

Putnam VT Mortgage Securities Fund

Before you invest, you may wish to review the fund’s prospectus, which contains more information about the fund and its risks. You may obtain the prospectus and other information about the fund, including the statement of additional information (SAI) and most recent reports to shareholders, at no cost by visiting putnam.com/individual/annuities, calling 1-800-225-1581, or e-mailing Putnam at funddocuments@putnam.com.

The fund’s prospectus and SAI, both dated 4/30/21, are incorporated by reference into this summary prospectus.

Fund summary

Goal

Putnam VT Mortgage Securities Fund seeks as high a level of current income as Putnam Investment Management, LLC believes is consistent with preservation of capital.

Fees and expenses

The following table describes the fees and expenses you may pay if you buy, hold and sell shares of the fund. You may pay other fees, such as brokerage commissions and other fees to financial intermediaries, which are not reflected in the tables and examples below. The fees and expenses information does not reflect insurance-related charges or expenses borne by contract holders indirectly investing in the fund. If it did, expenses would be higher.

Annual fund operating expenses

(expenses you pay each year as a percentage of the value of your investment)

Share class	Management fees	Distribution and service (12b-1) fees	Other expenses	Total annual fund operating expenses	Expense reimbursement*	Total annual fund operating expenses after expense reimbursement
Class IA	0.39%	N/A	0.35%	0.74%	(0.24)%	0.50%
Class IB	0.39%	0.25%	0.35%	0.99%	(0.24)%	0.75%

* Reflects Putnam Investment Management, LLC’s contractual obligation to limit certain fund expenses through 4/30/22. This obligation may be modified or discontinued only with approval of the fund’s Board of Trustees.

Example

The following hypothetical example is intended to help you compare the cost of investing in the fund with the cost of investing in other funds. The example does not reflect insurance-related charges or expenses.

If it did, expenses would be higher. It assumes that you invest \$10,000 in the fund for the time periods indicated and then redeem or hold all your shares at the end of those periods. It assumes a 5% return on your investment each year and that the fund’s operating expenses remain the same. Only the first year of each period in the example takes into account the expense reimbursement described above. Your actual costs may be higher or lower.

Share class	1 year	3 years	5 years	10 years
Class IA	\$51	\$212	\$388	\$896
Class IB	\$77	\$291	\$524	\$1,191

Portfolio turnover

The fund pays transaction-related costs, such as commissions, when it buys and sells securities (or “turns over” its portfolio). A higher turnover rate may indicate higher transaction costs. These costs, which are not reflected in annual fund operating expenses or the above example, affect fund performance. The fund’s turnover rate in the most recent fiscal year was 895%.

Investments, risks, and performance

Investments

We invest mainly in mortgages, mortgage-related fixed income securities and related derivatives that are either investment-grade or below-investment-grade in quality (sometimes referred to as “junk bonds”). Under normal circumstances, we invest at least 80% of the fund’s net assets (plus any borrowings for investment purposes) in mortgages, mortgage-related fixed income securities and related derivatives (i.e., derivatives used to acquire exposure to, or whose underlying securities are, mortgages or mortgage-related securities). The fund generally uses the net unrealized gain or loss, or market value, of mortgage-related derivatives for purposes of this policy, but may use the notional value of a derivative if that is determined to be a more appropriate measure of the fund’s investment exposure. This policy may be changed only after 60 days’ notice to shareholders.

We expect to invest in mortgage-backed investments that are obligations of U.S. government agencies and instrumentalities and accordingly are backed by the full faith and credit of the United States (e.g., Ginnie Mae mortgage-backed bonds) as well as in mortgage-backed investments that are backed by only the credit of a federal agency or government-sponsored entity (e.g., Fannie Mae and Freddie Mac mortgage-backed bonds), and that have short- to long-term maturities. The fund currently has significant investment exposure to commercial mortgage-backed securities.

We also expect to invest in lower-rated, higher-yielding mortgage-backed securities, including non-agency residential mortgage-backed securities (which may be backed by non-qualified or “sub-prime” mortgages), commercial mortgage-backed securities, and collateralized

mortgage obligations (including interest only, principal only, and other prepayment derivatives). Non-agency (i.e., privately issued) securities typically are lower-rated and higher yielding than securities issued or backed by agencies such as Ginnie Mae, Fannie Mae or Freddie Mac. While our emphasis will be on mortgage-backed securities, we may also invest to a lesser extent in other types of asset-backed securities.

We may consider, among other factors, credit, interest rate, prepayment and liquidity risks, as well as general market conditions, when deciding whether to buy or sell investments.

We typically use to a significant extent derivatives, including interest rate swaps, swaptions, forward delivery contracts, total return swaps, and options on mortgage-backed securities and indices, for both hedging and non-hedging purposes, including to obtain or adjust exposure to mortgage-backed investments.

Risks

It is important to understand that you can lose money by investing in the fund.

The value of investments in the fund's portfolio may fall or fail to rise over extended periods of time for a variety of reasons, including general economic, political or financial market conditions, investor sentiment and market perceptions, government actions, geopolitical events or changes, and factors related to a specific issuer, geography, industry or sector, such as the housing or real estate markets. These and other factors may lead to increased volatility and reduced liquidity in the fund's portfolio holdings or in relevant markets. The novel coronavirus (COVID-19) pandemic and efforts to contain its spread are likely to negatively affect the value, volatility, and liquidity of the securities and other assets in which the fund invests and exacerbate other risks that apply to the fund. These effects could negatively impact the fund's performance and lead to losses on your investment in the fund.

The risks associated with bond investments include interest rate risk, which is the risk that the value of the fund's investments is likely to fall if interest rates rise. Bond investments are also subject to credit risk, which is the risk that the issuers of the fund's investments may default on payment of interest or principal. Bond investments may be more susceptible to downgrades or defaults during economic downturns or other periods of economic stress. Default risk is generally higher for non-qualified mortgages. Interest rate risk is generally greater for longer-term bonds, and credit risk is generally greater for below-investment grade bonds, which may be considered speculative. Mortgage- and asset-backed investments, unlike traditional debt investments, are also subject to prepayment risk, which means that they may increase in value less than other bonds when interest rates decline and decline in value more than other bonds when interest rates rise. We may have to invest the proceeds from prepaid investments, including mortgage- and asset-backed investments, in other investments with less attractive terms and yields. The fund's investments in mortgage-backed securities and asset-backed securities, and in certain other securities and derivatives, may be or become illiquid. The fund's concentration in an industry group composed of privately issued residential and commercial mortgage-backed securities and mortgage-backed securities issued or guaranteed by the U.S. government or its agencies or instrumentalities may make the fund's

net asset value more susceptible to economic, market, political and other developments affecting the residential and commercial real estate markets and the servicing of mortgage loans secured by real estate properties. During periods of difficult economic conditions, delinquencies and losses on commercial mortgage-backed securities in particular generally increase, including as a result of the effects of those conditions on commercial real estate markets, the ability of commercial tenants to make loan payments, and the ability of a property to attract and retain commercial tenants.

Our use of derivatives may increase the risks of investing in the fund by increasing investment exposure (which may be considered leverage) or, in the case of many over-the-counter instruments, because of the potential inability to terminate or sell derivatives positions and the potential failure of the other party to the instrument to meet its obligations. Our use of short selling may result in losses if the securities appreciate in value.

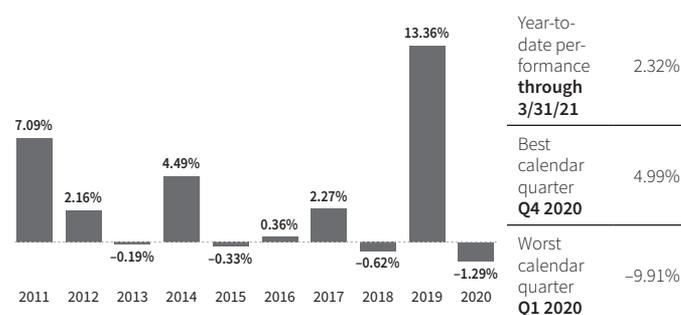
There is no guarantee that the investment techniques, analyses, or judgments that we apply in making investment decisions for the fund will produce the intended outcome or that the investments we select for the fund will perform as well as other securities that were not selected for the fund. We, or the fund's other service providers, may experience disruptions or operating errors that could negatively impact the fund.

The fund may not achieve its goal, and it is not intended to be a complete investment program. An investment in the fund is not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency.

Performance

The performance information below gives some indication of the risks associated with an investment in the fund by showing the fund's performance year to year and over time. Before April 30, 2018, the fund was managed with a materially different investment strategy and may have achieved materially different performance results under its current investment strategy from that shown for periods before this date. The performance information does not reflect insurance-related charges or expenses. If it did, performance would be lower. Please remember that past performance is not necessarily an indication of future results.

Annual total returns for class IA shares



Average annual total returns

(for periods ended 12/31/20)

Share class	1 year	5 years	10 years
Class IA	-1.29%	2.68%	2.64%
Class IB	-1.68%	2.42%	2.37%
Bloomberg Barclays U.S. MBS Index ⁺ (no deduction for fees, expenses or taxes)	3.87%	3.05%	3.01%
Bloomberg Barclays Government Bond- Bloomberg Barclays U.S. MBS Linked Benchmark ^{**} (no deduction for fees, expenses or taxes)	3.87%	2.83%	2.80%

* The Bloomberg Barclays Government Bond-Bloomberg Barclays U.S. MBS Linked Benchmark represents performance of the Bloomberg Barclays Government Bond Index from inception date of the fund, January 1, 2000, through April 29, 2018 and performance of the Bloomberg Barclays U.S. MBS Index from April 30, 2018 through the current period.

+ Source: Bloomberg Index Services Limited.

BLOOMBERG® is a trademark and service mark of Bloomberg Finance L.P. and its affiliates (collectively "Bloomberg"). BARCLAYS® is a trademark and service mark of Barclays Bank Plc (collectively with its affiliates, "Barclays"), used under license. Bloomberg or Bloomberg's licensors, including Barclays, own all proprietary rights in the Bloomberg Barclays Indices. Neither Bloomberg nor Barclays approves or endorses this material, or guarantees the accuracy or completeness of any information herein, or makes any warranty, express or limited, as to the results to be obtained therefrom, and to the maximum extent allowed by law, neither shall have any liability or responsibility for injury or damages arising in connection therewith.

Your fund's management

Investment advisor

Putnam Investment Management, LLC

Portfolio managers

Michael Salm, Co-Chief Investment Officer, Fixed Income, portfolio manager of the fund since 2007

Brett Kozlowski, Co-Head of Structured Credit, portfolio manager of the fund since 2018

Jatin Misra, Co-Head of Structured Credit, portfolio manager of the fund since 2017

Sub-advisor

Putnam Investments Limited*

* Though the investment advisor has retained the services of Putnam Investments Limited (PIL), PIL does not currently manage any assets of the fund.

Purchase and sale of fund shares

Fund shares are offered to separate accounts of various insurers. The fund requires no minimum investment, but insurers may require minimum investments from those purchasing variable insurance products for which the fund is an underlying investment option. Insurers may purchase or sell shares on behalf of separate accounts by submitting an order to Putnam Retail Management any day the New York Stock Exchange (NYSE) is open. Some restrictions may apply.

Tax information

Generally, owners of variable insurance contracts are not taxed currently on income or gains realized with respect to such contracts. However, some distributions from such contracts may be taxable at ordinary income tax rates and distributions to contract owners younger than 59½ may be subject to a 10% penalty tax. For more information, please see the prospectus (or other offering document) for your variable insurance contract.

Payments to insurance companies

The fund is offered as an underlying investment option for variable insurance contracts. The fund and its related companies may make payments to the sponsoring insurance company (or its affiliates) and dealers for distribution and/or other services. These payments may create an incentive for the insurance company to include the fund, rather than another investment, as an option in its products and may create a conflict of interest for dealers in recommending the fund over another investment. The prospectus (or other offering document) for your variable insurance contract may contain additional information about these payments.

Information about the Summary Prospectus, Prospectus, and SAI

The summary prospectus, prospectus, and SAI for a fund provide information concerning the fund. The summary prospectus, prospectus, and SAI are updated at least annually and any information provided in a summary prospectus, prospectus, or SAI can be changed without a shareholder vote unless specifically stated otherwise. The summary prospectus, prospectus, and the SAI are not contracts between the fund and its shareholders and do not give rise to any contractual rights or obligations or any shareholder rights other than any rights conferred explicitly by federal or state securities laws that may not be waived.

Additional information is available at putnam.com/individual/annuities, by calling 1-800-225-1581, or by e-mailing Putnam at funddocuments@putnam.com.

