

Chief Investment Officer's Letter



Ronald D. Schmitz, Chief Investment Officer

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October 16, 2020

To: Members of the Board of Trustees and Participants of the Virginia Retirement System

There is an old saying: “May you live in interesting times.” It seems like that sentiment closely matches our experience during 2020. This year has seen some unique, if not unprecedented, events in a variety of areas: public health, financial markets, economic activity and politics.

The investment staff has temporarily transitioned to a work-from-home environment, as have most of our VRS colleagues. I am pleased to say the transition went smoothly, thanks to the hard work and dedication of the IT staff, senior management, the Board and all employees affected. Business continuity planning has long been considered a best practice in the business world, and it has been gratifying to see those efforts pay off.

The VRS response to the pandemic leads to the discussion of the response of the markets and the VRS portfolio during this time. The global economy and financial markets had an extremely sharp decline in February and March due to COVID-19. The economic recovery has been somewhat uneven, but the markets have come roaring back to achieve levels at or above those existing in the heady pre-pandemic days.

The stock market is forward-looking, and the recovery in market values shows that investors are discounting the short-term hit to revenues and earnings, focusing instead on the outlook for 2021. Between the government stimulus and the expectation of positive developments in vaccines and treatments for COVID-19, the market is clearly expecting a return to normal.

PERFORMANCE OVERVIEW

As shown in the table below, the Total Fund has tended to perform well versus its benchmark for the longer term, generally exceeding the benchmark by about half a percent and above the Board's target excess return. However, the excess return over the last three and five years has been more modest, given some difficulties in the equity and credit portfolios, discussed in the next section of this letter. Given our slightly defensive stance, the return for the current fiscal year was comfortably ahead of the benchmark.

Annualized Return for Periods Ended June 30, 2020:

	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	25 Years
VRS Total Fund	1.4%	5.2%	5.8%	8.1%	6.4%	5.5%	7.8%
Benchmark*	1.0%	5.1%	5.6%	7.6%	6.0%	5.1%	7.2%

Investment return calculations were prepared using a time-weighted return methodology based on market value, net of investment expenses.

* The VRS Total Fund Benchmark is a blend of the asset class benchmarks at policy weights. Benchmarks are selected with the help of a third-party investment consultant.

The investment objective of the VRS Defined Benefit Plan portfolio is to maximize returns while managing risk within an acceptable range. Because of the long-term nature of the plan's liabilities, VRS is a long-term investor with a long planning horizon. The total fund is highly diversified to help mitigate losses from significant market downturns similar to what we saw in the first quarter of 2020. Stocks, bonds, real estate, private equity, private debt, cash and other investment strategies serve to diversify the total portfolio to avoid all assets behaving in the same manner at the same time. Diversification also follows the mandate of the *Code of Virginia* (§ 51.1-124.30(C)) by helping to prevent frequent shifts in participating employers' contribution rates and providing rate consistency from year to year.

The VRS portfolio is positioned to provide diversification across five primary asset classes. Only two of the five primary asset classes outperformed for the fiscal year; however, it is important to note that the Total Fund did outperform its benchmark.

ASSET CLASS COMMENTARY

Figures 3.1 and 3.2, which follow this letter, show the asset allocation of the fund at June 30, 2020, as well as performance by asset class for various periods ending on that date. Comments about each portfolio's structure and holdings follow those graphics.

- The VRS Public Equity team adheres to a philosophy of favoring high-quality stocks that sell at prices below the intrinsic value suggested by current earnings. (Growth stocks – well-known technology names for example – sell at high prices relative to current earnings because of investors' belief that future earnings will be strong.) Value-oriented strategies, such as ours, have tended to underperform in recent years. Growth stocks have done well and are increasingly mispriced as judged by our value-oriented approach. Despite the near-term returns, we are confident in the efficacy of our approach and like to remind stakeholders that a similar phenomenon occurred in the late 1990s when the price of technology stocks moved ahead of their fundamentals. Our strategies performed quite well in the aftermath. We see a similar situation today and remain confident about our prospects going forward.
- Our Credit Strategies portfolio has also been under pressure in the short run. The biggest single driver of strong credit returns in the last year or so has been falling interest rates, which have driven up prices of fixed coupon, or rate-sensitive, securities. The Credit Strategies program is overweight in floating-rate debt, private debt and distressed debt. These positions are not as sensitive to falling interest rates,

and that has caused the program to lag its benchmark in the near term. We remain confident that being exposed to higher yielding private debt, with a first call on assets should a bankruptcy occur, will serve us well across both interest rate and credit cycles in the longer term.

- On a more positive note, Fixed Income, Real Assets and Private Equity all have solid long-term numbers. Fixed Income returns are strong across the board. The VRS team has achieved remarkable consistency in delivering excess returns. The level of outperformance is notable, given that the portfolio does not take much risk relative to its benchmark.
- Real Assets (real estate and other assets such as infrastructure, timber, agriculture and energy) has also been an excellent source of excess returns. Near term, we have experienced some write-downs, especially in the hospitality sector. Longer term, our emphasis on industrial/warehouse and multi-family properties – and underweight to office properties – has been a winner. Digital infrastructure and renewable energy have also been positive contributors to relative performance.
- Private Equity posted strong three-, five- and 10-year results versus its benchmark. In fact, Private Equity delivered returns that were 4% higher per year than Public Equity. That is exactly what we aim to achieve. Assets with a digital or technology focus have been unaffected by the pandemic. More traditional industries have had to engage in cost-cutting exercises and have, in many cases, attempted to shore up their respective balance sheets.

ASSET LIABILITY STUDY

During the fiscal year, the Board completed an asset and liability study. This effort involved long-term projections of liability growth as well as capital market assumptions on returns and risk. The Board maintained a similar risk/reward policy as had previously been in effect; however, there were slight modifications to the asset mix policy portfolio. Public Equity and Private Market asset classes were targeted at slightly lower levels, with an increase in Multi-Asset Public Strategies (MAPS).

These new strategies are an attempt to accomplish various portfolio objectives. The Private Investment Partnerships (PIP) portfolio comprises strategic relationships with two large private market general partners across the real estate, energy and credit opportunity sets. The MAPS portfolios seek value-added returns through active decisions around asset class and industry exposures, as well as through a risk mitigation strategy that attempts to temper volatile equity market return patterns.

MARKET OUTLOOK

The Economist's Intelligence Unit has revised its 2020 global growth estimate downward to -5.1% as of August from -2.5% in April, suggesting that a V-shaped recovery starting in the second half of the year may be fading. Likewise, world trade growth was revised

downward, as were export prices. This data supports a slowing in global recovery in the second half of 2020.

In its September 16 meeting, the Federal Open Market Committee (FOMC) left its upper and lower bounds for Federal Reserve funds unchanged at 0.25% and 0%, respectively. Initial and ongoing jobless claims, while still elevated, continue to decline but at a decelerating pace. Separately, Fed Chair Jerome Powell expressed some uncertainty around maintaining the strength of the current economic recovery.

Consumer price inflation at the end of August was growing annually by 1.3%, well below the Fed's target levels. The Fed has adopted a trailing average inflation target, which means that printed inflation above the target will be tolerated if policy can maintain the band around the target average of 2%. The Fed has stated that it will not hike rates to control inflation until it sees clear signs that inflation is above the target of 2%. Some critics argue that this approach may result in more inflation volatility, possibly igniting protracted inflationary episodes.

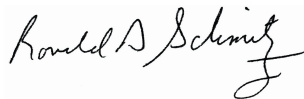
Despite the current lack of inflationary pressures, real average hourly earnings are growing at a 3.3% annual pace, while real average weekly earnings are growing at 3.9%, both offering strong support for growth in personal income and spending.

Given the conditions as described, the macro outlook remains mixed, with strong performance in some sectors like housing and a rebound in manufacturing. But weak advances in capacity utilization would support the Fed's worry that the recovery will continue to lose steam in 2020 without additional fiscal support. Expectations for 2021 remain benign.

A LAST WORD

I want to thank the VRS Board of Trustees and the Investment Advisory Committee for their dedication and support over this past year, as well as my colleagues in VRS administration. My appreciation also goes out to our outstanding team of investment professionals. Together, we will continue to build on VRS' legacy and plan for its future.

Sincerely,



Ronald D. Schmitz
Chief Investment Officer

The Investment Section provides detailed information regarding the structure of the investment portfolio. This information includes performance, asset allocations, portfolio highlights, a list of VRS' money managers and public equity commissions for the fiscal year. The section also presents the System's investment management fees and expenses and an investment summary.

Investment Account

The VRS Board of Trustees has fiduciary responsibility to invest the fund solely in the interest of the beneficiaries of the System. As established by the *Code of Virginia*, "the Board shall invest the assets of the Retirement System with the care, skill, prudence and due diligence that a prudent person acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of like character and with like aims."

Benefit payments are projected to occur over a long period of time, allowing VRS to adopt a long-term investment horizon and asset allocation policy for the management of fund assets. Asset allocation policy is critical because it defines the basic risk and return characteristics of the VRS investment portfolio. Asset allocation targets are established using an asset-liability analysis designed to assist the Board in determining an acceptable volatility target for the fund and an optimal asset allocation policy mix. The asset-liability analysis considers both sides of the VRS balance sheet in order to estimate the potential impact of various asset class mixes on key measures of total plan risk, including the resulting estimated impact on funded status and contribution rates.

The Board delegates authority to the Chief Investment Officer to allocate the System's investments within the approved asset allocation policy and within the Board-approved active risk budget. The total fund active risk budget describes the degree of tolerance for yearly variation in the fund's performance relative to the Total Fund VRS Custom Benchmark. The primary risk measure used for this purpose is Total Fund Tracking Error, calculated as the standard deviation of the difference between the fund's return and the return of the Total Fund VRS Custom Benchmark. From this measure, probability estimates can be derived to help the Board estimate the risk of underperforming the benchmark by certain margins.

The investment staff manages the VRS portfolio on a day-to-day basis according to policies and guidelines established by the Board. The staff manages assets on a direct basis and through outside investment managers. Managers employ both active and passive investment strategies. The Board has established various performance benchmarks to serve as tools for measuring progress toward the achievement of long-term investment goals.

The asset allocation mix of the VRS fund as of June 30, 2020, is shown in Figure 3.1:

FIGURE 3.1: ASSET ALLOCATION MIX

AS OF JUNE 30, 2020

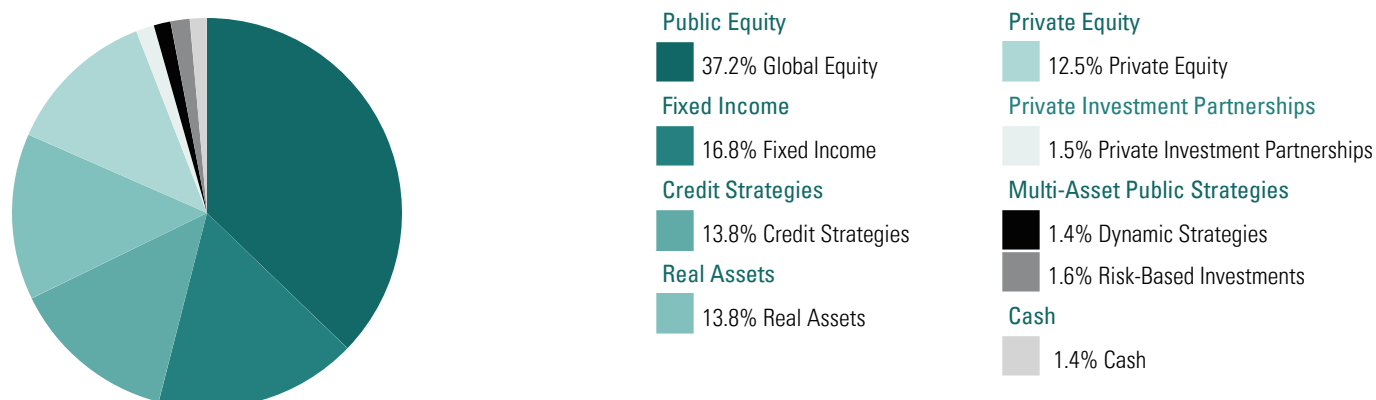


FIGURE 3.2: INVESTMENT PERFORMANCE SUMMARY

ANNUALIZED DATA FOR THE PERIOD ENDING JUNE 30, 2020

	1 Year	3 Years	5 Years	10 Years
1. Total Fund				
VRS	1.4%	5.2%	5.8%	8.1%
VRS Custom Benchmark ¹	1.0%	5.1%	5.6%	7.6%
2. Total Public Equity				
VRS	-0.7%	4.2%	5.2%	9.1%
Custom Benchmark ²	1.3%	5.6%	6.0%	9.0%
3. Total Fixed Income				
VRS	9.5%	5.8%	4.9%	4.5%
Custom Benchmark ³	7.9%	5.1%	4.1%	3.8%
4. Total Credit Strategies				
VRS	0.3%	4.1%	4.7%	6.2%
Custom Benchmark ⁴	1.3%	4.2%	4.7%	5.7%
5. Total Real Assets				
VRS	1.0%	6.0%	8.1%	11.1%
Custom Benchmark ⁵	2.3%	5.5%	7.0%	9.7%
6. Total Private Equity				
VRS	0.8%	10.0%	11.3%	12.8%
Custom Benchmark ⁶	-7.9%	5.1%	6.6%	10.9%
7. Total Private Investment Partnerships				
VRS	-6.4%	3.4%	5.2%	N/A
Custom Benchmark ⁷	-1.7%	5.2%	6.3%	N/A
8. Total Multi-Asset Public Strategies				
VRS	-3.2%	N/A	N/A	N/A
Custom Benchmark ⁸	3.9%	N/A	N/A	N/A

Investment return calculations were prepared using a time-weighted return methodology based on market value, net of investment expenses.

FIGURE 3.2: INVESTMENT PERFORMANCE SUMMARY, cont.

¹ The VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

² Effective February 2020, the Public Equity Custom Benchmark is the MSCI ACWI IMI (net VRS tax rates) Index.

³ Effective January 2020, the Fixed Income Custom Benchmark is a blend of the Bloomberg Barclays Aggregate Bond Index (90%), Bloomberg Barclays U.S. HY Ba/B 2% Issuer Cap Index (5%), and JP Morgan EMBI Global Core Index (5%).

⁴ Effective January 2020, the Credit Strategies Custom Benchmark is a blend of the S&P Performing Loan Index (60%), Bloomberg Barclays U.S. HY Ba/B 2% Issuer Cap Index (30%) and Bloomberg Barclays U.S. Aggregate Bond Index (10%).

⁵ Effective July 2014, the Real Assets Custom Benchmark is the market value weighted blend of the Total Real Estate Benchmark, of which 85% is the NCREIF Private Real Estate Benchmark (ODCE Index (net) lagged by three months) and 15% is the Total REIT Benchmark (FTSE/EPRA/NAREIT Developed REIT Index), and the Other Real Assets Custom Benchmark (the CPI-U Index plus 400 basis points per annum lagged by three months) with modified benchmarking for Other Real Assets during the increased allocation period.

⁶ Effective January 2020, the Private Equity Custom Benchmark is the MSCI ACWI IMI Index (net VRS tax rates) lagged by three months plus 250 basis points per annum with modified benchmarking during the increased allocation period.

⁷ Effective January 2020, the Private Investment Partnerships Benchmark is the weighted average of the custom Private Equity Benchmark (MSCI ACWI IMI Index (net VRS tax rates) lagged by three months plus 250 basis points) (40%), the NCREIF Private Real Estate Benchmark (ODCE Index (net) lagged by three months) (30%), the Other Real Assets Custom Benchmark (the CPI-U Index plus 400 basis points per annum lagged by three months) (10%), the Bloomberg Barclays US HY Ba/B 2% Issuer Cap Index (10%), and the S&P Performing Loan Index (10%).

⁸ Effective July 2018, the Multi-Asset Public Strategies Custom Benchmark is the market value weighted average of the benchmarks of the mandates (Dynamic Strategies and Risk-Based Investments) within the program.

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Portfolio Highlights

PUBLIC EQUITY

The market value of the Total Public Equity Program as of June 30, 2020, was \$31.0 billion, representing approximately 37% of the total fund. The program is dominated by traditional strategies valued at \$23.7 billion or 76.7%. The program also employs equity-oriented hedge fund strategies valued at \$7.2 billion or 23.3%. The objective of the portfolio is to exceed the Custom Benchmark over longer-term periods, net of all costs. The current Custom Benchmark is the MSCI All Country World Index (ACWI) IMI (net of VRS tax rates).

The Traditional Public Equity portfolio had 56% invested in domestic equity and 44% in international equity, and 40% was managed internally.

At fiscal year-end, the ACWI IMI benchmark was comprised of 56.9% of the MSCI U.S. Investible Market Index (IMI), 31.2% of the MSCI World excluding U.S. IMI and 11.9% in the MSCI Emerging IMI.

Traditional Public Equity versus the MSCI ACWI IMI strategic sectors and region weights are as follows:

FIGURE 3.3: TRADITIONAL EQUITY CUSTOM BENCHMARK SECTORS AND REGIONS*

Strategic Sectors	VRS	MSCI ACWI	Regions	VRS	MSCI ACWI
Communication Services	9.76%	8.68%	North America	58.61%	59.71%
Consumer Discretionary	11.00%	11.89%	Europe/Middle East/Africa	18.10%	19.10%
Consumer Staples	8.21%	7.70%	Asia/Pacific	22.16%	20.22%
Energy	2.57%	3.43%	Latin and South America	1.13%	0.97%
Financials	13.12%	13.27%	Total	100.00%	100.00%
Health Care	15.19%	12.87%			
Industrials	8.66%	10.26%			
Information Technology	19.70%	20.05%			
Materials	4.36%	4.95%			
Real Estate	3.25%	3.72%			
Utilities	4.18%	3.18%			
Total	100.00%	100.00%			

* Based on Barra's classification of sectors and regions and excludes cash.

The top 10 holdings in the Total Public Equity Program comprised 7.9% of the program at fiscal year-end. One company, Visa, was replaced by Bristol-Myers Squibb on this year's schedule.

FIGURE 3.4: PUBLIC EQUITY – TOP 10 EXPOSURES*

AS OF JUNE 30, 2020

Company	Fair Value	Shares
Microsoft	\$ 484,862,168	2,382,498
Apple	363,657,082	996,867
Alphabet	280,850,173	198,385
Amazon.com	262,366,541	95,101
Johnson & Johnson	246,101,937	1,749,996
Roche Holding	214,417,003	618,763
Verizon Communications	164,089,428	2,976,409
MasterCard	141,125,782	477,260
Facebook	140,615,595	619,261
Bristol-Myers Squibb	140,404,835	2,601,627

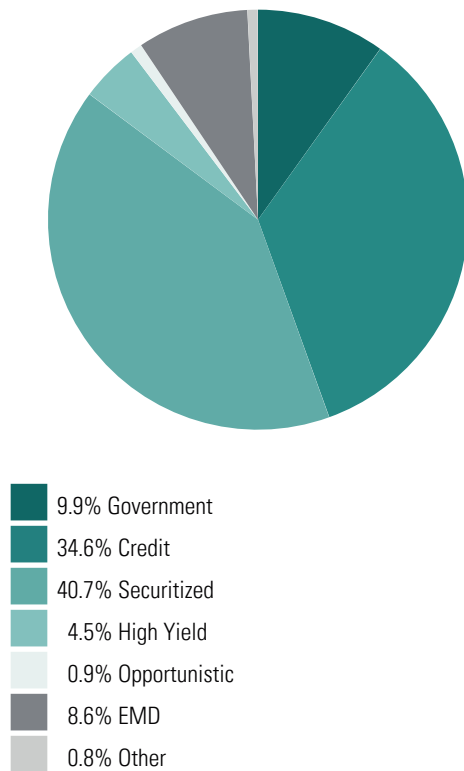
* Aggregated various share classes based on parent company. Refer to the "More Information" section on page 158 for details on how to request additional information.

FIXED INCOME

VRS invests a portion of its portfolio in fixed income investments to reduce total fund volatility, produce income and provide for some protection in the event of a deflationary environment. The market value of the Fixed Income Program as of June 30, 2020, was \$12.5 billion, representing 15.3% of the total fund.

FIGURE 3.5: FIXED INCOME PORTFOLIO BY SECTOR ALLOCATION

AS OF JUNE 30, 2020



The Fixed Income Program is internally invested in a diversified portfolio of debt securities, such as government securities, corporate securities, mortgage-backed securities and emerging market debt. The objective of the program is to exceed the return of the Fixed Income blended benchmark comprised of 90% Bloomberg Barclays U.S. Aggregate Index, 5% JPM EMBI Global Core Index, and 5% Bloomberg Barclays U.S. HY Ba/B 2% Issuer Constrained Index, while staying in compliance with risk limits. For fiscal year 2020, the return of the program was 9.5% versus a return of 7.9% for the benchmark.

FIGURE 3.6: FIXED INCOME PORTFOLIO BY CREDIT QUALITY BREAKDOWN

AS OF JUNE 30, 2020

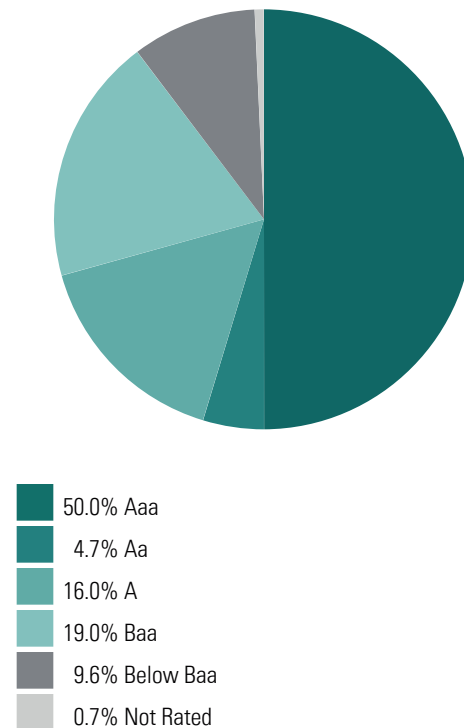


FIGURE 3.7: FIXED INCOME – TOP 10 HOLDINGS BY MARKET VALUE*

AS OF JUNE 30, 2020

Security	Par Value	Fair Value
GINNIE MAE MBS	\$245,000,000	\$259,518,700
FREDDIE MAC UMBS	240,000,000	250,190,400
GINNIE MAE MBS	200,000,000	211,016,000
FREDDIE MAC MBS	160,000,000	166,481,600
FREDDIE MAC MBS	152,000,000	159,785,440
GINNIE MAE MBS	150,000,000	157,548,000
FREDDIE MAC MBS	140,000,000	147,140,000
FREDDIE MAC MBS	132,000,000	138,186,840
FANNIE MAE MBS	111,320,401	119,645,433
TREASURY NOTE	85,000,000	88,204,500

* Refer to the "More Information" section on page 158 for details on how to request additional information.

SHORT-TERM INVESTMENTS AND TRANSITION ACTIVITY

Generally, VRS desires to remain fully invested at all times and seeks to minimize its holdings of cash investments. Temporary cash balances are invested in short-term money market instruments with the goal of maintaining high credit quality and liquidity, as well as to synthetically replicate exposure to equity and/or fixed income.

PRIVATE EQUITY

VRS invests in private equity to achieve returns greater than those available in the public equity markets. Specifically, the program seeks to outperform the Morgan Stanley Capital International All Country World Index (MSCI ACWI) by 2.5% per year. Program returns are calculated on both a time-weighted basis and a dollar-weighted, or internal rate-of-return (IRR) basis. On a time-weighted basis, the program return for fiscal year 2020 was 0.8%. On a dollar-weighted, or IRR basis, the private equity one-year return was 0.0% as of March 31, 2020.

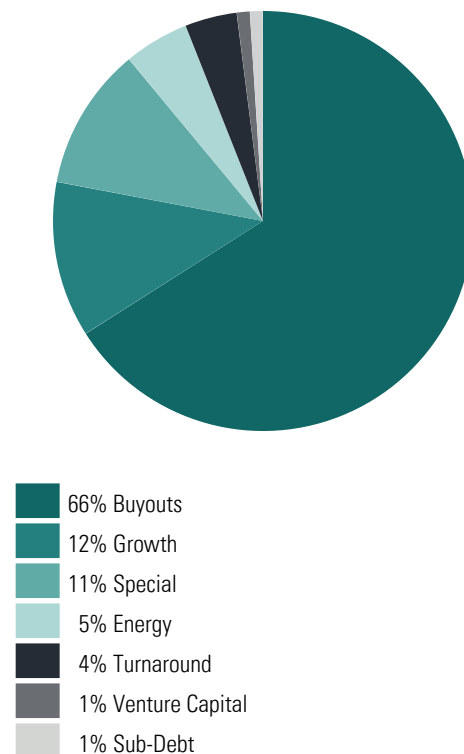
As of June 30, 2020, the carrying value of the program was approximately \$10.2 billion. Most of the program is invested in limited partnerships.

Sectors in which the program invests include leveraged buyouts, venture capital, growth, sub-

debt, turnaround, energy and special situations. The Private Equity Program’s market value by subclass was as follows:

FIGURE 3.8: PRIVATE EQUITY PROGRAM

AS OF JUNE 30, 2020



REAL ASSETS

A portion of the VRS portfolio is invested in real assets to help diversify the Total Fund by providing exposure to asset classes and sectors that offer low historical correlations with the public markets and with the additional objectives of generating competitive risk-adjusted returns, significant operating cash flows and inflation linkages. The portfolio continued to grow in fiscal year 2020, producing a 1.0% return and underperforming the benchmark by 130 basis points. The private real estate portfolio delivered a 5.9% return while the real estate investment trusts (REITs) produced a total return of -17.9%. Investments in infrastructure, natural resources, timberland and farmland produced a -2.9% return for the fiscal year.

The percentage of the Total Fund represented by the real assets portfolio fluctuated over the course of the year but grew slightly to 13.8%. In dollar terms, the real asset portfolio grew \$101 million due primarily to asset income and appreciation, with distributions from existing investments slightly outpacing contributions to new investments by approximately \$10.5 million.

At fiscal year-end, the portfolio strategy composition was approximately 60% private real estate, 16% infrastructure, 10% REITs, 7% energy and mining, 4% timberland and 3% farmland. Portfolio leverage as a percentage of total real assets was 31.0% as of June 30, 2020.

FIGURE 3.9: REAL ASSETS BY SECTOR

AS OF JUNE 30, 2020

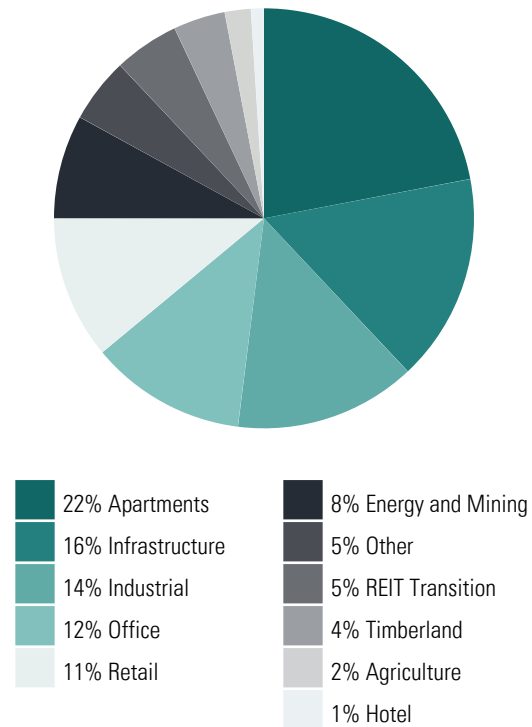
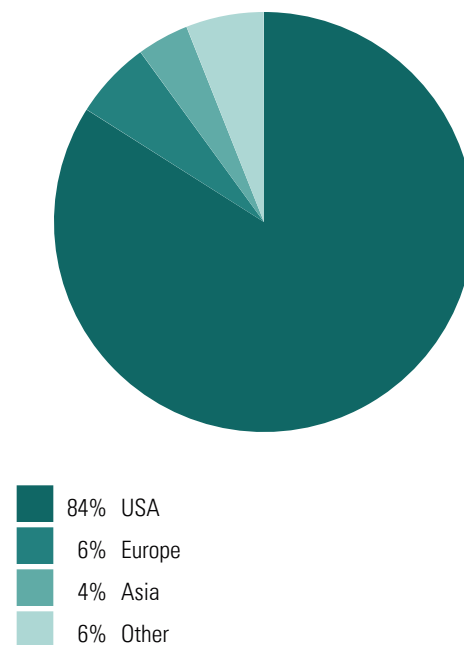


FIGURE 3.10: REAL ASSETS BY GEOGRAPHIC REGION

AS OF JUNE 30, 2020

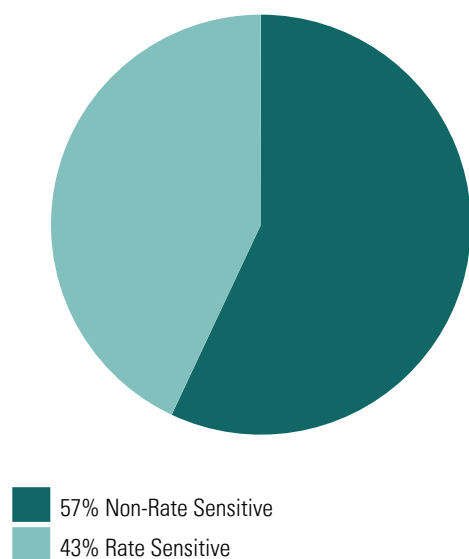


CREDIT STRATEGIES

VRS allocates a portion of the portfolio to credit-related investments. The Credit Strategies program generates returns through income and capital appreciation. The objective of the program is to provide an attractive risk/return profile relative to the Custom Credit Strategies benchmark. For the fiscal year, the program returned 0.3%, while the program's custom benchmark returned 1.3%.

FIGURE 3.11: CREDIT STRATEGIES PROGRAM

AS OF JUNE 30, 2020



CURRENCY

VRS has currency risk due to its investments in non-dollar-denominated assets. To help control this risk, VRS has a Currency Program that uses a combination of internal hedging strategies and external management. The external currency management part aims to lower overall Fund volatility and provide diversified alpha across the Fund. Investments include constrained positions in global currencies. The currency positions are typically traded on a forward basis, and thus no capital is necessary at the time of the trade. At forward settlement date, gains and losses are received/paid out against a notional value.

The current notional value, as of June 30, 2020, was \$1.8 billion. For the fiscal year, it returned 3.7% versus a zero benchmark.

MULTI-ASSET PUBLIC STRATEGIES

The Board of Trustees approved the Multi-Asset Public Strategies (MAPS) program on July 1, 2018, to manage strategies that add value and mitigate risk beyond the structure allowed by individual asset class program mandates. The program is separated into two portfolios with differing objectives. The Risk-Based Investment portfolio invests in strategies that offer meaningful diversification to the exposures of the overall Plan. The Dynamic Strategies portfolio seeks to add value across asset classes through the incorporation of macro perspectives. As of June 30, 2020, the total program had a market value of \$2.4 billion and was invested with six multi-asset class public investments managers and one internally managed fixed income strategy. During the fiscal year, it returned -3.2% against the program's custom benchmark, which returned 3.9%.

PRIVATE INVESTMENT PARTNERSHIPS

Beginning July 1, 2018, the VRS Board approved a strategic allocation to Private Investment Partnerships (PIP). These investments had previously been part of the Strategic Opportunities Portfolio. The objective of the program is to provide an attractive risk/return profile relative to the Private Investment Partnerships benchmark.

Managers in this program invest broadly across the private and less liquid components of the credit, private equity, real asset and real estate investment spaces. During the fiscal year the program returned -6.4% while the program's custom benchmark returned -1.7%.

MORE INFORMATION

A complete list of the investment portfolio is available upon request. Address requests to the VRS FOIA Coordinator, Virginia Retirement System, P.O. Box 2500, Richmond, VA 23218-2500. More information is available at varetire.org/web-policy/foia.

VRS Money Managers

The diversified investment structure as of June 30, 2020, is reflected in the following tables, which list VRS managers by investment program and style.

PUBLIC EQUITY MONEY MANAGERS

External Managers – Top 10 Managers	Style Description
Acadian Asset Management	Emerging, Non-U.S. Small-Cap
Ariel	Global
Arrowstreet Capital	Global
Baillie Gifford	Emerging, Global
J.P. Morgan	U.S. Large-Cap
Jackson Square	U.S. Small-Cap
LSV Asset Management	Global, Non-U.S. Small-Cap, U.S. Small-Cap
Nordea	Emerging, Global
Internal Portfolios	Style Description
Afton	U.S. Small
Matoaka	Non-U.S. Large
Mobjack	U.S. Large
Piedmont	Non-U.S. Large
Potomac	U.S. Large
Internal Emerging	Emerging
Top 10 Equity Hedge Funds	Style Description
Cevian	Activist
Eminence	Long/Short
Farallon	Multi-Strat
Lansdowne Partners	Long/Short
Maverick Capital	Long/Short
Nitorum	Long/Short
Select	Long/Short
Taiyo	Activist
Theleme	Long/Short
ValueAct Capital	Activist

FIXED INCOME

Internal Portfolios	Style Description
VRS Investment Grade Credit	High-Quality Corporates
VRS Securitized	Mortgage and Other Asset-Backed Securities
VRS Government	U.S. and Other Government-Related Debt
VRS Emerging Market Debt	EM Sovereign and Quasi-Sovereign Debt
VRS Systematic High Yield	High-Yield Corporates
VRS Fixed-Income Opportunistic	Various Fixed-Income Related Assets

(Continued)

VRS Money Managers *(continued)*

PRIVATE EQUITY – TOP 10 MANAGERS

Style Description

Apax Partners	Buyout
Apollo	Buyout
Bain Capital	Buyout
CVC Capital	Buyout
General Atlantic	Growth
Grosvenor	Customized Separate Account
Hellman and Friedman	Buyout
TA Associates	Growth
TPG Partners	Buyout
Veritas	Buyout

CREDIT STRATEGIES – TOP 10 MANAGERS

Style Description

Beach Point Capital Management	Distressed, Leveraged Loans, Opportunistic
Prudential	Investment-Grade, Mezzanine
J.P. Morgan	High-Yield
Pacific Investment Management Co.	High-Yield
Solus	Opportunistic, Leveraged Loan
Anchorage Capital	Hedge Fund, High Yield
Allianz Global Investors	Convertibles
Schroders	Structured Securities, Private Debt
Blackrock	Direct Lending
KKR	Direct Lending, Special Situations, Real Estate Lending

PRIVATE INVESTMENT PARTNERSHIPS

Style Description

Carlyle	Multi-Asset Class Private Investments
KKR	Multi-Asset Class Private Investments

CURRENCY

Style Description

First Quadrant	Developed
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REAL ASSETS – TOP 10 MANAGERS

Style Description

Blackstone Real Estate Partners	Core, Enhanced Core, Opportunistic Real Estate
Clarion Partners	Enhanced Core Real Estate
Industry Funds Management	Global Infrastructure
J.P. Morgan Asset Management Inc.	Core Real Estate
Morgan Stanley	Core, Enhanced Core Real Estate & Global Infrastructure
Pantheon Ventures	Global Infrastructure, Global Natural Resources
PGIM	Core & Enhanced Core Real Estate
Pritzker Realty Group	Enhanced Core & Opportunistic Real Estate
Stonepeak Infrastructure Partners	Core-plus Infrastructure
VRS – Internal Equity Management	Global REITs

MULTI-ASSET PUBLIC STRATEGIES

Style Description

AQR	Multi-Asset Class Public Investments
Blackrock	Multi-Asset Class Public Investments
Capstone	Multi-Asset Class Public Investments
J.P. Morgan	Multi-Asset Class Public Investments
Morgan Stanley	Multi-Asset Class Public Investments
Internal Fixed Income	Long-Duration Treasuries

Public Equity Commissions

AS OF JUNE 30, 2020

Broker	Commission	Broker	Commission
Goldman Sachs & Co., New York	\$ 1,732,816.92	Merrill Lynch International London Equities	164,331.24
National Financial Services Corp., New York	1,304,942.74	UBS Securities LLC, Stamford	145,194.10
Credit Suisse, New York (CSUS)	1,183,988.18	UBS Equities, London	115,877.36
Morgan Stanley & Co. Inc., New York	326,367.08	Sanford C. Bernstein & Co. Inc., New York	101,541.86
Merrill Lynch Pierce Fenner Smith Inc., New York	183,570.70	Other Brokers	1,578,118.99
Instinet Europe Limited, London	169,892.87	Total FY 2020	\$ 7,006,642.04

SCHEDULE OF INVESTMENT EXPENSES

FOR THE YEAR ENDED JUNE 30, 2020

(EXPRESSED IN THOUSANDS)

	Assets Under Management	Management Fees and Expenses
External Management:		
Public Equity Managers	\$ 11,328,140	\$ 54,587
Fixed Income Managers	4,332,454	2,652
Credit Strategies Managers	11,657,761	64,132
Real Assets Managers	11,866,825	106,545
Alternative Investment Managers	10,234,809	128,799
Hedge Funds Managers	7,170,671	71,501
Risk-Based Investments Managers	2,239,561	16,751
Currency Managers*	—	2,700
Dynamic Strategy	942,814	4,331
Internal Management:	23,594,397	38,184
Miscellaneous Fees and Expenses:		
Custodial Fees	—	4,500
Legal Fees	—	770
Other Fees and Expenses	—	7,493
Total	\$ 83,367,432	\$ 502,945

* The fees related to Active Currency Overlay Program is based on the managers' notional account values. The total notional value at June 30, 2020, was \$1.8 billion.

Investment Summary

In accordance with Section 51.1-124.31 of the *Code of Virginia* (1950), as amended, the Board of Trustees has pooled substantially all defined benefit plan assets of the Virginia Retirement System, the State Police Officers' Retirement System, the Judicial Retirement System, the Group Life

Insurance Fund and the Retiree Health Insurance Credit Fund into a common investment pool. The common investment pool of the pension trust funds, other trust funds and custodial funds held the following composition of investments at June 30, 2020 and 2019:

(EXPRESSED IN THOUSANDS)

	2020 Fair Value	Percent of Total Value	2019 Fair Value	Percent of Total Value
Bonds and Mortgage Securities:				
U.S. Government and Agencies	\$ 2,914,682	3.48%	\$ 4,317,660	5.11%
Mortgage Securities	4,056,194	4.84%	4,889,973	5.79%
Corporate and Other Bonds	13,110,381	15.66%	12,689,298	15.04%
Total Bonds and Mortgage Securities	20,081,257	23.98%	21,896,931	25.94%
Common and Preferred Stocks	22,987,340	27.45%	24,722,983	29.28%
Index and Pooled Funds:				
Equity Index and Pooled Funds	10,230,872	12.22%	11,069,496	13.10%
Fixed-Income Commingled Funds	1,377,164	1.64%	1,342,413	1.59%
Total Index and Pooled Funds	11,608,036	13.86%	12,411,909	14.69%
Real Assets	9,931,630	11.86%	9,877,199	11.70%
Private Equity	18,698,079	22.34%	15,083,638	17.87%
Short-Term Investments:				
Treasurer of Virginia – LGIP Investment Pool	361,958	0.43%	331,823	0.38%
Foreign Currencies	61,091	0.08%	112,545	0.14%
Total Short-Term Investments	423,049	0.51%	444,368	0.52%
Total Investments	\$ 83,729,391	100.00%	\$ 84,437,028	100.00%

Description of Hybrid Defined Contribution Plan

Defined contribution plan assets for Hybrid Retirement Plan members are maintained in two separate accounts. The Hybrid 401(a) Cash Match Plan account contains the hybrid plan member and employer mandatory contributions and the employer match on the voluntary member

contributions. The Hybrid 457 Deferred Compensation Plan account contains the hybrid plan member's voluntary contributions. The schedule below shows the assets in each investment option and the accumulated plan assets in each option.

HYBRID PARTICIPANT ACCOUNT PLAN ASSETS BY FUND OPTION*

AS OF JUNE 30, 2020

Fund Name	Hybrid 401(a)	Hybrid 457	Total
Retirement Portfolio	\$ 20,983,940	\$ 10,920,552	\$ 31,904,492
Target Date 2025 Portfolio	32,156,433	17,232,581	49,389,013
Target Date 2030 Portfolio	43,413,544	23,364,645	66,778,189
Target Date 2035 Portfolio	51,489,727	26,349,763	77,839,490
Target Date 2040 Portfolio	51,542,627	24,686,040	76,228,667
Target Date 2045 Portfolio	58,738,570	26,890,464	85,629,034
Target Date 2050 Portfolio	72,201,822	30,301,426	102,503,248
Target Date 2055 Portfolio	113,086,485	39,835,726	152,922,211
Target Date 2060 Portfolio	45,981,879	15,013,217	60,995,096
Target Date 2065 Portfolio	631,889	188,622	820,511
Money Market Fund	3,715,983	1,131,793	4,847,777
Stable Value Fund	1,282,469	1,737,647	3,020,116
Bond Fund	977,323	1,154,620	2,131,943
Inflation-Protected Bond Fund	337,742	375,622	713,364
High-Yield Bond Fund	706,978	1,025,839	1,732,817
Stock Fund	10,637,079	12,073,713	22,710,791
Small/Mid-Cap Stock Fund	3,414,407	3,904,964	7,319,371
International Stock Fund	1,794,053	2,121,267	3,915,321
Global Real Estate Fund	825,722	1,019,574	1,845,296
VRS Investment Portfolio – PIPVRSIP	10,202	3,399	13,601
VRS Investment Portfolio	99,170	52,206	151,376
Self-Directed Brokerage	411,384	305,253	716,637
Total Plan Assets	\$ 514,439,428	\$ 239,688,933	\$ 754,128,361

* Fund totals have been rounded to the nearest dollar amount.

Description of Defined Contribution Plans Investment Options

Participants in the System's Hybrid Retirement Plan benefit structure have access to a number of core investment options for contributions to their defined contribution plans. These options are intended to provide participants with a variety of investment choices while controlling the associated costs. In addition to the option-specific annual operating expense detailed in the Investment Option Performance Summary, participants pay an annual record-keeping fee of \$30.50 that is deducted from their accounts on a monthly basis (approximately \$2.54 per month).

Participants with more than one account in the Plan pay only one annual fee of \$30.50. At June 30, 2020, the plans provided the following core investment options to participants.

DO-IT-FOR-ME FUNDS

Retirement Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that object, the portfolio will be broadly diversified across global asset classes.

U.S. Bonds: 53.9% U.S. Large/Mid-Cap Stocks: 21.9% International Stocks: 11.8%
U.S. Inflation-Index Bonds: 5.8% U.S. Small-Cap Stocks: 3.4%
Commodities: 1.6% Developed Real Estate: 1.6%

Target Date 2025 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Bonds: 42.4% U.S. Large/Mid-Cap Stocks: 28.2% International Stocks: 17.5%
U.S. Inflation-Index Bonds: 5.1% U.S. Small-Cap Stocks: 3.0%
Developed Real Estate: 2.4% Commodities: 1.4%

Target Date 2030 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 34.4% U.S. Bonds: 31.4% International Stocks: 23.2%
U.S. Inflation-Index Bonds: 4.2% Developed Real Estate: 3.0%
U.S. Small-Cap Stocks: 2.7% Commodities: 1.1%

Target Date 2035 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 40.5% International Stocks: 28.6% U.S. Bonds: 21.0%
Developed Real Estate: 3.6% U.S. Inflation-Index Bonds: 3.2%
U.S. Small-Cap Stocks: 2.2% Commodities: 0.9%

Target Date 2040 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 46.1% International Stocks: 33.7%
U.S. Bonds: 11.7% Developed Real Estate: 4.1% U.S. Inflation-Index Bonds: 2.0%
U.S. Small-Cap Stocks: 1.9% Commodities: 0.5%

Target Date 2045 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 50.5% International Stocks: 37.4%
U.S. Bonds: 4.7% Developed Real Estate: 4.5% U.S. Small-Cap Stocks: 1.6%
U.S. Inflation-Index Bonds: 1.0% Commodities: 0.3%

Target Date 2050 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 52.3% International Stocks: 39.9%
Developed Real Estate: 4.7% U.S. Bonds: 1.4% U.S. Small-Cap Stocks: 1.4%
U.S. Inflation-Index Bonds: 0.2% Commodities: 0.1%

Target Date 2055 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 52.4% International Stocks: 40.2% Developed Real Estate: 4.8%
U.S. Small-Cap Stocks: 1.4% U.S. Bonds: 0.9%
U.S. Inflation-Index Bonds: 0.2% Commodities: 0.1%

Target Date 2060 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 52.5% International Stocks: 40.3% Developed Real Estate: 4.8%
U.S. Small-Cap Stocks: 1.4% U.S. Bonds: 0.9% Commodities: 0.1%

Target Date 2065 Portfolio: Seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. In pursuit of that objective, the portfolio will be broadly diversified across global asset classes, with asset allocations becoming more conservative over time.

U.S. Large/Mid-Cap Stocks: 52.6% International Stocks: 40.3% Developed Real Estate: 4.7%
U.S. Small-Cap Stocks: 1.4% U.S. Bonds: 1.0%

HELP-ME-DO-IT FUNDS

Money Market Fund: Seeks to provide a high level of current income as is consistent with liquidity and stability of principal.

Other Repurchase Agreement: 46.7% Certificate of Deposit: 18.7%
Financial Company Commercial Paper: 7.6% U.S. Treasury Debt: 7.0% Non-Financial Company Commercial Paper: 6.1%
Non-Negotiable Time Deposit: 5.4% Asset-Backed Commercial Paper: 4.8%
Government Agency Repurchase Agreement: 2.3% Treasury Repurchase Agreement: 1.4%

Stable Value Fund: Seeks to provide safety of principal, while earning a level of interest income consistent with an underlying portfolio of short- to intermediate-duration high-quality fixed income (bond) securities and cash or cash equivalents, and liquidity to accommodate participant transactions.

Corporates: 27.6% Agency MBS: 21.1% Asset-Backed: 16.0% U.S. Treasury/Agency: 10.4%
Cash/Equivalents: 7.9% CMBS: 5.6% Taxable Municipals: 5.3%
Other U.S. Government: 4.8% Non-Agency MBS: 1.3%

Bond Fund: Seeks to track the performance of the Bloomberg Barclays Aggregate Bond Index. The index is an unmanaged index that represents the broad U.S. investment-grade bond market and is comprised of U.S. treasury securities, government agency bonds, corporate bonds, mortgage-backed securities, asset-backed securities and a small amount of foreign bonds traded in the U.S.

Treasury: 35.4% Mortgages: 26.7% Industrials: 16.5% Financials: 8.3%
Non-U.S. Credit: 3.7% Agencies: 2.3% CMBS: 2.2% Utilities: 2.1%
Cash: 1.7% Taxable Municipals: 0.7% Asset-Backed Securities: 0.4%

Inflation-Protected Bond Fund: Seeks to track the performance of the Bloomberg Barclays U.S. Treasury Inflation-Protected Securities Index. The index is an unmanaged index that represents the U.S. Treasury Inflation-Protection Securities (TIPS) market. The index includes investment-grade TIPS with one or more years to final maturity.

U.S. Treasury: 98.0% Cash: 2.0%

High-Yield Bond Fund: Seeks to achieve returns that exceed, over time, its benchmark, the ICE BofA U.S. High-Yield BB-B Constrained Index. The index is an unmanaged index of BB-B rated securities that caps any single issuer exposure to 2.0%. The index is indicative of the higher quality high-yield bond market.

Communications: 22.1% Consumer Non-Cyclical: 18.3% Consumer Cyclical: 16.7%
Other/Cash: 11.2% Energy: 8.5% Capital Goods: 8.2% Technology: 5.5% Basic Industry: 4.5%
Finance: 2.8% Transportation: 1.1% Utilities: 0.9% Other Industrial: 0.2%

Stock Fund: Seeks to track the performance of the Standard & Poor's 500 Index. The index is an unmanaged index that represents the broad large-capitalization U.S. stock market and is comprised of 500 widely held U.S. stocks chosen by Standard & Poor's.

Information Technology: 27.5% Health Care: 14.6% Communication Services: 10.8%
Consumer Discretionary: 10.8% Financials: 10.1% Industrials: 8.0% Consumer Staples: 7.0%
Utilities: 3.1% Energy: 2.8% Real Estate: 2.8% Materials: 2.5%

Small/Mid-Capitalization Stock Fund: Seeks to track the performance of the Russell 2500 Index. The index is an unmanaged index that represents the broad middle- to smaller-capitalization U.S. stock market.

Information Technology: 17.1% Health Care: 15.9% Industrials: 14.8% Financials: 14.5%
Consumer Discretionary: 11.8% Real Estate: 8.8% Materials: 5.2%
Communication Services: 3.3% Utilities: 3.2% Consumer Staples: 3.0% Energy: 2.4%

International Stock Fund: Seeks to track the performance of the MSCI ACWI ex-U.S. IMI Index. The index is an unmanaged index that represents the equity performance of large, mid- and small-cap segments of developed and emerging markets, excluding the U.S.

Financials: 17.0% Consumer Discretionary: 12.5% Industrials: 12.4%
Information Technology: 11.2% Health Care: 10.4% Consumer Staples: 9.5% Materials: 7.9%
Communication Services: 7.2% Energy: 4.5% Real Estate: 3.9% Utilities: 3.5%

Global Real Estate Fund: Seeks to track the performance of the FTSE EPRA/NAREIT Developed Index. The index is an unmanaged index that is designed to reflect the performance of listed real estate companies worldwide, including the U.S.

Office REITs: 13.5% Residential REITs: 13.4% Retail REITs: 12.8%
Industrial REITs: 11.9% Real Estate Operating Companies: 11.0% Specialized REITs: 10.6%
Diversified REITs: 8.3% Diversified Real Estate Activities: 7.5% Health Care REITs: 7.1%
Hotel & Resort REITs: 2.1% Real Estate Development: 1.7%
Hotels, Resorts & Cruise Lines: 0.1%

VRS Investment Portfolio (VRSIP): Seeks to maximize return while managing risk within an acceptable range. Due to the long-term nature of the defined benefit plan's liabilities, the horizon for investment decisions is generally defined as 10 years or longer.

Public Equity: 37.2% Fixed Income: 16.8% Credit Strategies: 13.8% Real Assets: 13.8%
Private Equity: 12.5% MAPS: 3.0%
PIP: 1.5% Cash: 1.4%

DO-IT-MYSELF FUNDS

Self-Directed Brokerage Account (SDBA): Allows investors to select from thousands of publicly traded mutual funds, exchange-traded funds (ETFs) and individual securities in addition to the available core investment options. The SDBA option is offered through TD Ameritrade. The SDBA option is for knowledgeable investors who acknowledge and understand the risks and costs associated with the investments contained in this option.

In addition to the annual record-keeping fee and operating expenses, this option is subject to transaction fees charged by TD Ameritrade and investment management-related fees and expenses for the funds or investments selected.

Investment Option Performance Summary: Defined Contribution Plans

AS OF JUNE 30, 2020

(RETURNS GREATER THAN ONE YEAR ARE ANNUALIZED)

DO-IT-FOR-ME PATH: TARGET DATE PORTFOLIOS

Investment Options	Inception Date	1 Year	3 Years	5 Years	10 Years or Since Inception	Total Annual Operating Expenses	
						As a %	Per \$1,000
Retirement Portfolio	08/01/05	6.15%	5.84%	5.23%	6.19%	0.08%	\$0.80
Custom Benchmark ¹		6.00%	5.78%	5.18%	6.14%		
Target Date 2025 Portfolio	07/05/06	4.88%	6.07%	5.77%	7.72%	0.08%	\$0.80
Custom Benchmark ¹		4.74%	5.99%	5.69%	7.63%		
Target Date 2030 Portfolio	08/01/05	3.88%	6.10%	5.98%	8.20%	0.08%	\$0.80
Custom Benchmark ¹		3.73%	5.99%	5.88%	8.09%		
Target Date 2035 Portfolio	07/05/06	2.93%	6.11%	6.18%	8.63%	0.08%	\$0.80
Custom Benchmark ¹		2.80%	5.99%	6.05%	8.50%		
Target Date 2040 Portfolio	08/01/05	2.03%	6.09%	6.32%	9.00%	0.08%	\$0.80
Custom Benchmark ¹		1.92%	5.96%	6.18%	8.85%		
Target Date 2045 Portfolio	07/05/06	1.49%	6.06%	6.40%	9.31%	0.08%	\$0.80
Custom Benchmark ¹		1.37%	5.91%	6.23%	9.14%		
Target Date 2050 Portfolio	09/30/07	1.22%	6.02%	6.41%	9.56%	0.08%	\$0.80
Custom Benchmark ¹		1.12%	5.88%	6.24%	9.39%		
Target Date 2055 Portfolio	05/19/10	1.24%	6.02%	6.41%	9.70%	0.08%	\$0.80
Custom Benchmark ¹		1.11%	5.87%	6.24%	9.53%		
Target Date 2060 Portfolio	11/17/14	1.23%	6.00%	6.41%	6.06%	0.08%	\$0.80
Custom Benchmark ¹		1.11%	5.87%	6.24%	5.89%		
Target Date 2065 Portfolio	09/23/19	N/A	N/A	N/A	0.08%	0.08%	\$0.80
Custom Benchmark ¹		N/A	N/A	N/A	0.16%		

HELP-ME-DO-IT PATH: INDIVIDUAL OPTIONS

Investment Options	Inception Date					Total Annual Operating Expenses	
		1 Year	3 Years	5 Years	10 Years or Since Inception	As a %	Per \$1,000
Money Market Fund Benchmark: Bloomberg Barclays 3-Month Treasury Bill Index Yield as of June 30, 2020, was 0.46%	11/01/99	1.64%	1.93%	1.36%	0.72%	0.08%	\$0.80
Stable Value Fund Custom Benchmark ² Yield as of June 30, 2020, was 2.23%	02/01/95	2.44%	2.27%	2.03%	2.06%	0.25%	\$2.50
Bond Fund Benchmark: Bloomberg Barclays U.S. Aggregate Bond Index	11/01/99	8.78%	5.36%	4.35%	3.88%	0.03%	\$0.30
Inflation-Protected Bond Fund Benchmark: Bloomberg Barclays U.S. Treasury Inflation-Protected Securities Index	07/30/02	8.42%	5.17%	3.87%	3.61%	0.03%	\$0.30
High-Yield Bond Fund Benchmark: ICE BofA U.S. High-Yield BB-B Constrained Index	05/31/04	(1.48)%	3.16%	4.64%	6.55%	0.40%	\$4.00
Stock Fund Benchmark: S&P 500 Index	11/01/99	7.56%	10.78%	10.76%	14.02%	0.01%	\$0.10
Small/Mid-Cap Stock Fund Benchmark: Russell 2500 Index ³	11/01/99	(4.66)%	4.11%	5.51%	11.48%	0.02%	\$0.20
International Stock Fund Benchmark: MSCI ACWI ex-U.S. IMI Index ⁴	11/01/99	(4.74)%	1.25%	2.51%	5.89%	0.06%	\$0.60
Global Real Estate Fund Benchmark: FTSE EPRA/NAREIT Developed Index ⁵	10/01/02	(15.56)%	(0.86)%	2.19%	8.23%	0.09%	\$0.90
VRS Investment Portfolio (VRSIP) VRS Custom Benchmark ⁶	07/01/08	1.40%	5.17%	5.85%	8.08%	0.59%	\$5.90

¹ Benchmarks are calculated using blended returns of third-party indices that proportionately reflect the respective weightings of the Portfolios' asset classes. Weightings are adjusted quarterly to reflect the Portfolios' asset allocation shifts over time. Indices currently used to calculate the custom benchmarks are Russell 1000 Index, Russell 2000 Index, MSCI ACWI ex-U.S. IMI Index, Bloomberg Barclays U.S. Aggregate Bond Index, Bloomberg Barclays U.S. Treasury Inflation-Protected Securities Index, FTSE EPRA/NAREIT Developed Index and the Bloomberg Commodity Index Total Return.

² Effective August 2016, the benchmark represents a hypothetical return generated by the monthly yields of actively traded U.S. Treasuries based on [50% two-year maturity + 50% three-year maturity] plus an annualized spread of 0.25% and is representative of the Fund's expected return profile, given how the Fund is managed and book value accounting treatment. Prior to August 2016, the custom benchmark was based on the monthly yield of actively traded U.S. Treasuries with a three-year maturity plus an annualized spread of 0.50%. The benchmark returns are linked.

³ Effective July 2012, the performance benchmark is the Russell 2500 Index. Prior to July 2012, the performance benchmark was the Russell Small-Cap Completeness Index. The benchmark returns are linked.

⁴ Effective August 2016, the performance benchmark is the MSCI ACWI ex-U.S. IMI Index. It was the MSCI World ex-U.S. Index from July 2012 through July 2016, and prior to July 2012, it was the MSCI EAFE Index. The benchmark returns are linked.

⁵ Effective July 2012, the performance benchmark is the FTSE EPRA/NAREIT Developed Index. Prior to July 2012, the performance benchmark was the Dow Jones U.S. Select REIT Index. The benchmark returns are linked.

⁶ The VRS Custom Benchmark is a blend of the asset class benchmarks at policy weights.