North Dakota Revenue Outlook

IHS Markit

March 12, 2019

Biennium forecast

Revenue Source	2017-19 Biennium Forecast (Original)	2017-19 Biennium Forecast	2019-21 Biennium Forecast
Sales and use tax	1,701,747,285	1,770,298,530 *3.1%*	1,670,864,200 *-5.6%*
Motor vehicle excise tax	220,003,000	241,960,797 *9.1%*	266,883,010 *10.3%*
Individual income tax	698,728,000	744,086,447 *11.6%*	793,043,320 *6.6%*
Corporate income tax	102,088,415	218,734,303 *31.1%*	195,179,730 *-10.8%*

* The percentages reflect the change from the prior biennium.

Fiscal year forecast

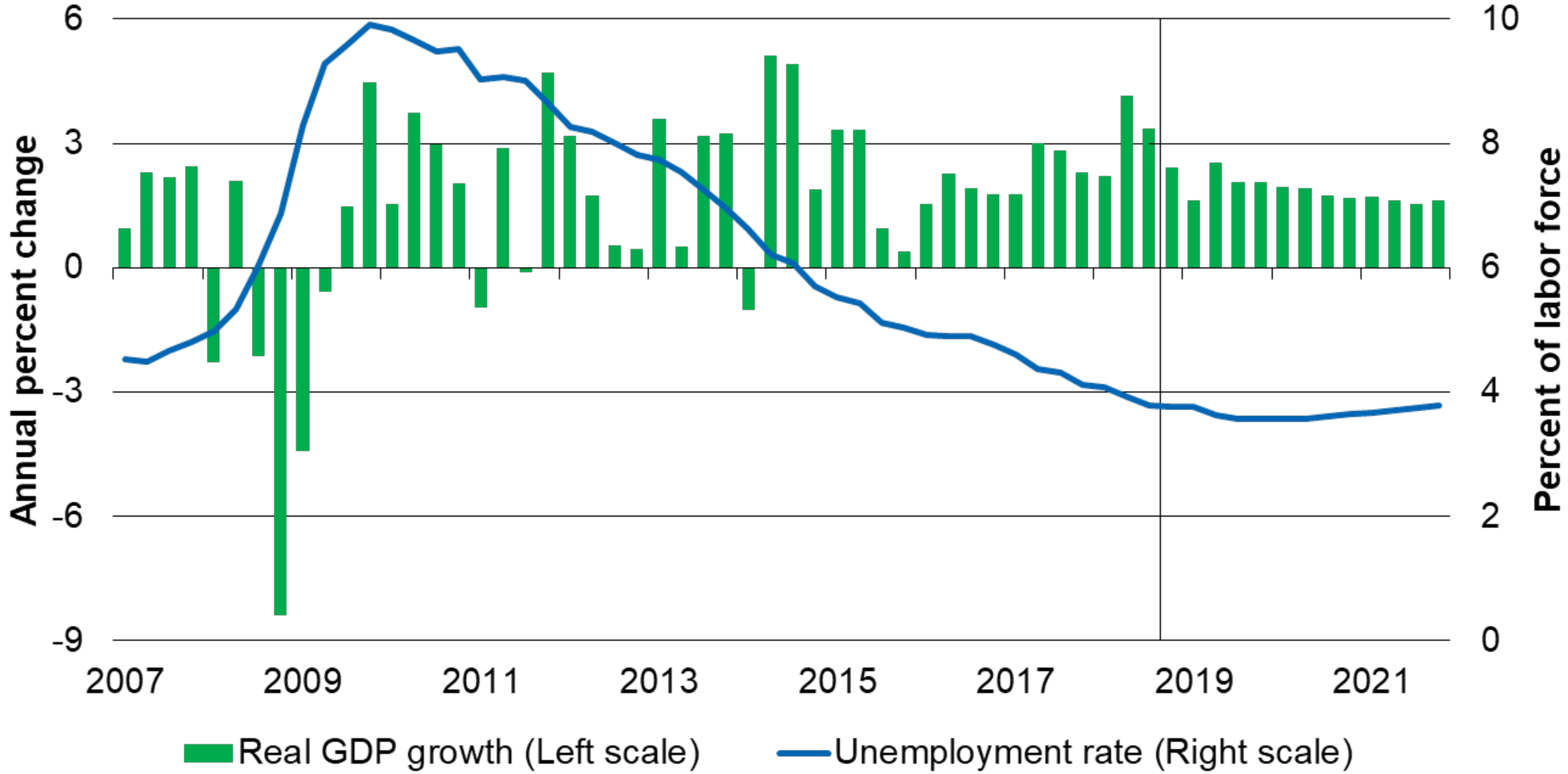
Revenue Source	2015-17 Biennium		2017-19 Biennium		2019-21 Biennium	
	Fiscal Year 2016 Actual	Fiscal Year 2017 Actual	Fiscal Year 2018 Actual	Fiscal Year 2019 Forecast	Fiscal Year 2020 Forecast	Fiscal Year 2021 Forecast
Sales and use tax	925,369,574	792,498,261	829,120,206	941,178,324	829,973,300	840,890,900
	-26.9%	*-14.4%*	*4.6%*	*13.5%*	*-11.8%*	*1.3%*
Motor vehicle excise tax	106,332,785	115,451,670	114,342,237	127,618,560	131,347,530	135,535,480
	-23.6%	*8.6%*	*-1.0%*	*11.6%*	*2.9%*	*3.2%*
Individual income tax	353,937,749	312,721,918	364,254,125	379,832,322	391,466,040	401,577,280
	-33.9%	*-11.6%*	*16.5%*	*4.3%*	*3.1%*	*2.6%*
Corporate income tax	97,580,800	69,225,591	92,348,170	126,386,133	96,550,550	98,629,180
	-50.2%	*-29.1%*	*33.4%*	*36.9%*	*-23.6%*	*2.2%*

Economic fundamentals remain sound, and financial conditions have improved

- Financial conditions have improved in 2019, helping to support continued growth in the private sector. Real GDP is projected to increase 2.4% this year.
- Employment continues to increase at a robust pace. The unemployment rate is expected to decrease from 4.0% in January to a low of 3.6% by mid-2019.
- Tight US labor and product markets will push inflation modestly above the Federal Reserve's 2% objective.
- The Fed is expected to raise the federal funds rate in July 2019 and early 2020, bringing the upper end of the target range to 3.00%.
- Real GDP growth will subside to 2.0% in 2020 and 1.7% in 2021 in response to waning support from fiscal stimulus, capacity limits, and higher interest rates.
- As the US economy makes the transition from above-trend to below-trend growth, the risk of a downturn will rise.

The US economic expansion will continue, pushing the unemployment rate down to 3.6% in 2019

Real GDP and unemployment



Bottom line for the US economy

- After 2.9% growth in 2018, real GDP will expand 2.4% in 2019, supported by fiscal stimulus and sustained job growth.
- Financial conditions have improved in early 2019: equity values have rebounded from late-December lows, long-term Treasury yields remain near 12-month lows, and risk spreads are easing.
- Consumer spending continues to be supported by solid growth in employment and real disposable incomes.
- Business fixed investment has benefited from tax and regulatory changes, but growth will slow in step with the global economy.
- The Federal Reserve is expected to raise the federal funds rate once in both 2019 and 2020, while continuing its balance sheet run-off.
- Real GDP growth will slow to 2.0% in 2020 and 1.7% in 2021 owing to supply constraints, tightening fiscal policies, and rising interest rates.

North Dakota Outlook

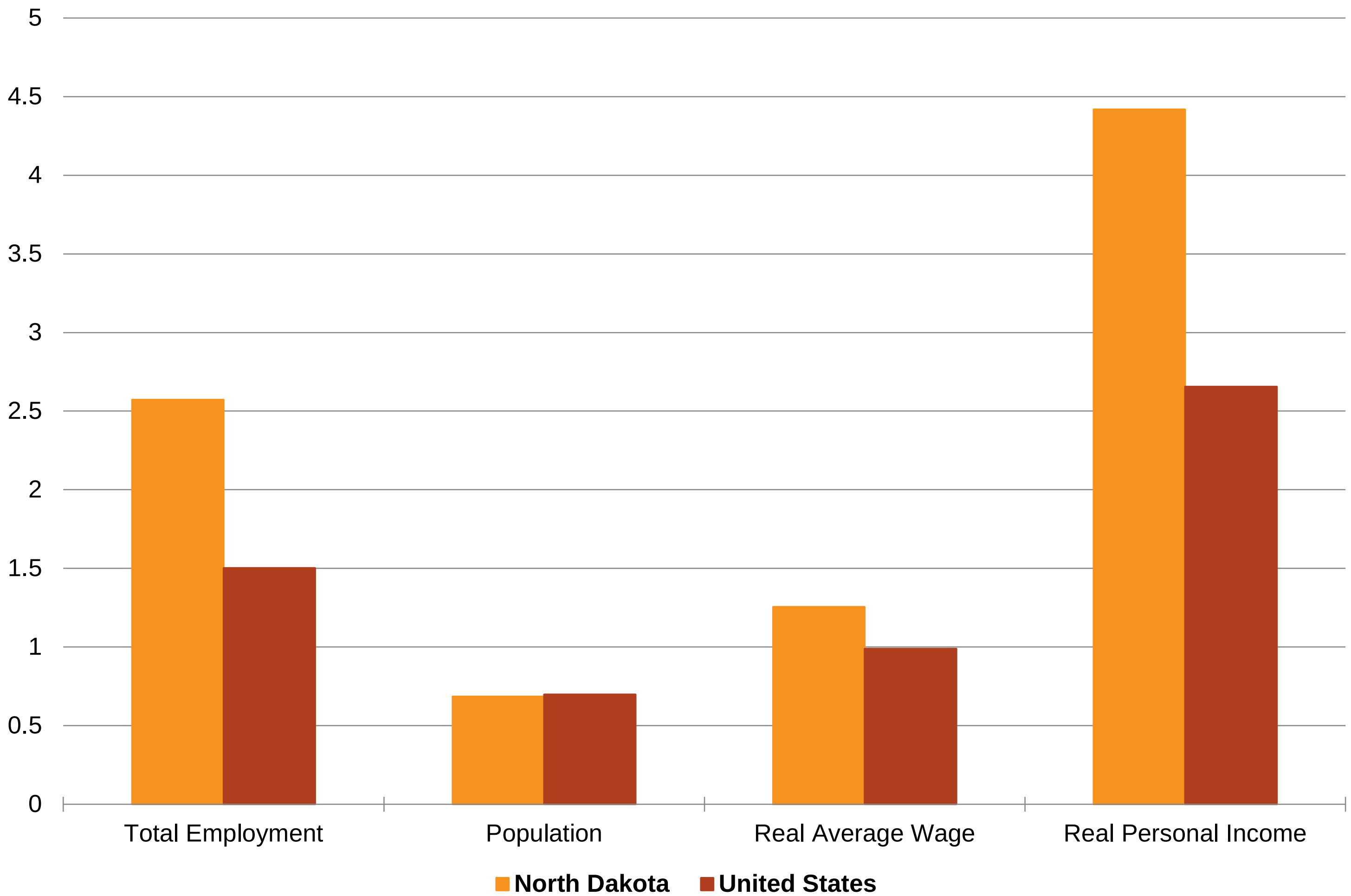
	2017	2018	2019	2020	2021
Establishment Employment (Thousands)					
Total Non-Agricultural	430.7	431.5	442.6	450.1	453.9
Pct. Ch. Ann. Rate	-0.9	0.2	2.6	1.7	0.8
Manufacturing	24.7	25.3	25.7	26.1	26.1
Pct. Ch. Ann. Rate	0.4	2.4	1.9	1.3	0.1
Non-Manufacturing	406.0	406.3	416.9	424.0	427.8
Pct. Ch. Ann. Rate	-0.9	0.1	2.6	1.7	0.9
Construction & Mining	44.9	46.6	51.4	53.6	54.7
Pct. Ch. Ann. Rate	-4.3	3.9	10.1	4.4	2.0
Resident Employment & Unemployment (Thousands)					
Total Employment	403.7	399.3	406.2	414.0	416.6
Pct. Ch. Ann. Rate	0.5	-1.1	1.7	1.9	0.6
Labor Force	414.5	410.0	416.5	424.7	428.1
Labor Force Partic Rate	69.6	68.7	69.3	70.1	70.0
Number Unemployed	10.8	10.8	10.2	10.7	11.5
Unemployment Rate	2.6	2.6	2.5	2.5	2.7

North Dakota Outlook

	2017	2018	2019	2020	2021
Total Personal Income (Billions$)	39.5	41.3	44.0	46.8	49.3
Pct. Ch. Ann. Rate	-0.7	4.6	6.5	6.4	5.3
Med. Household Income (000s)	61.8	65.0	68.5	71.5	74.0
Avg. Annual Wage (000s)	49.5	51.5	53.2	55.3	57.5
Wages and Salaries	22.1	23.1	24.4	25.8	27.1
Property Income	9.1	9.5	10.0	10.7	11.2
Proprietor's Income	3.0	3.4	3.9	4.3	4.6
Farm Proprietor	-0.2	0.1	0.5	0.8	1.1
Business Proprietor	3.2	3.3	3.4	3.5	3.5
Real Gross State Product, NAICS Based (Billions 2012$)					
Total GSP	50.8	51.8	53.6	55.0	56.1
Pct. Ch. Ann. Rate	-0.5	1.9	3.6	2.7	2.0
Housing					
Total Housing Starts (Ths)	3.3	3.2	3.5	3.7	3.8
Population (Thousands)					
Total Population	755.5	757.5	762.7	769.5	776.6
Pct. Ch. Ann. Rate	0.0	0.3	0.7	0.9	0.9

Key Performance Indicators, 2019

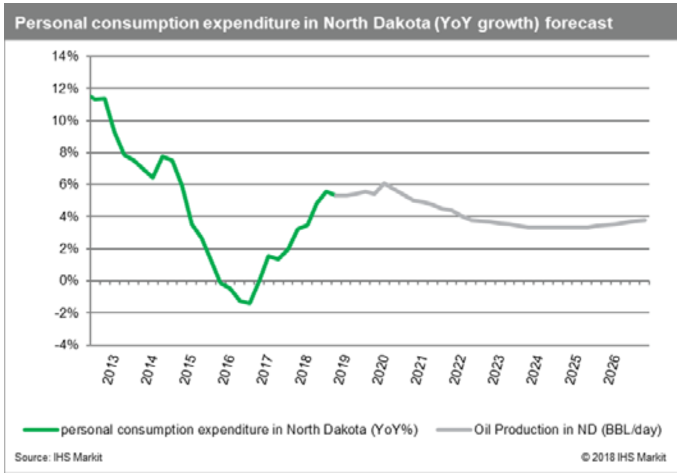
Percent change, year-over-year

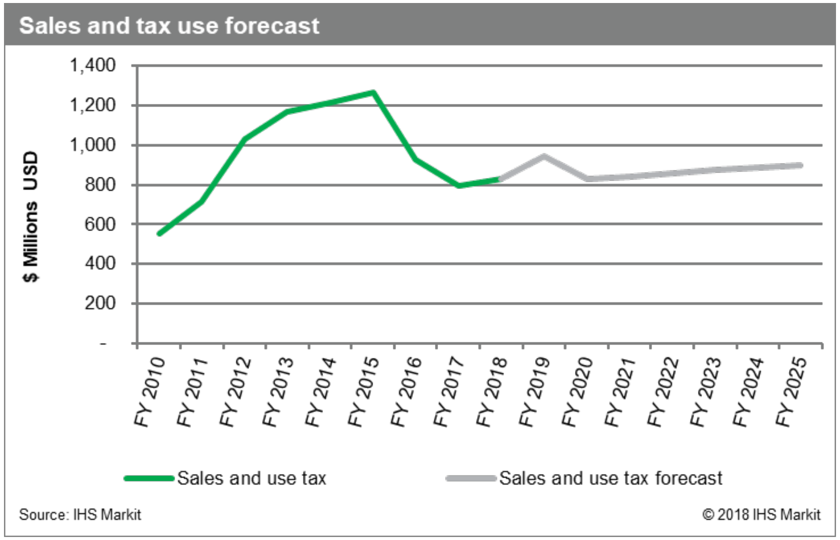


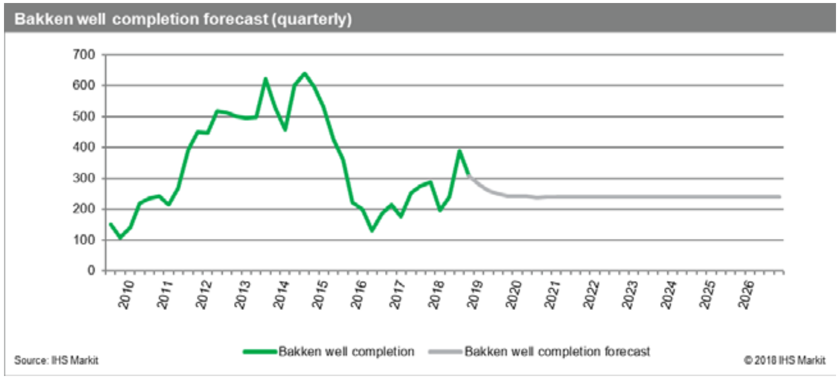
Economic indicators used in the tax model

REVENUE SOURCE	ECONOMIC DRIVER	DESCRIPTION
Sales and Use tax	•Bakken well addition •Personal consumption expenditures (ND state)	The sales and use tax base are best captured by Bakken well additions and consumers spending on goods and services
Motor vehicle excise tax	•New passenger and light truck registrations (ND state) •Employment in construction, natural resources, and mining (ND state)	The motor vehicle excise tax base is best captured by the state's new vehicle registrations (including new passenger car and light truck). ND has a significant proportion of workforce from oil industry, therefore, employment at oil & gas related industry accounts for added impacts of oil industry on the tax base.
Individual income tax	•Total wage disbursements (ND state) •Personal income, dividends interest and rent (ND state)	The tax base of individual income tax submitted as withholdings is relatively stable and largely driven by total wage income in the state. The tax base of individual income tax submitted as estimated payments, on the other hand, is more volatile due to the nature of capital gains realization. That being said, a reasonable amount of variations in the tax base of individual income estimated payments is captured by the state's property income, i.e., rental income of persons, personal dividend income, and personal interest income.
Corporate income tax	•Before-tax corporate profits with IVA & capital consumption adjustment (US national) •Crude price	The tax base of corporate income tax is affected by several factors including corporate profits and apportionment rule. To untangle the compounding impacts of changing apportionment rule on tax collection, we select national before-tax corporate profits with inventory valuation adjustment and capital consumption adjustment as the main driver of corporate income tax collection. Crude oil price is another driver as it affects oil company's profits.

Sales and use tax





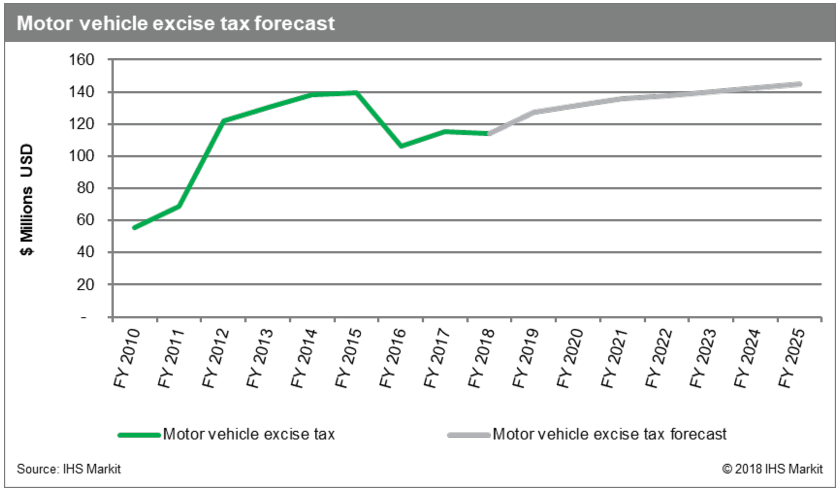


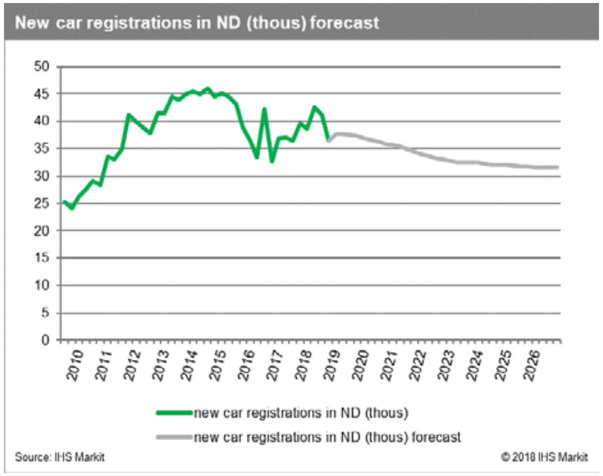
Sales and use tax – Deep Dive

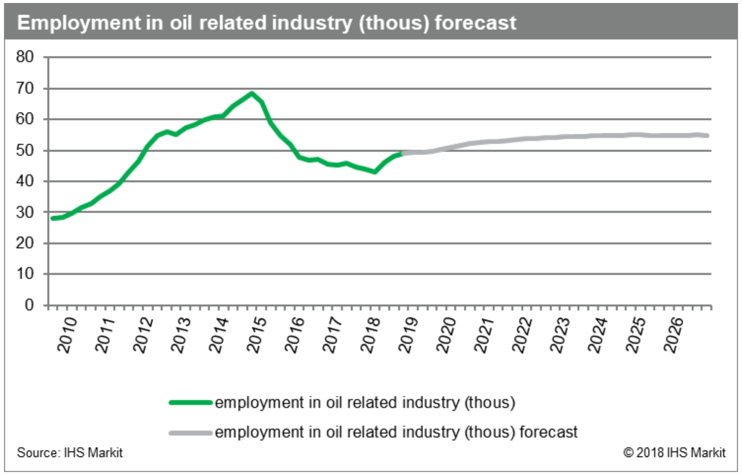
- Due to extreme uncertainty that surrounds oil prices and production, we elected to provide a more conservative forecast based on a monthly well completion trend of 80 in the longer term, in addition to IHSM's more optimistic well completion forecast. For reference, IHSM's well completion forecast ranges from 15% to 30% higher on a quarterly basis over the 5-year analysis period.
- To further assess the impact of well completions on sales tax, we simulated the sales tax model to get sales and use tax revenue in 2019-21 biennium under two alternative assumptions: 15 more wells per quarter v.s. trend of 80, as well as 30 more wells per quarter v.s. trend of 80.

Sales and use tax	Baseline	15 More Wells per Quarter	30 More Wells per Quarter
2019-21 Biennium	1,670,864,200	1,716,580,100	1,763,546,900
	-5.6%	*-3.7%*	*-1.7%*

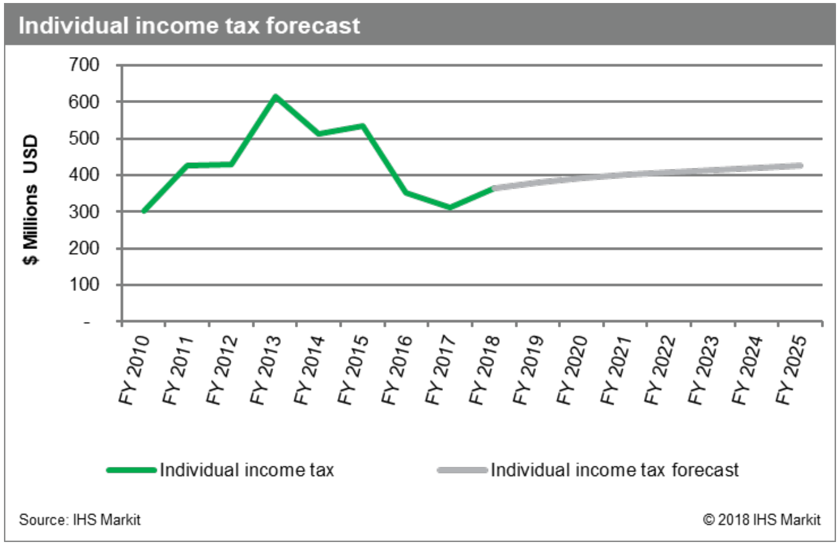
Motor vehicle excise tax

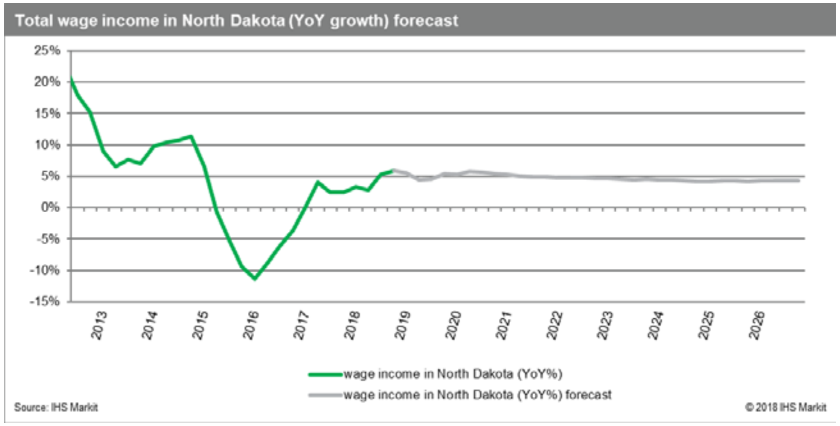


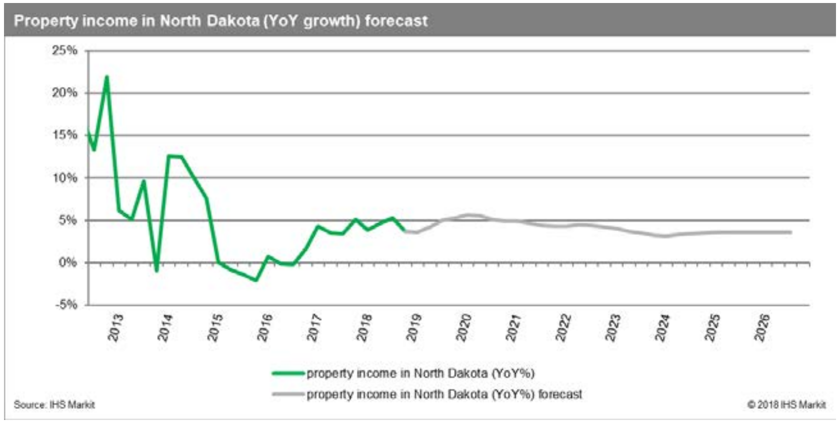




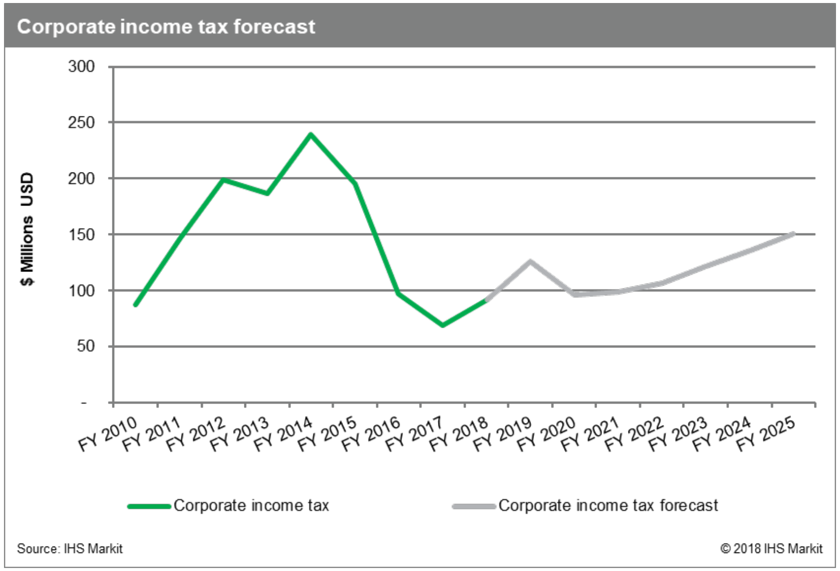
Individual income tax

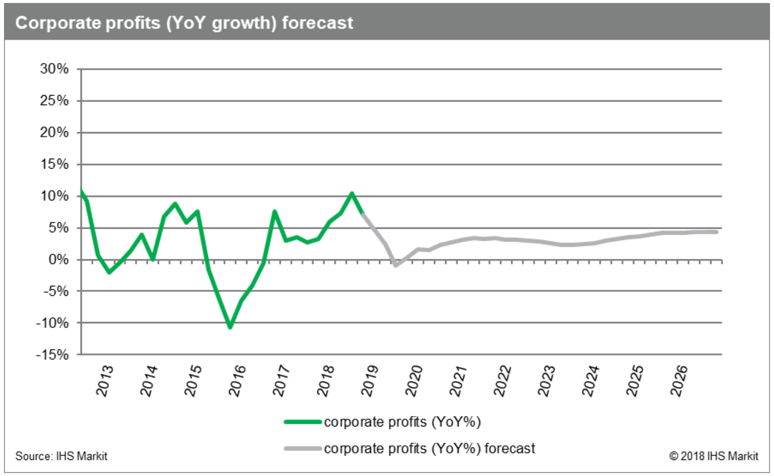


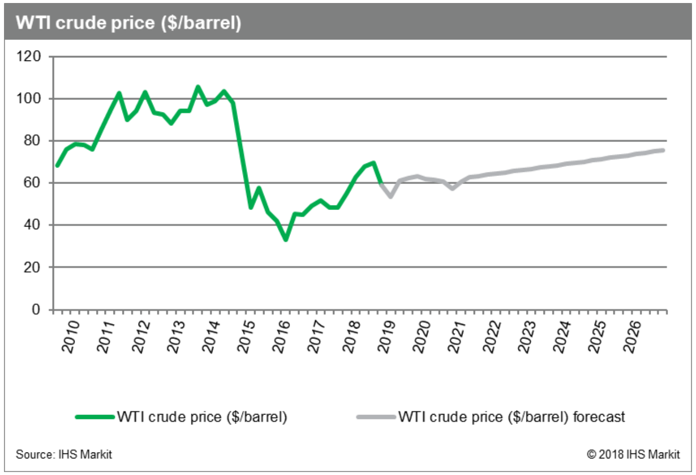




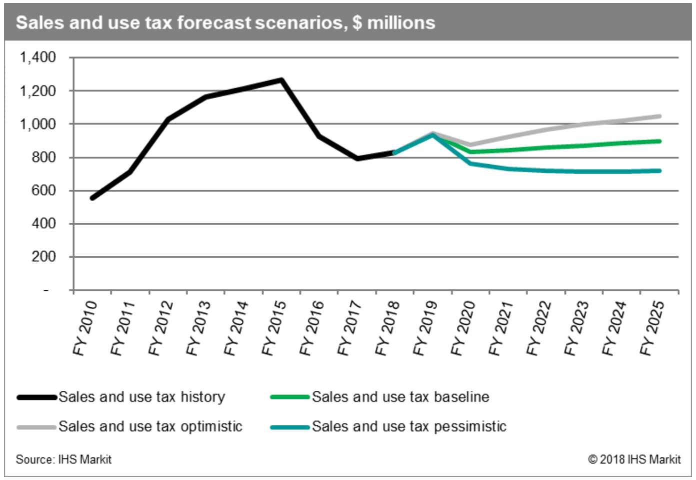
Corporate income tax

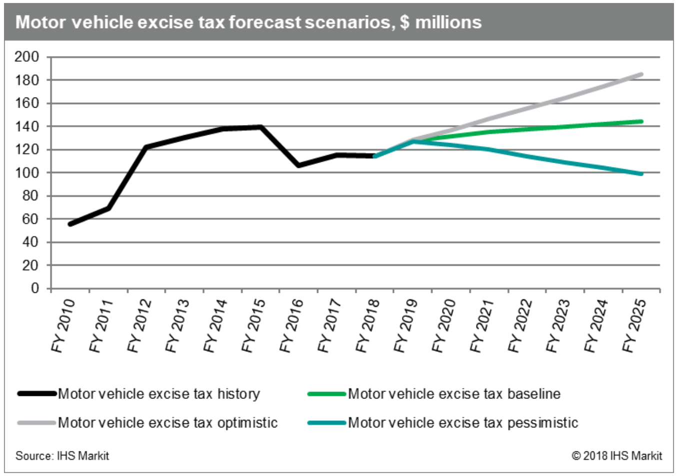


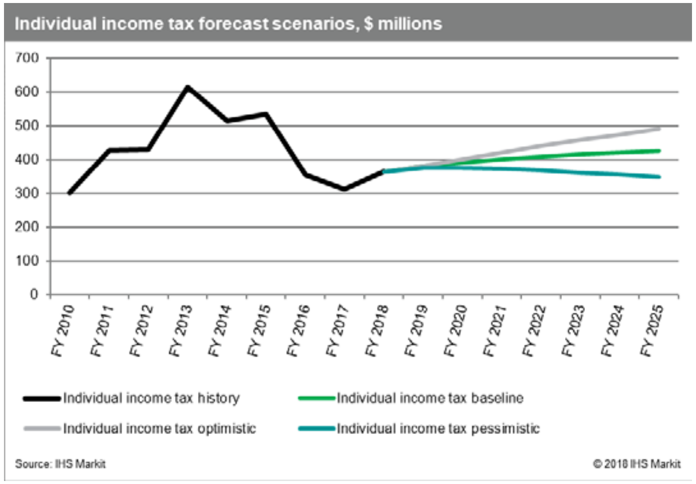


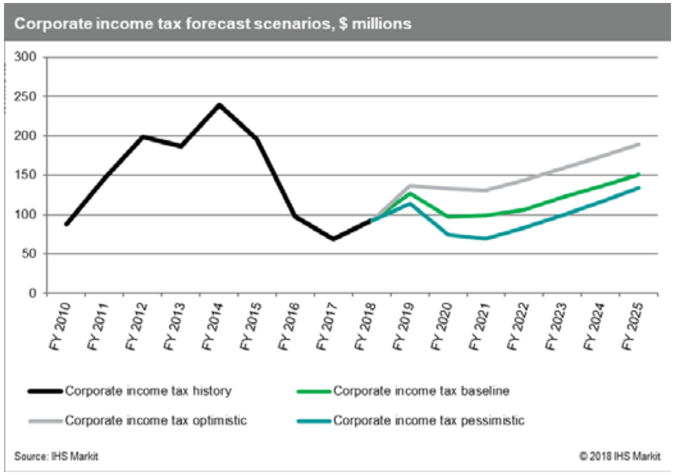


Optimistic and Pessimistic Scenarios









Optimistic and Pessimistic Scenarios *

Revenue Source	2017-19 Biennium Baseline	2017-19 Biennium Optimistic	2017-19 Biennium Pessimistic
Sales and use tax	1,770,298,530 *3.1%*	1,775,322,930 *3.3%*	1,762,936,030 *2.6%*
Motor vehicle excise tax	241,960,797 *9.1%*	242,608,757 *9.4%*	240,998,797 *8.7%*
Individual income tax	744,086,447 *11.6%*	746,247,091 *11.9%*	740,874,249 *11.1%*
Corporate income tax	218,734,303 *31.1%*	229,039,923 *37.3%*	206,719,003 *23.9%*

Revenue Source	2019-21 Biennium Baseline	2019-21 Biennium Optimistic	2019-21 Biennium Pessimistic
Sales and use tax	1,670,864,200 *-5.6%*	1,803,160,900 *1.6%*	1,491,837,900 *-15.4%*
Motor vehicle excise tax	266,883,010 *10.3%*	283,450,320 *16.8%*	243,802,880 *1.2%*
Individual income tax	793,043,320 *6.6%*	823,652,745 *10.4%*	749,952,193 *1.2%*
Corporate income tax	195,179,730 *-10.8%*	264,088,910 *15.3%*	143,800,407 *-30.4%*

* The optimistic scenario is based on oil prices that are $10 more than the baseline; the pessimistic scenario is based on oil prices that are $15 less than the baseline.
** The percentages reflect the change from the prior biennium.

North American Crude Oil Markets Short-Term Outlook

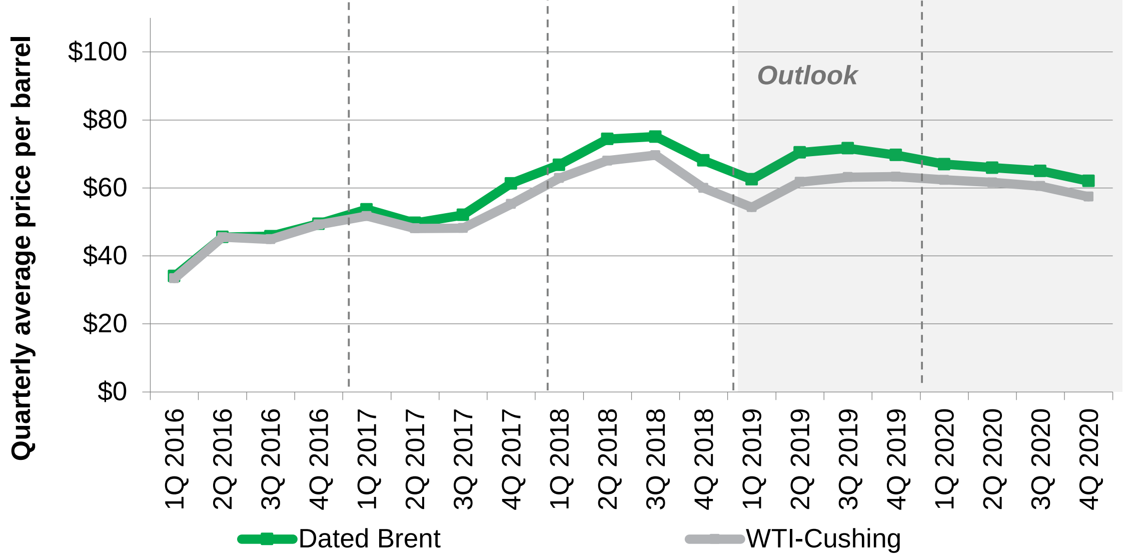
March 12, 2019

North American crude oil market key messages: February 2019

- **The US crude oil export requirement will rise quickly in 2019–20, assuming tight oil output growth does not falter.** Based on our current production outlook, we expect exports will need to rise to 4 MMb/d by end-2019 and 5 MMb/d by end-2020. Finding a market for all this crude—most of which is light, sweet—could be challenging in such a compressed time period, with China's role critical as the world's fastest-growing importer. US Gulf Coast (USGC) export terminal congestion could also become an issue, but docks are adding more capacity and loading crude in larger ships, including very large crude carriers (VLCCs).
- **Light-heavy differentials on the Gulf Coast will remain exceptionally narrow through first half 2019.** Vienna Alliance production cuts, sentiment from Alberta's mandated supply curtailment, and expected further reductions of Iranian output have reduced global availability of medium and heavy crudes and strengthened heavy crude prices. The Donald J. Trump administration sanctions against Petróleos de Venezuela, S.A. (PDVSA) effectively ban Venezuelan crude exports to the United States, and we expect Venezuelan production (which is mostly heavy) to drop sharply in 2019.
- **Western Canadian crude prices have traded in a relatively tight band to US benchmarks as a result of Alberta's mandated production curtailment, but we expect differentials to widen over the course of 2019.** We believe western Canadian heavy crude prices will begin reflecting rail economics (instead of stronger pipeline economics) by midyear, although the precise timing of this shift is difficult to pinpoint because of changing curtailment rules and limitations in data precision.

Saudi output cuts plus embargoed barrels push Brent higher in first half 2019, but increase in US production leads to weakening prices in second half 2019 and 2020

Dated Brent and WTI-Cushing crude oil price outlook to 2020



Source: IHS Markit, Argus Media Limited (historical) © 2019 IHS Markit

Assumptions

- **World demand.** Global liquids demand growth decelerates from 1.63 MMb/d in 2018 to 1.45 MMb/d in 2019 and 1.38 MMb/d in 2020, owing to shrinking demand in OECD Asia, as well as slowing growth in North America and China.
- **The Vienna Alliance action.** The Gulf-3 (Saudi Arabia, the UAE, and Kuwait), along with Algeria, Russia, and Oman, cut output from reference levels through first half 2019. The Gulf-3 keep output restrained further through 2020.
- **Iran and Venezuela output continues to decline.** US sanctions affect production of both Iran and Venezuela. The latter also experiences economic and political pressures.
- **US and Canadian output.** US production will grow from 11.8 MMb/d in fourth quarter 2018 to 13.0 MMb/d in fourth quarter 2019 as new pipelines provide more takeaway capacity for Permian oil. Growth continues in 2020, with output averaging 13.6 MMb/d. Assuming curtailment is removed in 2019, Canada's output will grow from 4.5 MMb/d in 2018 to 4.8 MMb/d in 2019 and to 5.0 MMb/d in 2020.

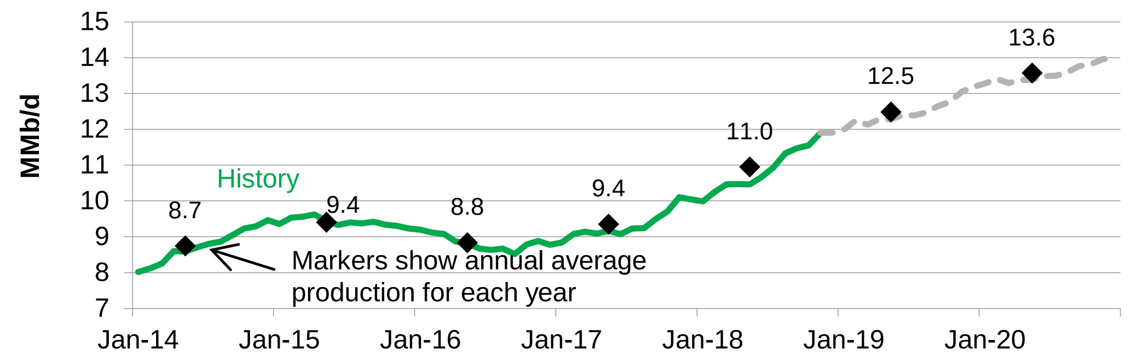
Benchmark crude price outlook ($/bbl)

	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020
Dated Brent	$52.06	$61.31	$66.81	$74.40	$75.08	$68.06	$62.52	$70.41	$71.66	$69.69	$66.97	$65.95	$64.98	$62.03
WTI	$48.16	$55.23	$62.89	$68.03	$69.63	$60.14	$54.69	$61.03	$62.53	$63.22	$61.75	$61.64	$60.56	$57.43

Source: IHS Markit, Argus Media Limited (historical) © 2019 IHS Markit

US production system gets bigger, with the potential for large swings

Monthly US crude oil production



Source: IHS Markit, Energy Information Administration (EIA)

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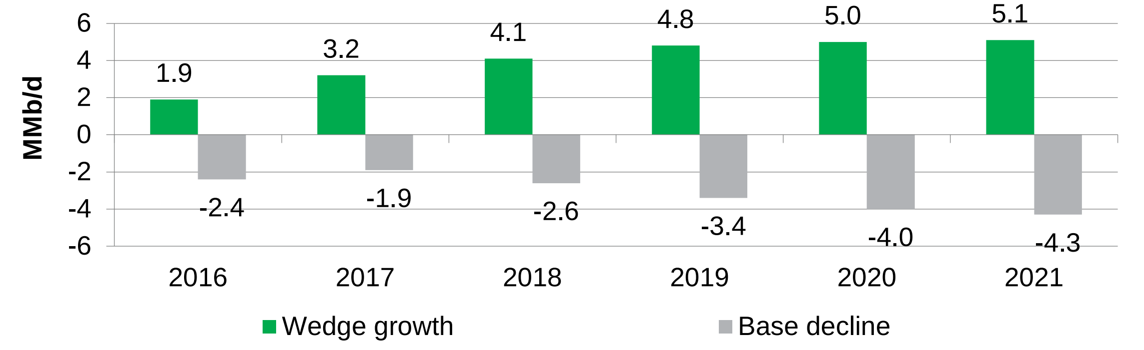
US onshore base decline and wedge production (January–December)



Source: IHS Markit

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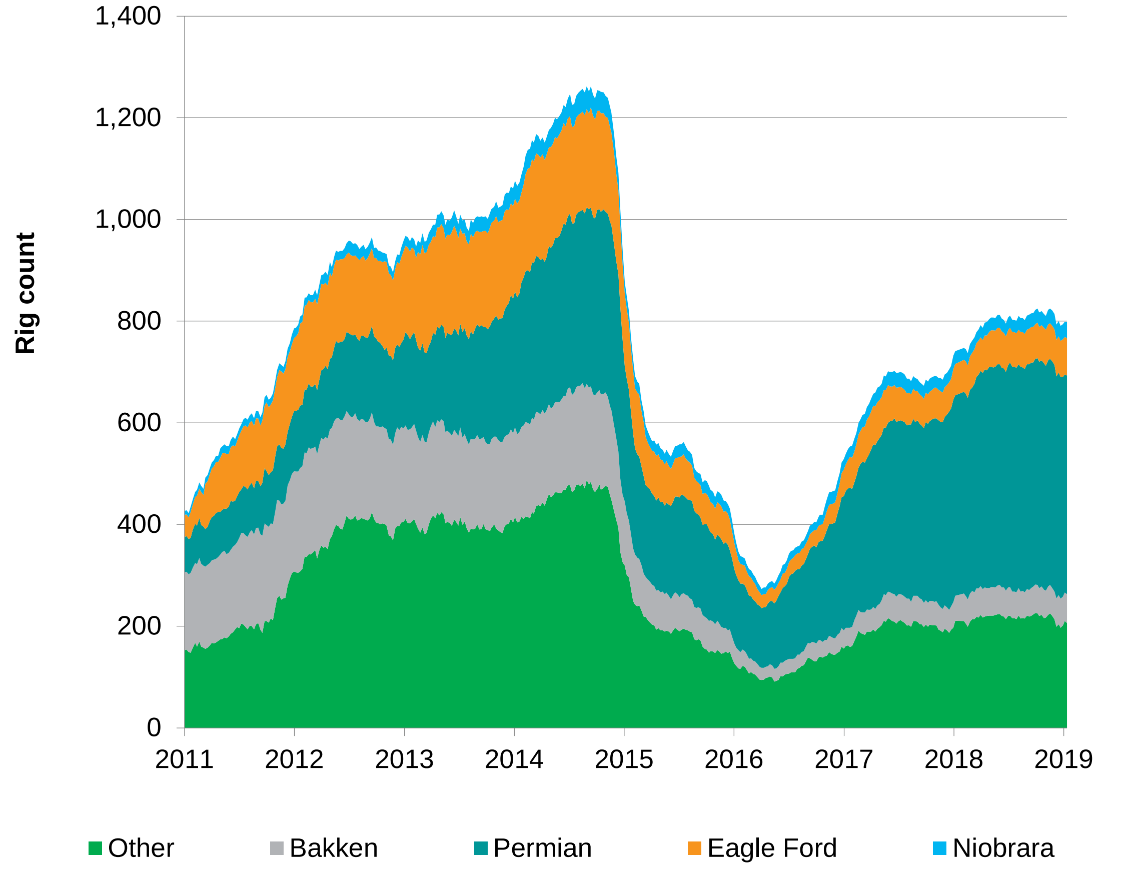
- After growing nearly 2.0 MMb/d from January to December 2018, US crude oil production, in our expectation, will rise by 1.2 MMb/d by end-2019 and by 700,000 b/d by end-2020, equating to annual average growth of 1.5 MMb/d and 1.1 MMb/d, respectively.
- Our outlook assumes that WTI averages about $60/bbl during the outlook horizon. Although lower than the 2018 average of $65, these price levels are still sufficient for producers to generate 1 MMb/d or more growth while generally spending within cash flow. However, if prices were to drift lower to a $50–55 WTI level, onshore producers would have to choose between growth and returning cash to shareholders.
- Despite the steady growth of the past two years, the 12 MMb/d system still has the potential for large swings in production. Shale producers have proven highly sensitive and responsive to even relatively modest changes in oil prices.
  - Public companies' actual capex growth in 2018 was 18%, more than double initial guidance of 8% at the beginning of the year. Higher oil prices transmitted quickly to more spending on drilling. If prices were to sustain in the mid-$60s or higher during 2019, we would expect another blockbuster year of 2 MMb/d "entry-to-exit" growth.
  - However, if WTI prices were to decline to $45 or below, growth could happen only through industry overspending and borrowing. But investors are now demanding that producers demonstrate capital discipline, which makes this unlikely. Production declines would follow any halt to drilling and completion growth because of the very large and fast-declining production base.
  - Plausible price scenarios, therefore, could result in very different paths for end-2019 or end-2020 US production, anywhere in a wide 2 MMb/d-plus range.

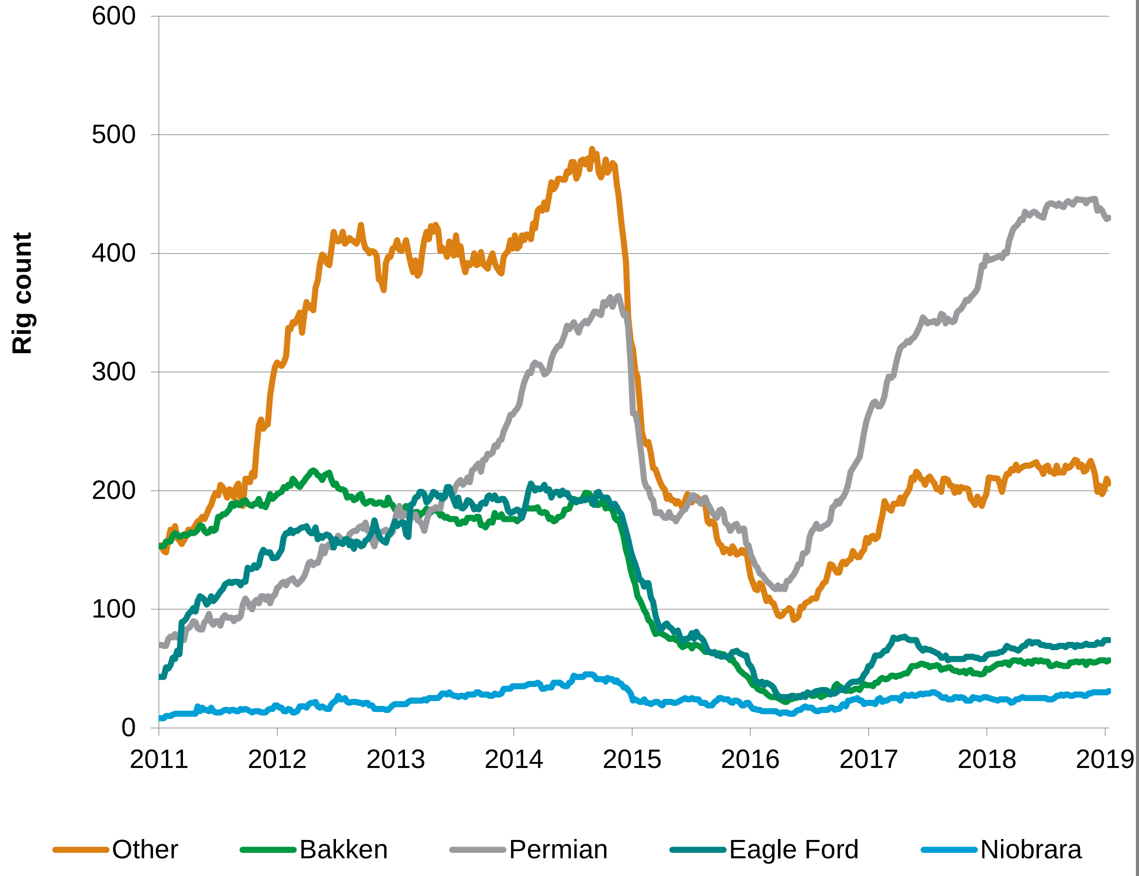
US rig count growth appears to have plateaued for now

US horizontal oil rig count by play



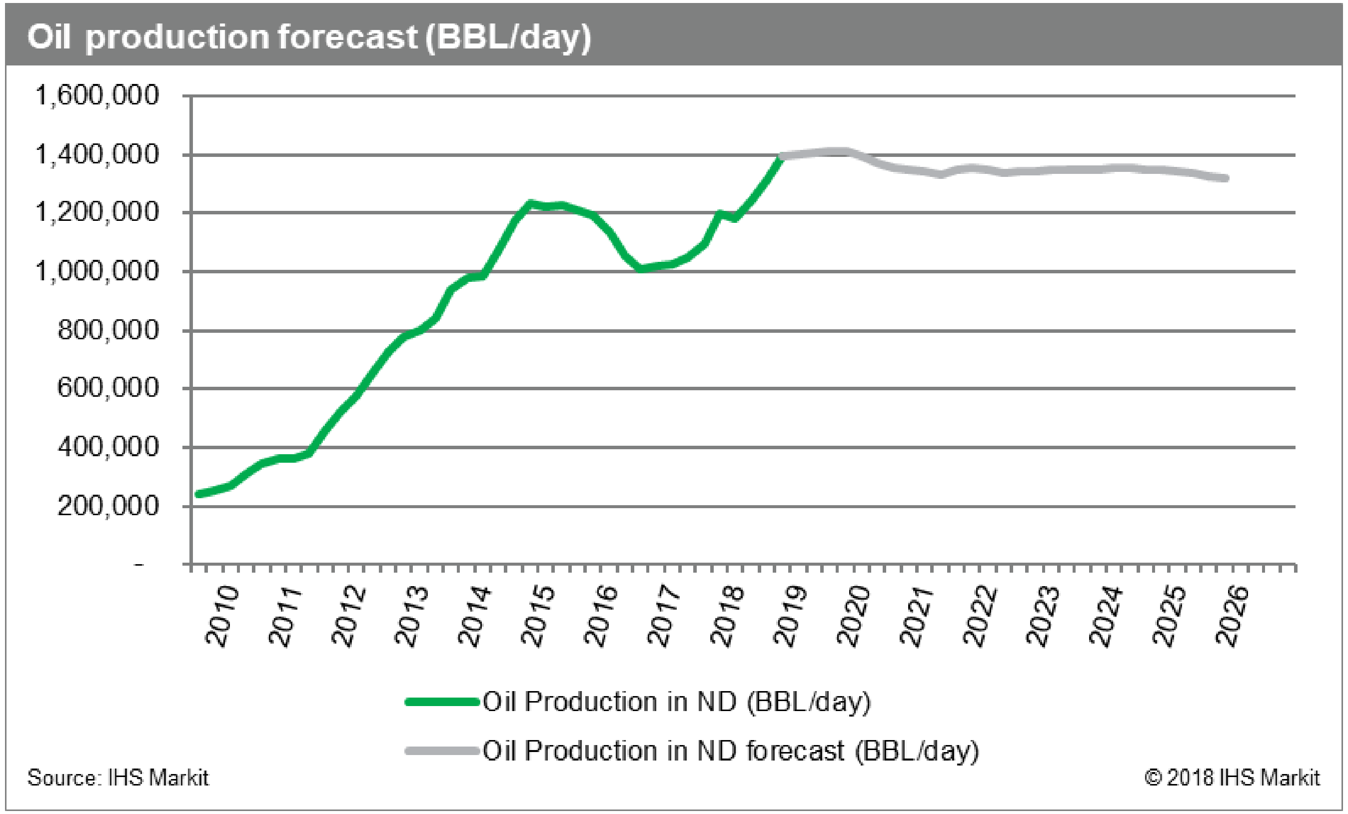
Source: Baker Hughes, IHS Markit

US horizontal oil rig count by play



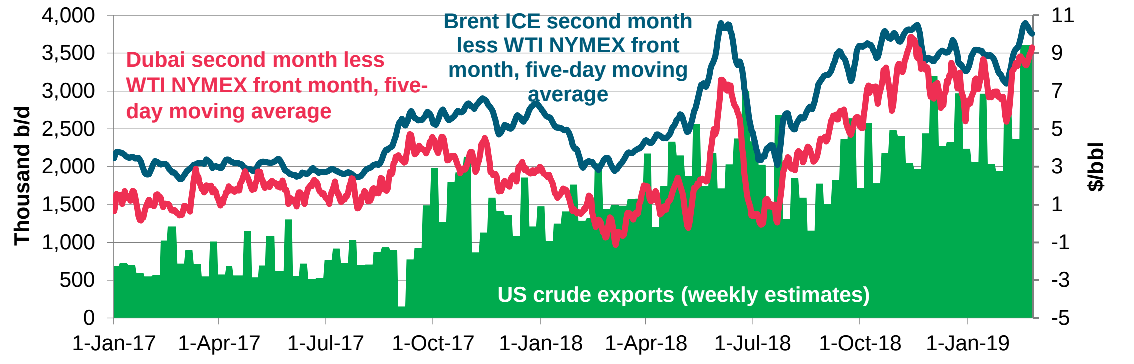
Source: Baker Hughes, IHS Markit

Bakken oil production expected to peak in 2019/2020 before further slow-down



US crude exports reach new heights

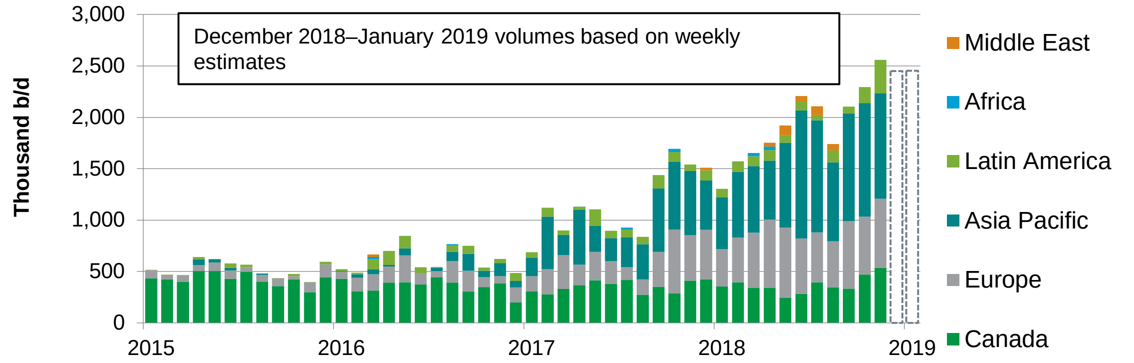
US crude oil exports and Brent-WTI futures time spread



Source: IHS Markit, EIA

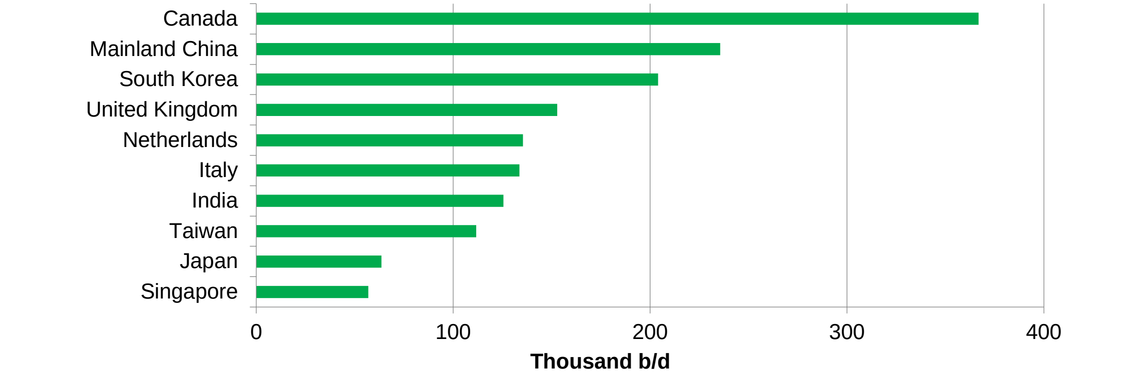
- US exports hit a new monthly average record of 2.55 MMb/d in November, according to the latest full monthly Census data. And the latest EIA weekly report estimated that crude exports had surpassed 3.6 MMb/d the week ending 15 February, by far the strongest weekly level yet recorded.
- November's record monthly exports featured only a trickle of oil to China (8,000 b/d), which resumed shipments after stepping out of the market in August as trade relations deteriorated between the United States and China. Exports to Canada, Latin America, and Europe were quite strong in November and more than offset the small volumes to China.
- A resumed widening of the Brent-WTI and Dubai-WTI spread suggests that arbitrage economics will remain broadly favorable to rising US export volumes.

US crude and condensate exports by destination



Note: FSU = former Soviet Union.
Source: IHS Markit

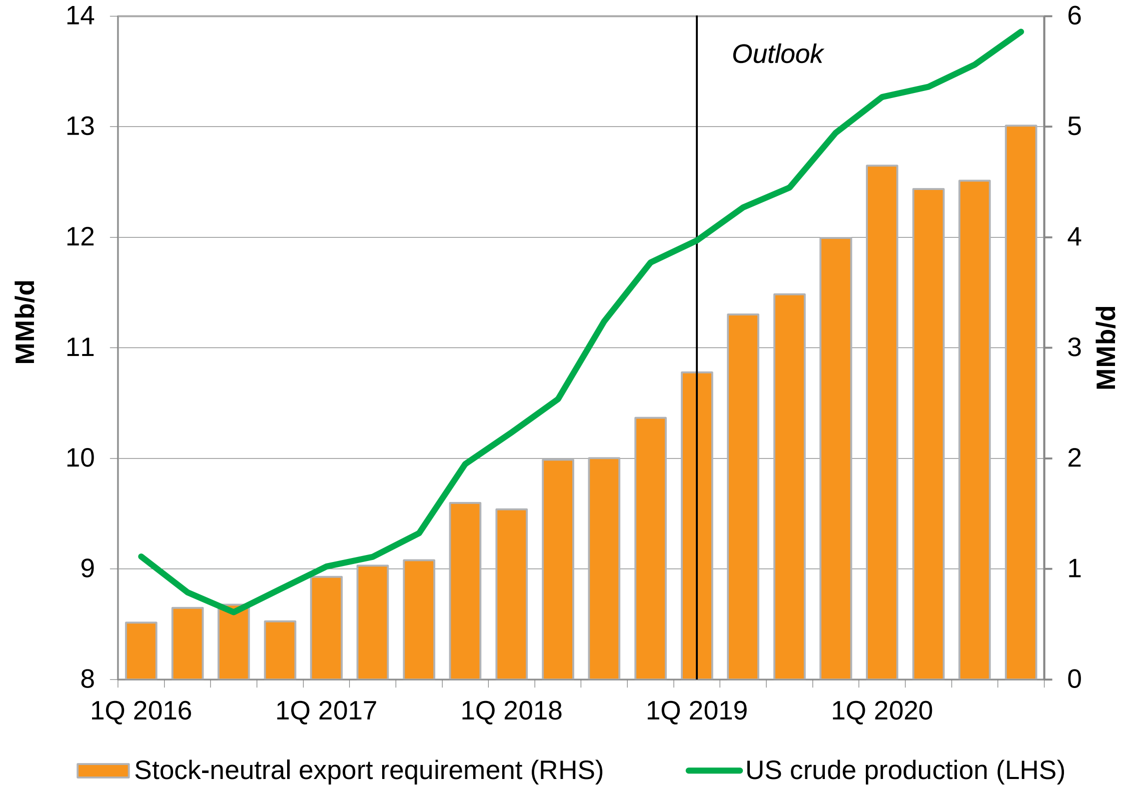
Top 10 destinations for US crude, 2018 average



Source: IHS Markit

US crude export requirement will climb very quickly—can it be absorbed?

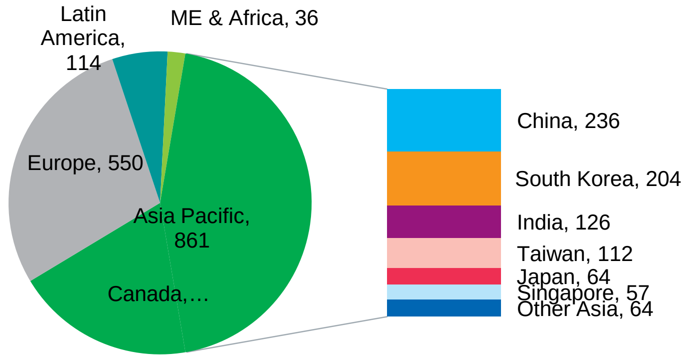
US crude export level required to balance domestic crude inventories



Note: The stock clearing level represents the volume of crude exports required to offset domestic production given the IHS Markit outlook for refinery throughputs and US crude imports.
Source: IHS Markit

- The United States exported about 2 MMb/d on average in 2018, double 2017 levels. Even with production growth decelerating in 2019–20, US exports will still need to rise on average by about 250,000 b/d per quarter to keep inventories in check.
- We expect exports will need to rise to 4 MMb/d by end-2019 and 5 MMb/d by end-2020, based on our expectations for refinery runs, imports, and production. The US export market will need to transition from infancy to adulthood more rapidly than any major exporter ever has.
- Finding a market for all this crude—most of which is light, sweet—could be challenging in such a compressed time period. China will remain the fastest-growing consumer of crude and therefore remains critical for absorbing growing US exports. US crude prices may have to discount further to encourage demand, especially as many of Asia's big new refineries were designed to run Middle Eastern sour grades.

US crude and condensate export destination by region, 2018 (thousand b/d)



Notes: Data through November 2018
Source: IHS Markit

Outlook for US and Canadian crude price differentials

- **Light-heavy differentials on the Gulf Coast will remain exceptionally narrow through first half 2019.** Vienna Alliance production cuts, sentiment from Alberta’s mandated supply curtailment, and expected further reductions of Iranian output have reduced global availability of medium and heavy crudes and strengthened heavy crude prices. The Trump administration sanctions against PDVSA effectively ban Venezuelan crude exports to the United States, and we expect Venezuelan production (which is mostly heavy) to drop to 740,000 b/d in fourth quarter 2019, compared with 1.14 MMb/d in fourth quarter 2018.

- **Western Canadian heavy crude price differentials are expected to widen back to reflecting rail economics over the course of 2019, although there is considerable uncertainty on the timing.** Western Canadian crude prices remain strong after more than a month of Alberta’s curtailment. However, our Canadian crude balances indicate that the WCS-WTI differential should widen back to levels more indicative of rail-based netback pricing by midyear. However, the precise timing of this shift is in a state of flux because of shifting Alberta government curtailment rules and uncertainty surrounding available pipe and rail capacity.

- **WTI-Cushing should remain weak relative to the Gulf Coast and international prices through first half 2019.** The Brent-WTI spread has widened, driven by rising ongoing congestion at the Cushing hub, which we expect to persist as crude flows into the hub exceed outbound flows. However, starting in the second half of the year, large-diameter pipelines out of the Permian will begin streaming, which should act to strengthen Cushing, Midland, and other inland pricing centers.

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Presentation

North Dakota Ag Prospects

March 2019

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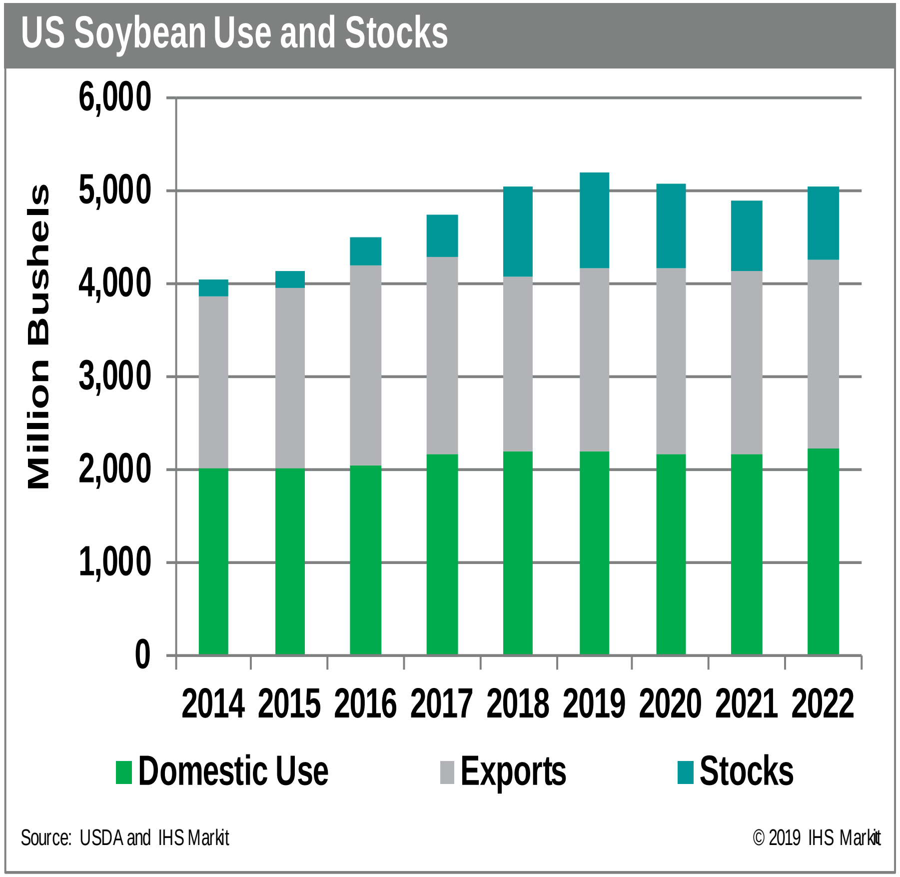
Oilseeds

Despite large supplies of US soybeans, trade issues will lead to weak prices and a reduce share of world trade

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Marketing Year Average Price $/Bu	10.10	8.95	9.47	9.33	8.85	8.96	8.80	9.59	9.34
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
U.S. Share of World Production	33%	34%	33%	35%	35%	32%	31%	30%	31%

- As we move into the forecast period we expect US soybean acreage and production to move lower and eventually some reduction in carry-over inventories will take place. The balance is finally struck during the 2020 crop year allowing for modest price recovery in the out years of the forecast
- The expectation of normal / trend yields in South America and some growth in Brazils planted area continues to erode US share of World soybean production and trade.

US Soybean production outpaces demand



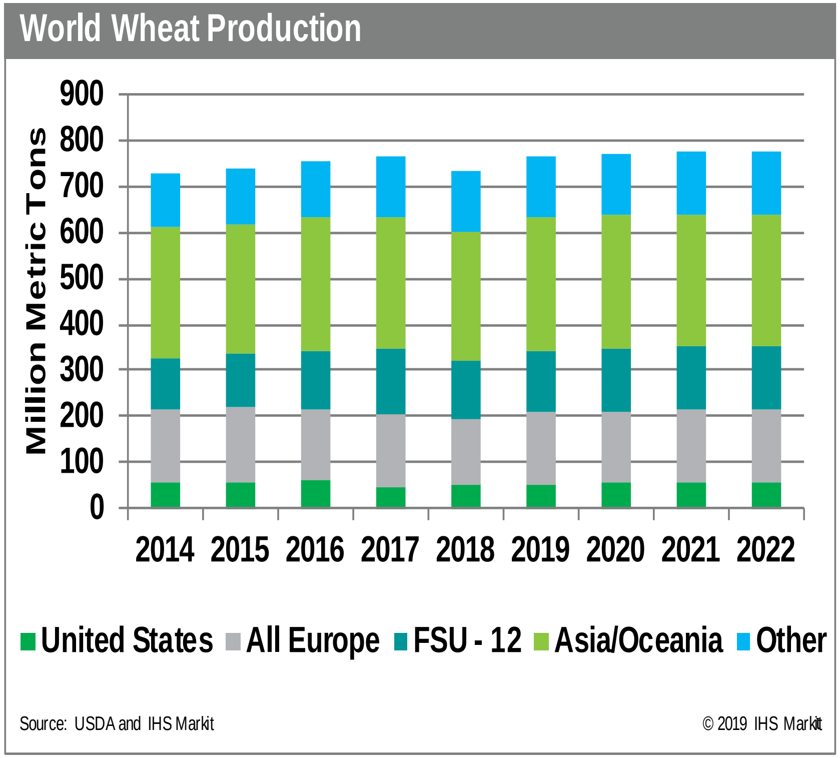
- US Soybean acreage is expected to retrench in response to lower prices in the near term.
- ND soybean acreage has been roughly 5 million acres for the past 3 years and yields have seen a little give and take leaving production at 240 million bushels - about the same as 2016 and 2017.
- The ND canola crop came off very large in 2018 totaling over 3 billion pounds - the increase was almost entirely due to strong yields.

Current Crop Year Prospects for Soybeans

- Trade conflict with China continues to hit US soybeans particularly hard – total exports down more than 30% from year-ago levels
- The 2018 US Soybean crop came in at a record 4.5 billion bushels – putting more pressure on inventories..
- North Dakotas soybean crop came in at 243 million bushels basically flat with 2017. The crop was cut back in the final production estimates.
- Farm level soybean prices in ND were $8.05 in January compared with $8.81 the same time last year.

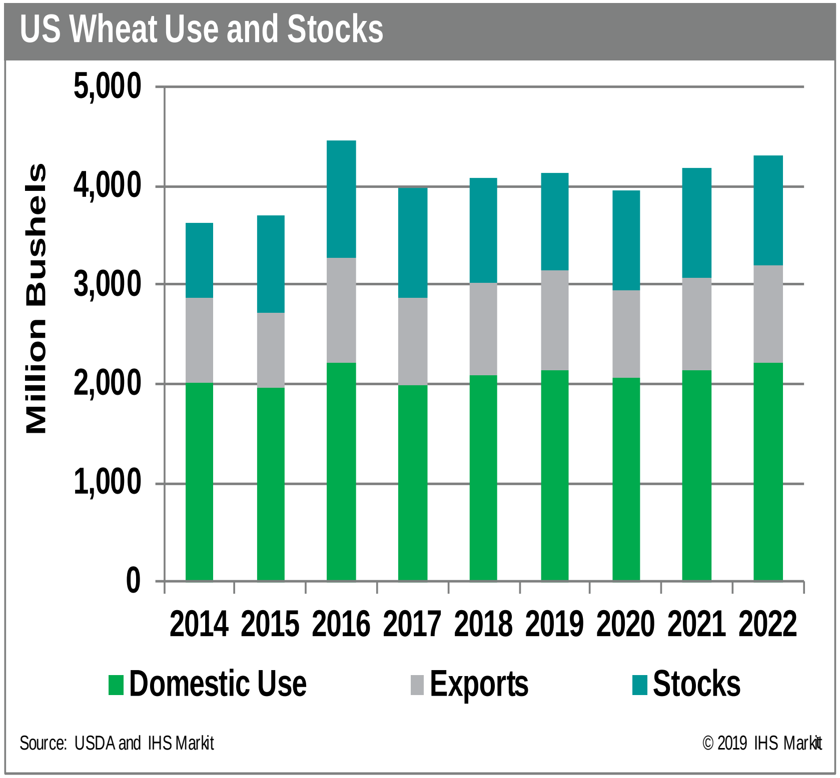
Wheat

Soybean production improves globally 2018/19



- US wheat production rebound some in 2018 while some major producers including Russia experience a significant shortfall.
- Current expectations call for increased US production in the forecast period allowing US exports to benefit.
- The 2018 ND wheat crop came in strong, particularly the hard red spring wheat crop. Total ND wheat production was up roughly 50% from 2017 at 364 million bushels. ND was the top wheat producing state in 2018 by a wide margin.

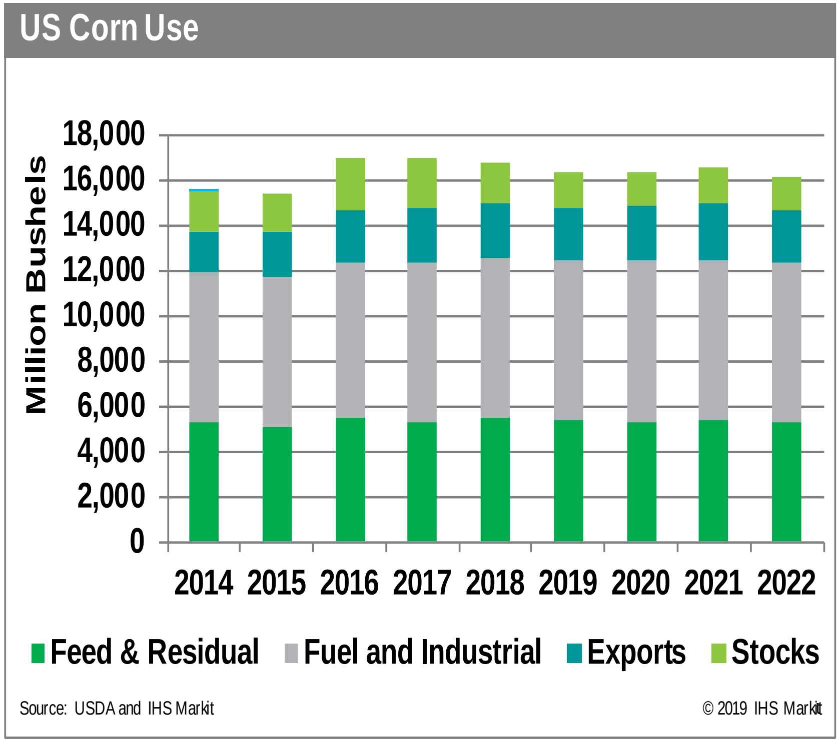
US wheat situation relatively stable



- Through the end of February US wheat exports were off about 6% compared with year ago levels – but strong sales indicated for the remainder of the market year could hope close the gap.
- ND wheat plantings were very strong in 2018 and are expected to remain near 7.5 million acres during the forecast period.
- Wheat prices are expect to average about 10% above the prior season and reduced stock levels will help keep prices above the low levels experienced in 2016 and 2017.

Corn

US corn situation – reduced stocks allow for some pice strength



- ND reduced corn planted acreage in 2018 while most other states held corn area mostly constant. A strong rebound in ND yields resulted in flat production in 2018 at 448 million bushels.
- ND farmers are expected to increase corn area in 2019 as a result of better prices and strong yield in 2018.
- A return to ,somewhat lower, trend corn yields is expected to cause supplies to tighten and keep prices above recent lows.

Other Crops

- The 2018 ND Hay crop came in with favorable yields and good weather allowed for expanded acreage to be harvested – production for the state came in at 4.4 million tons, up from 3.4 million tons in 2017. While much of this hay is used on farm to support the beef industry the rebound in production provides a strong foundation for the ND livestock industry.
- ND Sugar beet yields were off from 2017 as was planted acreage – overall production feel from 6.4 million tons to 5.7 million tons. ND is the number 3 sugar beet producing state. The number one producing state, Minnesota, also saw lower acreage and yields in 2018.
- ND is the top producer od dry edible beans in the US, typically accounting for 25% or more of total production. The 2018 crop came in with respectable yields and very little abandonment of planted acreage. Total production for the state came in at 10.8 million CWT. down from 12.4 million CWT. In 2017. Strong production in other producing states has driven prices down by 10% from year ago levels.

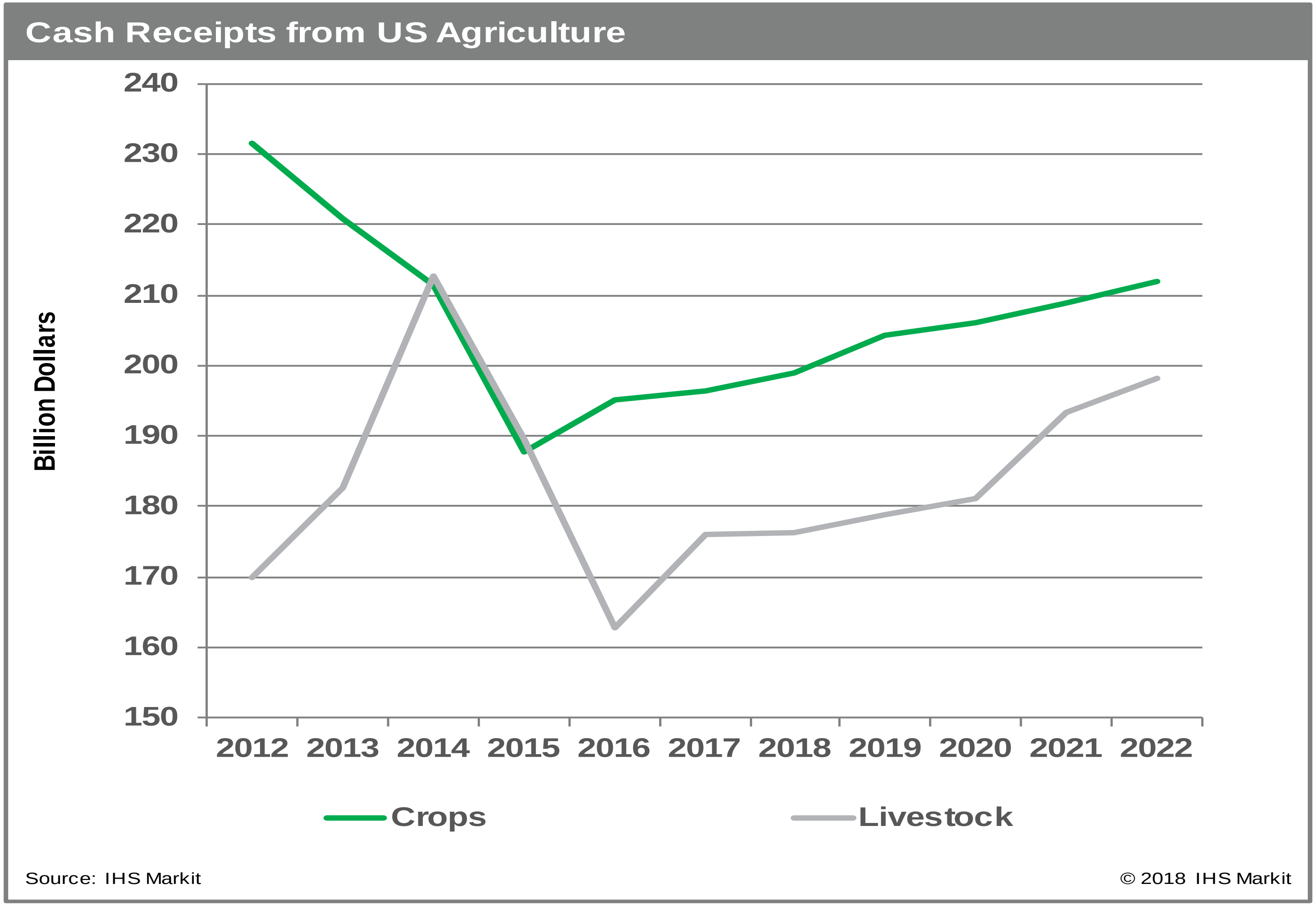
Beef Sector

US Beef Sector

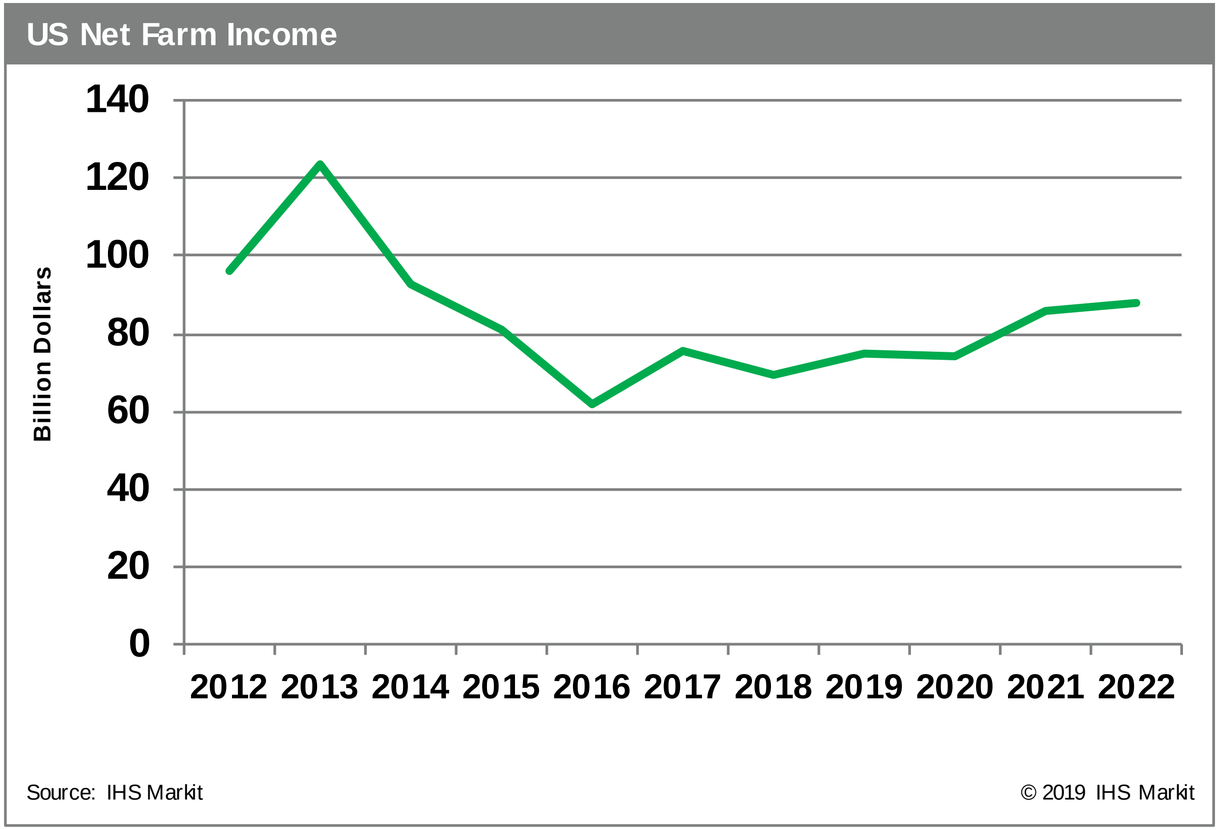
- ND Cattle ranchers are slowly rebuilding their herd with both beef cow number and cattle that have calved numbers up from year ago levels as of January 1, 2019. Feeder cattle prices are expected to be basically flat for the next year or so before starting to rise in 2020.
- US per capita meet consumption levels are expected to remain relatively high with 2018 coming in very strong.

US farm income and short term trade risks

Cash receipts from US agriculture are expected to slowly recover during the forecast period



Increased cash receipts will be met with some increases in production cost, moderating the rise in net farm income. While US agriculture will not return to the 2013 euphoria we do think the bottom has passed.



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