



SRPS
Investment Section

CHIEF INVESTMENT OFFICER'S REPORT

INVESTMENT OVERVIEW

The Maryland State Retirement and Pension System returned 3.57 percent net of fees in fiscal year 2020, relative to the actuarial return target of 7.40 percent, and 3.14 percent for its policy benchmark. After the payment of benefits, the market value of managed assets increased by approximately \$562 million, from \$54.2 billion on June 30, 2019 to \$54.8 billion on June 30, 2020.

While the System was able to generate a positive return of 3.57 percent for the fiscal year, the performance was not evenly distributed among the various asset classes. The rate sensitive category, consisting of high-quality bonds, produced the highest return for the fiscal year at 18.1 percent as short-term interest rates were targeted at zero percent. At the other end of the spectrum was the real assets group, which returned -5.42 percent, hurt by a supply and demand imbalance in the energy sector in the second half of the fiscal year.

The Board's asset allocation policy is designed to achieve the actuarial rate of return over long periods of time by assembling a diversified portfolio of asset classes, each of which may have a large or small, positive or negative return in any given year. By assembling assets that exhibit distinct risk and return characteristics in different market environments, the Board expects more stable investment returns over time than a less diversified portfolio. This lower risk portfolio should result in a larger asset pool for the System's beneficiaries than a more volatile portfolio with the same average return. Understanding the Board's principals of asset allocation is important in evaluating the performance in any one-year period. While the realized return of 3.57 percent for fiscal year 2020 is below the Board's long-term expectation for the portfolio, it is well within its expected ranges for annual variations.

The System's asset allocation is organized into five broad categories: Growth/Equity, Rate Sensitive, Credit, Real Assets, and Absolute Return. During the fiscal year, the asset allocation remained unchanged from the prior year, as the long-term return expectations and risk profile of the portfolio remained consistent with the Board's objectives.

The Growth/Equity portfolio is comprised of public equity and private equity. Within public equity, there are dedicated allocations to U.S., international developed, and emerging markets. The objective of this asset class is to generate high returns associated with the economic growth underlying global economies.

The Rate Sensitive category consists of exposure to core, or investment-grade, bonds. This asset class is designed to provide protection against downturns in the equity market by offering a reliable income stream through the yield component. This yield also provides some protection against a deflationary environment, characterized by falling interest rates. This asset class includes long-duration U.S. Treasury bonds, Treasury inflation protected securities, corporate bonds and securitized debt.

The purpose of the Credit asset class is to take advantage of the potential higher returns offered by below investment-grade bonds. The return objective is similar to public equity, with a lower risk profile. This category includes high yield bonds, bank loans, emerging markets debt, distressed debt, mezzanine debt, and other credit-focused investments.

Real Assets includes real estate, natural resources and infrastructure investments. A significant portion of the assets in this category provides a regular income stream. Due to the tangible, or real, element of this asset class, it is expected to provide some level of protection against an inflationary environment, as well as additional diversification to the total portfolio.

The objective of the Absolute Return asset class is to achieve a return that falls between the expectations for public equity and bonds, with low correlation to other asset classes. The risk profile of this asset class is expected to be significantly lower than public equity, which should provide protection during periods of stock market decline. Strategies in this asset class include event-driven, global macro, relative value and opportunistic funds.

INVESTMENT POLICY AND OBJECTIVES

The Board of Trustees is charged with the responsibility of managing the assets of the System. In doing so, the Board is required to exercise its fiduciary duties solely in the interest of the participants with the care, skill, and diligence that a prudent person would exercise under similar circumstances. This standard of care encourages diversifying investments across various asset classes.

Investment objectives are designed to support the fulfillment of the Board's mission to optimize risk-adjusted returns to ensure that sufficient assets are available to pay benefits to members and beneficiaries when due. As a long-term investor, the Board understands that short-term market returns will fluctuate.

These investment objectives are implemented in accordance with investment policies developed by the Board. The “prudent person standard”, as outlined in both the Maryland Annotated Code and the Board’s investment policies, allows the Board to set investment policies and delegate authority to investment professionals employing active and passive strategies. Firms retained generally have a demonstrated performance record and a clearly defined and consistently applied investment process.

The Board manages the assets for the System with the goal of achieving an annualized investment return that over a long-term time frame: (1) meets or exceeds the investment policy benchmark for the System; (2) in nominal terms, equals or exceeds the actuarial investment return assumption adopted by the Board; and (3) in real terms, exceeds the U.S. inflation rate by at least 3 percent. A more detailed discussion of each of these goals follows below.

1. **Meeting or exceeding the Investment Policy Benchmark for the System.** The Investment Policy Benchmark is calculated by using a weighted average of the Board-established benchmarks for each asset class. This benchmark enables the comparison of the actual performance of the System to a proxy portfolio and provides a measure of the contribution of policy implementation and active management to overall fund returns.
2. **In nominal terms, equaling or exceeding the actuarial investment return assumption of the System.** The Board adopts the actuarial rate of interest, which was set at 7.40 percent for fiscal year 2020. The actuarial investment return assumption functions as an estimate of the long-term rate of growth of the assets for the System. In adopting an actuarial return assumption, the Board anticipates that the investment portfolio will achieve higher or lower returns each year but will trend toward 7.40 percent over time.
3. **In real terms, exceeding the U.S. inflation rate by at least 3 percent.** The inflation related objective compares the investment performance against a rate of inflation measured by the Consumer Price Index (CPI) plus 3 percent. The inflation measure provides a link to the liabilities of the System, which have an embedded sensitivity to changes in the inflation rate.

The Board is also responsible for establishing the asset allocation policy for the System. It does this by weighing three liability-oriented objectives when making asset allocation determinations. These objectives include:

1. achieving and maintaining a fully funded pension plan;
2. minimizing contribution volatility year to year; and
3. realizing surplus assets.

Asset allocation policy targets are determined by recognizing that liabilities (future benefit payments to the participants and beneficiaries of the System) must be paid in full and on time. The mix of asset classes is chosen to provide sufficient growth to meet the long-term return objective of the System, while providing sufficient diversification to moderate the volatility of that return. For example, a portfolio of equities will likely provide the required return over a long time horizon, but will subject the market value of the portfolio to unacceptable levels of volatility such that the goals of minimizing contribution volatility and realizing surplus assets would be difficult to achieve. Combining other asset classes with equities will provide differentiated return sources, reduce the volatility of returns and help realize those liability-oriented objectives.

The Board’s long-term asset class targets and ranges as of June 30, 2020 are shown below.

ASSET CLASS	LONG-TERM	
	POLICY TARGET	RANGE
Growth Equity	50%	+/- 7%
U.S Equity	16%	
International Developed Equity	10%	
Emerging Markets Equity	11%	
Private Equity	13%	
Rate Sensitive	19%	+/- 5%
Long-term Government Bonds	10%	
Securitized/Corporate Bonds	5%	
TIPS	4%	
Credit	9%	+/- 4%
High Yield Bonds/Bank Loans	7%	
Emerging Market Debt	2%	
Real Assets	14%	+/- 4%
Real Estate	10%	
Natural Resources/Infrastructure	4%	
Absolute Return	8%	+/- 4%
Total Assets	100%	

INVESTMENT PERFORMANCE

Investment performance is calculated using time-weighted rates of total return, including the impact of fees and expenses. Total return includes interest and dividends, as well as capital appreciation.

The investment program realized a return of 3.57 percent for fiscal year 2020. Annualized returns for the 3-, 5-, 10-, 20- and 25-year periods ending June 30, 2020 were 6.0 percent, 5.8 percent, 7.6 percent, 4.8 percent and 6.5 percent, respectively.

	FY 2020 SRPS Performance	FY 2020 Benchmark Performance	SRPS Exposure June 30, 2020
Public Equity			
Custom Benchmark	2.0%	0.4%	36.2%
U.S. Equity	5.0%		11.7%
Russell 3000		6.5%	
International Equity	-2.8%		6.7%
MSCI World ex U.S.		-5.4%	
Emerging Markets Equity	-4.7%		10.0%
MSCI Emerging Markets		-3.4%	
Global Equity	10.4%		7.8%
MSCI AC World Index		2.1%	
Private Equity	2.5%		14.2%
Custom State Street PE		-1.9%	
Rate Sensitive	18.1%		18.7%
Custom Benchmark		17.2%	
BC U.S. Gov't Long Index		25.1%	
BC U.S. TIPS Index		8.7%	
Credit/Debt Strategies	-0.4%		9.3%
Custom Benchmark		-0.1%	
BC High Yield		0.0%	
S&P LSTA Leveraged Loan		-2.0%	
JP Morgan GBI EM GD		-2.8%	
JP Morgan EMBI GD		0.5%	
JP Morgan CEMBI Broad		4.6%	
Real Assets	-5.4%		11.8%
Custom Benchmark		-2.3%	
Absolute Return	-2.5%		7.8%
Custom Benchmark		0.6%	
Multi-Asset	2.9%		1.5%
Custom Benchmark		3.1%	
Cash	1.5%		0.5%
Custom Benchmark		1.6%	
TOTAL FUND	3.6%	3.1%	100%

The allocation as of June 30, 2020 reflects the ranges and transitional targets of the System as described in the previous section.

ECONOMIC AND CAPITAL MARKET OVERVIEW

Despite the economic and financial market turmoil in fiscal year 2020 brought on by the Covid-19 pandemic, the System produced its eleventh consecutive year of positive performance. Prior to the wide spread arrival of the pandemic in the U.S. in February 2020, the economy and the stock market were performing quite well. The Federal Reserve had lowered interest rates three times in the first half of the fiscal year for a total of 75 basis points in an effort to extend the economic expansion. Inflation was approaching the Fed's targeted rate of 2 percent, but still considered mild with no rate hikes on the horizon. The unemployment rate reached a historic low of 3.5 percent. Economic growth in the U.S., as measured by gross domestic product, was running at a healthy and measured pace of 2.4 percent as of the fourth quarter of 2019. Against this positive economic backdrop, U.S. equities, as measured by the Russell 3000 index, were up over 10 percent for the first seven months of the fiscal year.

In February 2020, the economy and financial markets experienced a complete reversal with the introduction of Covid-19 in the U.S. To slow the spread of this pandemic, most jurisdictions in the country were subject to some form of stay-at-home mandate, which brought the economy to a halt and froze many financial markets. The U.S. stock market fell nearly 35 percent from its peak in February 2020 to its nadir in March 2020. Credit spreads for investment grade and high yield corporate bonds expanded sharply as investors sought safety in havens such as U.S. Treasury bonds. The unemployment rate rose from 3.5 percent in February to 14.7 percent in April 2020. Gross domestic product also tumbled, falling 5 percent and 31.4 percent in the first and second quarters of 2020, respectively.

In response to this economic fallout, the Federal Reserve and Congress acted swiftly and decisively to inject liquidity into the financial markets and provide fiscal relief for consumers. In March 2020, the Federal Reserve lowered short-term interest rates to zero and instituted significant asset purchase programs and other lending policies to provide relief to small businesses and municipalities. Also in March 2020, Congress passed the CARES Act to provide expanded and extended unemployment benefits and rebates for qualified taxpayers. The CARES Act also helped small businesses to make payroll and cover other expenses.

These monetary and fiscal measures were effective in stabilizing financial markets and providing relief to taxpayers, businesses and municipalities. Stocks rebounded by over 20 percent in the quarter ended June 30, 2020, and credit

spreads contracted markedly. The rate of unemployment, while still elevated, improved from 14.7 percent in April 2020 to 11.1 percent as of June 30, 2020.

It is expected that the accommodative policies of zero interest rates and quantitative easing programs will persist until the inflation rate exceeds the targeted 2 percent for an extended period. These conditions should provide a positive environment to support strong economic growth in the future. The trajectory of global stock markets and economies will depend on the path of the Covid-19 pandemic, and the development of successful vaccines and therapy programs.

PUBLIC EQUITIES

As of June 30, 2020, approximately \$19.8 billion was invested in public equities, representing 36.2 percent of total assets. The public equity program consists of three components: U.S. equities, international developed equities, emerging markets equities and global equities.

The Terra Maria program, which seeks to identify promising smaller or developing management firms, is an integral part of the public equities asset class. As of June 30, 2020, 76 percent of the public market Terra Maria program was invested in equities, with 47 percent in international stocks. Each of the managers in the Terra Maria program has an active management mandate. A more detailed discussion of the Terra Maria program follows below.

A. U.S. Equities

As of June 30, 2020, approximately \$6.4 billion, or 11.6 percent of total assets, was invested in U.S. public equities. Passively managed U.S. equities totaled \$2.7 billion, while Terra Maria program assets were \$353 million, representing 5.0 percent, and 0.6 percent of total assets, respectively.

U.S. Equity	\$ Millions	% of Total Plan
Passively/Enhanced Managed	\$2,728	5.0%
Terra Maria Program	\$353	0.6%
Total U.S. Equity	\$6,360	11.6%

For fiscal year 2020, U.S. equities returned 5.0 percent, compared to 6.5 percent for its benchmark, the Russell 3000 Index.

B. International Equities

As of June 30, 2020, approximately \$3.7 billion, or 6.7% of total assets, was invested in international equities, nearly all of which was managed actively. Terra Maria assets were \$1.1 billion, representing 2.0% total assets. As more fully described below, in 2009 the System instituted a currency overlay program which is designed to protect the value of some foreign equities in a rising dollar environment.

International Equity	\$ Millions	% of Total Plan
Actively Managed	\$2,476	4.5%
Terra Maria Program	\$1,099	2.0%
Currency Overlay	\$11.1	0.1%
Total International Equity	\$3,692	6.7%

For fiscal year 2020, international equities, including the impact of the currency overlay program, returned -2.8%, compared to -5.4% for its benchmark, the MSCI World ex-U.S. Index.

C. Emerging Market Equities

As of June 30, 2020, approximately \$5.5 billion, or 10.0% of total assets, was invested in emerging market equities. Actively managed assets outside of the Terra Maria program totaled \$5.0 billion, Terra Maria assets were \$331 million, and passively-managed assets were \$29 million, representing 9.2%, 0.6%, and 0.1% of total assets, respectively.

Emerging Equity	\$ Millions	% of Total Plan
Passively Managed	\$29	0.1%
Actively Managed (excluding T.M.)	\$5,045	9.2%
Terra Maria Program	\$331	0.6%
Total Emerging Markets Equity	\$5,466	10.0%

For the fiscal year, the portfolio returned -4.7% compared to -3.4% for the MSCI Emerging Market Index.

D. Global Equities

As of June 30, 2020, approximately \$4.3 billion, or 7.8% of total assets was invested in global equities, which includes both U.S. and foreign stocks. This portfolio is comprised of 100% active mandates.

Global Equity	\$ Millions	% of Total Plan
Actively Managed	\$4,270	7.8%
Total Emerging Markets Equity	\$4,270	7.8%

For the fiscal year, the portfolio returned 10.4% compared to 2.1% for the MSCI AC World Index.

CURRENCY OVERLAY PROGRAM

The currency overlay program was implemented in May of 2009. An objective of the program is to provide insurance against a strengthening dollar, which could negatively impact returns from foreign currency denominated equities. The manager in this program uses a systematic currency overlay strategy and generally, does not make fundamental currency valuation assessments. The strategy is also dynamic in that the degree to which currency hedging is applied changes depending on currency market conditions. The manager in this program tends to use low hedge ratios when the dollar is weak, and high hedge ratios when the dollar is strong.

During fiscal year 2020, the currency program enhanced returns in the System's foreign equity holdings, as the U.S. dollar strengthened relative to other currencies. The currency hedging program generated \$36.3 million in value during the fiscal year. In addition to generating positive results during fiscal year 2020, the currency program has served to reduce volatility and improve the risk/return profile of the System's non-U.S. equity exposure since its inception.

PRIVATE EQUITY

As of June 30, 2020, private equity totaled \$7.8 billion, or 14.2% of total assets. This asset class includes buyouts, growth equity, venture capital, secondaries and funds-of-funds.

In fiscal year 2020, commitments were made to 21 private equity funds, totaling \$2.2 billion. Since the inception of the private equity program in fiscal year 2005, \$17.8 billion in commitments have been made to 246 different funds. Unfunded commitments totaled \$6.2 billion as of June 30, 2020. Future commitments will follow a pacing model designed to maintain the 13% allocation target for invested assets. In fiscal year 2020, the private equity program returned 2.5%, compared to negative 1.9% for its benchmark, the State Street Private Equity Index. This return is net of all fees, expenses and carried interest.

RATE SENSITIVE

As of June 30, 2020, the rate sensitive portfolio represented \$10.2 billion, or 18.6% of total assets. The rate sensitive portfolio returned 18.1% for the year, compared to 17.2% for its blended benchmark: 53% BBG Barclays US Government Long Bond Index, 13% BBG Barclays US Investment Grade Corporate Index, 13% BBG Barclays US Securitized Index, and 21% BBG Barclays US TIPS Index.

CREDIT/DEBT STRATEGIES

The credit/debt strategies portfolio totaled approximately \$5.1 billion, representing 9.3% of total plan assets as of June 30, 2020. Investments in this asset class are held in both liquid and illiquid structures. Typical asset types in the portfolio include: mezzanine and distressed debt, high yield bonds, bank loans, and emerging market debt. The portfolio has a blended benchmark of 78 percent U.S. (80% BBG Barclays U.S. Corporate High Yield Index, 20% S&P LSTA Leveraged Loan Index), and 22% Non-U.S. (50% BBG Barclays EM Local Government Index -30 bps, 25% BBG Barclays EM Hard Currency Sovereign Index, 25% BBG Barclays EM USD Corporate Index). The portfolio returned -0.4% for the fiscal year, versus -0.1% for its benchmark.

REAL ASSETS

The real assets portfolio totaled approximately \$6.5 billion, representing 11.8% of total assets as of June 30, 2020. The objectives of this asset class are to provide a level of protection against inflation, and to enhance diversification for the total fund. As of June 30, 2020, the largest component of the asset class was real estate, totaling \$4.6 billion, or 8.4% of total assets. The remaining assets consisted of investments associated with natural resources and infrastructure totaling \$1.8 billion or 3.4% of total assets.

The real assets portfolio returned -5.4% for the fiscal year, compared to -2.3% for its blended benchmark, which consists of approximately 70% real estate with the remainder in natural resources and infrastructure. Real estate achieved a 1.3% return, versus the real estate benchmark return of 3.2%. Much of the underperformance was due to a mismatch in how the benchmark and portfolio account for fees. The benchmark was reported gross of fees, while the System's performance is reported net of all fees, the difference equaling roughly ninety basis points. Going forward, the benchmark returns will be reported on a net of fee basis, consistent with the accounting of the portfolio. The natural resources and infrastructure portion of the portfolio underperformed its benchmark by 4.9%, as the private natural resources portfolio underperformed the public benchmark.

ABSOLUTE RETURN

The absolute return portfolio totaled approximately \$4.3 billion, representing 7.8% of total assets as of June 30, 2020. The portfolio consists of event-driven, global macro, relative value, and opportunistic funds. Its goal is to provide diversification for the total plan through its low correlation to the broad financial markets. The absolute return portfolio returned -2.5%, compared to the 0.6% return for its benchmark, Hedge Funds Research, Inc. (HFRI) Fund of Funds Index: Conservative +1%.

TERRA MARIA PROGRAM

As previously mentioned, the Terra Maria program seeks to identify promising smaller or developing managers. The four public market program managers serve as an extension of staff to source investment managers, perform manager due diligence, monitor managers and prepare manager "hire/fire" and funding recommendations. The managers include Attucks Asset Management, Capital Prospects LLC, Xponance, Inc., and Leading Edge Investment Advisors.

Terra Maria publicly-traded assets totaled approximately \$2.5 billion, or 4.5 percent of total assets at June 30, 2020. The program returned -2.3% for the fiscal year, underperforming its custom benchmark return of -2.1%. The relative performance results have remained positive since the April 2007 inception of the program. The System also invests in emerging managers in other asset classes. In private equity, the System has committed \$1.17 billion to developing managers that are minority and women-owned firms.

At the end of fiscal year 2020, \$11.1 billion, or 20.2 percent of the System's total assets, were managed by minority and women-owned firms.

INVESTMENT MANAGEMENT FEES

The asset allocation of the System is the primary determinant of return. The asset allocation is also the primary determinant in the cost of investing the assets. Thirty-one percent of the policy allocation does not have public market benchmarks and therefore does not have a passive option for implementation. These alternative assets such as closed-end limited partnerships used for private equity, infrastructure and some real estate, in addition to open-end partnerships used for real estate and hedge fund strategies are included in the asset allocation with the objective of earning higher returns over time, reducing risk by providing returns that are differentiated from stock and bond returns, or for both reasons.

These alternative assets are typically structured as limited partnerships with embedded profit sharing provisions to motivate the manager to make profitable investments, and to ensure alignment of interests. Carried interest represents the portion of the investment profits that is earned by managers, and is only paid if performance thresholds are achieved. The percentage of profits that is allocated to the manager is substantially lower than the amount received by the System. Because of this disproportionate sharing of profits, the amounts realized by the System far exceed any incentive earned by investment managers. Large amounts of carried interest should be considered a positive result, as this would imply much greater gains to the System. In calendar year 2019, the System realized an estimated \$623.5 million in profits from these private alternative investments, while the investment managers, or general partners, earned roughly \$127.2 million in carried interest incentives.

The Board is mindful of the negative effects fees have on net investment performance and is committed to aggres-

sively negotiating fair and reasonable terms to mitigate the drag on performance, while maintaining exposure to investments that exhibit positive risk and return characteristics in a total portfolio context.

CONCLUSION

The System experienced a volatile and challenging fiscal year ended June 30, 2020, as the effects of the COVID-19 pandemic largely halted the global economy for the better part of three months. As a result of this contraction in economic activity, most risk-related assets produced low, or negative, returns for the fiscal year. That the System was able to achieve a positive return of 3.57 percent over this stressed period is testament to the balanced and diversified profile of the investment portfolio. The asset allocation is structured such that various parts of the fund are expected to perform differently during various economic regimes. Fiscal year 2020 was marked by high volatility, a sharp recession, a spike in unemployment and credit spreads, and interest rates that fell to zero. In this scenario, the asset class that is expected to perform best is long-duration Treasury bonds. The System has significant exposure to these types of securities, which generated a positive return of 18.1 percent. Without such a diversified asset allocation, the System's return for the fiscal year would have been much lower. While we do not know when financial markets will experience heightened volatility and stock market drawdowns, history tells us they are inevitable. It is for this reason the Board of Trustees has adopted an asset allocation that can meet the actuarial return assumption over time, with a prudent and responsible level of risk.

Respectfully submitted,



Andrew C. Palmer CFA
Chief Investment Officer



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MARYLAND STATE RETIREMENT AND PENSION SYSTEM

INVESTMENT PORTFOLIO SUMMARY as of June 30, 2020 and 2019 (Expressed in Thousands)

	2020		2019	
	Fair Value	% of Fair Value	Fair Value	% of Fair Value
Rate Sensitive				
Fixed Income	\$ 8,144,500	14.8%	\$ 8,159,802	15.0%
Inflation linked bonds	2,443,622	4.5	2,159,487	4.0
(1) Cash (non-manager)	269,703	0.5	263,206	0.5
(2) Net cash & cash equivalents (manager)	-401,787	-0.7	-504,851	-0.9
Total Rate Sensitive	10,456,038	19.1	10,077,644	18.6
Credit				
Hight Yield Bond/Bank Loans	3,929,373	7.2	3,471,772	6.4
Emerging markets debt	1,047,458	1.9	1,013,022	1.9
(2) Net cash & cash equivalents (manager)	139,911	0.3	356,041	0.7
Total Credit	5,116,742	9.4	4,840,835	9.0
Equity				
Domestic stocks	6,270,704	11.4	6,565,295	12.1
Emerging markets stocks	5,356,659	9.8	5,017,336	9.3
Global stocks	4,151,508	7.6	4,013,443	7.4
International stocks	3,481,978	6.4	3,794,391	7.0
(2) Net cash & cash equivalents (manager)	526,726	1.0	322,607	0.6
Total Public Equity	19,787,575	36.2	19,713,072	36.4
Private Equity	7,802,533	14.2	7,604,200	14.0
Total Equity	27,590,108	50.4	27,317,272	50.4
Absolute Return	4,265,309	7.8	4,013,023	7.4
Real Estate (includes private)	4,607,054	8.4	5,064,575	9.3
Multi Asset	768,693	1.4	651,962	1.2
Natural Resources & Infrastructure	1,827,326	3.3	2,132,249	3.9
(2) Net cash & cash equivalents (manager)	135,822	0.2	107,045	0.2
Total Portfolio	\$ 54,767,092	100.0%	\$ 54,204,605	100.0%

(1) Securities lending collateral payable has been netted against the actual collateral. The amounts net to zero.

(2) Includes investment receivables and payables.

Note: This schedule includes assets invested on behalf of the Maryland Transit Administration.

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

INVESTMENT PORTFOLIOS BY MANAGER

as of June 30, 2020

(Expressed in Thousands)

	Fair Value	Investment Advisory Fees		Fair Value	Investment Advisory Fees
Public Equity			Fixed Income Manager		
RhumbLine Advisors	\$ 3,738,585	\$ 1,270	SState Street Global Advisors	\$ 1,504,511	\$ 870
D E Shaw & Co., LP	1,981,578	5,738	Pacific Investment Management Company	3,076,517	4,348
AQR Capital Management, LLC	1,254,996	3,293	Western Asset Management	2,397,483	4,009
Baillie Gifford & Company	1,973,366	7,262	Pine Bridge Investments LLC	659,105	969
Dimensional Fund Advisors, Inc.	698,791	5,661	Capital Prospects, LLC (1)	674,905	1,420
Durable Capital Partners	535,574	278	MetLife Investment Management	510,390	1,310
T. Rowe Price Associates, Inc.	1,166,857	3,421	TIPS MD	2,347,414	N/A
Marshall Wace	891,120	2,840	Credit Suisse Asset Management	384,227	987
Axiom International Investors	989,383	6,287	Double Line US Securitized	447,446	653
Longview Partners Ltd.	653,951	3,582	Dodge & Cox	367,663	627
FIS Group, Inc.(1)	590,374	4,032	MD Long Government Bonds	1,189,532	N/A
Artisan Partners Limited Partnership	613,350	2,830	VOYA TALF Opportunity Fund	20,000	0
RWC Partners Emerging Markets	290,294	660	Cash & Cash Equitization	269,703	N/A
TT International	654,670	3,097	Nominal FI Income Structural/Tactical	215,321	N/A
Westwood Global Investment	593,379	3,809	Other (2)	8,742	60
Brown Capital Management	614,090	2,950	Total Fixed Income	\$ 14,072,959	\$ 15,253
Attucks Asset Management, LLC (1)	413,118	2,446			
Leading Edge Invest. Advisors, LLC (1)	426,340	2,293	Alternative Investment		
Polunin Capital Management	381,256	3,490	Private Equity Funds (1)	\$ 7,802,533	\$ 108,828
Capital Prospects, LLC (1)	352,678	2,118	Credit/Debt Related (1)	1,499,821	25,458
Equity Long Short (1)	922,701	12,459	Multi-Asset (3)	840,570	1,537
State Street Global Advisors	29,141	101	Absolute Return (1)	4,290,309	66,772
Record Currency Management	14,866	3,727	Real Assets		
Other (2)	7,118	3,228	Natural Resources & Infrastructure (1)	1,865,910	15,838
Total Public Equity	\$ 19,787,576	\$ 86,872	Private Real Estate (1)	4,607,170	39,379
			Record Currency Management	(56)	21
			Other (2)	300	4,140
			Total Alternative Investments	\$ 20,906,557	\$ 261,973
			Total	\$ 54,767,092 (4)	\$ 364,098 (5)

(1) Sub-managers separately listed on the following pages

(2) Consulting fees and/or investment managers no longer under contract as of 6/30/20

(3) Assets that represent the overall allocation.

(4) Includes assets invested on behalf of the Maryland Transit Administration.

(5) Includes management fees allocated to the Maryland Transit Administration.

Note: Investment Advisory Fees represents management fees invoiced or reported on capital statements.

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

ALTERNATIVE INVESTMENTS RELATIONSHIP LISTING

as of June 30, 2020

Private Equity

1315 Capital,LP	CVC Capital Partners VII,LP	Longitude Venture Partners IV, LP
1315 Capital II,LP	Dover Street VII,LP	Madison Dearborn Capital Partners V,LP
Abbott Capital Private Equity Fund III,LP	Equistone Partners Europe Fund IV,LP	Madison Dearborn Capital Partners VI,LP
Adams Street Partners,LLC	Equistone Partners Europe Fund V,LP	Madison Dearborn Capital Partners VII,LP
Advent Central & Eastern Europe IV,LP	Equistone Partners Europe Fund VI,LP	Maryland Innovation Opportunity Fund I
Advent International GPE V-D,LP	Everstone Capital Partners II,LLC	MBK PartnersFund III,LP
Advent International GPE VI-A,LP	Everstone Capital Partners III,LLC	MBK Partners Fund IV,LP
Advent International GPE VIIIB,LP	Frazier Healthcare V,LP	MD Asia Investors,LP
Advent International GPE IX,LP	Frazier Healthcare VI,LP	MDAsia Investors II,LP
Apax Europe VI-A,LP	Frazier Healthcare VII,LP	MD Asia Investors III,LP
Apax Europe VII-A,LP	Frazier Healthcare Growth Buyout Fund VIII,LP	Navis Asia Fund VI,LP
Apax IX	Frazier Healthcare Growth Buyout Fund IX,LP	New Mainstream Capital Fund II,LP
Apollo Investment Fund VII (AIF),LP	Frazier LifeSciences VIII,LP	New Mainstream Capital Fund III,LP
Apollo Investment Fund VIII (AIF),LP	Frazier LifeSciences IX,LP	New Mountain Partners III,LP
Apollo Investment Fund IX, LP	Frazier LifeSciences X,LP	New Mountain Partners IV,LP
Arcadia II Beteiligungen BTGmbH&Co	Frontier Fund III,LP	New Mountain Partners V,LP
Astorg VI	Frontier Fund IV,LP	North Sky CleanTech Fund IV,LP
Astorg VII	Frontier Fund V,LP	Orchid Asia V,LP
Audax Private Equity Fund II,LP	GGV Capital VII,LP	Orchid Asia VI,LP
Audax Private Equity Fund III,LP	GGV Capital VII Plus,LP	Orchid Asia VII,LP
Audax Private Equity Fund IV,LP	GGV Discovery II,LP	PAG Asia Capital II,LP
Audax Private Equity Fund V,LP	Goldman Sachs Vintage Fund V,LP	PAG Asia Capital III,LP
Audax Private Equity Fund VI,LP	Great Hill Equity Partners IV,LP	Pacific Equity Partners V,LP
Bain Capital Asia Fund III	Great Hill Equity Partners V,LP	Partners Group Secondary 2008 ,LP
Bain Capital Asia Fund IV	Great Hill Equity Partners VI,LP	Partners Group Secondary 2011,LP
Bain Capital Europe Fund IV,LP	Green Equity Investors VII	Partners Group Emerging 2011,LP
Bain Capital Europe Fund V,LP	Harbour Vest Partners VI-Partnership	Partners Group Secondary 2015,L,LP
Bain Capital Life Sciences Fund, LP	Fund,LP	Point 406 Ventures II,LP
Bain Capital LifeSciences Fund II,LP	Hellman&Friedman Capital Partners VI,LLC	Point 406 Ventures III,LP
Bain Capital Fund IX,LP	Hellman&Friedman Capital Partners VII,LLC	Point 406 Ventures 2016 Opportunities Fund
Bain Capital IX Coinvestment Fund,LP	Hellman&Friedman Capital Partners VIII,LLC	Point 406 Ventures Opportunities Fund II
Bain Capital Fund X,LP	Hellman&Friedman Capital Partners IX,LLC	Point 406 Ventures IV,LP
Bain Capital X Coinvestment Fund,LP	HgCapital 5,LP	Roark Capital Partners IV,LP
Bain Capital Fund XI,LP	HgCapital 6A,LP	Roark Capital Partners V,LP
Bain Capital Fund XII,LP	HgCapital 7C,LP	Silver Lake Partners V,LP
Baring Asia Private Equity Fund VI,LP	HgCapital 8A,LP	TA Associates X,LP
Baring Asia Private Equity Fund VII,LP	HgCapital Mercury A,LP	TA Associates XI,LP
Black River Capital Partners Fund (Agr.A)LP	Institutional Venture Partners XV	TA Associates XII,LP
Blackstone Capital Partners VI,LP	Institutional Venture Partners XVI	TA Associates XIII,LP
Blackstone Capital Partners VII,LP	Jade Equity Investors	TDR Capital III,LP
Blue Wolf Capital Fund III,LP	Landmark Equity Partners XIV,LP	TDR Capital IV,LP
Blue Wolf Capital Fund IV,LP	Landmark Equity Partners XV,LP	Thoma Bravo Fund XII,LP
Bridgepoint Europe Fund V,LP	Landmark Equity Partners XVI,LP	Thoma Bravo Fund XIII,LP
Bridgepoint Europe Fund VI,LP	Landmark Equity Partners Co-Investment	Tiger Iron Old Line Fund,LP
CDH Fund V,LP	Fund XVI,LP	Tiger Iron Old Line Fund II,LP
Charterhouse Capital Partners VIII,LP	Lexington Capital Partners,VII	TPG Partners VI,LP
ChrysCapital VIII, LLC	Lexington Middle Market Investors III,LP	TPG Partners VII,LP
Clayton, Dubilier&Rice Fund VIII,LP	Lexington Middle Market Investors IV,LP	Vista Equity Partners Fund IV,LP
Clayton, Dubilier&Rice Fund IX,LP	Lexington Co-Investment Partners IV	Vista Equity Partners Fund V,LP
Clayton, Dubilier&Rice Fund X,LP	Lightspeed Opportunity Fund,LP	Vista Equity Partners Fund VI,LP
Clearlake Capital Partners III,LP	Lion Capital Fund I,LP	Vista Equity Partners Fund VII,LP
Clearlake Capital Partners IV,LP	Littlejohn Fund III,LP	Vista Foundation Fund II,LP
Clearlake Capital Partners V,LP	Littlejohn Fund IV,LP	Vista Foundation Fund III,LP
Clearlake Capital Partners VI, LP	Littlejohn Fund V,LP	Vista Foundation Fund IV,LP
Coller Capital Partners VI,LP	Littlejohn Fund VI,LP	Vistria Fund I,LP
Coller Capital Partners VII,LP	LLR Equity Partners IV,LP	Vistria Fund II,LP
Coller Capital Partners VIII, LP	LLR Equity Partners V,LP	Vistria Fund III,LP
Crescent Capital Partners IV,LP	Lombard Asia IV,LP	Wind Point Partners VII,LP
Crescent Capital Partners V,LP	Longitude Venture Partners III,LP	Wind Point Partners VIII,LP
CVC European Equity Partners V-B,LP	Longitude Venture Partners III,LP	Wind Point Partners IX

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

ALTERNATIVE INVESTMENTS RELATIONSHIP LISTING

as of June 30, 2020

Private Real Estate

(continued)

AEW Senior Housing Fund II,LP	JP Morgan Investment Management Inc	Rockwood Capital RE Partners Fund VIII,LP
AEW Senior Housing Fund IV,LP	Lasalle Property Fund	Rockwood Capital RE Partners Fund IX,LP
Carmel Partners Investment Fund VII	Lion Industrial Trust	Scout Fund II,LP
CBRE US Core Partners	Lone Star Real Estate Fund II,LP	Starwood Hospitality Fund II,LP
CBRE Strategic Partners US Value7,LP	Lone Star Real Estate Fund III,LP	Tristan Capital-European Special Opps3
Covenant Apartment Fund VII	Lone Star Real Estate Fund IV,LP	Tristan Capital-European Special Opps4
Federal Capital Partners Fund II	Lone Star Real Estate Fund V,LP	Tristan Capital-European Special Opps5
Federal Capita lPartners Fund III	Lone Star Real Estate Fund VI,LP	UBS Trumbull Property Fund
Frogmore Real Estate PartnersII,LP	Lubert Adler Real Estate Fund VI	Waterton Residentia lProperty Venture XIII
GI Partners Fund III,LP	Lubert Adler Real Estate Fund VI-A	
GI Partners Fund IV,LP	Morgan Stanley Prime Property Fund,LLC	
Heitman America Real Estate Trust	Realty Associates Fund X	

Real Return

Alinda Infrastructure Fund II, LP	Global Timber Investors 9	Quantum Energy Partners IV, LP
Domain Timber Investments	Hancock Timberland X, LP	Quantum Energy Partners V, LP
EIF US Power Fund IV, LP	Harvest Fund Advisors, LLC	Quantum Energy Partners VI, LP
Energy and Minerals Group V, LP	Natural Gas Partners X, LP	Quantum Energy Partners VII, LP
Energy and Minerals Group V-Accordion, LP	Natural Gas Partners XI, LP	RMS Forest Growth III,LP
First Reserve Fund XII, LP	NGP Natural Resources XII	Tortoise Capital Advisors, LLC
First Reserve Fund XIII, LP	NGP Midstream & Resources, LP	White Deer Energy, LP

Absolute Return

1977 Merger Arbitrage Fund	Exodus Point	Nimbus Weather Fund Ltd
Aristeia Capital	Fort Global Contrarian	Petershill Private Equity
Aristeia-Coinvest	Graham Tactical Trend	Petershill Private Equity IV
BlackRock Absolute Return Structural	HSCB Bermuda Fund LTD	Pharo Gaia Fund, LTD
Bridgewater All Weather	Hudson Bay Fund	SGM Co Investment Fund
Bridgewater Pure Alpha	ILS Property &Casualty Fund	Shoals Financial Opportunity Fund, LP
Clover Parallel LLC	King Street Capital, LP	Standard General Fund
Contrarian Emma 2	Kirkoswald Global Macro fund	Tudor Maniyar Macro Fund
DGAM Diversified Strategies Fund	Lone Star Fund XI	Voloridge Fund
Empyrean Capital Fund	Nephia Palmetto Fund	

FIXED INCOME RELATIONSHIP LISTING

as of June 30, 2020

Credit/Debt Related

Alchemy Special Opps. Fund II,LP	EIG Energy Fund XV,LP	Partners Group European Mezzanine 2008,LP
Alchemy Special Opps. Fund III,LP	EIG Energy Fund XVI,LP	Peninsula Fund V,LP
Apollo Credit Opps Fund III,LP	Falcon Strategic Partners III,LP	Perella Weinberg Partners
CarVal Credit Value Fund A,LP	Falcon Strategic Partners IV,LP	Prudential Capital Partners III,LP
CarVal Credit Value Fund A II,LP	Garda Firvo	Prudential Capital Partners IV,LP
CarVal Credit Value Fund A III,LP	GSO Credit Alpha Fund II	Shamrock Capital Content Fund II, LP
CarVal Credit Value Fund A IV,LP	HCR Potomac Fund	Shoreline China Value Fund III,LP
CarVal Credit Value Fund A V,LP	Healthcare Royalty Partners IV	TA Subordinated Debt Fund III,LP
CVI Chesapeake Credit Opps. Fund, LP	KKR Mezzanine Partners I,LP	Varde Fund X,LP
Castle Lake III,LP	Merit Mezzanine Fund V,LP	Voya Talf Opportunity Fund
Castle Lake IV,LP	Oaktree European Principal Fund III,LP	Wayzata Opportunities Fund III,LP
Castle Lake V,LP	Oaktree Opportunity Fund VIII,LP	Whitehorse Liquidity Partners III, LP
Castlelake Aviation IV Stable Yield Opps. LP	Oaktree Opportunity Fund VIII,LP	
Castlelake Aviation IV Stable Yield , LP	Oaktree Principal Fund V,LP	
Crescent Capital Mezzanine Partners VI, LP	Park Square Capital Partners II,LP	

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

TERRA MARIA PROGRAM
as of June 30, 2020

Terra Maria Program

Attucks Asset Management

Arga Investment Management,LP
Globeflex Capital,LP
Metis Global Partners
Paradigm Asset Management Company,LLC
Redwood Investments,LLC

Capital Prospects LLC

Birch Run Investments
Bridge City Capital, LLC
Garcia Hamilton and Associates
Inview Investment Management, LLC
Lebenthal Lisanti Capital Management, LLC
Longfellow Investment Management
LM Capital Group
Matarin Capital Management
New Century Advisors
Pacific Ridge Capital Partners
Pacific View Asset Management
Piedmont Investment Advisors ,LLC
Profit Investment Management
Pugh Capital Management
Ramirez Asset Management
Semper Capital Management
Sky Harbor Capital Management

Xponance

Algert Global, LLC
Arga Investment Management, LP
Ativo Capital Management,LLC
Denali International Small Value
EAM Investors
FIS Emerging CIT
Aubrey Capital Management
Bayard Asset Management
Change Global Investment
Channing Global
FIS Tactical Completion Fund
Global Alpha Capital Management
Lizard Partners, LLC
Metis Global Partners

Leading Edge Investment Advisors

Ativo Capital Management
Blackcrane Capital LLC
BlackCreek Investment Management,Inc.
Henry James International
Redwood Investments, LLC
Strategic Global Advisors

Bold denotes Program Manager for the Terra Maria Program

EQUITY RELATIONSHIP LISTING

as of June 30, 2020

Public Equity

Axiom International Investors	Marshall Wace TOPS China (Long/Short)	RWC Partners Emerging Markets
Baillie Gifford	Marshall Wace TOPS Emerging Markets	T. Rowe US Structured
DFA Emerging Mkts	(Long/Short)	Voloridge Fund, LP
Durable Capital Partners	Polunin Capital Management	

Equity Hedge

Indus-Pacific Opportunities Fund
Marshall Wace Eureka Fund

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

EQUITY COMMISSIONS TO BROKERS

for the Fiscal Year Ended June 30, 2020

(Expressed in Thousands)

Brokers (1)	Total Shares	Total Commission
J P Morgan Securities	161,263	\$ 575
CLSA Singapore	41,902	554
Instinet	111,485	408
Macquarie Bank Limited	115,597	396
Goldman Sachs	109,203	386
UBS Securities	96,111	337
Cowen Execution Services	19,918	293
Credit Suisse Securities	180,067	282
Merrill Lynch	119,835	269
Morgan Stanley	145,338	261
BOFA Securities	36,348	251
Loop Capital Markets	13,630	224
Jefferies & Company	32,618	196
Citigroup Global Markets	41,862	172
B.Riley & Co LLC	5,729	171
BNP Paribas Securities	43,086	159
State Street Global Markets	13,322	125
Abel Noser	2,458	123
Other Broker Fees	350,061	2,396
Total Broker Commissions	<u>1,639,833</u>	<u>\$ 7,578</u>

*(1) Proceeds from the sale and disbursements for the purchase of securities are reported net of brokers' commissions. As such, brokers' commissions are not included as investment expenses on the Statement of Changes in Plan Net Assets. Other broker fees include **159** brokers each receiving less than \$100,000 in total commissions.*

For the fiscal year ended June 30, 2020, total broker commissions averaged .46 cents per share.

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

LARGEST STOCK & BOND HOLDINGS AT MARKET as of June 30, 2020

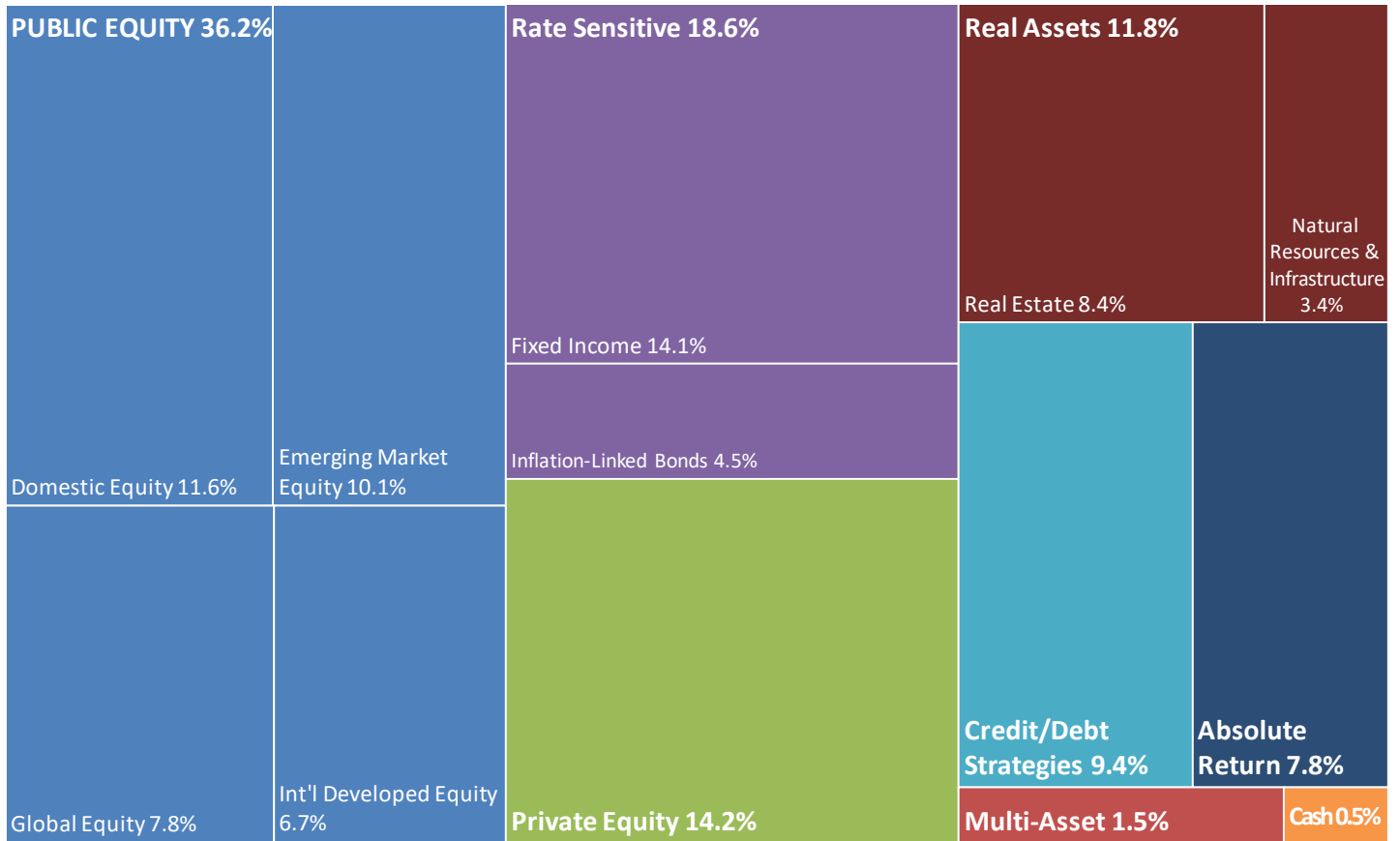
EQUITY INCOME SECURITIES:	Shares	Fair Value
Apple Inc.	767,074	\$ 279,828,595
Amazon.com Inc.	100,444	277,106,916
Microsoft Corporation	1,357,315	276,227,176
Alibaba Group Holding SP ADR	637,044	137,410,391
Facebook Inc Class A	553,804	125,752,274
Tesla Inc.	106,671	115,184,413
Tencent Holdings Ltd.	1,696,600	109,145,244
Alphabet Inc. Class A	69,003	97,849,704
Roche holding AG	263,194	91,203,366
Alphabet Inc. Class C	63,370	89,580,466
Taiwan Semiconductor Manufacturing Co. Ltd.	7,777,459	82,507,572
Johnson & Johnson	549,519	77,278,857
UnitedHealth Group Inc.	248,178	73,200,101
Procter & Gamble Co.	556,238	66,509,378
Illumina Inc.	177,344	65,679,350

FIXED INCOME SECURITIES:	Par Value	Fair Value
United States Treasury Bonds, 4.375% Nov 15, 2039	\$ 175,200,000	\$ 275,487,984
United States Treasury Bonds, 2.875% May 15, 2043	196,000,000	256,048,520
United States Treasury Inflation Linked, 0.625% Apr 15, 2023	243,995,582	253,699,286
United States Treasury Bonds, 3.375% Nov 15, 2048	157,670,000	231,688,182
United States Treasury Inflation Linked, 3.875% Apr 15, 2029	151,753,249	214,485,007
United States Treasury Bonds, 3.625% Aug 15, 2043	129,650,000	189,370,680
United States Treasury Bonds, 3.125% May 15, 2048	134,575,000	188,604,171
United States Treasury Bonds, 3% May 15, 2047	134,324,000	183,090,328
United States Treasury Inflation Linked, 0.5% Jan 15, 2028	165,718,334	181,660,438
United States Treasury Inflation Linked, 3.625% Apr 15, 2028	129,491,869	174,244,258
United States Treasury Bonds, 3% Nov 15, 2044	126,500,000	169,361,995
United States Treasury Inflation Linked, 2.375% Jan 15, 2025	138,813,176	159,718,440
United States Treasury Inflation Linked, 0.125% Apr 15, 2022	150,198,603	152,380,989
United States Treasury Inflation Linked, 0.125% Jan 15, 2023	141,695,993	145,146,291
United States Treasury Bonds, 3% May 15, 2045	107,330,000	144,107,698

A complete list of portfolio holdings is available upon request.

MARYLAND STATE RETIREMENT AND PENSION SYSTEM

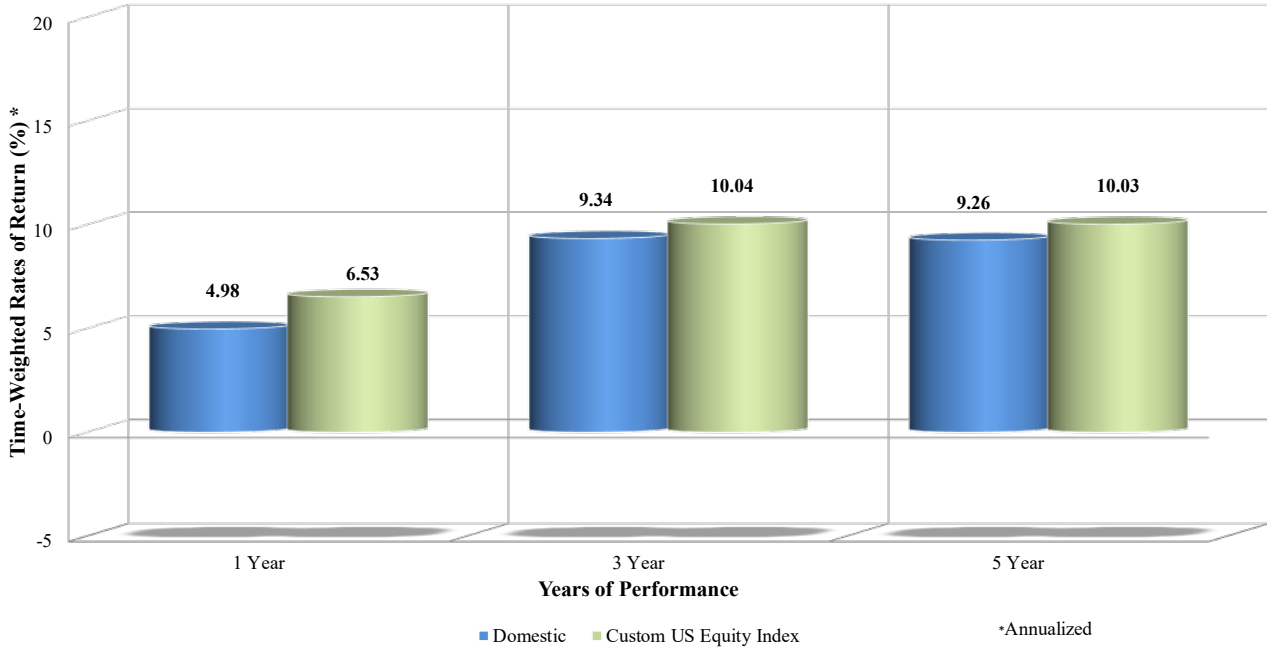
INVESTMENT PORTFOLIO ALLOCATION
as of June 30, 2020



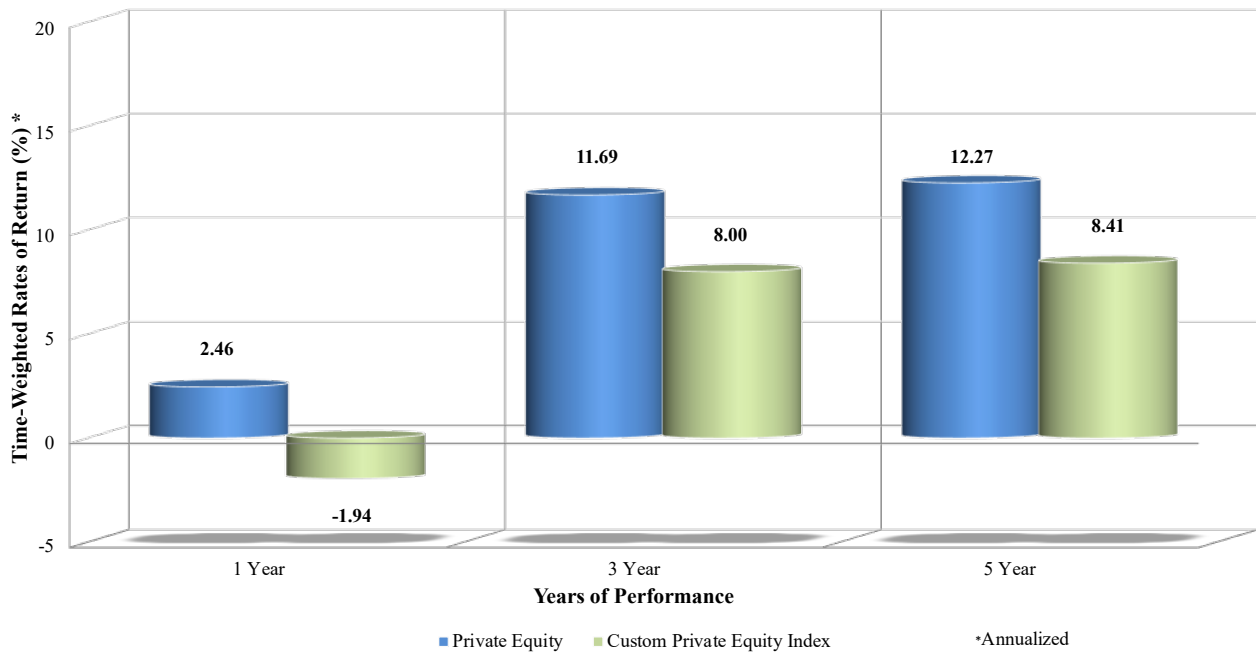
- PUBLIC EQUITY 36.2%
- RATE SENSITIVE 18.6%
- ABSOLUTE RETURN 7.8%
- MULTI-ASSET 1.5%
- CREDIT/DEBT STRATEGIES 9.4%
- REAL ASSETS 11.8%
- PRIVATE EQUITY 14.2%
- CASH 0.5%

MARYLAND STATE RETIREMENT AND PENSION SYSTEM
 COMPARATIVE INVESTMENT RETURNS ENDING JUNE 30, 2020

DOMESTIC EQUITY

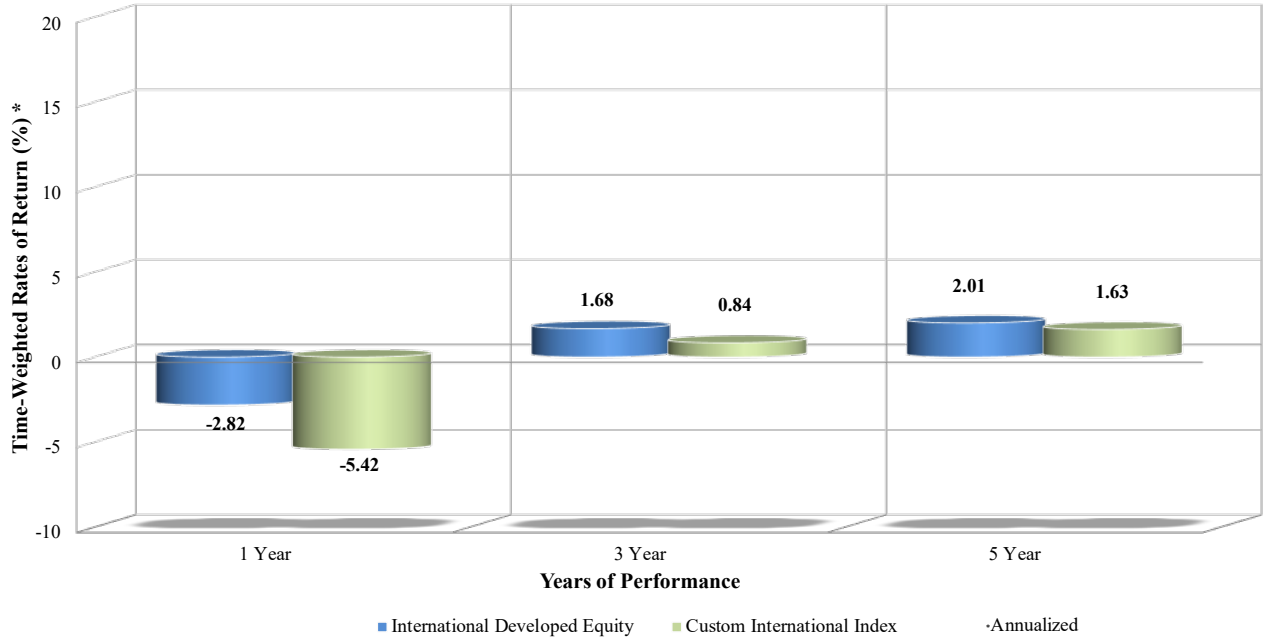


PRIVATE EQUITY

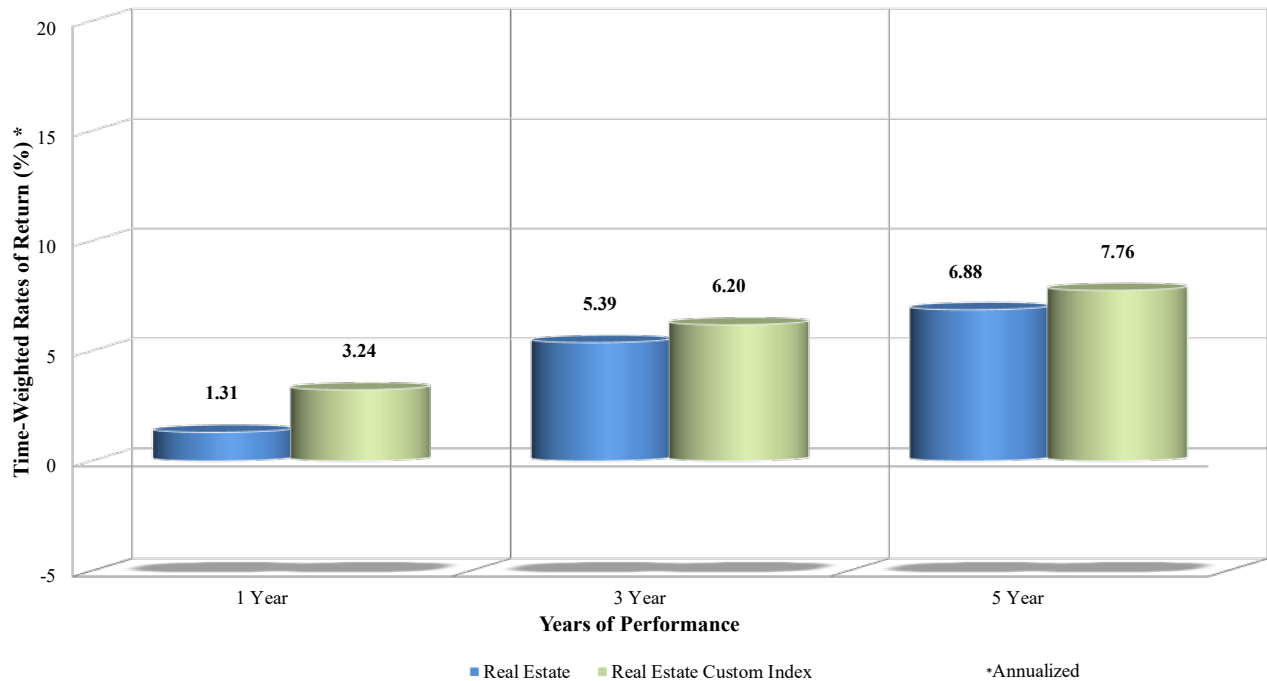


MARYLAND STATE RETIREMENT AND PENSION SYSTEM
 COMPARATIVE INVESTMENT RETURNS ENDING JUNE 30, 2020

INTERNATIONAL DEVELOPED EQUITY

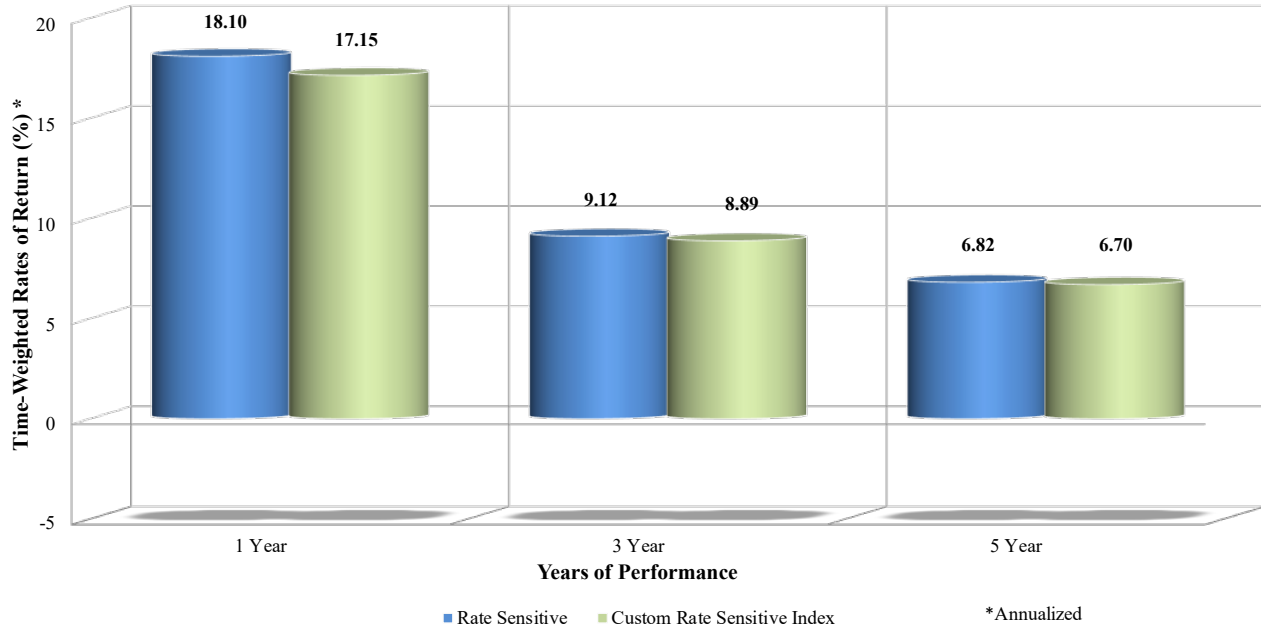


REAL ESTATE

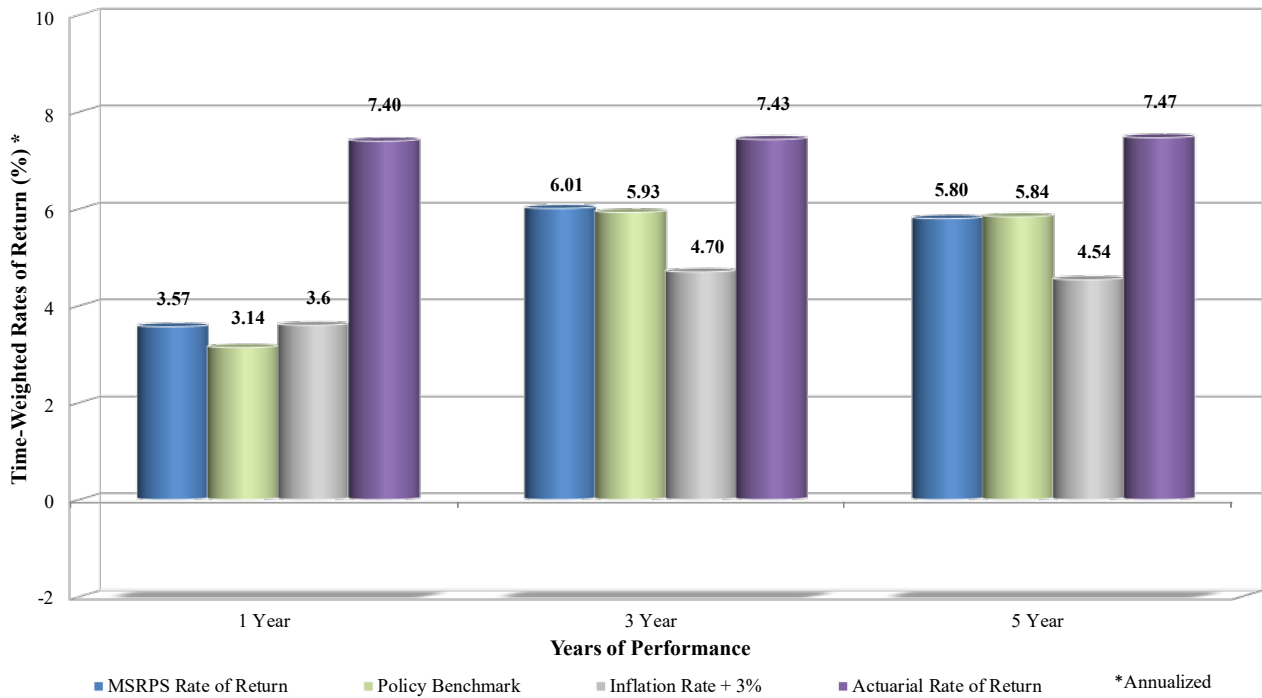


MARYLAND STATE RETIREMENT AND PENSION SYSTEM
 COMPARATIVE INVESTMENT RETURNS ENDING JUNE 30, 2020

RATE SENSITIVE

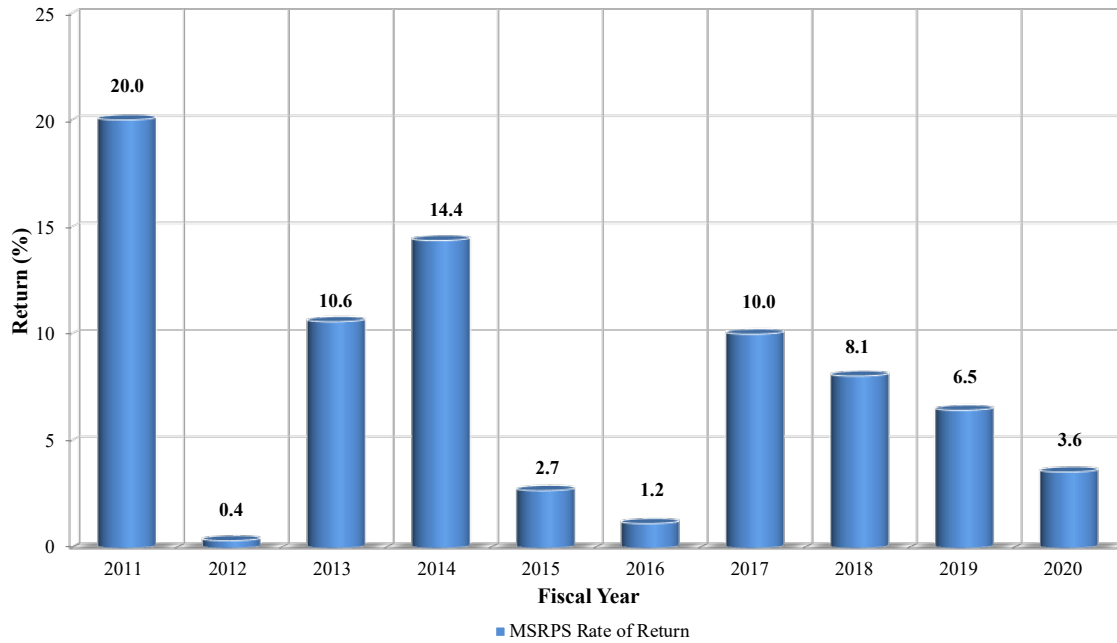


TOTAL PLAN

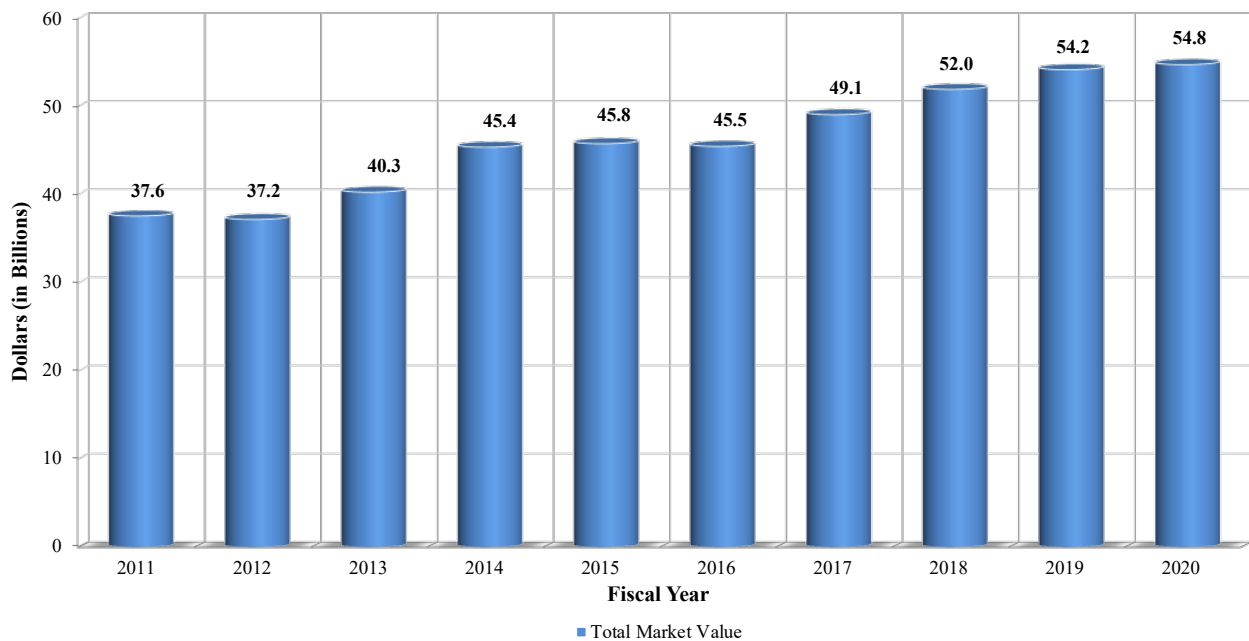


MARYLAND STATE RETIREMENT AND PENSION SYSTEM

TEN-YEAR HISTORY OF TIME-WEIGHTED ANNUAL RETURNS



TEN-YEAR GROWTH OF INVESTMENT PORTFOLIO





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