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Recognizing a new reality in the securitized sector

For institutions seeking different and unique return sources in fixed income, securitized mortgage sectors offer exposure to risk premiums and structures that can complement a government or corporate credit focused portfolio.

Additionally, the securitized sectors can provide diversification benefits to a broader portfolio given the different type of fundamental risk premiums that can be targeted.

The potential hurdles to investing in securitized sectors include misperceptions of the landscape, lack of a representative benchmark, and limited and varied track records of investment managers; these hurdles can be overcome with education and consultation with managers who offer experience analyzing the sectors.

Institutional investors seeking return sources within fixed income are generally comfortable with allocations to high yield and emerging-market debt, but have shown a reluctance to exploit options available across the broad securitized landscape. On one hand, this is understandable given the experience some institutions had with certain types of mortgage-backed securities (MBS) during the 2008 financial crisis. At the same time, as securitized sectors continue to evolve, they offer many of the attributes that institutions seek in other non-traditional, or alternative, fixed income sectors, and exhibit attractive return and diversification potential that other alternatives lack. We believe that a clear understanding of the securitized sectors and the opportunities they offer in the post-crisis era eludes some investors. As active investors, we see this as a signal of an inefficient market opportunity, and we seek to educate investors to help them overcome the hurdles they encounter when considering these assets.

Part 1: Why securitized sectors make sense from a relative value standpoint

In recent years, many large institutional investors have been comfortable allocating portions of their investment portfolios to high-yielding fixed income sectors. These opportunities sit outside of traditional investment-grade benchmarks, and typically include high-yield corporate credit, bank loans, and emerging-market debt. Institutions tend to make these allocations either directly, through dedicated mandates, or by investing in multi-sector fixed income strategies such as core plus, multi-asset credit, or unconstrained (outside benchmark) bonds. These sectors have attracted attention since well before the 2008 crisis, but allocations have grown in more recent years as yields for government securities around the world continued to fall to historically low levels.

In contrast, some institutions generally lack familiarity with securitized sectors beyond agency MBS, which is currently the second-largest component of the Bloomberg Barclays U.S. Aggregate Bond Index, behind only U.S. Treasury securities. There are a number of opportunities in securitized sectors, and each has its own nuances. We see the best opportunities in three of these sectors:

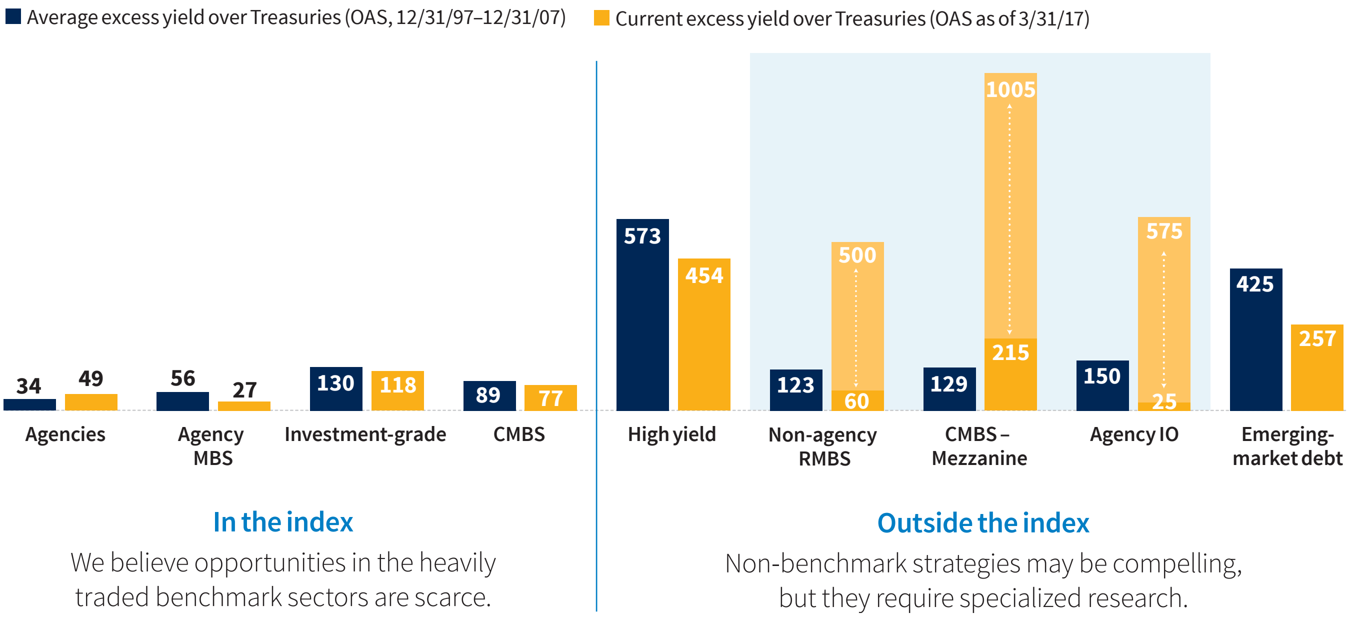
- **Non-agency residential mortgage-backed securities (RMBS).** The RMBS market experienced a severe negative impact during the financial crisis, but today it presents a much different landscape: The sector is smaller, securities are primarily below investment grade, and they trade at meaningfully wider spreads. Opportunities exist across the four broad subsectors of the legacy RMBS market: prime, Alt-A, pay option ARM (POA), and subprime, which together represent a substantial $550 billion in market value today. We would note that this market is shrinking by 10%–15% annually because there has been no material new issuance as a consequence of the 2007–08 crisis. Helping to compensate for the lack of a new-issue market, although it is separate from the legacy RMBS market, are the credit risk transfer (CRT) transactions. Fannie Mae and Freddie Mac have been bringing CRTs to market since 2013, as the two government-sponsored enterprises (GSEs) look to distribute housing market risk through the private capital markets.
- **Commercial mortgage-backed securities (CMBS).** The CMBS market is likely more familiar to fixed income investors, as it has been part of the Aggregate Index since the late 1990s, although it is a relatively small component representing less than 2% of the index. Given the structure and subordination in the CMBS market, the CMBS Index is dominated by AAA-rated securities, which represent over 90% of the benchmark. However, when we consider the most recent spreads available in the marketplace, we believe that the best opportunities in the CMBS market exist further down the capital structure in CMBS mezzanine tranches, bonds which are primarily rated BBB by the ratings agencies. BBB-rated bonds represent less than 1% of the CMBS Index, because it includes only investment-grade securities, like all of the sub-indexes of the Aggregate benchmark. There is an active new-issue market for CMBS and, therefore, the size of the CMBS market, which includes both legacy pre-crisis deals as well as new issuance from 2010 on, has been relatively stable at roughly $600 billion for the past few years.
- **Agency collateralized mortgage obligations (CMOs).** Finally, the agency CMO market offers specific types of bonds that allow investors to better isolate the prepayment risk premium, such as interest-only and principal-only bonds (IOs and POs), inverse floaters, and inverse IOs. Each of these structures comes with its specific return profile and risks, which in many cases can be unfamiliar to institutional investors (and even to some investment managers, depending on their area of expertise). This market is even smaller than either the non-agency RMBS or CMBS markets, and is estimated to be roughly $150 to $200 billion in size, significant enough for portfolio-building opportunities.

According to our research, securitized sectors offer compelling yield spread opportunities compared with high-yielding alternatives

We feel that for investors who have historically considered investing in riskier fixed income sectors such as high-yield corporates, bank loans, and emerging-market debt, the securitized sectors can be a compelling complement in a portfolio context. Investors can gain exposure in the RMBS, CMBS, and prepayment (IO and PO) markets that compete with higher-yielding corporate and sovereign credit markets from a yield/spread or expected return basis.

Securitized mortgage sectors offer yield spreads above pre-crisis levels

Comparison of yield spreads by sector, current (3/31/17) vs. average (12/31/97 to 12/31/07).



A note about this data: For the three securitized mortgage sectors of the market, we represent their current spread levels as a range, rather than as a single data point. We do this in part because there is no market-established index (or indexes) that represents the overall market. Also, in the securitized market, structures can be created that are less (or more) credit- or prepayment-sensitive. Generally speaking, bonds that are less credit- or prepayment-sensitive trade at tighter spreads and bonds that are more volatile trade at wider spreads. Consequently, for each of these sectors we choose to show a range of spreads that reflect the types of bonds that are available in the market.

Data is provided for informational use only. Past performance is no guarantee of future results. All spreads are in basis points and measure option-adjusted yield spread relative to comparable maturity U.S. Treasuries with the exception of non-agency RMBS and mezzanine CMBS, which are loss-adjusted spreads to swaps calculated using Putnam's projected assumptions on defaults and severities, and agency IO, which is calculated using assumptions derived from Putnam's proprietary prepayment model. Agencies are represented by BBG Barclays U.S. Agency Index. Agency MBS are represented by BBG Barclays U.S. Mortgage Backed Securities Index. Investment-grade corporates are represented by BBG Barclays U.S. Corporate Index. High yield is represented by JPMorgan Developed High Yield Index. CMBS is represented by both Agency and Non-Agency CMBS that are eligible for inclusion in the BBG Barclays U.S. Aggregate Bond Index; CMBS-Mezzanine pre-2007 spreads are represented by the same index using the AA, A and BBB components. Average OAS for Mezzanine CMBS is only available for the 2000-2007 and is therefore only displayed for that time period. Emerging-market debt is represented by the BBG Barclays EM Hard Currency Aggregate Index. Non-agency RMBS is estimated using average market level of a sample of below-investment-grade securities backed by various types of non-agency mortgage collateral (excluding prime securities). Current OAS for mezzanine CMBS is estimated from an average spread among baskets of Putnam-monitored new issue and seasoned mezzanine securities, as well as a synthetic (CMBX) index. Agency IO is estimated from a basket of Putnam-monitored interest-only (IO) and inverse IO securities. Option-adjusted spread (OAS) measures the yield over duration equivalent Treasuries for securities with different embedded options.

Sources: Bloomberg, Putnam as of 3/31/17.

Comparing sectors inside and outside the index by yield spreads highlights this contrast. For most sectors within the Aggregate Index, current spreads over Treasuries are below their long-term pre-crisis averages. Outside the index, yields are generally higher, but the securitized sectors (RMBS, CMBS, and agency IOs) offer the most attractive yield spreads relative to their pre-crisis levels.

The spread comparison indicates that current opportunities in RMBS, CMBS, and agency IOs can compete with high-yield credit and emerging-market debt on a yield/spread or potential return basis. This forms the relative value argument for considering these sectors as a compliment to a corporate or sovereign credit strategy.

Glossary of mortgage-backed securities terms and risks

The **securitized sector** includes bonds created by pooling contractual debt to provide cash flows; mortgages are the largest category.

A **mortgage-backed security** (MBS) is a type of asset-backed security that is secured by a mortgage or collection of mortgages and the property that is mortgaged. Also known as a mortgage "pass-through."

Agency pass-throughs are securities with principal and interest backed by a U.S. government agency, such as the Federal National Mortgage Association (Fannie Mae), Government National Mortgage Association (Ginnie Mae), and Federal Home Loan Mortgage Corporation (Freddie Mac).

A non-agency **residential mortgage backed security** (RMBS) is an MBS not backed by Fannie Mae, Ginnie Mae, or Freddie Mac. RMBS subsectors include prime, Alt-A, pay-option ARM (POA), and subprime.

Collateralized mortgage obligations (CMOs) represent claims to specific cash flows from pools of home mortgages. The streams of principal and interest payments on the mortgages are distributed to the different classes of CMO interests in "tranches." Each tranche may have different principal balances, coupon rates, prepayment risks, and maturity dates. A CMO may be highly sensitive to changes in interest rates and any resulting change in the frequency at which homeowners sell their properties, refinance, or otherwise prepay loans.

An **interest-only** (IO) security is a type of CMO in which the underlying asset is the interest portion of the mortgage.

A **principal-only** (PO) security is a type of CMO in which the underlying asset is the principal portion of the mortgage.

An **inverse floater** security adjusts its coupon payment as interest rates change; e.g., as rates fall, the coupon rate rises.

Commercial mortgage-backed securities (CMBS) are secured by the loan on a commercial property and the property that is mortgaged.

A **collateralized loan obligation** (CLO) is a security typically backed by lower-rated corporate loans.

Part 2: Correlations demonstrate diversification potential

In addition to offering attractive relative value, securitized sectors can also offer relatively low correlation to other assets in a comparison of excess return data across various asset classes since the financial crisis.

Per our research, the correlations demonstrate that investing across the spectrum of corporate credit (investment grade, high yield, and bank loans) and sovereign credit (emerging markets) provided little diversification, as all of these assets have a relatively high correlation, ranging from 0.74 to 0.90. Additionally, various sub-sectors of the corporate- and sovereign-credit markets had a fairly high correlation to both U.S. and global equities.

The correlations of RMBS, CMBS, agency IOs, and agency MBS to the various corporate credit sectors, on the other hand, were much lower, in a range from 0.24 to 0.58. The correlations of the securitized sectors with U.S. and global equities were even lower.

It is also interesting to note that, in the lower right portion of the table, the cross-correlations of returns among the securitized sectors themselves are quite low, ranging from 0.00 to 0.39. These low correlation levels indicate that including all three sectors of the market (RMBS, CMBS, and IOs) could offer diversification benefits even within a securitized-only strategy.

The reasons for these low correlations lie in different types of risk premium exposure. Market trends that may benefit one sector or subsector of the securitized market may have an entirely different (or opposite) impact to another. For example, consider a scenario where housing market fundamentals improve, making it easier for homeowners to both qualify for or refinance their existing mortgage. All things being equal, this would lead to lower default rates (a benefit to the RMBS market) and increased refinancing activity (a negative for agency IOs), assuming that this scenario played out in an environment where mortgage rates did not move dramatically higher or lower.

Historically, securitized mortgage sectors have had lower correlations to equities and corporate credit than high yield or emerging-market debt

Correlations of monthly hedged excess returns since 2009

	IG	HY	Bank loans	EM	S&P	MSCI World	NA RMBS	Agency IO	CMBS	Agency MBS
IG	1.00									
HY	0.90	1.00								
Bank loans	0.83	0.88	1.00							
EM USD	0.85	0.89	0.74	1.00						
S&P	0.53	**0.64**	0.39	**0.64**	1.00					
MSCI World	0.62	**0.70**	0.46	**0.73**	0.97	1.00				
NA RMBS	0.42	0.33	0.34	0.31	**0.14**	**0.20**	1.00			
Agency IO	0.37	0.45	0.50	0.40	**0.25**	**0.28**	0.21	1.00		
CMBS	0.58	0.47	0.49	0.39	**0.24**	**0.30**	0.39	0.00	1.00	
Agency MBS	0.24	0.25	0.25	0.29	**0.07**	**0.12**	0.20	0.17	0.29	1.00

A note about this data: We favor analyzing the correlation of excess returns (i.e., returns net of the impact of interest-rate movements) instead of total returns based on the assumption that when investors allocate to these sectors, they are looking to exploit the risk premiums available in them rather than the interest-rate risk embedded in them.

Sources: Bloomberg, Putnam, as of 3/31/17. For illustrative purposes only. Indexes used in the above calculation include the BBG Barclays U.S. Corporate Index, BBG Barclays U.S. High Yield Index, S&P/LSTA Leveraged Loan Index, and the BBG Barclays EM USD Sovereign Indices. Where there is no available representative index, data is based on a universe of securities selected by Putnam that are representative of various fixed income sectors and subsectors within the mortgage market. Diversification does not assure a profit or protect against loss. It is possible to lose money in a diversified portfolio.

We believe that adding securitized debt to a broader portfolio can potentially produce more return without increasing risk for investors. Our research has shown that, over time, many of the more familiar out-of-index sectors of the fixed income markets were not only highly correlated to each other, but they were also highly correlated to the equity market. Investors may be disappointed by the diversification benefit achieved by adding strategies that focus solely on the corporate balance sheet (high yield and bank loans) or the sovereign balance sheet (EM debt). In contrast, we believe that a strategy focused on the homeowner's balance sheet (like RMBS and IOs, for example) can add true diversification benefits.

Types of fixed income risk

Interest-rate risk (also called term structure risk) is the sensitivity to changes in interest rates and the shape of yield curves.

Credit risk is the possibility a borrower may fail to make payments to investors.

Prepayment risk involves borrowers paying debt off early, typically in a falling-rate environment, reducing the number of payments and interest received.

Liquidity risk refers to the relative difficulty trading a security in a reasonable amount of time.

Part 3: Overcoming hurdles with education and benchmarking

In spite of the attractiveness of the securitized mortgage sectors, many investors may face a number of hurdles to investing in the market. The initial hurdle can be the lack of understanding of the broad securitized sector itself. Some investors may equate securitized sectors with the more familiar agency MBS sector. However, in recent years the agency MBS market has been influenced by the actions of the U.S. Federal Reserve, which has been the largest investor in this market over the past several years as it undertook quantitative easing programs. The result is that agency MBS spreads are much tighter than their average prior to the crisis. These spreads are now liable to widen as the Fed potentially reduces its balance sheet. As demonstrated by the sector yield comparison chart, spreads for RMBS, CMBS mezzanine tranches, and prepayment-sensitive securities such as agency IOs are both significantly wider than those of agency MBS and also wider to where these sectors traded before the crisis.

All three securitized sectors suffered from difficult performance during the crisis as nearly all risky assets did, primarily due to liquidity issues (in the case of senior CMBS tranches and IOs) or due to real concerns about credit-related issues (in the case of the non-agency RMBS market as a result of the over-extension of credit in that market and the housing price declines that followed). However, the situation today is much different given how both collateral and structure have evolved. We strongly feel that the education process to provide a more current picture of the landscape to investors — as well as their boards and investment committees — is well worth the endeavor.

A second hurdle that many investors encounter when considering the merits of investing in a dedicated strategy is choosing a benchmark. There is no single broadly diversified mortgage benchmark that includes non-agency RMBS, CMBS, and IOs. The best that investors can expect is to create a customized blended benchmark that includes all three sectors.

For CMBS, an index dates back to 1999 and includes investment-grade bonds that are ERISA eligible, have an expected average life of greater than one year, and meet certain deal and tranche size requirements. However, it's worth noting that the vast majority of BBB-rated mezzanine bonds are not included in the index since they are Rule 144A securities. Overall, the index has a market value of $375 billion, and includes both non-agency and agency deals, as well as deals that were issued pre-crisis ("legacy" deals) and post-crisis (CMBS 2.0/3.0).

Regarding RMBS, the marketplace has changed so dramatically since 2008 that comparing the pre-crisis vs. post-crisis market is an "apples to oranges" comparison. Nevertheless, following the crisis, Amherst Pierpont Securities, LLC created a legacy non-agency RMBS index that tracks the performance of the underlying collateral and the total return of the individual bonds across the four broad subsectors of the legacy RMBS market: prime, Alt-A, pay-option ARM (POA), and subprime. There are over 4,700 deals included in the index with an aggregate remaining market value of approximately $550 billion as of December 2016.

For the IO and PO market — which dates back to 1987 — there really is, unfortunately, no well-established index. Merrill Lynch maintains the BofA Merrill Lynch U.S. Agency CMO Trust IO Index as a subset of their U.S. Agency CMO Index, which has an inception date of 1996. However, the index only includes 10 issues with an approximate market value of $1.6 billion, so it appears that it may not be the ideal representation of the broad market for agency IOs.

Given these limitations on indexes, we believe that the most helpful approach for comparing the opportunity in securitized sectors with traditional fixed income, higher-yielding fixed income, and equities may be to use a dedicated strategy that has invested in all three securitized sectors as a proxy in place of a benchmark. Keeping in mind that differences in duration among these indexes could have an effect on relative performance during time periods when interest rates fluctuate dramatically, the yield, expected return, and volatility profiles of a dedicated mortgage strategy would hypothetically be quite similar to those of a high-yield corporate strategy.

A broad securitized strategy has demonstrated lower correlations and higher risk-adjusted returns over a five-year period

Correlations of 5-year trailing returns (net of fees)	Putnam Dedicated Mortgage Strategy Composite	Bloomberg Barclays Global Aggregate Index	Bloomberg Barclays U.S. Aggregate Index	S&P 500 Index	BofA ML Global High Yield IG Country Constrained Index
Putnam Dedicated Mortgage Strategy Composite	—				
BBG Barclays Global Aggregate Index	0.18	—			
BBG Barclays U.S. Aggregate Index	0.11	0.70	—		
S&P 500 Index	0.26	0.15	-0.10	—	
BofA ML Global High Yield IG Country Constrained Index	0.52	0.53	0.21	0.69	—
5-year risk adjusted returns (net of fees)					
Sharpe ratio	1.83	0.02	0.72	1.29	0.97
Standard deviation	4.52	4.56	2.86	10.12	5.91

As of 3/31/17. Risk statistics are calculated using composite month-end return values. Returns are calculated net of fees, in U.S. dollars, and include the reinvestment of dividends and interest. Past performance is not guarantee of future results. Indexes are unmanaged and do not incur expenses. You cannot invest directly in an index. Please see the composite disclosures at the end of the document.

A third hurdle faced by investors considering an allocation to securitized mortgages is the difficulty in identifying managers with expertise. Unlike high yield and emerging-market debt, where dozens of managers can point to long-term track records that span over 20 years in some cases, very few managers of mortgage strategies can point to relevant long-term track records, given the changing nature of the mortgage marketplace in the post-crisis world.

Also, there is far less similarity between individual manager's strategies, their chosen benchmarks, and their risk, tracking-error, and even duration targets. Some managers have chosen to use a cash benchmark, others use the Aggregate Index or the MBS Index, and others target an absolute rate of return. Investors may find a lack of consistency among managers with regard to the subsectors of the market in which they specialize. For example, investment managers may use some combination of RMBS, CMBS, and prepayment strategies, and could also include collateralized loan obligations (CLOs) as well as traditional and/or esoteric asset-backed securities (ABS). Finally, many of the managers who specialize in the mortgage market only offer their strategies in a hedge-fund or private placement vehicle, making it difficult to compare their products with other more traditional open-ended or unlevered strategies.

To address this concern, we also believe the right approach involves considering investment managers who have broad expertise and a lengthy track record. In particular, consider asking the following questions when you evaluate managers on their expertise in mortgage sectors:

- Does the manager invest across all securitized mortgage sectors, that is, non-agency RMBS, CMBS, and agency CMOs, including instruments such as IOs, POs, inverse floaters, and inverse IOs?
- What is the length and the quality of the manager's track record in securitized mortgage sectors?
- Does the manager have research analysts dedicated to covering each sector as it continues to evolve?
- Does the manager have a portfolio construction process in order to maximize the potential for diversification and risk-adjusted returns over time?
- Does the manager have an investment philosophy that focuses on incorporating diverse sources of risk to build more resilient portfolios?
- Does the manager take a broader view of capital markets to be aware of the changing relative attractiveness of liquid alternative sectors over time?

A broad securitized mortgage strategy offers fundamental return potential and diversification value

We believe that including allocations to securitized sectors can potentiality be a diversifier and source of alpha in a broader fixed income portfolio. First, securitized sectors represent a large and broad enough market to offer exposure to different risk premiums and structures that can be constructed to create and/or complement a government or credit-focused portfolio. Second, securitized debt has valuations that, in some cases, give it return potential competitive with high yield and emerging-market debt, while offering exposure to various types of collateral and security structures. Last, securitized sectors offer a fundamental form of diversification, whether it's a homeowner or a commercial mortgage, which includes exposure to a different type of risk premium than the corporate or government balance sheet.

Putnam Investments Dedicated Mortgage Strategy Composite

Year	Gross of Fees Return (%)	Net of Fees Return (%)	Annual Benchmark Return (%)	Three year Standard Deviation of Composite (%)[1]	Three year Standard Deviation of Benchmark (%)[1]	Standard Deviation of Account Returns (%)[2]	Composite Assets (millions)	Total Firm Assets (millions)[3]	Number of Accounts
2016	7.08	6.34	0.48	2.99	0.05	N/A	251	109,728	≤5
2015	0.49	-0.33	0.18	3.35	0.02	N/A	569	110,621	≤5
2014	6.04	4.98	0.16	5.47	0.02	N/A	559	120,093	≤5
2013	10.50	9.39	0.19	7.23	0.01	N/A	531	110,816	≤5
2012	37.63	36.25	0.25	6.92	0.01	N/A	483	98,926	≤5
2011	-7.21	-8.14	0.23	N/A	N/A	N/A	314	95,033	≤5
2010	16.06	14.89	0.27	N/A	N/A	N/A	292	102,320	≤5
2009	10.31*	9.84*	0.11*	N/A	N/A	N/A	133	96,570	≤5

* The period from inception, August 1, 2009, to December 31, 2009, is not annualized.

1 The three-year, annualized ex-post standard deviation of monthly composite and benchmark returns represents a measure of total investment risk (volatility) and calculates the variance of a distribution of returns. Data is not presented for periods with less than 36 months of composite returns.

2 The standard deviation of comparable performance over time is a measure of volatility. Composite dispersion is measured by the standard deviation across equal weighted portfolios represented within the composite for the full year. Standard deviation is N/A for composites with five or fewer accounts for the full year.

3 Total Firm Assets prior to 2011 do not include Guaranteed Investment Contract ("GIC") assets.

Firm overview: Putnam Investments claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Putnam Investments has been independently verified for the periods ended December 31, 2000, through December 31, 2015. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation. The verification reports are available upon request. Putnam Investments (the "Firm") is defined as a broad-based investment management organization that provides financial services to institutions and individuals through separately managed accounts, pooled funds, and mutual funds. Except for a minority stake owned by employees, the Firm is a wholly owned subsidiary of Great- West Lifeco Inc. Investment management is provided by four wholly owned subsidiaries of the Firm: The Putnam Advisory Company, LLC; Putnam Investment Management, LLC; Putnam Fiduciary Trust Company; and Putnam Investments Limited. A list of the Firm's composite descriptions is available upon request.

Composition of composite: The Putnam Investments Dedicated Mortgage Strategy Composite (the "Composite") pursues a total return objective over a cash benchmark by investing in securitized debt (MBS, RMBS, CMBS, CMO, and ABS). For comparative purposes, the Composite is benchmarked to the 1-month USD Libor; however, individual accounts in the Composite may be benchmarked to an MBS index in addition to a cash benchmark or have no benchmark. Accounts in the Composite may have specific target returns that may be higher or lower than the strategy's general return objective. The Composite comprises all fully discretionary non-ERISA accounts managed by Putnam Investments in this investment style. The Composite creation date was August 17, 2009.

The Composite was formerly called the Mortgage Recovery Composite and prior to that, the Mortgage Recovery II Composite. The use of futures, options, forwards, and other derivatives may be used by accounts in the composite for hedging or as an alternative to investing in the cash markets or as a method of managing portfolio characteristics such as position on the yield curve. Some derivatives may be "leveraged," which means that they provide a portfolio with investment exposure greater than the value of your portfolio's investment in the derivatives. As a result, these derivatives may magnify or otherwise increase investment losses to a portfolio. Strategies that use leverage to gain exposure to various markets may not be suitable for all investors. Any use of leverage exposes the strategy to risk of loss. In some cases the risk may be substantial.

Risk considerations: The prices of bonds in your portfolio may fall or fail to rise over extended periods of time for a variety of reasons, including both general financial market conditions and factors related to a specific issuer or industry. The risks associated with bond investments include interest-rate risk, which means the prices of your investments are likely to fall if interest rates rise. Bond investments are also subject to credit risk, which is the risk that the issuers of an investment may default on payment of interest or principal. Interest-rate risk is generally greater for longer-term bonds, and credit risk is generally greater for below-investment-grade bonds. We may have to invest the proceeds from prepaid investments, including mortgage-backed investments, in other investments with less attractive terms and yields. Mortgage-backed investments carry the risk that they may increase in value less when interest rates decline and decline in value more when interest rates rise. We may invest in distressed debt, including investments in sub-prime mortgage securities which can involve a substantial degree of risk, Our use of derivatives may increase these risks by, for example, increasing investment exposure or, in the case of many over-the-counter instruments, by being illiquid because of the potential inability to terminate or sell derivatives positions. This strategy may not be suitable for all investors. It is important to understand that you can lose money by investing in this strategy.

Calculation of composite: Returns are presented in U.S. dollars ("USD"). Benchmark, Putnam account and Putnam mutual fund valuation sources and timing may sometimes differ, causing dispersion within the composite and between the composite and the benchmark. The results of the Composite for all periods shown include the reinvestment of dividends and other earnings. The Firm values securities using market quotations, fair value prices from pricing services and/or broker quotations. In limited circumstances, the Firm will value securities based solely on its own analysis, this may include using model prices based on third-party data or, for private equity securities, a fair valuation process whereby a special Valuation committee will review the nature of each deal, the model currently used to value each deal, and any critical underlying assumptions in order to determine fair value. Fair valuations based on internal resources are made in accordance with the Putnam Funds Pricing Procedures and are subject to the oversight of the Firm's Valuation Committee. Please note that, in limited cases, the inputs used to value the security are unobservable and reflect the source's own assumptions. Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request.

Benchmark disclosure: The Bank of America (BofA) Merrill Lynch U.S. Dollar 1-Month LIBOR Constant Maturity Index tracks the performance of a synthetic asset-paying LIBOR to a stated maturity. The index is based on the assumed purchase at par of a synthetic instrument having exactly its stated maturity and with a coupon equal to that day's fixing rate. That issue is assumed to be sold the following business day (priced at a yield equal to the current day fixing rate) and rolled into a new instrument. Indexes are unmanaged and do not incur expenses. You cannot invest directly in an index.

Gross and Net of fees disclosure: Gross of Fee Returns are net of transactions costs but do not include the deduction of management fees and other expenses that may be incurred in managing an investment account. A portfolio's return will be reduced by management and other fees. The impact of management fees can be material. For instance, assume that $1 million is invested in a Putnam Investments account, and this account achieves a 10% compounded annual return, gross of fees, for 10 years. If a management fee of 0.50% was charged each year for the 10-year period, the annual return would be 9.5% and the ending dollar value would be $2,478,200, net of fees, as opposed to $2,593,700, gross of fees. The actual fee rates are stated in advisory contracts with clients. For composites that contain U.S. mutual funds and UCITS funds, gross-of-fee performance is calculated by applying the prorated monthly percentage of the total net annual expense ratio (as published in the fund's annual report) to the monthly return on net asset value per share. Annual expense ratios for the current year may be based on the prior year's financial statements. Returns may be adjusted based upon each year's audited annual report.

Net of fee returns are calculated using a model fee ("Model Net Fee"). For the applicable time periods, net of fees returns reflect either the deduction of the highest management fee that is paid by a portfolio in the Composite during the performance period, applied on a monthly basis or the deduction of the highest applicable management fee in effect during the performance period that would be charged based on the fee schedule appropriate to this mandate, without the benefit of breakpoints, applied on a monthly basis, whichever is higher. Net of fee calculation methodology may change over time. For composites that include commingled funds that pay a performance fee and that calculate performance using the highest fee paid by an account in the composite, performance based fee adjustments are included in net of fee returns. For commingled funds, the fee is typically updated for the most recent fiscal year end after the portfolio has been audited. Returns may be adjusted based upon each year's audited annual report. Please be advised that the Composite may include other investment products or share classes of funds that are subject to management fees, including performance fees, that are inapplicable to you but that could have been in excess of the Model Net Fee. Therefore, the actual performance of all the portfolios in the composite on a net-of-fees basis will be different, and may be higher or lower, than the Model Net Fee performance. Composites that include certain commingled portfolios may also assess a performance fee to underlying investors which could result in the underlying investors paying a higher total management fee than the highest stated management fee below. However, Model Net Fee performance is intended to provide the most appropriate example of the impact management fees would have by applying management fees relevant to you to the gross performance of the Composite. Actual investment advisory fees incurred by clients are typically negotiated on an individual basis and may vary depending upon, among other things, the applicable fee schedule and portfolio size.

Fee schedule: The standard fee schedule is based on the market value of an account's assets under management and is stated on an annual basis. Separate account management fees are subject to change and are for investment management services only. Standard management fee is: 0.65% of assets on the first $100 million, 0.60% of assets on the next $150 million, and 0.55% for assets over $500 million.

Past performance is not a guarantee of future performance. No assurance can be given as to future performance.

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