

2016 Real Return Asset Class Review

June 23-24, 2016

Tom Masthay, Director – Real Assets

Eddie Schultz, Investment Analyst

Rachel Cleak, Investment Analyst



Agenda

- I. Executive Summary
- II. Performance & Implementation Review
- III. IPS Compliance & Portfolio Review
- IV. Market Update: Real Return
- V. Milestones & Initiatives
- VI. Appendix – Manager Scorecards

I. Executive Summary



Real Return Asset Class Objectives

IPS Stated Objective for the Real Return Portfolio:

“The Real Return asset class is used for inflation protection, return enhancement and diversification.”

A primary goal of the annual review presentation is to discuss the real return portfolio and its construction relative to IPS stated performance goals:

- Long term performance objective is a rate of return of CPI + 4%, net of investment management fees.

The performance review section analyzes this objective and associated benchmark indices.

- The real return portfolio is expected to generate returns net of all fees and expenses, in excess of their respective indices, over rolling five year investment time horizons.

An initiative for 2015-2016 is to initiate a benchmark enhancement study.

Comprehensive Annual Review Process

Why do we conduct annual reviews?

Per the TMRS IPS, comprehensive reviews are to be conducted and documented at least annually. The goal is to formally review managers' performance, current investment strategy or style relative to that which was communicated, and other issues related to the managers' organization, personnel, or investment philosophy. The annual review process is part of the IPS manager retention framework.

The annual review & ongoing monitoring processes may include but are not limited to:

- SEC Form ADV reviews
- SSAE16 and other operational audit reviews
- Compliance Certifications
- Detailed Performance Analyses
- Manager Meetings
- Quarterly Monitoring Documentation
- Manager Annual Meetings
- Limited Partnership Advisory Committees
- Strategic Portfolio Reviews
- Meetings with comparable managers
- Market Research
- Attending Conferences

The Annual Review process holds TMRS accountable for being self-critical of its portfolio management process in order to preempt manager specific, strategic, or other potential problems.

Real Return Timeline Review (2015-2016)

Q2 2015

- Contract with real return consultant Albourne signed.

Q3 2015

- Real Return allocation is doubled from 5% to 10% of the total plan allocation. Colchester Global, an inflation linked bond manager, was the only allocation at the time representing \$1B of a \$24B total TMRS portfolio.

Q4 2015

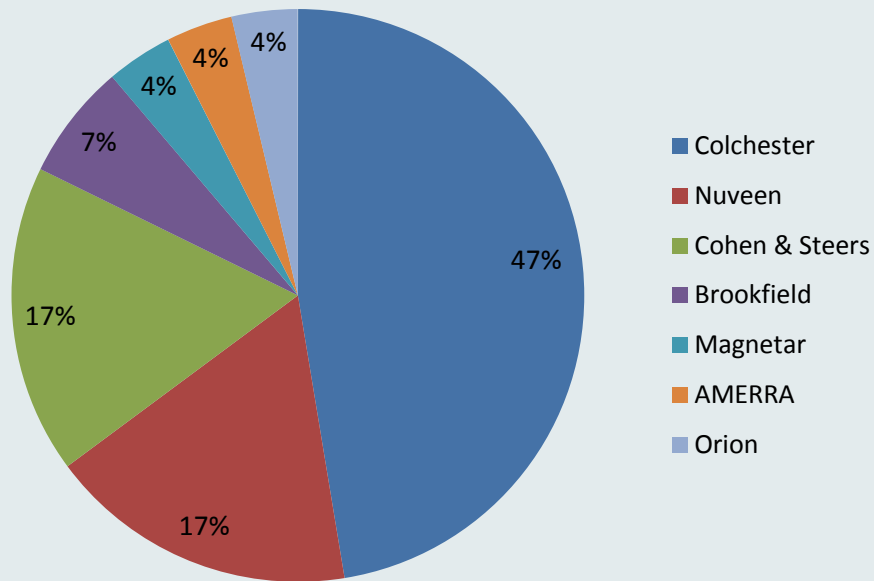
- December 2015 Board Meeting: Board approves \$700 million of liquid real return mandates, \$100 million of private real return mandates and a 2016 search processes in an amount up to \$800 million in net new commitments.

Q1-Q2 2016

- Board approves 3 new private real return funds totaling \$350 million in new commitments to bring the portfolio to approximately 84% allocated.

Manager Allocation & Market Value Summary

Current Portfolio by Manager Weight



As of 12/31/15 Colchester was the only manager with invested capital

Liquid Investments

Nuveen – Funded \$350mm in March 2016
 Cohen & Steers – Funded \$350mm in May 2016

2015 – 2016 Allocation Activity

Nuveen (liquid) - \$350mm
 Cohen & Steers (liquid) - \$350mm
 Brookfield (private) - \$150mm
 Magnetar (private) – 100mm
 Orion (private) - \$100mm
AMERRA (private) - \$100mm
\$1.15 Billion

Real Return Portfolio Value
 12/31/15 = \$940mm

Real Return Portfolio Value
 3/31/16 = \$1,344mm

Private Investments

Magnetar – Closed December 2015
 Orion – Closed May 2016
 Brookfield – Closed May 2016
 AMERRA – Closing Expected June/July 2016

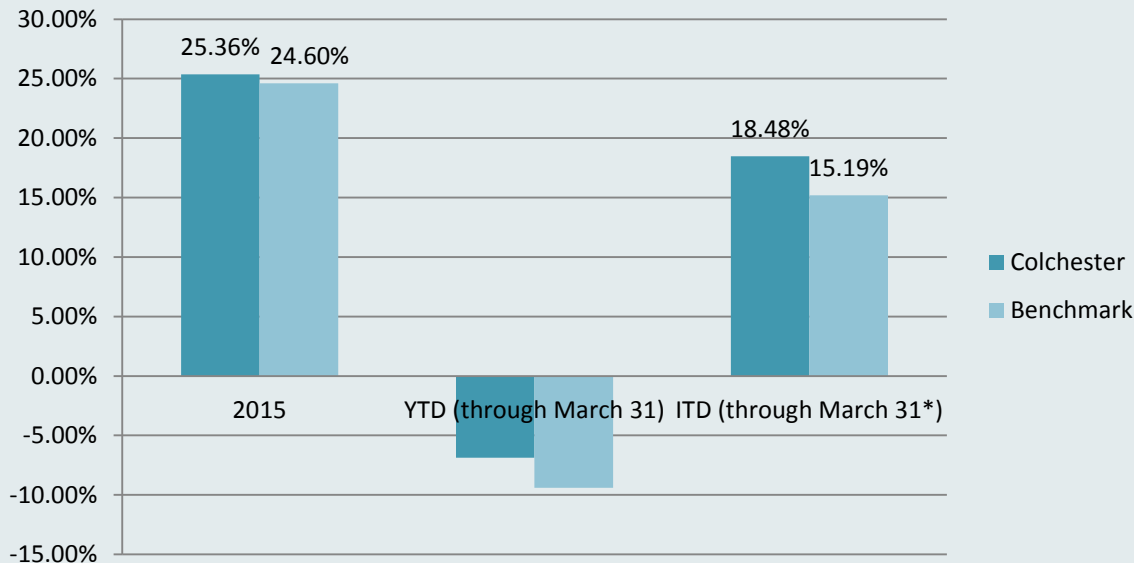
II. Performance & Implementation Review

Performance Review as of December 31, 2015



Colchester GILBs Performance

Colchester Relative Performance



Cumulative Performance Inception to Date (since Feb. 2011)			
	<u>Bonds</u>	<u>Currency</u>	<u>Total</u>
Colchester	25.36%	-6.88%	18.48%
Benchmark	24.60%	-9.41%	15.19%
Relative to Benchmark	0.76%	2.53%	3.29%

Performance Factors in 2015:

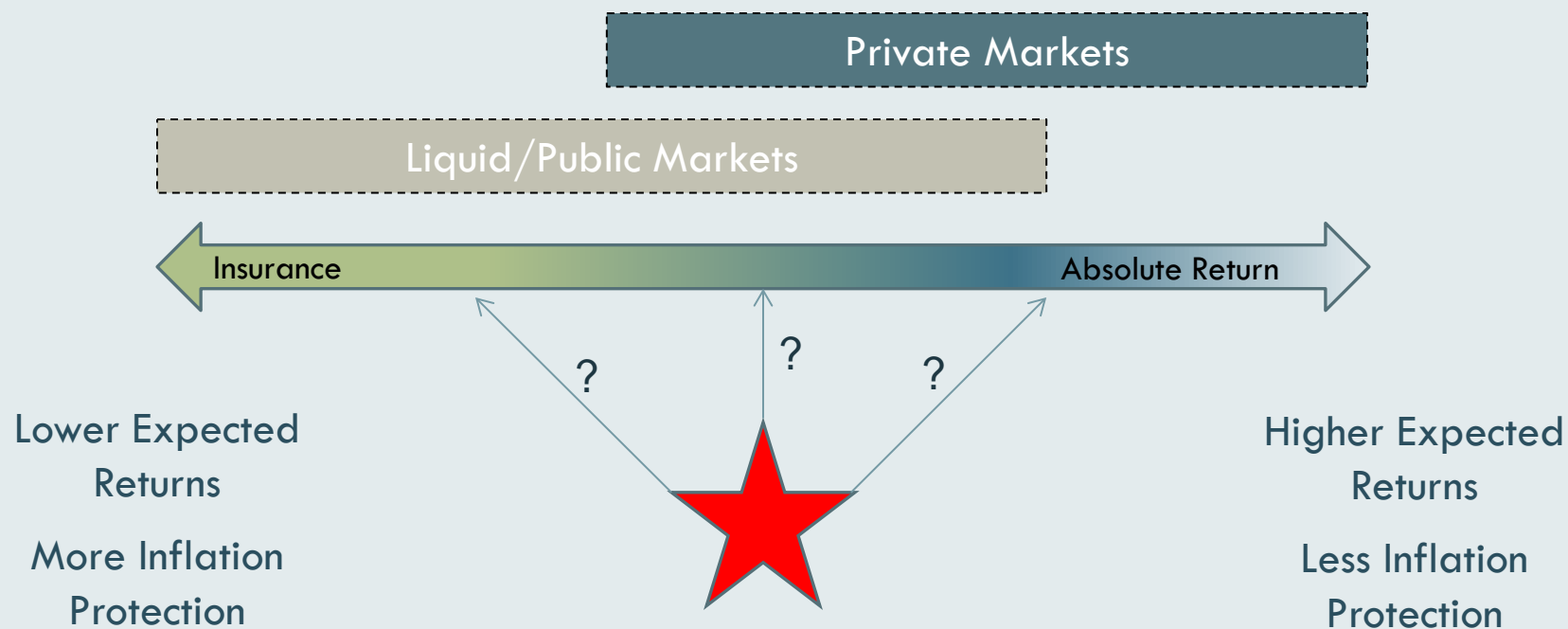
- Detractors: Overweight positions in Emerging Market Currencies
- Contributors: Bond Selection & Underweight to US TIPS

ITD Performance Analysis

- Strong Dollar has driven currency performance. Colchester may hedge exposures back to USD.
- Duration – Approximately 60% of bond returns are due to lower interest rates.

TMRS' Real Return Performance Objective

The Real Return asset class is used for inflation protection, return enhancement and diversification. CPI + 400bps is the Strategic Benchmark.



Return Enhancement & Inflation Protection are contradictory objectives.

Liquid Real Return Portfolio Construction

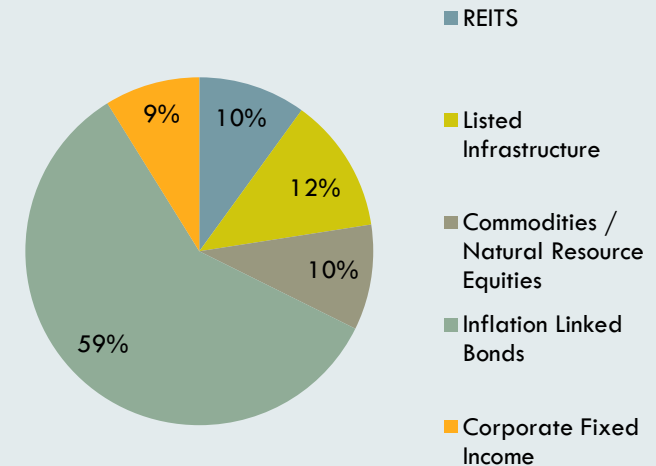
Benchmark Exposures

TMRS Aggregate Liquid Real Return Benchmark

<u>REITS</u>	10.0%
FTSE EPRA NAREIT Developed RE Index	5.7%
<u>Listed Infrastructure</u>	12.6%
S&P Global Listed Infrastructure Index	5.8%
Wells Fargo Hybrid & Preferred Securities REIT Index	3.7%
Dow Jones Brookfield Global Infrastructure Index	3.1%
<u>Commodities & Natural Resource Equities</u>	9.8%
Bloomberg Commodity Index Total Return	5.7%
S&P Global Natural Resources Index	3.1%
Gold Spot Price (Bloomberg)	1.0%
<u>Inflation Linked Bonds</u>	58.8%
Barclays World Inflation Linked Bonds Total Return	58.8%
<u>Corporate Fixed Income</u>	8.9%
Barclays US Corporate High Yield Index	3.7%
Barclays Global Capital Securities Index (High Yield)	3.1%
BofA Merrill Lynch 1-3 year US Corporate Index	2.1%

The TMRS Liquid Real Return Benchmark is a roll-up of underlying manager benchmarks. The portfolio has three positions: 1) Global Inflation linked bonds managed in an active-index strategy by Colchester Global (\$1.0B); Diversified income focused mandate managed by Nuveen (\$350mm); and 3) Equity and commodity oriented multi-asset mandate managed by Cohen & Steers (\$350mm).

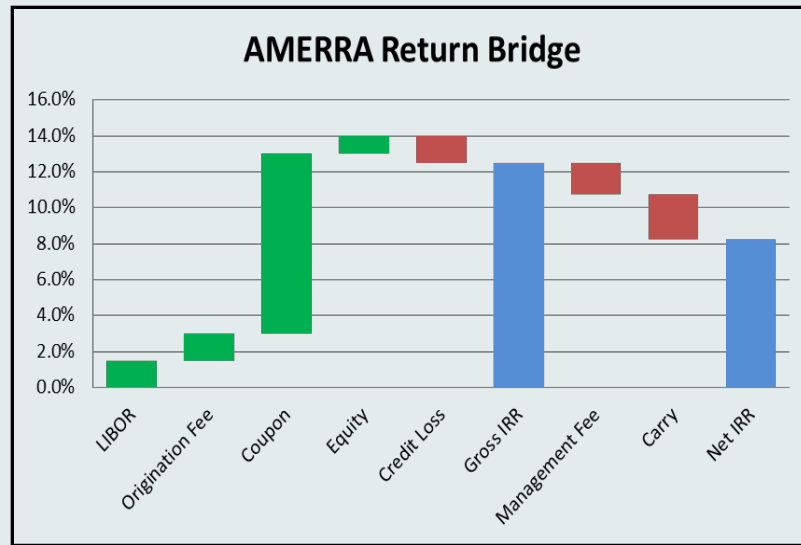
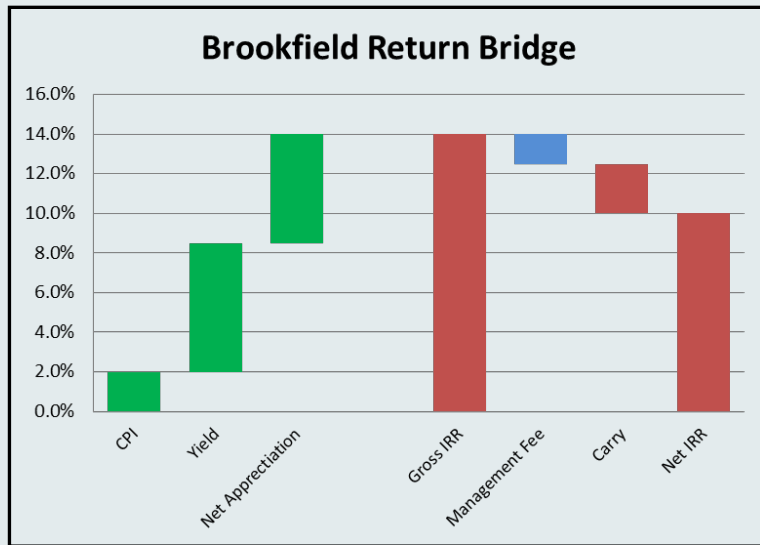
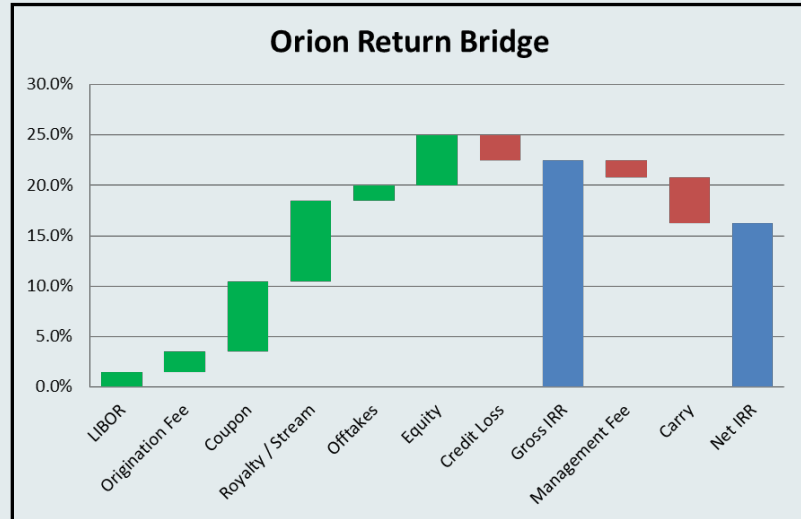
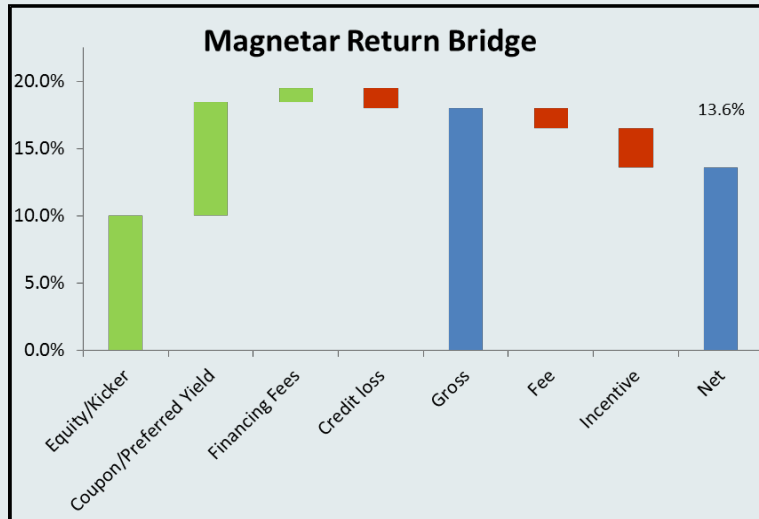
Current TMRS Liquid Real Return Allocation by Sector



TMRS' Benchmark is currently driven by Global Inflation Linked Bond Exposure.

Private Real Return Portfolio Construction

Sources of Return



TMRS has focused on contracted yield with upside participation rights.

Real Return Portfolio Construction

A two-dimensional framework



Real Return Portfolio Construction

Four Quadrant Approach

Stock & Bond Returns
Relative to Long Term Average

Stocks Below, Bonds Above	Both Above
<u>Protect Here</u> Both Below (22% of all observations)	Stocks Above, Bonds Below <div style="border: 1px solid orange; padding: 2px; display: inline-block;">Stocks LT Avg. 6.0% Bonds LT Avg.: 3.6%</div>

Early implementation of the real return portfolio has focused on getting broadly diversified quickly. More refined tools help guide decisions regarding strategic levels of inflation beta, liquidity and targeted return profiles.

*Diversified Real Assets Perform Strongly in
Lower Left Quadrant*

Liquid Real Return Portfolio Construction

2015-2016 Liquid Real Return Search Process

In order to research and build into a strategic real return approach, TMRS has utilized a two staged process during its liquid mandate search process. Stage 1 of the process was comprised of requests for answers to three questions:

- 1) Given an opportunity cost of capital equivalent to that of a GILBs portfolio and an overall real assets portfolio performance goal of CPI + 400bps, please describe how your firm's product will help TMRS accomplish its goals in the contexts of targeted returns and diversifying existing GILBs exposure. Specifically please address how it is anticipated the portfolio will respond to absolute inflation levels and changes in inflation expectations.
- 2) Please describe how your firm considers the dual objective of return maximization and correlation with inflation. To the extent your firm believes it can deliver both, please explain in the contexts of downside protection and CPI upside participation/optionality. To the extent a non-CPI concept of inflation is most pertinent in your firm's opinion, please address this question in that framework.
- 3) Please address your firm's beliefs regarding differences or likenesses between fundamentally driven inflation and monetarily driven inflation. Additionally, to the extent your firm believes there is a difference, please address which type of inflation your product is better designed to be beneficially responsive to and why.

In addition to assessing managers relative to each other, the search process has sought out portfolio management thought leadership and constructive criticism of the current portfolio.

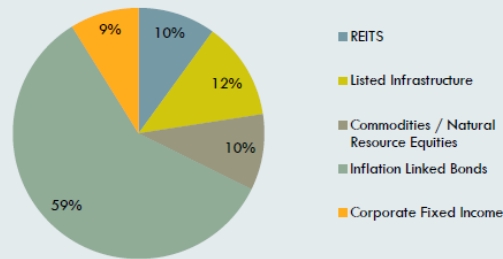
Liquid Real Return Portfolio Construction

2015-2016 Liquid Real Return Search Process

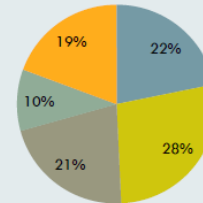
Stage 1 resulted in the selection of Cohen & Steers and Nuveen, mandates that did not own inflation linked bonds. Stage 2 of the real return search process is aimed at a more comprehensive solution to complete the liquid portfolio and refine answers to strategic approaches for inflation beta and targeted return profiles. TMRS used a presentation format for stage 2.

TMRS Liquid Real Return – Scenario Analysis

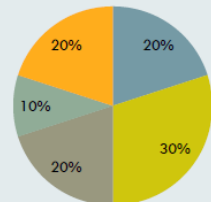
Current TMRS Allocation by Sector



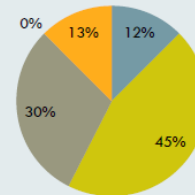
Scenario A Allocation by Sector



Scenario B Allocation by Sector



Scenario C Allocation by Sector



What data can we use to best justify a long term strategic outlook for sector allocations?

Or, are we better served in real return by maintaining greater tactical flexibility?

9

Excerpt from Stage 2 presentation.

Performance & Implementation Conclusions

- TMRS real return portfolio performance has been in line to be in excess of manager benchmark performance inception to date. The GILBs mandate in place is not expected to return the long term strategic goal of CPI + 400bps. Recent allocations have been aimed at increasing the return profile of the real return portfolio, consistent with the IPS stated goal of return enhancement.
- TMRS' private real return will be expected to experience some J-curve effects going forward as these allocations will be going through early stages of fund life cycles. The substantial capital deployed into liquid real assets and fee discounts that were successfully negotiated for are expected to mitigate this effect.
- Manager selections from 2015-16 have focused on appropriate scaling and efficiency of capital deployment. Currently at 84% allocated, it is the goal to have the portfolio 100% allocated by year end though a completion portfolio of liquid real return strategies and continuing to research/deploy capital into private real return assets. Garnering a cohesive strategic framework coincident with a deeper look at benchmarking will help guide these decision making processes.

III. IPS Compliance & Portfolio Review



IPS Compliance Review

Vehicle Concentration Guideline – No more than 35% of the total net assets of the real return portfolio may be invested in any one vehicle.

TMRS is not in compliance with this guideline – the Colchester GILBS portfolio represented 100% of the portfolio through year-end 2015. New allocations are reducing the concentration level and with implementation of real return mandates expected through the remainder of the year it is expected the portfolio will be in compliance.

Closed or Open-end Vehicle Concentration Limit – TMRS is within guideline limits that no more than 15% of total net assets may be invested in a single vehicle.

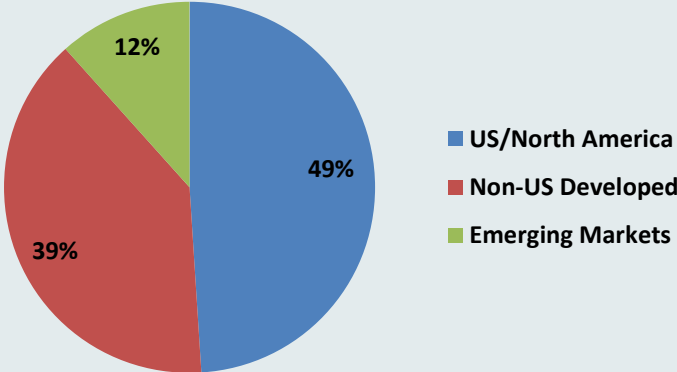
Commingled Open-End Concentration Limit – TMRS is within guideline limits that no more than 20% of total net assets may be invested in a single vehicle.

Percentage of Manager AUM Limit – TMRS does not account for more than 25% of total AUM of any contracted manager's total AUM.

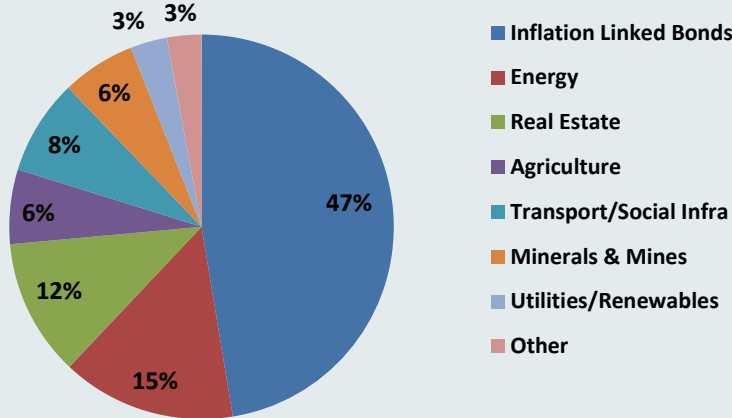
Portfolio Review

Diversification Metrics

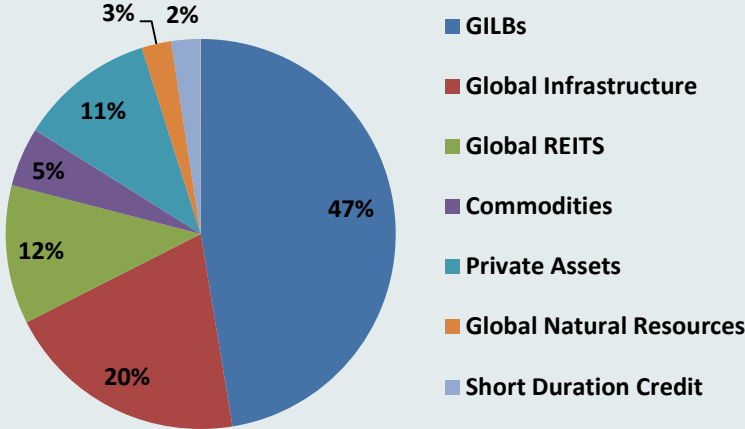
Portfolio Exposure by Geography



TMRS Portfolio Exposure by Sector



Portfolio Exposure by Asset Type

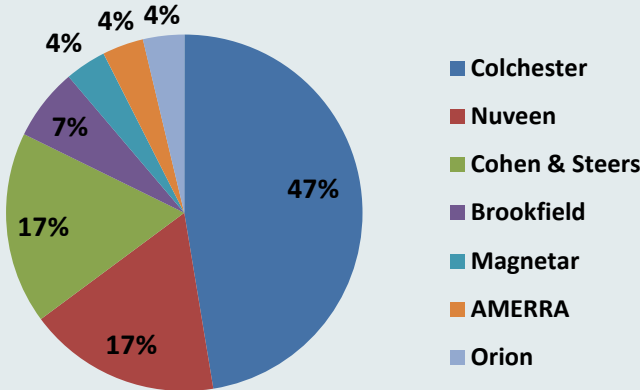


*Exposures by Adjusted Commitments

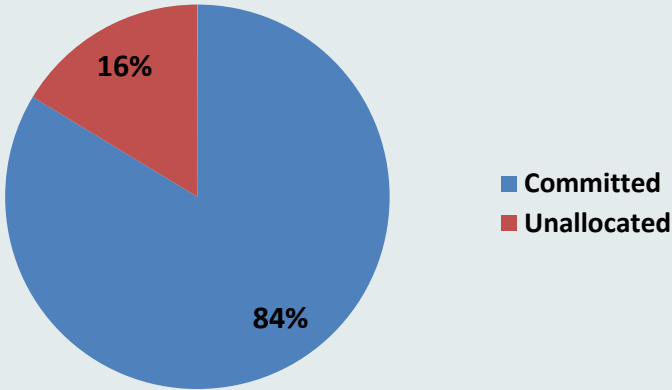
Portfolio Review

Diversification Metrics

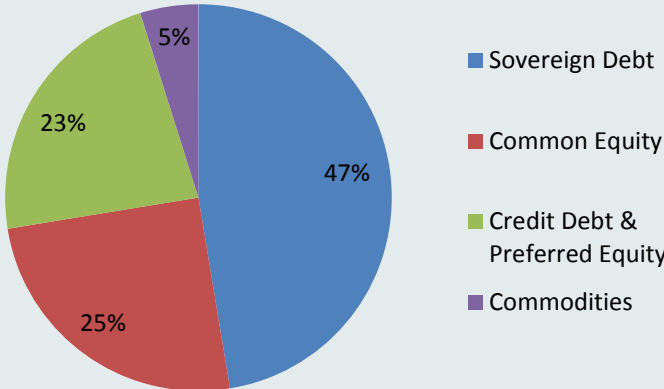
Portfolio Exposure by Manager



Funded/Committed Status



Post-Recommendation Portfolio Exposure by Asset Class



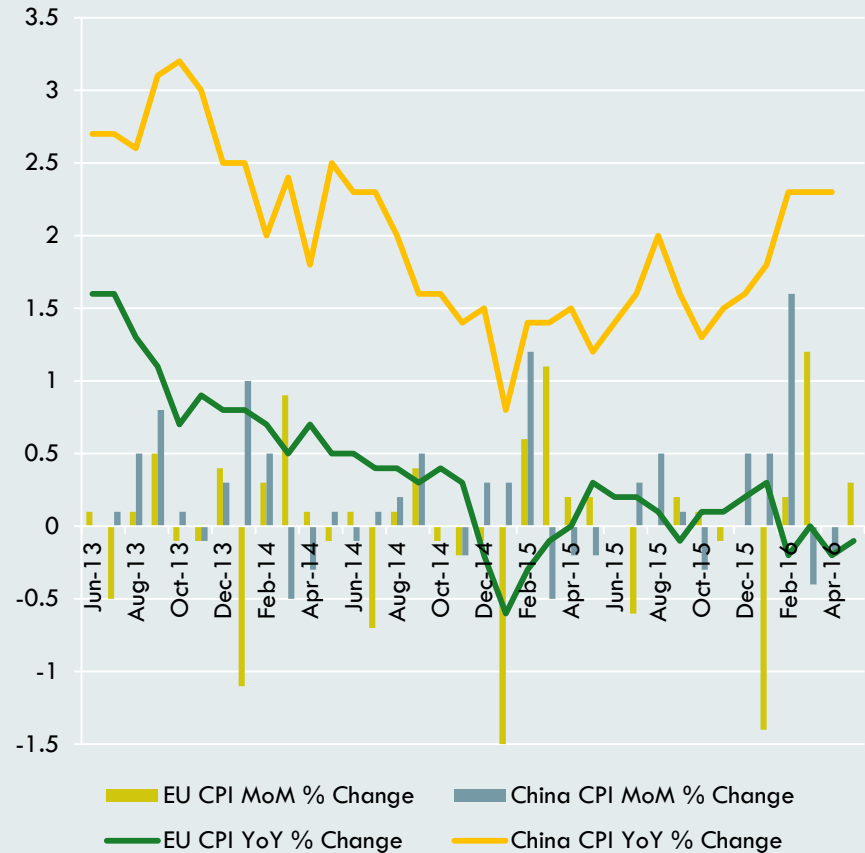
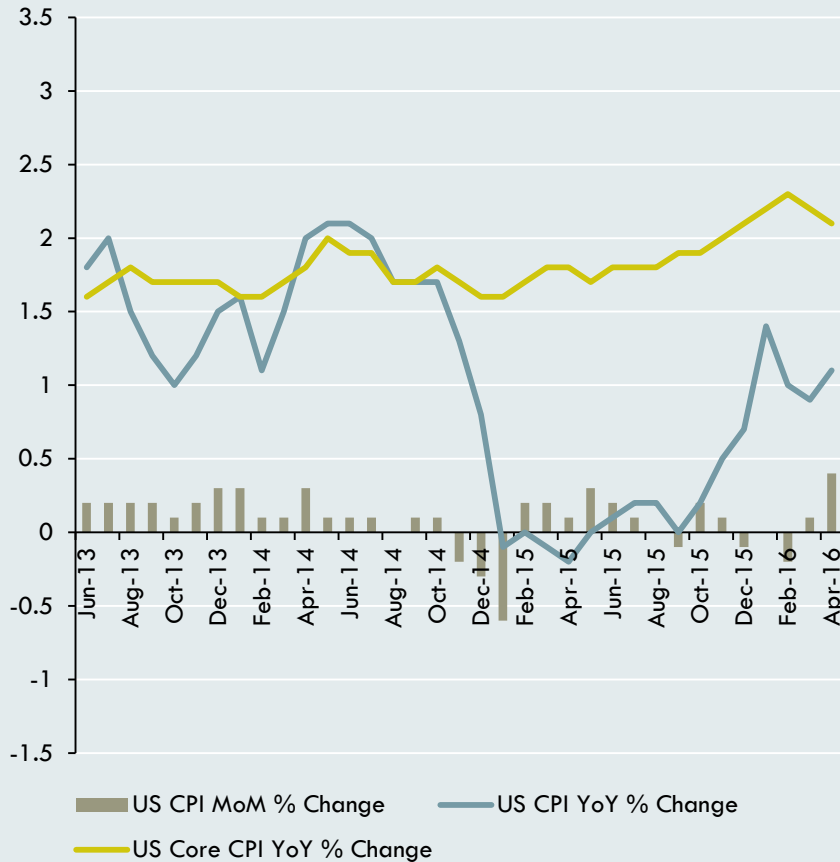
*Exposures by Adjusted Commitments

IV. Market Update: Real Return



Headline Inflation Data

US, EU & China

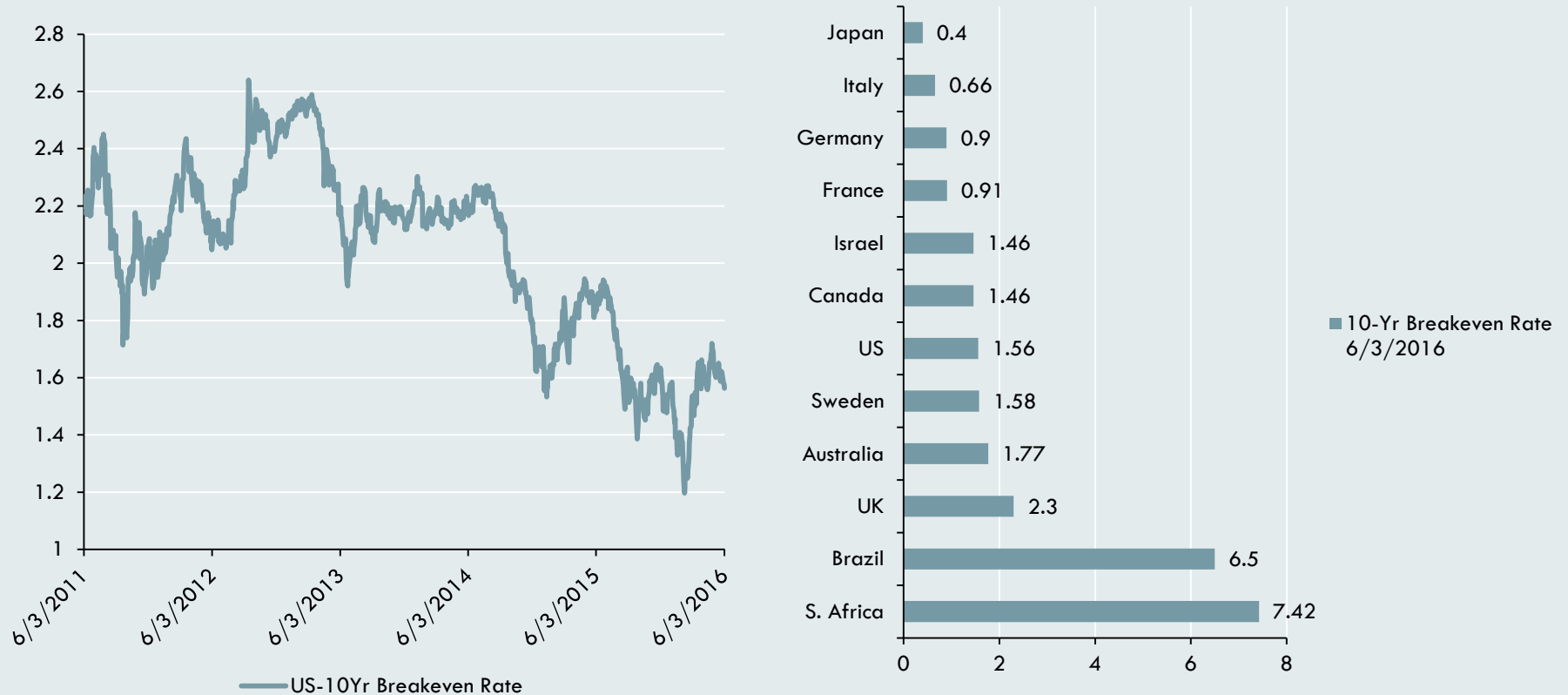


Slumping energy prices have been the major component keeping inflation below targets in the US while the fluctuating US dollar has made inflation management globally very difficult.

Inflation Expectations

TIPS & GILBs Breakevens

Breakevens provide a snapshot of what the fixed income market is currently predicting for inflation.



- Data Source: Bloomberg
- Note: Breakevens are the difference in the yield between a nominal and inflation protected bond of similar maturity and grade

Foreign Exchange Trends

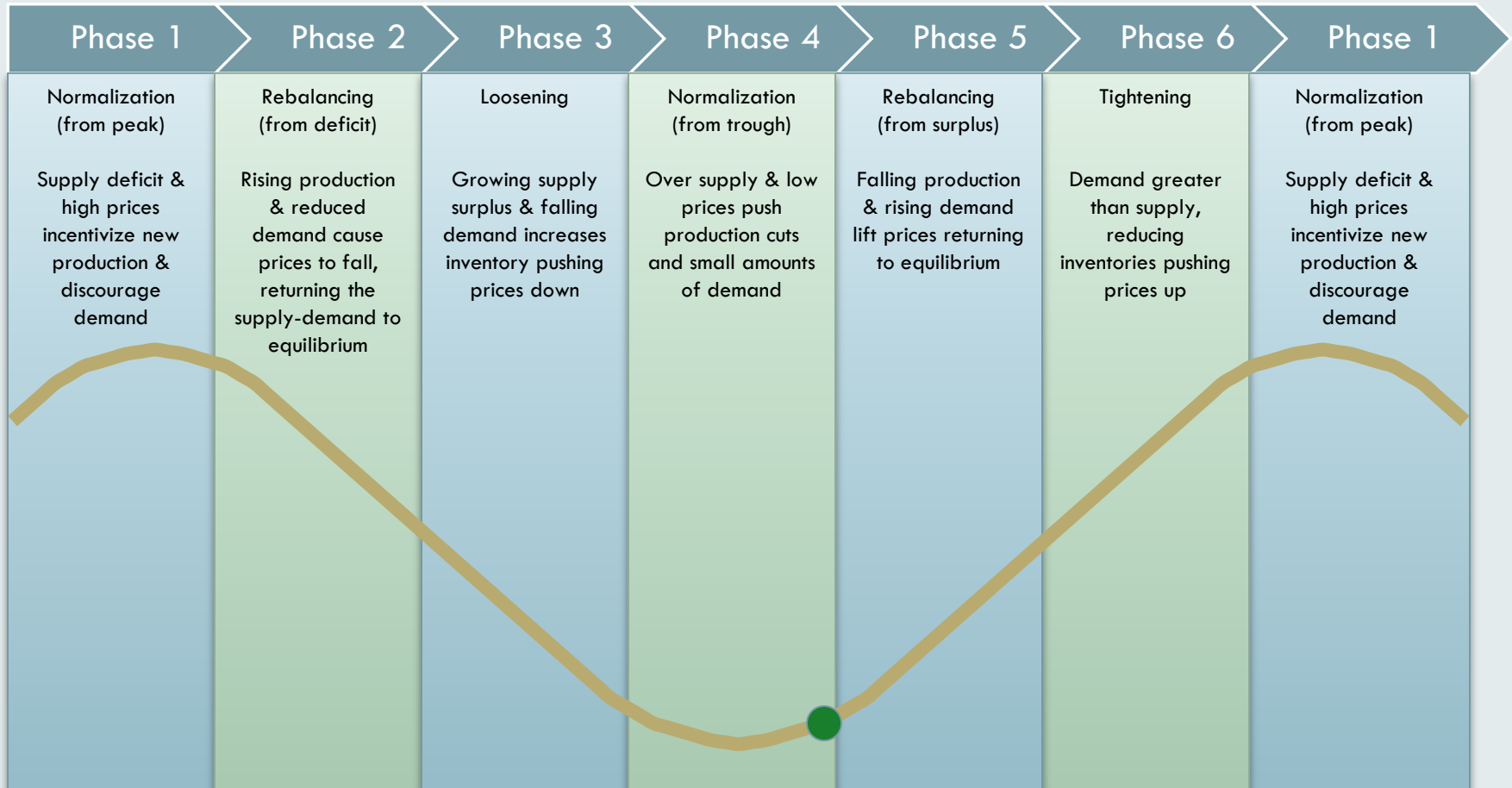
Strength of the US Dollar



The US Dollar and commodities negative correlation makes the relative strength of the US currency highly impactful on countries reliant on importing or exporting commodities.

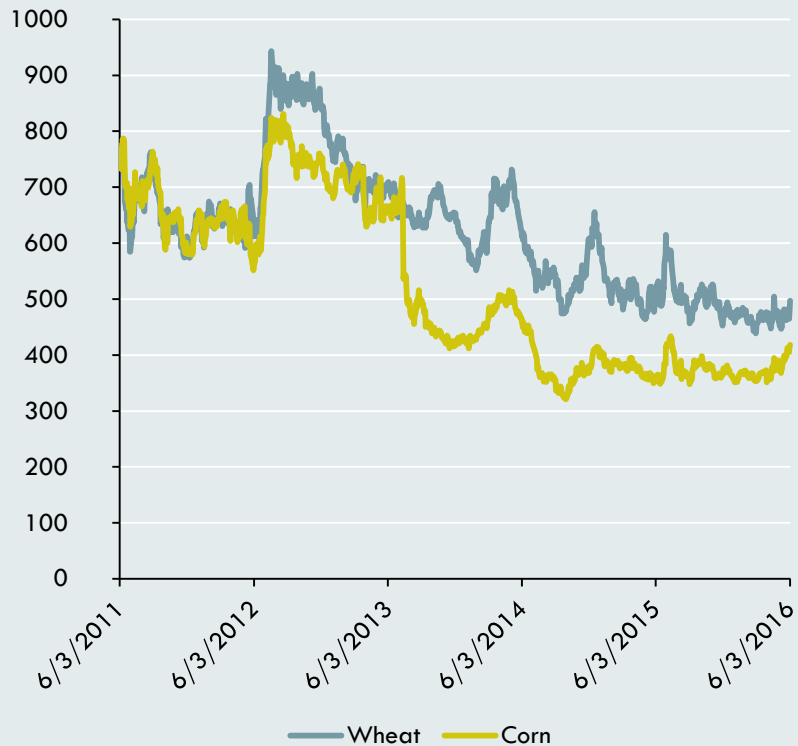
Fundamental Commodity Cycle

Global Commodity Market Entering Phase 5



Commodity Pricing

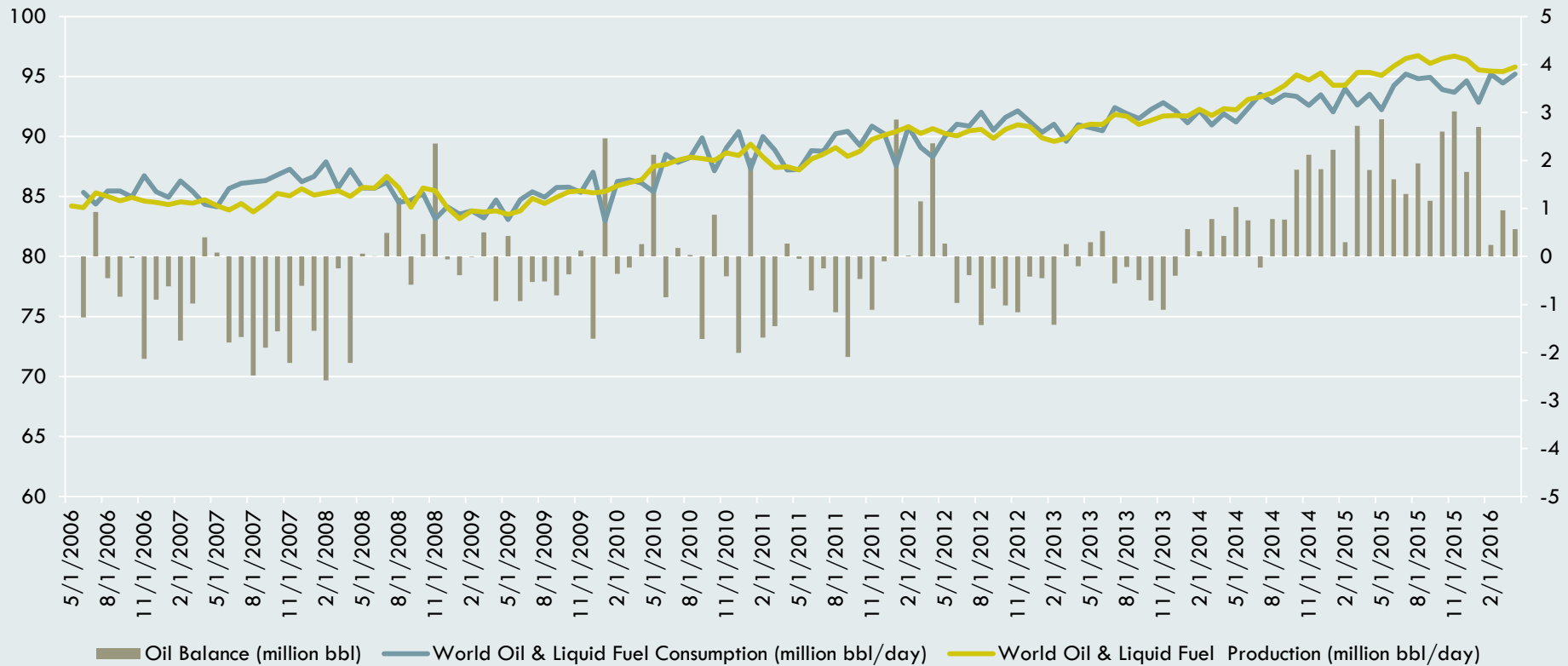
Key Commodities as of First Week of June 2016



Since the peak of the commodity super cycle in 2008 the global commodities markets have trended below equilibrium and current indicators point toward a trough in the market.

World Oil Balance

“Low Prices Fix Low Prices”



An imbalance in the global supply of oil caused a precipitous fall in oil prices in late 2014, but based on current capex expenditures the low prices have caused future production to fall below expected demand.

V. Milestones & Initiatives



Milestones & Metrics

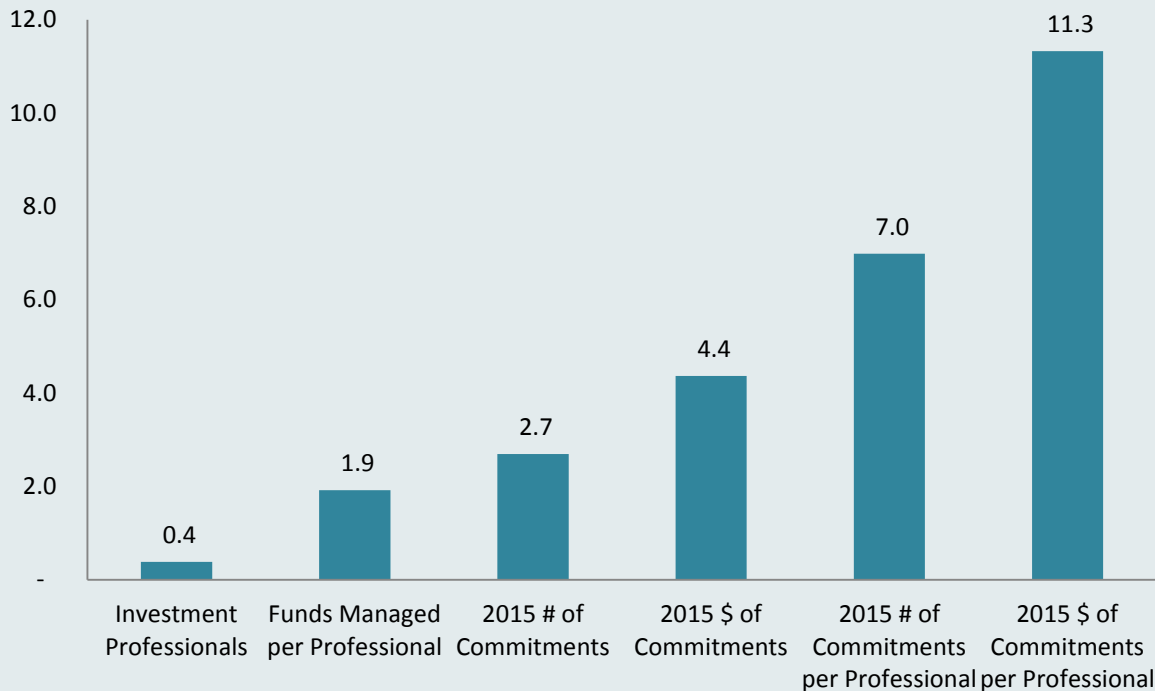
Key Real Asset Milestones & Metrics

- 17 new investment vehicles have been approved (11 Real Estate, 6 Real Return) in the last 12 months. 16 have closed on legal docs to date. The portfolios had 17 total vehicles prior.
- \$2.4 billion of new investment mandates approved (\$1.3B Real Estate, \$1.1B Real Return) in the last 12 months.
- In 12 months, Real Asset (RA) team took 450 manager meetings: 283 In-Person meetings in Austin; 38 domestic travel meetings; 34 international travel meetings; 95 manager presentation calls.
- Real Estate progressed from approximately 55% allocated to 100% allocated in trailing 12 months.
- Real Return progressed from approximately 41% allocated to 84% allocated in trailing 12 months.
- 1-year estimated fee savings of \$3.1 million on managers approved in last 12 months.
- The RA team now serves on 23 Limited Partnership Advisory Committees.
- Analyst Eddie Schultz, Esq., earned the CFA Designation in fall of 2015.
- The RA team currently consists of three individuals. Rachel Cleak has focused on RA as a third team member since joining in January 2016. She commenced the CFA program this June.

Real Assets – An Incredibly Productive Year

TMRS Portfolio Activity Statistics

(compared by multiple of avg. comparable plan)



Among 17 Public Pension Plan Respondents managing real estate & real assets TMRS:

- Ranked #1 in total number of fund commitments
- Ranked #2 in total dollars committed (#1 was \$100B+ plan)
- Ranked #1 in total funds committed per investment professional employed
- Ranked #1 in total dollars committed per professional

- Average Respondent Plan Size: \$50 billion
- Median Respondent Plan Size: \$27 billion
- Avg. 2015 Commitment Level: \$550 million
TMRS: \$2.4 billion

- 16 of 17 plans more active in 2015 than 3 yr. avg.
- Avg. Plan has more mature portfolios than TMRS
- Average 2015 # of Commitments: 6.3
TMRS: 17

2016-2017 Real Asset Goals

“Get Better”

TMRS Vision Statement: *TMRS will be the preferred provider of competitive retirement benefits and excellent customer service by improving plan funding, investment return, communication, and education.*

Real Estate & Real Return Initiatives

- Allocate greater time resources to manager, market and portfolio research.
- Enhance operational & reporting functionalities.
- Initiate benchmark review project for real estate, and benchmark enhancement study for real return.
- Comprehensively re-evaluate core real estate portfolio and consider rebalancing initiatives. Research Real Estate co-investment opportunities more extensively.
- Progress Real Return Portfolio to 100% Allocated: i) add additional public markets real return strategies to fully fund; ii) continue to diversify private real return portfolio.
- Research and pursue Real Return co-invest opportunities as deals with strategic fit are sourced.

VI – Appendix: Manager Scorecards

Manager scorecards are provided for managers under contract as of 12/31/16.



Annual Manager Report Card for: Colchester

Assessment Area	Grade	Update & Comments
Organization		Colchester is meeting the expectations of TMRS in all material respects.
People		No Change
Philosophy/Strategy/Process		No Change
Portfolio(s)		No Change
Performance		Colchester has had satisfactory performance ITD.
Compliance		Compliant
Guideline Changes		No Change
Risk Management		No Change
Operations		No Change
Client Service		No Change
Other		N/A

Excellent	In Good Standing	Fair <i>(working with manager)</i>	Unsatisfactory <i>(remedial action being taken)</i>	Comprehensive Review
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Annual Manager Report Card for: Magnetar

Assessment Area	Grade	Update & Comments
Organization		Magnetar is meeting the expectations of TMRS in all material respects.
People		No Change
Philosophy/Strategy/Process		No Change
Portfolio(s)		No Change
Performance		Magnetar is too early in the fund life for performance to be meaningful.
Compliance		Compliant
Guideline Changes		No Change
Risk Management		No Change
Operations		No Change
Client Service		No Change
Other		N/A

Excellent	In Good Standing	Fair <i>(working with manager)</i>	Unsatisfactory <i>(remedial action being taken)</i>	Comprehensive Review
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Disclosures

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