SamCERA
SAN MATEO COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

Notice of Special Meeting

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The Board of Retirement

of the San Mateo County Employees' Retirement Association will meet on

Monday, January 8, 2018 at 10:30 A.M.

Please take notice that the Chair of the Board of Retirement, acting pursuant to the authority of Government Code §54956, hereby calls a special meeting to take place on January 8, 2018 at 10:30 a.m. in SamCERA's Board Room, 100 Marine Parkway, Suite 160, Redwood City, CA 94065. The special meeting is for the purpose of discussing and transacting the following business:

PUBLIC SESSION – The Board will meet in Public Session at **10:30 a.m.**

1. **Call to Order, Roll Call**
2. **Oral Communication from the Public**
3. **Approval of Proposed Alternative Investment *(to be heard in Closed Session, Confidential Under Gov. Code § 54956.81 and 6254.26)***
4. **Report of Action Taken in Closed Session**
5. **Presentation and Discussion of SamCERA's Private Real Asset Program**
6. **Adjournment**

Pursuant to Government Code §54954.3, members of the public, to the extent required by law, will have the opportunity to directly address the Board concerning the above-mentioned business.

This notice is to be delivered to each member of the Board of Retirement and to each local newspaper of general circulation and radio or television station requesting notice in writing. The notice shall be delivered personally or by other means, and shall be received at least 24 hours before the time of the meeting as specified in this notice.

Dated: December 28, 2017

Mark Battey, Chair

[Posted 12/28/2017]

The Board Meets at <u>100 Marine Parkway, Suite 160</u>, which is located on the SE Corner of Twin Dolphin & Marine Parkway in Redwood City. Detailed directions are available on the "Contact Us" page of the website www.samcera.org. *Free Parking is available in all lots in the vicinity of the building. A copy of the Board of Retirement's open session agenda packet is available for review at the SamCERA offices and on our website unless the writings are privileged or otherwise exempt from disclosure under the provisions of the California Public Records Act. Office hours are Monday through Thursday 7 a.m.– 6 p.m.*

In compliance with the California Government Code and the Americans with Disabilities Act: *SamCERA*'s facilities and board and committee meetings are accessible to individuals with disabilities. Contact *SamCERA* at (650) 599-1234 at least three business days prior to the meeting if (1) you need special assistance or a disability-related modification or accommodation, including auxiliary aids or services, in order to participate in this meeting; or (2) you have a disability and wish to receive the agenda, meeting notice, agenda packet or other writings that may be distributed at the meeting in an alternative format. Notification in advance of the meeting will enable *SamCERA* to make reasonable arrangements to ensure full accessibility to this meeting and the materials related to it.

[Posted 12/28/2017]

San Mateo County Employees' Retirement Association
Board of Retirement

January 8, 2018 (Closed Session) 3

TO: Board of Retirement

Michael R Coultrip

FROM: Michael Coultrip, Chief Investment Officer

SUBJECT: Approval of Proposed Alternative Investment (Confidential Under Gov. Code §54956.81 and §6254.26, to be heard in Closed Session, C1)

Recommendation
Approve a re-up commitment of $20 million to Sycamore Partners III, as part of SamCERA's buyout portfolio within private equity.

Discussion
In closed session, Faraz Shooshani (Verus) will present this agenda item, including an oral review of the firm and investment process.

Attachments
A. Verus Recommendation Sycamore Partners III (Confidential)
B. Sycamore Partners III Investor Presentation (Confidential)

SAN MATEO COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
Board of Retirement

January 8, 2018 Agenda Item **5**

TO: Board of Retirement

Michael R. Coultrip

FROM: Michael Coultrip, Chief Investment Officer

SUBJECT: Discussion of SamCERA's Private Real Asset Program

Recommendation

Review the report on Real Assets and provide direction to staff as needed.

Background

During the October 2016 meeting the Board approved a new asset allocation policy, which included increasing the allocation to private real assets from 2% to 4% as part of a larger inflation hedge bucket.

Discussion

John Nicolini from Verus will present this agenda item, and will review the purpose of real assets in a portfolio, outline the role of each sector within real assets, provide current market observations on real assets, and answer any questions or concerns about real assets from the Board.

Attachment

Verus Real Asset Discussion

Verus

PERSPECTIVES THAT DRIVE ENTERPRISE SUCCESS

JANUARY 2018

Real Assets Refresh

Table of contents

VERUSINVESTMENTS.COM

SEATTLE 206-622-3700
LOS ANGELES 310-297-1777
SAN FRANCISCO 415-362-3484

Discussion Topics

— Purpose of real assets – inflation protection and diversification

— Challenging the idea of real assets as an insurance policy against inflation

— Role of each sector within real assets

— Current market observations and how those frame our recommendations to clients

— Questions or concerns from the Board

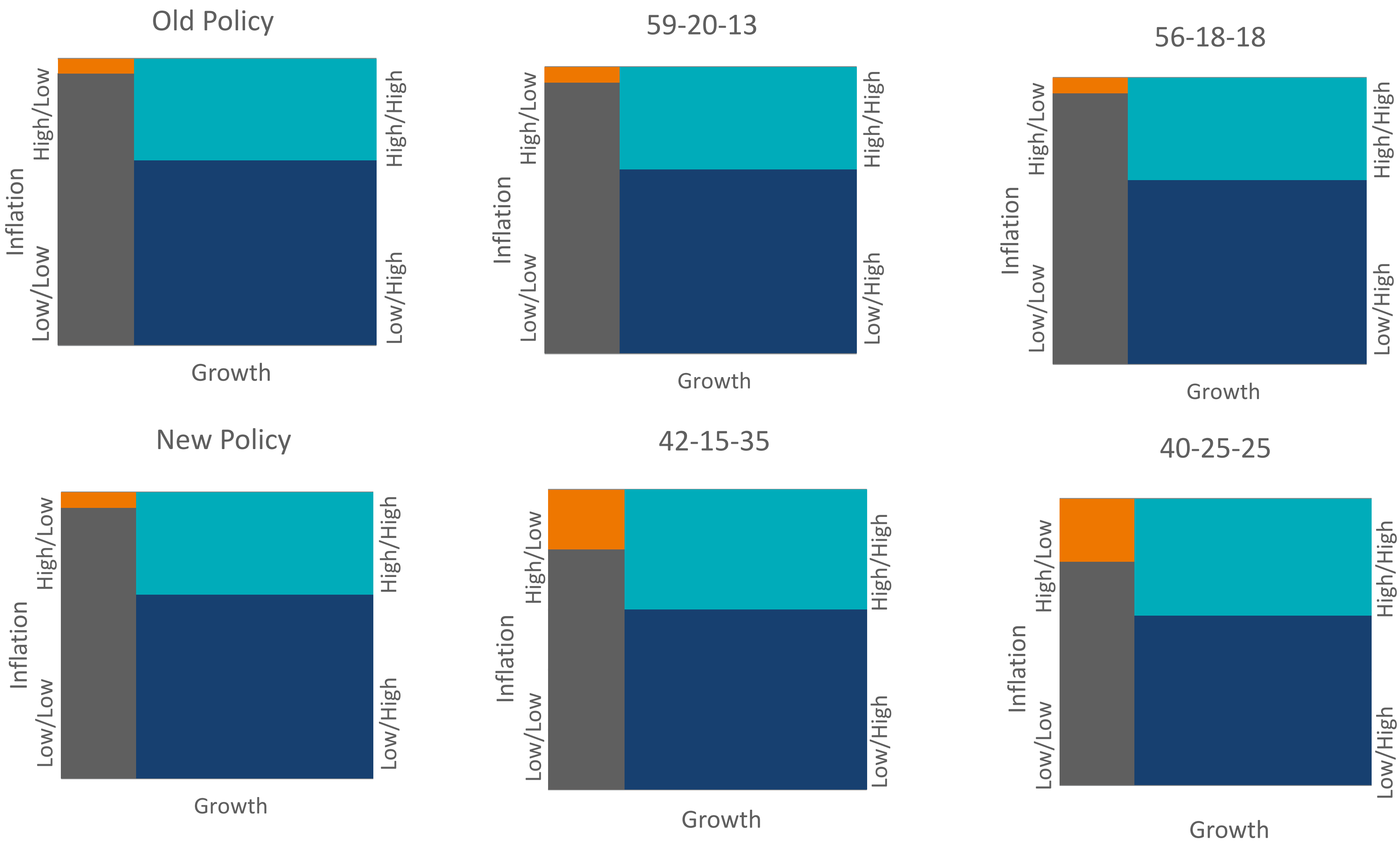
Why Real Assets

Investment models

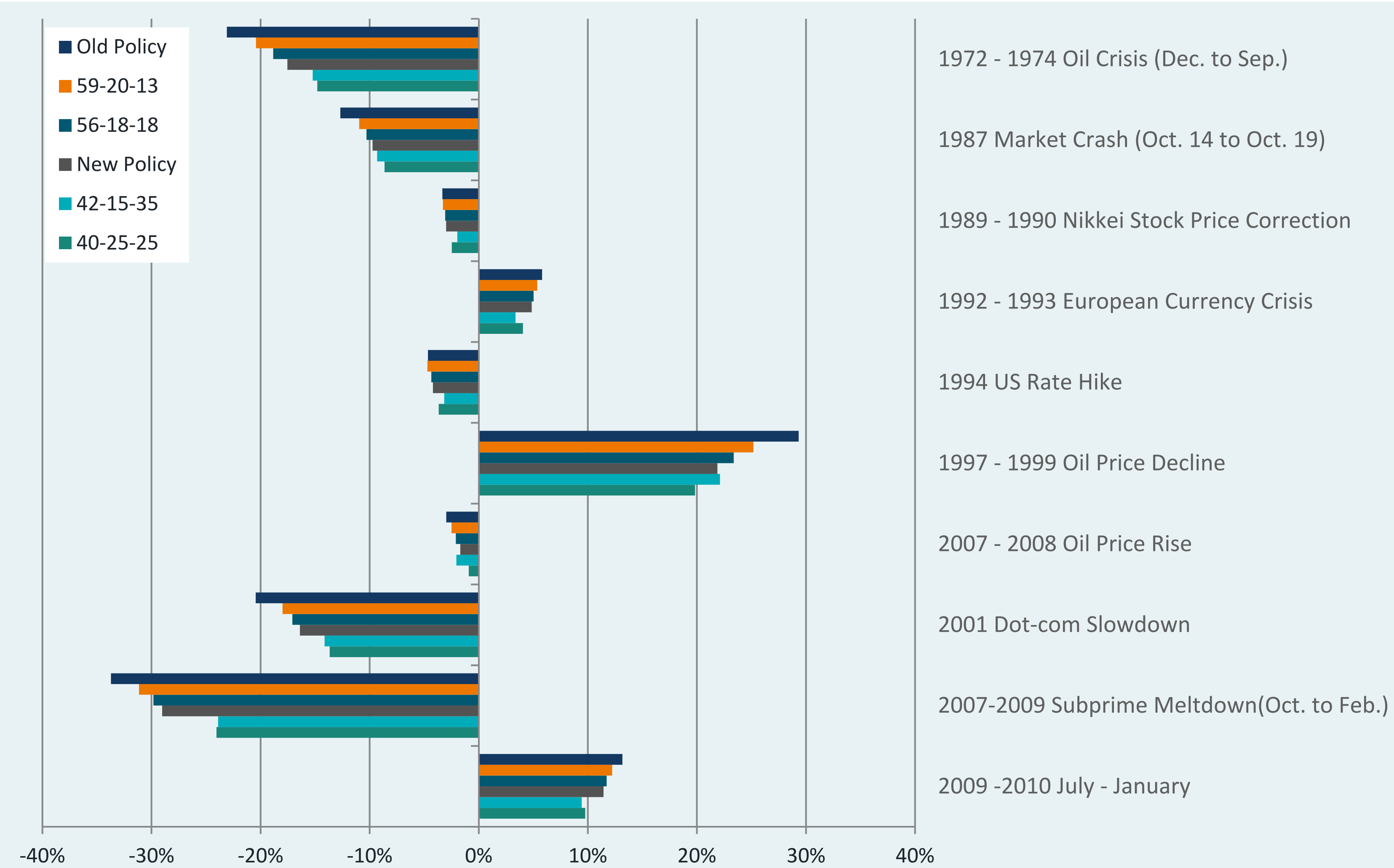
Asset Class	Old Policy	59-20-13	56-18-18	New Policy	42-15-35	40-25-25
Growth	**63.0%**	**59.0%**	**56.0%**	**54.0%**	**42.0%**	**43.0%**
US Equity	28.0%	22.0%	20.0%	18.0%	20.0%	13.0%
International Equity	19.0%	19.0%	18.0%	18.0%	7.0%	13.0%
Private Equity	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Opp. Credit	6.0%	8.0%	8.0%	8.0%	8.0%	7.0%
Global Bond	3.0%	3.0%	3.0%	3.0%	0.0%	3.0%
Diversifying	**15.0%**	**20.0%**	**18.0%**	**18.0%**	**15.0%**	**22.0%**
Core Fixed Income	10.0%	14.0%	12.0%	12.0%	9.0%	15.0%
Hedge Fund	5.0%	6.0%	6.0%	6.0%	6.0%	7.0%
Inflation	**14.0%**	**13.0%**	**18.0%**	**20.0%**	**35.0%**	**25.0%**
Core Real Estate	7.0%	8.0%	10.0%	10.0%	15.0%	12.0%
Liquid Pool	3.0%	2.0%	4.0%	6.0%	10.0%	8.0%
Real Assets	2.0%	3.0%	4.0%	4.0%	10.0%	5.0%
TIPS	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Risk Parity	**8.0%**	**8.0%**	**8.0%**	**8.0%**	**8.0%**	**10.0%**
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Economic diversification

Most portfolios have a bias towards high a growth / low inflation regime.



Scenario Analysis



Source: MSCI BARRA

New Policy allocations

US Equity		18.0
International Developed		18.0
Private Credit		2.0
Opportunistic Credit		6.0
Private Equity		7.0
Global Fixed Income		3.0
	Total Growth	***54.0***
Core Fixed Income		12.0
Hedge Fund		6.0
	Total Diversifying	***18.0***
Liquid Pool		6.0
Core Real Estate		10.0
Private Real Assets		4.0
	Total Inflation	***20.0***
Risk Parity		8.0
Total Allocation		**100.0**

	SamCERA
Mean Variance Analysis	
Forecast 10 Year Return	***6.67***
Standard Deviation	11.26
Return/Std. Deviation	*0.59*
1st percentile ret. 1 year	*-20.45*
Sharpe Ratio	0.44

Not Just an Insurance Policy

The three balanced tenets of our investment philosophy

Verus real assets philosophy

The three tenets of our investment philosophy:

1. Create a real asset portfolio with a high degree of inflation beta
2. Provide attractive diversification benefits to the overall portfolio
3. Focus on attractive risk-adjusted returns

We don't maximize one tenet to the detriment of the other two

Client needs will dictate how much we may overweight or underweight specific characteristics. For example, commodities offer a high degree of inflation beta, but a low expected return. We will allocate more or less to commodities depending on the inflation protection the client seeks.

The role of real assets

	Strategy	GDP sensitivity	Inflation sensitivity	Income orientation	Return enhancing	Risk reducing	Liquidity
Privately-traded real assets	Private real estate core	High	Moderate	High	Moderate	Moderate	Moderate
	Private real estate value added	High	Low/None	Moderate	High	Low/None	Low/None
	Private real estate opportunistic	High	Low/None	Low/None	High	Low/None	Low/None
	Private infrastructure	Moderate	Moderate	High	Moderate	Moderate	Low/None
	Private natural resources	Moderate	High	Low/None	High	Low/None	Low/None
	Farmland / agriculture	Low/None	Low/None	High	Moderate	High	Low/None
Publicly-traded real assets	TIPS	Low/None	Moderate	Low/None	Low/None	High	High
	Commodity futures	Moderate	High	Low/None	Low/None	Moderate	High
	REITs	Moderate	Low/None	Moderate	High	Low/None	High
	MLPs	Moderate	Moderate	High	High	Low/None	High
	Listed infrastructure	Moderate	Moderate	Moderate	High	Moderate	High
	Listed natural resources	Moderate	Moderate	Low/None	High	Low/None	High

Magnitude	Low/None	Moderate	High

Note: the summary above was determined using historical averages and correlations on a relative basis within each category. It is important to note that investments within these asset classes are often heterogeneous and may possess different qualities and sensitivities (see Appendix for further details).

CMA's for Real Assets - 2017

SURVEY OF 2017 CMA'S – NOMINAL RATES OF RETURN

	Verus	JPMorgan	BNY Mellon	Franklin Templeton	Survey of 12 Consultants
Natural Resources	N/A	N/A	6.3%	8.3%	N/A
Infrastructure	7.4%*	6.3%	6.3%	7.9%	6.5%
Commodities	4.3%	3.8%	2.0%	4.0%	4.6%
Core Real Estate	4.6%	5.5%	4.0%	N/A	6.2%
Value-Add Real Estate	6.6%	7.0%	N/A	N/A	N/A
TIPS	2.6%	3.5%	2.1%	0.7%	3.2%
Domestic Equities	4.7%	6.3%	6.3%	7.3%	6.8%

— Range of expectations within real assets; portfolios should be customized to target the right mix of return and risk that a client desires

— Infrastructure returns are in-line with domestic equity assumptions, though they exhibit less risk

— The expected returns don't account for a private market premium for infrastructure or natural resources

Why Private Real Assets

- Compared to commodities, natural resource companies outperform, substantially
- Compared to publicly-listed natural resource companies, private resource funds earn a premium
- Private infrastructure outperforms listed-infrastructure
- Primary reason to invest in private real assets: **Return Enhancement**

	1 Year	3 Years	5 Years	10 Years	15 Years
Private Energy	14.4	-4.7	1.4	4.7	9.8
Timber	2.6	2.3	4.1	3.3	4.1
Infrastructure	12.5	9.5	10.0	7.5	8.0
Real Estate – Non Core	10.0	10.6	11.9	4.0	6.9
All Private Real Assets	**11.5**	**5.8**	**8.7**	**4.6**	**7.5**
S&P Global Natural Resources	**20.5**	**1.3**	**1.1**	**-0.7**	**N/A**
S&P Global Infrastructure	**13.1**	**5.9**	**9.3**	**3.6**	**N/A**
MSCI ACWI Energy	6.3	-6.9	-1.6	-1.5	7.9
Bloomberg Commodities	-0.3	-10.4	-10.5	-6.8	-0.3
Cash	0.6	0.3	0.2	0.4	1.2

Source: Thomson Reuters Cambridge Universe, All data as of June 30, 2017.

SamCERA Real Asset Performance

- Early investment in mining finance led to a shallow j-curve for the private real asset portfolio
- CIM and Blue Road have emerged from their j-curve, both performing well relative to similar vintage year funds in their category

- Portfolio is outperforming the policy benchmark (1/3rd Bloomberg Commodities/ 1/3rd S&P Global Natural Resources/ 1/3rd S&P Global Infrastructure) by 72bps since inception (net of fees)
- The largest drag on performance was the portfolio's first investment in Sheridan Energy
- Portfolio should deliver a mid-teen IRR (net) based on expected returns from underlying strategies

Current conditions and outlooks

Maintain real asset exposure with return drivers outside of pure inflation

Observations driving our outlook

Risk of unexpected inflation shock

Inflation levels remain moderate in developed markets, though we've seen a recent upward shift in inflation, mostly due to rising energy prices off of last year's lows. The risk of unexpected inflation shock suggests it is prudent to maintain real asset exposures with return drivers outside of pure inflation.

Within real estate, we recommend a conservative approach to leverage, liquidity, quality and pace of capital deployment

Private real estate continues to appear favorable compared to other inflation protecting asset classes, although returns may be moderating to normal levels. Fundamentals have remained strong alongside slow and steady economic growth without the overbuilding that is typically seen at this stage of the cycle. Real estate debt appears to be offering a favorable risk return tradeoff.

Our outlook for energy and metal commodity prices look favorable beyond 2-3 years

Supply cuts, driven by lower prices, are filtering through to the market. For clients comfortable assuming equity risk, investing in natural resource companies that can generate positive cash flow at current spot prices should be even more attractive if prices increase in the next 3-5 years. Commodity futures still face return headwinds in the near-term, but could play a role within a portfolio as a hedge against inflation shocks.

It is important to distinguish between strategic allocations and intermediate-term valuation differentials

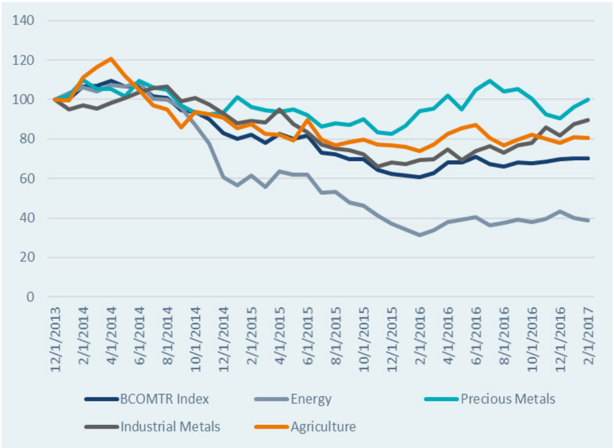
This report is written primarily with an intermediate-term view (3-5 years), and is intended to help guide potential tilts within strategic target allocations and new capital deployment. It is not intended to override long-term portfolio planning.

Commodities

— Commodity performance has been lackluster over the past decade, delivering negative returns through the global financial crisis and the recent oil crisis. Much of this performance has been caused not by price movement, but by the shape of commodity futures curves. An upward sloping curve creates a drag for investors as a higher price is paid to enter each futures contract, and a downward sloping curve creates positive carry for investors as prices paid for futures contracts are lower. This premium/discount is a major determinant of commodity performance, and is known as "roll yield". Roll yield can be negatively affected by commodity crises as current contract prices drop further than distant prices and the curve becomes steeper.

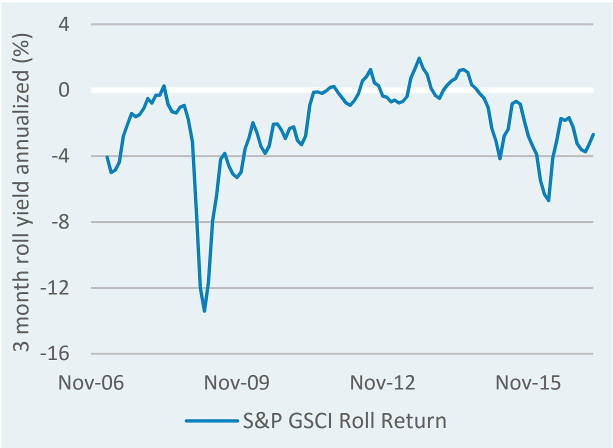
— As commodity prices moderate, futures curves have flattened and negative roll yield has begun to dissipate. Oil in particular significantly impacts overall roll yield due to its large weight in commodities indices. Oil has exhibited a flatter curve shape recently. We are continuing to monitor these effects since a neutral or positive roll return would improve commodity returns.

SECTOR PERFORMANCE



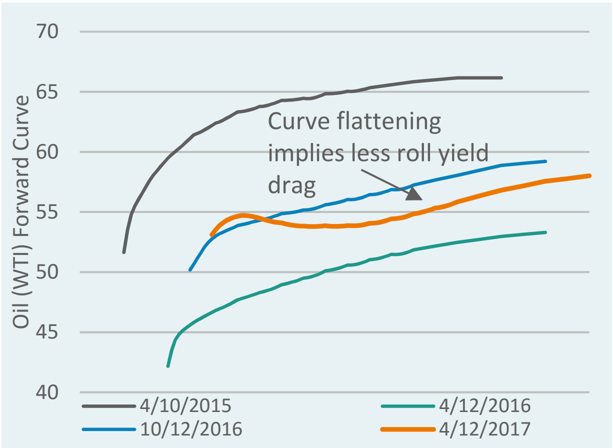
Source: Bloomberg, as of 3/15/16

ROLL RETURN



Source: Standard & Poors, Goldman Sachs, as of 3/31/17

CURVE SHAPE



Source: Bloomberg

Commodities – Role within a portfolio

- Based on inflation sensitivity measures, commodities provide the best inflation protection.
- The performance of the asset class has been disappointing both on an absolute and relative basis. Many investors expected an equity-like return stream from the asset class but the benign inflation environment and supply/demand headwinds within commodities have resulted in mostly negative returns for several years.
- Investors should not expect commodities to deliver returns at or near equity levels. The low interest rate environment, upward slopping futures curve and uncertain path around commodity spot prices does not make a strong case for high returns. They do however, have a role to play in some client portfolios. The low correlation to equities and high inflation beta characteristics can be attractive for investors seeking a strong hedge to inflation shocks.

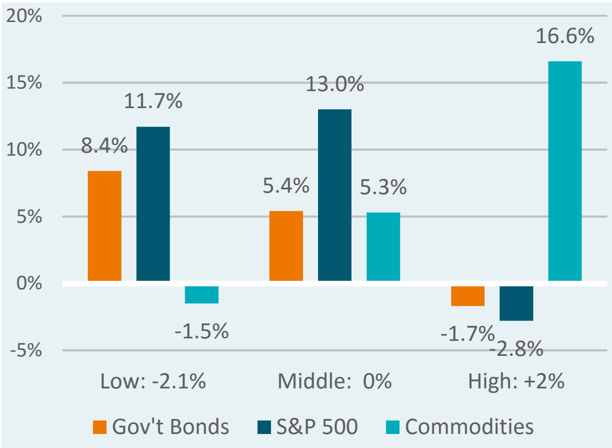
COMMODITY VS. NATURAL RESOURCE EQUITIES ROLE WITHIN A PORTFOLIO

	Futures-Based Commodities	Resource Equities (Mining & Energy)	Private Resource Equities (Mining & Energy)
Broad commodity exposure	Yes	No	Yes
Diversifier (low equity correlation)	Yes	No	No
Inflation shock protection	Yes	Yes	Yes
Adds equity risk to portfolio	No	Yes	Yes
Equity-like expected return	No	Yes	Yes
Roll yield drag (most recent)	Yes	No	No
Illiquid	No	No	Yes

COMMODITY FUTURES AND SPOT RETURNS FOR SELECTED PERIODS

	Nominal		Inflation Adjusted	
Period	Futures	Spot	Futures	Spot
1/2005 to 12/2014	5.1%	9.4%	2.9%	7.3%
1/1995 to 12/2004	8.6%	8.2%	6.1%	5.8%
1/1985 to 12/1994	9.7%	6.7%	6.2%	3.1%
1/1975 to 12/1984	9.0%	7.1%	1.9%	0.0%
1/1965 to 12/1974	19.2%	13.2%	14.1%	8.1%
1/1959 to 12/1964	3.9%	3.0%	2.6%	1.7%

ASSET CLASS RETURNS DURING INFLATION SHOCK REGIMES: 1960-2015 (1-YEAR PERIODS)

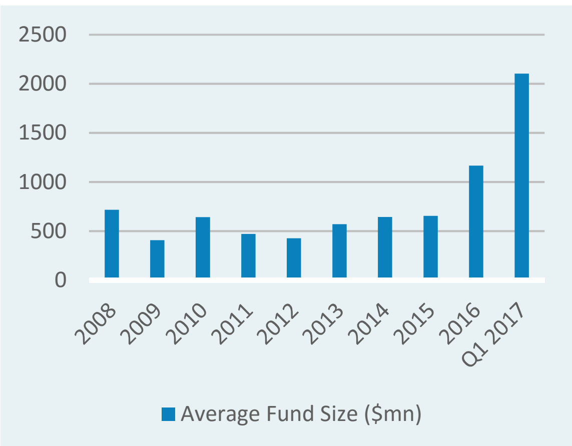


Source: Summerhaven

Infrastructure

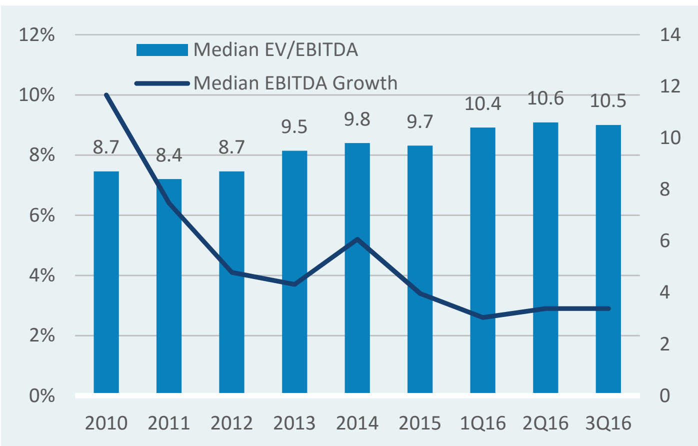
- Infrastructure encompasses a suite of investment strategies across a subset of particular industries. While there isn't one definition for what can be included within infrastructure, we tend to focus on the power generation, transportation, midstream energy, telecom and utility sectors. Listed and unlisted infrastructure funds will invest across these sectors, or in some cases specialize in one or two particular industries.
- Unlisted infrastructure has grown dramatically in the last 5-7 years as investors sought assets that could provide a more attractive yield relative to fixed income, and also the potential for inflation protection.
- Low interest rates and a competitive market have driven deal valuations to historically high levels. Listed infrastructure is trading around 10.5x EBITDA with a 2.5% growth rate. It appears that the market is leveling off, reflecting an awareness that valuations are rich.
- There is a lot of speculation in the marketplace around the Trump administration's impact on the infrastructure market. Given the political realities of passing legislation with a deeply divided Congress, we aren't putting a lot of stock into large infrastructure projects being developed by the government. The one area where there has been notable changes is within the make-up of the FERC (Federal Energy Regulatory Commission) board. FERC regulates midstream pipeline development and power transmission and generation. The new board headed by Trump nominees is viewed to be friendlier to the midstream and power companies and should spur new developments in those markets.

INFRASTRUCTURE AVERAGE FUND SIZE



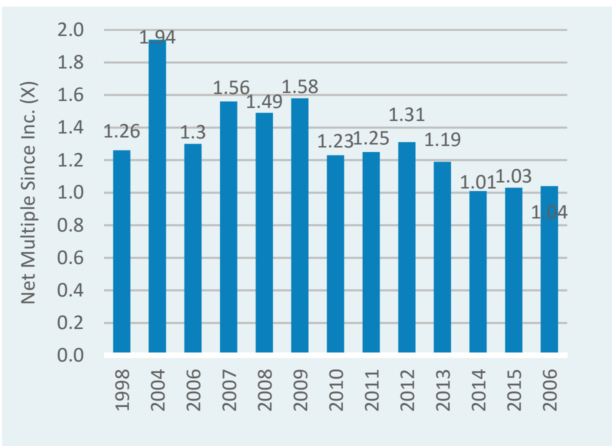
Source: Preqin

LISTED INFRASTRUCTURE VALUATIONS/GROWTH



Source: Capital IQ

MEDIAN NET MULTIPLE RETURNS FOR INFRASTRUCTURE BY VINTAGE YEAR

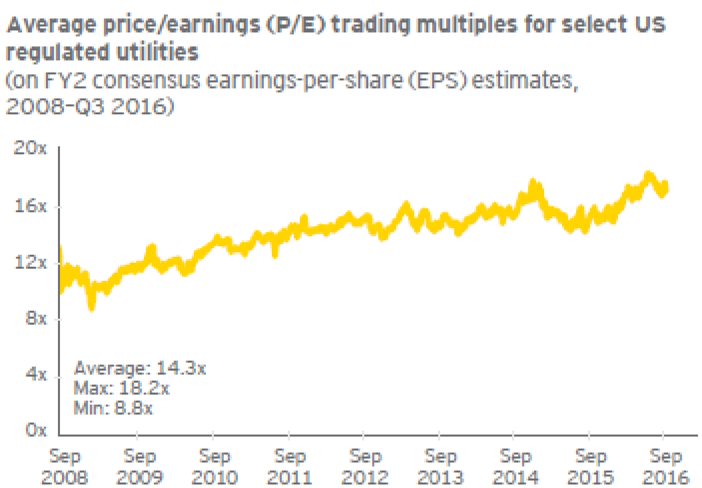


Source: Cambridge Associates

Infrastructure (continued)

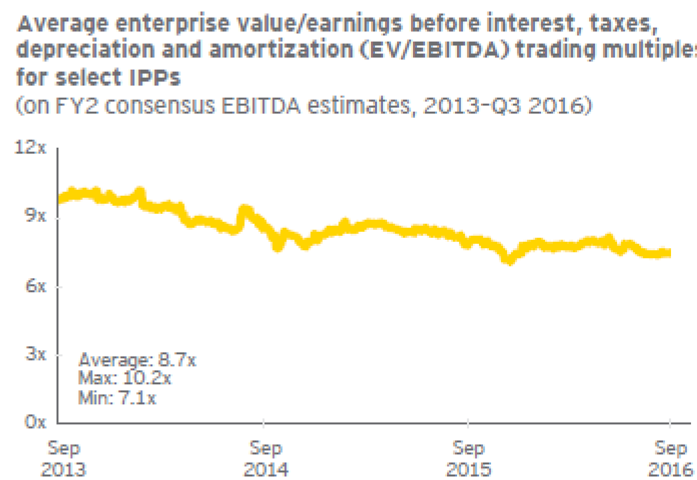
- We remain favorable towards value-add relative to core infrastructure as the risk/reward looks more attractive today. Interest rate sensitivity is generally lower in value-add infrastructure and pricing levels, though elevated, are below comparable core valuations. Within value-add we focus more on sector specialists or teams with a track record of successful project development.
- Relative to regulated power, which is trading at a premium to historical valuations, merchant power generation is trading at a discount given the pricing dynamics in that market. Low natural gas prices, along with the disruption of renewables has driven commodity power prices lower, significantly reducing cash flow and impairing balance sheets across the industry. Though we are cautious given the number of unknowns, there could be some attractive deals in the merchant market with financial stress and lack of IPP competition for deals.
- Midstream energy has been the best performing and most attractive industry within infrastructure for many years. There continues to be a need in unconventional basins (Appalachian and Permian, in particular) for additional processing and transportation infrastructure. That said, the MLP market is healthier today than it was a year ago and large amounts of private capital raised over the last 2-3 years has contributed to a competitive market. Midstream deals increasingly favor the E&P drillers as MLPs and PE-backed teams compete for volume and acreage dedication. We continue to look for opportunities in midstream energy with a focus on nimble management teams.

VALUATIONS ON REGULATED UTILITY POWER



Source: E&Y

VALUATIONS ON MERCHANT POWER

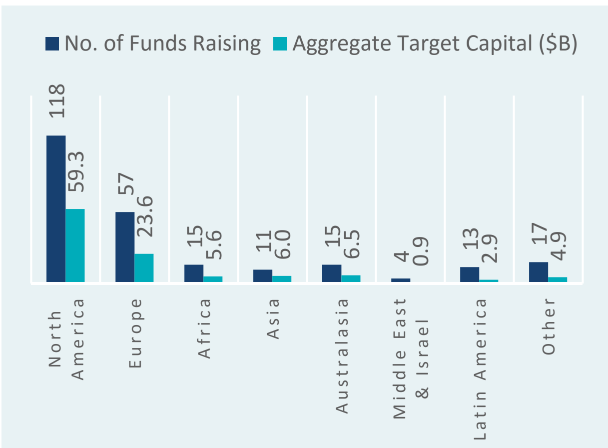


Source: E&Y

Private natural resources

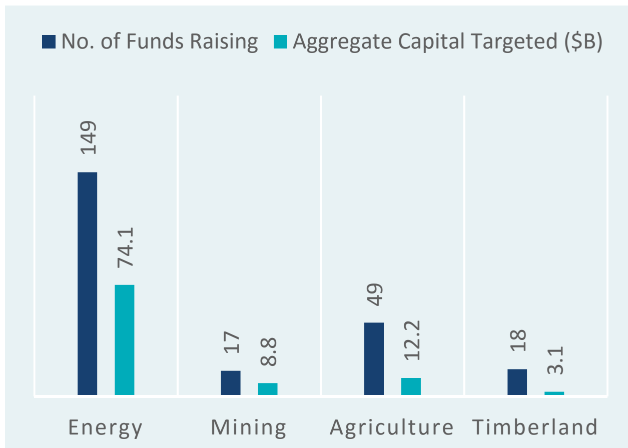
- Private natural resources includes private energy, mining, agriculture and timber funds. Each of these resource sectors carries unique risk and return characteristics, making them difficult to generalize as a single asset class.
- Energy is the largest investable sector within natural resources. The number of funds and capital raised within energy is 2-3x that of the other three sectors combined. The depth of the energy market allows for investors to scale into the sector and creates a more liquid market for transactions. Energy is also the sector with the most capital chasing deals - currently $150bb in dry powder.
- Mining, agriculture and timber tend to be sectors that we allocate to opportunistically. The liquidity within these markets is quite low, leading to fund terms extending well beyond 10 years.
- Within agriculture we have largely focused on agriculture business strategies utilizing permanent crops.
- Fundraising in timberland has been trending lower for several years as disappointing returns within that industry continue to create a headwind for TIMOs.

FUNDS BY GEOGRAPHIC FOCUS



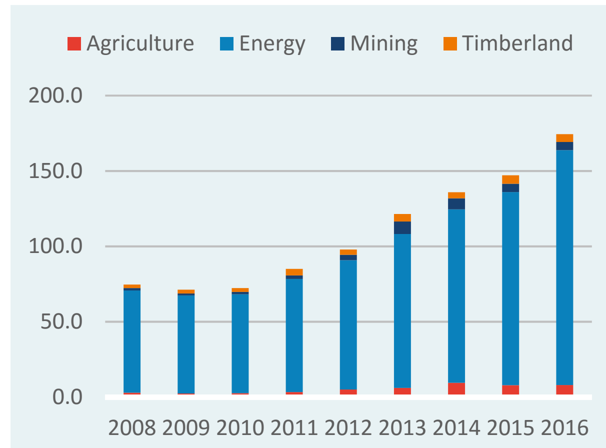
Source: Preqin

CURRENT NATURAL RESOURCE FUNDS IN MARKET



Source: Preqin

FUND DRY POWDER BY STRATEGY



Source: Preqin

Private energy

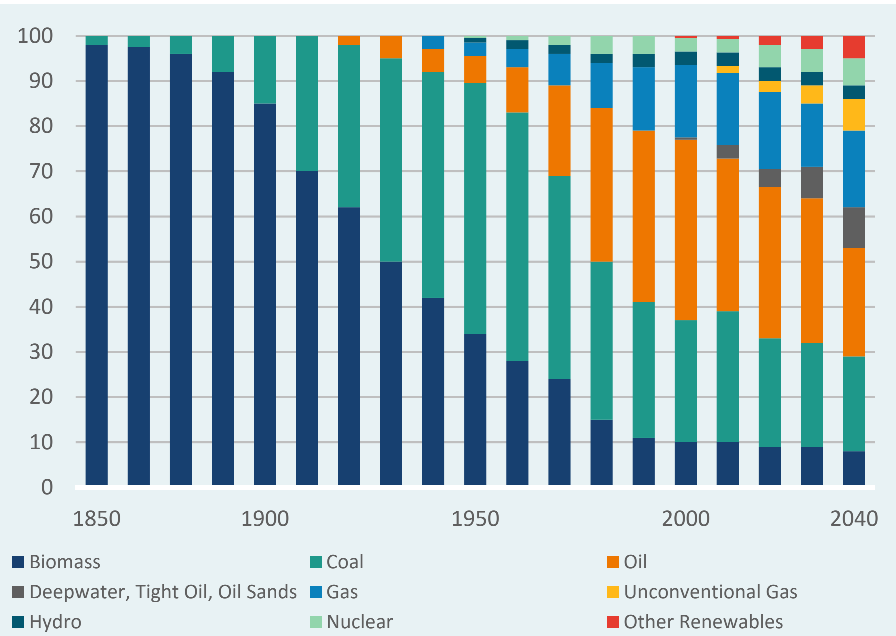
— Global energy generation is still dominated by carbon-based fuels. Energy efficiency through technology allows us to use less fuel to drive energy needs. CO_2 emissions are expected to fall in OECD nations and China through 2040, while non-OECD nations still face challenges in reducing carbon emissions.

— China, India and Indonesia are expected to more than triple their car penetration per thousand people over the next 25 years.

— Given expectations around global demand growth, ongoing capex in all upstream market segments will be needed to meet future demand. Significant parts of the energy market require higher prices to encourage investment spending.

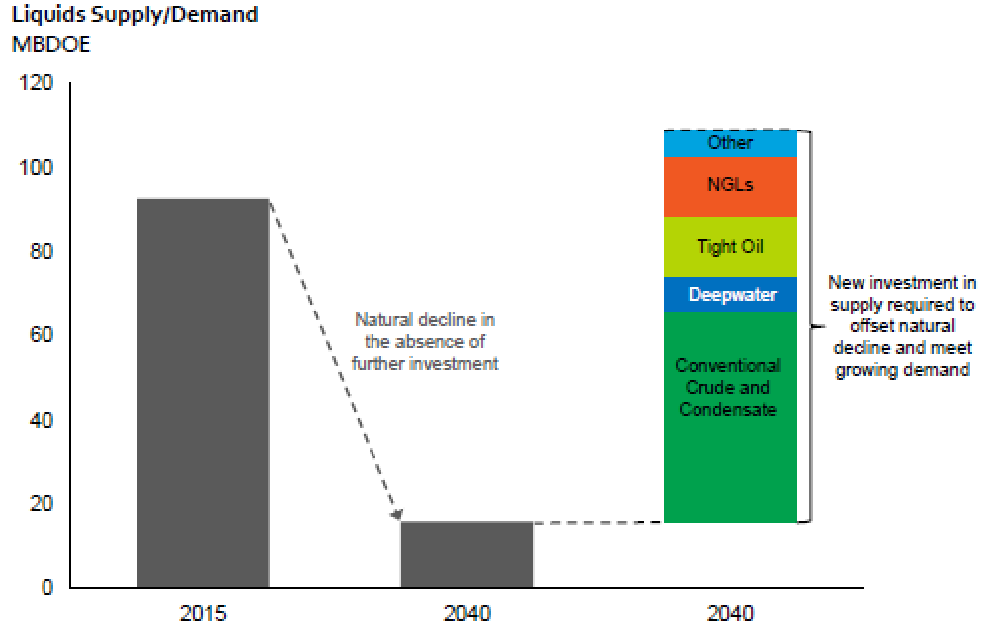
— Near-term supply/demand challenges could continue absent additional supply cuts by OPEC and related parties.

TECHNOLOGY CONTINUES TO CHANGE THE GLOBAL FUEL MIX



Source: ExxonMobil

ONGOING CAPEX WILL BE NEEDED TO MEET FUTURE DEMAND



Source: ExxonMobil

Private energy (continued)

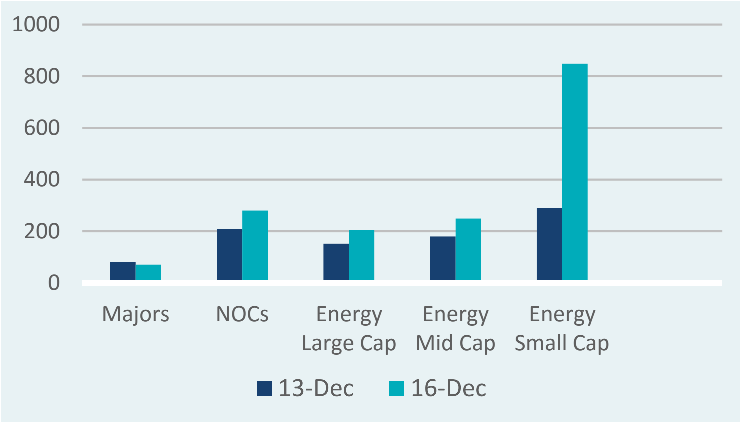
— Collapsing energy prices drove credit spreads higher, valuations lower and sent over 120 companies into bankruptcy.

— Credit spreads for small cap energy companies remain well above historical averages. Cost of capital is significantly higher for smaller E&P and oil field service (OFS) companies.

— Transactions in the oil & gas market are below trend globally, though North America is a noticeable outlier given the availability of capital and attractive drilling economics.

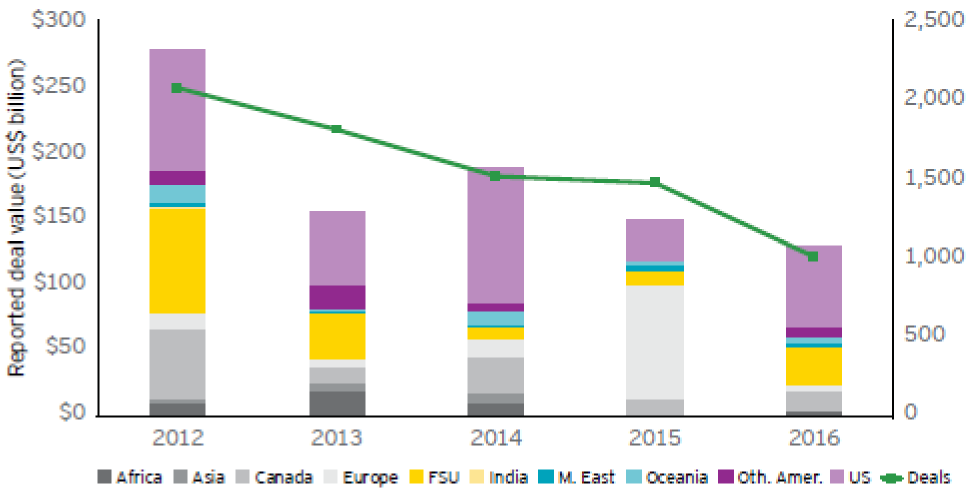
— Though we have some concerns with the amount of capital chasing energy deals, with independent energy companies repairing balance sheets, opportunities should continue to remain attractive in E&P and OFS.

CREDIT SPREADS IN ENERGY BY COMPANY SIZE (BPS)



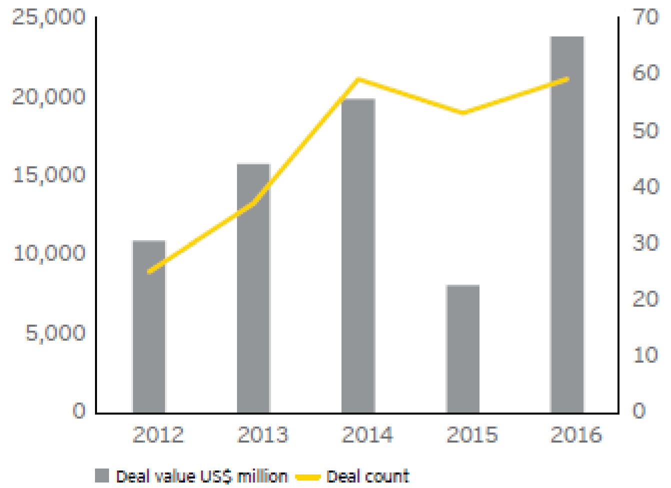
Source: E&Y

UPSTREAM ENERGY TRANSACTIONS GLOBALLY (2012-2016)



Source: E&Y

PE ACQUISITION ACTIVITY IN ENERGY

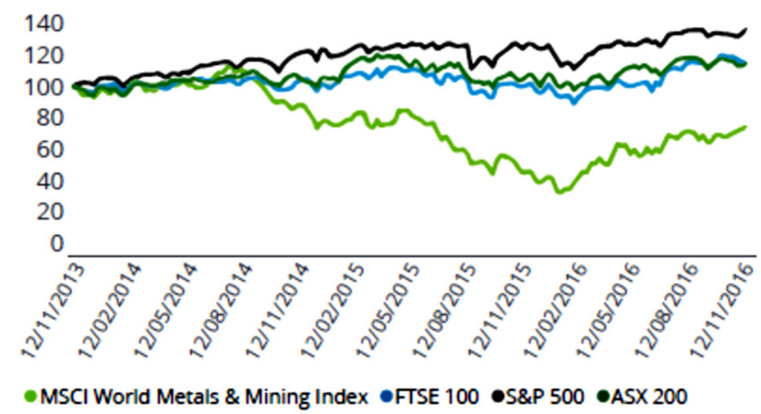


Source: E&Y

Private mining

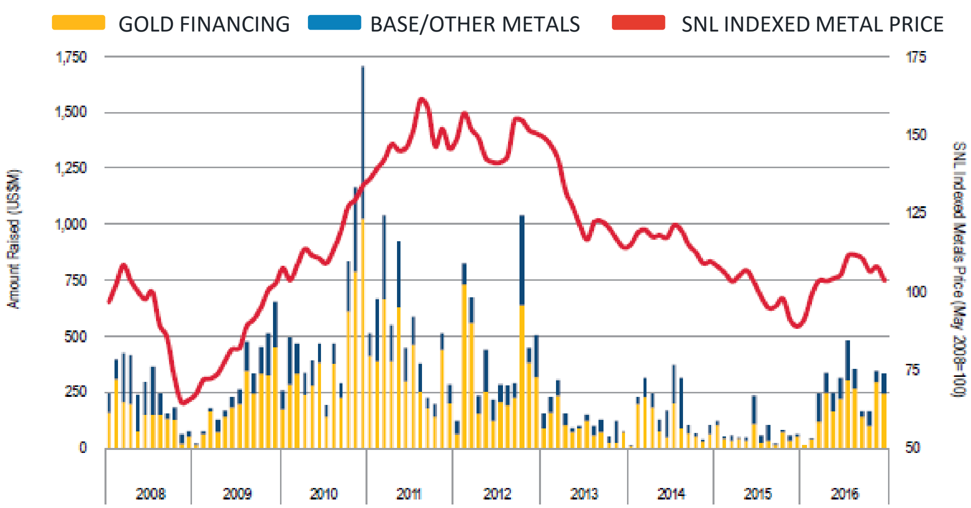
- Stress in the energy sector is well documented among institutional investors. Somewhat overlooked is the longer suffering mining sector. Though 2016 saw a bit of a rebound for mining, pockets of opportunities continue to exist for investors.
- Junior mining companies have had a difficult time financing exploration activity. IPOs within the mining sector have collapsed with just 15 listings in 2016 compared to over 80 in 2012. M&A volumes are down as well, notwithstanding a few large transactions.
- With industry players repairing impaired balance sheets and European banks reducing their loan volumes, we believe private capital has an opportunity to step in and acquire attractive assets and advance projects.

MINING EQUITIES HAVE UNDER PERFORMED



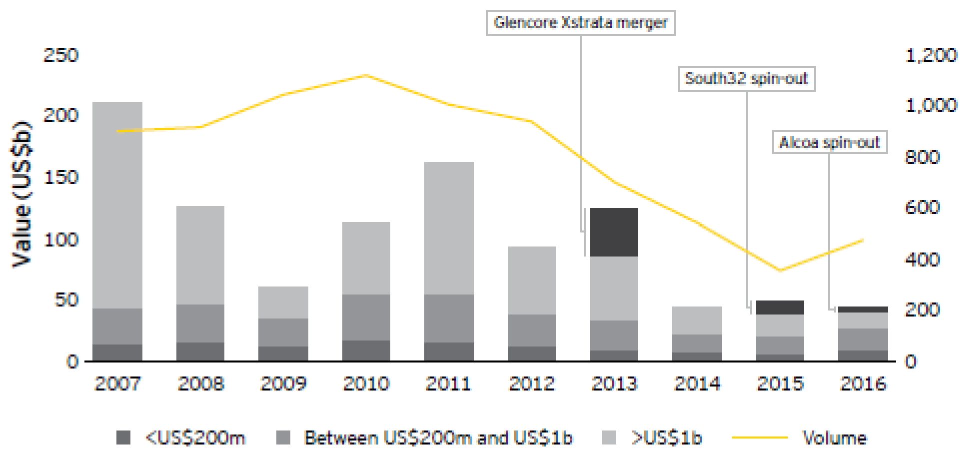
Source: Deloitte

EXPLORATION-RELATED FINANCING BY JUNIORS (2008-2016)



Source: S&P Global Intelligence

MINING M&A – VOLUME AND VALUE (2007-2016)



Source: E&Y

Questions/Concerns?

Appendix

Interest rate sensitivity

Real Assets	Interest Rate Exposure	Impact from a Rising Rate Environment
Real Estate	Real Estate is sensitive to nominal interest rate movement due to their correlation with cap rates. Investments with high income components tend to be more sensitive to interest rate movements.	Rising rates would likely cause an increase in cap rates. Although historically these do not move 1:1, they generally follow the same long-term trends. An increase in cap rates would have a direct negative impact on real estate valuations. Currently, a cushion exists in the cap rate spread to Treasuries, which could lessen this impact. Additionally, higher interest rates would generally mean a larger portion of total return would come from income, especially if rates are rising due to improving economic growth. Investment level leverage would become more expensive as well.
Infrastructure	Infrastructure, specifically core infrastructure, is sensitive to movements in interest rates. Discount rates on cash flow are tied to 10-year Treasury rates. When the yield on Treasuries falls (rises), the discount rate falls (rises) and values increase (decrease).	Infrastructure asset valuations would generally be negatively affected due to the discount rate effect. Once that impact occurs infrastructure assets would generate a higher portion of total return from income. Investment level leverage would become more expensive as well.
TIPS	There are three components to TIPS returns: the level of real yields, changes in real yields and the inflation adjustment.	TIPS are sensitive to rising real rates. If interest rates are going up but inflation is flat or rising by less than nominal rates, TIPS will suffer. TIPS will outperform nominal bonds if real yields are falling. Because the duration of TIPS portfolios tends to be longer than core bonds, they will have a higher sensitivity to rising rates.
Commodity Futures	Commodities are exposed to interest rates from the yield associated with holding collateral on futures instruments. As commodities do not provide cash flows, they are not priced with an associated discount rate.	Overall, rising interest rates will have a neutral-to-positive impact on commodity returns through the impact on collateral yield.
Natural Resources Equities	Unlike real estate or infrastructure, natural resource equities derive more of their return from capital appreciation than yield. While not immune to increasing discount rates, natural resource companies will be impacted more by commodity price movement than any shift in discount rates.	Higher interest rates, especially if associated with economic growth, will generally have less of an impact on natural resource companies than yield-oriented investments.

Inflation sensitivity

Real Assets	Deflation	Rising Inflation	High Inflation
Real Estate	Real estate would face headwinds in a deflationary environment as the ability to raise leases/rents would become challenging.	As inflation rises, input prices for commercial real estate go up, increasing the replacement cost for real estate, thereby allowing easier rent/lease increases.	Price appreciation would be higher, thus good protection against inflation as a store of capital. But higher interest rates would decrease the attractiveness of using leverage.
Infrastructure	The stable, steady contracted or regulated income streams of core infrastructure should hold up well even with declining inflation.	Automatic inflation adjustments to many of the regulated assets and contracted assets increase income during times of rising inflation.	Nominal returns should be higher during a high inflationary period as many regulated and contracted utility rates have inflation kickers in their contracts.
TIPS	The principal of TIPS cannot be reduced below par value when held to maturity. This implied put characteristic can make TIPS broadly attractive during a deflationary period.	TIPS offer protection during inflationary environments as the instrument's principal is adjusted every 6 months based on CPI levels. This helps protect real returns. If the inflation prints higher than the TIPS breakeven, investors are being over-compensated relative to Treasuries.	During high inflation, the protection offered by TIPS may be less than adequate as the adjustment to principal is only made every six months and has a lag on the payout. However, the payout of the investment is still guaranteed by the government so there should be marginal protection.
Commodity Futures	Commodity futures typically have dropped during deflationary or disinflationary environments. Gold and other precious metals may be a good store of wealth during deflationary times.	Periods of rising inflation are the best environment for commodity futures as they tend to provide very direct exposure to price movements.	High inflation doesn't necessarily mean high returns for commodity futures. The rate of change of inflation is a larger determinant in the returns than the absolute level of inflation.
Natural Resources Equities	Real assets have typically seen declining demand during these periods, affecting both spot prices and companies with exposure to the natural resources, whether it be oil & gas, metals, timber or agriculture.	Increasing prices have a direct impact on profit margins for companies with commodity exposures. However, overall equities tend to underperform in periods of rising inflation.	High inflation may improve profit margins of natural resource companies in the near term, but longer periods of high inflation have had a negative impact on overall equity valuations as debt costs are typically higher in such periods as well.

Glossary of terms

Adjusted Funds From Operations (AFFO): A measurement which is helpful in analyzing real estate investment trusts (REITs). The AFFO typically equals the trust's funds from operations (FFO) but is adjusted for ongoing capital expenditures which are necessary for upkeep of the REIT's assets.

Capitalization Rates: The rate of return of a real estate investment, which is calculated by dividing the property's net operating income by the property's purchase price.

Core Real Estate: This category of real estate will include a preponderance of stabilized properties. Core real estate should achieve relatively high income returns and exhibit relatively low volatility. Core real estate funds tend to use less leverage.

Consumer Price Index (CPI): A measure of purchasing power and inflation that takes the average prices of a basket of consumer goods and services, such as food, medical care, and transportation, and compares the same basket of goods in terms of prices to the same period in a previous year. Changes in CPI are used to assess price changes associated with the cost of living.

Dry Powder: Investment reserves raised by investment funds to cover future obligations or to purchase assets in the future.

GDP: The total value of all services and goods produced within a country's borders, for a given time period. This calculation includes both private and public consumption, government expenditures, investments, along with total exports net of total imports.

Internal Rate of Return (IRR): the IRR is the discount rate that equates the present value of cash outflows (investment) with the present value of cash inflows (return of capital). IRR is often referred to as a dollar-weighted rate of return that accounts for the timing of cash inflows and outflows.

Master Limited Partnerships (MLPs): A limited partnership structure which is publicly traded on an exchange. MLPs combine the tax benefits of a limited partnership with the liquidity of publicly traded securities. To qualify as an MLP, the entity must generate 90% of its income from the production, processing and transportation of oil, natural gas and coal.

Net Operating Income (NOI): A calculation which is used to analyze real estate investments that generate income. NOI is the property's annual income generated by operations after deducting all expenses incurred from those operations. The growth rate in NOI is a common metric used in determining the health of a property.

Opportunistic Real Estate: An opportunistic fund is one that includes preponderantly non-core assets. The fund as a whole is expected to derive most of its return from property appreciation which may result in significantly volatile returns. These funds may employ a variety of tools such as development, significant leasing risk and potentially high leverage.

Real Estate Investment Trusts (REITs): A REIT is a company that owns and operates commercial real estate properties. REITs can be publicly traded or privately held. There are two main type of REITs: Equity REITs which generate income from the operation of properties, and Mortgage REITs, which invest in mortgages or mortgage securities.

Timber Investment Management Organizations (TIMOs): A management group that invests in timberland assets for institutional investors. TIMOs will purchase, manage and sell various timberland properties on behalf of investors.

Treasury Inflation Protected Securities (TIPS): A treasury bond that is adjusted to eliminate the effects of inflation on interest and principal payments, as measured by the Consumer Price Index (CPI). TIPS are issued in terms of five, ten and twenty years and are auctioned twice per year.

Value-Added Real Estate: A value-added real estate fund often holds a combination of core assets and other assets characterized by less dependable cash flows. These strategies are likely to have moderate lease exposure and employ moderate leverage. Consequentially, these strategies seek significant returns from property appreciation and typically exhibit moderate volatility.

Vacancy Rates: The vacancy rate is calculated as the total number of unoccupied units of a property divided by the total units of the property, at a particular point in time.

Vintage Year: Represents the year the first capital call or portfolio company investment was made.

Notices & disclosures

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