Regional Analysis

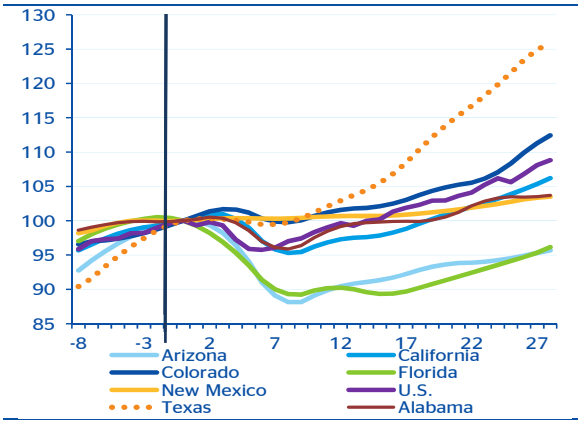
Texas Economy Parries Oil Price Blow, Looking To Avoid Knockout From Abroad

Boyd Nash-Stacey

- **Texas avoids resource-based recession in 2015, returning to potential in 2017**
- **Timing of impact on Texas economy pushed outward to 2016, due to discordant shocks to manufacturing sector and oil & gas industry**
- **Post-crisis impetus to reduce systemic risks in the financial sector lowers probability of tail-risk scenario for Texas economy**
- **Transformational drilling technologies in Oil & Gas sector and structural advantages underscore the long-run viability of Texas**

In the post-crisis period, the Texas growth miracle seemed as if it would never end. Labor markets were improving at a breakneck pace, losses in output due to the crisis were recouped in two years (U.S.: 14 quarters), home prices recovered to pre-crisis levels within a year of the initial shock and attractive financing terms and strong population inflows supported healthy non-residential investment. As a result, Texas is one of three states to have returned to above its pre-crisis trend growth potential. However, as headwinds in the Oil & Gas (O&G) sector strengthened and global growth outlook began to tilt to the downside, fears that Texas could be at risk of slipping into recession surfaced. In fact, leading indicators such as initial jobless claims in Texas, have climbed 18.6% from post-crisis lows in October 2014, and are diverging from the U.S. trend, which is close to 2000 lows.

Chart 1
Recovery in Real GDP From Crisis(4Q2007=100)



Source: BBVA Research & Haver Analytics

Prior to the bottom falling out of oil prices last year, we identified key risks that Texas would face under multiple demand and supply oil price scenarios.[1] Since then, global growth has fell short of last year's expectations, weakening demand-side conditions in the oil market, while competition amongst major producers and diverging geopolitics has led to a surge in production, resulting in an unprecedented build-up in inventories. These conditions implied Texas growth would be ~5 percentage points lower in 2015 and 2016.

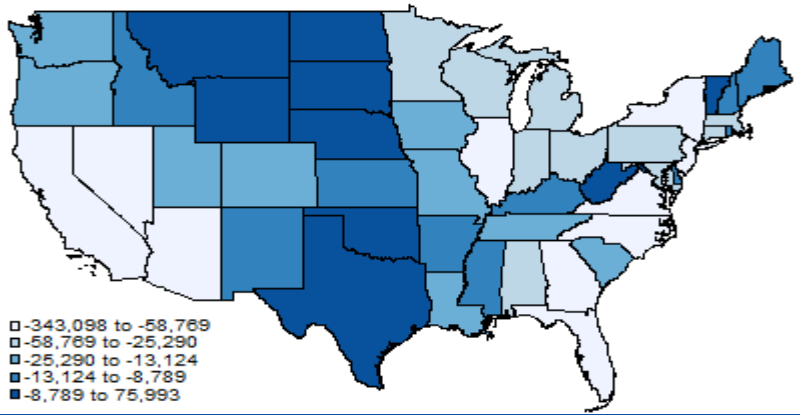
However, the broader and more pressing questions is how much the rise in global uncertainty, and shifts in global growth fundamentals– China's transition to a consumer-based economy, normalization of Federal Reserve Policy and debt overhang in emerging markets– weaken the outlook for Texas; taken together, these factors have led to a persistent strengthening of the dollar, which has eroded the competitiveness of Texas

[1] https://www.bbvaresearch.com/en/publicaciones/rekindling-old-ties-a-closer-look-into-what-risks-lie-ahead-for-texas-if-oil-prices-collapse/

goods, particularly in the tradables sector. Similarly, the strong dollar and lower upside globally has, and will, continue to weigh on U.S. growth. However, since the 1970s there has been no period in which Texas has been more independent than since 2008.[2]

Ultimately, in spite of these headwinds, we maintain our expectation that Texas avoided recession in 2015, gradually returning to long-run trend growth in 2017. Three factors underlie this outlook. First, the discordant timing of the impact from a strengthening dollar and languid slowdown in the mining sector is a significant factor in our positive medium-term outlook. If these shocks occurred concurrently there would be a higher probability that Texas would enter recession–negative annual growth. Moreover, the impact of a strengthening dollar is also likely to fade as the pace of dollar strengthening slows, easing pressures in the manufacturing sector. Second, the structure of the Oil and Gas (O&G) industry has evolved to one that is more flexible and innovative, reducing the probability of prolonged hardship. Similarly, Texas' reliance on oil production for economic growth, while rising during the recent shale boom, remains well below previous peaks. Third, underlying systemic risks to the financial sector from pressures on credit quality in the O&G sector are less acute and regionally concentrated, as a result of lower risk appetite in the post-crisis period and a more cautious lending environment.

Map 1
Output Gap (Millions 2009$)



Source: BBVA Research & Haver Analytics

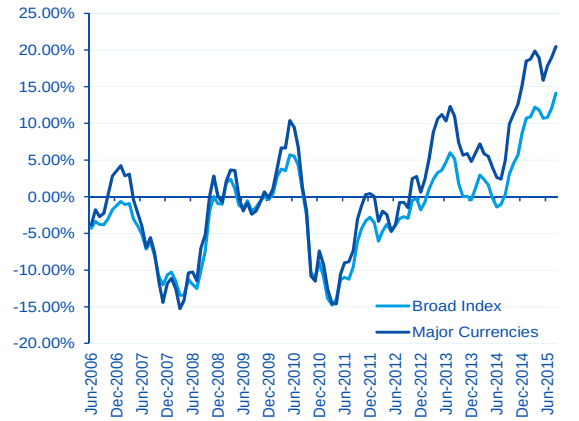
Ultimately, short-term factors related to the current commodity price and global growth cycles will fade, again bringing to the forefront Texas' true value as a global leader in growth and innovation.

Texas Not Immune To Dollar Strengthening

A historically strong dollar, driven by the slowing Chinese super-cycle, a downshift in global growth and dovish ECB has intensified headwinds generated by low oil prices, pushing down exports of both manufactured and non-manufactured good in Texas. To date the size and breadth of the appreciation has been staggering. In real terms, the U.S. dollar appreciated 20.5% against major currencies and 14.1% against a broader index of currencies, the fastest appreciation in over 18 years. Moreover, the strong appreciation pushed both indexes to decade's high levels. Nevertheless, a steep decline in the petroleum deficit as a share of the total trade balance has weakened the link between oil prices and exchange rates, implying global demand and divergent monetary policies are driving the appreciation.

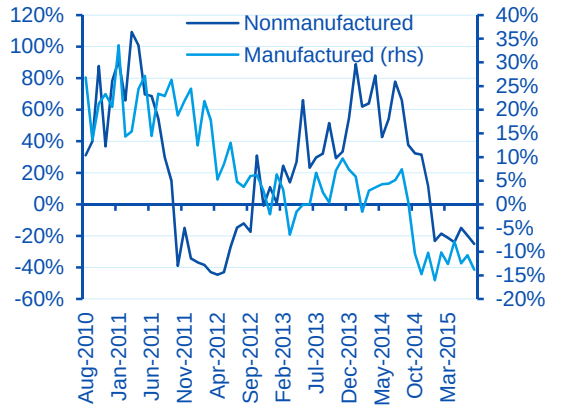
[2] Results are based restricted regressions, which measure the impact that U.S. trend and cycle growth has on Texas. Controls for oil price fluctuations, interest rates and home prices were included. Interestingly, during the current period (2008-current), interest rates and oil prices are having the most significant and largest impact on Texas growth (1977-current).

Chart 2
Real Exchange Rates (year-over-year %)



Source: BBVA Research & Haver Analytics

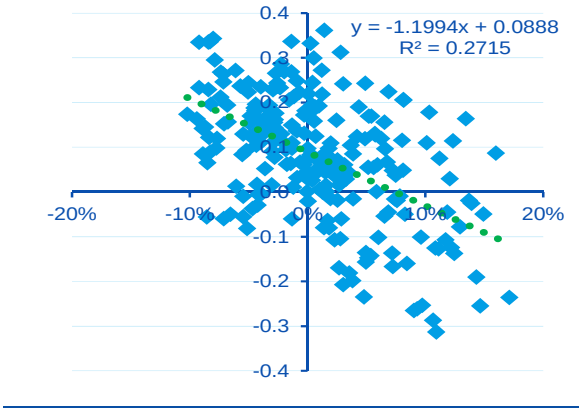
Chart 3
Texas Exports (year-over-year %)



Source: BBVA Research & Haver Analytics

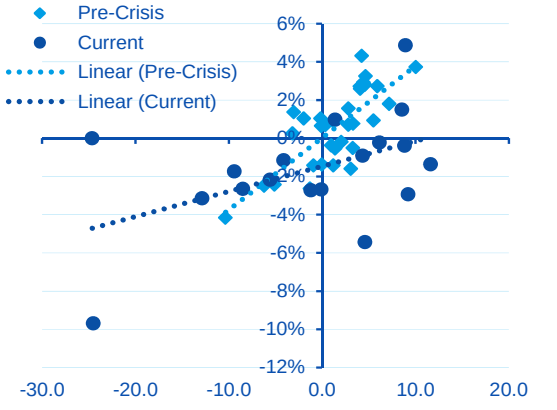
Broadly speaking, global growth and exchange rates have a limited impact Texas overall growth and employment. In fact, neither global growth nor exchange rates significantly impact either Texas employment or growth. Moreover, this relationship holds in the post-crisis period, which underlies Texas' industry diversity. However, export sensitive sectors and manufacturing employment have felt the pinch from slower global growth and a strong dollar.

Chart 4
Broad Weight Exchange Rate & Texas Manufactured Exports (year-over-year %)



Source: BBVA Research & Haver Analytics

Chart 5
U.S. Petroleum Current Account Deficit and Oil Prices (change, % change)



Source: BBVA Research & Haver Analytics

On average, a one percent increase in the nominal broad index exchanged rate is associated with a two percent reduction in Texas manufactured exports. This implies manufactured exports, which make up a significant share of total exports, are likely to continue to decline over the 2H15, gradually returning to positive territory in 2016. Although non-manufactured goods comprise only ~10% of total goods exported, they are more sensitive to U.S. exchange rates, declining 25% since mid-year 2014; this compares with a 13.8% year-over-year drop in manufactured goods. In total, Texas exports are $1bn lower than they were at year-end 2014.

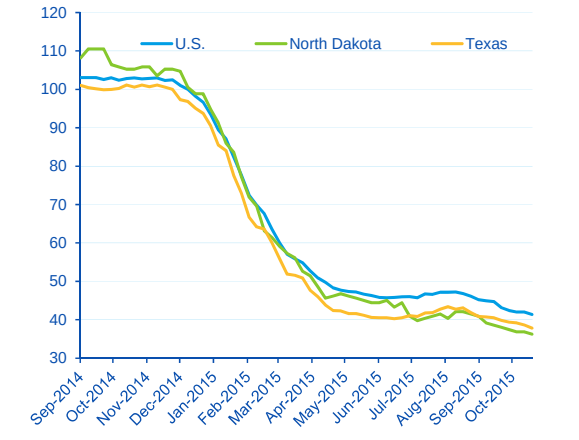
The pullback in exports dampens the labor market outlook for Texas' manufacturing sector. Prior to the strong appreciation in the dollar in the 2H14, Texas' manufacturing sector added 80K jobs or ~10% of all jobs added in the manufacturing sector in the U.S. Taken together, in 2015, the manufacturing sector has given back nearly 50% of all the jobs added in post-crisis period (36.1K), with a bulk of the losses occurring in two major MSAs– Houston (11.7K) and Dallas (6.4K). Employment in export-sensitive manufacturing sector such as petroleum & coal manufacturing, machinery manufacturing and manufactured transportation equipment have declined by 5.6% year-over-year due to the large dollar-denominated drop in Texas export volumes. However, historically exchange rate movements explain ~30% of the variation in the changes employment in these categories– largest impact occurs 6 months after initial shock to exchange rates.

Headwinds in the manufacturing sector can also be attributed to reduced investment in manufactured goods used in traditional and unconventional drilling. In fact, oil prices explain an additional fourth of the contraction in these exchange rate sensitive sectors. Texas' manufacturing sector benefited greatly from technology-based shale revolution, as the sector surpassed wholesale trade and professional scientific & technical services to become the 4th most productive sector in Texas and third most productive manufacturing workforce in the country. During this period, manufacturing worker productivity climbed 12% at a time when U.S. labor, capital and multi-factor productivity is slowing.

On Less Explicit Terms, Texas Remains Susceptible To Oil Price Fluctuations

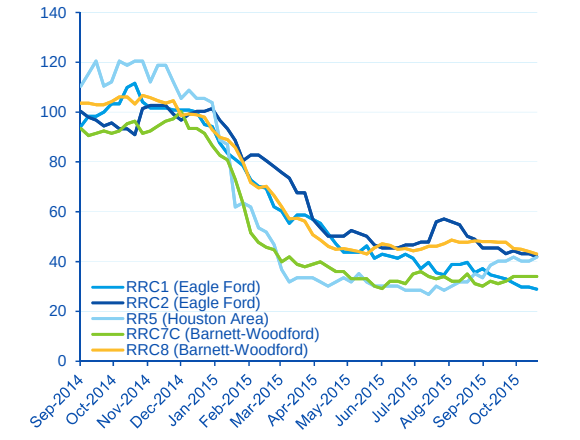
It is impossible to evaluate the outlook for Texas without understanding the implications that the drop in oil prices has for the Oil & Gas sector, which is trending towards the preeminence it showed prior to the 1980s. In fact, in the 90s, crude oil production accounted for between 1-4% of real GDP growth on an annual basis. In 2014, however, oil production accounted for 6.1% rising from 2.6% in 2009. Moreover, in terms of contributions to the labor force, the mining sector accounted for nearly 10% of the jobs created since 2010 whereas in the 1990s the mining sector was contracting at an annual pace of two percent.[3]

Chart 6
Active Rig Counts (Index, Jul-2014=100)



Source: BBVA Research & Haver Analytics

Chart 7
Texas Active Rig Counts (Index, Jul-2014=100)



Source: BBVA Research & Haver Analytics

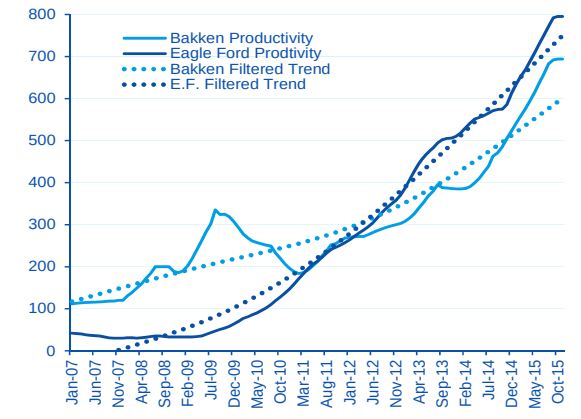
[3] For the purposes of this analysis we will focus primarily on oil production and activity, as production on natural gas in dollar terms represents less than two-tenths of one percent of Texas economic output.

Rising uncertainty and the low price outlook is already impacting the exploration and drilling activity. However, a shift towards a more efficient model for existing projects has led to a divergence between drilling activity and production. Last year we identified a nearly one-to-one relationship between oil prices and rig activity.[4] Rig activity, which is a good proxy of activity in the oil & gas sector, was also shown to operate on a one and two quarter lag with price changes. In line with our expectations, the observed ~50-60% drop in West Texas Intermediate (WTI) prices translated into an equally large drop in the number of active rigs in Texas. In fact, through April 2015, the number of the active rigs in Texas declined by 54 percent, while activity in U.S. and North Dakota declined 50 percent and 56 percent, respectively. This drop in activity was largely consistent across shale formations and inland drilling areas (ex. Alaska).

To date, the drop in rig activity has had only minimal impact on production, as unconventional (horizontal and shale) oil production have changed the production function of U.S. drilling. Multi-PAD drilling, faster completion rates, higher success rates in drilling technologies, financial incentives from expiring hedges and incentives to buoy cash flows added to the impetus to boost productivity in the short-run. In fact, these factors together increased production by 274K bpd in the U.S. and 145K bpd in Texas bring both to peak levels of 9.6 million bpd 4 million bpd in June and July, respectively.

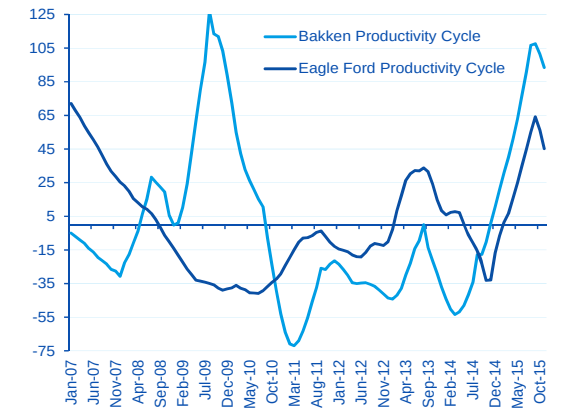
Since peak production levels this summer overall production remains at historically high levels for Texas and only slightly lower than the previous peak for the U.S. in the 1970s (9.6million bpd vs. 9.2 million bpd). This trend is consistent with our view that production levels will be resilient in the short-to-medium run.[5] However, much of the industry will face growing financial and technological pressures from the expiration of existing hedges, which accounted for 15% of 1Q15 revenue or $3.7bn. Also, existing excess capacity will likely be exhausted with new exploration activity declining.[6] Decomposing productivity into its trend (technological change in shale drilling) and cycle shows that previous impetus to boost productivity may be waning. In fact, the observed cycle component underlying productivity, estimated using a Hodrick-Prescott (HP) filter shows this that the cyclical expansion is slowing while the underlying trend continues to increase. This implies downside risks to output going forward, as production in 4Q15 is averaging 200K barrels per day less per day than in 3Q15.

Chart 8
Shale Basin Productivity (Bpd per rig)



Source: BBVA Research & Haver Analytics

Chart 9
Shale Productivity Cycle (Bpd per new rig)

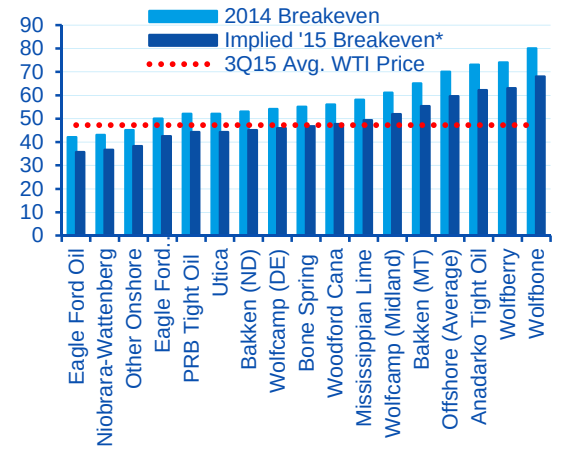


Source: BBVA Research & Haver Analytics

[4] https://www.bbvaresearch.com/wp-content/uploads/2014/11/141112_US_EW_TexasOilPriceShock1.pdf https://www.bbvaresearch.com/wp-content/uploads/2015/05/150521_US_EW_CrudeOilProduction.pdf
[5] https://www.bbvaresearch.com/wp-content/uploads/2015/05/150521_US_EW_CrudeOilProduction.pdf
[6] http://www.bloomberg.com/news/articles/2015-07-01/shale-driller-losing-their-insurance-against-price-drops

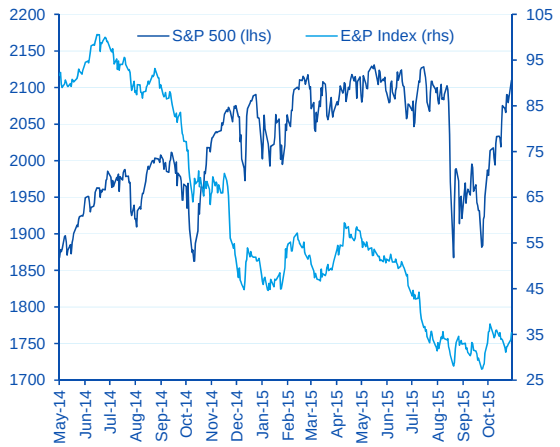
Despite the downside risk to exploration based on current price-levels, it is important to highlight the dynamic nature of breakeven pricing and the fact that industry-wide pressures on service providers and lower cost of energy inputs and other commodities will result in across-the-board reductions in breakeven prices. For example, some estimates suggest that industry-wide cost cutting has resulted in close to $20/bbl reduction in cash flow breakevens.[7] Assuming more modest cost savings of 15% suggests that based on 2014 breakeven prices, wells in the Eagle Ford, Niobrara, conventional onshore, PRB Tight oil, Utica and North Dakota Bakken will remain economic at average 3Q15 WTI prices of 47.2 $/barrel. However, the reduced time to well completion and quicker payback could result in more aggressive pullback (volatility) in shale plays and tight oil investment and exploration.[8]

Chart 10
Breakeven Prices for Major Shale Plays



Source: BBVA Research & Haver Analytics

Chart 11
S&P 500 & E&P Equity Price Indexes



Source: BBVA Research & Haver Analytics

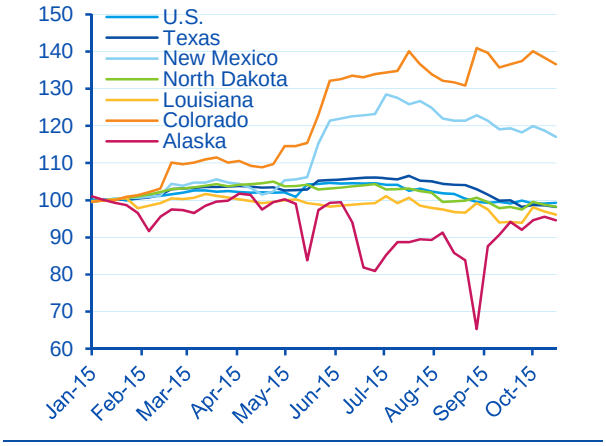
Moreover, some estimates suggest that more than $1.5Tr in current projects are uneconomic at current prices and as a result firms will have to find additional savings beyond the renegotiated terms with service providers that stand to offset only half of required 20-30% reduction in average drilling costs.[9] The fact that many of the major Texas basins are profitable at current averages suggests that the state will likely maintain its comparative advantage over other domestic producers. However, because the average drilling costs are at are only slightly below quarterly averages, and that globally Texas drillers are not competitive with Middle Eastern producers, suggests there is little room to the downside for producers.

In terms of investment, real private investment in Mining, Exploration, Shafts and Wells has declined 35.3% from current peaks in 4Q14. Based on our analysis the drop in real investment is twofold, owing to both price fluctuations and oil price uncertainty. However, a strong proxy for uncertainty, the current 30-day crude oil price volatility (OVX), remains well below previous peaks, and is thus not a major factor contributing to the current drop in prices (<1%). Assuming WTI prices remain close to current levels (consistent with our baseline), the drop in real private investment should stabilized near current investment amounts of seasonally adjusted annual rates of $85Bn per quarter – in line with the long-run average. However, further downward pressure on prices or

[7] http://www.woodmac.com/public/media-centre/12527236?filter_type=all
[8] http://www.rystadenergy.com/AboutUs/NewsCenter/Newsletters/UsArchive/us-q1-2015
[9] http://www.woodmac.com/public/media-centre/12529325

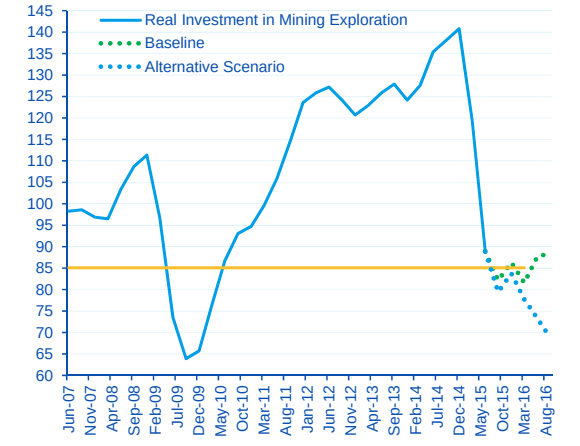
renewed uncertainty about global crude oil supplies or global growth could push investment to levels not seen prior to 2008 (alternative scenario). The fact that Texas accounts for nearly 40% of all U.S. crude oil production implies that a non-trivial share of the investment pullback will likely occur in Texas.

Chart 12
Crude Oil Production by State (Index, Jan-2015=100)



Source: BBVA Research & Haver Analytics

Chart 13
Real Investment in Exploration/Shafts/Wells (billions of 2009$, change)



Source: BBVA Research & Haver Analytics

In terms of financial pressures, valuations of exploration and production (E&P) companies have also suffered amidst low oil prices, with industry-wide valuations dipping 10pp below overall price levels (~60% decline). This likely underlies renewed markets expectations for lasting reductions in E&P investment and profitability, but also highlights the uncertainty surrounding domestic shale producers.

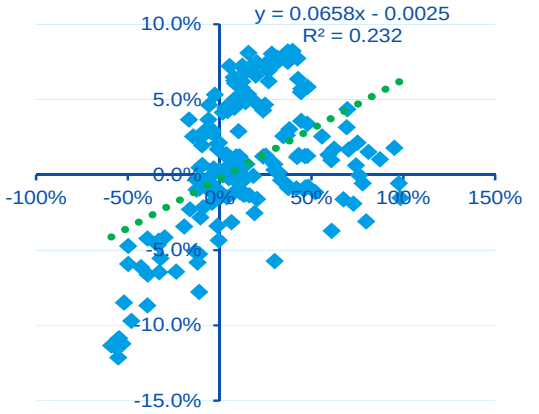
Employment in the mining sector has also suffered amidst slowing exploration activity and high degrees of uncertainty. In fact, Oil & Gas extraction and mining support services employment has contracted 1.9K and 21.2K, respectively as a renewed pessimism in the outlook for global demand and refusal from OPEC to cut production has led to layoffs by major oil and gas firms and a slowing of projected capital expenditure and drilling activity. Our estimate suggests that the response of mining employment to rig activity is 10-to-3, meaning that a 10% drop in drilling rig activity is associated with a 3% reduction in mining sector employment. Based on our outlook for investment and drilling activity, our expectations are for direct mining sector employment losses of 70-95K, of which 70% will occur in 2015 (60K). This implies a 20% year-over-year decline by year-end 2015 and 5.9% year-over-year decline in 2016.

Adding to the nearly 29K job losses in the mining sector are declines and stagnant growth in manufacturing sectors closely tied O&G such as petroleum and coal manufacturing, primary metal manufacturing and nonmetallic manufacturing. Looking forward, nearly half of all second order effects (indirect and induced) will occur in sectors such as manufacturing, utilities and transportation.[10] Although these sectors represent a small share of total employment in Texas (3.7% of private sector employment in Texas), the fact that they tend to be high-value added sectors, for which wages are higher, underlies the magnitude of the second order effects. There bright spots in this outlook as some of the impacts will be net positive, as sectors such as utilities and

[10] Petroleum and coal products manufacturing, Nonmetallic mineral product manufacturing, Chemical manufacturing, Truck transportation, Pipeline transportation, Primary metal manufacturing

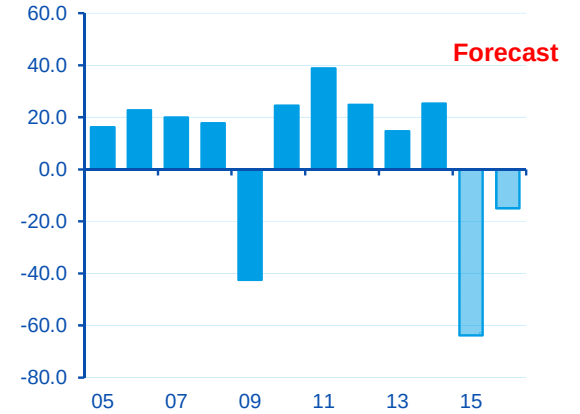
transportation are energy-intensive industries, and are thus more reliant on energy as inputs to production, suggesting they stand to be the largest beneficiaries of the decline in energy prices. In fact, for air transportation, for a given unit of output, 22.6% of inputs are devoted to energy. In today's current low energy price environment, growth and profitability in these sectors will help ease pressures on energy investment and exploration, and drop in mining employment in Texas.

Chart 14
Oil Prices & Energy Related Manufacturing Employment* (year-over-year %)



Source: BBVA Research

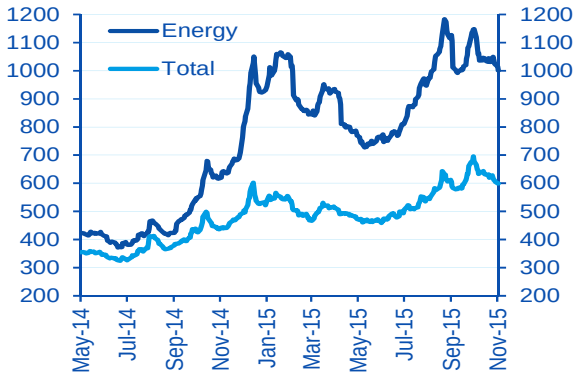
Chart 15
Texas Mining Employment (year-over-year, K)



Source: BBVA Research

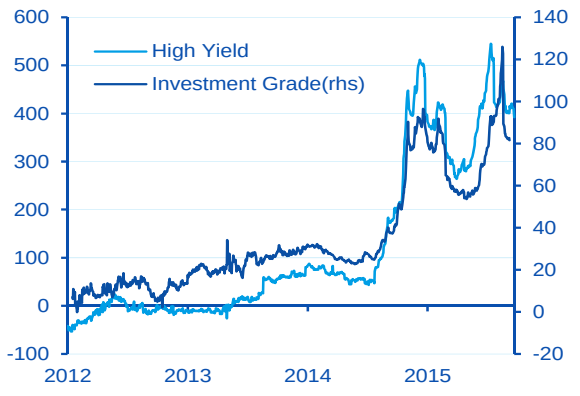
Texas Financial Sector Prepared for Commodity Price Cycle

Chart 16
High Yield Option Adjusted Spreads (bp)



Source: BBVA Research & Haver Analytics

Chart 17
Energy Companies Interest Rate Premium (bp)



Source: BBVA Research & Haver Analytics

In terms of systemic risk to the banking sector, the results from a special questionnaire in the Federal Reserve Board (FRB) Senior Loan Officer and the fact that the U.S. financial sector has undergone a structural transformation in its approach to systemic risk seem to suggest risks are manageable. In fact, 70.6% of respondents said it was somewhat-to-very important to tighten underwriting standards in the energy sector while 80.4% said it was somewhat-to-very important to reduce the size of existing lines of credit. Furthermore, 82.3% of respondents said it was somewhat-to-very important to restructure outstanding loans; although, none of the

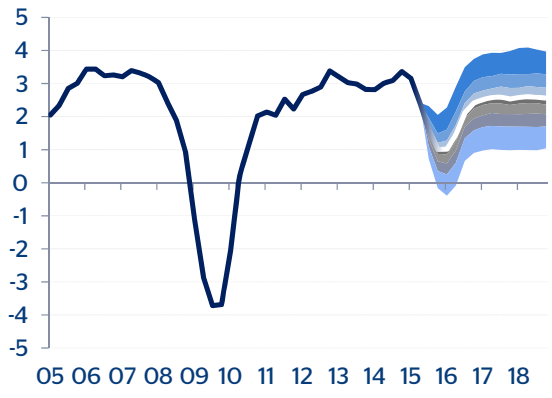
respondents expected credit quality to deteriorate substantially and only 4 percent reported having between 20-30% of their loans on their books to oil and natural gas drilling firms.[11] A more reluctant lending environment and impetus from the Federal Reserve to reduce systemic risks through regulation likely reinforced post-crisis risk aversion.[12]

Signs such as lower valuations, tighter lending conditions and less favorable borrowing terms do, however, suggest markets and banks are preparing for increased credit risk within the E&P sector. In terms of option-adjusted spreads, high yield energy firm's borrowing costs have increased 700bp since July 2014 and require compensation 400 times than the high-yield average. Moreover, investment grade borrowing costs have also risen 250% above July 2014 levels and similarly require compensation of over 100bp other investment grade products. This is a staggering rise in both categories considering that borrowing cost for the energy sector were at parity or even bellow market borrowing costs less than two years ago.

Texas Economy Down, But Not Out

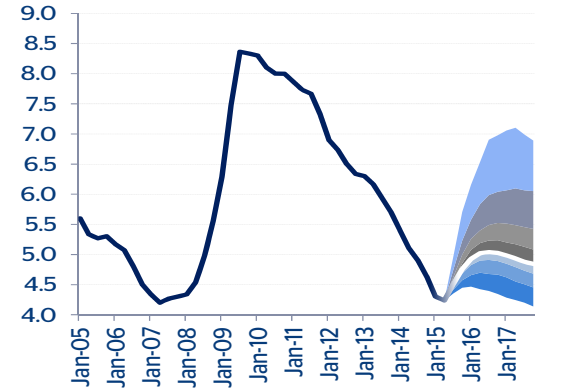
After assessing the impact that oil has had to date, and medium-to-longer term trends in the Oil & Gas sector, we maintain our medium-term outlook for slower, but positive growth–no recession. Notwithstanding the obvious short-term risks to economic conditions are medium-run risks to labor markets and real estate prices, and overall economic growth. As important as the direct impact of low oil prices, are the broader implications for sub-sectors of the Texas economy. Incorporating these factors and the weakness in the manufacturing sector, the pace of job creation will be 208K-241K less in 2015 and 138K-161K less in 2016. Although this represents a non-trivial share of net job losses, it still implies positive employment growth in 2015 and 2016. Specifically, we expect year-over-year employment growth to be 0.2% by year-end 2015 and 2.0% by year-end 2016.

Chart 18
Texas Nonfarm Payroll Outlook (year-over-year %)



Source: BBVA Research

Chart 19
Texas Unemployment Rate Scenarios (%)



Source: BBVA Research

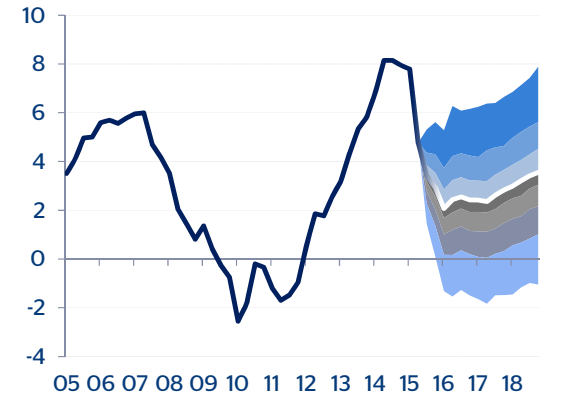
The pass-through from lower employment growth will put upward pressure on unemployment rates in Texas. In terms of the unemployment rate, our baseline is for average rates of 4.3% by year-end 2015 and 4.8% in 2016, with risks of the unemployment rate rising above 7% in the 2016 The major risk to unemployment relates to any further deterioration in oil prices or a slow transition from oil field services to other goods-based sectors such as

[11] http://www.federalreserve.gov/BoardDocs/snloansurvey/201502/default.htm
[12] Overheating in Credit Markets: Origins, Measurement, and Policy Responses Remarks by Jeremy C. Stein Board of Governors Federal Reserve System

manufacturing or construction. The fact that oil prices are likely to remain low for the foreseeable future and the negative effects of a higher dollar environment suggest that transition may not be smooth for medium-to-low skilled worker previously employed in the mining sector. However, the risk of rates rising above 7% is low (less than 5%), and even still, in this low-probability scenario rates would be 1.2pp less than rates observed during the 2009 crisis.

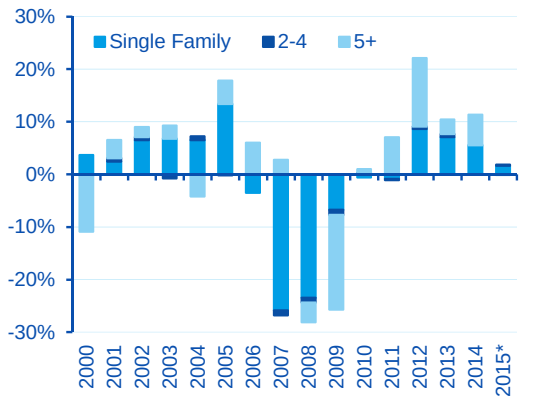
The compounding effects to the demand-side from weaker labor markets and labor market uncertainty, and supply-side pressures from strong post-crisis construction activity underpin our forecasts for statewide house prices to decelerate to 4.3% by year-end 2015 and 1.5% in 2016, on a year-over-year basis. Based on this weaker labor market outlook three major trends in real estate are likely to emerge in Texas. First, based on an increase in available housing units, higher inflow of existing homes (listings) and deceleration in sales activity to date, we are expecting increasing headwinds for Texas home prices. Although inventories remain below historical averages, there has been slower growth in home sales, which is adding to existing inventory levels. Second, based on the lower home price valuations and increasing inventories, construction activity will continue to decelerate. In fact, based on current trends building permits are likely to remain flat for the year, the first time since 2009; a trend that we expect to continue into 2016. Third, wage growth is likely to slow as a result of nontrivial share of job losses in high paying O&G professionals mount. As rates rise with successive increases by the Federal Reserve, mortgage rates are likely to rise, which implies lower affordability when combined with lower wages dampening that outlook for housing demand.

Chart 20
Texas Home Price Scenarios (year-over-year %)



Source: BBVA Research

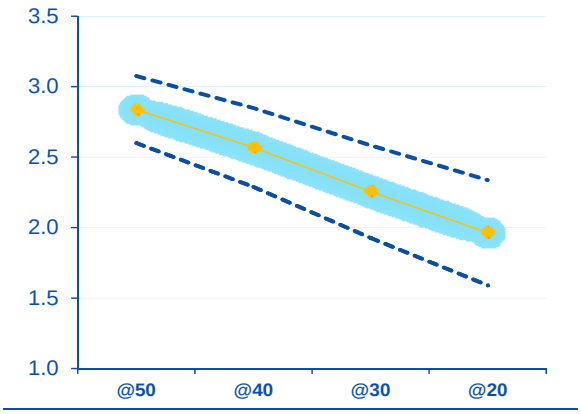
Chart 21
Texas Building Permits (year-over-year %)



Source: BBVA Research

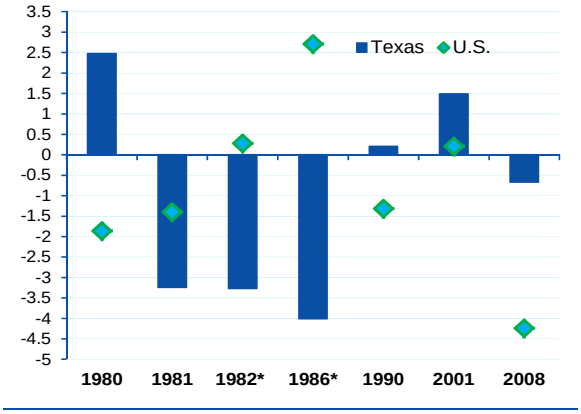
Despite risks being balanced to the downside, we maintain our baseline forecasts for Texas growth of 1.9% in 2015. Texas' gains in worker productivity during the recovery and high population growth underlie our outlook for a pickup in Texas growth in 2016 and 2017 to 2.9% and 3.8%. In terms of recessionary risks with respect to oil prices, there would have to be prolonged periods whereby WTI spot prices remain below 30 $/barrel and significant deterioration in manufacturing sector output and exports for Texas to be at risk of negative growth in 2016. Although within our feasible set of risks, we maintain that this still has a low probability of occurring. The fact that Texas more closely mirrors the U.S. business cycle in times of low commodity prices reinforces our expectation for a soft landing in Texas.

Chart 22
Oil Price Growth (Average '15-'16)



Source: BBVA Research & Haver Analytics

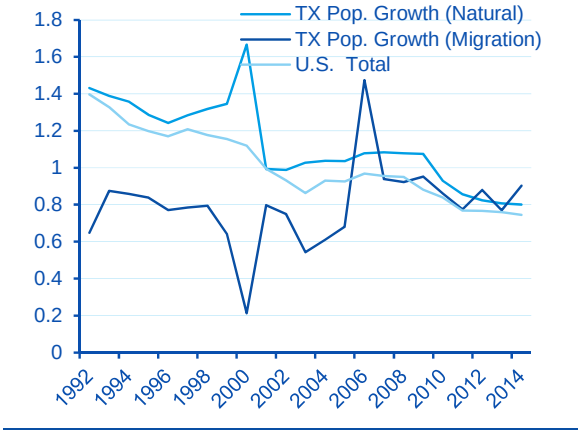
Chart 23
Texas GDP Growth: Commodity & U.S. Cycles



Source: BBVA Research & Haver Analytics
*Commodity Cycle

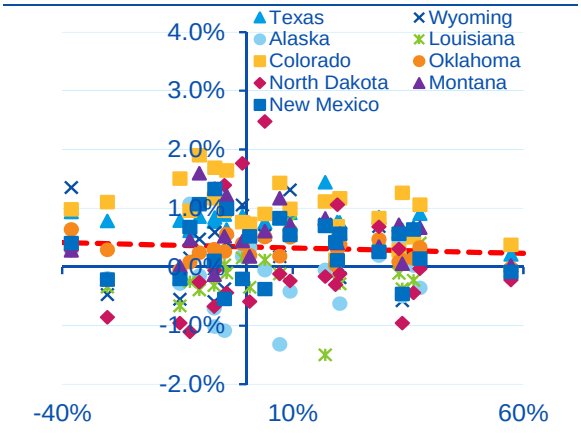
Don't Sell the Farm Yet

Chart 24
Population Growth (%)



Source: BBVA Research & Haver Analytics

Chart 25
Domestic Migration & Oil Prices (year-over-year%)



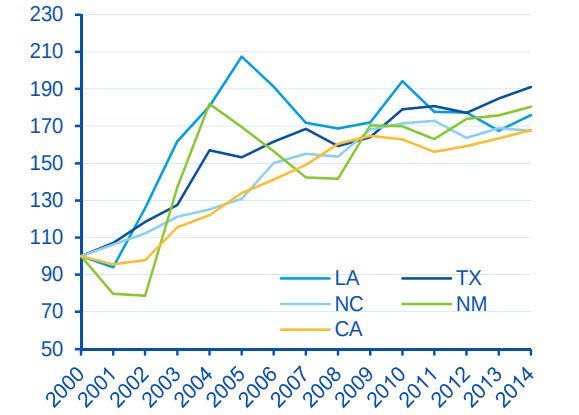
Source: BBVA Research & Haver Analytics

One factor that is unlikely to add to Texas' woes is a major outflow of the population or significant slowing of population growth in the near future. Since 2000, Texas population growth has been slightly more than twice as fast as the U.S. average, with 40% of the growth attributable to net migration. Moreover, since 1991, it appears that neither economic growth nor oil prices explain net migration over the past 20 years in Texas or any other major oil-producing states. Moreover, natural population – the growth in population excluding migration– since 1991 has been higher than total population growth in the U.S. Ultimately, this suggests that even when assuming net migration is effectively zero, overall population growth is likely to, at worst, remain consistent with the U.S. average. In terms of outflows, since net domestic migration statistics have been available (1991), there has never been net outflows on a year-over-year basis and there has only one year in which population growth was lower than 100K.

Texas also has structural advantages that will act to offset short-term headwinds in the Oil & Gas sector and strong dollar. First, from a demographic perspective Texas has a younger population and workforce than the

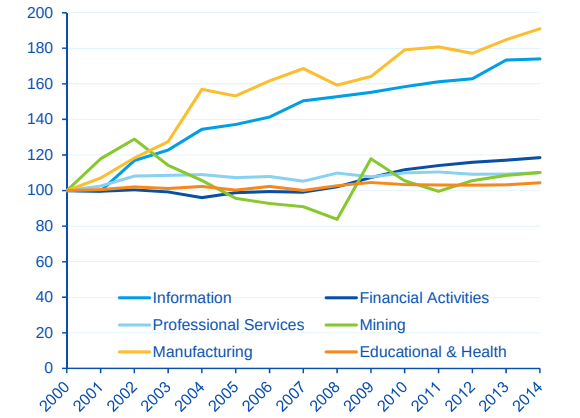
U.S., with a median age of 34 and 38 years, respectively– U.S.: 37.7 & 40.1. Moreover, the share of individuals under five and eighteen is higher than the U.S. suggesting the next working-age cohort will be younger than the U.S. In terms of fertility, Texas Total Fertility Rate (TFR), unlike a majority of the U.S., is close to developed economies replacement rate (2.1), suggesting that without migration, the state could at worst maintain the current population.[13] In a more likely, and optimistic scenario, this endogenous population growth will be buttressed by Texas' attractiveness as a migration destination for both domestic and international migrants. Texas' cost-of-living also remains favorable relative to other major metropolitan areas (MSAs). Based on current trends Texas population will continue growing at nearly 1.9% (0.8% attributed to natural gains)[14] per year as opposed to the U.S. that is forecasted to decelerate to 0.7% by 2040.

Chart 26
Real Output per Worker by State (Index, 2000=100)



Source: BBVA Research & Haver Analytics

Chart 27
Texas Labor Force Productivity (Real output per worker, index, 2000=100)



Source: BBVA Research & Haver Analytics

Texas also continues to boast one of the most dynamic and fastest growing workforces, and strong mix of capital and labor. In terms of worker productivity Texas ranks 8th in terms of real output per worker ($127.0K per worker in 2009$); since 2000, real output per worker has grown at the third fastest rate in the country. In addition, in a sector that has struggled to gain competiveness globally, Texas has the 2nd most productive manufacturing sector, measured in terms of worker productivity. Not only do Texas' manufacturing workers rank favorable in terms of output per worker, in terms of total factor productivity, Texas experienced the 4th highest post-crisis contribution from Total Factor Productivity.[15] Lastly, a favorable fiscal and regulatory environment should continue to attract investment to the state.

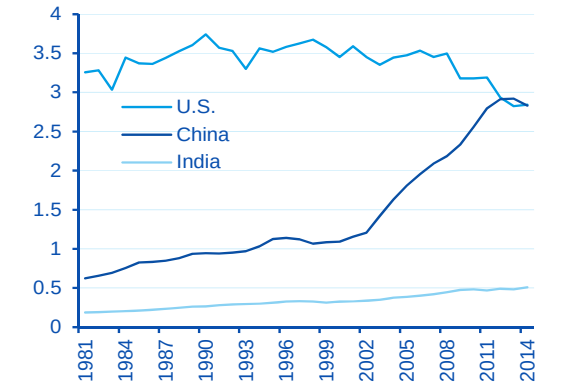
It would be naïve to suggest that without a strong Oil & Gas sector Texas would be better off, but there are clear structural advantages that would insulate the state from a catastrophic collapse. However, longer-run trends in the Oil & Gas sector seem to suggest that Texas' return to preeminence in oil production will continue into the 21st century. This suggests that the Oil & Gas sector will remain a vital aspect of the Texas economy with risks balanced to the upside. This is not without challenges as hydraulic fracturing (fracking) has altered supply-side conditions of the market, while the transition to an environment where the majority of crude oil consumptions

[13] http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_01.pdf
[14] http://osd.texas.gov/Data/TPEPP/Projections/
[15] https://www.bbvaresearch.com/en/publicaciones/u-s-productivity-deceleration-evidence-from-state-level-data-of-the-u-s/

comes from developing economies will likely progress slowly and be subject to more volatile consumption cycles.

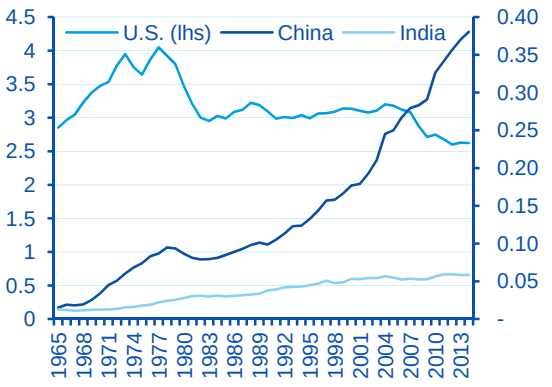
Risks to the U.S. Oil & Gas sector stemming from China's transition from a rapidly industrializing, export-driven economy to a consumer-based economy also appear misguided as the super-cycle transition is likely to pose greater risk to non-petroleum based commodities. In fact, although China's consumption of oil per capita has grown 6.1% per year since 2000, consumption on per capita basis is 1/7th the size of U.S. per capita consumption. For coal, however, the 7.6% annual increase in per capita coal consumption has brought that measure in line with the U.S. per capita consumption levels, suggesting limited upside to consumption of coal. Furthermore, continued increases in the size and purchasing power of China's middle class will likely coincide with increasing demand for automobiles, of which a non-trivial share will require petroleum products for fueling.

Chart 28
Per Capita Coal Consumption (TOE per M residents)



Source: BBVA Research & Haver Analytics

Chart 29
Per Capita Oil Consumption (TOE per M residents)



Source: BBVA Research & Haver Analytics

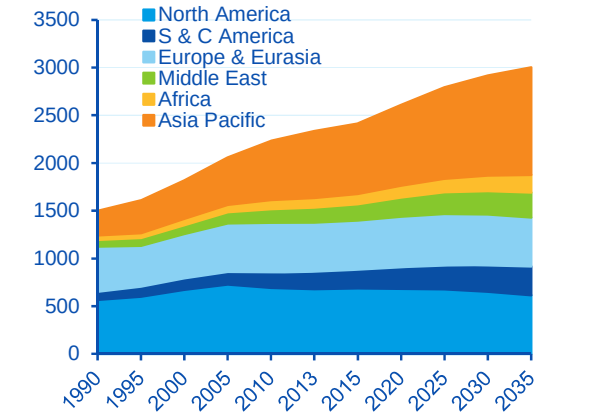
Further, India's transition to an industrializing economy, supported by strong population growth and a growing middle class will also counteract slowing overall demand and per unit demand in Developed economies. This process will likely accelerate the catch up in both categories, with oil adjusting later in the super-cycle. In terms of the mix of demand, estimates suggest that by 2035 oil will still satisfy an increasing share of transport demand globally– 89%, an increase from ~ 75% today. Although there are risks of a more rapid transition to renewables based transportation, speaking to the slow transition to a renewables-based transportation model is the belief that renewables-based transportation will account less than 4% of total transportation.[16]

Greater efforts to reduce CO2 and greenhouse gas emissions or advances in battery technologies that lower the relative costs of electric passenger vehicles have the potential to significantly alter the demand for crude oil. Although there have been significant strides made in battery technologies and alternative fuels, the transition to a renewables-based transportation model is likely to progress slowly, allowing for a gradual transition across markets. In fact, the EIA, using motor gasoline product supplied as a proxy for future gasoline consumption suggests that trends other than lower gasoline prices such as a stronger job market, higher wage growth, a trend towards purchases of less fuel efficient vehicles has increased the number vehicle miles traveled (VMT); a trend that should continue to increase likelihood of a petroleum-based transportation model.[17] Speaking to the price

[16] http://www.bp.com/en/global/corporate/energy-economics/energy-outlook-2035.html
[17] http://www.eia.gov/todayinenergy/detail.cfm?id=22932

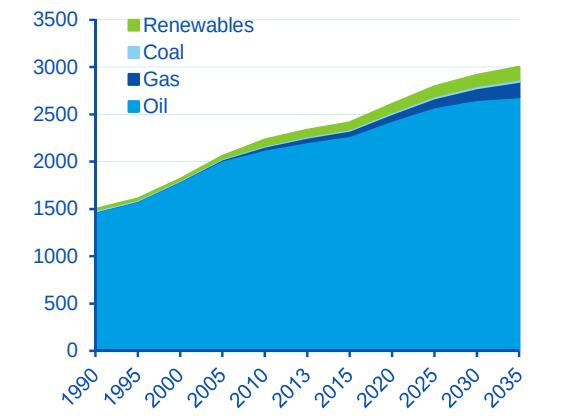
sensitivity of consumers and the impact of low gasoline prices, light truck sales have accounted for more than 120% of the recent growth in auto sales (1.2M total) suggesting that low gasoline prices are altering the demand fuel efficient vehicles.

Chart 30
Consumption of Transportation Inputs (Millions TOE)



Source: BBVA Research & BP

Chart 31
Transportation Inputs (Millions TOE)



Source: BBVA Research, Haver Analytics & BP

The ephemeral nature of regulation makes long-term predictions difficult; however current efforts in Washington appear to be currently focused on greenhouse gases emissions produced in electric power generation, for which petroleum products account for only small share. This suggests that over a 10-year horizon there is limited risk of any abrupt shift in policy towards crude oil emissions. Even still, solar energy is booming in Texas and by 2029, Texas is expected to install between 10,000 and 12,500MW of solar generating capacity. This suggests that Texas could be a global leader in renewables investment and technology in spite of the fact that there are fewer incentives and mandates than other U.S. states.[18]

In terms of the future structure of global crude supplies, it is unlikely that idiosyncratic factors and supply disruptions will have lasting impacts on crude oil supply. For instance, U.S. and European economic sanctions imposed on Iran reduced supplies of crude oil by nearly 1 million bpd between 2011 and 2012 (920 K bpd). Likewise, civil war in Libya, decades of conflict in Iraq and geopolitical uncertainty in Egypt have had both short and medium run effects on global supplies. However, these disruptions have declined in intensity over time and rarely have persistent impacts on markets. In fact, the dominant price setter and swing producer, OPEC, now has to compete with Russia, who is battling economic sanctions and weak economic growth and the U.S., which has seen what appears to be a persistent shift in the supply of crude oil.

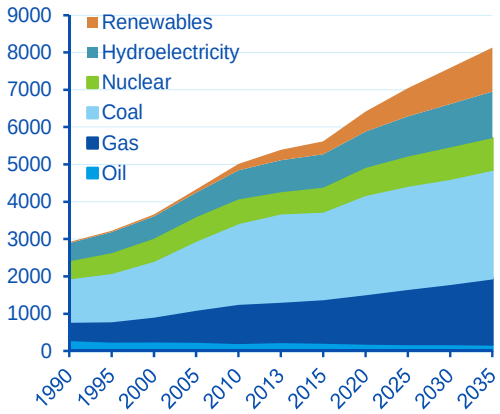
Despite expectations for North American production to wane in the short-run, the rise in U.S. shale production, growth in North American deepwater and oil sands should act as an additional market stabilizer if OPEC continues to protect market share rather than reduce supply pressures. Some estimates suggest that by 2035 North American production is expected to account for 24% of global supplies, up from 19% in 2013. Therefore, the largest question for U.S. oil producers is whether or not shale drilling technology offers competitive

[18] https://www.bbvaresearch.com/wp-content/uploads/2015/09/U.S-Industry-Analysis_Bright-Prospects-for-Solar-Energy-Report1.pdf

advantages over other methods of drilling and if technology and investment can endure a persistent low oil price environment.

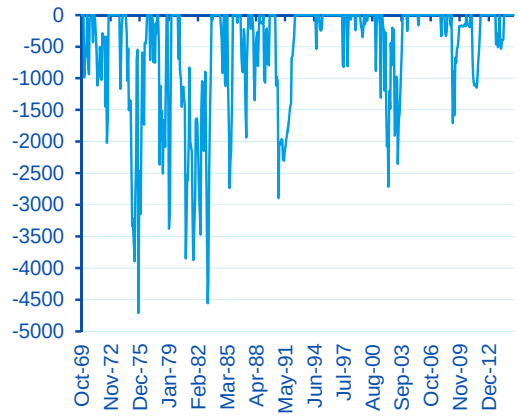
If what some have suggested that the shale drilling technology represents a permanent shock to global production dynamics, that global supplies are unlikely fixed in the long-run (inelastic) and that a growing share of production will come from the U.S. shale and traditional producers. Thus, there is a high probability that the Texas' Oil & Gas sector will rebound.[19] In fact, shale productivity has increased 18.9% per year in Texas' most prolific shale plays the Eagle Ford since 2010, which culminated in an additional production increase of 527 bpd per rig. This productivity surge underlies the forecast for an increasing share of global crude oil supplies to come from U.S. and Texas. In addition to the productivity gains associated with drilling multiple wells within one play (multi-PAD), the payback on shale wells is short and skewed towards a variable cost model, suggesting production can adjust quickly to price volatility unlike other methods that require lumpier investment- sands and deepwater.

Chart 32
Electric Generation by Inputs (Millions TOE)



Source: BBVA Research & BP

Chart 33
Supply-Side Negative Surprises (Difference K bpd from HP trend)



Source: BBVA Research & Haver Analytics

This model is most similar to traditional manufacturing, which implies a more volatile investment and production environment.[20] Financing this segment of Texas' Oil & Gas sector will require a new model that can absorb short-term volatility and match the client's needs for less collateralized project based financing. Also, because these projects tend to be operated by independent producers that lack consistent streams of income, they will require non-traditional products, particularly as interest rates being to rise.

In terms of potential beyond the U.S. border, there is the potential for additional economic gains form of exports of goods and services related to shale drilling. As more and more countries try to develop their own shale oil reserves, there will be significant opportunity to export the physical technology and human capital need to develop the shale plays. Not only does Texas have a head start in terms of knowhow given that the technology was developed within the state, but it also is home to 52.3% of U.S. oil & gas exploration employees and a growing share of mining support services (48%) - a 15pp increase since 1990. Ultimately, this has the potential to moderate the volatility in Texas economic cycles that could rise in relation to more volatile shale drilling cycles.

[19] http://www.bp.com/content/dam/bp/pdf/speeches/2015/new-economics-of-oil-spencer-dale.pdf
[20] http://www.bp.com/content/dam/bp/pdf/speeches/2015/new-economics-of-oil-spencer-dale.pdf

Furthermore, the bulk of the innovation and expertise relating to the manufacturing of shale drilling equipment will likely need to be imported by countries attempting to develop their own shale plays, which adds to the long-run export potential of Texas and its major ports.

Bottom Line

Current data indicates that Texas is feeling the impacts from low oil prices. Now risks have tilted to the downside, as historically strong dollar, driven by the slowing Chinese super-cycle, downshift in global growth in emerging markets and dovish ECB, has intensified headwinds for the Texas economy. Although Texas is more diverse and less reliant on oil for economic growth, the sector has become more relevant over the past 5 years. However, the industry has undergone a transformation with shale drilling offering a production function that is less lumpy, offers faster paybacks and the flexibility to respond to business cycles and commodity price fluctuations. Moreover, in terms of systemic risk to the banking sector, the results from a special questionnaire in the Federal Reserve Board (FRB) Senior Loan Officer and increased credit spreads suggest financial markets and banks are prepared for risk and volatility. Taken together this underlies our expectation for Texas' growth to be 1.9% in 2015, with the economy recovering to potential in 2017. We maintain that there would have to be prolonged periods whereby WTI spot prices remain below 30 $/barrel, and significant deterioration in manufacturing output and exports, for Texas to be at risk of negative growth.

In the long run, the outlook for Texas remains bright. First, Texas' is unlikely to experience a significant outflow of the population, as migration flows are shown to have little relationship to oil price fluctuations or short term changes in growth. Second, Texas also boast one of the most dynamic and fastest growing workforces, and strong mix of capital and labor, as worker productivity ranks 8th nationally, and has grown at the third fastest rate since 2000. Third, China's shift to a consumer-based economy and more rapid industrialization in India reinforce the expectation for a gradual, albeit volatile, shift in the demand side of the market from developed to developing economies. This suggests that there is still upside for the unconventional drillers in the U.S. Lastly, as more and more countries try to develop their own shale exploration–Mexico, Argentina, China and Europe– there will be significant opportunity to export physical and human capital, and the technology need to develop the shale plays. Ultimately, short-term factors will inevitably fade, again brining to the forefront Texas' true value as a global leader in growth and innovation.

DISCLAIMER

This document was prepared by Banco Bilbao Vizcaya Argentaria's (BBVA) BBVA Research U.S. on behalf of itself and its affiliated companies (each BBVA Group Company) for distribution in the United States and the rest of the world and is provided for information purposes only. Within the US, BBVA operates primarily through its subsidiary Compass Bank. The information, opinions, estimates and forecasts contained herein refer to the specific date and are subject to changes without notice due to market fluctuations. The information, opinions, estimates and forecasts contained in this document have been gathered or obtained from public sources, believed to be correct by the Company concerning their accuracy, completeness, and/or correctness. This document is not an offer to sell or a solicitation to acquire or dispose of an interest in securities.