Marketing Material

May 2019 / Research Report

FREDDIE MAC K-DEAL PRIMER

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1 / Executive Summary

K-Deal History and Structure

The Federal Home Loan Mortgage Corporation, or Freddie Mac, was created in 1970 to expand the secondary market for mortgages, with a mission statement to provide liquidity, stability, and affordability for the U.S. housing market. Beginning in 2008, Freddie Mac shifted its multifamily model from an investment platform to a securitization business with a goal to reduce taxpayers' exposure to credit risk. In 2009, Freddie Mac took a big step toward bringing this program to the market when it launched the first Structure Pass-Through Certificate (K-Deal). The Freddie K-Series, or K-Deal, is a securitization program sponsored by the Freddie Mac (or "Freddie") that was created to privatize multifamily loan holdings and shift the systematic credit risk from the taxpayers to the private sector. The structure frequently referred to as "Agency" Commercial Mortgage Backed Security (CMBS) is similar to traditional CMBS, but offers additional transparency via Freddie Mac and includes a guarantee by Freddie Mac on the most senior tranche.

Structure, diversification, and issuance: Freddie Mac first underwrites and purchases loans that back multifamily properties via a network of Seller Servicers designated to underwrite in accordance with Freddie's rigid underwriting standards. Groups of 60 or 70 of these loans are pooled together into securities that are comprised of multiple classes of bonds catered towards investors with differing appetites for risk. Freddie Mac has completed 266 of these deals that are backed by 15,109 loans, amounting to a combined $292 billion in issuance since the program's inception in 2009.[1]

Historical credit performance: The percentage of Freddie Mac's multifamily loan portfolio that has defaulted has been minimal, peaking at 1.6% in 2006, and only breaching 1.0% of loans three times since 1994. Since 2014, the percentage of loans in default has been zero. Aggregate losses in Freddie Mac's origination history have averaged just five basis points (bps) per year dating back to 1994, with peak individual year losses of 44 bps for the 2006 vintage.[2]

Range of return by tranche: Though no assurance that desired results will be achieved, we estimate that the internal rate of return (IRR) of the guaranteed senior portion of the capital structure over the life of the investment ranges between 3.25% – 3.50%, the mezzanine piece from 4.90% – 5.15%, and the first loss position (after the underlying loan sponsor's equity cushion), or the B-piece, from 7.50% – 10%.[3,4]

B-Piece Strategy and Characteristics

The B-piece is the most subordinated tranche of debt in seniority within a K-Deal, but offers the potential for the highest total return. We believe that the implied, albeit minimal, default and loss risk is largely mitigated by the equity cushion and Freddie Mac's disciplined underwriting standards, reinforcing the outsized IRRs even in times of distress.

[1] Freddie Mac, https://mf.freddiemac.com/docs/mf_securitization_investor-presentation.pdf. As of December 2018.
[2] Freddie Mac. As of December 2018.
[3] Freddie Mac, DWS Estimates. As of December 2018.
[4] On a spread basis using 10-year swaps (S), the senior portion is offering approximately S + 55 to S + 80, mezzanine piece roughly S + 220 to S + 245, and the B-piece approximately S + 480 to S + 730. Bloomberg, Freddie Mac. As of December 2018.

Current investment universe: In order to participate in the exclusive offering of the B-piece, a buyer must be pre-approved by Freddie Mac as a Directing Certificate Holder (DCH), which requires extensive qualifications. These include extensive experience in owning and operating multifamily properties, a history of relevant experience as a fixed income investor, history and relevant experience as a subordinated debt investor and a reputation of acting as patient, recurring capital, among other strict qualifications. We believe this limits the competing demand for Freddie K B-Pieces, with only 17 unique buyers in 2018, of which the top 10 comprised 84% of total volume.[5] On top of this, due diligence is extensive. Participants need to abet the underlying loans and walk the 60 to 70 portfolio properties, which typically takes at least 45+ days per deal.

Strong returns relative to other alternative investments: Freddie K B-Pieces may produce IRRs in the 7.50% – 10% range, depending on: collateral type, structure, and capital market cycle. K-Deals have historically offered a premium relative to many other fixed income instruments, including subordinated real estate debt, non-agency CMBS, and investment-grade corporate bonds.[6,7] Additionally, we believe current K-Deals may also offer premium returns relative to public and private equity today.

Historically low delinquency rates: Compared to other securitizations such as the multifamily CMBS market, Freddie Mac has exhibited significantly lower delinquency rates. Multifamily CMBS delinquency rates were roughly 190 bps in December 2018 versus Freddie Mac's one basis point.[8] Furthermore, at the height of delinquencies following the inception of the K-Deal program, multifamily non-agency CMBS delinquency rates breached 1,500 bps, while Freddie Mac's never topped 40 bps.[9]

Borrower experience: A key area of focus of Freddie Mac's origination and servicing platform is centered on each underlying borrower's experience with the lender, which is a common issue in non-agency CMBS. The loan product created by Freddie is very competitively priced and structured. Once closed, the seller servicer and bondholders are expected to provide timely service and responsiveness to requests. In exchange, Freddie opts to lend only to strong borrowers with good credit and a history of good behavior as owners / operators. While intangible and difficult to measure, the net benefit of this underwriting / servicing mentality is lower default rates from borrowers wishing to protect their good-standing with Freddie Mac.

Equity cushion and underwriting standards abet attractive return profile: Detachment loan-to-value (LTV) through the B-piece is typically 70%, meaning there is roughly 30% equity cushion provided by experienced multifamily owner-operators. As Freddie K pooled loans are not cross-collateralized, this means that an individual asset would need to see more than a 30% drop in value before the B-piece would incur possible losses.[10] To put this in perspective, at the height of the Global Financial Crisis (GFC), average apartment property values fell 32% from peak-to-trough.[11]

Limited binary risk: Given the nature of the underlying collateral comprised purely of multifamily properties, agency CMBS tends to have fewer binary risks relative to non-agency CMBS. For example, non-agency, conduit CMBS is exposed to lodging (12.3%) and unanchored retail (5.9%), as well as regional malls and single tenant properties (within Office, Industrial and Retail). These sectors would expect to have very low recovery rates in an event of default.[12] Comparatively, multifamily has a diverse group of tenants with varying maturities and tend to have predictable recovery rates (74% from 1994-2018).[13]

[5] Freddie Mac. As of December 2018.
[6] Freddie Mac; Giliberto-Levy; Bloomberg. As of December 2018.
[7] On a spread basis using 10-year swaps (S) the B-piece offers approximately S + 480 to S + 730. Sources: Bloomberg, Freddie Mac. As of December 2018.
[8] Moody's Investors Service: Moody's Delinquency Tracker; Freddie Mac. As of December 2018.
[9] Moody's Investors Service: Moody's Delinquency Tracker; Freddie Mac. As of December 2018.
[10] Freddie Mac; DWS Estimates. As of December 2018.
[11] Real Capital Analytics (Commerical Property Price Index). As of December 2018.
[12] Bloomberg. As of February 2019.
[13] Freddie Mac. As of December 2018.

The opinions and forecasts contained herein sets forth our views as of this date of this report. The underlying assumptions and these views are subject to change without notice. Past performance may not be indicative of future results. Hypothetical performance results have many inherent limitations, some of which are described herein. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

Investment forecast: While returns described herein contemplate a hold-to-maturity assumption of 3 to 15 years (depending on transaction type), other hold or financing scenarios may offer the potential to generate enhanced returns or to de-risk via sale or re-finance once the underlying loan pool performance is more seasoned.

Pool formation: During the allotted due diligence period, the DCH could influence the eventual pool of collateral. This process includes the ability to remove loans with the following characteristics: elevated repayment risk, exposure to binary market drivers (i.e. student or single employer markets), and disproportionate exposure to a certain market(s) or property sub-types.

Apartment Market Outlook

Constructive U.S. environment: Since the financial crisis, rentals have surged, driven by affordability concerns and lifestyle choices, both of which continue to help sustain the preference for renting over owning. More recently, rising home prices and mortgage rates, coupled with the lack of new supply (particularly starter homes), have tilted the affordability scales in favor of rentals. Over the near term, elevated supply is expected to continue putting modest upward pressure on vacancy and cause rent growth to moderate. However, receding construction starts point to a re-balancing of supply and demand in one to two years, leaving vacancy rates and rent growth in line with their 20-year historic averages of 5.0% and 2.8%, respectively.[14]

Workforce housing fundamentals portend stability: Combining the workforce housing supply and demand dynamics, we believe the outlook for workforce housing is stable, at minimum. Continued rent-to-income pressure in the workforce population should be offset by rising mortgage rates, while tight supply in the affordable market should buoy occupancy across the Class B and C property types. These fundamentals support continued health across the workforce housing segment, which in turn should support the concentrated affordable housing positions of each K-Deal.

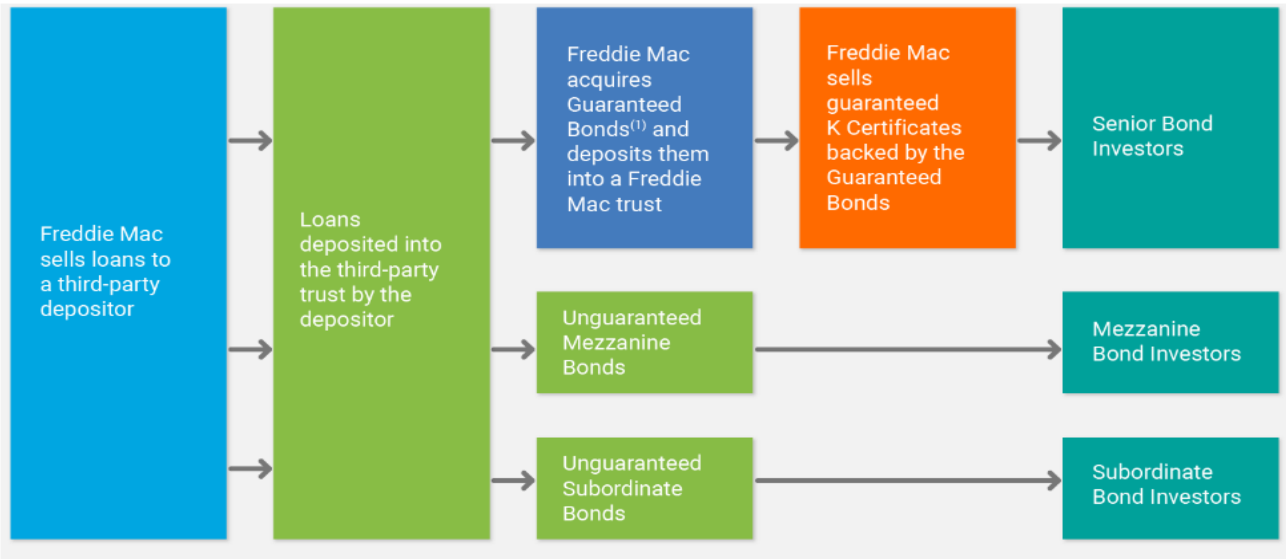
[14] CBRE-EA; Axiometrics. As of December 2018. The opinions and forecasts contained herein sets forth our views as of this date of this report. The underlying assumptions and these views are subject to change without notice. Past performance may not be indicative of future results. Hypothetical performance results have many inherent limitations, some of which are described herein. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

2 / K-Deal History and Structure

How it started: Beginning in 2008, Freddie Mac shifted its multifamily model from an investment platform to a securitization business with a goal to reduce taxpayers' exposure to credit risk. In short, the K-Series program was designed to purchase loans, assemble them into diversified pools, and sell them in securitized vehicles. These securitizations are backed by newly acquired mortgages underwritten to Freddie Mac's industry-leading standards. Underwriting and credit reviews are completed by Freddie Mac, and securitized loans are held to the same standards as loans retained in its own investment portfolio. In 2009, Freddie Mac took a big step toward bringing this program to the market when it launched the first Structure Pass-Through Certificate (K-Deal). Since then, Freddie K has completed 266 of these deals that backed 15,109 loans, amounting to a combined $292 billion in issuance. As of year-end 2018, approximately 94% of Freddie Mac's multifamily mortgage purchases were intended for securitization.[15]

How it works: To create a Freddie Mac K-Certificate or more colloquially, a K-Deal, Freddie Mac first underwrites and purchases loans that back multifamily properties varying in geography and quality on the secondary market. It then takes these loans and pools them into securities that are comprised of two classes of bonds: guaranteed senior and unguaranteed mezzanine and subordinated debt. In an effort to create liquidity in the multifamily space, the most senior bonds (Class A) of the Freddie K-Series securitization are fully guaranteed by the U.S. government. The most junior component of the pool (not guaranteed) is sold on a non-competitive rotational basis to institutional investors that have been pre-screened by Freddie as an eligible controlling class shareholder.

EXHIBIT 1: K CERTIFICATES GENERAL STRUCTURE



(1) Guaranteed Bonds include senior amortizing bonds as well as interest only bonds off senior and subordinate P&I bonds.

Source: Freddie Mac. As of December 2018.

Frequency of offerings and investor participation: Since the beginning of the program in June 2009, the 266 deals to date would correspond to over two deals per month. However, the pace of issuance has picked up recently. In September 2018 alone, there were four deals for approximately $3.8 billion. October dropped off slightly with just three issuances for $3.6 billion, while activity picked up for the balance of the year as November and December saw five and eight deals, for $5.4 billion and $7.3 billion, respectively.[16] Since the K-Deal program's inception in 2009, there have been 524 investors overall

[15] Freddie Mac, https://mf.freddiemac.com/docs/mf_securitization_investor-presentation.pdf. As of December 2018.
[16] Freddie Mac. As of December 2018.

(guaranteed and non-guaranteed classes), with 161 participating in deals through the first half of 2018, and roughly 30 different accounts on average per transaction through June 2018. However, subordinated pieces have seen much less participation and competition due to the requirement that a buyer qualify as a Directing Certificate Holder (DCH). There have been just 48 subordinated investors since inception and only 17 in 2018.[17]

Distribution of pricing and returns across tranches: With several different tranches of each K-Deal, there are a variety of ways to invest in the structure that fits the required return profile for a multitude of investors. Starting with the guaranteed bonds, the senior tranche usually garners the heaviest weight of the securitization and is guaranteed by Freddie Mac (and implicitly the U.S. government). The senior piece is often seen as the way Freddie monetizes these deals, as the bonds are issued at a slight premium to par. We estimate that the IRR over the life of the investment ranges from 3.25% – 3.5%. Moving to the mezzanine bonds, these vehicles are not guaranteed by Freddie Mac, and as such garner a slightly higher coupon and are issued at a slight discount to par. We estimate the gross IRR of the mezzanine piece to be about 4.90% – 5.15%. Finally, the first loss position after the equity cushion, or the B-piece, is often issued at a heavy discount to par (usually 35% – 40%), and we estimate that the investment results in a gross IRR of 7.50% – 10%[18,19]

EXHIBIT 2: HYPOTHETICAL STRUCTURE SAMPLE FREDDIE CAPITAL STACK

	CREDIT RATING	TRANCHE	WAL	LAST $ EXPOSURE	ATTACH – DETACH POINTS	EST. GROSS IRR	OID
SENIOR GUARANTEED BONDS	AAA AA A	$1,200M	6.5 – 10	$63K/UNIT	0% – 63%	3.25% – 3.50%	102-103
MEZZANINE BONDS	NR/BBB	$33M	10	$65K/UNIT	63% – 65%	4.90% – 5.15%	92-93
B-PIECE – CONTROLLING CLASS	NR	$100M	10	$70K/UNIT	65% – 70%	7.50% – 10.00%	35-40
SPONSOR EQUITY CUSHION	NR	$270M	10	$100K/UNIT	70% – 100%	13.0% – 15.0% (LEVERED)	N/A

Note: WAL stands for Weighted Average Life. OID stands for Original Issue Discount. IRR stands for Internal Rate of Return.
For illustrative purposes only.
Sources: DWS, Freddie Mac. As of December 2018. Hypothetical performance results have many inherent limitations, some of which are described herein. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

Call protection: Freddie Mac K-Deals include additional features, such as strong call protection. Generally, deals include two pieces: a lockout period usually within the initial 24 to 30 months after securitization, and a lengthy defeasance period

[17] Freddie Mac, https://mf.freddiemac.com/docs/mf_securitization_investor-presentation.pdf. As of December 2018.
[18] DWS Estimates assuming new issue pricing and hold-to-maturity strategy; Freddie Mac. As of September 2018.
[19] On a spread basis using 10-year swaps (S), the senior portion is offering approximately S + 55 to S + 80, mezzanine piece roughly S + 220 to S + 245, and the B-piece approximately S + 480 to S + 730. Sources: Bloomberg; Freddie Mac. As of December 2018.

thereafter (ending roughly four months prior to the maturity date). Furthermore, roughly 6% of loans include yield maintenance penalties rather than the aforementioned defeasance.[20] Though less common, percentage penalty premium is also used as a call protection mechanism.

Freddie Mac mortgage underwriting guidelines: Freddie Mac has relatively stringent guidelines when it comes to purchasing mortgages on the secondary market. To be considered for a K-Deal securitization, a loan must have the following properties:

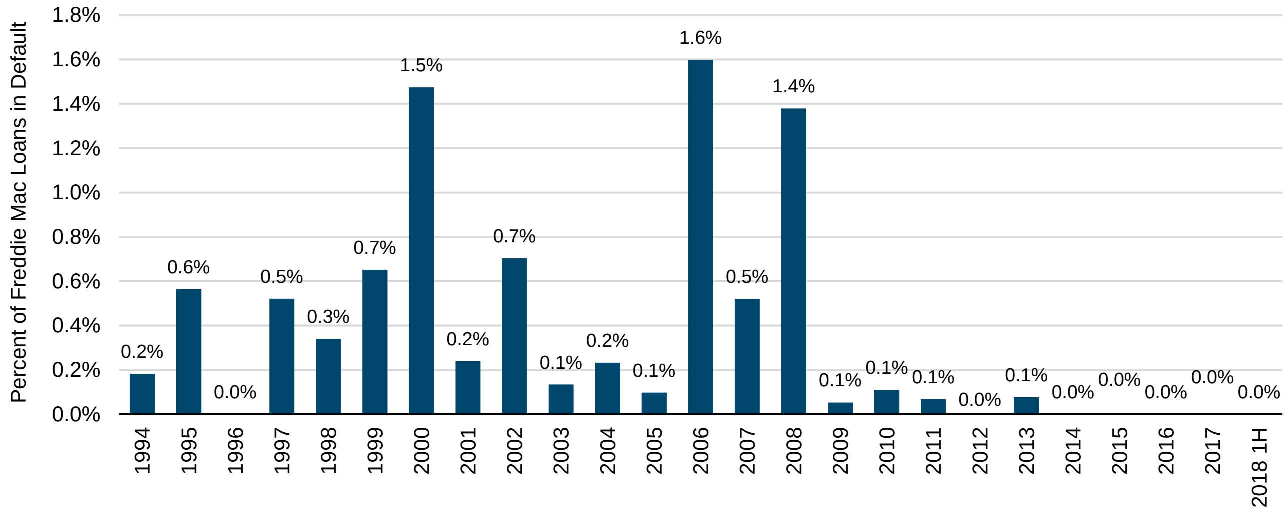
- **Property type**: Origination requirements are focused on loans secured by occupied, stabilized, and completed multifamily properties, with limited amounts of senior housing, student housing, cooperative housing, and manufactured housing. Mortgages could be fixed or floating rate.[21]
- **Loan term**: Loan terms are 5, 7, 10, and 12-15 years, with maximum amortization of 30 years and may contain initial interest-only periods of one to five years. Floating rate mortgages are based on 1-month LIBOR, generally require a third party LIBOR cap and are sized using an equivalent fixed rate. There may be moderate exposure to full-term interest-only loans, but these require higher initial amortizing debt service coverage (DSCR) and lower loan-to-value (LTV) ratios.[22]
- **Credit profile**: Maximum LTV of 80%, and minimum DSCR of 1.25x (fixed) or 1.00x (floating, at LIBOR cap). All loans require a maturity risk analysis. On average, the LTV of the pool is 69%, while the pool's DSCR at origination is 1.84x.[23]

The result of Freddie Mac's strict underwriting guidelines may be seen in its performance history. Looking at the percentage of Freddie Mac's multifamily loan portfolio that has defaulted by funding year, the overall rate has been minimal, maxing out at 1.6% in 2006, and only breaching the 1.0% mark three times since 1994. Since 2014, the percentage of loans in default has been zero. Aggregate losses in Freddie Mac's origination history have averaged five bps per year dating back to 1994, with peak individual year losses of 44 bps for the 2006 vintage.[24]

Past performance may not be indicative of future results

[20] Freddie Mac. As of December 2018.
[21] Freddie Mac. As of December 2018.
[22] Freddie Mac. As of December 2018.
[23] Freddie Mac. As of December 2018.
[24] Freddie Mac. As of December 2018.

EXHIBIT 3: FREDDIE MAC % DEFAULTED BY FUNDING YEAR



Source: Freddie Mac. As of December 2018
Note: The Multifamily Loan Performance Database (MLPD) provides historical information on a subset of the Freddie Mac multifamily loan portfolio. The MLPD comprises information regarding certain multifamily whole loan, K-Deal and SBL-Deal loans. It excludes loans that are credit revolvers, sold book (pre-1994) loans, and negotiated transactions/structured deals and K001 and K002.

Location of assets: A key feature of the Freddie K program is securitizing a pool of geographically-diverse assets. In a recent offering, the portfolio of assets covered a sizable portion of the U.S.'s top-25 MSAs defined by Freddie Mac.[25] Geographic diversification is important for two reasons. First, not all markets are created equal; some are seeing late-cycle recovery while others are in a more mature phase of the cycle. While the individual loans of the pool are not cross-collateralized, within a security any impairment of cash flows from one loan may be offset by durable cash flows from others. Furthermore, diversification may help limit environmental risks such as natural disasters or flooding. Below we include the detailed locations of a recent Freddie Mac 10-year K-Series deal.

Past performance may not be indicative of future results
[25] Freddie Mac. As of December 2018.

EXHIBIT 4: DIVERSE LOCATION OF UNDERLYING COLLATERAL

Source: Freddie Mac. As of September 2018. For illustrative purposes only.

3 / Subordinate/B-Piece Tranche Strategy

Exclusive buyer universe: To meet the issuance pace of Freddie Mac, the B-piece is typically privately placed to a group of seven to ten active buyers in a privately negotiated process. In order to participate in this exclusive offering, the buyers must be pre-approved by Freddie Mac as a Directing Certificate Holder (DCH) with the following qualities:

- Extensive experience as an owner and operator of multifamily properties[26]
- History of exhibiting relevant experience as a fixed income investor, specifically in subordinated investments[27]
- History of acting as an originator of subordinated debt[28]
- Reputation as a patient, long-term investor using recurring capital[29]

We believe these requirements have narrowed the list of eligible lenders significantly, reducing completion for Freddie K B-Pieces. With a limited group of participants and an even more limited group that is active, a DCH buyer could see a deal possibly every two to three months under Freddie Mac's quasi-rotational program. This helps establish a consistent deal flow for an investment with a persistently strong risk-return profile.

B-Piece payment structure: A typical K-Series transaction will be structured as either (1) Sequential Pay (2) Pro Rata Pay or (3) Weighted Average Coupon. This terminology indicates the manner in which principal and interest payments are remitted to the bondholders.

1. In a **Sequential Pay** structure, principal is distributed to the most senior bondholders first and ultimately to the B-piece in sequential order. The B-piece is purchased at a significant discount to par in exchange for receiving zero distributions (or zero coupon) during the hold period. Assuming no losses, the par value of the bond is distributed to the investor when the underlying loans are repaid.
2. In a **Pro Rata Pay** structure, principal is distributed to all of the bondholders on a pro-rata basis. The B-piece is purchased at par and receives a monthly distribution based on the negotiated spread over LIBOR. Assuming no losses, the par value of the bond is distributed to the investor when the underlying loans are repaid.
3. While Sequential Pay and Pro Rata Pay are the most common, certain transactions will utilize a **Weighted Average Coupon** (or "WAC") structure. In a WAC, the principal distributions are the same as Sequential Pay; however the B-piece is purchased at a lesser discount and receives a coupon payment during the hold period. The expected return in a WAC is comprised of both the partial monthly distributions and the residual par distribution.

As a result of these structures, each B-piece may demonstrate returns in a zero-coupon, partial coupon, or 100% coupon format. The implication for those with zero-coupons is that it could increase the duration (i.e. rate sensitivity of the investment). Adding a coupon component reduces duration, all else being equal. It should be noted that while a coupon structure has a shorter duration, returns will be more sensitive to a term default than a zero-coupon.

Mezzanine returns relative to alternative investments: K-Deals have outperformed historically on the mezzanine and B-piece papers relative to alternative forms of both debt and other securitized paper. While it's difficult to pin down K-Deal standard deviation, and thus the Sharpe Ratio given that the secondary market for K-Deals is thin, it is possible to compare the total returns of these deals relative to other asset classes. As we note in the chart below, Freddie K B-Pieces garner IRRs of 7.50% – 10%, depending on: collateral type, structure, and capital market cycle.[30,31] Compared to other forms of debt, K-

[26] Freddie Mac. As of December 2018.
[27] Freddie Mac. As of December 2018.
[28] Freddie Mac. As of December 2018.
[29] Freddie Mac. As of December 2018.
[30] Freddie Mac. As of December 2018.
[31] On a spread basis using 10-year swaps (S) the B-piece offers approximately S + 480 to S + 730. Sources: Bloomberg; Freddie Mac. As of December 2018.
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Deals have offered a premium return historically dating back to the program's inception in 2009 vs. real estate private debt, non-agency CMBS, U.S. bonds, and Global bonds, while performance has been roughly in-line with senior REIT debt.

EXHIBIT 5: ANNUAL RETURNS BY ASSET CLASS (AS OF DECEMBER 2018)

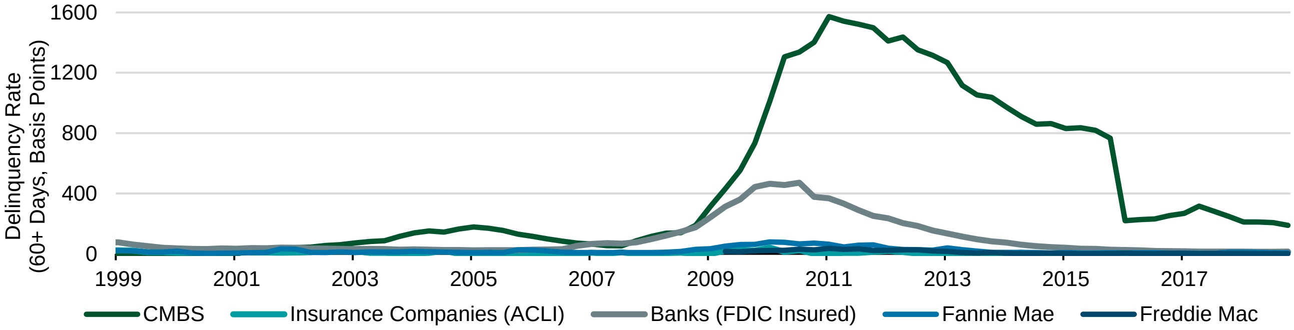
TOTAL RETURN	K-DEAL B-PIECE	CRE PRIVATE DEBT	NON-AGENCY CMBS	SENIOR REIT DEBT	CRE PRIVATE EQUITY	REITS	U.S. BONDS	GLOBAL BONDS	U.S. EQUITIES	GLOBAL EQUITIES
10 YR AVG.	NA	5.4%	6.5%	8.2%	7.0%	11.8%	3.7%	2.7%	12.3%	6.4%
2018 1YR	8.5 – 9.5%	2.6%	3.1%	-0.2%	6.7%	-4.0%	0.0%	-1.2%	-4.4%	-11.2%

Note: We note that K-Deals are not indexed, and therefore the total returns listed are IRR estimates of deals made in 2018. Past performance is not a guide to future results.

Sources: Freddie Mac/DWS estimates (K-Deal B-Piece), Giliberto-Levy Commercial Mortgage Performance Index (CRE Private Debt), Bloomberg/Barclays Non-Agency IG CMBS (Non-Agency CMBS), Bloomberg/Barclays Investment Grade: Reits Total Return Index Value Unhedged USD (Senior REIT Debt); NCREIF Property Index (CREPrivate Equity), FTSE/NAREIT All Equity REIT Index (REITs), Bloomberg/Barclays U.S. Aggregate Bond Index (U.S. Bonds), Bloomberg/Barclays Global Aggregate Index (Global Bonds), S&P 500 (U.S. Equities), MSCI All Country World Index (Global Equities), DWS. As of December 2018.

Historically low default rate and strong credit profile: While the history of K-Deals is somewhat limited given the near 10-year lifespan, we note that the overwhelming majority of loans placed into these securitizations are current. In fact, K-Deals are secured by assets with some of the industry's lowest delinquency and vacancy rates, along with other strong property fundamentals that propagate healthy coverage ratios. As of December 31, 2018, Freddie Mac's securitization delinquency rate was just one basis point.[32] Compared to other securitizations such as the multifamily CMBS market, this represents a marked improvement: multifamily CMBS delinquency rates were roughly 190 bps as of December 2018.[33] Furthermore, at the height of delinquencies following the inception of the K-Deal program, multifamily CMBS delinquency rates breached 1,500 bps, while Freddie Mac never crossed the 40-basis point threshold at its peak in early 2011.[34]

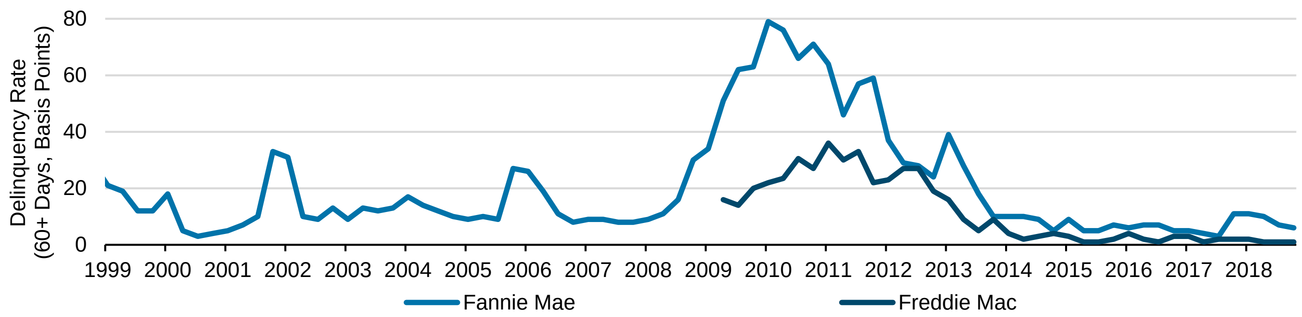
EXHIBIT 6: MULTIFAMILY DELINQUENCY RATES BY LOAN PRODUCT



Note: Freddie Mac does not report modified or forbearance loans in delinquency rates if the borrower is less than two monthly payments past due. Fannie Mae reports forbearance loans in their delinquency rates.
Sources: Freddie Mac (Monthly Volume Report); Fannie Mae (Monthly Summary); American Council of Life Insurers (ACLI): Mortgage Loan Portfolio Profile (MLPP); U.S. Federal Deposit Insurance Corporation (FDIC): Quarterly Loan Portfolio Performance Indicators; Moody's Investors Service (CMBS). As of December 2018.

[32] Moody's Investors Service: Moody's Delinquency Tracker; Freddie Mac. As of December 2018.
[33] Moody's Investors Service: Moody's Delinquency Tracker; Freddie Mac. As of December 2018.
[34] Moody's Investors Service: Moody's Delinquency Tracker; Freddie Mac. As of December 2018.

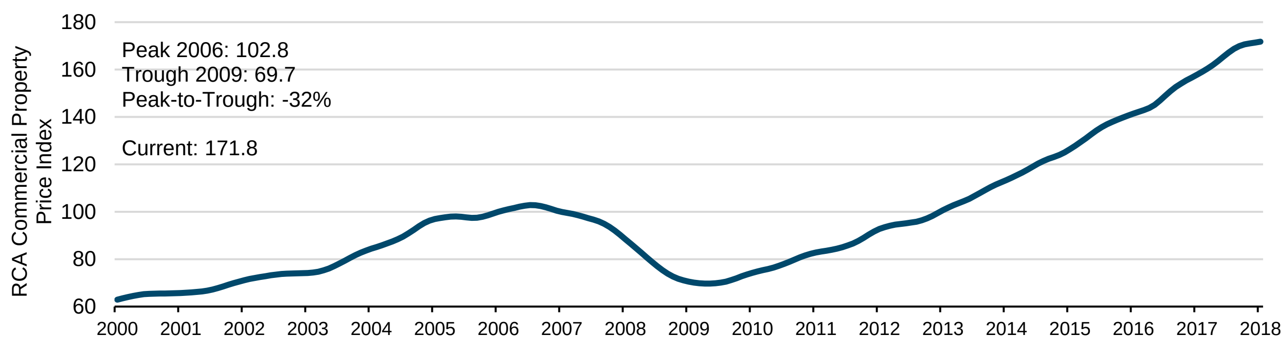
EXHIBIT 7: GOVERNMENT SPONSORED ENTITY (GSE) MULTIFAMLY DELINQUENCY RATES



Note: Freddie Mac does not report modified or forbearance loans in delinquency rates if the borrower is less than two monthly payments past due. Fannie Mae reports forbearance loans in their delinquency rates.
Sources: Freddie Mac (Monthly Volume Report); Fannie Mae (Monthly Summary). As of December 2018.

Equity cushion and underwriting standards: Detachment loan-to-value (LTV) through the B-piece is generally 70%, meaning there is roughly a 30% equity cushion provided by experienced multifamily owner-operators. As Freddie K pooled loans are not cross-collateralized, this means that an asset would need to see more than a 30% drop in value before the B-piece would incur possible losses. To put this in context, during the financial crisis apartment values dropped on average 32% from peak-to-trough.[35] Moreover, Freddie K's loans fared much better than the general market, in a sector that held up better than the broader real estate market.

EXHIBIT 8: APARTMENT COMMERCIAL PROPERTY PRICE INDEX (CPPI)



Source: Real Capital Analytics. As of December 2018.
Note: Freddie Mac does not report modified or forbearance loans in delinquency rates if the borrower is less than two monthly payments past due. Fannie Mae reports forbearance loans in their delinquency rates.

Looking at Freddie Mac loan performance over time, one can better understand the overall strength of the organization's underwriting standards. During the GFC, total defaulted loans maxed out at just 1.6%, and overall credit losses as a percentage of the loans was just 44 basis points. Since 2014, there have been no defaults and thus no credit losses; Freddie has reportedly applied even greater diligence to loans acquired on the secondary market. The table on the following page depicts this dynamic.

[35] Real Capital Analytics (Commercial Property Price Index). As of December 2018.

EXHIBIT 9: FREDDIE MAC MULTIFAMILY LOANS PERFORMANCE DATABASE

FUNDING YEAR	FUNDED LOANS	TOTAL ORIGINATION VOLUME ($MM)	TOTAL DEFAULTED (%, $MM)	REALIZED CREDIT LOSS AS A PERCENT
1994	122	$439	0.18%	0.11%
1995	230	1,082	0.56%	-0.03%
1996	377	1,349	0.00%	0.00%
1997	325	1,651	0.52%	-0.18%
1998	583	2,799	0.34%	0.18%
1999	679	4,942	0.65%	0.15%
2000	473	4.164	1.47%	0.22%
2001	716	6,291	0.24%	0.14%
2002	727	6,254	0.70%	0.19%
2003	706	6,338	0.13%	0.07%
2004	755	7,575	0.23%	0.08%
2005	810	8,805	0.10%	-0.02%
2006	941	11,465	1.60%	0.44%
2007	1,364	18,034	0.52%	0.21%
2008	1,353	17,548	1.38%	0.30%
2009	929	14,836	0.05%	0.01%
2010	850	12,891	0.11%	0.04%
2011	1,167	18,555	0.07%	0.01%
2012	1,481	25,947	0.00%	0.00%
2013	1,396	24,403	0.08%	0.04%
2014	1,523	25,936	0.00%	0.00%
2015	3,314	42,856	0.00%	0.00%
2016	4,035	51,551	0.00%	0.00%
2017	5,000	62,992	0.00%	0.00%
2018 1H	1,077	14,308	0.00%	0.00%
Total / Weighted Average	**30,933**	**$393,011**	**0.20%**	**0.05%**
Subset: 1994-2005	**6,503**	**$51,689**	**0.41%**	**0.09%**
Subset: 2006-2008	**3,658**	**$47,047**	**1.10%**	**0.30%**
Subset: 2009-Current	**20,772**	**$294,275**	**0.02%**	**0.01%**

Source: Freddie Mac. As of December 2018.

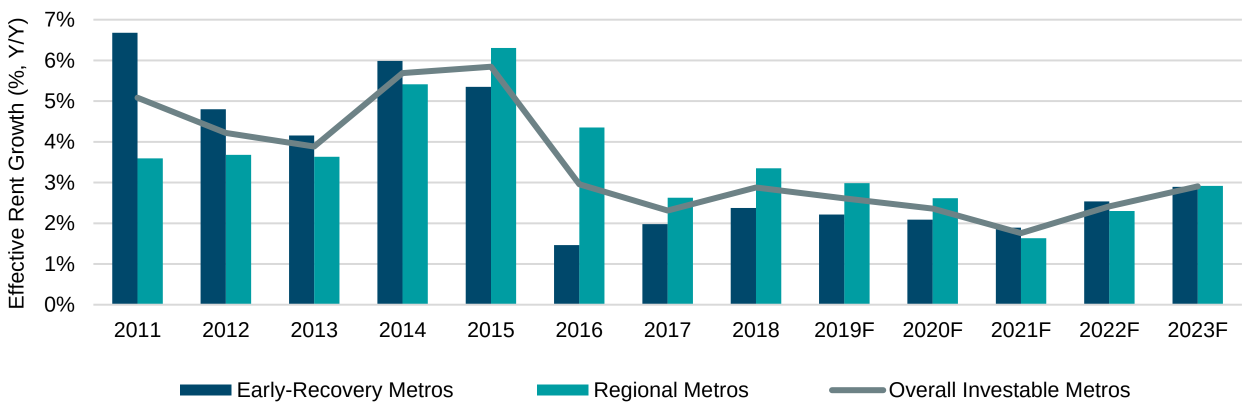
4 / Apartment Outlook

Overall apartment outlook: While the Apartment market remains healthy, the sector is in the mature phase of its cycle. High levels of construction activity the past few years have heightened concern regarding oversupply. However, demand has kept pace with inventory growth over the past five years and apartment vacancy remains near a cyclical low first achieved in mid-2015. Rising mortgage interest rates have widened the affordability gap between renting and owning. This is weighing on single-family home sales, and in combination with stringent underwriting standards and a low supply of entry-level homes, should sustain strong apartment demand.

Upward pressure on vacancy is expected to cause rent growth to moderate, though we still project rent growth for the investable markets to average 2.4% per year over the near term.[36] New supply is expected to recede in the outer years of the forecast, which should place demand and supply fundamentals in balance, resulting in vacancy rates and rent growth in line with their 20-year historic averages of 5.0% and 2.8%, respectively.[37]

As many large coastal markets are exhibiting decelerating rent growth, it will likely be the late-recovery Sunbelt and smaller West Coast markets that bolster national rent growth over the next several years. Metros such as Riverside, Orlando, Phoenix, and San Diego are expected to outperform based on strong job growth and favorable demographics. Also, given its improving economy and disciplined construction, we believe an early foothold should be established in Houston during its recovery. Freddie K securitizations contain a diversified portfolio of assets, including many in the Sunbelt and West Coast.

EXHIBIT 10: EFFECTIVE RENT GROWTH (2011-2023)



Source: Axiometrics; DWS. As of December 2018.
Note: Early-Recovery Metros: Austin, Boston, Chicago, Dallas, Denver, Houston, Los Angeles, New York, Oakland, Philadelphia, San Francisco, San Jose, Seattle, Washington DC. Regional Metros: Atlanta, Charlotte, Fort Lauderdale, Miami, Minneapolis, Nashville, Orange County, Orlando, Phoenix, Portland, Raleigh, Riverside, San Diego, Tampa, West Palm Beach.

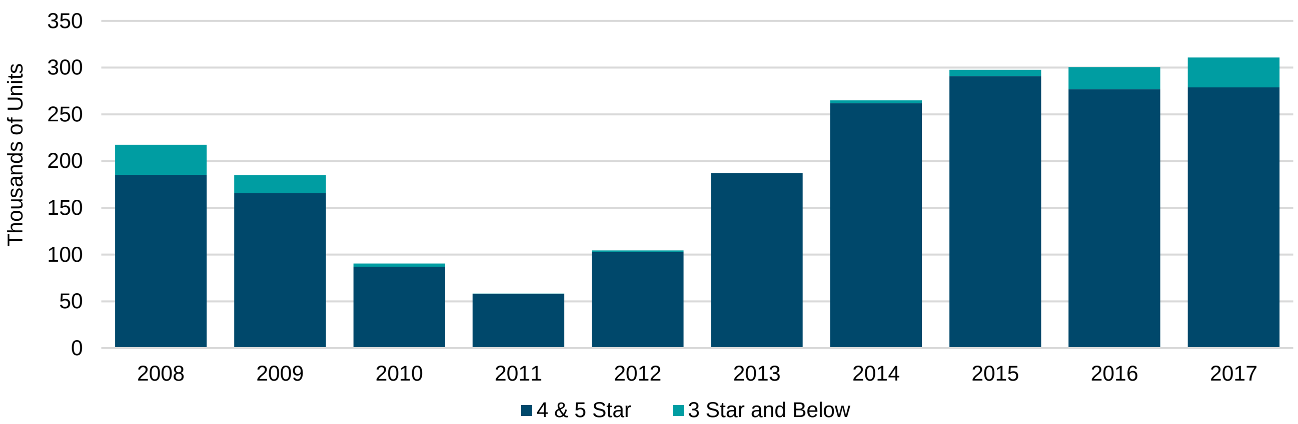
[36] Axiometrics; DWS. As of December 2018.
[37] Axiometrics; CBRE-EA. As of December 2018.

Workforce housing outlook: Workforce housing, also called Naturally Occurring Affordable Housing (NOAH), serves a broad segment of the total rental pool as these Class B/C properties lack resort-style amenities and upscale finishes found in many of the Class A properties being built today. It is important to note that these properties are not typically government subsidized. The renter demographics consist of tenants who earn anywhere from 60 – 120% of the market's median income from professions such as Health & Education, Leisure & Hospitality, Government, and Retail & Wholesale Trade. An analysis of a recent Freddie K deal shows that workforce housing can comprise over 50% of the underlying collateral, and as such, we believe it is prudent to detail NOAH's outlook further.

Despite current unemployment levels (3.8%) near their lowest level in 50 years, household incomes have not kept pace with robust job growth.[38] As such, renters are now paying a relatively high percentage of their incomes towards housing, increasing affordability concerns across the country. The effects of this are twofold: homeownership remains firmly out of reach for many first-time homebuyers (especially those with student loans and other debt), while Class B and C rent growth roughly continues to keep pace with that of Class A.[39]

With development gravitating towards the upper-end, Class A segment of the multifamily market where projects consist of higher rents, and consequently higher yields, the affordable housing segment has become somewhat supply constrained. CoStar defines Class A product as 4 & 5 star, while NOAH falls within the 1-3 star bucket. The below analysis shows that 94% of all new multifamily units delivered over the past 10-years were Class A units, while NOAH supply growth has been vastly limited.[40]

EXHIBIT 11: ANNUAL CHANGE IN APARTMENT SUPPLY BY COSTAR RATING



Source: CoStar. As of December 2017.
Note: The National Multifamily Housing Council (NMHC) defines workforce housing to include 1 to 3 star properties in CoStar, which maps to Class B and C apartments, while Class A apartments are typically 4 and 5 star properties. 5 star properties constitute the highest CoStar rating while 1 star properties are the lowest.

Combining these supply and demand dynamics, we believe the outlook for workforce housing is stable, at minimum. Continued rent-to-income pressure in the workforce population should be offset by rising mortgage rates, while tight supply in the affordable market should buoy occupancy across the Class B and C property types. These fundamentals support continued health across the workforce housing segment, which in turn should support the concentrated NOAH positions of each K-Deal.

[38] U.S Bureau of Labor Statistics. As of March 2019.
[39] Axiometrics. As of December 2018.
[40] CoStar. As of December 2017.

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