FOR INFORMATION ONLY

April 9, 2020

TO: Trustees – Board of Investments

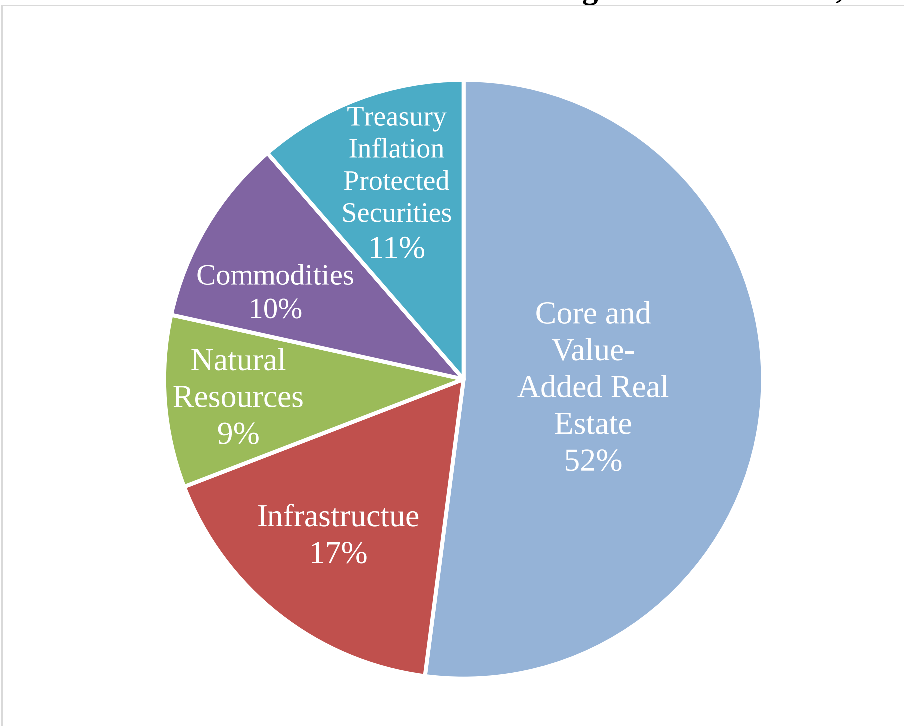
FROM: Jonathan Grabel
Chief Investment Officer

SUBJECT: **Functional Asset Category Update – Real Assets and Inflation Hedges**

The Investments Division is providing periodic updates on the functional asset categories. Below is the update on the Real Asset and Inflation Hedges asset category, which includes core and value-added real estate, natural resources & commodities, infrastructure and Treasury Inflation-Protected Securities ("TIPS"). The objective of the Real Assets category is to provide diversification to reduce risks from global equities, a hedge against unanticipated increases in inflation, and income.

As of March 31, 2020, the Real Assets and Inflation Hedges category represented approximately 16.7% of the Total Fund, which is slightly below the 17% target allocation, and well within its target range of 14% to 20%. A breakdown of the components within Real Assets, as of March end, is shown in **Chart 1** below:

Chart 1
Allocation of Real Assets and Inflation Hedges as of March 31, 2020



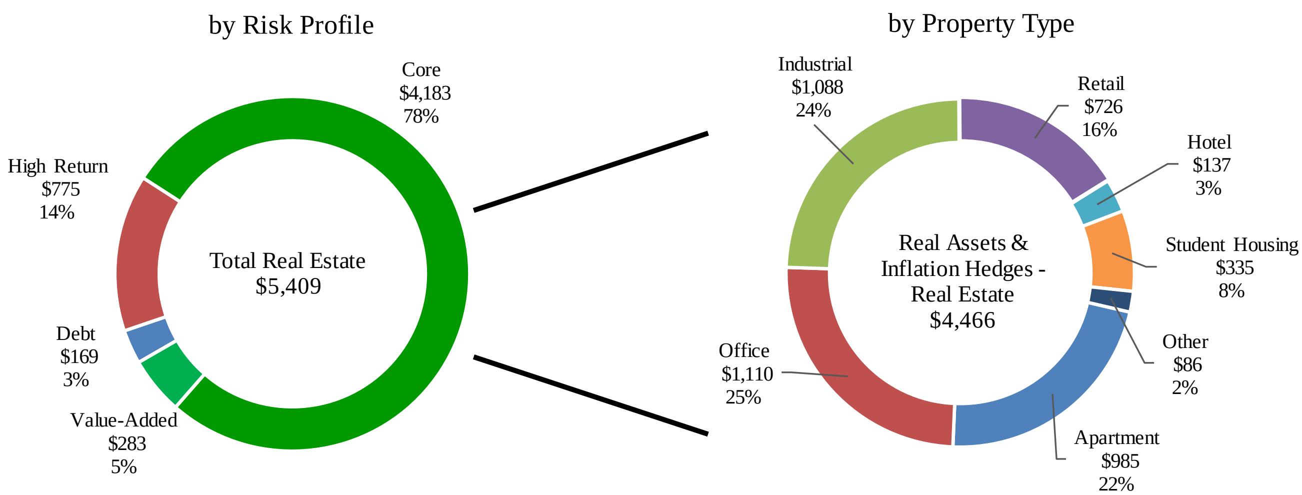
LACERA has been closely monitoring developments with respect to COVID-19 to ensure that our partners are able to provide investment management services and to ensure that there have been no disruptions to business operations including portfolio management, property management, research, trading, and client services.

The Real Assets and Real Estate teams have assessed the impact of COVID-19 on the LACERA's managers' staff and operations. The firms appear to be appropriately adapting their business, systems, and processes to provide uninterrupted service to LACERA.

Real Estate

The real estate included in Real Assets and Inflation Hedges is comprised of core and value-added investments and accounts for approximately $4.5 billion as of December 31, 2019 (less sales through March 31, 2020). Multiple property types are included in the diversified real estate portfolio as illustrated in **Chart 2** below.

Chart 2
Real Estate Portfolio Composition
As of December 31, 2019, adjusted for sales through March 31, 2020, $ in millions



Market Impact
The COVID-19 pandemic is expected to have a significant negative impact on property values since cash flows are likely to decrease and investor return requirements increase as a result of the crisis. The magnitude of value declines will not be known for several quarters. Although many assets are marked to market by managers or appraisers on a quarterly basis, the crisis will not be captured in most first quarter valuations. The second and, more likely, the third quarter of 2020 is when valuation changes are anticipated to be recognized.

The public REIT market, which is priced on a daily basis, is often viewed as a leading directional indication of value changes to private real estate. Through March 31, 2020, the REIT sector in the US. has returned -27% year-to-date and experienced a drop of 30% from its mid-February peak. The value decline has varied significantly by property type, with the worst performers being regional malls (-61%), hotels (-53%), retail (-49%) and the best performers being data centers (+12%), self-storage (-8%), and industrial (-11%).
The Pension Real Estate Association ("PREA") conducts quarterly Consensus Forecast surveys of its manager members. The last full survey was conducted in February 2020, resulting in a predicted

total return from the NCREIF property index ("NPI") for 2020 of 6.3% with a range of 5.4% to 7.0%. An interim update survey was conducted between March 26 and April 2. The results revealed that return expectations have declined significantly. The range of returns in the newest forecast for 2020 was -9.5% to 1.3% with a base case of -3.3%.

A more immediate effect of the pandemic on real estate is being seen on rental income, occupancy levels, leasing activity, and transaction pace as outlined below:

- *Rental income* is exhibiting signs of stress. Some tenants are not able to pay their current rent and have begun to, or are expected to, request some form of rental relief, either in the form of deferral or waiver. Managers are closely monitoring this phenomenon and evaluating each request on a case-by-case basis. Since many rental payments have grace periods, definitive figures are not yet available for rental shortfalls or relief requests that have been received. This factor varies significantly by property type and is addressed further below.

- *Occupancy levels* at many property types are declining. Many office tenants are telecommuting. Many retail tenants have temporarily closed stores. Many student housing properties have seen occupancy drop to single digits as campuses have cancelled in-person classes and moved to on-line education. Although lease obligations remain, the drop in occupancy will put pressure on collection of rents as discussed in the prior bullet.

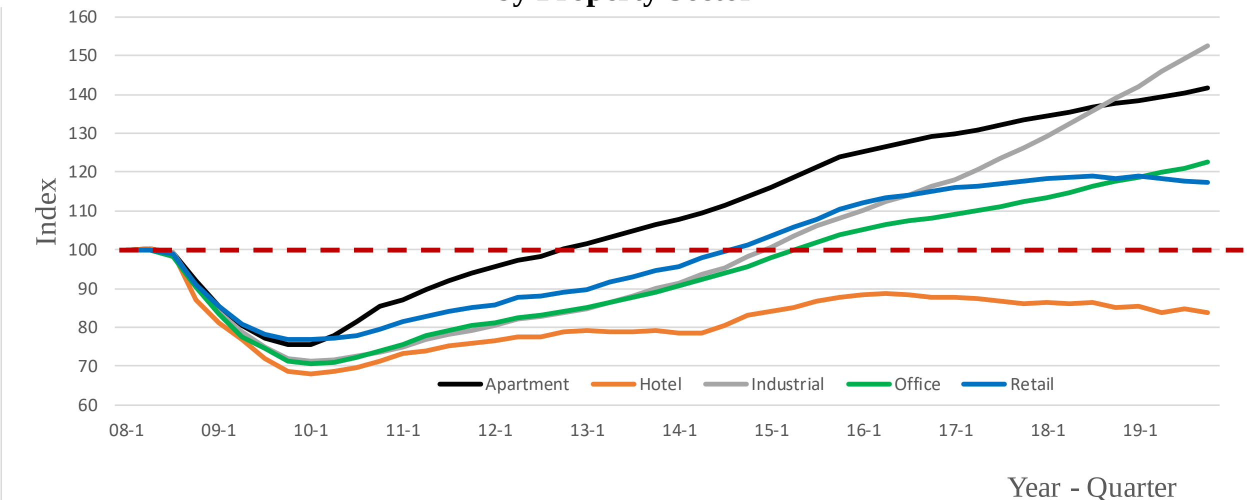
- *Leasing activity* has dramatically decreased for most property types as tenants postpone leasing decisions until there is more clarity in their near-term space needs. Some virtual leasing is taking place at apartment property assets.

- *Transaction pace* for real estate investments is rapidly grinding to a halt. Sellers are withdrawing from the marketplace due to difficulty of underwriting new investments when there is so much uncertainty about future cash flows and growth rates. Additionally, lenders have retrenched and are only lending on the most conservative projects, and even then, at higher interest rates. Currently, most sellers are pulling deals or postponing marketing disposition candidates.

Different property types have exhibited different performance in past recessions. **Chart 3** illustrates the trajectories of returns by major property types following the Global Financial Crisis of 2008 ("GFC"). The data illustrates valuation changes in properties included in the NCREIF Property Index. Hotels were the hardest hit, declining the most in value and recovering the slowest. Apartments recovered the fastest but were overtaken by industrial in the most recent years.[1]

[1] Impact of Recessions on CRE Values: Lessons from the NCREIF Index, Jeffrey D. Fisher, Ph.D. 2020.

Chart 3
Value Change After the Great Financial Crisis
by Property Sector



Notwithstanding the historical valuation changes experienced as a result of the GFC, the effect the current pandemic is expected to have on the various property types will vary significantly. Each property type is discussed below:

- *Industrial* investments may benefit the most from the current situation as there is an increase in demand in certain locations due to increased on-line spending, and therefore retailers are looking to increase their storage capacity. Many items that flow through the supply chain are tied to basic needs such as food and beverage, consumer products and medical supplies.[2] However, seaport and airport locations are suffering due to depressed traffic.[3]

- *Apartments* are expected to exhibit the defensive nature typically demonstrated by this property type across recessions. The need for housing persists (demand) while new construction (supply) is expected to decline. Eviction moratoriums are becoming increasingly common during the COVID-19 pandemic. Severe job losses in late March will affect collectability of rent in April and May. However, the CARES Act relief is expected to help tenants with much needed support for their rental payments.

- *Office* properties are expected to be negatively impacted due to the accelerating U.S. unemployment rate. Unemployment will eventually lead to higher office vacancy as many businesses reduce their expansionary activity. This may eventually lead to a correction in office market rents. Oil and gas tenants also face a substantial downturn (as detailed in the natural resources section of this memo).[4]

- *Retail* properties are one of the sectors most negatively impacted by the current crisis. Even before the COVID-19 pandemic, retailers were struggling with the challenges from on-line competition. Social distancing practices have further hurt retail as foot traffic is

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[2] "Logistics Real Estate Amid the COVID-19 outbreak" Prologis Research. Third Edition. 27th March 2020.
[3] "U.S. Investment Themes and Strategies and COVID-19 Impacts" Presentation. Invesco Real Estate, March 2020.
[4] "US Investment Themes and Strategies and COVID-19 Impacts" Presentation. Invesco Real Estate, March 2020

substantially reduced within shopping malls. However, retail stores which sell groceries and other essential goods have been more resilient.[5]

- *Student Housing* will likely also be negatively affected if college campus closures continue into the Fall 2020 semester. Over the short-term, the financial impact has been minimal due to upfront payments and continued occupancy despite many students returning home. Pre-leasing as of late March was in line with prior-year levels in many locations, but this sign of stability can change quickly if classes continue to be completed online rather than on-campus.

- *Lodging* may be the hardest hit property type due to prevalent travel restrictions. Hotel occupancy rates have plummeted, and many hotels have opted to close temporarily. Business travel may be reduced permanently if companies continue to reduce even a portion of their discretionary travel through the continued use of virtual meetings. Tourists may not feel as open to global travel if health concerns persist. Alternatively, travel may spike due to pent up demand once travel restrictions are lifted.

Leverage

Staff is carefully monitoring leverage across the real estate separate account portfolio. There are 82 core and value-added property investments in the portfolio that have been levered at 41% as measured at the portfolio level based on the December 31, 2019 valuations. Fifty-nine of the assets are levered and the amount of leverage varies from a low of 10% to a high of 68%. **Table 1** summarizes the loan-to-value ("LTV") and debt service coverage ratio ("DSCR") for the levered core and value-added investments held in separate accounts.

Table 1
Levered Core and Value-Added Investments
As of December 31, 2019, adjusted for known sales through March 31, 2020, $ in millions

Property Type	Gross Market Value	Loan Balance	Net Market Value	LTV Range	DSCR
Industrial	$979	$372	$607	21%-49%	2.9x
Office	941	437	504	40%-49%	2.7x
Student Housing	614	279	335	43%-50%	2.6x
Medical Office	80	38	42	47%	2.4x
Apartments	1,821	798	1,023	10%-61%	2.2x
Retail	957	453	504	28%-55%	2.2x
Hotel*	407	275	132	68%	1.8x
Total	**$5,799**	**$2,652**	**$3,147**	**46%**	**2.4x**

** The hotel investment is a ground lease position.*

The assets generally appear to have strong DSCRs. However, if the crisis reduces cash flow from the properties, the DSCR may decrease significantly. Fortunately, only three of the fifty-nine loans are cross-collateralized. Each loan is being monitored and evaluated on a case by case basis. Staff

[5] Burrell, Andrew. "Winners and losers in retail property", US Commercial Property Update, Capital Economics, 3rd April, 2020

is developing a cash flow model (described below) to help evaluate this changing dynamic. The loan maturity dates are spread across the next two to ten years.

Cash Flow

Staff is developing a model to estimate cash flow needs at the property level and conduct a sensitivity analysis of cash flow drivers. Staff is collaborating with each separate account manager to revise cash flow expectations from operational budgets dated April-June 2020, thereby building an updated manager base case for the second quarter of 2020. Additionally, the model will enable scenario planning with updated market data. We expect the model to be operational mid-April and to support staff in assessing cash needs across the real estate portfolio for directly owned properties.

Ongoing Diligence

Staff is closely monitoring portfolio activity and conditions during this crisis. Managers are reporting updates frequently, often several times a week, as issues arise. Particular attention is being paid to rent relief requests, operational safety at properties and debt service. Updated reports on rental income and cash flow projections are being received and reviewed on a regular basis.

Real Assets Excluding Real Estate

Table 2 below summarizes the components of the public market allocation of the Real Assets asset category and its performance year-to-date through April 6, 2020, and during the month of March.

Table 2
Performance of Real Assets Excluding Real Estate

	% of Total Fund As of 2019 Year End	Estimated Portfolio Performance Year to Date through April 6, 2020	Estimated Benchmark Performance	Portfolio Return Relative to Benchmark	Estimated March Portfolio Performance	Estimated Benchmark Performance	Portfolio Return Relative to Benchmark
Real Assets Completion Portfolio Total	5.0%	-22.2%	-24.2%	2.0%	-15.1%	-16.5%	1.4%
Infrastructure Completion Portfolio	3.2%	-17.8%	-20.4%	2.6%	-13.7%	-15.6%	1.9%
Natural Resources Completion Portfolio	1.8%	-30.3%	-29.8%	-0.5%	-17.9%	-17.8%	-0.1%
Commodities	2.1%	-25.5%	-22.1%	-3.4%	-15.8%	-12.8%	-3.0%
Treasury Inflation Protected Securities (“TIPS”)	1.7%	4.0%	4.0%	--	-1.7%	-1.8%	0.1%

Generally, of the three broad categories, the commodities portfolio performed the weakest, down about 26% year-to-date. The real assets completion portfolio was down 22% year-to-date. TIPS held up well during the quarter and are up 4%.

Infrastructure and Natural Resources

Almost all of LACERA's assets in the area of Infrastructure and Natural Resources are invested in a completion portfolio. This portfolio is intended to be a way for LACERA to initially invest in these sectors using public market equities. However, over time, as LACERA builds up its private investments in these sectors, the public equity will be brought down. LACERA has one position in a legacy private natural resources fund that transferred from private equity. The completion portfolio has had poor absolute performance, down 22.2% year-to-date, with the Natural Resources section of the portfolio performing worse, down 30.3%, while the infrastructure segment is down 17.8%. Within natural resources, the decline was led by losses of greater than 40% in the energy equity benchmark, caused by very unfavorable supply and demand dynamics in global oil markets.

In addition to the demand shock created by reduced consumption related to the COVID-19 pandemic, a supply shock in crude oil markets began in March. Saudi Arabia substantially discounted their market oil price, boosting their production in order to take market share from Russia who failed to agree to production cuts proposed by OPEC. Many believe both countries also intended to lower the oil price so low as to make U.S. shale oil production uneconomic and ultimately remove that production from the market. Current negotiations between Russia and OPEC may lead to reduced supply that could stabilize prices and relieve some of the pressure the lower prices are causing to oil exporting economies. However, the outlook for a longer-term deal is highly uncertain in the current year.

Within infrastructure, the category benchmark (down 20.4%) performed similarly to the global equity benchmark, the MSCI ACWI IMI Index (down 21.5% year-to-date through April 6, 2020), diminishing the desired portfolio role as a diversifier to broad equity risk. While large segments of the infrastructure benchmarks such as utilities and cell phone tower companies held up relatively well against overall market declines, some industries in the infrastructure index such as the sizable energy midstream industry, publicly traded airports, and shipping ports had losses greater than the overall equity market.

While the performance of the completion portfolio has been weak in absolute terms, LACERA's active manager has generated better than benchmark returns this year both before and since the beginning of the crisis. The portfolio has been positioned defensively since the start of year, underweighting more cyclical sectors and industries such as energy and overweighting less cyclical industries such as waste management. Their portfolio management has led to an overall 5-8% underweight to the poorer performing natural resources segment and a corresponding overweight to infrastructure.

Going forward, LACERA's approved Real Assets structure review includes the deployment of capital into the private infrastructure and natural resources markets. Current efforts are focused on the due diligence of open-ended infrastructure funds in the core to core plus risk spectrum. LACERA is exercising caution in buying into the assets of current open-ended funds given the considerable uncertainty which could prevail around the valuation of these assets. Our intention is to underwrite the valuations given the new market conditions and determining if the new asset valuations at the end of March and future quarters reflect current risks and capital market conditions. Some assets such as hydroelectric power generation may have valuations that are much less sensitive to the current environment while other infrastructure assets such as energy assets may be much more affected by current conditions.

Given the sizeable dislocations in the natural resources sector, the team has is also looking to see if opportunities might arise in the secondaries market as some dissatisfied Limited Partners ("LPs") may be willing to sell their private funds in the sector at discounted prices as the year progresses. At this stage, it is too early to assess willingness for other LPs to sell and it will likely take one to two quarters for selling interest to make itself known as these funds get marked down to lower values.

Commodities

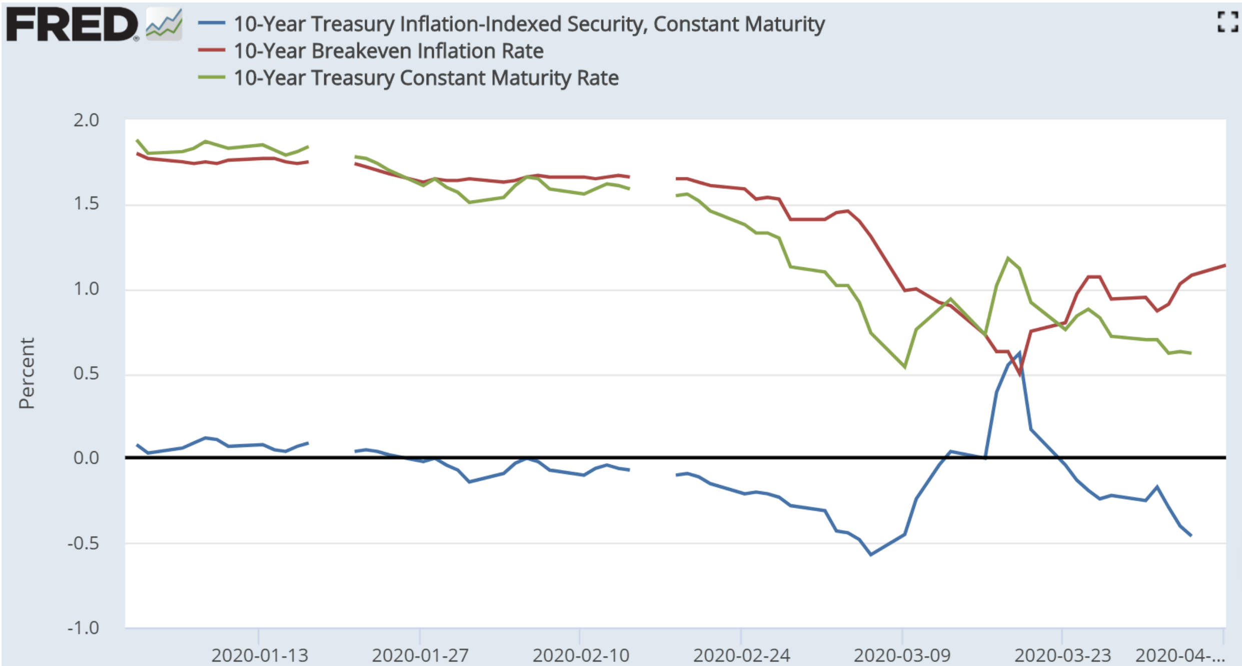
Each of LACERA's commodity managers gains exposure to commodities via futures and holds a collateral account which is used to meet margin requirements for the futures. Given the current market conditions the Real Asset team has been closely monitoring the portfolio as well as collateral requirements.

The commodity benchmark has been driven downward 22% year-to-date caused by the demand shock created by the COVID-19 beginning in China then affecting the rest of the world. This demand shock has driven most commodities down, led by petroleum and energy segments, down by about 55% and 45% respectively, and livestock, down 35%. Other segments, driven lower by reduced demand, were down in the teens: agriculture, grains, softs, and industrial metals. Only precious metals were positive, led by gold which is still being viewed as a relatively safe haven asset and hedge against substantial fiscal and monetary stimulus.

Relatively poorer performance in LACERA's portfolio relative to the benchmark was caused by two factors. First, two out of LACERA's three managers were caught on the wrong side of the oil move. Also, this year to date, LACERA's portfolio has suffered losses on the collateral side of the commodities portfolios. Managers have, to varying degrees, attempted to add value relative to the short duration, low credit risk embedded in the collateral component of the commodities benchmark by taking some risk either through extending duration or taking credit risk. This strategy was not rewarded in March when an unprecedented liquidity crunch started by the COVID-19 crisis penalized all fixed income assets other than the most liquid Treasury bills and notes. Managers detracted from performance by holding a portion of collateral exposures in short duration agency backed debt and investment grade corporate bonds. Only collateral held in short duration Treasurys, overnight repo, or overnight cash funds held up.

TIPS

TIPS experienced a sharp sell-off during the first half of March, shown as the increase in real rates. The 10-year real rate (blue line) is the difference between the 10-year Treasury yield (green line) and breakeven inflation expectations (red line). A decrease in prices in TIPS implies an increase in real rates. The real rate component of TIPS is the fixed rate paid to TIPS-holders on the principal balance of the bond; principal balances are also adjusted semiannually by the actual inflation rate during each period. The price decline was fueled by a short-term liquidity crunch. As the Federal Reserve stabilized the Treasury market in the middle of March by implementing its unlimited Quantitative Easing program, it began to buy TIPS, easing some of the liquidity conditions in the TIPS market. Over the year to date, sharp declines in nominal yields were greater than declines in the breakeven inflation rate, so real rates have dropped, which has resulted in a positive 4.0% return for the TIPS benchmark. LACERA's TIPS index manager performance is in line with the benchmark.



LACERA's TIPS allocation is expected to perform best in environments where unexpected inflation increases, however this is not likely to occur in the short term in the current environment. The COVID-19 shock appears to be as damaging to GDP as any recession in the post-war era, if not more so. The lower GDP is creating excess capacity and high rates of unemployment that should tamp down any inflationary effects. While the fiscal stimulus and monetary easing response from the Fed and the government can create inflationary pressures, this is unlikely to materialize in the short term and near-term expectations for inflation and real rates remain low.

Next week there will be an update on the Credit functional asset category.