TIAA-CREF Asset Management

Natural Resources & Infrastructure Quarterly

Third Quarter 2015

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What's Inside

The Natural Resources & Infrastructure Quarterly features overviews of the following:

- Despite mixed performance across developed and emerging economies, global growth is poised for modest improvement.

- Fed-related uncertainty and the strengthening dollar weigh heavy across global bond markets and currency markets.

- Crude oil prices fell 24% in the quarter, reflecting the persistent imbalance between supply and demand. Early signs of lowering supply are emerging in the U.S. as production has fallen from its April high.
- Borrowing base re-determinations by banks in 4Q are expected to reduce liquidity for operators due to the lower price environment. The reduced availability of capital may force operators to monetize higher quality assets.

- Core infrastructure assets with demonstrated downside protection continue to have strong demand as the universe of buyers expands.
- Recent months have seen a number of midstream energy assets reach the market.
- M&A activity in the airport sector has picked up. The latest closings and notable forthcoming sale launches are primarily located throughout Europe.

- Timberland markets remain demand constrained. While U.S. housing continues to improve, high standing inventory and the softening of Chinese demand have kept downward pressure on prices.
- Positive housing data and rising builder's confidence in the U.S. are indicators of an expanding market for wood products over the long run.

- Agri-commodity prices finished lower at the end of 3Q15 due to anticipated near-record U.S. production, which is expected to put downward pressure on U.S. Corn belt rents.
- Strong demand and weather-related supply constraints are supporting farmer profitability and land values in the permanent crop space.
- Accelerated depreciation of the Brazilian real and Australian dollar, relative to most major trading currencies, has supported land values and producer economics in Brazil and Australia.

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Financial Services

The third quarter of 2015 was full of mixed economic signals and investment performance that left many market observers uneasy.

Quantitative easing continued from the ECB, supporting better-than-expected economic growth. The ubiquitous Grexit storyline rests for now, after another bailout and the reelection of Prime Minister Alexis Tsipras. While in other international relations, the U.S. and five other world powers struck a nuclear deal with Iran, bringing a measure of diplomatic stability. In monetary policy, China's Yuan was devalued in the face of economic slowdown, sending further shockwaves to emerging markets, many of which already face falling currencies and sluggish growth. At the confluence of geopolitical activity and negative macro developments, global stock markets tumbled, while the Fed cited soft inflation and concerns about global economic developments in the September decision against a U.S. rate hike.

To raise or not to raise rates remains the primary question, at least on the mind of U.S. market analysts. The Fed's near-zero interest-rate policy has dominated financial headlines. Despite improving economic fundamentals and a stronger labor market, the Fed did not budge on rates. Attention is now on December for a rate hike, with measurable increases in inflation as a likely decisive factor for Fed officials. While much focus is on rates, broad economic growth in the U.S. continues at roughly the same pace as it has for much of the recovery. Although the manufacturing sector had weak performance mainly relating to energy activity softening, labor markets continue to tighten, wages are poised for growth, consumption is stable, and construction spending continued to strengthen—all healthy economic indicators.

In the Eurozone, economic recovery may actually be poised to accelerate. The ECB announced no change in rates and continued its easing policy that, thus far, has supported growing lending activities, manufacturing output, sentiment and spending. The Greek bailout plan kept the struggling country in the Eurozone with a hefty price tag of €86 billion, along with the social strife that was well documented over the summer. In exchange for halting the Grexit, Greece agreed to harsh austerity measures and will impose spending cuts and higher taxes in order to service the debt load, now exceeding 200% of total GDP.

After agreeing to not enrich uranium, Iran, after 10 years of sanctions, is in process of reintegrating into the world economy. Iran has the world's third-largest crude deposits, the addition of which would add to a market already in oversupply.

Meanwhile, China's growth appears cyclically stable, but declining. As China's transformation from a production to service economy continues, market observers do not have a consensus view of what stable growth will represent. While steady growth of the legacy production-based economy ranged between 3–5%, GDP data for the service segment is not widely available and generally less transparent. What is known is that industrial activity will shrink and consumer-oriented segments of the economy are of growing importance. Programs such as the Chinese government's fiscal stimulus are meant to provide cushion for the country's near-term growth as the structural shift continues.

Moving toward year-end, the U.S. economy appears positioned to continue growing, Fed-related uncertainty notwithstanding. Internationally, the Eurozone is showing signs of economic improvement, although time will reveal its resilience. China's growth will continue to decelerate, with near-term growth supported by fiscal stimulus. Despite mixed signals, global growth is poised for modest overall improvement.

Markets Summary

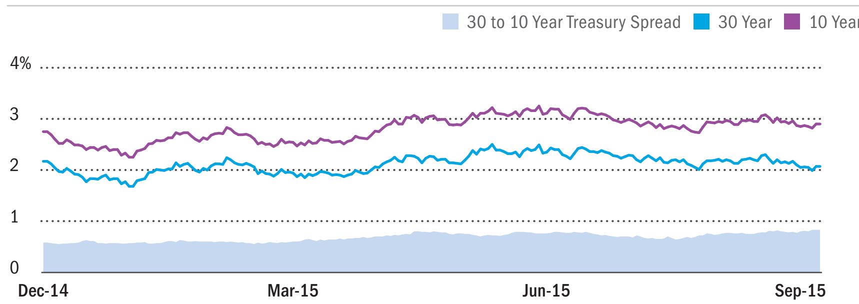
Key Market Metrics, as of September 30, 2015

	QTD	Previous QTD	6 Months	1 Year	3 Years	5 Years
Key Market Prices						
U.S. 10 Year Treasury	**2.06%**	2.35%	1.94%	2.25%	1.78%	3.30%
U.S. 30 Year Treasury	**2.87%**	3.11%	2.54%	2.75%	2.95%	4.34%
Initial Unemployment Claims	**275k**	296k	282k	294k	369k	413k
Unemployment Rate	**5.1%**	5.3%	5.5%	5.6%	7.9%	9.3%
CB Consumer Confidence	**103.0**	99.8	101.4	93.1	66.7	63.4
S&P 500	**1,920**	2,063	2,068	2,059	1,426	1,258
FX Markets*						
USD-CAD	**1.34**	1.25	1.27	1.16	1.00	0.99
Euro-USD	**1.12**	1.12	1.07	1.21	1.32	1.34
USD-BRL	**3.96**	3.11	3.18	2.66	2.05	1.66
AUD-USD	**0.70**	0.77	0.76	0.82	1.04	1.02

* FX table displays 1 unit of 1st currency in terms of 2nd currency (e.g. 1 USD is currently equivalent to 1.34 CAD)

Bonds
After a tumultuous 1H 2015 of lower yields and compressed spreads, bond markets had mixed performance in 3Q. The ten year declined 10bps, while the thirty year improved by 15bps. From the 2015 lows, the ten year remains over 80bps higher and the 30 year has added a full 100bps. Spreads between the 10 and 30 year also widened as much as 18bps from their tightest levels of the year. The higher yields and widening spreads were broadly related to markets adjusting to a changing rate environment. The caution is tempered by mixed economic performance and investor desire for yield curve positioning as the market anticipates a Fed rate hike in the U.S.

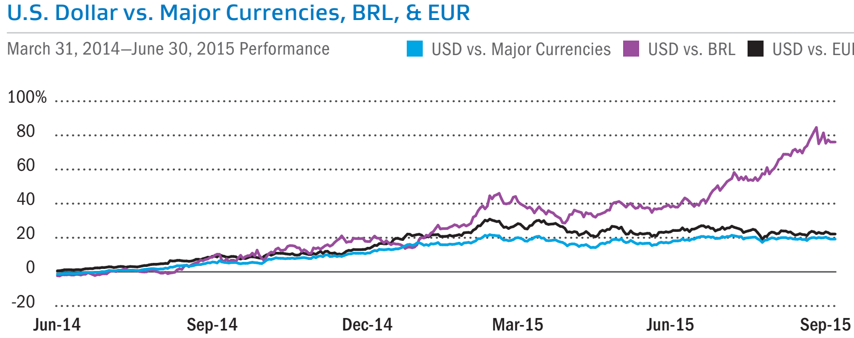
10 & 30 Year U.S. Treasury Bond Yields



Source: U.S. Federal Reserve Board, Haver Analytics, TIAA-CREF analysis

FX Markets
Currency markets in developed and emerging economies experienced divergent performance in 3Q. Year-to-date, the USD strengthened against the Euro, in light of improving economic fundamentals in the U.S., and ECB-related support in the Eurozone. Meanwhile, commodity-heavy economies continued to lose ground against the USD, further exacerbated by China's currency devaluation. The strengthening of the USD, coupled with declining commodity prices, has pressured commodity-rich currencies, causing significant pressure on economic growth.

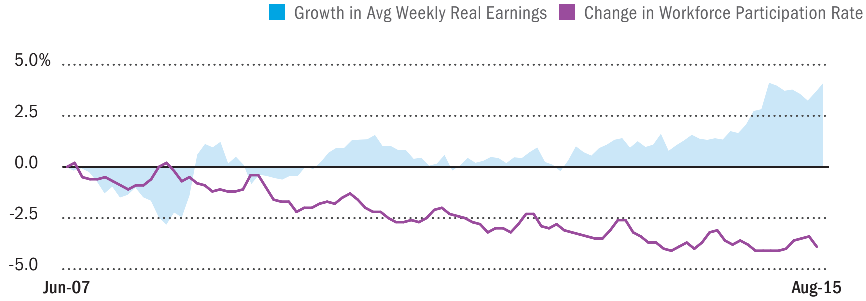
U.S. Dollar vs. Major Currencies, BRL, & EUR



Source: U.S. Federal Reserve Board, Haver Analytics, TIAA-CREF analysis

Employment and Earnings
Labor participation rates remain at the lowest since the late 1970s, while wage growth has experienced recent improvement from the levels of the Global Financial Crisis. Economic fundamentals are improving, unemployment is near 5%, and job gains have persisted for almost five years, yet the gradual decline in labor force participants holds. The decline likely partly relates to shifting demographics, remaining one of the most significant obstacles to stronger growth. As the delicate balance between the timing and magnitude of a Fed rate hike emerges, the Fed's rate policy will depend in part on continued monitoring of labor markets and wages.

Economic Laggards—Participation and Earnings

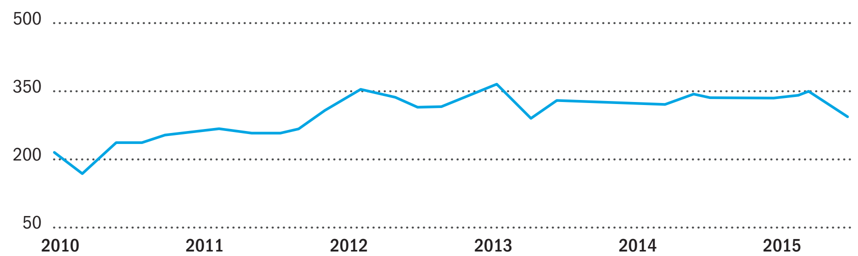


Source: U.S. Census Bureau, U.S. BLS, Haver Analytics, TIAA-CREF analysis

Energy
The energy complex hit new lows in 3Q15 as energy prices erased the gains in the prior quarter. Though there remains an excess of crude oil supply in the market, U.S. production has declined as operators have reduced investment in new production. There continue to be concerns about a slowing Chinese economy which has been a strong driver of demand for energy in recent years. Lower prices have increased U.S. demand for energy products and benefitted consumers. Stability in the energy sector will likely occur once the structural imbalance between supply and demand is resolved, likely with reductions in production.

S&P GSCI Energy Spot Index

Monthly Average

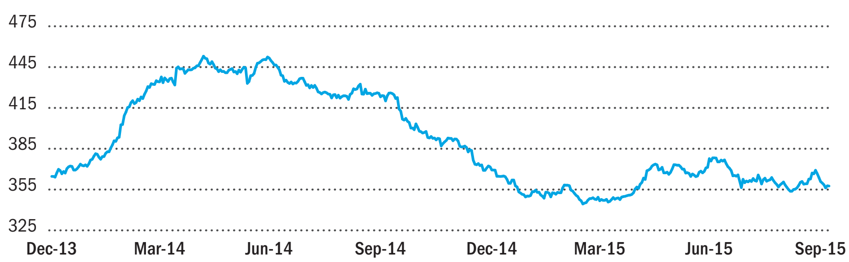


Source: Standard & Poor's, Haver Analytics

Agriculture
Agri-commodity prices finished lower at the end of 3Q15 due to anticipated, near-record U.S. production. With demand remaining steady, the 2015 crop is expected to add to inventories, thus maintaining high-stocks-to-use ratios. As a result, there is little supply-side pressure on prices; commodity futures reflect this dynamic, showing flat to modest growth over the next two years. Weather conditions and continued drought in California were not conducive to strong permanent crop production. However, with consumer demand for permanent crops on the rise, grower profitability has remained strong, as well as permanent crop land values.

CRB Foodstuffs Index

1967 = 100



Source: Commodity Research Bureau, Haver Analytics

Market Review

- Crude oil prices fell during the quarter, with WTI declining 24% to above $45 from just above $59 at the end of June while Brent declined 24% to above $48 from just below $64.
- U.S. rig counts, which appeared to stabilize early in 3Q, continued the year-long decline to 838 rigs at the end of September, the lowest level in the last five years and a 54% decline since year-end according to Baker Hughes.
- The reductions in capital investment by operators are beginning to address the excess supply of oil. Total U.S. crude oil production has begun to decline as a result with production declining from its April high of 9.6 million bbl/d to below 9.4 million bbl/d in July.
- U.S. crude oil stocks remain well above historical averages over the last five years with stocks in excess of 450 million barrels.
- Prices remain high enough to support continued drilling in the core areas of the Bakken, Eagle Ford, Marcellus, Niobrara and Permian basins partially due to falling drilling and completion costs according to the EIA. IHS estimates that North American operators can now earn a similar rate of return at $60/bbl that they previously earned at $90/bbl.
- In 4Q2015, operators are expecting significant re-determinations in their borrowing bases from banks due to the lower price environment. In a survey from Haynes & Boone, nearly 80% of exploration and production companies expected a reduction in their borrowing base with an expected average decrease in the ability to borrow against reserves of 39%.
- The reduced availability of capital creates opportunities for private capital providers as operators may seek to monetize higher quality assets than were previously on the market to generate liquidity particularly as higher priced hedges continue to roll-off.
- MLPs and YieldCos have seen significant declines in their valuations largely due to concerns over rising interest rates.

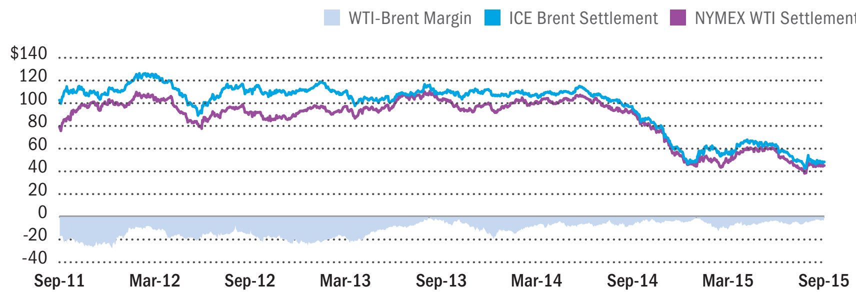
Outlook

- The EIA forecasts WTI crude oil prices will average $45/bbl for the remainder of 2015 and $54/bbl in 2016 while Brent crude oil prices will average a $5/bbl premium to WTI over that time. The EIA forecast for Henry Hub natural gas is for prices below $3.50/MMBtu through 2016
- The EIA forecasts U.S. crude oil production to decline through August 2016 to an average of 8.6 million bbl/d then increase in 4Q16 returning to an average of 9.0 million bbl/d.

Key Market Metrics

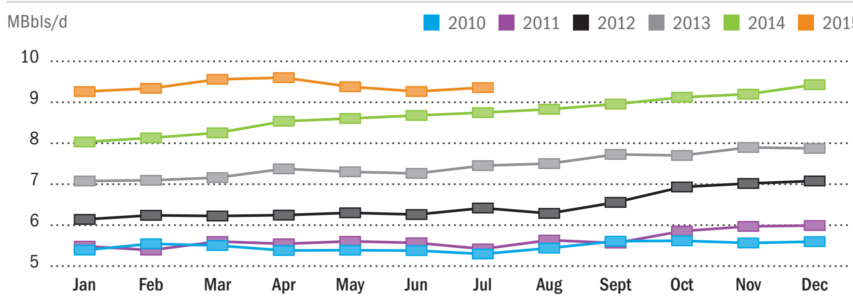
	QTD	Previous QTD	6 Months	1 Year	3 Years	5 Years
NYMEX WTI Crude Oil	**$45.09**	$59.47	$47.60	$91.16	$92.19	$79.97
ICE Brent Crude Oil	**$48.37**	$63.59	$55.11	$94.67	$112.39	$82.31
WCS Crude Oil	**$31.04**	$47.47	$35.05	$76.91	$80.69	$63.62
Henry Hub Nat. Gas	**$2.52**	$2.83	$2.64	$4.12	$3.32	$3.87
Alberta Nat. Gas	**$2.10**	$2.09	$2.12	$3.72	$2.20	$3.45
Wtd. Avg. $/kWh in U.S.	**N/A**	10.64	10.30	10.80	10.26	10.17
OPEC Prod. (Mbbls/d)	**N/A**	31.8M	31.1M	30.8M	30.9M	29.0M
U.S. Oil Imports (Mbbls/d)	**7.6M**[1]	7.3M	7.6M	7.5M	8.4M	9.2M
U.S. Gas Output (Bcf/d)	**89.5B**[2]	89.7B	91.1B	87.4B	80.3B	74.6B

Crude Oil Exchange Prices



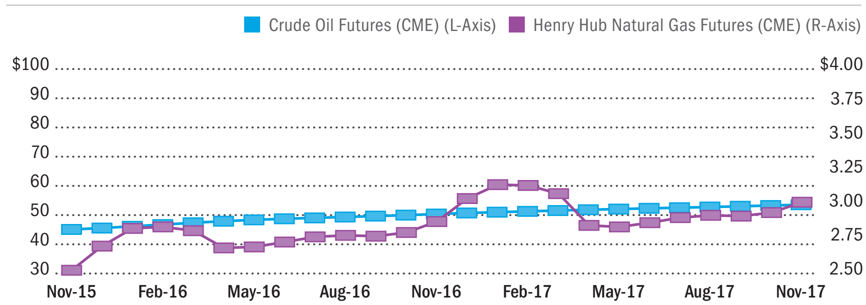
Source: Haver Analytics, TIAA-CREF analysis

U.S. Crude Oil Production



Source: Energy Information Administration, Haver Analytics

Futures Curve—Crude Oil & Natural Gas



Source: CME

[a] Brent Crude; [b] West Texas Intermediate
[1] Items are as of 8/31/15; [2] Items are as of 7/31/15

Market Review

- Core infrastructure assets with demonstrated downside protection continue to have strong demand as the universe of buyers expands.
- P3 activity in North America continues to develop. Most recently, the Virginia Department of Transportation issued an RFQ for the I-66 P3, which is provisionally budgeted at $2.1 bn. Also, a Meridiam-led consortium has been chosen to design, construct, operate and maintain a new LaGuardia airport terminal for a 35-year period. The estimated $3.6 bn project is currently the largest P3 bid in North America.
- Several core greenfield projects, such as the Lima subway in Peru and the St. Lawrence Bridge in Canada, reached financial close over the summer. Despite the success, the need for substantial government support in the form of subsidies and guarantees was evident to ensure private sector participation.
- Recent months have seen a number of North American midstream energy assets reach the market, primarily as a result of a number of 2006 vintage infrastructure funds moving closer to maturity and high expected valuations by sellers.
  - Morgan Stanley Infrastructure Partners agreed to sell Southern Star Central natural gas and storage network to Canadian institutional investor CDPQ and GE Energy.
  - GE Energy and Alinda Infrastructure Partners selected Black Hills as the preferred bidder for their gas distribution and storage company, SourceGas, in a $1.89 bn sale.
- The success of the Indiana Toll Road deal earlier this year demonstrated by IFM's $5.7 bn purchase price, the largest for an existing public asset in the U.S., has prompted the sale of additional U.S. transportation assets at premium prices, such as the Chicago Skyway and Pocahontas Parkway.
- About $38 bn of M&A transactions reached financial close in 2Q15 with $15 bn in Europe and $12 bn of Asian deals leading the way.
  - M&A activity in the airport sector has picked up. Recent closings and notable forthcoming sale launches are primarily located throughout Europe.
- PE fund flows for 3Q15 were above levels year-over-year. According to Preqin, eight funds closed and a total of $13 bn was raised compared to 16 funds closed and $10 bn raised in 3Q14.

Outlook

- Industry observers have noted the next six to 12 months will see more activity in the secondary M&A market than the primary P3 market.
- Decreased valuations of public MLPs and YieldCos may present potential opportunities for private investors.

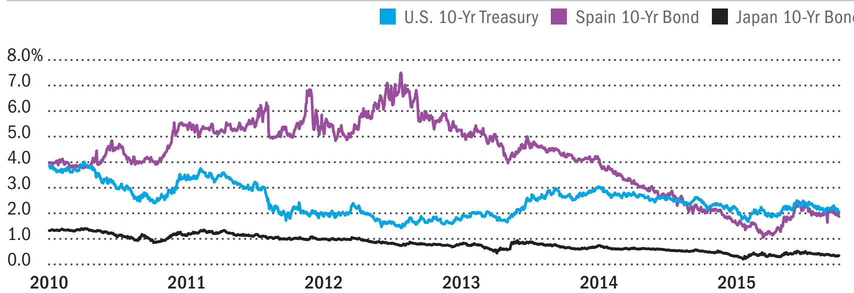
[1] Items are as of 8/31/15; [2] Items are as of 7/31/15

Key Market Metrics

	QTD	Previous QTD	6 Months	1 Year	3 Years	5 Years
U.S. Pop. Growth from '00	**13.5%**	13.2%	13.0%	12.4%	10.9%	9.3%
U.S. Inflation Rate (Y-o-Y)	**0.2%[1]**	0.1%	-0.1%	1.7%	2.0%	1.1%
Y-o-Y U.S. Real GDP Growth	**N/A**	0.0%	2.9%	2.9%	2.4%	3.1%
U.S. Deficit as % of GDP	**N/A**	2.1%	3.2%	3.0%	4.8%	8.5%
U.K. Deficit as % of GDP	**N/A**	2.0%	1.3%	3.5%	4.2%	5.2%
FTSE Utilities*	**429.9**	440.3	449.4	460.7	374.9	370.8
FTSE Constru./Manufact.*	**587.0**	646.7	646.7	645.8	488.1	477.8
U.S. Inv. Priv. Structures**	**N/A**	$504 bn	$499 bn	$505 bn	$453 bn	$361 bn
Freight Transport Index	**122.8[2]**	122.1	122.8	121.8	112.1	107.0

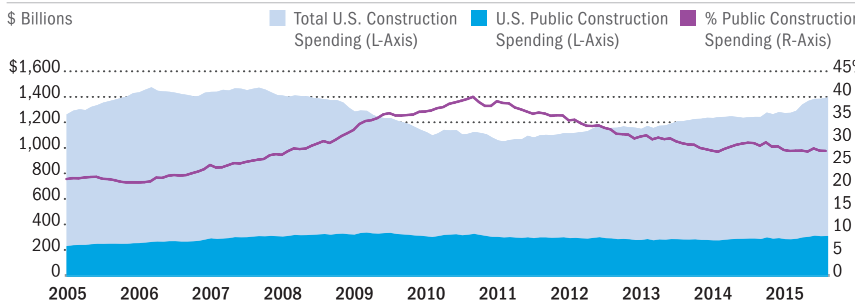
* Global, Total Return Index; ** Total investment ($) in non-residential structures in the U.S.

10-Year Benchmark Government Bond Yields by Country



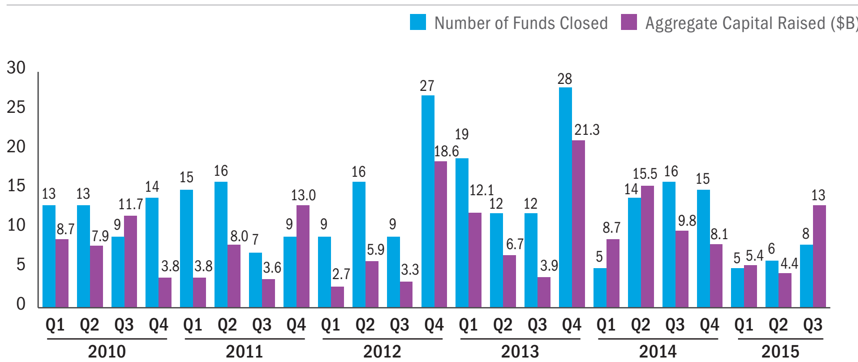
Source: U.S. Treasury, Banco de España, Ministry of Finance Japan, Haver Analytics

10-Year U.S. Construction Spending



Source: U.S. Census Bureau, Haver Analytics, TIAA-CREF analysis

Unlisted Infrastructure Fundraising by Year



Source: Preqin Infrastructure Spotlight

Timberland Market Overview

Market Review

- In general, timber prices softened in 3Q due to decreasing aggregate demand and excess inventories. While U.S. housing continues to improve, high standing supply and the softening of Chinese demand have kept downward pressure on prices. Nevertheless, some positive signs have appeared for timberland investors. In the U.S. South, pulp and log prices are slowly heading upwards. In addition, an improved job market, early signs of income growth, and rising builder's confidence in the U.S. are indicators of an expanding market for wood products over the longer term.
- U.S. housing data continues on an upward trend. For instance, housing starts approached a near eight-year high in July. In addition, new and existing home sales reached its highest level in eight years.
- During 3Q, Plum Creek sold 98,000 acres to Hancock in FL, while Murray Pacific sold 54,000 acres to Sierra Pacific in WA. Claw Forestry and Lyme are in the market with offerings of 107,000 and 234,000 acres, respectively. The closing of these latter transactions remains uncertain but the total year-to-date volume could surge to 2.3 mm acres and $4 bn, exceeding last year's total of 2.2 mm acres and $2.7 bn.

Outlook

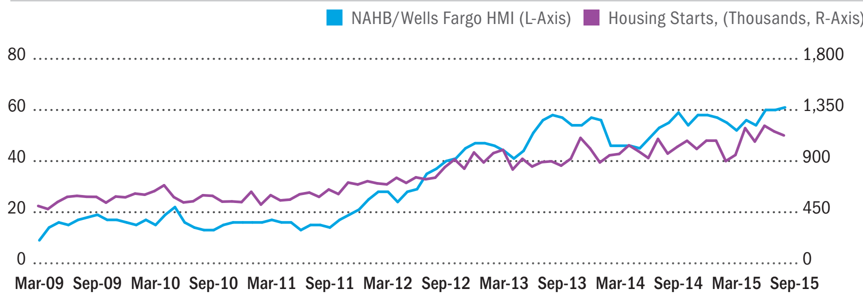
- The global timber dynamics are likely to remain demand constrained in the short term. Log and lumber volumes to China have decreased roughly 30% this year. However, the improvement in U.S. housing recovery will help buoy timber demand. In the long term, the significant Chinese deficit of timber, along with continued U.S. housing recovery, will drive global demand and production of wood products. A full price recovery is not expected in the near term.
- Plum Creek announced joint venture with several institutional investors with the objective of growing a $1 bn portfolio of U.S. timberlands. Foley's previously announced sale of 564,000 acres in northern Florida is now under contract to an unknown buyer.

Key Market Metrics

	QTD	Previous QTD	6 Months	1 Year	3 Years	5 Years
Total Res. Construction	**$390B[1]**	$383B	$364B	$343B	$301B	$242B
Housing Starts, SA (Vol)	**1,126k[1]**	1,211k	954k	1,026k	847k	594k
Building Permits (Vol)	**1,161k[1]**	1,337k	1,038k	1,053k	921k	563k
U.S. S. Sawtimber Index	**NA**	$25.6	$26.3	$25.1	$22.9	$28.2
CME Lumber ($/1,000BF)	**$229**	$288	$278	$333	$279	$227
NBSK U.S. Pulp Index	**$959**	$980	$980	$1,027	$832	$990
Paper & Paperboard Prod.*	**6,567k[1]**	6,534k	6,564k	6,698k	6,594k	7,006k
Industry Capacity Use (%)	**69%[1]**	68%	70%	71%	64%	56%
World Timber Index	**$916**	$1,083	$1,121	$979	$766	$727

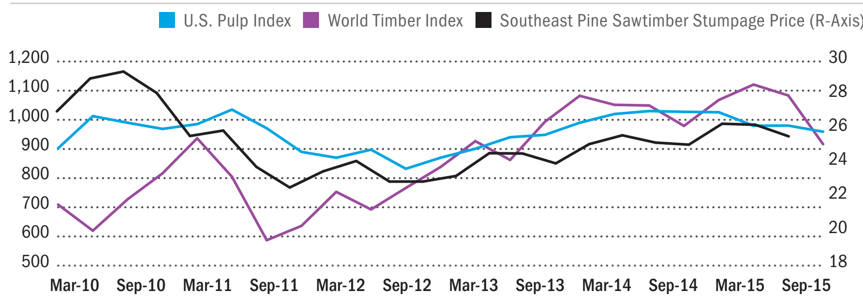
* U.S. Total Production, in Tons

Builder Confidence vs. Housing Starts



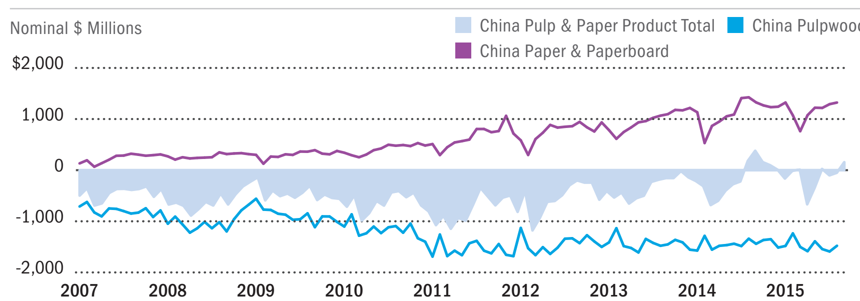
Source: Haver Analytics, TIAA Analysis

Timber-Related Indexes



Source: Bloomberg, TIAA Analysis

China Pulp & Paper Products Trade Balance



Source: Haver Analytics

[1] Items are as of 8/31/15

Agriculture Market Overview

Market Review

- Agri-commodity prices finished lower at the end of 3Q15 due to anticipated, near-record U.S. production, which exceeded early-season expectations. With steady demand, 2015 crop production is expected to add to inventories, thus maintaining high stocks-to-use ratios. Commodity futures reflect this dynamic, showing flat to modest growth over the next two years. Price volatility expected to continue over the short to medium term.
- Although U.S. farmer input prices are declining, albeit on a lagging basis, following the multi-year softening in agri-commodity prices, farmer margins in the U.S. Corn Belt have narrowed to break-even or unprofitable levels. Thus, U.S. rental rates for the 2016 crop year, which are undergoing negotiation at this time, are expected to decline on the back of continued softening of U.S. farmland values in 2016. Meanwhile, accelerated depreciation of the Brazilian real and Australian dollar, relative to most major trading currencies, has supported values and producer economics in Brazil and Australia.
- Weather conditions and continued drought in California were not conducive to strong production in the U.S. permanent crop space with almond, pistachio, and wine grape harvests indicating smaller crops year-on-year. However, strong consumer demand has kept prices high, which has supported overall profitability for growers and continued appreciation of land values more broadly.
- Varied crop and geographic performance demonstrates the importance of diversification for investors.

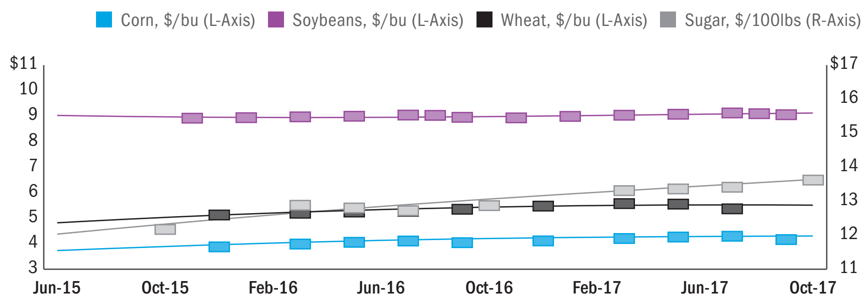
Outlook

- In its most recent forecast, the NOAA increased the probability to 95% of a strong El Niño weather pattern continuing through May 2016. If consistent with past El Niño events, drought stricken California may receive above-average rain and snowfall this winter, while Australian farmers may face increased water stress during the 2016 summer crop season.
- U.S. farmland markets remain competitive, particularly in the permanent crop space as investors hunt for higher returns. Softening land values in the primary U.S. grain and oilseeds regions may offer more compelling "buy" opportunities down the road. Currency depreciation in Australia and Brazil, along with legislation pending in Brazil that would ease foreign investment restrictions, is expected to be supportive to values and likely increase market interest.

Key Market Metrics

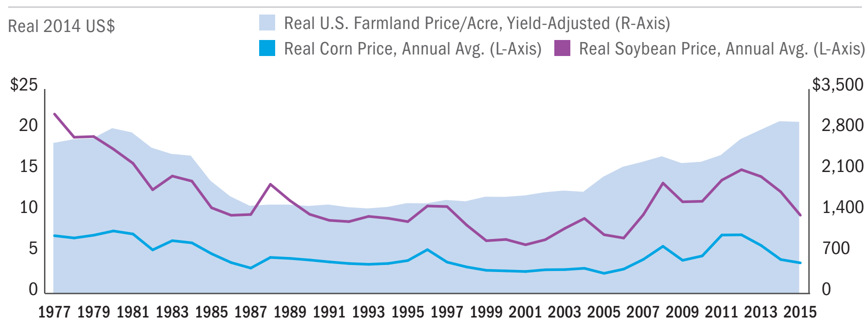
	QTD	Previous QTD	6 Months	1 Year	3 Years	5 Years
Corn ($/bu)	**$3.88**	$4.14	$3.76	$3.21	$7.56	$4.96
Soybeans ($/bu)	**$8.92**	$10.56	$9.73	$9.13	$16.01	$11.07
Wheat ($/bu)	**$5.13**	$6.15	$5.12	$4.78	$9.02	$6.74
Sugar ($/100 lbs)	**$12.17**	$12.28	$11.93	$15.48	$19.58	$25.30
Cotton ($/100 lbs)	**$59.49**	$67.51	$63.10	$61.96	$69.15	$104.18
Ethanol ($/gallon)	**$1.54**	$1.61	$1.49	$1.59	$2.34	$1.99
S&P GSCI Agri. Index	**282.8**	293.5	297.8	302.8	501.7	401.6
CRB Foodstuffs Index	**363.9**	377.7	346.8	423.2	452.8	427.1
FAO Food Price Index[1]	**155.7**	164.9	171.5	192.7	217.8	196.6
USDA Farmer Input Price Index[1]	**108**	109	110	112	105	90

Futures Curve—Key Agricultural Commodities



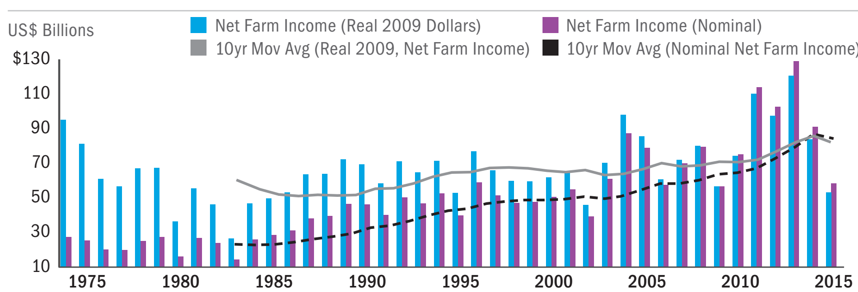
Source: Haver Analytics

Average Annual Crop Prices and Yield-Adjusted U.S. Farmland Values



Source: USDA, Haver Analytics, TIAA-CREF analysis

U.S. Annual Net Farm Income



Source: USDA ERS, TIAA-CREF analysis

[1] Items are as of 8/31/15

TIAA CREF
Financial Services

C27357

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