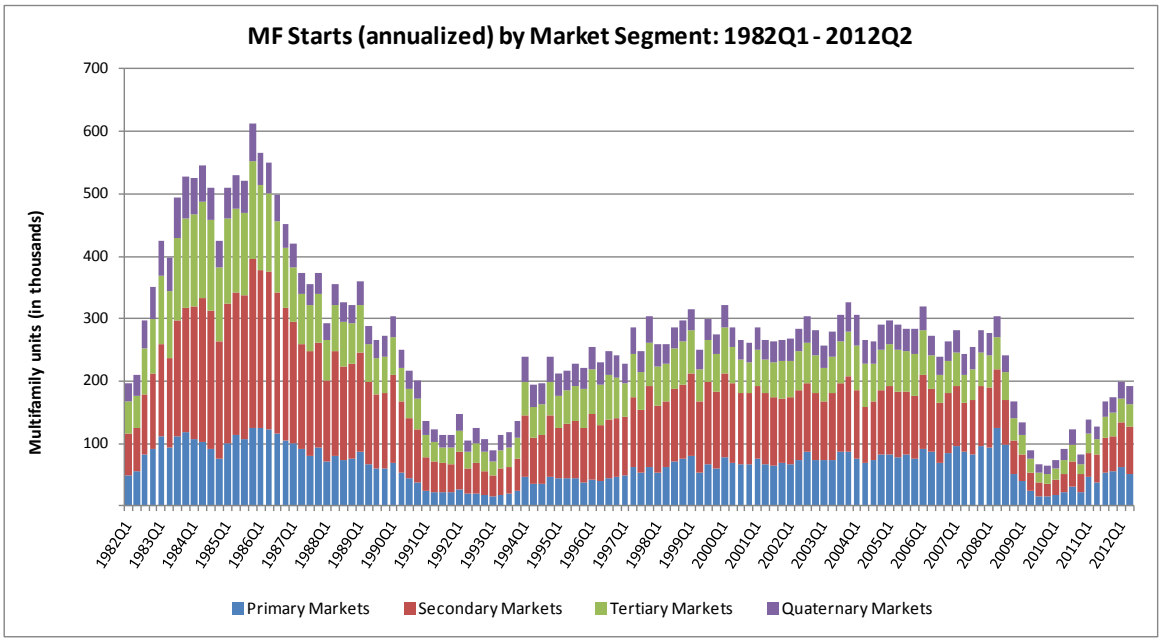
[10] In some of the studies conducted in other sections of this document, tertiary and quaternary markets as defined in this section are combined into one segment and defined as a tertiary segment.

Exhibit 5.14: Market segment summary statistics

Market Segment	Number of Markets	MF Stock (5+ Units) as of 2010Q2 (in Millions of Units)	Average Real Rent as of 2012Q2 ($)	MF (5+ Units) Starts in 2012 (Annualized)
Primary	9	7.7	1,480	64,310
Secondary	36	7.1	1,006	73,422
Tertiary	96	4.6	822	40,146
Quaternary	230	2.4	739	27,359
National market	371	21.8	1,309	205,238

New starts in tertiary markets exceeded the starts in primary markets in the early 1980s. After this period, the relative level of construction in tertiary markets slowed down. Secondary markets, on the other hand, have consistently provided the largest share of new construction among the four market segments. While the relative shares vary over the time, the general trend is consistent across the market segments (see Exhibit 5.15.). In all of these market segments, total construction was highest in early 1980s. To give a point of reference, the effect of the Tax Reform Act of 1986 was similar across the market segments, as the level of new starts significantly slowed down in all these markets.

Exhibit 5.15: Multifamily starts by market segments



Sources: U.S. Census Bureau, Moody's Economy.com, Freddie Mac

The primary market segment would be the least impacted from the loss of the GSEs. The primary markets not only have the largest multifamily housing stock, but also the largest economies and 30 percent of total national personal income. Stable employment, high

personal income, and robust demand for multifamily rental units have traditionally made primary markets attractive to private-sector investors. The other market segments would experience a higher degree of market impact from the loss of the GSEs. Smaller and less-diverse economies in those markets increase investment uncertainties; therefore, they are relatively less attractive to investors. (See Exhibit 5.16 for assumptions and Exhibit 5.17 for model results. See also Exhibit 7.10 in Section 7 of this study for model projections of the relative market impacts across market segments.)

Exhibit 5.16: Market segment impact assumptions

	Primary Markets	Secondary Markets	Tertiary Markets	Quaternary Markets
Mortgage rate	0 to 75 bps	50 to 100 bps	75 to 125 bps	100 to 300 bps
Leverage	No change	0% to -5%	-5% to -20%	-10% to -30%
Mortgage amortization term	No change	No change	-5 to -10 yrs	-5 to -10 yrs
Cap rate	No change	0 to 50 bps	50 to 100 bps	75 to 175 bps

Exhibit 5.17: Impact on multifamily supply and real rent by market segment

	Primary Markets	Secondary Markets	Tertiary Markets	Quaternary Markets
New multifamily starts (average annual change)	0% to -2%	-2% to -6%	-8% to -20%	-15% to -35%
Impact on multifamily starts (units)	0 to 8,500	8,000 to 31,000	23,000 to 55,000	22,000 to 52,000
Real rent cumulative change	0.0% to 1.3 %	0.8% to 3.1%	2.4% to 5.6%	2.7% to 6.3%

Not surprisingly, at the low end of the input ranges (i.e., the Low Impact scenario), the primary markets would experience little to no supply disruption, and real rents in those markets are not expected to change from their respective base line projections. While the GSEs compete with other debt investors for the mortgages in these markets, the loss of the GSEs would have little impact on the market competitiveness on the debt side for institutional-quality real estate in these markets. This segment of the market would be most desirable to many investors. However, older real estate in locations farther from jobs and amenities would have less access to capital. As such, at the aggregate level, these markets would see some changes.

Market impacts from the loss of the GSEs would become progressively more severe as we look into secondary, tertiary, and quaternary markets, and as the shocks to the input variables approach the upper end (i.e., the High Impact scenario).

The larger effects in the smaller market segments would lead to very little new construction in the Highest Impact scenario. This result is not unprecedented. There was no construction in more than half of the nation's 230 quaternary markets during the recent economic downturn. The expected reduction in new supply, combined with an already-low level of current new supply, would significantly slow the growth of multifamily stock in quaternary markets.

6. How Would Affordable Rental Housing Be Affected?

The multifamily housing market weathered the 2007-09 recession well. Even as labor markets and the broader economy weakened, the vacancy rate in the multifamily housing market remained resilient. The sector benefitted from an increased propensity of households to rent, and the general persistent undersupply of new units. In this environment, low- and moderate-income renters who remain financially distressed continue to experience a rental housing market that is both unaffordable and inadequate. The confluence of rising multifamily rents, stagnating personal income, and persistent affordable-housing supply gaps imply that more renter households are paying an increasingly higher proportion of their income for housing. A persistent supply gap in the affordable rental housing market indicates the potential existence of a market failure where the private sector has not taken into account the positive externalities of providing affordable housing units.[11]

Freddie Mac and Fannie Mae were established by Congress to enhance the liquidity, stability, and affordability of the residential housing market. The GSEs' multifamily businesses play an important role in facilitating the supply of affordable rental housing. In a recent report issued by the U.S. Government Accountability Office, the GSEs' multifamily lending activities, while constituting only 4.5 percent of their total business in 2008, accounted for about one-third of the affordable housing units.

In this section, we describe the state of the affordable rental housing market and examine the issue of rental housing affordability across market segments. We also provide our forecasts of future supply gaps under various scenarios if the GSEs operate their multifamily businesses without access to a government guarantee.

[11] Research shows that the development of affordable housing improves childhood development, school performance, and health outcomes, and has a spillover effect on the economy. Lubell and Brennan (2007), Lubell, Crain, and Cohen (2007), and Chakrabarti and Zhang (2010).

6.1. Rental Cost Burden

A rental housing unit is commonly considered affordable if the gross rent (defined as rent plus tenant-paid utilities) does not exceed 30 percent of the household income. The rental cost burden (the percentage of household income spent on rent and utilities) has been increasing during the past decade and is especially acute for low-income renters. The high rental cost burden means that renters have less disposable income to spend elsewhere, which could have a spillover impact on the broader economy.

Nearly 40 percent of the U.S. renter population spent more than 30 percent of household income on housing in 2000; that proportion is now more than half of all renters, reaching 51.4 percent in 2011 (see Exhibit 6.1). The rental cost burden is especially high for the very low-income segment of renters (renters with income up to 50 percent of area median income, or AMI). In 2011, 83 percent of the very low-income households paid more than 30 percent of their income on gross rent, and 58.8 percent of them spent at least half of their household income on rent and utilities.

Exhibit 6.1: Percentage of renters with high rental cost burdens, all renters and by income category, 2000-2011

	Percentage of Renters with Gross Rent Exceeding 30% of Household Income				Percentage of Renters with Gross Rent Exceeding 50% of Household Income			
Year	All Renters	Very Low-income (50% of AMI)	Low-income (80% of AMI)	Moderate-income (100% of AMI)	All Renters	Very Low-income (50% of AMI)	Low–income (80% of AMI)	Moderate-income (100% of AMI)
2000	39.8%	78.8%	65.9%	57.7%	19.7%	51.5%	34.9%	29.4%
2001	41.6%	79.6%	67.4%	59.6%	20.9%	53.4%	36.6%	31.0%
2002	42.7%	79.4%	67.7%	60.1%	21.7%	53.2%	37.3%	31.7%
2003	44.2%	78.9%	68.1%	61.2%	23.0%	54.4%	38.7%	33.3%
2004	45.6%	80.3%	69.8%	62.6%	23.9%	55.8%	39.7%	34.0%
2005	47.1%	81.5%	71.2%	63.9%	25.0%	57.5%	40.9%	35.1%
2006	47.3%	80.5%	68.4%	61.4%	24.9%	54.0%	38.2%	33.1%
2007	46.9%	80.0%	67.6%	60.6%	24.4%	52.6%	37.3%	32.3%
2008	47.4%	80.8%	68.4%	61.4%	25.0%	53.9%	38.3%	33.3%
2009	49.3%	81.6%	70.4%	63.7%	26.5%	55.9%	40.3%	35.2%
2010	50.8%	82.7%	72.0%	65.5%	27.7%	57.7%	41.9%	36.7%
2011	51.4%	83.0%	73.1%	66.7%	28.4%	58.8%	43.3%	38.0%

Note: Gross rent includes rent and tenant-paid utilities.

Source: American Community Survey, 2000-2011

Since the last American Community Survey (ACS) was conducted in 2011, rents have increased because of tight rental markets. At the same time, the labor market recovery has remained slow, pointing to the growing rent burdens in the future. However, the growing trend of rent burden could be reversed if the pace of income growth exceeds the pace of rent growth – an unlikely scenario in the near term.

6.2. Affordable Rental Housing Supply Gap

A supply gap is the difference between the number of renters and the number of affordable, available, and adequate rental units (affordable housing units) at different income levels.[12] A decrease in the supply of multifamily mortgage debt capital would exacerbate an already worsening affordable rental housing supply gap. A decrease in the supply of units, given the same demand, would cause rents to further rise and, in turn, raise the rent burdens on the households least able to adjust. To better understand this situation, we performed an analysis similar to the Joint Center for Housing Studies (JCHS) of Harvard University's 2011 study, calculating the affordable rental housing supply gap. JCHS used data from the American Housing Survey (AHS) and reported the supply gaps for every other year from 2003 to 2009 (the national AHS data are available every two years). To obtain a continuous time series and further our analysis, we used ACS data to generate the affordable rental housing supply gaps from 2000 to 2011.[13]

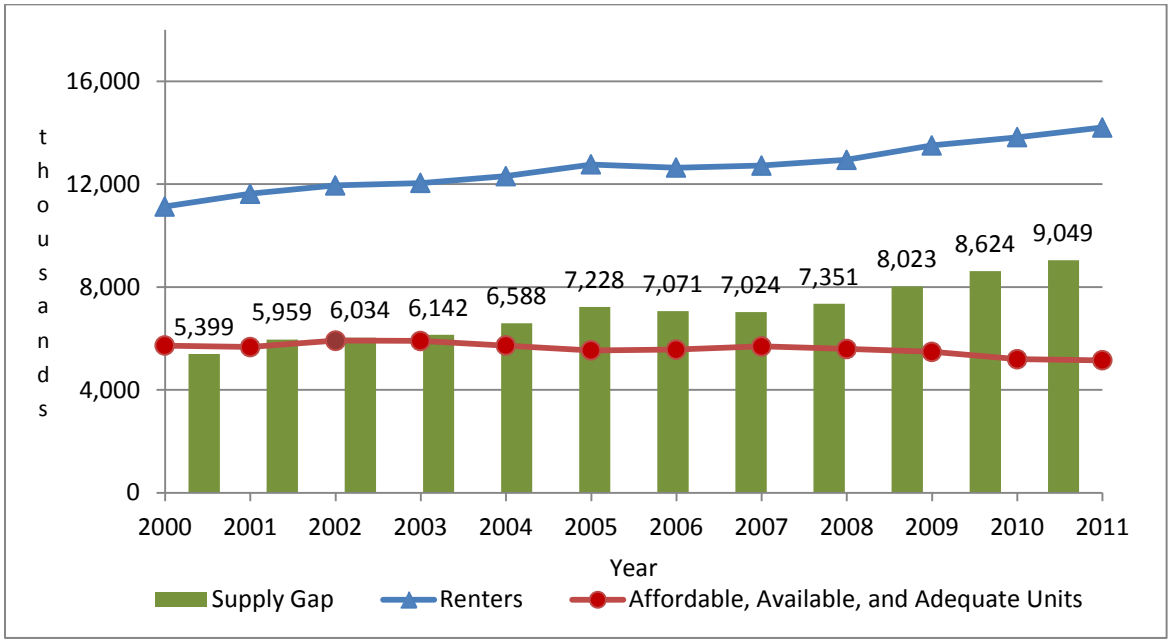
The supply gap for very low-income renters rose from 5.4 million units in 2000 to 9.05 million in 2011[14] (see Exhibit 6.2). The increase was caused by the dispersion between the number of renters and the number of affordable housing units. While the number of renters has increased every year from 2000 to 2011, the stock of affordable housing units has remained relatively flat or declined in most of the years. The trend of the widening supply gap also held for low-income renters, those earning 80 percent or less of AMI (for details, see Exhibit 7.12 in Section 7 of this study, References and Supplemental Exhibits).

[12] Affordable units have gross rents up to 30 percent of the household-income threshold of the category. Gross rent includes rent and tenant-paid utilities. Available units are vacant or rented by households with incomes no more than the threshold for the category. Adequate units are in livable conditions and exclude units that lack full plumbing. Similar definitions are used in the report "American's Rental Housing" by the Joint Center for Housing Studies of Harvard University.

[13] We also calculated the supply gap using data from AHS. Our results are consistent with JCHS's. For better accuracy, our analysis with ACS data adjusted the income thresholds for low- and very low-income households based on household size, using the adjusting ratios established by HUD for income-limit calculation. Specifically, the adjusting ratios for households with one to eight persons are 70, 80, 90, 100, 108, 116, 124, and 132 percent, respectively. For households with more than eight persons, the adjusting ratio is 8 percent more per person. Institutional group quarters are excluded from the data.

[14] The supply gaps reported in this report are after the adjustment of income thresholds for low and very low-income households and with institutional group quarters excluded from the data. Results are different without the income threshold adjustment and/or the exclusion of institutional group quarters. For example, the supply gap for very low-income renters was 4.6 million in 2007 without the income threshold adjustment and with institutional group quarters included. Adjusting the income threshold only raised the supply gap from 4.6 million to 6.2 million, while the exclusion of institutional group quarters increased this gap to 6.7 million.

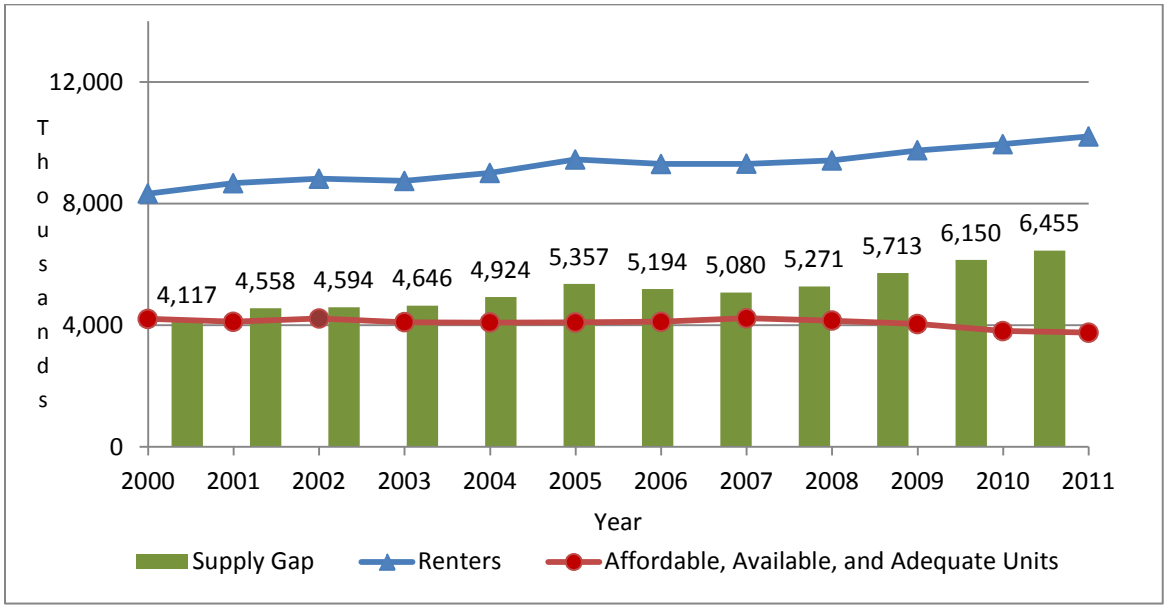
Exhibit 6.2: Affordable rental supply gaps for very low-income renters, 2000-2011 (single-family rentals included)



Note: The supply gap is the difference between the number of renters and the number of affordable, available, and adequate units. Very low-income renters are households with income up to 50 percent of the area median income. The income threshold for very low-income households is adjusted for household size. Affordable units have gross rents up to 30 percent of the household income threshold of the category. Gross rent includes rent and tenant-paid utilities. Available units are vacant or rented by households with incomes no more than the threshold for the category. Adequate units are in livable conditions and exclude units that lack full plumbing. Gross rent for vacant units is estimated at 1.15 times the asking rent, based on the definition used in the report "American's Rental Housing" by Joint Center for Housing Studies of Harvard University. Institutional group quarters are excluded.
Source: American Community Survey, 2000-2011. See also Exhibit 7.12 for more detail.

Expanding on the original work by the JCHS, we looked at the supply gap only for multifamily dwellings, eliminating single-family rentals from the data (see Exhibit 6.3). Our conclusion was similar, showing steady growth in the supply gap for that segment of the market. From 2000 to 2011, the multifamily supply gap for very low-income renters rose from 4.12 million to 6.46 million units.

Exhibit 6.3: Affordable rental supply gaps for very low-income renters, 2000-2011 (single-family rentals excluded)



Note: Same as Exhibit 6.2.

Source: American Community Survey, 2000-2011. See also Exhibit 7.13 for more detail.

6.3. Affordable Rental Housing Supply Gap by Market Types

Another way we examined the supply gap analysis was to break out the results by market segments. Our analysis showed that the supply gap is present in all three market segments (see Exhibit 6.4). The supply gaps in secondary and tertiary markets are larger in absolute number than in primary markets. Primary markets have the highest supply gap relative to the total number of renters. In 2011, tertiary markets contributed 49.7 percent of the supply gap for very low-income renters and 45.3 percent of the gap for low-income renters.

Exhibit 6.4: Supply gap for very low- and low-income renters by market type, 2005-2011 (single-family rentals included)

	Supply Gap for Very Low-income Renters (50% of AMI)						Supply Gap for Low-income Renters (80% of AMI)					
	Primary Market		Secondary Market		Tertiary Market		Primary Market		Secondary Market		Tertiary Market	
Year	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio
2005	1,698	63%	2,051	63%	3,479	51%	1,167	28%	1,129	22%	1,586	15%
2006	1,638	62%	1,956	61%	3,477	51%	1,147	28%	1,073	21%	1,642	15%
2007	1,593	61%	1,966	60%	3,465	51%	1,048	26%	1,034	20%	1,561	15%
2008	1,691	63%	2,043	62%	3,617	52%	1,136	27%	1,188	23%	1,728	16%
2009	1,749	63%	2,256	64%	4,017	55%	1,231	29%	1,306	24%	2,112	19%
2010	1,866	66%	2,459	67%	4,299	59%	1,474	34%	1,607	28%	2,547	22%
2011	1,947	67%	2,606	69%	4,496	60%	1,650	37%	1,850	32%	2,902	25%

Note: Tertiary market segment includes non-MSAs.

Source: American Community Survey, 2005-2011

After eliminating single-family rentals from the data, the supply gaps in the three market segments become smaller and the largest gap is still found in the tertiary markets (see Exhibit 6.5). As of 2011, the multifamily supply gap for very low-income renters was 2.84 million units in tertiary markets compared to 1.97 million in secondary markets and 1.65 million in primary markets.

Concentration analysis by metropolitan area revealed that a diverse group of metropolitan areas exhibit supply gaps. Exhibit 7.14 in Section 7 of this study shows the top 25 metropolitan areas with the highest gap-to-renter ratios for very low-income renters during the years 2005 to 2011. Most of the areas on that list represent secondary and tertiary markets, and eliminating single-family rentals from the data does not change the ranking (see Exhibit 7.15 in Section 7).

Exhibit 6.5: Supply gap for very low- and low-income renters, by market type, 2005-2011 (single-family rentals excluded)

	Supply Gap for Very Low-income Renters (50% of AMI)						Supply Gap for Low-income Renters (80% of AMI)					
	Primary Market		Secondary Market		Tertiary Market		Primary Market		Secondary Market		Tertiary Market	
Year	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio
2005	1,480	62%	1,608	61%	2,269	51%	973	27%	757	18%	856	13%
2006	1,420	62%	1,527	59%	2,247	51%	947	27%	690	17%	856	13%
2007	1,377	60%	1,503	58%	2,200	50%	845	24%	630	16%	770	11%
2008	1,444	62%	1,553	60%	2,273	51%	916	26%	723	18%	839	12%
2009	1,489	63%	1,698	63%	2,526	54%	986	27%	787	19%	1,080	15%
2010	1,581	66%	1,842	65%	2,727	58%	1,190	32%	1,019	23%	1,336	19%
2011	1,649	66%	1,967	67%	2,839	59%	1,347	36%	1,228	28%	1,578	22%

Note: Tertiary market segment includes non-MSAs.

Source: American Community Survey, 2005-2011

6.4. Impact of the Loss of the GSEs on Multifamily Affordable Housing

Next, we forecast the supply gap over the next five years. To simulate the future of the affordable housing market, we forecast the future supply gap under scenarios in which the GSEs' multifamily businesses operate without and with a limited government guarantee. The predicted growth rates of the median household income and renter households were provided by Moody's Analytics. The income distribution of renters was assumed to remain the same in our forecast so that the number of very low- and low-income renters would grow at the same pace as overall renters. To provide a basis for comparison, rental growth rates predicted by CBRE were used to provide a baseline forecast with the government guarantee unchanged from today's guarantee structure.

To predict the potential affordable rental housing supply gaps in a No Guarantee environment, we performed our analysis using the Low Impact and High Impact scenarios mentioned at the end of Section 5 of this study. The Low Impact scenario assumed the lower range of the estimated changes in mortgage terms (i.e., mortgage interest rate, amortization term, and LTV ratio) and property values due to the loss of the GSEs. The High Impact scenario used the upper end of the estimated changes in mortgage terms and property values, and projected much lower supply and higher real rents as a result of the loss of the GSEs (input variables for the forecasts are listed in Exhibit 7.16 in Section 7 of this study).

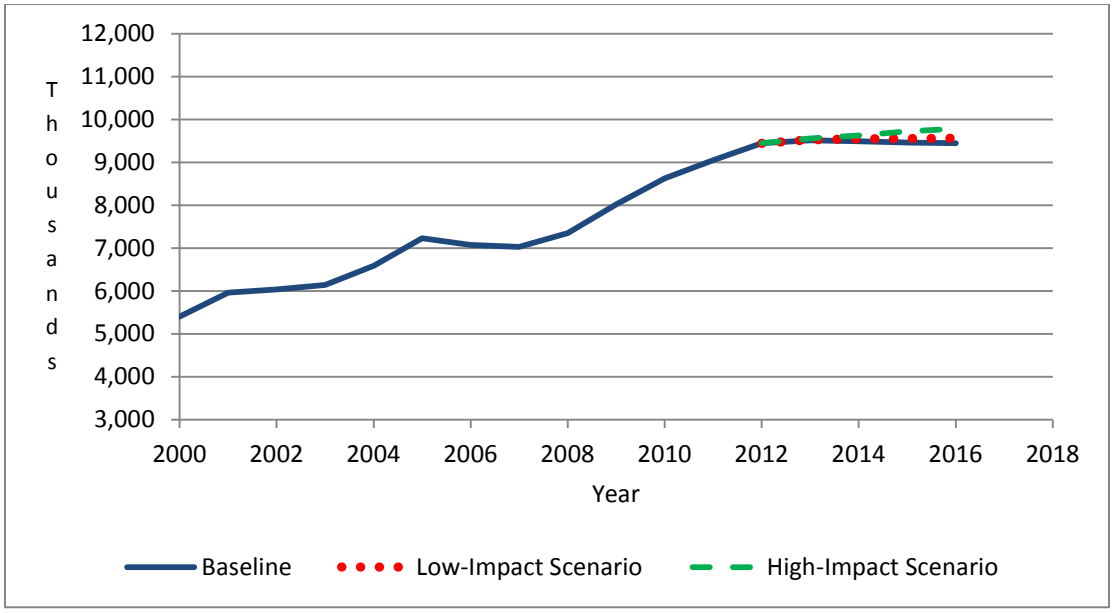
In the scenario with the current guarantee structure unchanged, we projected that the supply gap for very low-income renters would rise from 9.05 million units in 2011 to 9.45 million in 2012 and 9.52 million 2013 (see Exhibit 6.6). The major reasons were the comparatively faster growth in the number of renters and a moderate increase in the affordable, available, and adequate units. After 2013, as the predicted growth rate of median household income outpaces the rental growth rate and the increase of renter households slows, the supply gap is expected to trend down slowly but remain high. In 2016, the supply gap is expected to be 9.45 million units for very low-income renters and 6.56 million for low-income renters (see Exhibit 7.17).

Under the scenarios where the government guarantee is eliminated, faster rent growth would lead to larger and more persistent supply gaps for low- and very low-income renters. The impact would be greater over the longer time horizon. For example, the supply gap for very low-income renters would continue to rise each year between 2012 and 2016. The gap would be larger, with the 2016 gap reaching 9.56 million units under the Low Impact scenario and 9.78 million under the High Impact scenario.

The multifamily rental housing market (i.e., without the single-family rental stock) would experience similar trends (see exhibits 6.7 and 7.18). The supply gap for very low-income renters would be 6.76 million units in 2016 with current government guarantee structure unchanged. If the government guarantee were eliminated, the supply gap would reach 6.83

million or 6.99 million units in 2016 under the different scenarios, indicating an increase of 1.2 or 3.5 percent relative to the current market infrastructure.

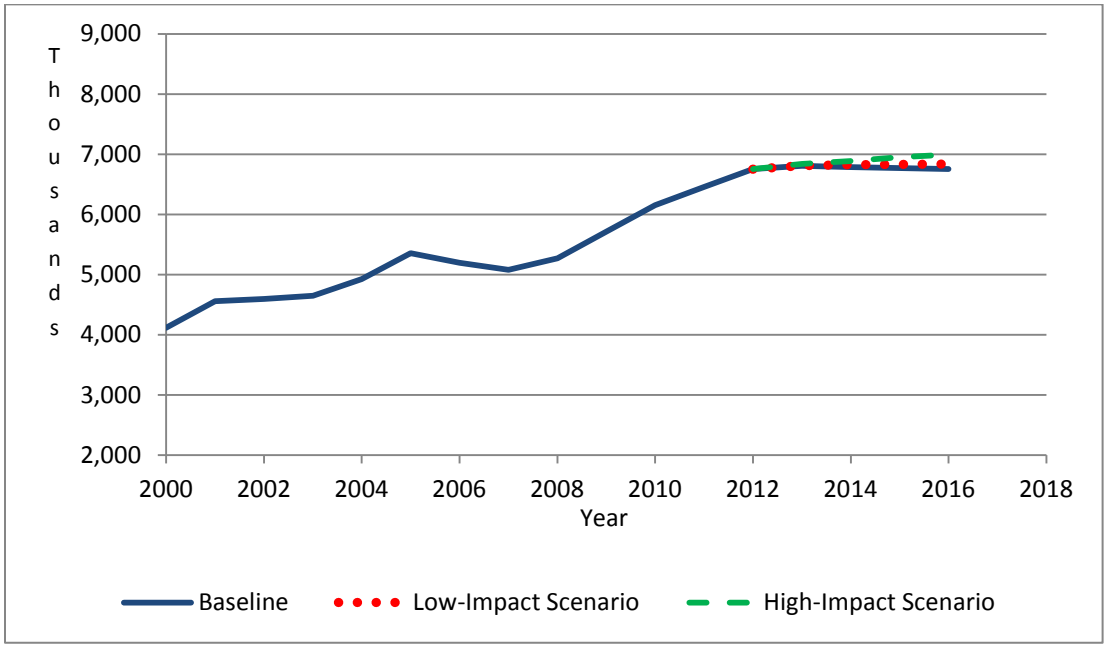
Exhibit 6.6: Forecasts of affordable rental housing supply gap for very low-income renters, 2012-2016 (single-family rental included)



Note: Detailed numbers are in Exhibit 7.17.

Source: American Community Survey 2011, Moody's forecasts of median household income and renter households 2012-2016, CBRE's forecasts of rent growth 2012-2016 (baseline), Freddie Mac's prediction of rent growth without government guarantees, 2012-2016. See Exhibit 7.16 for the predicted growth rates of the input variables (Low Impact and High Impact scenarios).

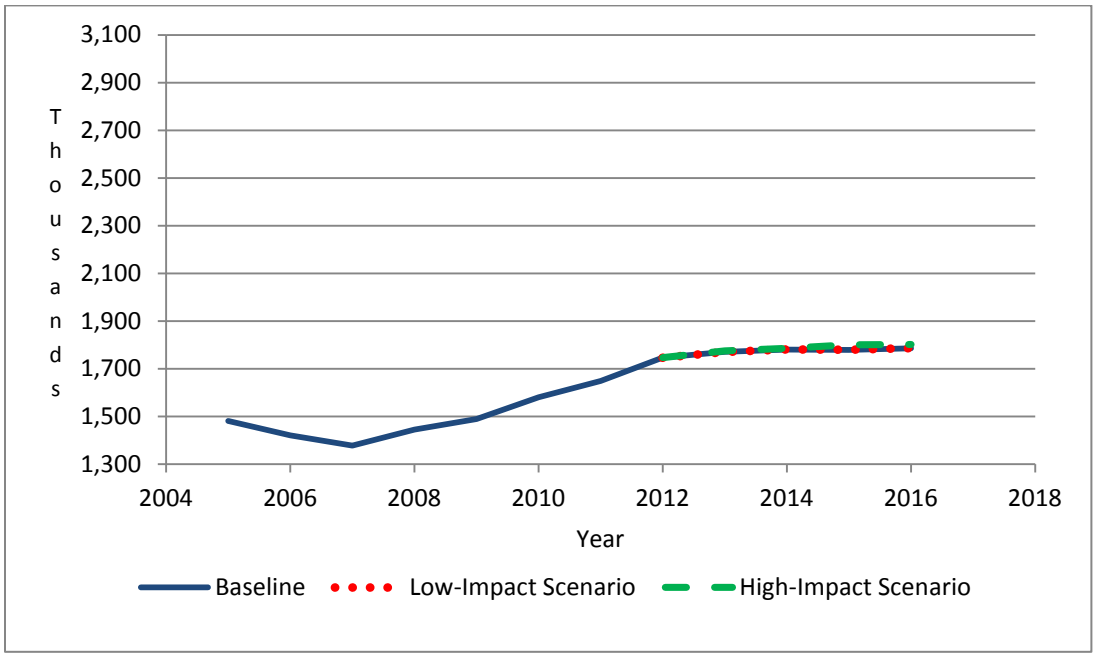
Exhibit 6.7: Forecasts of affordable rental housing supply gap for very low-income renters, 2012-2016 (single-family rental excluded)



Note: Detailed numbers are in Exhibit 7.18.
Source: Same as Exhibit 6.6.

Further analyses across different market segments showed that the loss of the GSEs would affect the affordable rental housing in all three segments, with larger impacts expected in the secondary and tertiary markets. In primary markets, the supply gap for very low-income renters would continue to rise between 2012 and 2016, with a small dip under the Baseline scenario in 2015 (see Exhibit 6.8). Eliminating the government guarantee would increase the supply gap in each year but in a moderate way, under the High Impact scenario. The supply gap would be the same under the Baseline and Low Impact scenarios because of the same predicted rent growth rates.

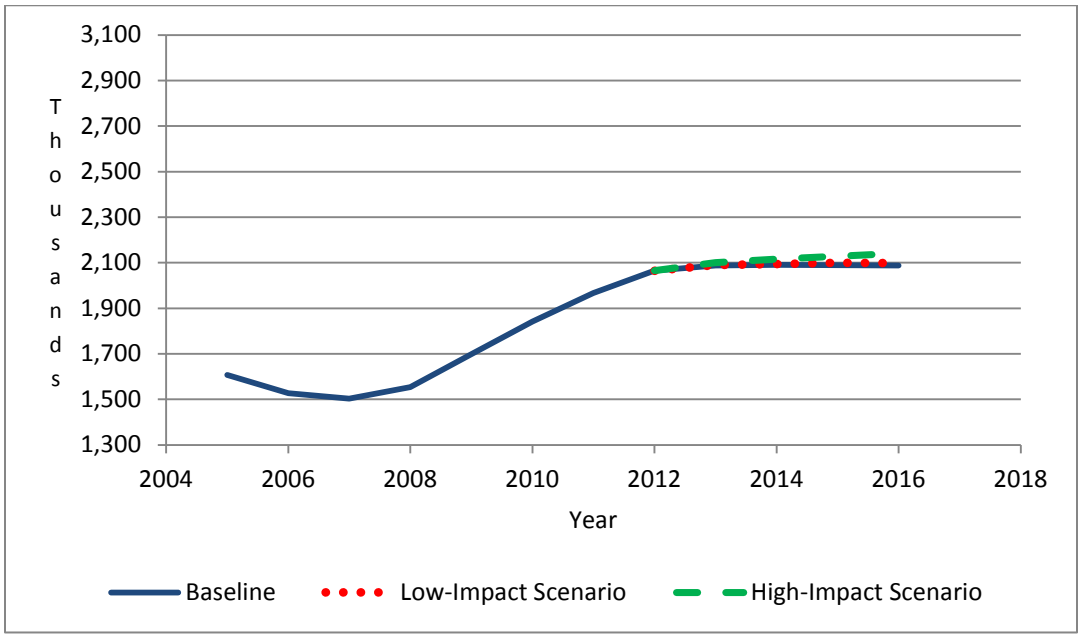
Exhibit 6.8: Forecasts of multifamily affordable rental housing supply gap for very low-income renters in primary markets, 2012-2016



Note: Detailed numbers are in Exhibit 7.19.
Source: Same as Exhibit 6.6.

In secondary markets, the gap for very low-income renters would decline starting in 2015 with the current government guarantee structure unchanged (see Exhibit 6.9). The loss of the GSEs would lead to a larger increase in the supply gap relative to the Baseline case and the supply gap would continue to increase until 2016 under the High Impact scenario. In 2016, the supply gap would be about 2.5 percent higher under the High Impact scenario than under the Baseline scenario.

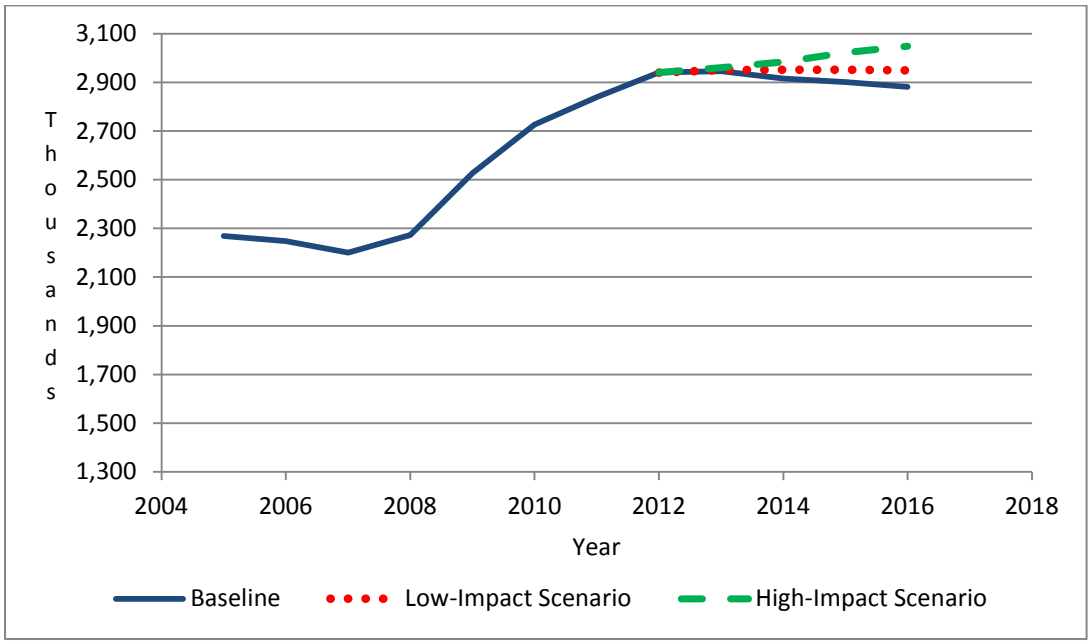
Exhibit 6.9: Forecasts of multifamily affordable rental housing supply gap for very low-income renters in secondary markets, 2012-2016



Note: Detailed numbers are in Exhibit 7.20.
Source: Same as Exhibit 6.6.

The impact of the loss of the GSEs would be most severe in the tertiary markets. Under the current market structure, the supply gap for very low-income renters in tertiary markets would continue to rise for a couple of years, then decline starting in 2014 because the predicted rent growth would be well below that of income (see Exhibit 6.10). However, under the High Impact scenario, the supply gap would increase every year from 2012 to 2016. The gap in 2016 would be 5.8 percent higher without the government guarantee (High Impact scenario) than with it.

Exhibit 6.10: Forecasts of multifamily affordable rental housing supply gap for very low-income renters in tertiary markets, 2012-2016



Note: Detailed numbers are in Exhibit 7.21.

Source: Same as Exhibit 6.6.

In summary, our analysis showed that a persistent supply gap exists in the affordable rental market, and the gap is expected to remain high. The loss of the GSEs likely would exacerbate supply gaps across all market segments, with low- and very low-income renters bearing a disproportionate share of the rent burden.

7. References and Supplemental Exhibits

7.1. References

Chakrabarti, Ritashree, and Zhang, Junfu. (2010). "Unaffordable Housing and Local Employment Growth". Working Paper No. 10-3. Boston: New England Public Policy Center at the Federal Reserve Bank of Boston.

Chervachidze, S.; Costello, J.; Wheaton, W. (2009). "The Secular and Cyclic Determinants of Capitalization Rates: The Role of Property Fundamentals, Macroeconomic Factors, and Structural Changes." *The Journal of Portfolio Management, Special Real Estate Issue*.

DiPasquale, D., and Wheaton, W. (1992). "The cost of capital, tax reform, and the future of the rental housing market." *Journal of Urban Economics* 31, 337-359.

Hendershott, P. and Shilling, J. (1982). "The economics of tenure choice, 1955-1979." National Bureau of Economic Research, working paper series #543.

Joint Center for Housing Studies of Harvard University. (2011). "American's Rental Housing."

Lubell, Jeffrey, and Maya Brennan. (2007). "Framing the Issues — the Positive Impacts of Affordable Housing on Education." Washington, D.C: Center for Housing Policy.

Lubell, Jeffrey, Rosalyn Crain, and Rebecca Cohen. (2007). "Framing the Issues — the Positive Impacts of Affordable Housing on Health." Washington, D.C.: Center for Housing Policy.

U.S. Government Accountability Office. (2012). *Mortgage Financing: Fannie Mae and Freddie Mac's Multifamily Housing Activities Have Increased*. Washington, D.C.

7.2. Supplemental Exhibits

Exhibits that further support the findings of this study follow. These are referenced throughout the preceding sections of this study.

Exhibit 7.1: Annual multifamily mortgage debt origination in Atlanta: Freddie Mac vs. Private Conduits (CMBS)

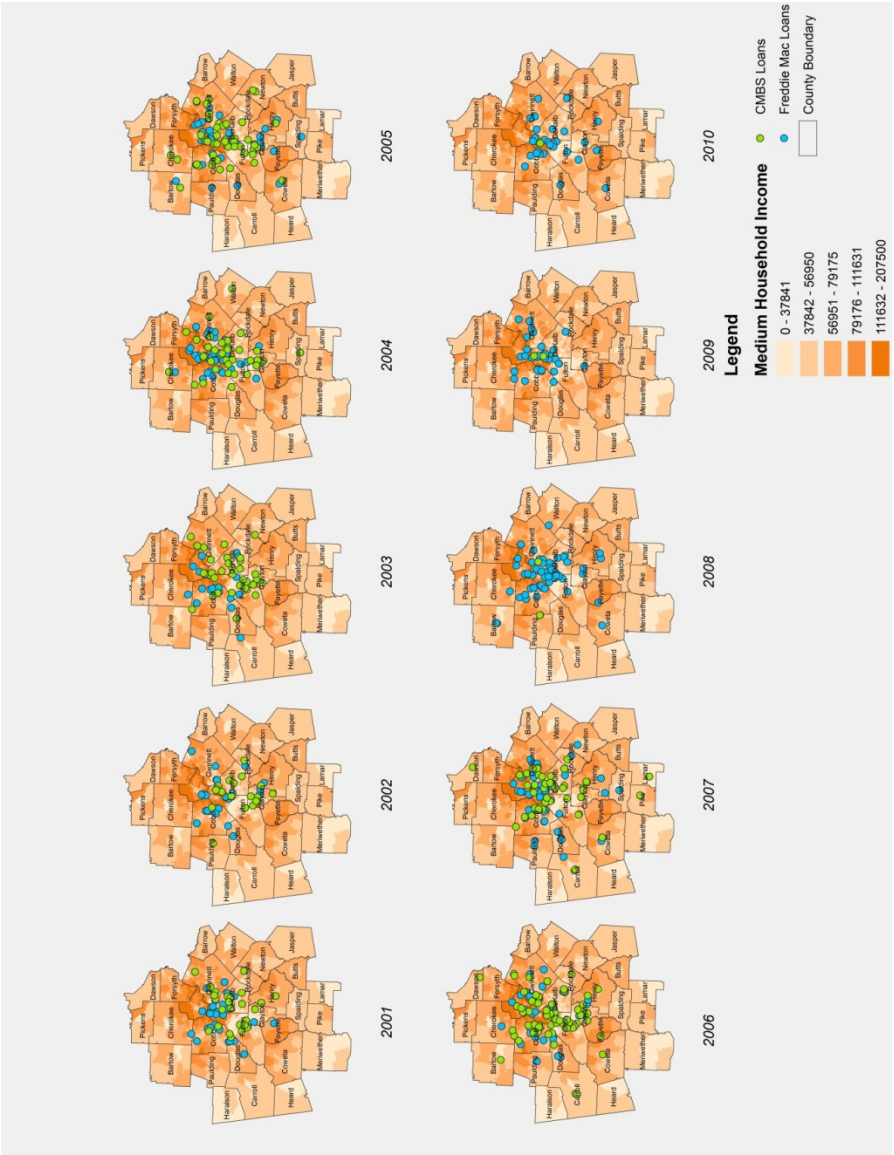


Exhibit 7.2: Summary origination characteristics of the U.S. non-agency commercial mortgage-backed securities market between 1985 and 2011

Year	No. of deals	Deal size, $ million							Percent
		Total	Office	Hotel	Retail	Industrial	Multifamily	Others	Multifamily
1985	3	564	564	0	0	0	0	0	0.0%
1986	4	1,553	638	0	0	0	165	750	10.6%
1987	22	2,633	1,452	33	82	0	389	677	14.8%
1988	47	2,645	14	162	294	0	524	1,650	19.8%
1989	48	4,727	2,355	107	713	14	130	1,409	2.7%
1990	32	4,119	1,214	65	1,425	64	94	1,256	2.3%
1991	49	7,176	715	89	472	57	3,078	2,764	42.9%
1992	47	13,005	546	0	860	0	3,339	8,260	25.7%
1993	104	14,185	352	51	2,482	205	2,948	8,146	20.8%
1994	71	11,572	1,724	298	3,626	874	3,136	1,915	27.1%
1995	60	13,488	2,392	1,270	3,779	989	3,904	1,152	28.9%
1996	73	23,280	3,782	2,895	7,571	2,097	6,449	486	27.7%
1997	64	34,913	8,256	4,154	11,895	2,125	7,866	618	22.5%
1998	66	71,327	16,173	9,718	20,595	5,081	16,165	3,595	22.7%
1999	82	51,973	11,245	6,598	16,259	4,020	11,388	2,463	21.9%
2000	80	44,973	14,424	4,000	12,798	3,764	7,766	2,221	17.3%
2001	95	65,077	23,566	5,371	20,001	4,262	10,386	1,491	16.0%
2002	69	50,833	14,595	1,361	16,633	5,233	9,275	3,736	18.2%
2003	96	75,973	21,466	5,870	28,642	4,806	12,482	2,707	16.4%
2004	92	90,907	28,777	8,716	30,065	5,755	13,291	4,302	14.6%
2005	100	167,446	52,877	20,741	48,875	9,793	26,941	8,219	16.1%
2006	102	197,126	57,953	30,789	54,849	11,965	28,575	12,995	14.5%
2007	86	226,489	78,179	32,964	50,637	15,842	36,020	12,847	15.9%
2008	11	15,911	5,093	3,597	4,196	923	1,482	620	9.3%
2009	23	6,882	954	164	1,132	129	268	4,236	3.9%
2010	45	18,027	1,840	2,151	4,151	1,117	1,157	7,611	6.4%
2011	49	32,488	7,189	4,403	13,317	1,550	3,555	2,475	10.9%

Sources: Commercial Mortgage Alert, Freddie Mac

Exhibit 7.3: Financial analysis of life insurance companies'/pension funds' take-up capacity

- Life insurers and pension funds have stable asset allocation to apartment lending, at about 5 to 10 percent of total commercial mortgage portfolio.
- Estimate of life insurers'/pension funds' multifamily origination volume is in the range of $12 billion to $17 billion per annum.
- For a 1 percent change in allocation to apartment loans by the top insurers, we estimate origination volume to change by $1.9 billion.
- If current industry-wide allocation to apartment loans is round 7 percent, then the potential short-term capacity could rise by 3 percent, or about $6 billion.
- If MetLife, Prudential, Genworth, AIG, ManuLife, and TIAA were to allocate 10 percent of commercial portfolio to apartments, then these six entities could contribute about $7 billion.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Life insurers & pensions, multifamily MDO, $ million	41,000	43,000	45,000	46,900	47,200	49,400	52,400	56,800	57,000	54,000	53,100	55,300
Life insurers & pensions, multifamily MDO, %total	10.7%	10.1%	9.7%	8.8%	8.1%	7.7%	7.7%	7.5%	7.0%	6.6%	6.6%	6.6%
Multifamily origination to total comm. debt origination						27.1%	24.1%	24.1%	36.8%	47.2%	43.0%	43.6%
Life insurers & pensions, total comm.originations, $ million						50,210	53,525	51,688	30,869	16,990	30,606	49,306
Life insurers & pensions, MF originations, $ million (est. @ 25%)						12,553	13,381	12,922	7,717	4,247	7,652	12,327
Life insurers & pensions, MF originations, $ million (est. @ 35%)						17,574	18,734	18,091	10,804	5,946	10,712	17,257
Percent apartment mortgage balance to total mortgage balance, $ million												
Life insurance companies:												
MetLife Inc.	..	..	8%	8%	8%	7%	7%	8%	7%	6%	5%	5%
Prudential Financial Inc.	19%	15%	16%	17%	15%	14%	13%	13%	12%	10%	10%	10%
Genworth Financial Inc.	..	..	..	8%	9%	9%	10%	10%	9%	9%	8%	8%
AIG Inc.	..	..	..	..	..	..	..	..	3%	4%	9%	9%
Manulife Financial Corp	..	..	..	..	..	..	..	..	..	6%	6%	..
Pension fund:												
TIAA-CREF	..	..	..	..	..	..	..	..	..	..	10%	10%

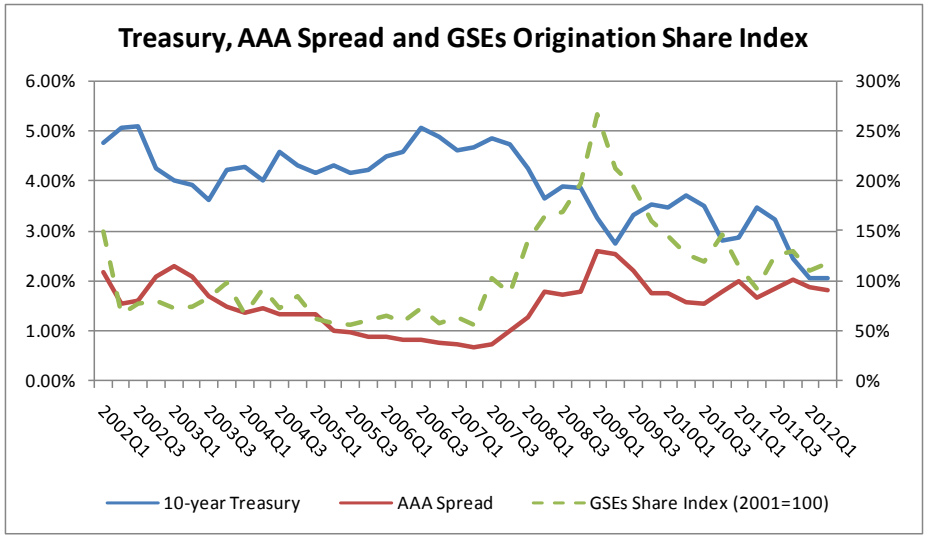
Sources: Company 10-K and annual reports, various years; MBA; Federal Reserve Flow of Funds; Bloomberg

Notes:

Excludes mortgages on foreign properties and agriculture mortgages

Manulife is a Canadian insurance company; mortgage portfolio includes Canadian properties (58%avg) and US properties (42%avg)

Exhibit 7.4: Input variables for the estimation of the impact of the loss of the GSEs on multifamily property cap rates and values



Statistics	All		Multifamily		Office		Retail	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Cap Rate	0.072	0.009	0.067	0.006	0.075	0.009	0.076	0.007
Income return 10-yr. moving average	0.019	0.002	0.017	0.002	0.019	0.002	0.019	0.001
Income return 10-yr. volatility	0.002	0.001	0.003	0.001	0.002	0.001	0.002	0.001
10-year Treasury rate	0.039	0.008						
AAA premium	0.015	0.005						
GSE share index (2001=1)	0.362	0.587	1.086	0.495	0.000	0.000	0.000	0.000
Origination Volume Index (2001=100)	158.732	95.027	131.562	47.709	136.688	96.981	207.945	110.065

Exhibit 7.5: Multifamily Starts Model data source and description

Variable	Description and Source
General data description	Quarterly data starting from 1995Q1 to 2012Q1. All data are at national level.
Multifamily starts	Multifamily housing starts for building with 5 and more units. Housing units in a multifamily building are defined as being started when excavation for the building has begun. Source: U.S. Census Bureau/Moody's Databuffet.
Investor cost of capital (ICC)	In-house calculated variable. Data source and detailed calculation will be provided to interested reviewers.
Construction cost	The engineering news record (ENR) construction cost index, calculated from wage rates and materials prices for the U.S. and applies to general construction cost, with a base period of 1913 = 100. Source: U.S. Bureau of Labor Statistics/Moody's Databuffet. Real values in 2011Q4 dollars are obtained using Consumer Price Index described below.
Multifamily rent	Average rent charged to multifamily tenants. Source: CBRE. Real values in 2011Q4 dollars are obtained using Consumer Price Index described below.
Vacancy rates	Average vacancy rates in multifamily properties. Source: CBRE.
Consumer Price Index (CPI)	Urban wage earner, all items less food and energy, with the base period 1982-84 = 100. Source: U.S. Bureau of Labor Statistics/Moody's Databuffet.

Exhibit 7.6: Multifamily Starts Model estimation: regression statistics and estimated coefficients

Regression Statistics	
Multiple R	0.926
R Square	0.858
Adjusted R Square	0.847
Observations	69

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.571	0.317	-1.801	0.076
Lag Starts	0.003	0.000	7.216	0.000
% Change in ICC relative to historical average	-0.866	0.235	-3.686	0.000
% Change in real construction cost	-2.714	1.264	-2.148	0.036
% Change in real rent	2.503	1.081	2.315	0.024
Vacancy	-0.073	0.043	-1.677	0.099

Exhibit 7.7: Multifamily Real Rent Model data source and description

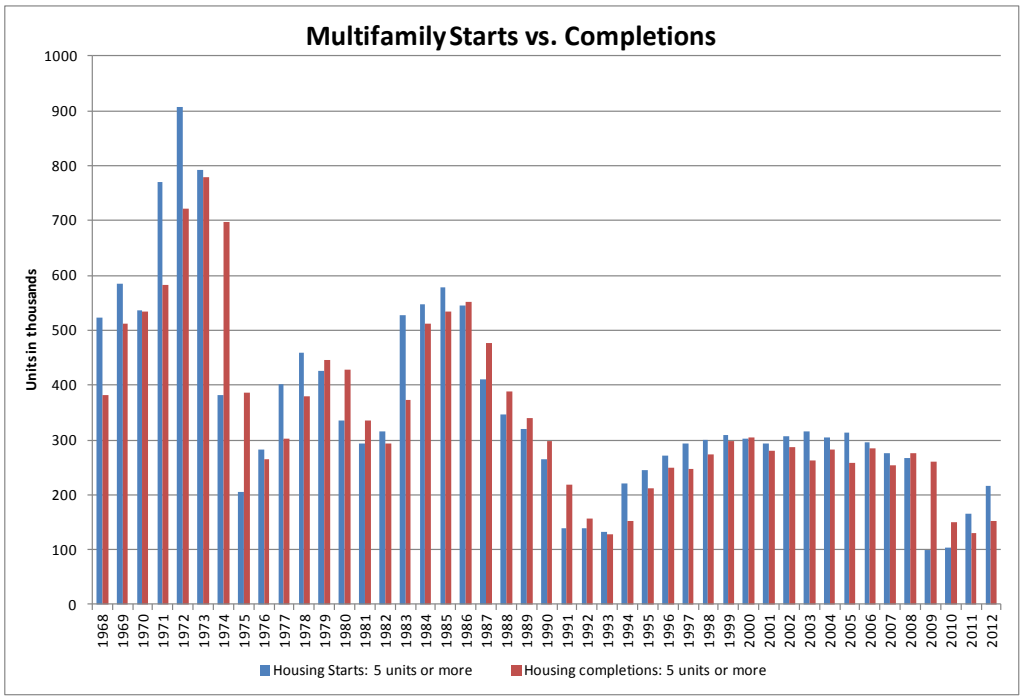
Variable	Description and Source
General data description	Quarterly data starting from 1995Q1 to 2011Q4. All data are at national level.
Multifamily rent	Average rent charged to multifamily tenants. Source: CBRE. Real values in 2011Q4 dollars are obtained using Consumer Price Index described below.
Multifamily completions	Multifamily housing completions for building with 5 and more units. In buildings with two or more housing units, all the units in the building are counted as completed when 50% or more of the units are occupied or available for occupancy. Source: U.S. Census Bureau/Moody's Databuffet.
Owner cost of capital (OCC)	In-house calculated variable. Data source and detailed calculation will be provided to interested reviewers.
Household income	Mean household income. Source: U.S. Census Bureau/Moody's Databuffet. Real values in 2011Q4 dollars are obtained using Consumer Price Index described below.
Nonfarm employment	Nonfarm employment. Source: U.S. Bureau of Labor Statistics/Moody's Databuffet.
Consumer Price Index (CPI)	Urban wage earner, all items less food and energy, with the base period 1982-84 = 100. Source: U.S. Bureau of Labor Statistics/Moody's Databuffet.

Exhibit 7.8: Multifamily Real Rent Model estimation: regression statistics and estimated coefficients

Regression Statistics	
Multiple R	0.787
R Square	0.619
Adjusted R Square	0.595
Observations	68

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.003	0.002	-1.593	0.116
% Change in mean real household income (annualized)	0.407	0.126	3.243	0.002
% Change in MA4 completions (Lag1)	-0.106	0.034	-3.095	0.003
% Change in OCC (Lag1)	0.103	0.038	2.702	0.009
% Change in Non-farm employment (annualized)	0.592	0.143	4.138	0.000

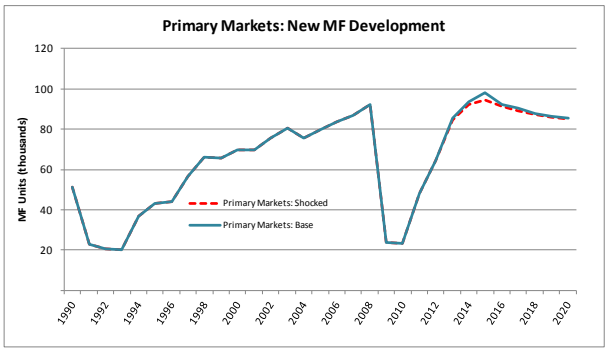
Exhibit 7.9: Multifamily starts (5+ units) versus completions (5+ units)

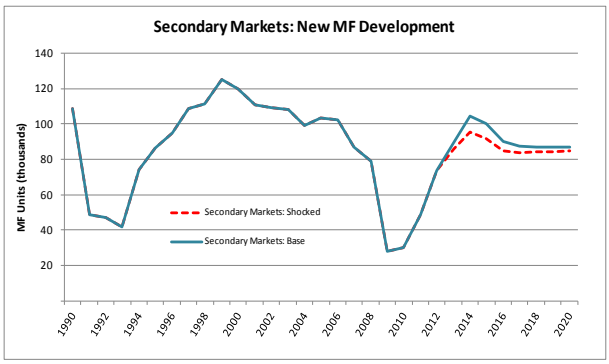


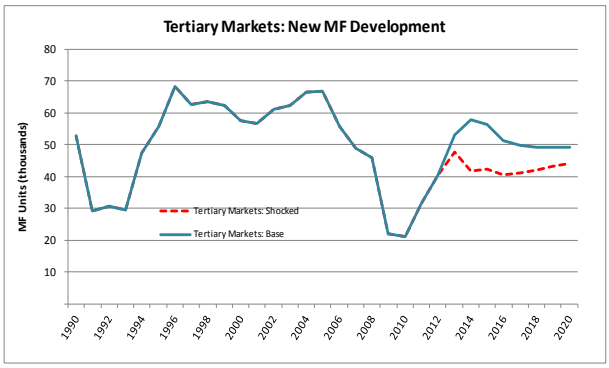
Source: U.S. Census Bureau; Moody's Economy.com; Freddie Mac

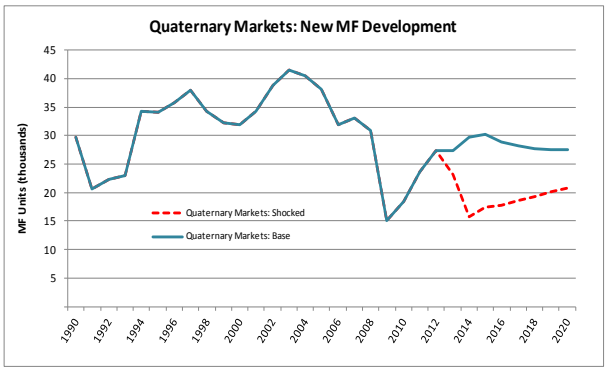
Exhibit 7.10: Multifamily starts and real rents by market sector

Multifamily Starts By Market Segment



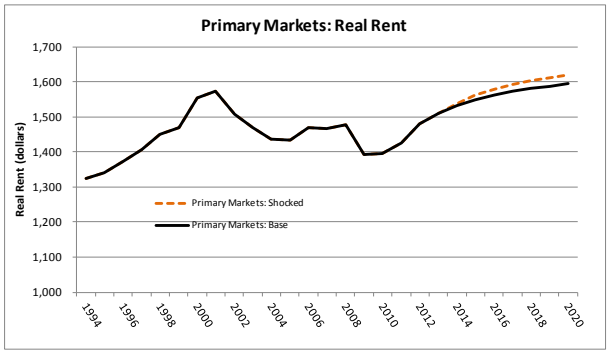


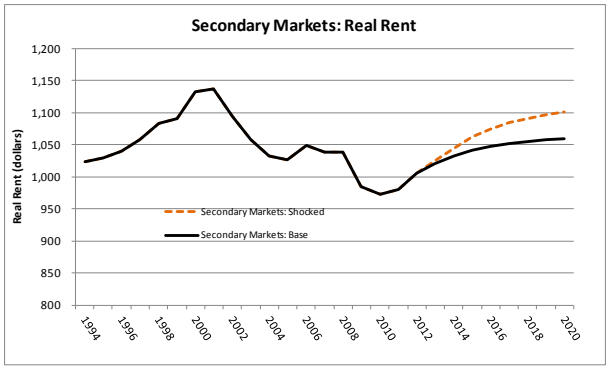


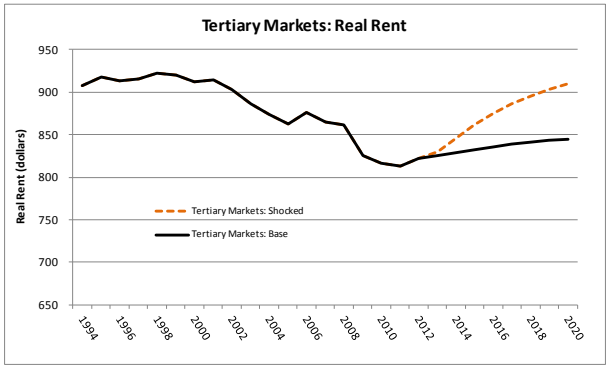


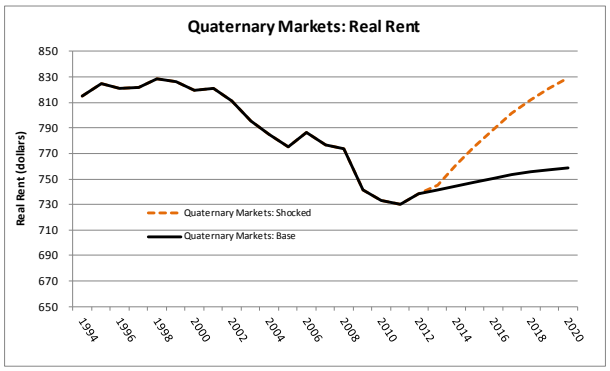
Sources: U.S. Census Bureau, Moody's Economy.com, Freddie Mac

Multifamily Real Rent by Market Segment









Sources: CBRE, Bureau of Labor Statistics, Moody's Economy.com, Freddie Mac

Exhibit 7.11: Example metropolitan areas in each market segment

Metropolitan Area	MF Stock as of 2010Q2 (thousand units)
Primary Markets (sample)	
New York, NY (5)	2,407
Washington, DC/MD/VA core	493
Houston, TX	479
Dallas, TX	381
Secondary Markets (sample)	
Philadelphia, PA/NJ/DE/MD	356
West Palm Beach, FL	192
Ft. Worth, TX	155
Charlotte, NC	122
Tertiary Markets (sample)	
Hartford, CT	121
Madison, WI	63
Wichita, KS	36
Boulder, CO	25
Quaternary Markets (sample)	
Binghamton, NY	23
Cedar Rapids, IA	16
Harrisonburg, VA	8
Sumter, SC	3

Note: The full list is available upon request.

Exhibit 7.12: Renters, affordable, available, and adequate units, and supply gaps, 2000-2011, single-family rentals included

	Very Low-income (50% of AMI)			Low-income (80% of AMI)		
Year	Renters	Affordable, Available, and Adequate Units	Supply Gap	Renters	Affordable, Available, and Adequate Units	Supply Gap
2000	11,127	5,728	5,399	17,758	15,406	2,352
2001	11,626	5,667	5,959	18,439	15,448	2,991
2002	11,949	5,915	6,034	18,646	15,698	2,948
2003	12,047	5,905	6,142	18,810	15,586	3,224
2004	12,313	5,725	6,588	19,237	15,703	3,534
2005	12,764	5,536	7,228	19,901	16,019	3,882
2006	12,639	5,568	7,071	19,834	15,972	3,862
2007	12,720	5,696	7,024	19,941	16,298	3,643
2008	12,948	5,597	7,351	20,296	16,244	4,052
2009	13,504	5,481	8,023	20,984	16,336	4,648
2010	13,820	5,196	8,624	21,474	15,847	5,628
2011	14,203	5,154	9,049	21,915	15,513	6,402

Note: Numbers are in thousands. Very low-income renters are renters with income up to 50 percent of AMI. Low-income renters have income up to 80 percent of AMI. The income thresholds for low- and very low-income renters are adjusted for household size based on HUD's adjusting ratios for income limit calculation. Affordable units have gross rents up to 30 percent of the household threshold of the category. Available units are vacant or rented by households with incomes more than the threshold for the category. Adequate units are in livable conditions and exclude units that lack full plumbing. Gross rent for vacant units is estimated at 1.15 times the asking rent following the JCHS report of "America's Rental Housing." Institutional group quarters are excluded.
Source: American Community Survey 2000-2011

Exhibit 7.13: Renters, affordable, available, and adequate units, and supply gaps, single-family rentals excluded

	Very Low-income (50% of AMI)			Low-income (80% of AMI)		
Year	Renters	Affordable, Available, and Adequate Units	Supply Gap	Renters	Affordable, Available, and Adequate Units	Supply Gap
2000	8,329	4,212	4,117	12,964	11,162	1,802
2001	8,671	4,113	4,558	13,447	11,240	2,206
2002	8,819	4,225	4,594	13,534	11,301	2,233
2003	8,748	4,102	4,646	13,437	10,949	2,488
2004	9,010	4,087	4,924	13,788	11,275	2,512
2005	9,453	4,096	5,357	14,463	11,877	2,586
2006	9,307	4,113	5,194	14,302	11,809	2,493
2007	9,310	4,230	5,080	14,312	12,067	2,245
2008	9,421	4,150	5,271	14,455	11,978	2,478
2009	9,754	4,040	5,713	14,824	11,971	2,853
2010	9,959	3,809	6,150	15,180	11,634	3,545
2011	10,211	3,757	6,455	15,420	11,267	4,153

Note and source: Same as Exhibit 7.12

Exhibit 7.14: Top 25 metropolitan areas with the highest gap-to-renter ratios for very low-income renters, average over 2005-2011, single-family rentals included

Area Name	Very Low-income (50% of AMI)				Low-income (80% of AMI)			
	Renters	Affordable, Available, and Adequate Units	Supply Gap	Gap /Renter Ratio	Renters	Affordable, Available, and Adequate Units	Supply Gap	Gap /Renter Ratio
Bryan-College Station, TX	13.4	1.4	12.0	89.8%	19.0	6.2	12.8	67.4%
Bloomington, IN	9.6	1.4	8.2	85.5%	13.3	5.3	7.9	59.9%
State College, PA	8.5	1.3	7.2	84.8%	12.9	5.9	7.0	54.6%
Champaign-Urbana-Rantoul, IL	13.6	2.5	11.1	81.8%	20.3	10.9	9.4	46.4%
Gainesville, FL	16.2	3.0	13.2	81.6%	23.2	9.6	13.6	58.7%
Chico, CA	10.8	2.0	8.8	81.4%	17.7	7.5	10.2	57.5%
Fort Lauderdale-Hollywood-Pompano Beach, FL	57.9	11.2	46.7	80.6%	96.0	42.3	53.7	56.0%
Orlando, FL	70.0	13.7	56.3	80.4%	125.0	67.4	57.5	46.1%
San Luis Obispo-Atascad-P Robles, CA	12.6	2.5	10.1	80.2%	20.9	9.5	11.4	54.5%
Orange County, CA	120.4	26.0	94.4	78.4%	194.3	111.6	82.7	42.6%
Lafayette-W. Lafayette, IN	12.0	2.6	9.4	78.4%	18.4	10.9	7.5	40.9%
Eugene-Springfield, OR	19.5	4.3	15.3	78.2%	29.9	15.9	14.0	46.9%
Iowa City, IA	9.1	2.0	7.1	78.0%	12.4	8.2	4.2	34.0%
Boulder-Longmont, CO	13.7	3.0	10.7	77.9%	20.7	12.6	8.1	39.2%
San Diego, CA	142.2	31.8	110.4	77.7%	230.6	128.0	102.6	44.5%
Los Angeles-Long Beach, CA	524.4	118.1	406.4	77.5%	832.0	433.2	398.8	47.9%
Sarasota, FL	19.8	4.6	15.1	76.6%	35.1	19.5	15.6	44.5%
Tallahassee, FL	20.2	4.7	15.5	76.5%	29.4	15.4	14.0	47.6%
Lubbock, TX	15.0	3.5	11.4	76.3%	22.9	14.3	8.6	37.4%
Medford, OR	8.7	2.1	6.6	76.3%	14.5	7.7	6.8	46.7%
Modesto, CA	21.9	5.2	16.7	76.3%	34.4	20.6	13.8	40.0%
Merced, CA	11.1	2.7	8.4	76.0%	18.1	11.8	6.3	34.8%
Tampa-St. Petersburg-Clearwater, FL	93.5	22.5	71.0	75.9%	160.1	90.6	69.5	43.4%
West Palm Beach-Boca Raton-Delray Beach, FL	40.0	9.8	30.2	75.5%	65.7	32.1	33.5	51.1%
Las Vegas, NV	76.3	18.9	57.4	75.2%	133.7	91.5	42.2	31.6%

Note: Renters, affordable, available and adequate units, and supply gaps are in thousands.

Source: American Community Survey 2005-2011

Exhibit 7.15: Top 25 metropolitan areas with highest gap-to-renter ratio for very low-income renters, average over 2005-2011, single-family rentals excluded

Area Name	Very Low-income (50% of AMI)				Low-income (80% of AMI)			
	Renters	Affordable, Available, and Adequate Units	Supply Gap	Gap /Renter Ratio	Renters	Affordable, Available, and Adequate Units	Supply Gap	Gap /Renter Ratio
Bryan-College Station, TX	10.7	0.9	9.8	92.0%	15.0	4.7	10.4	68.9%
State College, PA	7.7	1.0	6.8	87.7%	11.3	4.8	6.5	57.7%
Bloomington, IN	8.2	1.2	7.0	85.7%	11.0	4.3	6.6	60.5%
San Luis Obispo-Atascad-P Robles, CA	7.9	1.2	6.8	85.2%	12.1	5.8	6.3	51.9%
Flagstaff, AZ-UT	3.3	0.5	2.8	84.1%	5.4	2.5	2.9	53.8%
Gainesville, FL	12.9	2.1	10.9	84.0%	18.1	7.2	10.9	60.3%
Chico, CA	6.8	1.1	5.6	83.3%	10.6	4.4	6.3	59.0%
Orlando, FL	49.6	8.3	41.3	83.3%	88.7	50.8	37.8	42.7%
Champaign-Urbana-Rantoul, IL	11.1	2.0	9.1	82.1%	16.2	8.9	7.2	44.7%
Tallahassee, FL	13.9	2.5	11.3	81.8%	19.8	9.8	10.0	50.4%
Fort Lauderdale-Hollywood-Pompano Beach, FL	48.6	8.9	39.7	81.8%	80.3	35.7	44.6	55.6%
Lafayette-W. Lafayette, IN	10.0	2.0	7.9	79.6%	15.0	9.0	5.9	39.7%
Orange County, CA	101.8	21.2	80.7	79.2%	163.2	95.8	67.4	41.3%
San Diego, CA	112.5	23.8	88.7	78.9%	181.4	104.8	76.6	42.2%
Sarasota, FL	12.5	2.7	9.8	78.6%	22.0	13.1	8.9	40.4%
Auburn-Opelika, AL	5.5	1.2	4.3	78.4%	8.1	5.0	3.1	38.1%
Lubbock, TX	10.0	2.2	7.8	78.3%	14.7	9.6	5.1	34.9%
Eugene-Springfield, OR	14.8	3.2	11.5	78.0%	21.7	12.5	9.2	42.4%
Columbia, MO	8.0	1.8	6.2	77.5%	12.1	8.5	3.6	29.9%
Merced, CA	5.7	1.3	4.4	77.3%	9.1	6.8	2.2	24.7%
Boulder-Longmont, CO	11.4	2.6	8.8	77.3%	16.6	10.7	5.9	35.6%
Iowa City, IA	8.2	1.9	6.3	77.2%	11.2	7.6	3.5	31.7%
Los Angeles-Long Beach, CA	420.4	96.0	324.4	77.2%	657.2	349.5	307.7	46.8%
Tyler, TX	4.4	1.0	3.4	77.1%	6.9	4.4	2.6	36.8%
West Palm Beach-Boca Raton-Delray Beach, FL	31.3	7.3	24.0	76.6%	51.6	24.9	26.7	51.8%

Note: Renters, affordable, available and adequate units, and supply gaps are in thousands.
Source: American Community Survey 2005-2011

Exhibit 7.16: Predicted growth rates of input variables for the forecasts of affordable housing supply gap, 2012-2016

Year	Median Household Income	Renter Household	National Rent Growth	Rent Growth by Market Baseline			Rent Growth by Market Low Impact Scenario			Rent Growth by Market High Impact Scenario		
				Primary Market	Secondary Market	Tertiary Market	Primary Market	Secondary Market	Tertiary Market	Primary Market	Secondary Market	Tertiary Market
2012	2.05%	2.99%	4.30%	5.28%	4.03%	2.56%	5.28%	4.03%	2.56%	5.28%	4.03%	2.56%
2013	2.54%	0.90%	2.90%	3.49%	2.98%	1.78%	3.49%	3.09%	2.02%	3.65%	3.40%	2.34%
2014	3.82%	0.32%	3.60%	3.95%	3.55%	2.83%	3.95%	3.77%	3.52%	4.18%	4.41%	4.46%
2015	3.95%	0.25%	3.50%	3.73%	3.46%	3.05%	3.73%	3.67%	3.67%	4.29%	4.29%	4.50%
2016	3.68%	0.65%	2.90%	3.14%	2.90%	2.72%	3.14%	3.04%	3.24%	3.31%	3.47%	3.93%

Note: Variables are nominal.

Source: The predicted growth rates of median household income and renter households are provided by Moody's. The baseline rent growth rates are predicted by CBRE. Rent growth rates under Low and High Impact scenarios are predicted by Freddie Mac as in Section 5.

Exhibit 7.17: Forecasts of affordable rental housing supply gap, 2012-2016, single-family rental included

Year	Very Low-income (50% of AMI)			Low-income (80% of AMI)		
	Baseline	Low Impact Scenario	High Impact Scenario	Baseline	Low Impact Scenario	High Impact Scenario
2012	9,445	9,445	9,445	6,950	6,950	6,950
2013	9,515	9,524	9,555	6,986	7,011	7,095
2014	9,490	9,545	9,622	6,866	7,007	7,245
2015	9,462	9,551	9,720	6,722	6,959	7,383
2016	9,448	9,560	9,779	6,561	6,893	7,423

Note: Numbers are in thousands. The predicted growth rates of median household income, renter households, and rent are included in Exhibit 7.16.

Source: American Community Survey 2011, Moody's forecasts of median household income and renter households 2012-2016, CBRE's forecasts of rent growth 2012-2016 (Baseline scenario), Freddie Mac's prediction of rent growth without government guarantees, 2012-2016 (Low Impact and High Impact scenarios).

Exhibit 7.18: Forecasts of affordable rental housing supply gap, 2012-2016, single-family rental excluded

	Very Low-income (50% of AMI)			Low-income (80% of AMI)		
Year	Baseline	Low Impact Scenario	High Impact Scenario	Baseline	Low Impact Scenario	High Impact Scenario
2012	6,752	6,752	6,752	4,564	4,564	4,564
2013	6,804	6,811	6,837	4,595	4,614	4,674
2014	6,787	6,826	6,886	4,512	4,609	4,781
2015	6,770	6,831	6,951	4,411	4,573	4,881
2016	6,756	6,834	6,991	4,293	4,519	4,900

Note and source: Same as Exhibit 7.17

Exhibit 7.19: Forecasts of multifamily affordable rental housing supply gap in primary markets, 2012-2016

	Supply Gap for Very Low-income Renters (50% of AMI)						Supply Gap for Low-income Renters (80% of AMI)					
	Baseline		Scenario 1		Scenario 3		Baseline		Scenario 1		Scenario 3	
Year	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio
2012	1,746	68.3%	1,746	68.3%	1,746	68.3%	1,510	39.3%	1,510	39.3%	1,510	39.3%
2013	1,771	68.7%	1,771	68.7%	1,775	68.8%	1,553	40.1%	1,553	40.1%	1,557	40.2%
2014	1,781	68.8%	1,781	68.8%	1,786	69.0%	1,561	40.1%	1,561	40.1%	1,587	40.8%
2015	1,779	68.6%	1,779	68.6%	1,800	69.4%	1,558	40.0%	1,558	40.0%	1,599	41.0%
2016	1,786	68.4%	1,786	68.4%	1,802	69.0%	1,551	39.5%	1,551	39.5%	1,596	40.7%

Note and source: Same as Exhibit 7.17

Exhibit 7.20: Forecasts of multifamily affordable rental housing supply gap in secondary markets, 2012-2016

	Supply Gap for Very Low-income Renters (50% of AMI)						Supply Gap for Low-income Renters (80% of AMI)					
	Baseline		Scenario 1		Scenario 3		Baseline		Scenario 1		Scenario 3	
Year	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio
2012	2,065	68.6%	2,065	68.6%	2,065	68.6%	1,381	30.2%	1,381	30.2%	1,381	30.2%
2013	2,088	68.8%	2,090	68.9%	2,101	69.2%	1,415	30.6%	1,421	30.8%	1,437	31.1%
2014	2,091	68.7%	2,094	68.8%	2,116	69.5%	1,408	30.4%	1,422	30.7%	1,468	31.7%
2015	2,089	68.4%	2,099	68.8%	2,128	69.7%	1,384	29.8%	1,413	30.4%	1,499	32.3%
2016	2,088	68.0%	2,099	68.3%	2,141	69.7%	1,344	28.7%	1,385	29.6%	1,496	32.0%

Note and source: Same as Exhibit 7.17

Exhibit 7.21: Forecasts of multifamily affordable rental housing supply gap in tertiary markets, 2012-2016

	Supply Gap for Very Low-income Renters (50% of AMI)						Supply Gap for Low-income Renters (80% of AMI)					
	Baseline		Scenario 1		Scenario 3		Baseline		Scenario 1		Scenario 3	
Year	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio	Gap	Gap /Renter Ratio
2012	2,940	59.3%	2,940	59.3%	2,940	59.3%	1,673	22.4%	1,673	22.4%	1,673	22.4%
2013	2,945	58.9%	2,951	59.0%	2,961	59.2%	1,627	21.6%	1,640	21.8%	1,680	22.3%
2014	2,915	58.2%	2,951	58.9%	2,984	59.5%	1,543	20.4%	1,626	21.5%	1,726	22.9%
2015	2,901	57.7%	2,952	58.7%	3,022	60.1%	1,469	19.4%	1,602	21.2%	1,783	23.5%
2016	2,882	57.0%	2,949	58.3%	3,048	60.3%	1,398	18.3%	1,582	20.8%	1,809	23.7%

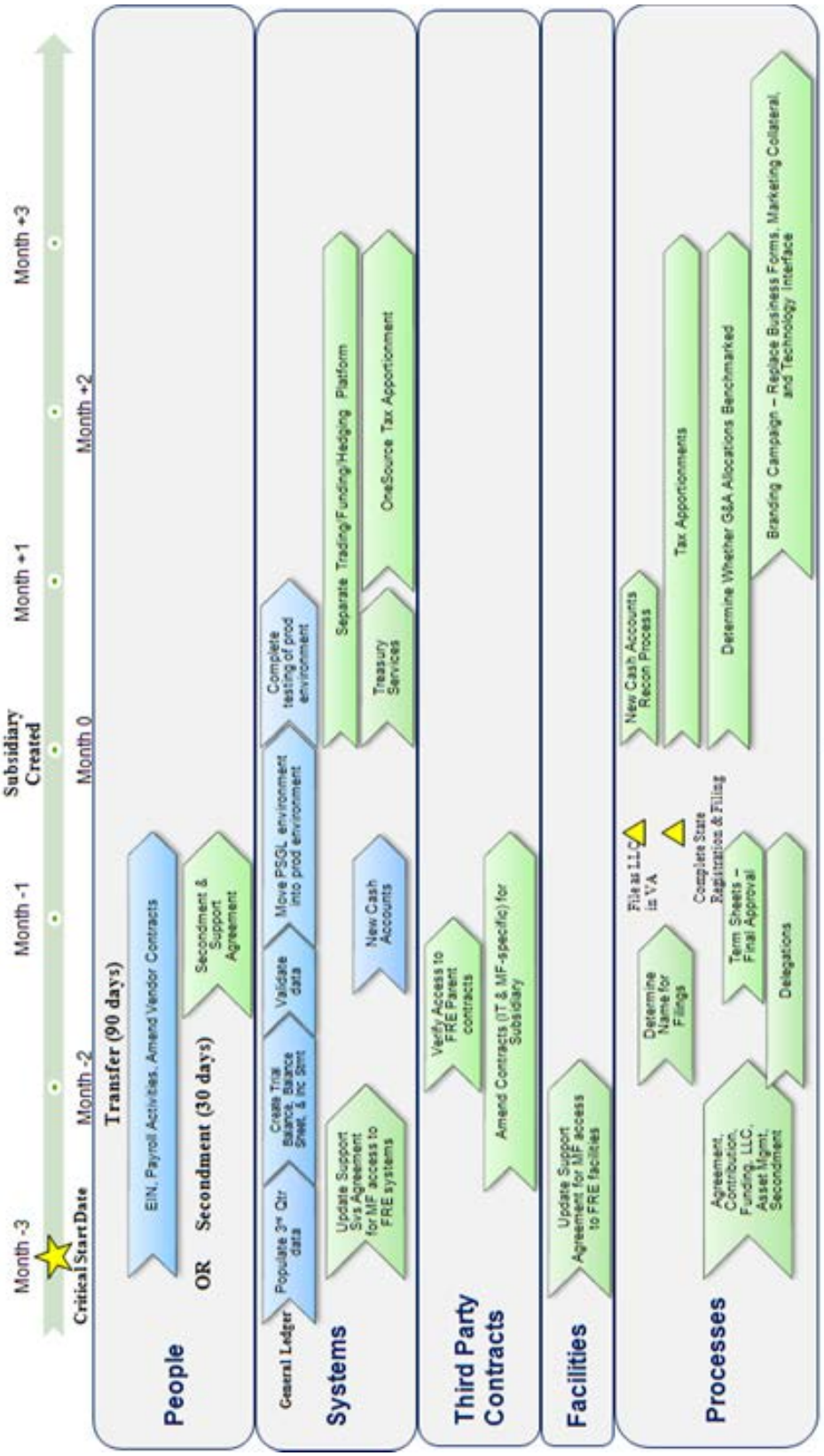
Note and source: Same as Exhibit 7.17

APPENDIX III: OPERATIONAL ANALYSIS

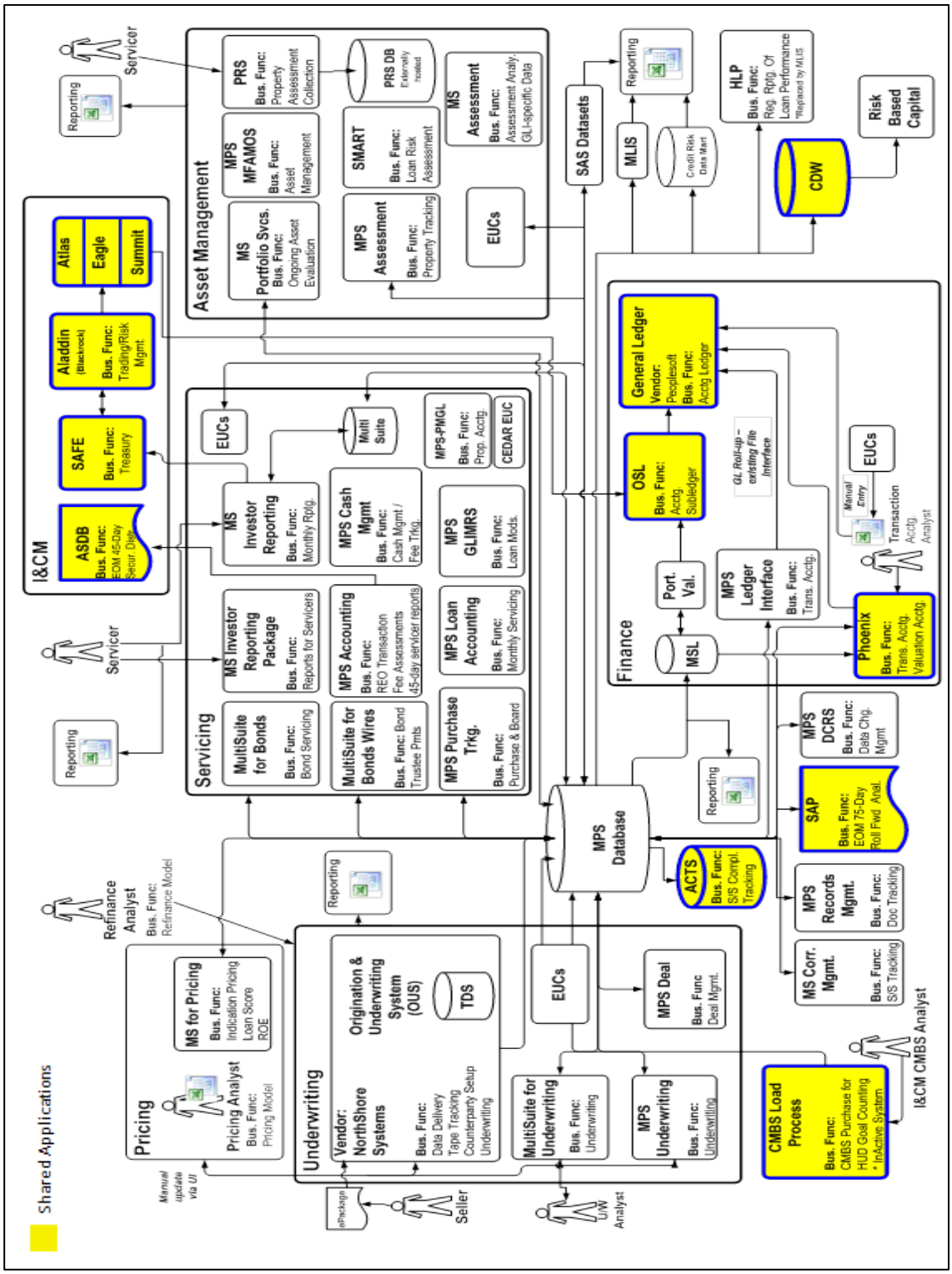
Additional information related to Section 5, Operational Analysis, of Freddie Mac's "Report to the Federal Housing Finance Agency: Housing Finance Reform in the Multifamily Mortgage Market" appears in this appendix.

Contents:

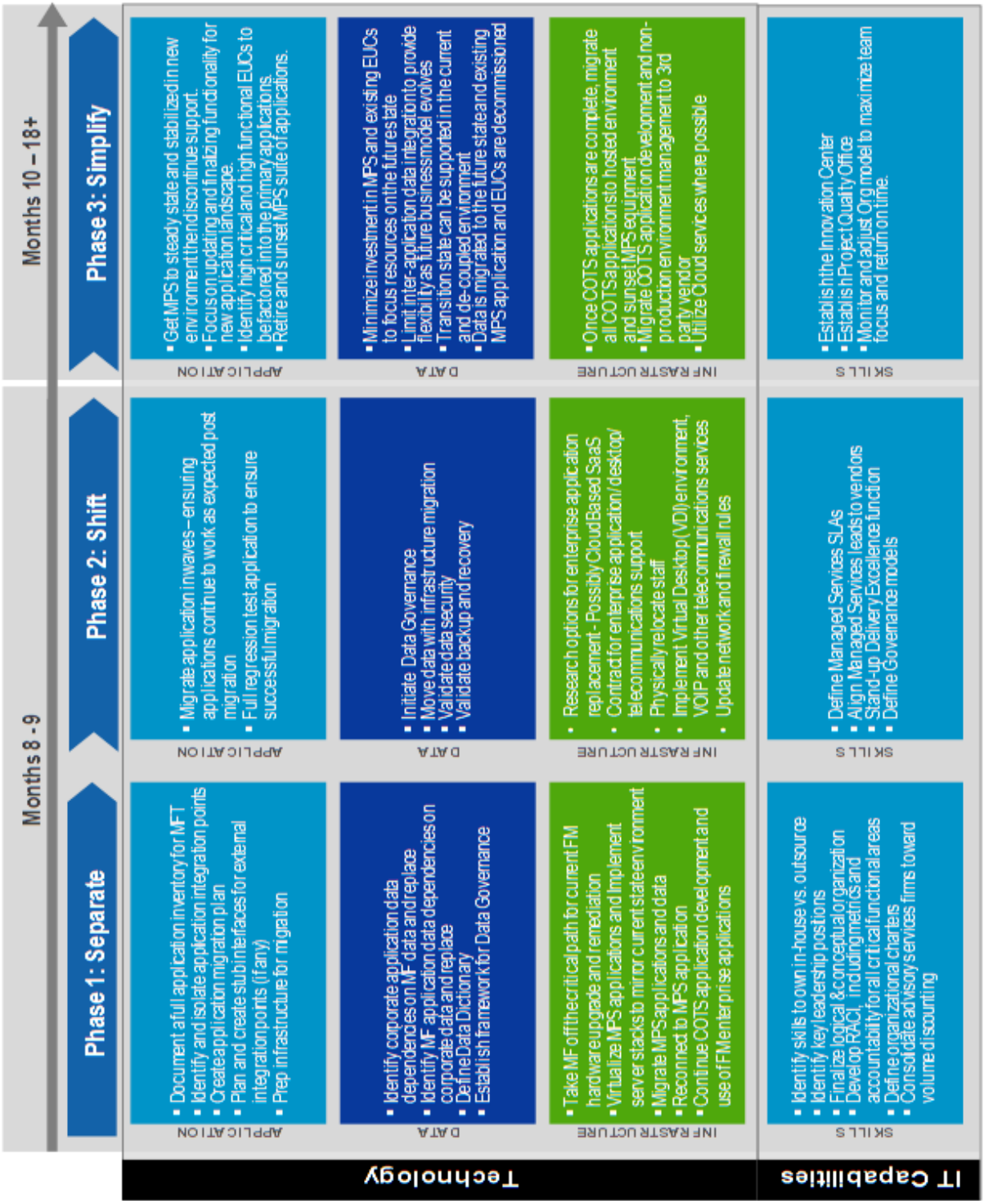
a. Asset Isolation Timeline



b. Current-state Systems and Application Overview



c. Technology Phase Road Map



d. Operational Separation Road Map