2019 COMPREHENSIVE ANNUAL FINANCIAL REPORT

For the Fiscal Year Ended June 30, 2019

INPRS is a component unit and a pension trust fund of the State of Indiana.

INPRS

INDIANA PUBLIC RETIREMENT SYSTEM

Prepared through the joint efforts of INPRS's team members.
Available online at www.in.gov/inprs

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INPRS is a component unit and a pension trust fund of the State of Indiana.

INPRS is a trust and an independent body corporate and politic. The system is not a department or agency of the state, but is an independent instrumentality exercising essential governmental functions (IC 5-10.5-2-3).

	FUNDS MANAGED BY INPRS	ABBREVIATIONS USED
	Defined Benefit	**DB Fund**
1.	Public Employees' Defined Benefit Account	PERF DB
2.	Teachers' Pre-1996 Defined Benefit Account	TRF Pre-'96 DB
3.	Teachers' 1996 Defined Benefit Account	TRF '96 DB
4.	1977 Police Officers' and Firefighters' Retirement Fund	'77 Fund
5.	Judges' Retirement System	JRS
6.	Excise, Gaming and Conservation Officers' Retirement Fund	EG&C
7.	Prosecuting Attorneys' Retirement Fund	PARF
8.	Legislators' Defined Benefit Fund	LE DB
	Defined Contribution	**DC Fund**
9.	Public Employees' Defined Contribution Account	PERF DC
10.	My Choice: Retirement Savings Plan for Public Employees	PERF MC DC
11.	Teachers' Defined Contribution Account	TRF DC
12.	Legislators' Defined Contribution Fund	LE DC
	Other Postemployement Benefit	**OPEB Fund**
13.	Special Death Benefit Fund	SDBF
	Custodial	**Custodial Fund**
14.	Local Public Safety Pension Relief Fund	LPSPR

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Stewardship

We prudently manage assets held in trust for current and future retirees. We are value oriented. We rigorously identify, measure, and manage risks.

$30.4 Billion
Fair value of defined benefit assets

$5.7 Billion
Fair value of defined contribution assets

7.4%
Annualized time-weighted rate of return on defined benefit investments

INPRS
INDIANA PUBLIC RETIREMENT SYSTEM

Verus

August 6, 2019

Board of Trustees
Indiana Public Retirement System
One North Capitol Avenue
Indianapolis, IN 46204

Dear Trustees:

Verus is pleased to provide the Board of Trustees of the Indiana Public Retirement System ("INPRS") with an overview of the market environment, an update on performance, and a summary of recent developments for the fiscal year ended June 30, 2019.

Investment Landscape

U.S. Equity

U.S. equities delivered strong returns over the trailing 1-year period ending in June; the S&P 500 Index returned 10.4 percent, weathering a healthy degree of volatility along the way. Last December, trade uncertainty and a decision from the Federal Reserve to hike interest rates helped to spark a 19.8 percent decline in the S&P 500 Index from previous peak levels. Year-to-date, U.S. large-cap equities have led global equity markets higher, and the S&P 500 Index advanced 18.5 percent, nearly recovering from the selloff at the end of 2018.

In recent periods, equity and bond markets have benefited from Federal Reserve support during periods of market stress. In late 2018 and the first half of 2019 some weakness appeared in the U.S. economy and markets grew shaky. During this time the Fed stepped in, indicating much easier monetary policy, boosting asset prices. Many investors have expressed concern regarding the level of the current (cycle-high) fed funds range relative to past business cycle highs. This has left many to ask how impactful further central bank easing might be as U.S. interest rates approach zero.

A variety of secular trends have helped cultivate a supportive environment for U.S. stocks. Technological advances, lower interest rates, and falling corporate tax rates have all helped to boost corporate profit margins to record highs. As earnings expectations moderate, these margins may be increasingly scrutinized by investors. Per FactSet, the estimated year-over-year revenue and earnings growth for the S&P 500 Index in the second quarter are 3.7 percent and -3.0 percent respectively. At the end of the first quarter, expectations called for revenue and earnings growth of 4.5 percent and -0.5 percent, respectively, indicating that analysts' expectations fell markedly over the second quarter.

International Equity

International equities underperformed domestic stocks as U.S. exceptionalism remained the story. For the year ending June 30th, 2019, the S&P 500 Index delivered a 10.4 percent return, outpacing the MSCI ACWI Index (up 5.7 percent), the MSCI Emerging Markets Index (up 1.2 percent), and the MSCI EAFE Index (up 1.1 percent). Within emerging market equities, Latin American equities (MSCI EM Latin America up 18.4 percent) diverged from Asian equities (MCSI EM Asia down 2.3 percent), likely aided by lower levels of economic exposure to the Chinese economy, which in Q2 grew only 6.2 percent from the prior year, its lowest rate since 1992.

Interest rate differentials between U.S. Treasuries and sovereign bonds in Europe and Japan widened as the Federal Reserve hiked rates while the European Central Bank and the Bank of Japan held rates steady. Expanding interest rate differentials likely contributed to the strength of the U.S. dollar over the period, which presented headwinds for unhedged investors in international equities. The only major international developed currency which strengthened vs. the dollar over the trailing year was the Japanese yen. The yen firmed up 2.8

999 Third Avenue, Suite 4200, Seattle, Washington 98104 206-622-3700 verusinvestments.com

percent relative to the dollar, mostly due to risk-off currency flows during the market selloff in the 4th quarter of 2018, where international investors sought safe-haven in the Japanese currency. Elsewhere, the British pound sterling weakened as uncertainty surrounding Brexit continued to drive trading in the currency.

Fixed Income

In late 2018, the Federal Reserve tightened monetary policy further with 0.25 percent rate hikes in September and December, bringing the target range for federal funds to 2.25 - 2.50 percent. In December, escalating geopolitical tensions and expectations for slowing global growth weighed on market sentiment, and despite the Fed cutting its guidance for additional rate hikes in 2019 from three to two, markets sold off. Moving into 2019, the Fed pivoted to a much more dovish stance, starting by clarifying its "patient approach" to future rate hikes, walking back its previous commitment to "further gradual increases". In March, the Fed announced its balance sheet "normalization" process would unwind faster than originally anticipated, which effectively eased financial conditions by creating additional market liquidity. Finally, in June the Fed pledged to "act as appropriate to sustain the expansion", an initiative unsupported by the Fed's stated mandate of targeting maximum employment, stable prices, and moderate long-term interest rates. Analysts viewed the Fed's language as effective in preparing markets for a 0.25 percent cut during its July meeting, and perhaps another 0.25 - 0.50 percent in cuts by the end of the calendar year.

The shift to more accommodative monetary policy is not a phenomenon unique to the Fed – the European Central Bank, the Bank of Japan, and others have also changed their tune, citing benign inflation pressures and an uncertain geopolitical backdrop as justification for lower rates. Still, with U.S. unemployment near 50-year lows and equities near all-time highs, some analysts have expressed concern over the strength of the Fed's stimulus measures should a recession rear its head.

Falling ten-year sovereign yields were one of the biggest stories driving markets over the year. Ten-year Treasury yields reached as high as 3.2 percent in November but ended Q2 2019 at 2.0 percent. Long-duration U.S. Treasuries were top performers in the U.S., gaining 12.3 percent over the year and benefitting from precipitous declines in yields. Hard-currency emerging market debt (up 12.4 percent) was the top fixed income performer over the year, and outperformed local-currency EMD (up 9.0 percent), mostly due to a period of emerging market currency weakness last summer. In Europe, yields on many ten-year sovereign bonds established fresh all-time lows with German yields falling from 0.3 to -0.3 percent and French yields falling from 0.7 to 0.0 percent. In Italy, yields fell from 2.6 to 2.1 percent, but spiked as high as 3.6 percent in the fourth quarter of last year due to concerns that the sitting coalition government would not respect the fiscal budget deficit limits enforced by the European Union. Over the year, the value of global negative-yielding debt rose from $8.16 trillion to $12.92 trillion.

In U.S. credit, high yield and investment grade spreads remained near cycle tights at 3.8 percent and 1.2 percent. The BBgBarc U.S. High Yield Corporate Index and BBgBarc U.S. Agg Corporate Index returned 7.5 and 7.9 percent over the period, respectively.

Outlook

Global economic growth expectations have been revised slightly lower over the year, but on balance appear to remain supportive for risk assets over the medium term. Subdued inflation prints around the world have encouraged central bankers to issue accommodative guidance, and unemployment has reached cycle lows across most of the developed world. Valuations have expanded since last year but are not yet viewed as stretched. Per FactSet, on July 12th, the forward 12-month P/E ratio of the S&P 500 Index was 17.1x, above both its five-year (16.5x) and 10-year (14.8x) averages.

July 1st marked the beginning of the record-setting 121st month of the current U.S. economic expansion. While many have expressed anxiousness regarding the length of the expansion, we do not see many red flags in the

short- to intermediate-term. Looking ahead, market participants are likely to remain fixated on global central bank policy, evolving international trade relations, and the impacts of protectionist measures like tariffs on global growth.

Plan Performance[1]

The INPRS consolidated defined benefit investment portfolio ("the Portfolio") earned a 7.4 percent return net of fees for the fiscal year ending June 30, 2019. This return outperformed the policy target index[2] return, and the long-term actuarial assumed return (6.75 percent) by 0.6 percent.

Portfolio risk as measured by standard deviation, remained relatively low during the year. The trailing three-year annualized standard deviation of returns was 4.4 percent for the portfolio and target index. Over the trailing 10-year period, standard deviation for the portfolio was 5.9 percent and 5.8 percent for the target index.

Intermittent turbulence aside, the continued positive economic growth led to positive absolute returns from all asset classes within the portfolio other than commodities; INPRS commodity investments, which are intended to provide diversification and hedge inflation risk, depreciated 8.2 percent, compared to an 8.0 percent loss for the benchmark. On a relative basis, INPRS was able to generate outperformance across all asset classes except for real estate; the portfolio's 8.7 percent return trailed INPRS' custom real estate benchmark, which was up 16.1 percent. Global public equity returned 5.4 percent, outperforming the benchmark by 0.8 percent. Private market investments performed very well during the fiscal year; the private equity portfolio was up 20.9 percent for the fiscal year compared to just 3.7 percent for the index, while the slightly more conservative private credit portfolio generated an 8.2 percent return, outperforming its index by 0.8 percent. Exposure to credit, nominal, and real interest rates all aided in portfolio returns; the global fixed income ex-ILB portfolio returned 10.0 percent and the inflation-linked bond portfolio returned 5.7 percent, outperforming the benchmarks by 0.1 percent and 0.5 percent, respectively. The absolute return portfolio appreciated by 4.2 percent, outperforming the index return by 2.4 percent, and the risk parity portfolio generated an 8.4 percent return, adding 2.2 percent versus the benchmark.

Looking out longer-term, the Portfolio continues to perform well relative to both the policy index and the actuarial assumed rate of return. On an annualized basis, for the three-year period ending June 30, 2019, the Portfolio returned 8.2 percent, outperforming the target index by 1.0 percent. For the five-year period, the Portfolio returned 5.1 percent, outperforming the target index by 0.6 percent, and for ten years, the Portfolio compounded at 7.8 percent, outperforming the policy index by 0.7 percent.

Plan Activity

During the 2019 fiscal year, Verus and INPRS' staff collaborated on a number of projects. Together we worked with staff to administer and complete an RFP for all passive management mandates, resulting in meaningful additional fee economies for INPRS. Verus also collaborated with staff on an RFP for the emerging manager mandate that reconfirmed the appropriateness of the existing manager and resulted in slight modifications to the mandate.

Verus assisted the public equity team in developing an active risk budget and we worked with the fixed income staff to evaluate and implement changes to the overall structure of the Fixed Income ex ILB Portfolio. This resulted in a portfolio that has a higher expected return, lower fees on invested capital, and modest diversification benefits while maintaining the same overall credit profile. Verus worked with Russell Investments and INPRS staff in establishing a total portfolio overlay and rebalancing methodology that will help the plan rebalance systematically in a more cost-effective manner.

Ongoing work also involved supporting INPRS' risk management infrastructure and reporting, investment and operational due diligence on existing managers, board education, and natural collaboration with staff on a variety of smaller projects and issues.

Verus values our relationship with INPRS and we appreciate the privilege of working with the Board and staff in designing policies and supporting decisions aimed at meeting the Plan's investment objectives. We remain confident in the direction of the Portfolio given the System's demographics, fiscal strength, and well-designed investment strategy. We look forward to continuing our partnership as we navigate ever-changing capital markets.

Sincerely,

Jeffrey J. MacLean
Chief Executive Officer

[1] Rates of return are net of fees and based on calculations made by the System's custodian, Bank of New York Mellon, and are presented using a time weighted rate of return methodology based upon fair value.
2 The target index weights for each asset class benchmark are set by the target asset allocation. The return for Risk Parity, Real Estate, and Private Equity are equal to the asset class returns and not the benchmark.

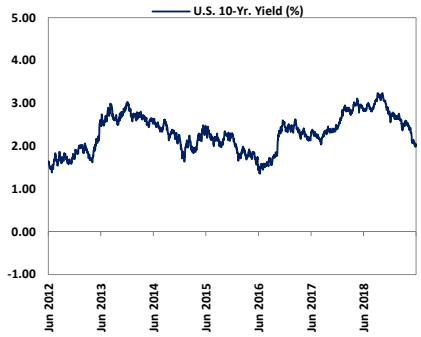
INPRS's Defined Benefit Investment Imperatives

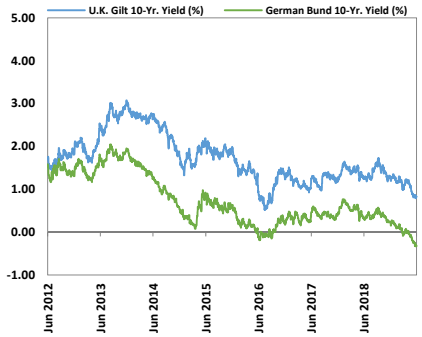
Established in fiscal year 2012, three long-term imperatives that are vital to the continued health of the System's defined benefit plans have served as the guide for the investment team. Every strategic, tactical, and operational decision that is made must have the expectation of positively contributing to at least one of these imperatives.

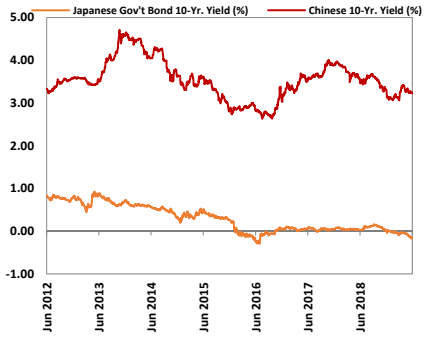
1) Achieve the long-term rate of return assumption. Effective fiscal year 2013, INPRS's Board set the long-term rate of return assumption at 6.75 percent, and again in fiscal year 2015, the Board reaffirmed 6.75 percent as the appropriate long-term assumption. In order for the System to maintain a healthy funded status, it is essential to achieve this rate of return over the long-term (defined as 10+ years in INPRS' Investment Policy Statement).
2) Accomplish the first imperative as effectively and efficiently as possible. While it is important to establish an asset allocation that is expected to meet the target rate of return over a long time horizon, as fiduciaries, it is also important to maintain focus on maximizing the return per unit of risk, limiting return volatility, and maximizing cost efficiency.
3) Maintain enough liquidity to make retirement payments on time. As the System matures, retirement payments will be a greater cash outflow each year. As a result, it is critical to maintain an appropriate level of liquidity to ensure payments are made on time and without causing undue stress to the investment portfolio.

The Year in Review (Defined Benefit Portfolio)[1]

The consolidated defined benefit assets returned 7.4 percent net of all fees over the past fiscal year, exceeding the target rate of return, and ended with a fair value of $30.4 billion. It was a roller-coaster year though as U.S. equities experienced the largest intra-year drawdown since 2009 (-19.4%) and developed market central banks reversed course away from a tightening-focused policy mid-year. Given a back-drop of slowing global growth and steady inflation in the second half of fiscal year 2019, the Federal Reserve and other major central banks took an easier policy stance to stimulate their various economies. These moves along with lower inflation expectations pushed interest rates back toward historic lows. Europe and Japan, in particular, saw nominal interest rates fall back into negative territory; while, in the U.S., the 10 year yield fell from nearly 3.2 percent mid-year to 2.0 percent by June 2019.[2]



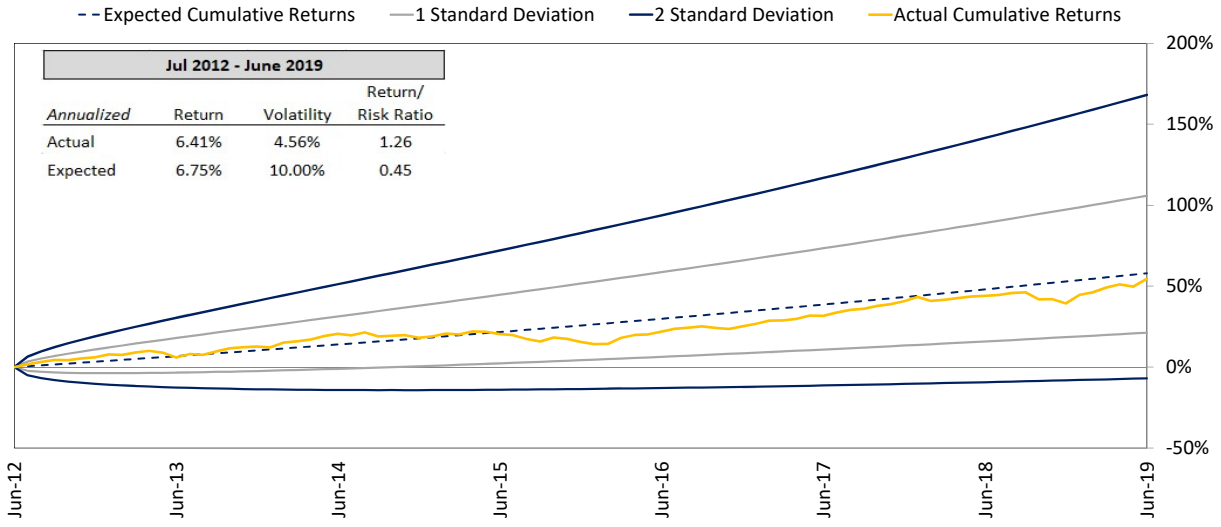




Based on extensive research of the various asset classes and their performance in different economic environments through time, it was determined starting in 2012 that a new risk-balanced framework better fit our first two imperatives. Developed from that research, the following chart illustrates the projected range of outcomes for INPRS's asset allocation around the 6.75 percent return target (blue dotted line). This visual is meant to track the cumulative performance of the actual portfolio (yellow solid line) versus those expectations along the way. Although the portfolio has underperformed the return target since adopting the new asset allocation strategy in 2012, the cumulative return is well within our range of expected outcomes and trending toward the target.

[1] Rates of return specific to INPRS's portfolio are based on calculations made by INPRS's custodian, Bank of New York Mellon, and are presented using a time-weighted rate of return methodology based upon fair value.
[2] Source: Bloomberg.

INPRS Net of Fee Cumulative Return



The following table shows INPRS's annual net-of-fees returns over the same time period. Since inception of the revised strategy, the portfolio has generated an annual return of 5.8 percent above the return of cash and outperformed the average historical spread for the asset allocation over cash by 4.5 percent.[1]

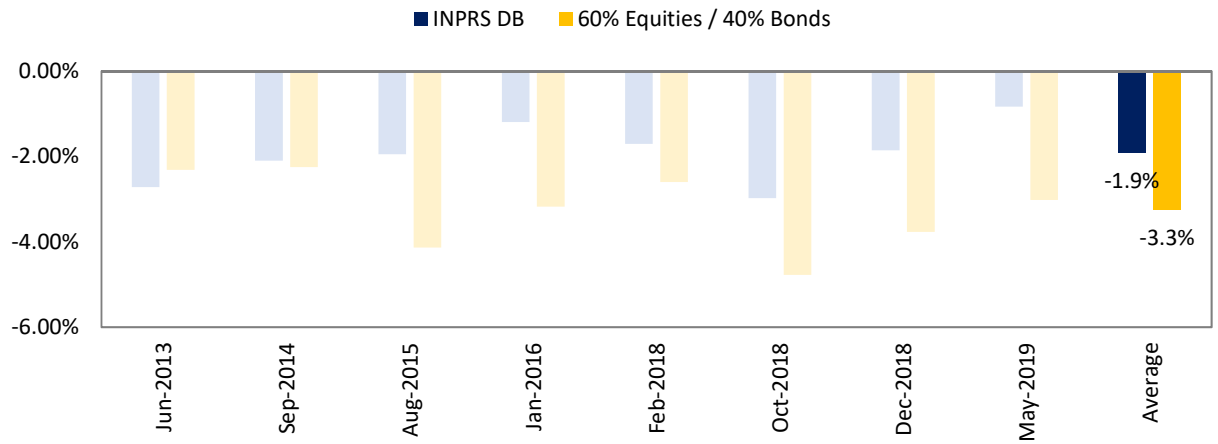
INPRS Annual Returns (Net of Fees)[2]

INPRS Annual Returns (Net of Fees)					
	Excess Return	**+**	**Cash Return**	**=**	**Total Return**
FY2013	5.9%		0.1%		6.0%
FY2014	13.6%		0.1%		13.7%
FY2015	0.0%		0.0%		0.0%
FY2016	1.0%		0.2%		1.2%
FY2017	7.5%		0.5%		8.0%
FY2018	8.0%		1.3%		9.3%
FY2019	5.1%		2.3%		7.4%
INPRS Annual Return ***(Actual FY2013 - FY2019)***	**5.8%**		**0.6%**		**6.4%**
Avg. Annual Return of INPRS Target Asset Allocation *(Back-Test 1937 - 2015)*	4.5%		3.6%		8.1%

[1] *Cash return based on Citigroup 3mo Treasury (Source: INPRS's custodian, Bank of New York Mellon).*
[2] *Excess return presented by INPRS's general consultant, Verus, at the June 2015 INPRS Board meeting. INPRS's current target asset allocation was approximated historically using available indices. Cash return based on the one-month US Treasury bill return from 1937 - 2015 (source: Dimensional Fund Advisors' Matrix Book 2016 of Historical Returns Data).*

The prior charts highlight the recent challenges from the historically low interest rate environment. Due to the low return on cash since 2012, the portfolio's total performance has fallen short of the target rate of return assumption of 6.75 percent thus far. However, the target rate of return was established based on a much longer time horizon. As such, the asset allocation that was constructed to meet the return objective will ultimately be measured over decades rather than a few years.

With this long-term focus in mind, it is important that we constantly monitor the portfolio over various market environments and evaluate whether it performed as we expected. One of the primary reasons for diversifying the portfolio was to be less impacted by the performance of equities. In the chart below, we evaluate this by looking at various historical months that a traditional 60 percent equity and 40 percent bond portfolio had a loss of 2 percent or worse since July 2012. As shown, INPRS's defined benefit portfolio continues to hold-up well on a relative basis during nearly all of these occurrences and, consistent with our expectations, has a materially lower loss on average than the 60/40 portfolio.



Performance Attribution

Looking closer at fiscal year 2019, the returns of INPRS's separate asset classes are shown in the chart below. All asset classes, except commodities, had positive returns over the course of the year as the falling interest rates in the second half of the year more than offset the weakness seen across most asset classes at the end of calendar year 2018. However, fixed income was the largest benefactor and led all public asset classes with a return of 10.0 percent.

Private markets (including private equity and private credit) continued their strong performance in fiscal year 2019 with a 20.4 percent return. Private equity still makes-up a vast majority of the exposure in private markets as we look to build-out our private credit portfolio. Returns from co-investments within the private equity portfolio, in particular, exceeded expectations due to idiosyncratic factors and were a boon for returns during the year.

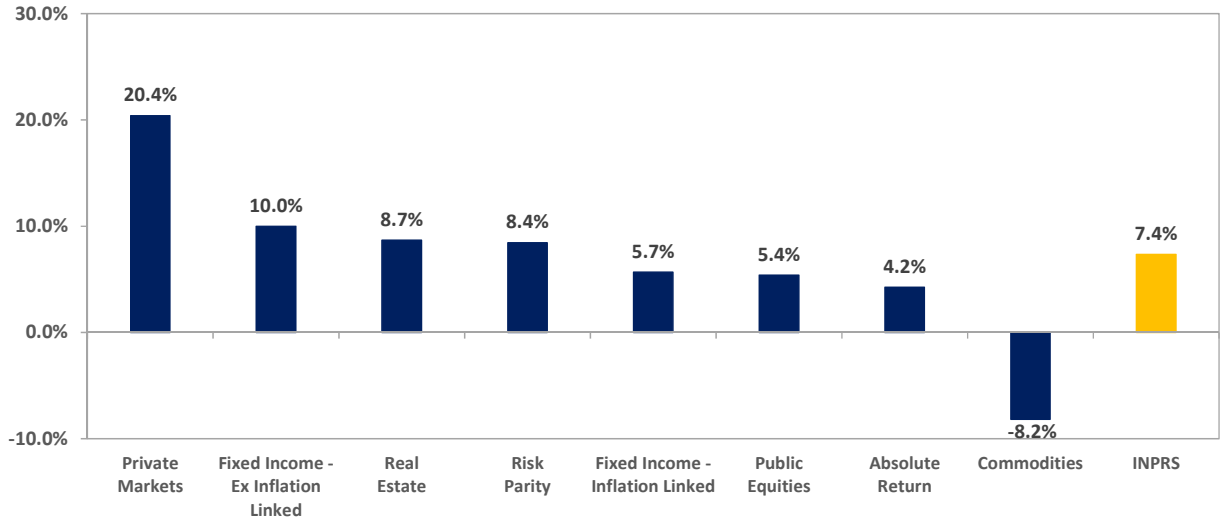
In a complete reversal from last year, commodities went from the top performing asset class with a 22.0 percent return in fiscal year 2018 to the worst performing asset class in fiscal year 2019 with a (8.2) percent return. Energy commodities were the largest driver of the negative performance as evident by comparing the (11.5) percent return of the energy-heavy S&P GSCI Index versus the -6.8 percent return of the more diversified Bloomberg Commodity Index over the course of the year. There was a wide dispersion across individual commodities though. The Bloomberg Precious Metals sub-index, including gold and silver, returned a positive 7.6 percent as elevated geopolitical uncertainty and U.S. dollar weakness boosted the safe-haven assets.[1]

The risk parity portfolio has been constructed with the most diversified collection of public markets exposure we can find. We believe this exposure will become even more important as equity markets come off one of the greatest runs of all-time, but it was also accretive in the past fiscal year. Given the strong returns across most public asset classes, the risk parity portfolio produced an 8.4 percent return this year and, as a result, outperformed the 6.2 percent return target.

The absolute return portfolio was constructed to limit correlation to equity, credit, and fixed income markets and help provide smoother performance for the overall portfolio during these difficult periods. In the second quarter of fiscal year 2019, the absolute return portfolio provided the intended diversification as it produced a positive 0.6 percent return while the public equity portfolio had a (13.6) percent return. However, the absolute return portfolio returned 4.2 percent and underperformed its target of cash plus four percent (5.3 percent) over the full year. While the return missed expectations over the short-term, the absolute return portfolio has achieved the target return since 2014, when the portfolio was reconstructed to be more diversifying to the rest of the defined benefit portfolio. Over this time period, the portfolio outperformed cash by 5.0 percent (5.8 percent return versus a 0.8 percent return on cash).

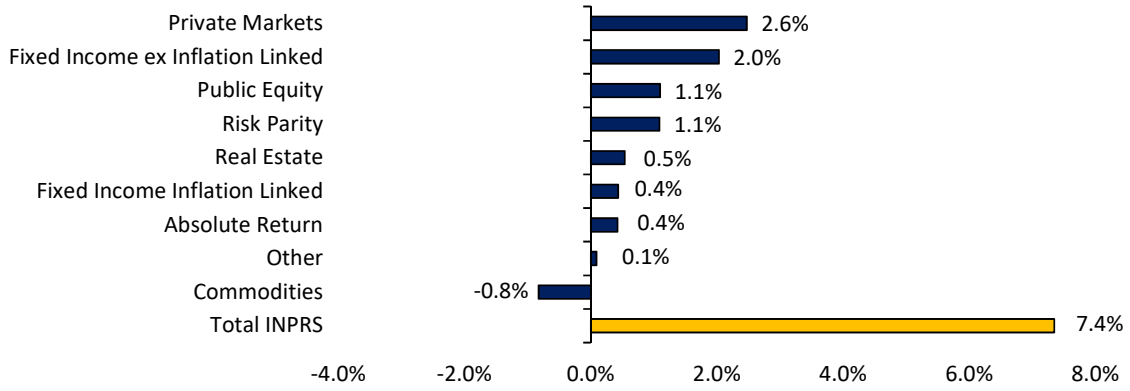
[1]*Source: Bloomberg.*

1-Year Asset Class Returns as of June 30, 2019



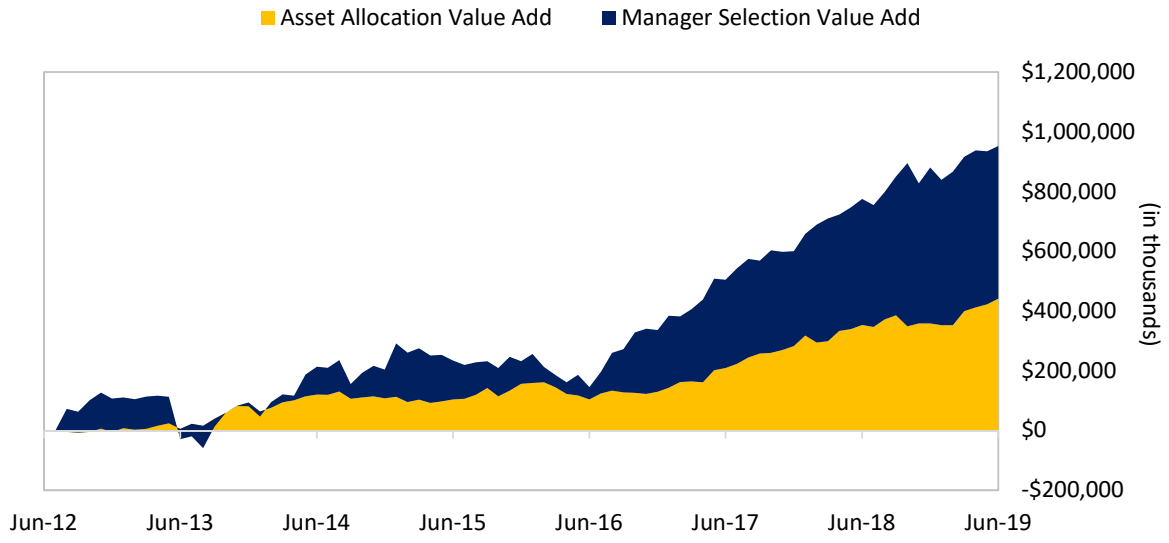
The chart above provides an incomplete picture, though, as it does not reflect the modifications we have made to our allocation across asset classes to better balance their varying levels of risk. The following chart adjusts for this by taking into account the weight of each asset class in the portfolio as well as its return over the past year. By linking these components, we are able to observe the contribution to total return that each asset class provided. This view serves as a better representation of performance given that our risk-balanced strategy produces an allocation that invests less in more volatile asset classes (e.g. commodities) and more in less volatile asset classes (e.g. fixed income).

1-Year Contribution to Total Return as of June 30, 2019



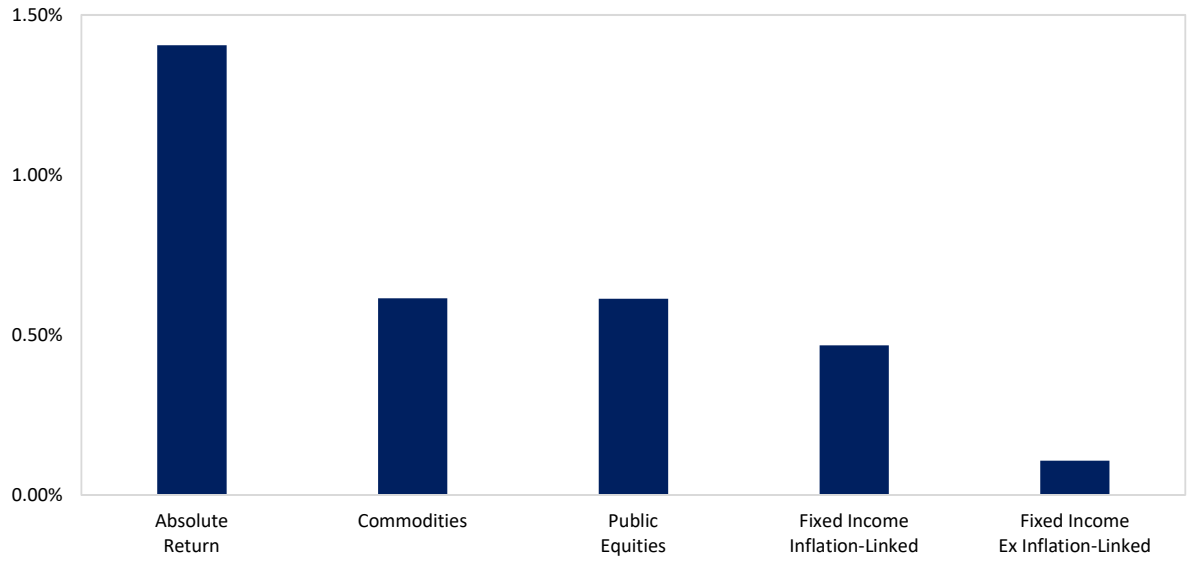
In fiscal year 2019, the investment team achieved a return that was 0.6 percent above the target asset allocation benchmark, net of all fees. The benchmark is meant to reflect what performance would have been had the portfolio been at target weights in each asset class the entire year and invested in passive strategies (e.g. index funds). Both the tactical asset allocation and manager selection decisions made by the team this year added value to the portfolio. This continued the positive trend of the past seven years as the outperformance generated by the investment team since July 2012 has produced approximately $952 million in added value (asset allocation + manager selection) over a portfolio of merely passive investments. To put this into perspective, these additional returns have been large enough to cover all of the PERF retirement payments made in fiscal year 2019.

Cumulative Excess Returns over the Target Allocation (Net of Fees)



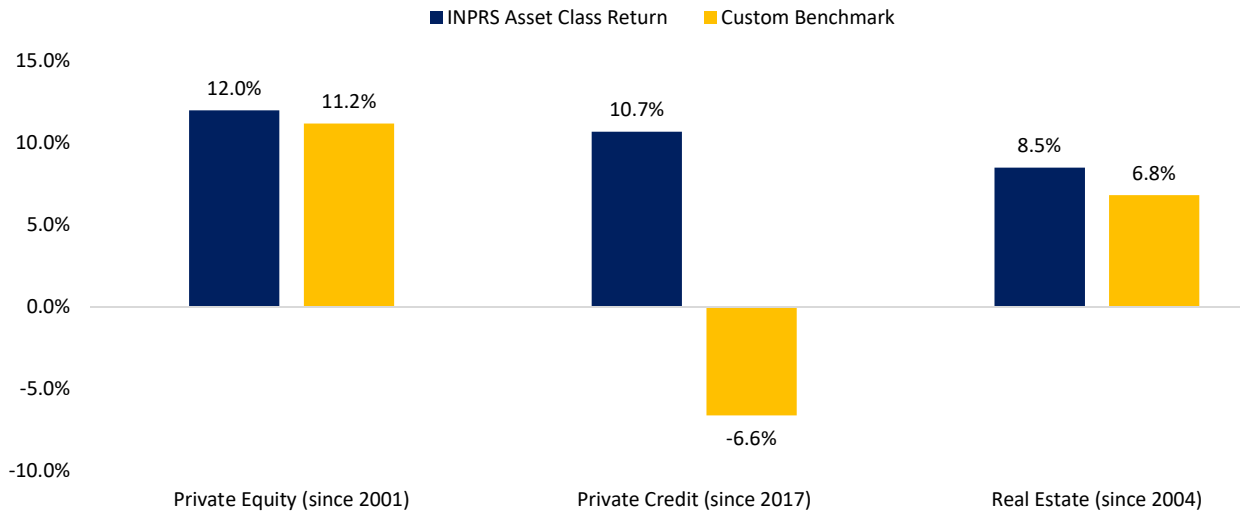
Breaking that result down further, you can see that manager selection has created a large portion of the outperformance over the past seven years because each public asset class has outperformed its benchmark.

Annualized Outperformance Relative to Benchmarks (Public Markets) July 2012-June 2019



INPRS's investments in private markets and real estate have produced similarly strong results relative to their benchmarks. They are not included in the value-add chart above because the managers in these asset classes control the timing of cash flows and, thus, we believe a different measure better captures their performance relative to a benchmark (i.e. internal rate of return or IRR). However, the chart below gives some perspective on their outperformance since inception.

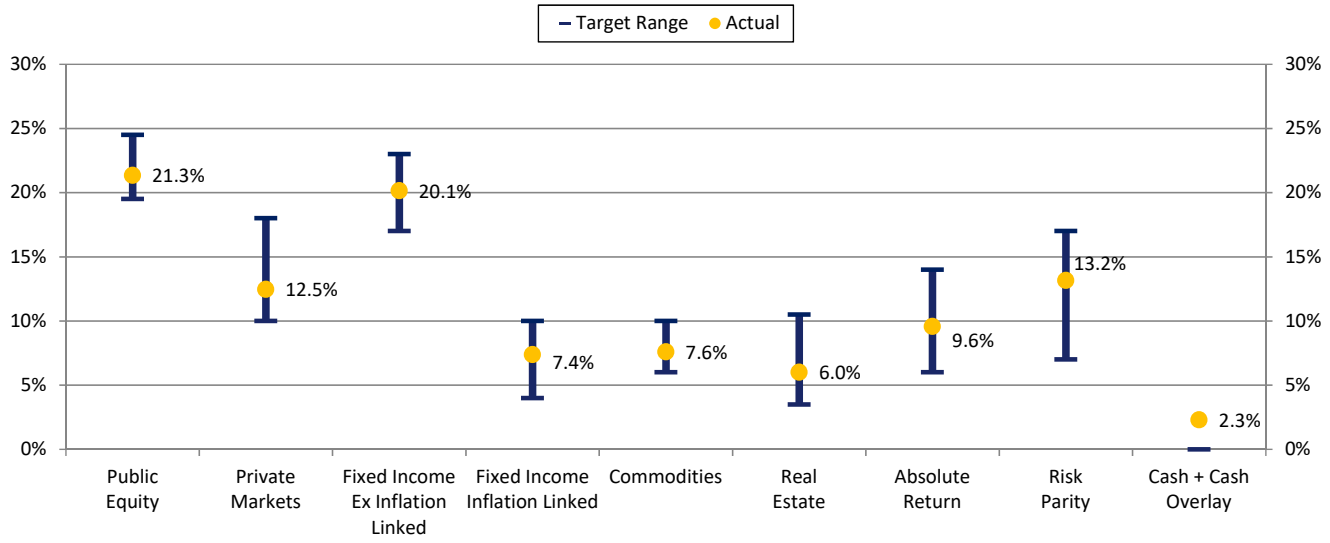
Annualized Performance (IRR) Relative to Benchmarks (Private Markets) Since Inception of Each Asset Class[1]



Current Portfolio Exposures

As previously mentioned, INPRS set-out on a course seeking more balance across economic and market environments starting in fiscal year 2012 with the approval of a new asset allocation strategy. Despite slight revisions to the asset allocation during the last asset-liability study in fiscal year 2015 that resulted in a marginally higher expected return and return-risk ratio, the outcome reaffirmed the path of diversification INPRS had previously chosen and continues to pursue. As such, INPRS rebalanced as needed over the course of fiscal year 2019 to stay within the Board-approved allocation bands for each asset class. The allocation as of June 30, 2019 can be found in the chart below.

Defined Benefit Asset Allocation as of June 30, 2019



[1] *As of March 31, 2019. Based on the first capital calls made by INPRS: Private Equity inception date is 5/14/2001; Private Credit inception date is 10/17/2017; and Real Estate inception date is 2/26/2004. The Private Equity custom benchmark is comprised of the following components lagged one quarter plus 3.00%: 60% Russell 2000 Index, 20% EAFE Small Cap Index, 15% CS High Yield Index, and 5% CS Western European High Index (Hedged). The Private Credit custom benchmark is comprised of the following components plus 1.50%: 50% Credit Suisse Leveraged Loan Total Return, 33% Wells Fargo BDC Total Return, and 17% Credit Suisse Western European Leveraged Loan. The Real Estate custom benchmark is comprised of the following components lagged one quarter: 70% FTSE NAREIT All Equity REITS Index and 30% Barclays CMBS Index.*

Liquidity

As you can see from the chart above, INPRS has meaningful exposure to less liquid asset classes with 28 percent allocated across private markets, real estate, and absolute return. We believe each of these asset classes serves a unique purpose within the construct of the allocation. However, with these benefits come other risks, namely a lack of liquidity (e.g. Many of these private market funds have a lock-up of ten years or longer, and many of the absolute return funds only allow for quarterly liquidity.)

Regardless of how good we think these exposures are, we want to ensure the portfolio has enough liquidity to meet retirement payments as they come due without unnecessary fire-selling of assets in turbulent markets (see the third imperative listed above). As a result, the investment team developed and maintains a liquidity measure that assesses the System's ability to take on illiquidity risk at any point in time. The metric compares the amount of liquid assets and cash inflows available over the next five years to the expected cash outflows (e.g. retirement payments, plan expenses, etc.) over the same time frame. Through strenuous stress testing, the investment staff is comfortable that there is adequate liquidity in various negative market environments, and as of June 30, 2019, INPRS's liquid assets and projected inflows are 2.9 times the projected outflows over the next five years (versus 2.6 times on June 30, 2018).

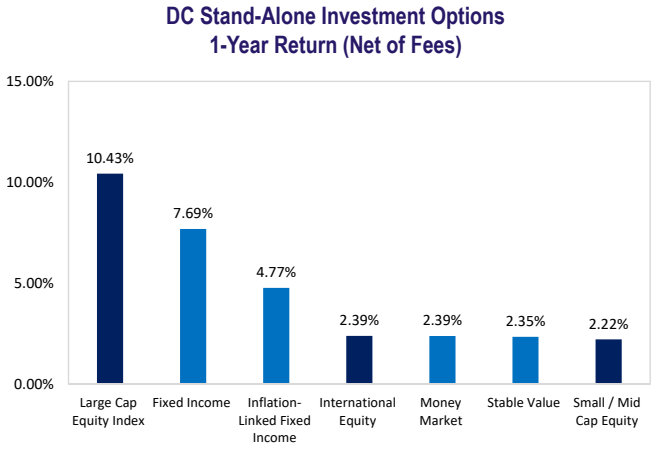
INPRS's Defined Contribution Investment Imperatives

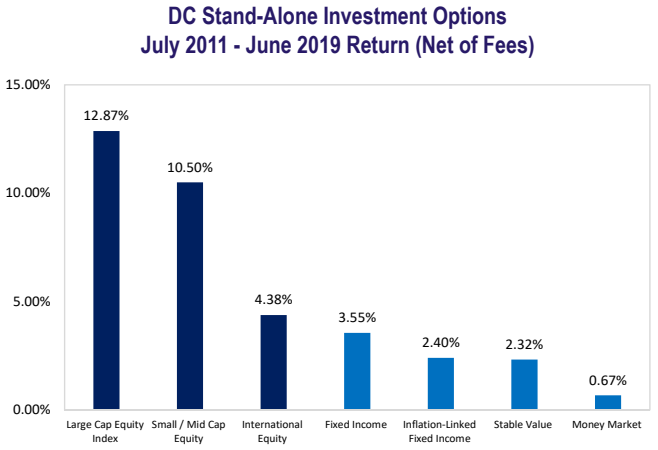
Known as the Annuity Savings Account ("ASA"), My Choice: Retirement Savings Plan ("My Choice"), and Legislators' Defined Contribution Plan, the defined contribution plans at INPRS provide members the ability to select their own asset allocation from a line-up of investment options approved by the Board. Established in fiscal year 2017, three long-term imperatives that are vital to the continued health of the System's defined contribution plans have served as the guide for the investment team.

1) **Provide a simple and diversified default option ("Allocate it for me" - Target Date Options).** Effective fiscal year 2011, INPRS' Board changed the default investment option for the ASA and My Choice plans to target date funds. This fund line-up was established to provide members with an auto-pilot allocation that targets an appropriate risk and return profile for their particular time horizon and automatically becomes more conservative as they approach retirement. Given how many members rely on INPRS to manage their asset allocation for them by defaulting to this option, it is crucial that we construct a target date fund line-up that is easy to understand yet sophisticated enough to help members achieve their savings goals.
2) **Provide a simple and diversified menu of stand-alone options ("Allocate it myself" - Core and Specialty Options).** For those members that want to select an allocation that is different than those offered in the target date funds, INPRS offers investment options for individual asset classes. This line-up of options allows members to construct an asset allocation that better suits their specific needs and objectives.
3) **Leverage the defined benefit asset base to provide low cost investment options.** One reason the multiple retirement plans under INPRS' management were originally consolidated was to reduce fees for all plans. As a result, it is critical that we maintain focus on utilizing the large asset base across the defined benefit and defined contribution plans to continually drive costs lower.

Performance Attribution

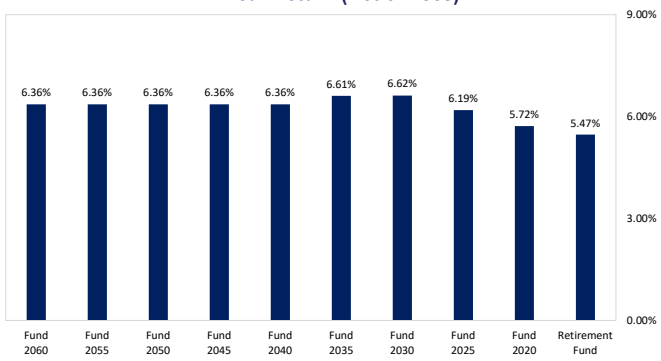
The defined contribution line-up is constructed using the basic building blocks of an asset allocation, including various equity and fixed income portfolios. As such, INPRS's investment options were influenced by the same economic forces mentioned in the defined benefit section above: slowing global growth and a lack of inflation. This backdrop caused the fixed income portfolios to outperform both the international and small/mid cap equity portfolios over the course of fiscal year 2019 (left chart below). While, U.S. large cap equities continued to produce solid returns in the face of global uncertainty. Over the long term, strong performance across each of the equity funds INPRS offers continues to be seen as we look at returns since coming out of the 2008 financial crisis (second chart below).



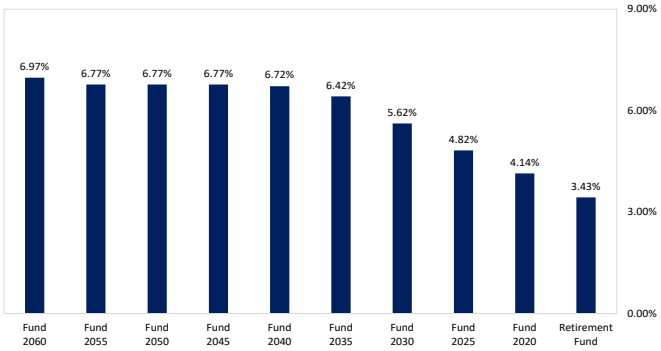


Given INPRS's target date funds are constructed using different mixes of the INPRS stand-alone investment options, their returns are merely an amalgamation of the returns shown above. The funds closer to retirement had stronger performance in fiscal year 2019 than they had the seven years prior due to their fixed income bias. While, the funds farther from retirement continue to have higher returns, as expected, going back longer-term due to their equity bias. The following charts illustrate these differences since the target date funds became INPRS's default investment option in 2011.

Target Date Funds
1-Year Return (Net of Fees)

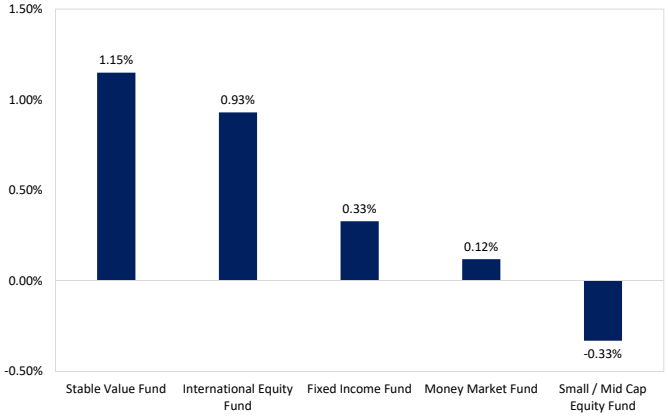


Target Date Funds
July 2011 - June 2019 (Net of Fees)

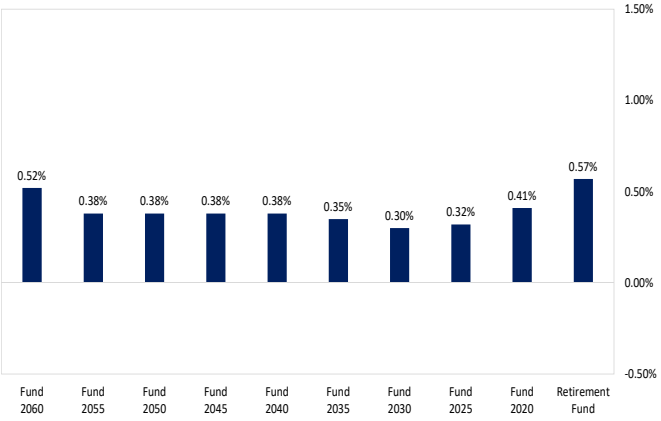


By including a moderate amount of active management within the fund line-up, the investment team was able to beat the benchmarks in four out of five of the stand-alone investment options with an active management component[1] over the past eight years by 0.12 to 1.15 percent annually, depending on the fund. The Small/Mid Cap Equity Fund had underperformance of 0.33 percent annually over this time frame due to manager underperformance. Consequently, the amount of active management within the Small/Mid Cap Equity Fund was reduced to 10 percent a few years ago and only one active small cap manager remains in the portfolio today, in-line with the Defined Benefit portfolio. Given that the target date funds are constructed using the INPRS stand-alone investment options, this also translated into outperformance across the target date fund glide path of 0.38 to 0.57 percent over the past eight years.

DC Stand-Alone Investment Options
July 2011 - June 2019 Outperformance vs. Benchmarks (Net of Fees)



Target Date Funds
July 2011 - June 2019 Outperformance vs. Benchmarks (Net of Fees)



Target Date Funds Review

INPRS is always looking for ways to improve the defined contribution investment line-up to the benefit of its members. After a period of evaluation in fiscal year 2019, INPRS's investment team identified the need to change its target date fund allocations based on demographic trends and plan-specific changes since the target date funds were established in 2010. The goal of these changes include: improving retirement outcomes and providing better alignment with similar offerings in the defined contribution market.

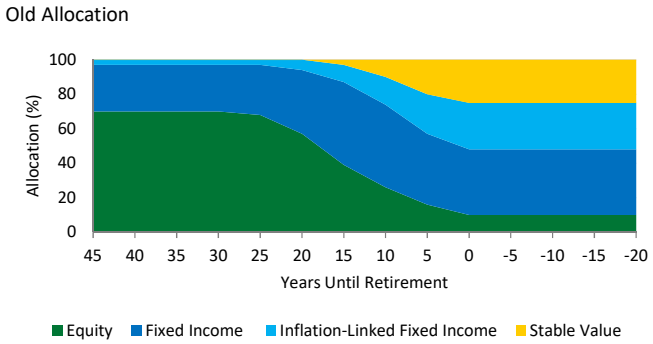
While volatility is an important consideration for any asset allocation, the investment team identified a variety of risks that may cause a member to miss on their retirement goals. INPRS's Investment Policy Statement now outlines each of these risks INPRS is attempting to better manage through the upcoming changes to the glide path, specifically:

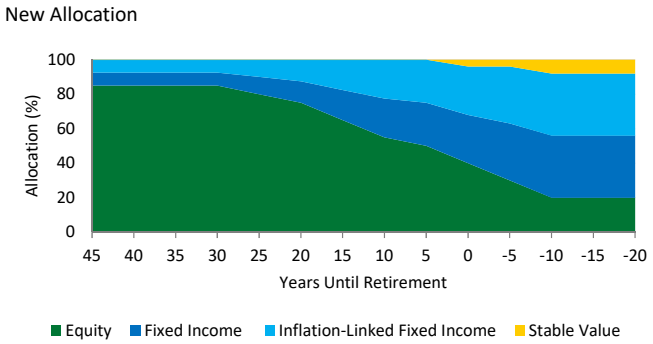
- Longevity risk: outliving your retirement savings,
- Shortfall risk: not being able to maintain your desired standard of living,
- Inflation risk: inflation outpacing investment returns, and
- Market risk: market movements harming retirement savings

[1] *The following DC investment options are only passively managed: Large Cap Equity Index Fund and Inflation-Linked Fixed Income Fund.*

The modifications to the target date fund glide path will take place between July 1, 2019 and September 30, 2019. The adjustments are illustrated in the graphs below and can be summarized as follows:

- Increasing equity and inflation-linked bond exposure while decreasing fixed-income exposure: These changes were designed to provide more capital appreciation during a members' working years and maintain an income-focus throughout retirement in order to combat longevity, shortfall, and inflation risks in retirement. As a result, each fund's level of expected investment risk to increase as well as expected return.
- Changing to a "through retirement" model: To achieve this, two new target date funds - the 2010 Fund and 2015 Fund - will be created. Whereas the former glide path reached its final asset allocation at retirement, the "through retirement" glide path is designed to seek higher expected returns into a member's retirement years by reaching its final, most conservative allocation 10 years into retirement. This change is intended to help members better manage longevity, shortfall, and inflation risks as they enter their retirement years.





While we believe the changes to the target date funds' allocations will benefit our members for decades to come, we are just as excited about making these changes while keeping the fees low for our members. The fees across the target date fund line-up will range from 0.09 - 0.10 percent per year down from 0.12 - 0.15 percent under the old construct. This reduction means that INPRS's continues to offer some of the most competitive fees in the country.

Target Date Fund Fee Comparison		
	Annual Fee (%)	**$ per $1,000**
INPRS	**0.09% to 0.10%**	**$0.86 to $1.03**
Institutional Peer Group	0.13% to 0.17%	$1.30 to $1.70
Vanguard	0.12% to 0.15%	$1.20 to $1.50
Fidelity	0.48% to 0.75%	$4.80 to $7.50
T. Rowe Price	0.54% to 0.72%	$5.40 to $7.20

Source: Institutional Peer Group is based on the 2018 CEM Benchmarking study. Vanguard, Fidelity, and T. Rowe Price current fees as reported on their respective websites on June 30, 2019.

This Time is the Same

Although we often hear "this time is different" related to the economy and markets, I would instead argue that this time is more of the same for investors. Regardless of how "different" the investment environment feels, I believe **psychology is still the largest obstacle for an investor, not markets themselves**. Great years in a portfolio can lead to overconfidence; while, poor years can introduce self-doubt. The fear of missing out on an investment with impressive returns may lead to buying over-priced assets, but contrast that with the fear of looking wrong that may cause avoidance of a contrarian strategy. There is also the continuous pull of comparing ourselves to peers, despite having unique circumstances and goals for our portfolio. These are just a few of the countless emotional distractions that investors, including us at INPRS, face every day.

This time is the same in my eyes because I believe the environment continues to call for trusting our people and process to navigate these potentially negative psychological influences. While fiscal year 2019 was a successful year for INPRS in terms of performance, which should be celebrated, we must not let good years like the last one overly influence our long-term strategy going forward. We must constantly test our conviction in the chosen strategy or managers while supporting each other as a team when, not if, it gets difficult along the way.

Sincerely,

Scott B. Davis, CFA
Chief Investment Officer

Outline of Investment Policies

Objective and Guiding Principles

The Indiana Public Retirement System's (INPRS) Board serves as the ultimate fiduciary of INPRS. The Board establishes investment policies while Indiana law establishes guidelines on the investment of the System's assets. At all times, INPRS must invest its assets according to the "Prudent Investor" standard.

The Investment Policy Statement (IPS) ensures that INPRS will maintain funding for each retirement fund to pay the benefits or actuarially determined liabilities over time in a cost-effective manner. It is a dynamic document and periodic reviews are undertaken.

Core tenets of the IPS are:

- Set investment policies that the Board judges to be appropriate and prudent.
- Develop clear, distinctive roles and responsibilities of the Board, staff, and each service provider.
- Serve as a guide for continual oversight of the invested assets.
- Establish formal criteria to measure, monitor, and evaluate the performance results of the investment managers.
- Communicate investment policies, directives, and performance criteria to the external and internal stakeholders.

DB Objectives and Structure

The Board recognizes that the allocation of defined benefit assets is the most important factor of investment returns over long periods of time. An asset liability study is conducted every five years to analyze the expected returns of various global asset classes, projected liabilities, risks associated with alternative asset mix strategies and their effect on the projected fair value of assets, funded status, and contributions to the funds. With a long-term investment focus, the defined benefit portfolio is invested across diverse asset classes as shown and approved by the Board in February 2019:

Defined Benefit Asset Allocation:	Target Allocation	Target Range	Benchmark
Public Equity	22.0%	19.5 to 24.5 %	MSCI All Country World IMI Index
Private Markets	14.0	10.0 to 18.0	Custom Benchmarks
Fixed Income - Ex Inflation-Linked	20.0	17.0 to 23.0	Custom Benchmark
Fixed Income - Inflation-Linked	7.0	4.0 to 10.0	Custom Benchmark
Commodities	8.0	6.0 to 10.0	Custom Benchmark
Real Estate	7.0	3.5 to 10.5	Custom Benchmark
Absolute Return	10.0	6.0 to 14.0	HFRI Custom Benchmark
Risk Parity	12.0	7.0 to 17.0	Custom Benchmark

DC Objectives and Structure

The defined contribution plans are structured to provide members with a choice of diverse investment options that offer a range of risk and return characteristics appropriate for members. Members can self-direct their investment options or leave their contributions invested in the default target date retirement fund. The offered investment options undergo periodic reviews by the Board. The defined contribution investment options currently include and the accompanying Fund Facts are available online: https://www.in.gov/inprs/fundfactsheets.htm.

- Target-Date Retirement Funds
- Large Cap Equity Index Fund
- International Equity Fund
- Small/Mid Cap Equity Fund
- Fixed Income Fund
- Inflation - Linked Fixed Income Fund
- Stable Value Fund
- Money Market Fund

Other Funds

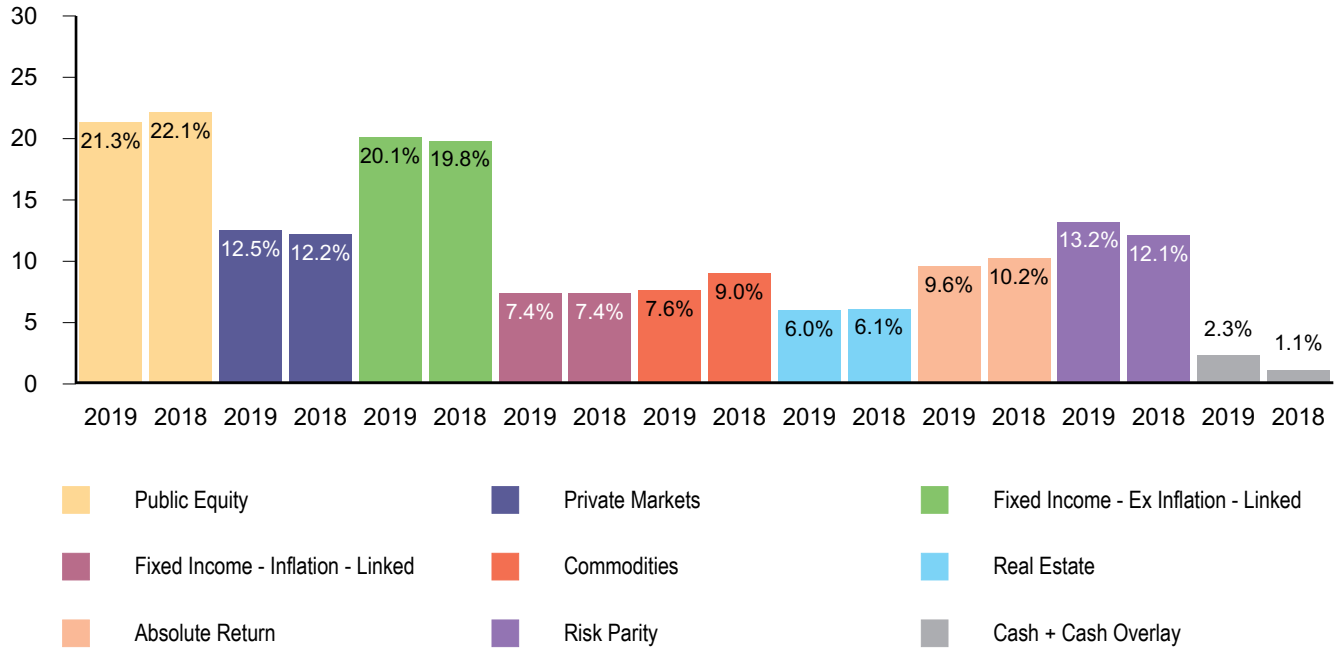
The other plans under the administration of the Board include the Local Public Safety Pension Relief Fund (LPSPR) and the Special Death Benefits Fund (SDBF). The assets of LPSPR are invested in short-term money market instruments, including, but not limited to commercial paper and securities issued or guaranteed by the U.S. government. The assets of SDBF are invested in intermediate U.S. government and U.S. credit bonds.

Investment Results - Consolidated Defined Benefit Assets

Asset Allocation Summary: June 30, 2019 Actual vs. June 30, 2018 Actual

The Total Consolidated Defined Benefit Investments shown below are grouped by global asset classes approved in the Investment Policy Statement, whereas the investments in the Statement of Fiduciary Net Position are grouped in assets and liabilities according to GASB and the security type assigned to each investment.

(dollars in thousands)	June 30, 2019			Allowable Range for Investments	June 30, 2018	
Global Asset Class	Amount	Percent	Target		Amount	Percent
Public Equity	$6,480,676	21.3%	22.0%	19.5 to 24.5 %	$ 6,280,193	22.1%
Private Markets	3,788,124	12.5	14.0	10.0 to 18.0	3,480,200	12.2
Fixed Income - Ex Inflation - Linked	6,116,645	20.1	20.0	17.0 to 23.0	5,635,420	19.8
Fixed Income - Inflation - Linked	2,241,789	7.4	7.0	4.0 to 10.0	2,121,768	7.4
Commodities	2,304,769	7.6	8.0	6.0 to 10.0	2,551,544	9.0
Real Estate	1,823,022	6.0	7.0	3.5 to 10.5	1,740,391	6.1
Absolute Return	2,905,873	9.6	10.0	6.0 to 14.0	2,914,022	10.2
Risk Parity	3,998,139	13.2	12.0	7.0 to 17.0	3,437,750	12.1
Cash + Cash Overlay	711,537	2.3	N/A		314,472	1.1
Total Consolidated Defined Benefit Investments	**$30,370,574**	**100.0%**	**100.0%**		**$ 28,475,760**	**100.0%**



Annualized Time-Weighted Rate of Return by Asset Class vs. Benchmark Returns

For the Year Ended June 30, 2019

	1-Year [1]			
Global Asset Class	Actual Return [2]	Benchmark Return [2]	Actual Over / (Under) Benchmark	Benchmark
Public Equity	5.4%	4.6%	0.8	MSCI All Country World IMI Index (MSCI ACWI)
Private Markets	20.4	3.7	16.7	Custom Benchmark [3]
Fixed Income - Ex Inflation - Linked	10.0	9.9	0.1	Custom Benchmark [4]
Fixed Income - Inflation - Linked	5.7	5.2	0.5	Custom Benchmark [5]
Commodities	(8.2)	(8.0)	(0.2)	Custom Benchmark [6]
Real Estate	8.7	16.1	(7.4)	Custom Benchmark [7]
Absolute Return	4.2	1.8	2.4	HFRI Custom Benchmark [8]
Risk Parity	8.4	6.2	2.2	Custom Benchmark [9]
Cash + Cash Overlay	5.6	6.9	(1.3)	Custom Benchmark [10]
Total Consolidated Defined Benefit Assets	**7.4**	**6.7**	**0.7**	Custom Target Benchmark

[1] Time-weighted rates of return based on calculations made by the System's custodian, Bank of New York Mellon.

[2] Net of fees.

[3] Benchmark represents the private equity custom PME made up of the following components lagged one quarter with a 300 basis point premium: Russell 2000(weight: 60%); MSCI EAFE Small Cap Index (weight: 20%); Credit Suisse High Yield Index (weight: 15%); Credit Suisse Western Europe High Yield Index (Hedged) (weight: 5%).

[4] Benchmark represents the sub-asset class target allocation within the fixed income portfolio over time.

[5] Global Inflation 70/30 is a 70% weight to Global Inflation-Linked Bonds (including U.S.) and a 30% weight to U.S. Inflation-Linked Bonds.

[6] 50% Bloomberg Commodity Index / 50% Goldman Sachs Commodity Index and the collateral component is a 75/25 blend of Global Inflation Linked Bonds (ILB's) and 90-day Treasury Bills respectively.

[7] Real Estate Custom PME made up of the following components lagged one quarter: 70% FTSE NAREIT All Equity REITS and 30% Barclays CMBS.

[8] Weighted average of INPRS exposure to representative HFRI sub-strategy indices.

[9] Comprised of 60% MSCI ACWI IMI Index (equities) and 40% Barclays Global Aggregate Bond Index (bonds).

[10] Benchmark represents the allocation to sub-asset class targets for the cash overlay starting in April 2016; prior to that, the 3-month LIBOR was the benchmark for cash.

10-Year Time-Weighted Investment Rates of Return[1]

For the Years Ended June 30

(dollars in thousands)		Fair Value of Assets	Rate of Return [2]	Actuarial Assumed Rate
2019	INPRS [3]	$30,370,574	7.4%	6.75%
2018	INPRS [3]	28,475,760	9.3	6.75
2017	INPRS [3]	26,364,510	8.0	6.75
2016	INPRS [3]	24,775,551	1.2	6.75
2015	INPRS [3]	24,629,820	0.0	6.75
2014	INPRS [3]	24,560,323	13.7	6.75
2013	INPRS [3]	21,488,715	6.0	6.75
2012	INPRS [3]	19,708,900	0.7	7.00
2011	PERF CRIF [4]	15,796,600	20.1	7.00
	TRF DB Assets [5]	5,984,000	18.2	7.00
2010	PERF CRIF [4]	13,314,000	13.9	7.25
	TRF DB Assets [5]	5,073,000	14.8	7.50

[1] Returns from 2010 - 2011 presented as previously reported; returns 2012 and thereafter are based on calculations made by the System's custodian, BNY Mellon.

[2] Net of fees: 2010-2011 reported as gross of fees.

[3] INPRS Consolidated Defined Benefit Assets.

[4] PERF Consolidated Retirement Investment Fund.

[5] TRF Defined Benefit Assets.

Historical Comparative Investment Results[1]

As of June 30, 2019

	Percent of Portfolio	Annualized Time-Weighted Rates of Return		
		1-Year [2,3]	3-Year [2,3]	5-Year [2,3]
Total Consolidated Defined Benefit Assets	100.0%	7.4%	8.2%	5.1%
vs. BNY Mellon Public Universe Median [4]		6.5	9.2	6.3
Target Reference Index [5]		6.7	7.2	4.5
Total Domestic Equity	10.9	8.1	14.0	9.6
vs. BNY Mellon Public Universe Median		7.5	13.8	9.7
Russell 3000 Index		9.0	14.0	10.2
Total International Equity	10.5	2.6	10.9	4.0
vs. BNY Mellon Public Universe Median		1.3	9.8	3.3
MSCI ACWI ex U.S. IMI Net		0.3	9.2	2.3
Total Domestic Fixed Income	10.8	11.8	4.1	4.8
vs. BNY Mellon Public Universe Median		7.6	3.2	3.3
Bloomberg Barclays U.S. Aggregate Bond Index		7.9	2.3	3.0
Total International Fixed Income	7.4	8.8	3.8	3.9
vs. BNY Mellon Public Universe Median		6.3	3.6	0.3
Bloomberg Barclays Global Aggregate ex-USD (USDH)		7.6	3.3	4.4

[1] As the investment objectives and resulting portfolio construction of INPRS may differ from those in the listed peer universes, the most relevant evaluation of INPRS's performance will be against the investment imperatives outlined in the report from the Chief Investment Officer and the cited benchmarks for each asset class.

[2] Net of fees.

[3] Investment performance is based on calculations made by the system's custodian, BNY Mellon.

[4] Universe of Public Funds.

[5] The target index weights for each asset class benchmark are set by the target asset allocation. The return for Risk Parity, Real Estate, and Private Markets are equal to the asset class returns and not the benchmark.

Statistical Performance as of June 30, 2019

Statistic	1-Year	3-Years	5-Years	10-Years
Annualized Time-Weighted Rate of Return	7.4%	8.2%	5.1%	7.8%
Annualized Standard Deviation	6.4	4.4	4.7	5.9
Annualized Sharpe Ratio [1]	0.8	1.5	0.9	1.2
Beta [2]	0.3	0.3	0.3	0.4
Correlation [2]	0.9	0.8	0.8	0.9
Annualized Alpha [3]	0.5	0.8	0.4	0.4

[1] *Risk Free Proxy is the Citigroup 3 Month T-Bill.*

[2] *Market Proxy is the S&P 500.*

[3] *Market Proxy is INPRS's Custom Dynamic Benchmark.*

Definition of Key Terms:

Standard Deviation: A statistic used to measure the dispersion in a distribution. Dispersion is measured relative to the mean, or average of the distribution. The greater the dispersion, the higher the risk associated with the pattern of observations. One standard deviation describes two-thirds of the observations in a normal or bell-shaped distribution. In an asset allocation context, standard deviation is a conventional proxy for risk or volatility.

Sharpe Ratio: Ratio used to measure risk-adjusted performance. The Sharpe Ratio is calculated by subtracting a risk-free rate (proxy) from the rate of return for a portfolio and dividing the result by the standard deviation of the portfolio returns. The Sharpe Ratio provides insight on excess risk held in the portfolio. The greater a portfolio's Sharpe Ratio, the better its risk-adjusted performance has been. A negative Sharpe Ratio indicates that a risk-less asset would perform better than the security being analyzed.

Beta: A measure of the volatility, or systematic risk, of a security or portfolio in comparison to the market as a whole. Beta is the tendency of a security's return to respond to swings in the market. A Beta of less than one indicates less volatility than the market. A Beta of greater than one indicates greater volatility than the market.

Correlation: A statistical measure of how two securities move in relation to each other. A correlation of positive 1.0 indicates similar magnitude and direction of change. A correlation of negative (1.0) indicates similar magnitude, but opposite direction. A correlation of zero indicates the relationship is purely random.

Alpha: A measure of relative performance. Alpha is the difference between the actual performance of the assets and the performance which should have been achieved given the market's performance and the asset's risk posture.

Asset Class Summaries

Public Equity: Portfolio Objective

The public equity portfolio seeks to provide long-term capital appreciation and income through exposure to public equity securities. INPRS uses a variety of external managers to create a globally diversified portfolio within the asset class. Historically, public equities have performed well in environments when actual economic growth came in higher than expectations and/or when actual inflation came in lower than expectations.

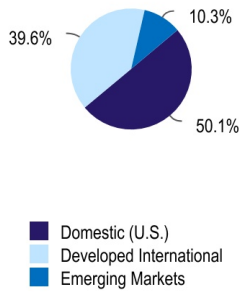
Asset Allocation and Portfolio Performance

1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon.

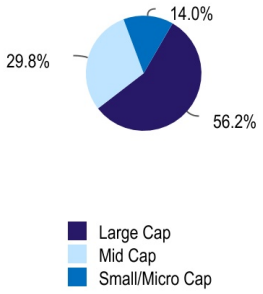
Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance [1]	MSCI All Country Index 1-Year
21.3%	22.0%	$ 6,481 Million	5.4%	4.6%

Portfolio Structure

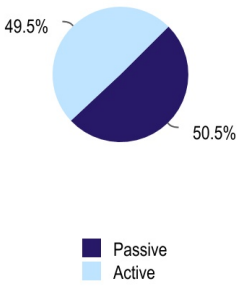
Regional Exposure



Market Cap Exposure



Investment Strategy



Performance Attribution

INPRS's public equity portfolio had a return of 5.4 percent for 2019. The portfolio outperformed the benchmark by 0.8 percent. The domestic segment underperformed the benchmark by 0.9 percent and the international segment outperformed the benchmark by 2.4 percent.

Market Overview

Over the past year, global equities, as represented by the MSCI All Country World IMI Index, were up 4.6 percent. Based on the Russell 3000 Index, domestic equities were up 9.0 percent over the fiscal year. Within the U.S,. growth outperformed value and the Russell 1000 large cap index outperformed the Russell 2000 small cap index. International equities rose by 0.3 percent based on the MSCI ACWI ex U.S. IMI Index with emerging markets besting developed markets.

In the first quarter, INPRS's global equity portfolio was up 4.3 percent. In the U.S., economic conditions continued to improve due a 50 year low in unemployment combined with an increase in consumer confidence. Country specific concerns weighed on international markets such as slowing growth in China and uncertainty surrounding Brexit negotiations. Domestic equities outperformed developed international equities by 6.1 percent during the quarter. Yet, by second quarter the global equity portfolio declined by 13.7 percent. Tighter global monetary policy and geopolitical concerns led to poor equity performance across geographies. Developed international equities outperformed domestic equities by 1.0 percent during the second quarter.

In the third quarter of the year, INPRS's global equity portfolio was up 12.9 percent. After the drawdown in the global equity markets, central banks, led by the United States Federal Reserve, showed a willingness to take a more patient approach regarding monetary policy. Increased optimism with regards to international trade also bolstered performance. Domestic equities outperformed developed market equities by 3.5 percent.

In the fourth quarter of the year, INPRS's global equity portfolio was up 3.7 percent. Globally, central banks took notice of downside risks and turned toward a more accommodative stance on monetary policy. No significant movement was cited in trade negotiations, contributing to further uncertainty around the path forward for the US and its trading partners. Again, domestic equities outperformed developed international equities during the quarter, this time by 0.6 percent.

Private Markets: Portfolio Objective

The private markets portfolio, which includes private equity and private credit seeks to provide risk-adjusted returns in excess of public markets while simultaneously decreasing the volatility of the investment portfolio through diversification.

Asset Allocation and Portfolio Performance

1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon. The custom public market equivalent (PME) index performance is calculated by the custodian, BNY Mellon. The overall private markets PME is calculated based on actual underlying private equity and private credit asset values.

The private equity PME is calculated on a one-quarter lagged basis and consists of the following indices: Russell 2000 Index (weight: 60%); MSCI EAFE Small Cap Index (weight: 20%); Credit Suisse High Yield Index (weight: 15%); Credit Suisse Western Europe High Yield Index (Hedged) (weight: 5%). Note: The private equity PME also includes a 300 basis point premium.

The private credit PME is calculated on a one-quarter lagged basis and consists of the following indices: Credit Suisse Leveraged Loan Total Return Index (weight: 50%); Wells Fargo BDC Total Return Index (weight: 33%); Credit Suisse Western European Leveraged Loan Index (weight: 17%). Note: The private credit PME also includes a 150 basis point premium.

Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	Custom Public Market Equivalent 1-Year Net Performance
12.5%	14.0%	$ 3,788 Million	20.4%	3.7%

Portfolio Overview: Private Equity

The private equity portfolio continues to maintain a home continent bias with 88.3 percent of market value with North American focused funds. Investments are well diversified by sub-asset class with buyout and venture / growth accounting for the largest portions of portfolio market value (53.7 percent and 18.2 percent, respectively).

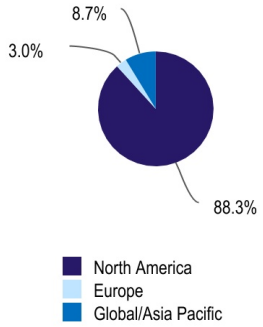
Primary fund commitments account for the vast majority of market value (78.4 percent), with fund of funds (12.0 percent), co-investments and co-investment funds (9.2 percent), and secondary interests (0.4 percent) accounting for the remainder.

The portfolio continues to mature with pre-2008 funds accounting for 13.1 percent of market value.

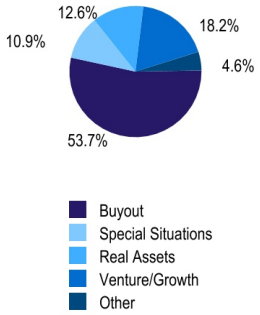
In fiscal year 2019, distributions (inflows) from and contributions (outflows) to the INPRS private equity portfolio totaled $981 million and $443 million, respectively, resulting in positive net cash flow of $538 million. During 2019, INPRS made new commitments totaling approximately $380 million.

Portfolio data and returns (IRR) as of 03/31/2019 are provided by Torrey Cove, INPRS's private markets consultant.

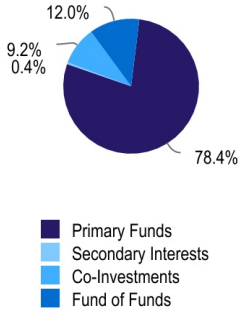
Private Equity Market Value by Region



Private Equity Market Value by Sub-Asset Class



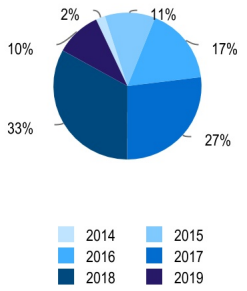
Private Equity Market Value by Structure



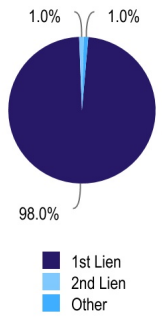
Portfolio Overview: Private Credit

By the end of 2018, INPRS had made $400 million of commitments with $34.3 million invested. During 2019, INPRS continued to expand the private credit portfolio with an additional $290 million in commitments, bringing commitments to the full total to $690 million. New commitments continued to build upon the theme of senior secured term loans to non-sponsor and sponsor-backed borrowers in a wide variety of industries across developed economies. While the initial commitments in 2018 were heavily focused on North America, INPRS expanded commitments to funds with focus on Western Europe in 2019. INPRS continues to work towards increasing the total exposure of private credit to four percent of the defined benefit plan.

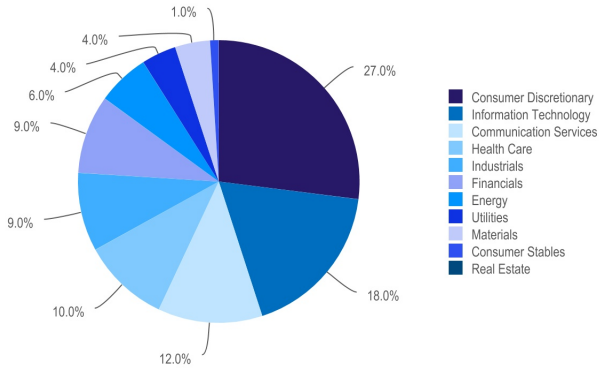
Private Credit Security Type



Private Credit Investment Year



Private Credit Sector

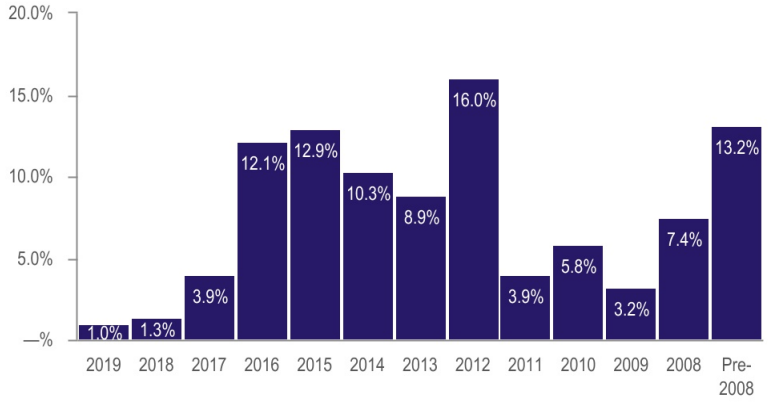


Performance Attribution: Private Equity

At end of 2019, the private equity portfolio had a market value of $3,555 milliion. The portfolio returned 20.9 percent for 2019, outperforming its benchmark by 17.2 percent. The portfolio outperformed the Cambridge Associates Pooled IRR for the one-year period ending March 31, 2019 by 7.40 percent (index 11.2 percent) and has outperformed the same index by 1.20 percent (index 10.9 percent) from inception through March 31, 2019.

North American investments have generated the highest IRR since inception, totaling 13.1 percent, while European investments have performed the least favorably with an IRR of 6.0 percent since inception. The buyout sub-asset class has generated the highest IRR since inception, amounting to 14.1 percent. The venture and special situations sub-asset classes have generated IRRs of 12.2 percent and 10.7 percent since inception.

Private Equity Market Value by Vintage Year



Performance Attribution: Private Credit

Private credit portfolio ended the year with $233 million in market value, an increase of $198.4 million over the prior year. The portfolio returned at 8.2 percent for 2019, outperforming its benchmark by 0.8 percent per custodian. Per asset class consultant, from inception through March 31, 2019, the portfolio has generated an IRR of 10.7 percent.

Fixed Income – Ex Inflation-Linked: Portfolio Objective

The fixed income - ex inflation-linked portfolio seeks to generate current income and long-term risk-adjusted return, in excess of the custom benchmark ("Benchmark"), through the investment in debt securities. A focus is placed on preservation of capital. To minimize the probability of substantial principal loss, INPRS staff seeks to reduce the volatility of the portfolio and enhance return from both contractual income and capital appreciation partially by investing in certain actively managed strategies.

Asset Allocation and Portfolio Performance

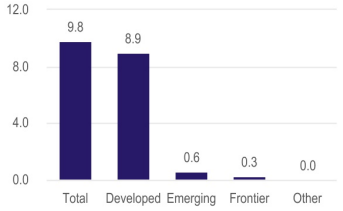
1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon. The custom benchmark represents sub-asset class target allocations within the portfolio over time.

Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	Custom Benchmark
20.1%	20.0%	$ 6,117 Million	10.0%	9.9%

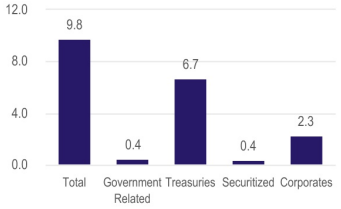
Portfolio Overview

The fixed income - ex - inflation-linked portfolio's effective duration is 9.4 years with 2.7 percent yield to maturity. Credit quality is A1/A2.

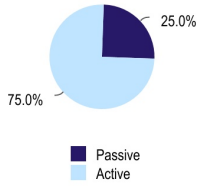
Contribution to Effective Duration - Country



Contribution to Effective Duration - Sector



Management Style



Performance Attribution

For 2019, the fixed income - ex inflation-linked portfolio returned 10 percent, outperforming its benchmark by 0.1 percent. Manager selection and asset allocation decisions within the long government/credit and opportunistic credit portfolios were the largest contributors to outperformance.

Market Overview

The year 2019 marked a continued tightening of financial conditions by central banks across the world during the first six months of the year, followed by a pause and a final reversal in the ensuing six months. The Federal Reserve (Fed) hiked rates twice in the year, on 9/26/18 and 12/19/18 due to a continued economic expansion, good GDP growth, a tight labor market, and inflation close to target. The subsequent pause in the hiking cycle may have been induced by financial volatility, geopolitical risks, and global slowdown in growth outside of the US. These conditions led the Fed to eventually increase market liquidity by signaling it would stop its balance sheet roll - off in March of 2019 by September. Further easing was expected by the market at the end of the year due to a continued slowdown in global growth, trade tensions, and inflation failing to hit target.

During the first quarter, the Fed unanimously voted to raise the Federal Funds Rate and to continue on a path of monetary tightening as GDP grew 3.1 percent year-over-year (YOY), inflation was above target at 2.3 percent YOY, and unemployment remained below 4.0 percent. These conditions may have signaled the economy was heating up to a level that could cause a recession if interest rates were not adjusted upwards. During this time, financial markets continued to rally on the upbeat outlook.

The second quarter began with Federal Reserve Chairman, Jerome Powell, proclaiming that interest rates were a "long way" from neutral, which likely caused a subsequent sell-off across a variety of risk markets. During this time, the yield curve flattened as market participants were pricing in a higher chance of a recession. The S&P fell from a high of 2,925 to a low of 2,351 and credit spreads across the globe widened.

In the third quarter of the year, risk markets across the world rebounded as the Fed changed its stance from rates being "long way" from neutral to rates are "at the lower bound" of neutral during the December 18 meeting. The CBOE Volatility Index (VIX) reflected a high of 36 during December fell to 14 by the end of the third quarter. At the end of the year, the yield curve inverted further as market participants priced in a likely rate cut from possible geopolitical risks and muted inflation. Moving forward market themes are likely to be dominated by the Fed's decision on interest rates, geopolitical tensions, trade, and global growth.

Fixed Income – Inflation-Linked: Portfolio Objective

The fixed income - inflation-linked portfolio seeks to generate a long-term risk-adjusted return similar to that of the custom global inflation index ("Benchmark") and to, more broadly, provide protection against unanticipated inflation.

Asset Allocation and Portfolio Performance

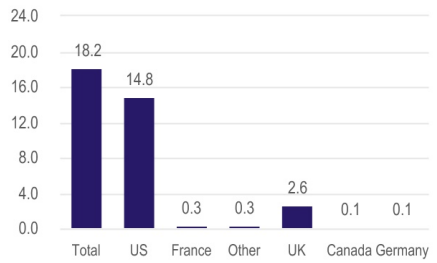
1-Year Net Performance is the time-weighted rate of return net of fees calculated by the custodian, BNY Mellon. The custom benchmark represents sub-asset class target allocations within the portfolio over time.

Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	Custom Benchmark 1-Year Performance
7.4%	7.0%	$ 2,242 Million	5.7%	5.2%

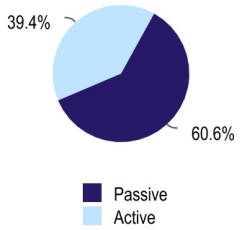
Portfolio Overview

The fixed income - inflation-linked portfolio's effective duration is 17.6 years with 0.4 percent yield to maturity. Credit quality is Aa1/AAA.

Contribution to Effective Duration - Country



Management Style



Performance Attribution

For 2019, the INPRS fixed income - inflation-linked portfolio outperformed by 0.5 percent. Active management within the global-inflation linked strategy was the largest contributor to benchmark outperformance.

Market Overview

During the first quarter of the year, low volatility ensued after a brief market sell-off in February 2018. The Fed lifted domestic interest rates by 25 basis points(bps) on 09/26/18, given strong GDP growth and a tight labor market. Inflation remained close to target. U.S. 10-year rates rose by 19 bps, while breakeven inflation decreased by 6 bps during the quarter and Global 10-year rates rose by 18 bps.

In the U.S., the second quarter was marked by increased volatility across asset classes as financial conditions tightened on the back Fed rate increases. On 12/19/18, the Fed implemented a 25 bps increase citing a sustained economic activity, strong market conditions, and inflation near its two percent target as its rationale. The 10-year rates rallied by 39 bps while breakeven inflation decreased by 34 bps during the quarter and Global 10-year rates rallied by 22 bps.

The Fed reversed a sustained heightening cycle at the end of the second quarter as risk markets across the world sold off, driven by fears of geopolitical instability and monetary tightening. In turn, risk assets across the globe rebounded accordingly in the third quarter. In the third quarter, 10-year rates rallied by an additional 21 bps and by this time the yield curve fully inverted. This inversion historically has been an indicator of a recession in the intermediate term. The Fed did not raise or cut rates in the third quarter. The Funds Rate settled between 2.25 - 2.50 and Global 10-year yields rallied an additional 14 bps.

During the fourth quarter, 10-year yield rallied an additional 50 bps while inflation expectations declined by 10 bps. Global 10-year rates rallied by 26 bps. At year-end, the Fed voted to raise interest rates with the market pricing further easing due to mounting tensions in trade negotiations, a slow down in global growth, and inflation being below target. The Fed continued to monitor risks to the economy while also noting that GDP growth and unemployment were strong.

Moving forward, developed markets are pricing in below two percent breakeven inflation, which is below central bankers targets. As of the 6/19/19 meeting, Fed officials were pricing in minimal change with the implied Fed Funds Target rate at 2.375.

Commodities: Portfolio Objective

The purpose of the commodity portfolio is to enhance long-term risk-adjusted returns by preserving investment capital and lowering overall volatility. The portfolio should also act as a hedge against unanticipated inflation. Commodity investments have historically delivered returns that are less correlated with equity and fixed income markets, which may provide an opportunity to enhance returns and/or reduce volatility.

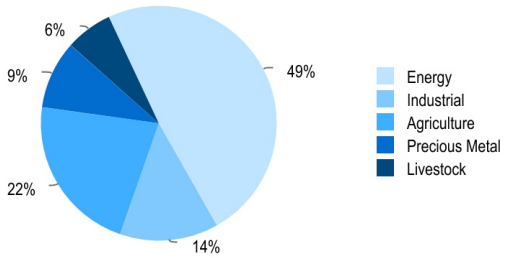
Asset Allocation and Portfolio Performance

1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon. The commodity portion of the portfolio benchmark is a 50/50 blend of the Bloomberg Commodity Index ("BCOM") and the Goldman Sachs Commodity Index ("GSCI"). The collateral component is a 75/25 blend of global inflation-linked bonds indices and 90-day Treasury Bills, respectively.

Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	Custom Benchmark 1-Year Performance
7.6%	8.0%	$ 2,305 Million	(8.2)%	(8.0)%

Portfolio Overview

Portfolio Structure



Performance Attribution

The commodities portfolio one-year total return lagged its benchmark by 0.2 percent. During the year, the energy-centric GSCI benchmark was down 11.5 percent while the more diversified BCOM index was down 6.8 percent. A slight underweight to the BCOM index relative to the GSCI index detracted from benchmark relative returns over the period.

Market Overview [1]

Commodity performance in 2019 was driven by tensions between the United States and many of its global trading partners as well as fluctuating supply and demand dynamics. Commodity sectors broadly declined throughout the fiscal year, with the exception of precious metals-the only sector that had increased in value. The 50/50 blended benchmark declined by 8.0 percent with the BCOM and GSCI components down by 6.8 and 11.5 percent, respectively.

The BCOM Energy subindex declined by 14.3 percent during the fiscal year. Energy markets experienced significant volatility during the period as the United States and China continued to work through trade disputes and tensions between the United States and Iran buoyed prices. During the first half of the year the energy subindex declined by 22.5 percent followed by a 10.6 percent increase in the second half of the year.

During the year, the BCOM Agriculture subindex declined by 4.2 percent. The decline in agriculture prices can be attributed to the severe impact of Chinese tariffs on imported United States agricultural products. Positive developments in trade negotiations, including China's promise to purchase US soybeans and an unusually wet planting season in the United States helped the sub index mitigate losses.

[1] Commodity and sector data sourced from Bloomberg. BCOMTR sub index performance used to proxy commodity sector performance.

Real Estate: Portfolio Objective

The real estate portfolio is mostly comprised of investments in private real estate partnerships, and the underlying exposures are a mix of debt and equity holdings. The portfolio seeks to generate attractive risk-adjusted returns by providing stable current income and preserving investment capital. The portfolio should also reduce volatility by providing a hedge against inflation and through the diversification benefits provided by real estate investments.

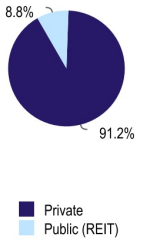
Asset Allocation and Portfolio Performance

1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon The custom public market equivalent index performance is based on calculations made by custodian, BNY Mellon. It is calculated on a one-quarter lagged basis and consists of the following indices: FTSE NAREIT All Equity REITS Index (weight 70 percent) and Barclays CMBS Index (weight 30 percent).

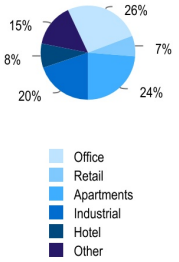
Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	Custom Public Market Equivalent 1-Year Performance
6.0%	7.0%	$ 1,823 Million	8.7%	16.1%

Portfolio Overview

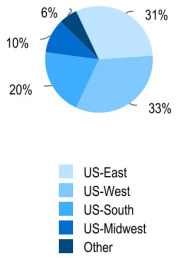
Management Style



Property Type



Property Location [1]



[1] *Exclusive of REIT mandate.*

Performance Attribution

For year 2019, the real estate portfolio underperformed its benchmark by 7.4 percent, with the real estate equity and debt portfolios returning 9.8 percent and 5.9 percent, respectively.

Market Overview

The portfolio's market value of $1,740 million at the end of the prior year increased in 2019 by $83 million. The rise of market value was primarily driven by higher returns within the industrial and multifamily property sectors, yet overall performance compared to the benchmark was less than expected.

For the trailing three-year, five-year, and 10-year period, the INPRS real estate portfolio returned 10.4 percent, 10.0 percent, and 10.1 percent. These positive returns have been driven by a combination of strong net operating income (NOI) growth coupled with robust appreciation. Given the market has benefited from a prolonged economic expansion, various indicators point to a real estate market entering a more mature part of the economic cycle. Given the cycle's maturity, near-term returns are expected to temper and become more reliant on NOI growth as compared to recent above historical average appreciation. Despite lower near-term expectations, various underlying real estate fundamentals remain solid.

Over the past year, the growing shift towards e-commerce has led to tenant demand across primary and secondary industrial markets. As e-commerce continues to become a larger portion of consumer spending, the industrial property class has experienced higher than historical average rent increases. Conversely, this move toward e-commerce coupled with the current oversupply in the retail market continue to impede retail property performance. These trends are expected to persist in the foreseeable future.

Absolute Return: Portfolio Objective

The purpose of the absolute return strategies program is to enhance the long-term risk adjusted returns of the plan by delivering alpha, providing diversification benefits, and preserving capital. Absolute return strategies generate returns by exploiting mispricing and inefficiencies in global capital markets, while attempting to reduce exposures to primary market factors (e.g. interest rates and equities) through various hedging techniques.

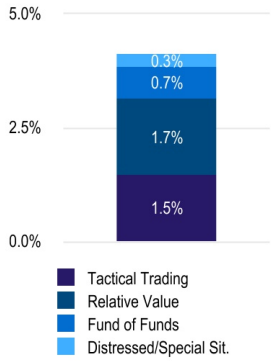
Asset Allocation and Portfolio Performance

1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon. The HFRI custom benchmark is a weighted average of INPRS's exposure to representative HRFI sub-strategy indices.

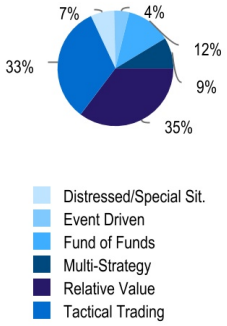
Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	HFRI Custom Benchmark
9.6%	10.0%	$ 2,906 Million	4.2%	1.8%

Portfolio Overview

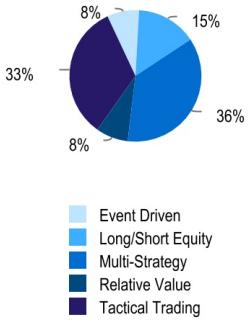
Contribution to Performance by Strategy



Portfolio Composition



Funds of Funds - Look-Through



Performance Attribution

INPRS outperformed the HFRI custom benchmark by 2.4 percent as a result from a combination of strategy selection and individual manager performance in the global macro and relative value strategies.

Market Overview

During the year, the portfolio was impacted by the shift of central banks across the world to a tighter monetary policy stance and subsequent easing, continued trade disagreements, populism, and sudden bursts of volatility. These themes are likely to persist into fiscal year 2020 and possibly beyond.

The portfolio's returns over the year ranged from (13.6) percent to 17.1 percent among the various strategies. Nineteen managers who performed positively had an average starting allocation of $138 million and a weighted average return of 5.9 percent in 2019. Five negative performing managers had an average starting allocation of $57 million and a weighted average return of (6.3) percent in 2019. The outperformance of managers with higher allocations drove returns through the year.

The portfolio also exhibited little beta to traditional asset classes over the year: 0.05 to a Global 60/40 (equities/fixed income) and 0.08 to the INPRS DB Plan. The average pairwise correlation of fund returns across the entire roster of hedge funds was 0.13. The low betas and correlations indicate that the portfolio has successfully generated attractive returns and supported the valuable benefits of diversification for the INPRS defined benefit plan.

INPRS's fund-of-funds portfolio gained 6.1 percent during fiscal year 2019. The allocation at the end of the fiscal year was 12.5 percent. Exposure to Relative Value, Multi - Strategy, and Event Driven strategies were accretive to performance over the fiscal year.

Risk Parity: Portfolio Objective

The risk parity portfolio seeks to deliver consistent and high risk-adjusted rates of returns as a standalone investment through the allocation of capital that equalizes risks across a myriad of macroeconomic environments. While traditional asset allocation is highly dependent on favorable equity returns, risk parity can be considered an "all weather" portfolio to garner consistent, high returns from multiple asset classes without long-term inclination towards any single asset class.

Risk parity portfolio is guided by these core tenets:

- Most asset classes provide investors with a positive risk premium that is greater than cash/cash equivalents during a full market cycle to encourage investment.
- Economic growth, inflation, and changes in risk premiums are the main drivers of returns.
- The return of a particular asset class is proportional to its risk over long periods of time.
- Leverage, when used in moderation, enables an investor to allocate more risk to less volatile asset classes to provide additional diversification and more balance to various macroeconomic environments.

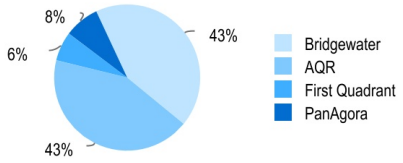
Asset Allocation and Portfolio Performance

1-Year Net Performance is the time-weighted rate of return, net of fees calculated by the custodian, BNY Mellon. Custom benchmark is comprised of 60 percent MSCI ACWI IMI Index (equities) and 40 percent Barclays Global Aggregate Bond Index (bonds).

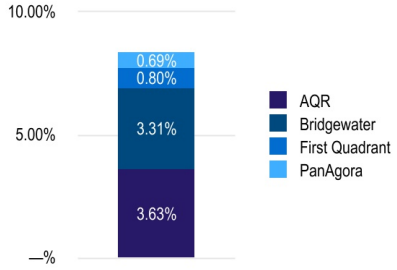
Asset Allocation as of June 30, 2019	Target Asset Allocation	Fair Value as of June 30, 2019	INPRS 1-Year Net Performance	Custom Benchmark 1-Year Performance
13.2%	12.0%	$ 3,998 Million	8.4%	6.2%

Portfolio Structure

Manager Allocation



Contribution to Performance by Manager



Performance Attribution

INPRS benchmarks performance of its Risk Parity position to a Global 60/40 portfolio consisting of 60% stocks and 40% bonds. This portfolio monitors the opportunity cost of a Risk Parity position vs the basic market alternative.

For the year, the INPRS's Risk Parity position returned 8.4% while a Global 60/40 Portfolio returned 6.2%. This indicates that INPRS's Risk Parity asset class allocation was accretive to plan performance.

INPRS saw positive performance from all four of its risk parity managers for the fiscal year, with AQR contributing the most, followed by Bridgewater, First Quadrant, and PanAgora respectively.

Market Overview

The year started with continued strong performance in equity markets as GDP growth remained strong, inflation was moderate, and labor markets were tight. Financial markets wavered and equities fell in the second quarter of the year as the Fed raised rates and a slow down in global growth ensued. In the later half of the year, growth continued to slow and inflation expectations moderated, causing central banks to switch from hawkish to dovish policy stances. Rates continued to rally through the 3rd and 4th quarter of the year causing long duration securities to perform very well. Performance for the year was driven mainly by nominal bond and equity positioning with mixed results from commodities.

Investment Results - Defined Contribution Assets

Assets by Investment Option

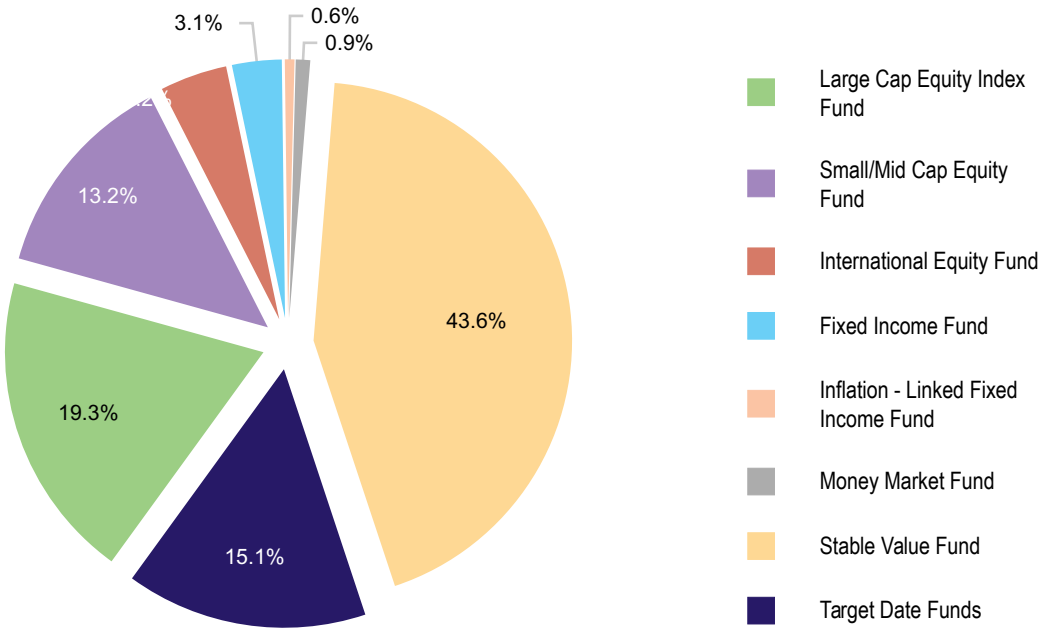
As of June 30, 2019

The Total Consolidated Defined Contribution Investments shown below are grouped by asset classes approved in the Investment Policy Statement, whereas the investments in the Statement of Fiduciary Net Position are grouped in assets and liabilities according to GASB and the security type assigned to each investment.

(dollars in thousands)

Investment Option	Plan Assets	Percent of Self-Directed Investments
Target Date Funds [1]	$ 869,048	15.1%
Large Cap Equity Index Fund	1,108,340	19.3
International Equity Fund	239,806	4.2
Small/Mid Cap Equity Fund	757,040	13.2
Fixed Income Fund	177,924	3.1
Inflation - Linked Fixed Income Fund	35,379	0.6
Stable Value Fund	2,506,323	43.6
Money Market Fund	51,737	0.9
Total Defined Contribution Assets	**$ 5,745,597**	**100.0%**

[1] Consolidated fair values of all Target Date Funds.



Historical Annualized Time-Weighted Rate of Return by Investment Option vs. Benchmark Returns

For the Year Ended June 30, 2019

Investment Option	1-Year [1]	3-Year [1]	5-Year [1]
Target Date Funds: [2]			
Fund 2060	6.4%	9.5%	5.6%
2060 Fund Index	6.1	9.0	5.2
Fund 2055	6.4	9.5	5.6
2055 Fund Index	6.1	9.0	5.2
Fund 2050	6.4	9.5	5.6
2050 Fund Index	6.1	9.0	5.2
Fund 2045	6.4	9.5	5.6
2045 Fund Index	6.1	9.0	5.2
Fund 2040	6.4	9.4	5.5
2040 Fund Index	6.2	8.9	5.1
Fund 2035	6.6	8.5	5.2
2035 Fund Index	6.5	8.1	4.8
Fund 2030	6.6	6.7	4.4
2030 Fund Index	6.7	6.2	4.1
Fund 2025	6.2	5.2	3.7
2025 Fund Index	6.3	4.8	3.5
Fund 2020	5.7	4.1	3.2
2020 Fund Index	5.8	3.8	2.9
Retirement Fund	5.5	3.4	2.7
Retirement Fund Index	5.6	3.1	2.5
All Other Funds:			
Large Cap Equity Index Fund	10.4	14.2	10.7
S&P 500 Index	10.4	14.2	10.7
International Equity Fund	2.4	10.4	3.4
MSCI ACWI ex US Index	1.0	9.3	2.1
Small/Mid Cap Equity Fund	2.2	13.3	7.8
Russell Small Cap Completeness Index	2.4	13.4	7.9
Fixed Income Fund	7.7	2.7	3.0
Barclays U.S. Aggregate Bond Index	7.9	2.3	3.0
Inflation - Linked Fixed Income Fund	4.8	2.2	1.7
Barclays U.S. TIPS Index	4.8	2.1	1.8
Stable Value Fund	2.4	2.0	1.7
Federal Reserve 3 Yr Constant Maturity	2.5	2.0	1.6
Money Market Fund	2.4	1.6	1.0
Citigroup 3 Month T-Bill Index	2.3	1.4	0.8

[1] *Return net of fees based on performance calculations made by the system's custodian.*

[2] *Target Date Fund benchmarks are comprised of performance data using a passive strategy with the same asset allocation of each Target Date Fund.*

Historical Annual Interest Crediting Rates

For the Years Ended June 30, 2019

	Annual Interest Crediting Rate [1]			
	77 Fund	JRS	EG&C	PARF
2019	2.8%	2.8%	2.8%	2.8%
2018	2.4	2.4	2.4	2.4
2017	1.8	1.8	1.8	1.8
2016	1.9	1.9	1.9	1.9
2015	2.7	2.7	2.7	2.7
2014	1.9	1.9	1.9	1.9
2013	5.5	—	0.3	5.5
2012	5.5	—	3.5	5.5
2011	5.5	—	3.5	5.5
2010	5.5	—	3.5	5.5

[1] Annual interest crediting rates are used to calculate interest on the sum of contributions to the fund for members who are not vested with a retirement benefit. Interest rates are approved by the INPRS Board of Trustees on an annual basis.

Top Ten Holdings

For the Year Ended June 30, 2019 [1]

(dollars in thousands)

Company	Shares	Fair Value
Microsoft Corporation	755,381	$ 101,191
Apple Inc.	454,717	89,998
Amazon.com Inc.	40,660	76,995
Nestle SA	489,718	50,760
Samsung Electronics Co. Ltd.	1,217,534	49,560
Facebook Inc	234,941	45,344
Prologis Inc.	563,344	45,124
Roche Holdings AG	147,243	41,477
Berkshire Hathaway Inc.	192,307	40,994
Tiawan Semiconductor Manufacturing	5,143,494	39,579

[1] A complete list of portfolio holdings is available upon request.

Income Holdings by Fair Value [1]

(dollars in thousands)

Description	Coupon Rate	Maturity Date	Par Value	Fair Value
U.S. Treasury - CPI Inflation Index Bond	2.125%	2/15/41	$ 168,213	$ 216,901
U.S. Treasury Bond	3.125	8/15/44	190,250	212,255
U.S. Treasury Bond	3.000	2/15/49	187,490	205,917
U.S. Treasury - CPI Inflation Index Bond	1.375	2/15/44	151,892	172,558
U.S. Treasury - CPI Inflation Index Bond	0.750	2/15/42	157,967	158,743
U.S. Treasury - CPI Inflation Index Bond	0.625	2/15/43	157,073	152,458
U.S. Treasury - CPI Inflation Index Bond	0.750	2/15/45	150,210	148,770
U.S. Treasury - CPI Inflation Index Bond	1.000	2/15/46	132,278	138,757
U.S. Treasury - CPI Inflation Index Bond	2.125	2/15/40	107,892	138,190
U.S. Treasury - CPI Inflation Index Bond	0.875	2/15/47	131,212	133,843

[1] A complete list of portfolio holdings is available upon request.

Investment Management Fees

For The Year Ended June 30, 2019

Private Markets and Real Estate managers provide account valuations on a net of fee basis. While management fees are disclosed in the Investment Management Fees schedule, for greater transparency, INPRS makes a good faith effort to provide realized carried interest and expenses that would not otherwise be disclosed. INPRS's consultants TorreyCove and Mercer provided additional fee information on a calendar year basis as of December 31, 2018 resulting in reported realized carried interest and expenses for Private Markets of $70.1 million and Real Estate of $19.3 million. Reported realized carried interest and expenses exclude funds where data was not provided by the general partners.

(dollars in thousands)

Asset Class		Fees Paid
Consolidated Defined Benefit Assets		
Public Equity	$	14,659
Private Markets		40,410
Fixed Income - Ex Inflation - Linked		13,398
Fixed Income - Inflation - Linked		6,246
Commodities		6,779
Real Estate		19,606
Absolute Return		76,369
Risk Parity		10,548
Cash + Cash Overlay		289
Total Consolidated Defined Benefit Assets		**188,304**
Defined Contribution Assets		9,188
Special Death Benefit Fund Assets		5
Total Investment Management Fees	**$**	**197,497**

Top Ten Brokers' Commission Fees

For the Year Ended June 30, 2019

(dollars in thousands)

Broker		Fees Paid
Morgan Stanley & Co. Inc.	$	1,007
Goldman Sachs & Co.		581
Newedge USA LLC		472
Pershing LLC		123
Merrill Lynch International Equities		101
J.P. Morgan Securities LTD		86
Wells Fargo Securities LLC		84
Instinet Europe Limited		75
Redburn Partners LLP		45
Merrill Lynch Pierce Fenner Smith Inc.		41
Top Ten Brokers' Commission Fees		**2,615**
Other Brokers		1,236
Total Brokers' Commission Fees	**$**	**3,851**

Investment Professionals

Fiscal Year Ended June 30, 2019

Consolidated Defined Benefit Assets

Custodian

Bank of New York Mellon

Consultants

Aksia (Absolute Return)
Mercer (Real Estate)
Torrey Cove (Private Equity and Private Markets)
Verus (General: Defined Benefit)

Public Equity Managers

Altrinsic Global Advisors, LLC
Arrowstreet Capital, LP
Artisan Partners Limited Partnership
Baillie Gifford & Company
BlackRock Institutional Trust
Disciplined Growth Investors
Jackson Square Partners
Leading Edge Investment Advisors
RhumbLine Advisers
Schroders
Times Square Capital Management, LLC

Private Markets Managers

A.M. Pappas & Associates
ABRY Partners
Accel-KKR
Accent Equity Partners AB
Actis Capital
Advanced Technology Ventures
Advent International
Aisling Capital
AlpInvest Partners
Apax Partners
Apollo Management
ARCH Venture Partners
Ascribe Capital
Ares Management
Austin Ventures
Avenue Capital Group
Bain Capital Partners
Baring Private Equity Asia
Bay Partners
Bertram Capital
Black Diamond Capital Management
Bregal Sagemount
Brentwood Associates
Butterfly Equity Partners, LLC
Caltius Capital Management
Cardinal Partners
Centerfield Capital Partners
Cerberus Capital Management
Charterhouse Capital Partners
CID Capital
Coller Capital
Columbia Capital
Court Square Capital Partners
Crescent Capital Partners
Crestview Partners
CVC Capital Partners
Doll Capital Management
Elevation Partners
EnCap Investments
Energy Capital Partners
Enhanced Capital Partners
Escalate Capital Partners
Falcon Investment Advisors
First Reserve Corporation
Forbion Capital Partners
Fortress
Gamut Capital Management
Gilde Buyout Partners
Globespan Capital Partners
GSO Capital Partners
GTCR Golder Rauner
H2 Equity Partners
Hammond Kennedy Whitney & Co
Hellman & Friedman
Herkules Capital
High Road Capital Partners
Horsley Bridge
HPS Investment Partners
Insight Venture Partners
Institutional Venture Partners
JFM Management
KAILAI Investments
Khosla Ventures
KPS Capital Partners
Landmark Partners
Leonard Green & Partners
Lexington Partners
Lightyear Capital
Lindsay Goldberg
Lion Capital
MBK Partners
Merit Capital Partners
Mill Road Capital
Neuberger Berman
New Enterprise Associates
New Mountain Capital
NGP Energy Capital Management
Oak Hill Advisors
Oak Hill Capital Management
Oak Investment Partners
Oaktree Capital Management
Opus Capital Venture Partners
Panda Power Funds
Parthenon Capital Partners
Pathlight Capital
Peninsula Capital Partners
Permira Advisers
Platinum Equity
Rho Capital Partners
RJD Partners
SAIF Management II
Scale Venture Partners
Silver Cup
Silver Lake Partners
StepStone Group
Sumeru Equity Partners
Sun Capital Partners
TA Associates
TCW Capital Partners
Technology Crossover Ventures
Technology Partners
Terra Firma Capital Partners
The Blackstone Group
The Carlyle Group
The Jordan Company (TJC)
TowerBrook Financial
TPG Capital
Trilantic Capital Partners
Trinity Ventures
Triton Partners

Consolidated Defined Benefit Assets

Private Markets Managers, continued

True Ventures
TSG Consumer Partners
Veritas Capital Management
Veronis Suhler Stevenson (VSS)
Vestar Capital Partners
Vintage Venture Partners
Vision Capital
Vista Equity Partners
Walden Group of Venture Capital Funds
Warburg Pincus
Warwick Energy Investment Group
Wayzata Investment Partners
Weston Presidio Capital
White Deer Management
Windjammer
WL Ross & Co.
Xenon Private Equity
York Capital Management

Fixed Income - Ex Inflation-Linked Managers

Goldman Sachs Asset Management, LP
Oak Hill Advisors, LP
Oak Tree Capital Management, LP
Pacific Investment Management Company (PIMCO)
Reams Asset Management
State Street Global Advisors
Stone Harbor

Fixed Income - Inflation-Linked Managers

BlackRock Institutional Trust
Bridgewater Associates, Inc.
Northern Trust Global Investments

Commodities Managers

BlackRock Institutional Trust
CoreCommodity Management
Goldman Sachs Asset Management, LP
Gresham Investment Management, LLC
Northern Trust Global Investments

Real Estate Managers

Abacus Capital Group, LLC
Asana Partners, LP
BlackRock Financial Management
Blackstone Property Partners
Blackstone Real Estate Partners
Brigade Capital Management
Claros REIT Management LP
Colony Capital, LLC
Exeter Property Group, LLC
Greenfield Partners, LLC
H/2 Capital Partners
Harrison Street Real Estate Capital, LLC
JDM Partners
LimeTree Capital
Lone Star Funds
Mesa West Capital
Noble Investment Group
Related Fund Management LLC
Rockpoint Group LLC
Stockbridge Capital Group
TA Realty Associates
Walton Street Capital, LLC
WestRiver Capital, LLC

Absolute Return Managers

AQR Capital Management
Aeolus Capital Management
Blackstone Alternative Asset Management
Blackstone Tactical Opportunities Associates
Bridgewater Associates, Inc.
Davidson Kempner Capital Management
D.E. Shaw & Co
Eisler Capital
Garda Capital Partners
King Street Capital Management
Man Investments (USA) Corporation
Nephila Capital
Oceanwood Capital Management
Oxford Asset Management
Pacific Alternative Asset Management Company (PAAMCO)
Perella Weinberg Partners
Pharo Management
Tilden Park Associates
Two Sigma Advisers

Risk Parity Managers

AQR Capital Management
Bridgewater Associates, Inc
First Quadrant
PanAgora

Cash Overlay Managers

Russell Investments

Defined Contribution Assets

Consultant

Capital Cities, LLC (General: Defined Contribution)

Large Cap Equity Index Fund Managers

BlackRock Institutional Trust

International Equity Fund Managers

Altrinsic Global Advisors, LLC

Arrowstreet Capital, LP

Baillie Gifford & Company

BlackRock Institutional Trust

Small/Mid Cap Equity Fund Managers

RhumbLine Advisers

Times Square Capital Management, LLC

Fixed Income Fund Managers

Loomis Sayles & Company

Northern Trust Global Investments

Pacific Investment Management Company (PIMCO)

Special Death Benefit Fund Assets

BlackRock Financial Management

Northern Trust Global Investments

Local Public Safety Pension Relief Fund Assets

Bank of New York Mellon

Inflation-Linked Fixed Income Fund Managers

BlackRock Institutional Trust

Northern Trust Global Investments

Stable Value Fund

Galliard Capital Management (Fund Advisor)

Income Research + Management (Fund Sub-Advisor)

Jennison Associates (Fund Sub-Advisor)

Loomis Sayles (Fund Sub-Advisor)

Reams Asset Management (Fund Sub-Advisor)

TCW (Fund Sub-Advisor)

Money Market Fund Manager

Bank of New York Mellon

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