

MARKET INTELLIGENCE

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Oil Price Adjustments

Overview

A combination of global supply and demand issues have forced oil prices to decline dramatically. West Texas Intermediate crude oil prices are currently near \$30 per barrel. Prices may decline further as the market searches for a bottom. Some analysts suggest oil prices could drop below \$20 per barrel. Even at current levels, oil prices are well below the levels incorporated into PCA's fall forecast.

If oil prices stay near \$30 per barrel, or lower, several consequences to cement consumption could arise that would impact the fall forecast projections. First, lower oil prices may support higher consumer spending and overall economic growth. In the context of a stronger growth environment, a small and delayed positive impact on construction activity may materialize. Unfortunately, there are several powerful offsets to this positive potential impact. Oil well drilling, for example, will decline further than expected. Second, the adverse impact in oil producing regions on collateral construction such as housing, retail and infrastructure supporting the oil fields will be more severe than expected. Third, oil and gas junk bonds defaults will increase and raise risks attached to foreign sovereign debt – all potentially adversely impacting credit conditions.

This Flash Report briefly examines the consequences of lower than expected oil prices on cement consumption.

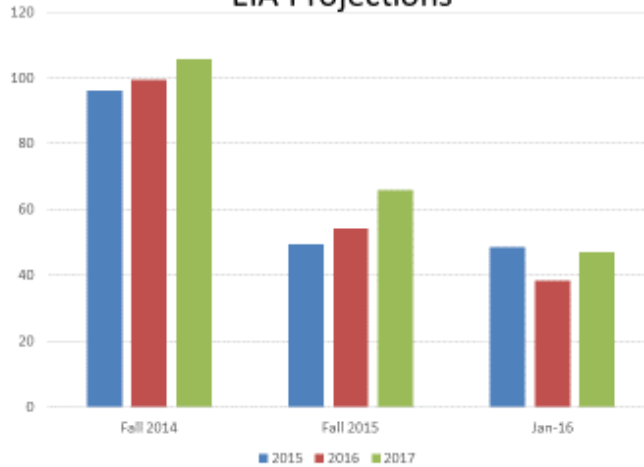
The Oil Price Outlook

The outlook for oil prices contains considerable uncertainty. Forecasting energy prices is a complex endeavor, and PCA relies on projections from the Energy Information Agency (EIA). At the time of the fall forecast, the EIA expected oil prices to average \$54 per barrel for West Texas Intermediate oil during 2016 and \$66 per barrel for 2017. Since then the EIA has reduced its forecast projections for West Texas Intermediate to \$38.54 per barrel in 2016 and \$47 per barrel in 2017 – representing a 29% reduction in oil price projections since the fall forecast.

Given the latest EIA projections, adjustments to the fall forecast are presented. Some suggest there is significant risk that even these revised EIA projections are too high and may be revised downward in future months. Such a development would require additional adjustments. Further reductions in EIA projections may be in the cards. Even with the foregoing adjustments, significant risk should be attached to the consequences associated with near-term oil price projections.

Oil Adjustments

EIA Projections



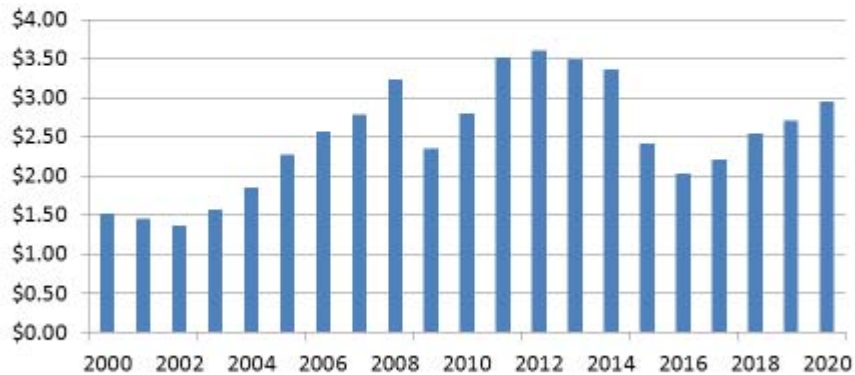
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Stronger Economic Activity

Lower oil prices results in lower inflation, cushions against interest rate increases, and adds to consumer spending. While there are adverse aspects to oil price decline among oil producing regions, those impacts are addressed in other sections of this report. Key mechanisms in which lower oil prices are transmitted into stronger economic activity comes from fuel cost savings for consumers, both on the road and for home heating.

Gasoline Prices

\$ Per Gallon, Unleaded, Nominal



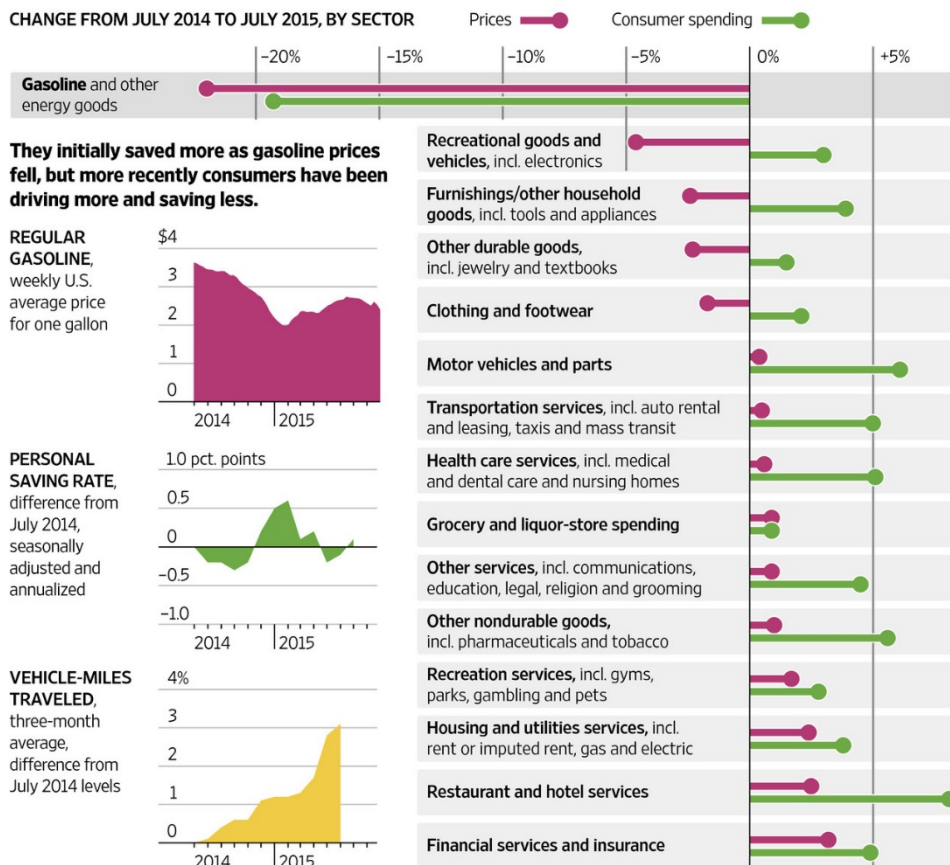
On average, each vehicle travels roughly 12,000 miles annually according to the Federal Highway Administration. Based on annual fuel consumption volumes, that translates into a miles per gallon average of 17.5 miles, or 685 gallons consumed per vehicle. There are 1.2 vehicles per licensed driver. That implies nearly 825 gallons per driver. Since there are 220 million drivers on the road, for every \$1 decline in gasoline prices at the pump translates into a savings of roughly \$180 billion. Given rough estimates on the national savings rate and the propensity to consume, this translates into \$165-\$170 billion extra consumption activity per one dollar decline at the pump.

After declining 95 cents in 2015, gasoline prices are expected to decline another 38 cents in 2016 before slowly rising thereafter according to EIA projections. By itself this implies that falling gasoline prices reduced consumer fuel payments roughly \$170 billion in 2015 and will reduce fuel payments by another \$68 billion in 2016. These dividends to consumers do not necessarily manifest themselves immediately. It often takes time for the extra cash to burn a hole in consumers' pockets. Some of the reduction in gasoline payments that occurred in 2015, therefore, will materialize during 2016. Some analysts also suggest that extra spending will be foregone and result in higher savings rates. In any case, the positive impacts of lower gasoline prices are very difficult to quantify due to timing lags.

Gas Tanked

Consumers have spent far less on gasoline over the past year as prices plunged, but have spread that windfall unevenly throughout the rest of the economy.

CHANGE FROM JULY 2014 TO JULY 2015, BY SECTOR



Note: All figures are adjusted for seasonality; sector prices calculated based on personal consumption expenditures price indexes. Sources: Commerce Dept. (prices, spending and saving); Transportation Dept. (miles); Energy Dept. (gas prices) THE WALL STREET JOURNAL.

Lower oil prices also results in declines in oil heating fuel. Roughly 6% of all homes rely on oil heat with most of the reliance centered in the Northeast. Lower projected crude oil prices this winter (2015-16) compared with last winter contribute to a reduction in the forecast residential heating oil price and average household heating oil expenditures. Households that use heating oil as a primary space heating fuel are expected to pay an average of \$2.17 per gallon this winter, 87 cents per gallon less than last winter. The average household is now expected to spend \$1,088 for heating oil this winter, \$763 less than last winter. The reduction in expenditures also reflects lower forecast consumption because warmer temperatures are forecast this winter compared with last winter.

PCA estimates that the decline in home heating prices during 2015 created a \$4 to \$5 billion windfall for homeowners using oil heat and \$2.1 billion in 2016, \$1.5 billion in 2017, \$1.0 billion in 2018 and \$600 million in 2019. Keep in mind, the decline in oil fuel prices will impact the price of competing fuels as well – amplifying the potential saving for homeowners is also expected to decline and reduce oil heating expenditures by nearly 35% or roughly \$639 per household during 2016.

Not only does lower oil prices imply consumer savings which then can be used to support higher spending activity, a 10% change in oil prices results in roughly a 1.5% inverse change in consumer sentiment. Stronger consumer confidence directly translates into stronger consumer spending.

Various analysts suggest that the oil price decline added between 20 to 40 basis points to the United States' economic growth during 2015 and is expected to add 10 basis points in 2016. Based on historical relationships between real GDP and cement consumption that implies an increase in cement consumption of 170,000 to 340,000 metric tons during 2015 and given EIA oil prices projections, roughly 70,000 to 140,000 metric tons in 2016.

There is little question that a stronger economic growth environment supports stronger cement consumption as lower oil prices impact the underlying construction fundamentals. Unfortunately, the transmission process from oil price declines to construction activity contains timing lags. It takes time for oil prices to impact consumer/business behavior, which in-turn impacts decisions to build. PCA believes, therefore, that little positive impact is accrued to cement consumption in 2015 or 2016 due to lower oil price.

Consider the following example: PCA estimates that lower oil prices could add roughly \$2 billion annually in travel and hotel expenditures during 2016. This translates into higher expected ROIs for these properties. Hotel occupancy rates reach 64.7% in 2015 and 65.9% in 2016 compared to fall forecast estimates of 63.1% and 64.6%. Room rates are projected to increase 4% in 2015 and 3.6% in 2016 compared against fall forecast of 3.6% and 3.4% respectively. The resulting higher net operating income lowers lending risks and enhances property valuation. This transmission process could eventually lead to increases in hotel construction. It is clear, however, that the process beginning from lower oil prices and resulting in construction increases is a long process and the impacts are somewhat diluted.

This example of the positive impact on the underlying construction fundamentals can be repeated again and again across nonresidential, residential sectors and public sectors.^{1, 2} The length of the time lag

¹ The decline in oil prices, for example, has a direct impact on fertilizer costs and the fundamentals facing farm construction. Fertilizer costs can account for as much as 30% of the costs for some agricultural products. As such, lower oil prices can serve as a boost to farm income. There is a tight correlation between farm income and farm construction activity. Unfortunately, the decline in oil prices occurred post planting season and offered little help to farmer. If oil prices remain low, 2015 farm income could receive boost and materialize in an increase in farm construction activity in 2016.

² As a further example, roughly one in five jobs are office jobs. Lower oil prices are expected to generate slightly stronger economic activity resulting in additional job creation. Of the 220,000 net total new jobs created by lower oil prices in 2015, roughly 45,000 are likely to be new office jobs. These increases result in marginal improvements in office vacancy rates – decreasing 2015 expected vacancy rates from 14.1% to 14.0%.

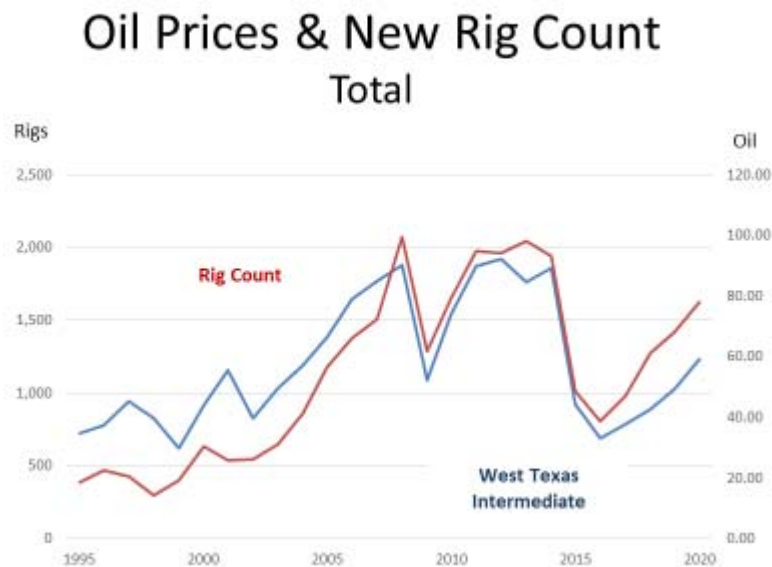
associated with the transmission processes varies depending on the type of construction undertaken which incorporates not only an impact assessment of the new economic environment on project ROIs, but also design, financing, and project procurement activity.

In addition to a timing lag between oil price changes and economic behavior, each construction project takes time. There is considerable variability in timing lags among the types of projects. PCA estimates the time lag between an increase in real GDP growth and residential construction is roughly 6 months. For nonresidential construction the transmission process is longer and the lag is estimated at 23 months. Finally, government construction lags changes in real GDP by 35 months. These are rough and broad estimates.

The key point being made is that little of the potentially positive impacts for construction activity resulting from lower oil prices will materialize in 2016. While the positive impacts for construction activity associated with the decline in oil prices may not occur immediately and may be relatively muted, the negative impacts could be more substantial and are likely to occur more quickly.

Direct Oil Well Cement Impacts

Oil well cement consumption is dependent on new drilling activity. With oil prices falling below \$40 per barrel during December 2015, and projected to remain below that level through 2016, oil production is expected to decline in United States' oil production regions. The expectation of reduced cash flows in 2016 and 2017 has prompted many companies to scale back investment programs, deferring major new undertakings until a sustained price recovery occurs. In this context, the availability of capital for many smaller producers may be severely diminished - giving rise to distressed asset sales and consolidation of acreage holdings by more financially sound firms.

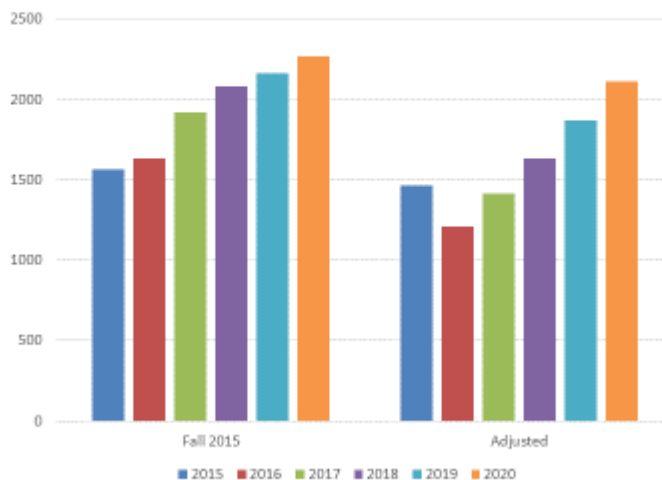


PCA expects regional differences in oil well cement consumption declines. In the shale arena, for example, there are seven major regions in the United States including the Bakken, Niobrara, Permian, Eagle Ford, Haynesville, Utica and Marcellus regions. Within each region, there are different qualities of shale and processes used to drill resulting in a wide variability in breakeven cost points among and within and among drilling regions.

Despite the expected decline in total rig counts nationally, rig counts have largely stabilized in the core counties of the Bakken, Eagle Ford, Niobrara, and Permian. In these areas, falling costs and ongoing technological and process improvements in rig, labor, and well productivity are anticipated to lead to faster rates of well completions and less-rapid production declines relative to other Lower 48 onshore areas.

All totaled, the retrenchment in onshore investment is anticipated to push down the count of oil-directed rigs and well completions in 2016 and 2017 below current levels. While preliminary, rig count completions are expected to decline to a level below 700 in 2016 which reflects roughly a 20% decline from depressed 2015 levels. All totaled, 2016 rig count is expected to be roughly 60% lower than 2014 levels. Even though an increase in drilling activity is expected in 2017, rig count activity will remain 50% below 2014 levels. Based on historical rig count cement intensities, this implies that oil well cement declined by more than 1.5 million metric tons in 2015 and an additional 250,000 ton decline, or more, would be expected in 2016 before modest increases materialize in 2017 and beyond. Keep in mind that lower oil prices are now expected to materialize throughout the forecast horizon and while not necessarily apparent in growth rates, cement volumes attached to oil well drilling are also lower throughout the forecast horizon.

Oil Well Cement Consumption 000 Metric Tons



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Downstream & Upstream Impacts on Cement Consumption

During 2015 direct oil and gas extraction jobs declined by 60,000. Applying a labor multiplier of 3.5 to account for up/downstream job losses implies the potential total loss of more than 200,000 jobs (some recent research estimates the labor multiplier much higher). The potential of oil prices stabilizing at \$30 per barrel or lower, and associated drilling reductions, implies that further job losses could materialize in 2016, and possibly 2017.

PCA estimates for every one ton of oil well cement lost from reduced drilling activity, 2.9 tons of cement consumption is lost from coincidental energy production construction. This adverse impact is greater in economies less diverse (in South Dakota the ratio is 5 to 1), and less severe in economies that enjoy a more diverse economic base (in Texas the ratio is 1.9 to 1). Given the continued deterioration in oil prices, the marginal adverse impact on collateral cement consumption could be much smaller in 2016 and 2017.

Oil Impact on Finances

The decline in oil prices has financial consequences. First, low oil prices impairs oil companies' revenue stream and if the declines are severe and sustained, could erode highly leveraged oil companies' ability to service debt. From 2010 to 2015, U.S. oil companies took out about \$247 billion in high-yield debt to fuel the shale oil boom. Bankruptcies in the United States' oil arena have increased dramatically. Many companies hedged against price declines, but this revenue is non-recurring and will run-off, thus potentially affecting future operating cash flows and long-term loan serviceability. Defaults as a result are expected to accelerate in 2016 and 2017 given the EIA's latest oil price projections. According to the Office of the Comptroller of the Currency, roughly 50% of all loans to highly leveraged oil companies (typically smaller firms) are in risk of default. Among the major banks raising red flags about the health of the loans are Wells Fargo, Bank of America and JPMorgan Chase. Some banks are renegotiating their credit lines to gas and oil companies, while others are cutting credit lines to oil and gas firms and are requiring more collateral to protect against the surge of defaults. All totaled this translates into as high as \$150 billion in defaults. Such large losses could trigger a modest credit retrenchment that impacts all types of borrowing.

The potential impact of oil loan defaults impact on credit conditions could be amplified from the run down revenue collections by key oil producing countries. Roughly 75% of the Nigerian government revenue collections are accrued to oil revenues – similarly, for Russia its 50% and Venezuela 40%. Many key Middle Eastern countries are also dependent. These countries will be forced to reduce central bank reserves or cash-in previously earned petrodollar reserves or to cut back on government spending programs. In many cases important domestic and foreign spending projects cannot be easily reduced without significantly adverse consequences. While sovereign defaults are unlikely, risk premiums could increase. The combination of lower-for-longer oil and higher real rates could be toxic for corporate credit and emerging markets.