

iShares U.S. Real Estate 1-Year ETF Analysis

With a fixed-indexed or registered index-linked annuity from MassMutual Ascend Life Insurance Company, you can allocate funds to 1-year term indexed strategies that earn returns based on the iShares U.S. Real Estate ETF. This ETF seeks to track the performance of the Dow Jones U.S. Real Estate Index, which is comprised primarily of real estate investment trusts. Let's take a closer look.

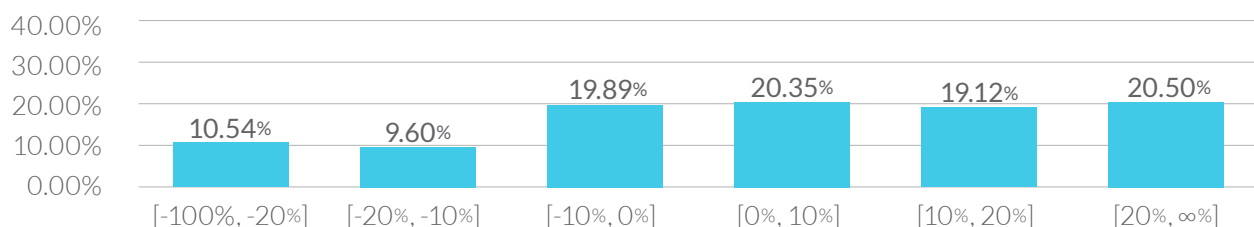
iShares U.S. Real Estate ETF returns using rolling periods

The data below uses 1-year rolling returns¹ of the iShares U.S. Real Estate ETF from December 31, 2004 through December 31, 2023, for a total of 4,697² observations.

Average Performance			Positive Performance		Negative Performance	
Average Return	Average Gain	Average Loss	Maximum Return ³	Num of Gains	Minimum Return ⁴	Num of Losses
4.38%	17.52%	-15.29%	116.25%	2,816 (60%)	-64.09%	1,880 (40%)

iShares U.S. Real Estate ETF return distribution

Using the same data set and assumptions, the return distribution graph below illustrates how frequently the annualized returns fell into specific ranges. The table below the graph shows the average return by range.



Return Range	[-100%, -20%]	[-20%, -10%]	[-10%, 0%]	[0%, 10%]	[10%, 20%]	[20%, ∞%]
Average iShares U.S. Real Estate ETF Return by Range	-37.02%	-14.31%	-4.24%	4.33%	14.86%	33.10%

¹1-year rolling returns refers to every 1-year period that started on a business day after December 30, 2004 and ended before January 1, 2024.

²One flat year, in which the iShares U.S. Real Estate return was 0%, is included in the number of total observations.

³Maximum return: 1-year period ending 3/8/2010

⁴Minimum return: 1-year period ending 3/5/2009

MassMutual Ascend offers several types of annuities, which have varying levels of upside potential and downside protection. Annuities also offer benefits such as tax deferral and guaranteed lifetime income. Talk with your financial professional about how an annuity can fit into your portfolio and help you reach your goals.

The launch date of the iShares U.S. Real Estate ETF was December 31, 2004. Indexed strategies are based on the price change of the ETF during the term. Returns are limited by a cap or participation rate.

MassMutual Ascend's registered index-linked annuities can only be sold through a Broker/Dealer that is contracted with MassMutual AscendSM. This material must be preceded or accompanied by a prospectus. To obtain a copy of the prospectus, please visit [MassMutualAscend.com/RILArates](https://www.MassMutualAscend.com/RILArates).

Annuities are long-term investments and may not be suitable for all investors. Withdrawals from an annuity contract may have tax consequences.

The iShares MSCI EAFE ETF is distributed by BlackRock Investments, LLC. iShares[®], BLACKROCK[®], and the corresponding logos are registered and unregistered trademarks of BlackRock, Inc. and its affiliates ("BlackRock"), and these trademarks have been licensed for certain purposes by MassMutual Ascend Life Insurance Company. MassMutual Ascend Life Insurance Company annuity products are not sponsored, endorsed, sold or promoted by BlackRock, and purchasers of an annuity from MassMutual Ascend Life Insurance Company do not acquire any interest in the iShares MSCI EAFE ETF nor enter into any relationship of any kind with BlackRock. BlackRock makes no representation or warranty, express or implied, to the owners of any MassMutual Ascend Life Insurance Company annuity product or any member of the public regarding the advisability of purchasing an annuity, nor does it have any liability for any errors, omissions, interruptions or use of the iShares MSCI EAFE ETF or any data related thereto.

Principal Underwriter/Distributor: MM Ascend Life Investor Services, LLC, member FINRA and an affiliate of MassMutual Ascend.

Annuities issued by MassMutual Ascend Life Insurance CompanySM (Cincinnati, Ohio), a wholly owned subsidiary of Massachusetts Mutual Life Insurance Company (MassMutual) under contract forms ICC20-P1144420NW, ICC20-P1144420NW-NoMVA, ICC20-P1144520NW, ICC20-P1144520NW-NoMVA, ICC20-P1474420NW, ICC20-P1474420NW-NoMVA, ICC21-P1152021NW, ICC21-P1152121NW, ICC21-P1476721NW, P1074514ID, P1080010ID, P1110416ID, P1112916ID, P1113516ID, P1126818ID, P1129918ID, P1129918ID-NoMVA, P1134618ID, P1134618ID-NoMVA, P1135619ID, P1140119ID, P1140219ID, P1146620ID, P1470017ID, P1470218ID, P1471718ID, P1822217ID, P1822317ID, P1825218ID, P1833421ID, P1833521ID, P1833621ID, P1841622ID and P1841722ID. All guarantees subject to the claims-paying ability of MassMutual Ascend.

This content does not apply in the state of New York.

NOT A BANK OR CREDIT UNION DEPOSIT OR OBLIGATION • NOT FDIC OR NCUA-INSURED • NOT INSURED BY ANY FEDERAL GOVERNMENT AGENCY • MAY LOSE VALUE • NOT GUARANTEED BY ANY BANK OR CREDIT UNION

∴ MassMutual Ascend