intelligent OPTION INVESTOR

IOI ChartBook – Union Pacific (UNP)

Update: No matter how we slice it, Union Pacific is significantly overvalued.

March 1, 2017

Three Things You Should Know About Union Pacific

For information, please contact:

Erik Kobayashi-Solomon

+1 646 801.2464

- **Much of Union Pacific's business stands to be hurt by the announced policies of the Trump administration.**

  There's no way around it – Union Pacific's business thrives on trade. Intermodal freight – Union Pacific's largest shipping category by revenues – has a large exposure to international trade and transporting containers from Los Angeles and Long Beach to Chicago and other inland terminals. Agriculture and Automotive freight has a huge dependence on NAFTA-related flows of goods – both imports and exports. These categories are likely to be severely impacted by the Trump administration's stated trade policies. One freight category – Industrial – is likely to be boosted by Trump's border wall and whatever infrastructure spending is actually done, but this will be too small of a bump to offset slow-downs in other areas. President Trump believes he can regulate a rebound in coal. He can't. The death of coal has a lot to do with economics and physics, and the laws of both fields are not subject to government prerogative.

- **Our analysis suggests that the company's executives are "battening down the hatches" to prepare for a tough operating environment in the near future.**

  The company looks as though it scrambled to conserve cash by careful working capital management and also dialed back its 2016 investment spending. 2017 spending is also likely to be cut nearly in half. All management teams signal to the market and to their investors. We believe Union Pacific's management team is signaling that difficult operating conditions lie ahead.

- **We believe the positive "Balance Sheet Effect" of Union Pacific's kid gloves regulatory environment is now balanced by a negative Balance Sheet Effect from its exposure to international trade.**

  Show me an admirer of "free market economics" and I'll show you someone who is severely deluded. The US railroads are heavily subsidized at the expense of shippers and the consumers who buy their products. We discuss the evolution of the lax regulatory environment which leads to these subsidies in our earlier reports on Union Pacific.

  This dynamic convinced us in April 2016 not to take a bearish position in this stock – a decision which saved us 10 months and counting of frustration and unrealized position losses. However, at the present time, we believe the positive effects of lax government regulation are offset by the potential large negative effects of the disruption to international trade mentioned in our first bullet point.

  No investor can escape from market risk, but we believe a bearish investment in Union Pacific to have very little valuation risk.

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Valuation Overview

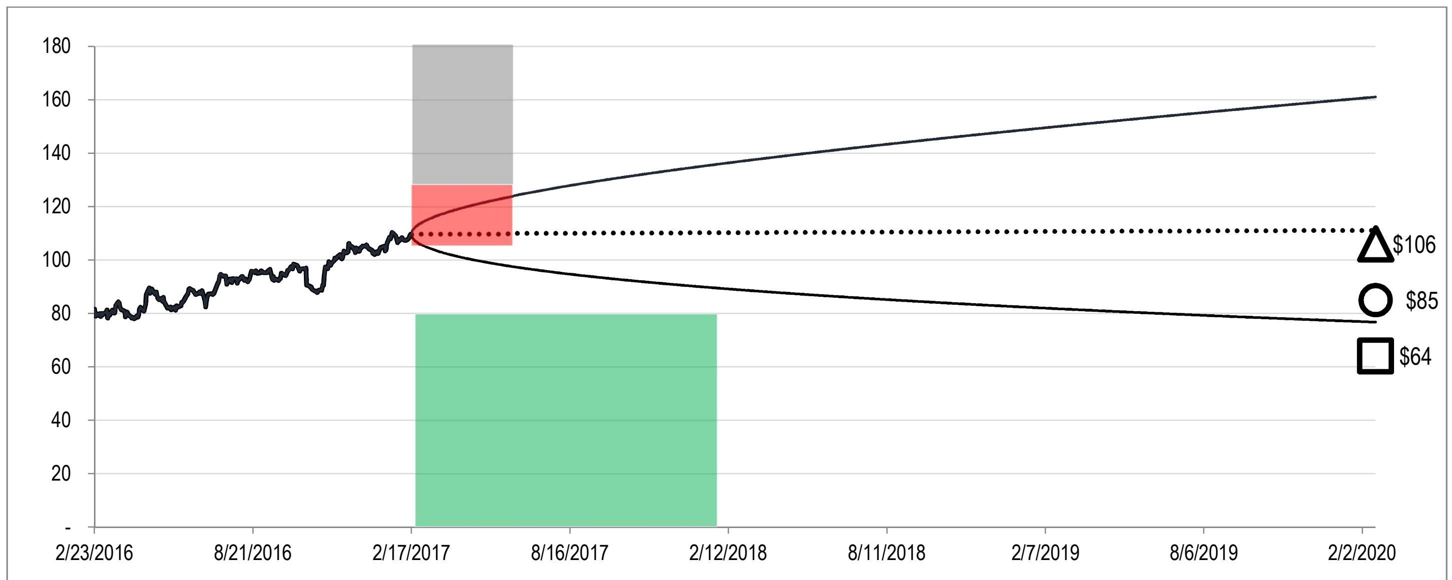

Figure 1. Source: YCharts, CBOE, IOI Analysis. Geometrical markers show IOI's best-case (triangle), worst-case (square), and equally-weighted average value (circle). Cone-shaped region indicates option market's projection of Union Pacific's future stock price. The red-shaded region represents the sale of a close to At-the-Money (ATM) call option "spread" on Union Pacific's stock; gray-shaded region represents the purchase of a call option to cover our upside exposure; green-shaded region represents the purchase of a far Out-of-the-Money (OTM) put option on Union Pacific's stock. See also our *Investment Structuring section, later in this report.*

	IOI Best Case	IOI Worst Case	Historical Median
Year 1-5 Average Revenue Growth	11%	5%	5%, 7% (5, 10-year)
Year 1-5 Average Profitability	27%	23%	23%, 21% (5, 10-year)
Year 6-10 Cash Flow Growth	7%	5%	11%

The revenue growth assumptions listed in the table above are much faster than what we think is economically possible. We have used these much faster revenue growth rates as a tool to stress-test our valuation. Even using these assumptions, Union Pacific appears overvalued.

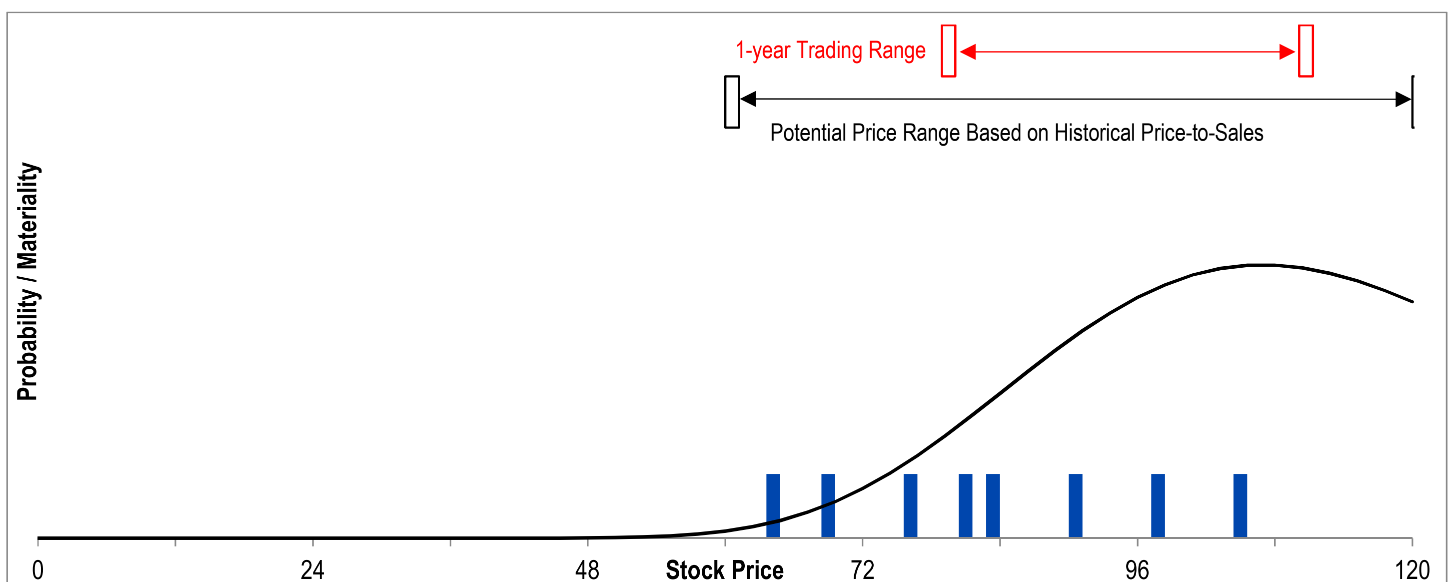

Figure 2. Source: CBOE, IOI Analysis

The complex valuation range shows valuation scenarios relatively evenly spaced from $64 per share to $106 per share. We believe the likely values are toward the bottom end of this range.

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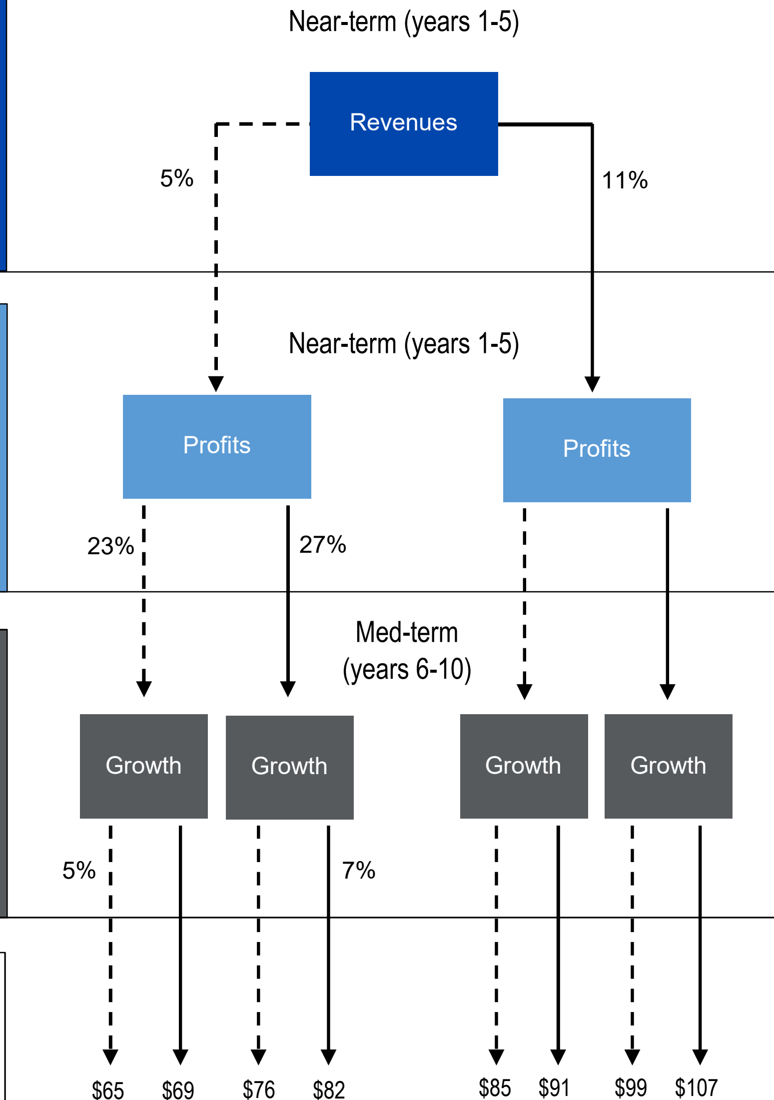
Valuation Waterfall

Revenue Growth
Our present revenue growth assumptions are based on a statistical analysis of Union Pacific's historical revenue growth rates. We consider even our worst-case assumptions to be much too bullish due to a variety of factors discussed in this report. Union Pacific's revenues have been aided by an enormous consolidation in the industry We are modeling this company as thought that enormous consolidation will happen again – it won't.

Profitability
Our profitability assumptions are unchanged from our April 2016 forecasts as we see no reason to change them. Actual 2016 profitability was very high, but we believe this is due to the company's managers preparing for a difficult operating environment in the near term. See our comments regarding working capital management and investment spending in the appropriate sections later in this report.

Medium-Term Cash Flow Growth
Union Pacific's historical cash flow growth has been very high, thanks to industry consolidation and reduced regulatory pressure. We see evidence that its investment projects in the 2010-2011 time period are generating much less bang for their buck than those projects started in the 2006-2007 timeframe. This trend is likely to continue, in our opinion.

Fair Value Range
We believe this fair value range is too high and the scenarios represent a stress-test of our April 2016 model. Our April 2016 view on the demand environment and revenue growth appears to be on target. Our 2017 valuation is designed to see how far we could stress credulity with our operating assumptions, then see what kind of valuation range those assumptions implied. This is it.



Methodology

IOI analyses focus on three main valuation drivers: revenue growth, profitability, and medium-term cash flow growth. We estimate a best- and worst-case scenario for each of these drivers resulting in a total of $2^3 = 8$ fair value scenarios based on discounted cash flow methodology. Profitability is measured by Owners' Cash Profit (OCP) margin. We use a discount rate of 10% for large capitalization stocks.

A wide spread of lowest and highest fair values indicates a firm whose value is uncertain. Risk depends on the stock price's relationship to the valuation range.

Best-case scenarios are represented with a solid line; worst-case scenarios, with a dotted one.

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Valuation Drivers

Revenue Growth

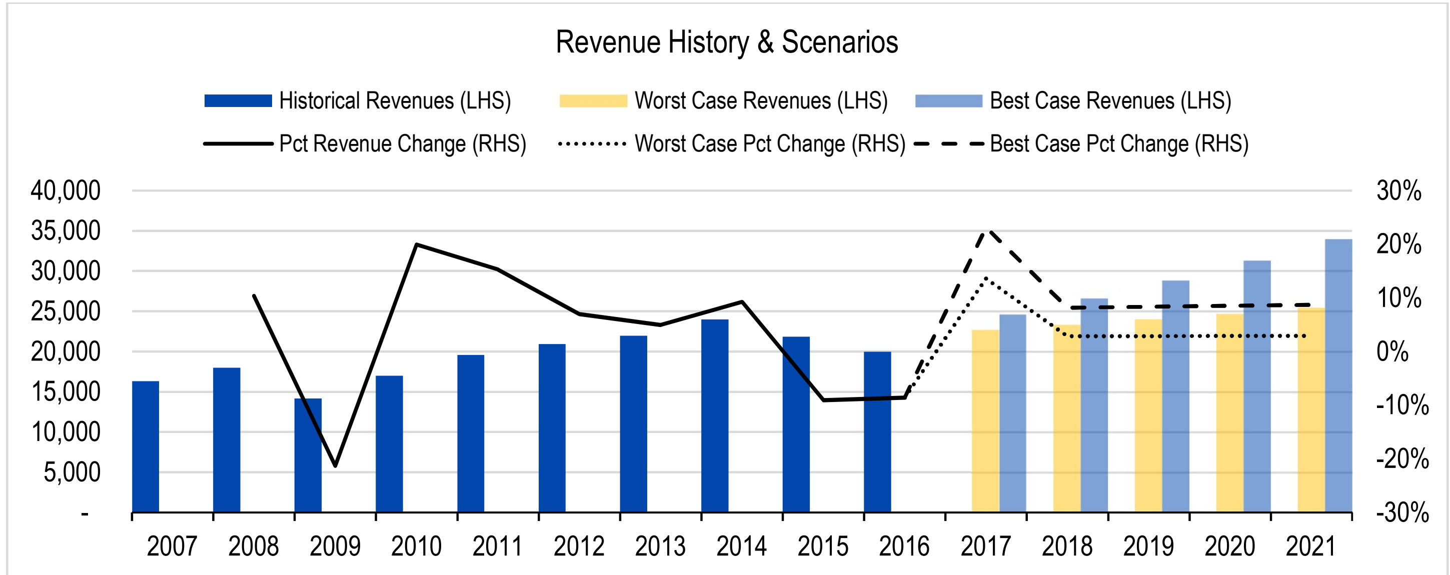
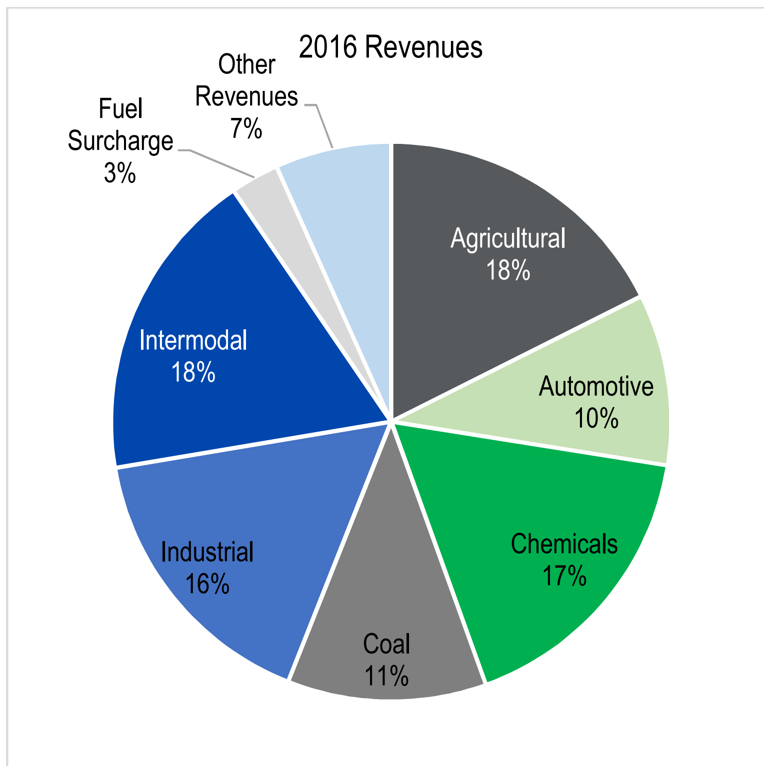


Figure 3. Source: Company Statements, IOI Analysis

Our best-case revenue scenario assumes a significant rebound in demand generating a 11% growth in years 2017-2021. In contrast, our worst-case scenario assumes a 5% annual growth during those years. Both scenarios are based upon build-ups for each of Union Pacific's business types as listed below. You can find those build-ups in the Segment-Level Revenue Projections section of this report.



Other Revenues are mainly those of its subsidiaries, charges received from operating commuter rail services, and fees for storage, equipment rental, and the like.

We estimated that **Fuel Surcharges** are proportional to "revenue ton-miles" for each freight type, so estimated freight type revenues excluding these surcharges. Fuel surcharges during 2016 were very low compared to historical due to the fall in the price of oil.

Union Pacific does not operate in **Mexico**, but, as we will see in the following pages, its Agricultural, Automotive, and Coal operations do a lot of business transporting to and from our southern border. In all, roughly 10% of UNP's 2016 revenues were related to trade with Mexico.

In the pages that follow, we review the demand environment for each freight type.

Figure 4. Source: Company Statements, IOI Analysis. In the company's statements, fuel surcharges are included in each of the freight types. We have adjusted segment-level revenues and modeled Fuel Surcharge separately.

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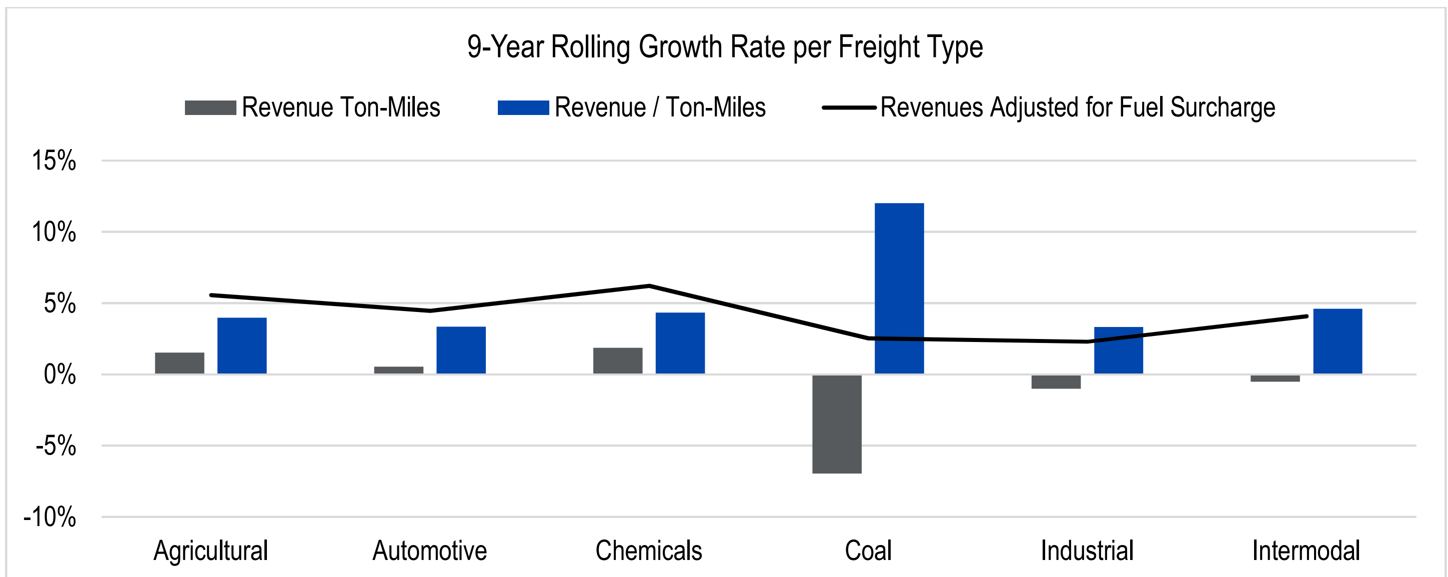

Figure 5. Source: Company Statements, IOI Analysis.

In the railroad business, volume is expressed in “Revenue Ton-Mile” terms. This figure represents the distance a ton of freight can be hauled to generate revenue (some hauling is transferring from one track to another, so is not charged). After adjusting freight revenues by the fuel surcharge, we derived a figure of Revenues per Revenue Ton-Mile to generate an estimate of the price the company is charging its shipping clients.

In the figure above, we see that the blue columns – representing price – have increased an average of the low- to mid-single digit percentage range each year over the previous nine for all the freight categories but Coal, which increased in the low-teens percentage range. Notice that the gray columns – representing volumes – have increased much slower (Ag, Auto, Chemicals) or fallen (Coal, Industrial, Intermodal).

We think this mismatch is a perfect visual representation of Union Pacific’s pricing power, which we believe has its roots in a lax regulator that is hesitant to enforce restrictions against unfair trade practices. We address this issue in an earlier report.

The remainder of this section analyzes the demand environment for each of UNP’s freight categories.

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Agricultural – Roughly One-Fifth of Revenues

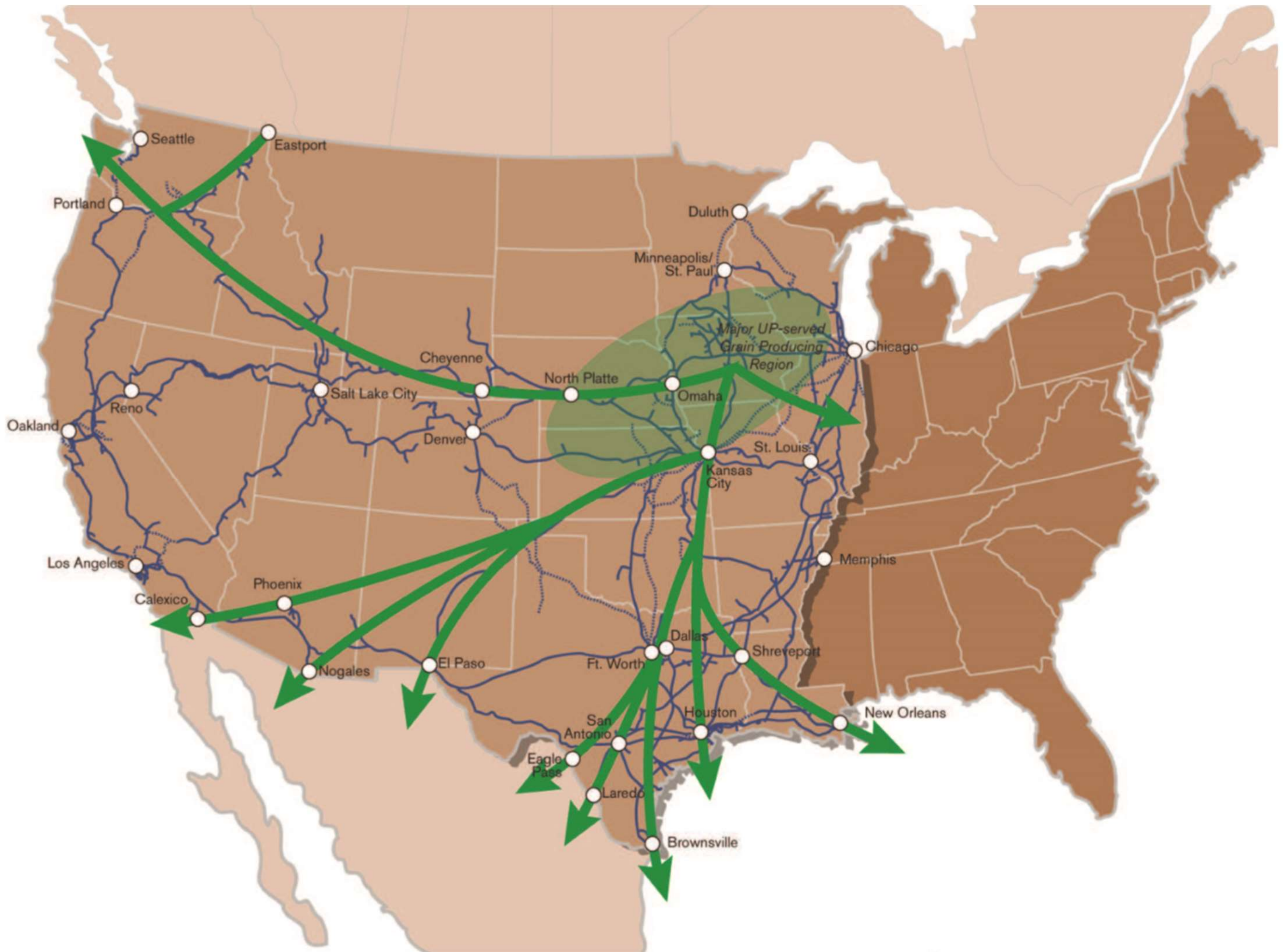

Figure 6. Source: 2015 Union Pacific Factbook

Listening to President Trump, one might be forgiven for thinking that NAFTA's sole outcome was destroying well-paying manufacturing jobs in the US. In fact, the opening of Mexican agricultural markets to US farmers has been a big boon to domestic corn and soy producers. Agricultural products, grown on huge-scale industrial farms in the Midwest decimated Mexico's agricultural sector and is at least part of the root cause for unskilled Mexican labor seeking work north of the border. President Pena-Nieto seems anxious to renegotiate NAFTA with President Trump, and agricultural products is likely one of the topics that Mexico most wants to revisit.

Union Pacific generates roughly 10% ($2 billion in 2016) of its revenues from trade to and from Mexico, and we believe a large proportion of this is related to agricultural tonnage. Clearly, if President Trump decides to play hardball with President Pena-Nieto and imposes a border tax for automotive and other manufactured parts (more about that later), a logical Mexican response would be to levy similar tariffs on US corn. Trump's political support in the American Heartland is likely to wane if and when US farmers start seeing corn prices collapsing.

Roughly a fifth of Union Pacific's agricultural freight revenues are associated with milk products, which much be refrigerated in transit. Wisconsin members of Congress have complained that many of their constituents have no practical alternative than to ship by rail, and most agricultural areas are served by only a single carrier (west of the Mississippi, this is either UNP or BNSF). The regulator should be deciding rate cases in favor of agricultural shippers, but for reasons discussed in an earlier report on Union Pacific, this has not happened over the last 20 years or more. If the regulator was to start regulating, we would see a slower increase in pricing, but we do not foresee this happening.

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Automotive – One-Tenth of Revenues

Figure 7. Source: 2015 Union Pacific Factbook

Note that while Automotive revenues make up only about 10% of overall, transportation costs are high, so the revenue earned per carload is much higher for these products than for corn, for instance.

One of the two of the most prominent streams in the map above moves west from the port in Los Angeles; the other moves northeast from production facilities on the Mexican border. 54% of Union Pacific's automotive freight volume in 2016 represented the shipment of finished cars, and we believe these are likely imported vehicles coming into the Port of Los Angeles and across the Mexico-US border from NAFTA-enabled Maquiladores.

Much of the other 46% of automotive revenues associated with auto parts is likely due to shipping of partially-finished goods to Mexican Maquiladores for final assembly, so the degree to which Union Pacific's Automotive freight business is exposed to trade frictions is high.

The other dynamic worth considering is the pace of auto sales, which has been on a downward trend since fall of 2014.

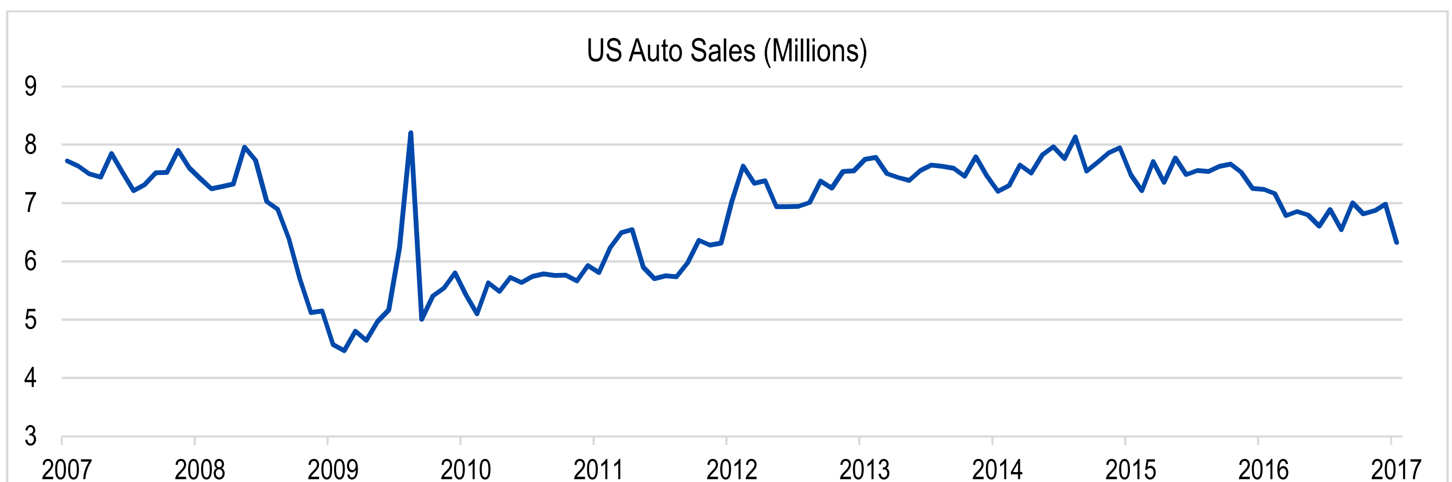

Figure 8. Source: Bureau of Economic Analysis via YCharts

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Chemicals – 17% of Revenues

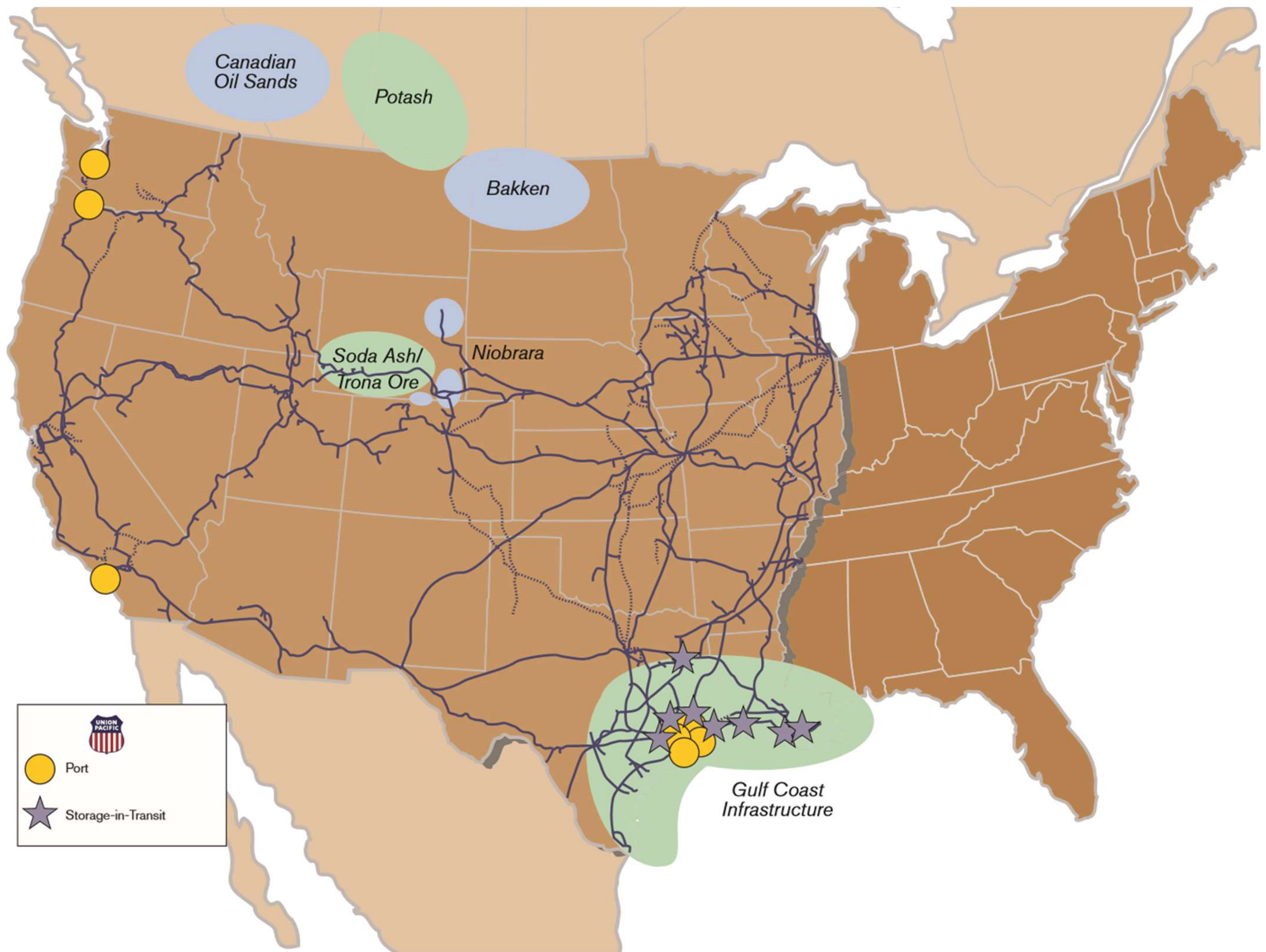

Figure 9. Source: 2015 Union Pacific Factbook

From the figure above, you can see how important the Texas and Louisiana Gulf Coast are to Union Pacific. The lion's share of UNP's Chemicals business (around 44%) is refined petroleum products (e.g., LPG and plastics), with the remainder being split between fertilizers and "industrial chemicals" (e.g., Sulphur, Soda Ash, Phosphorus).

We have discussed how trade policy may affect the market for agricultural goods, and the same issues may affect demand for fertilizers. Other types of freight are typical cyclical goods (Soda Ash is used in glass production, for instance) which will be in greater demand under good economic conditions and in less demand under poor ones.

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Coal – Roughly One-Tenth of Revenues

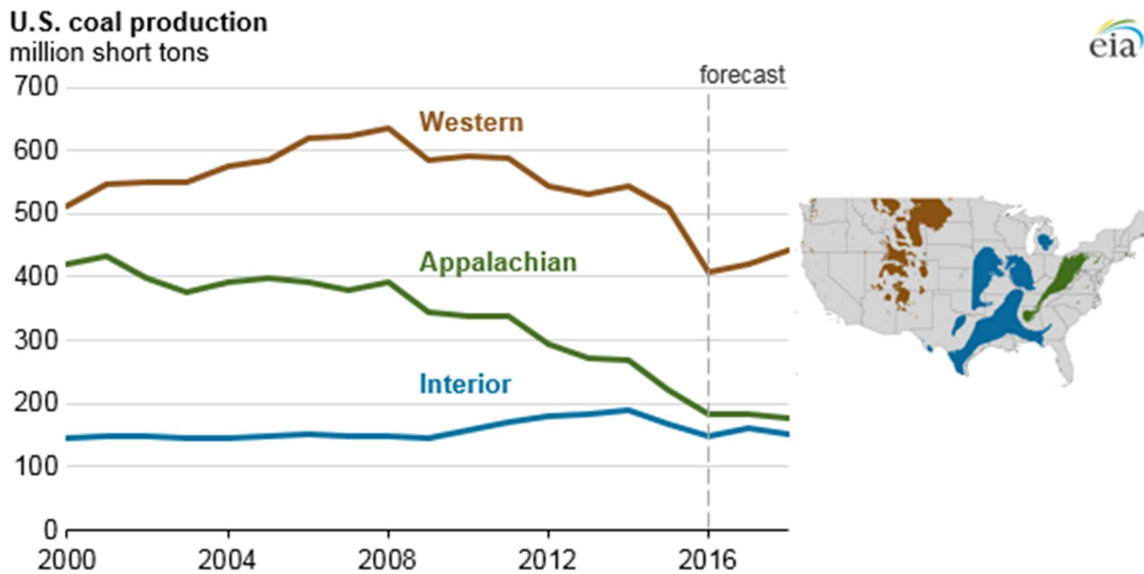

Figure 10. Source: Energy Information Administration Short-Term Energy Outlook report (February 2017)

Coal comes in two varieties – metallurgical coal, used in the steel-making process, and thermal coal, used in the process of generating electricity. As I understand it, metallurgical coal has lower Sulphur and other impurities within it, and forms a solid "cake" when heated out of the presence of Oxygen; it is mainly found in the Appalachian region. Thermal coal has a higher proportion of impurities and disintegrates into powder, rather than remaining in cake form when superheated; in coal-fired power generation plants, this powder is injected into a furnace to heat a boiler that creates the steam that drives an electric generator.

Union Pacific mainly transports thermal coal out of the Powder River Basin (PRB) in Wyoming and from mines in Utah and Colorado. Over three-fourths of the coal it carries is mined in the PRB.

Despite coal industry PR, thermal coal is not a clean-burning fuel, and EPA regulations have contributed to a fall in coal production in the US; coal production peaked in the US in 2008. The fall in mined coal volumes is not only due to regulatory issues, however; fracking has made natural gas a much cheaper source of fuel for power generation than coal and renewable sources are increasingly price competitive. While natural gas prices remain low, it is likely that more power plants will be built that use natural gas as a fuel stock and the proportion of coal-fired generation plants will fall. Exacerbating this issue is a natural decline in the energy content of US coal (a drop of 20% since 1950) associated with the highest grades of coal (anthracite and low-volatile bituminous) being mined first.

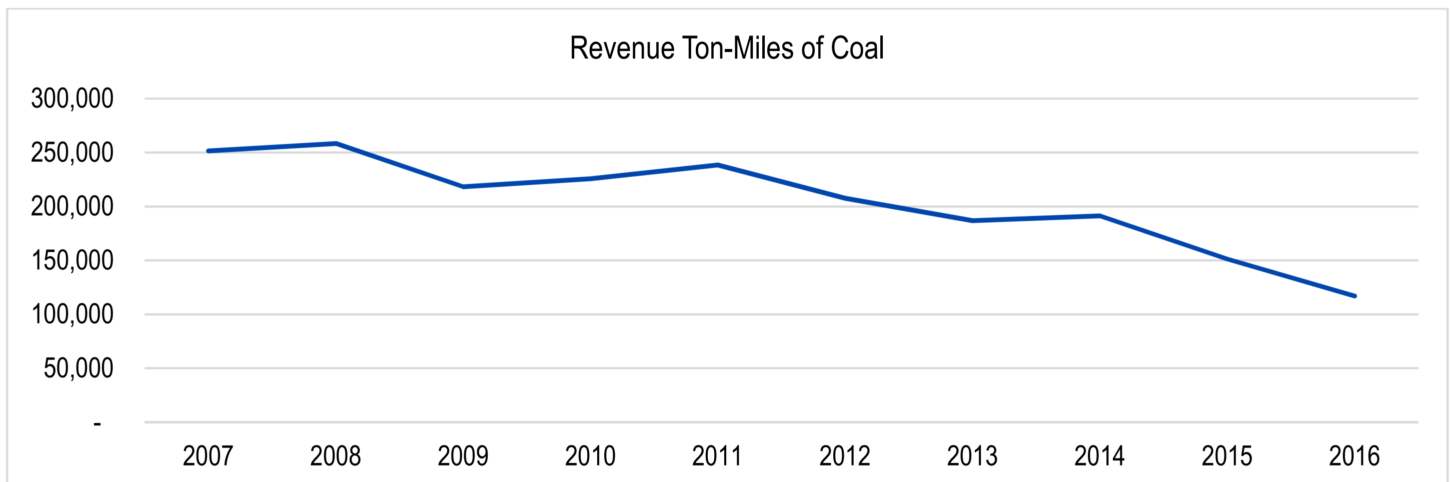

Figure 11. Source: Company Statements, IOI Analysis

President Trump has stated that he wants to bring the coal industry back to economic prominence. I'd like to have a Ferrari stuffed full of neatly bundled $100 bills. Neither is likely to happen any time soon. In figure 10 above, you can see that the EIA forecasts an uptick in production of Western coal based on the agency's forecast for an increase in the price of natural gas. If the EIA is correct, there may be a short-term bump in coal volumes transported, but the secular trend is certainly downward.

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Industrial – 16% of Revenues

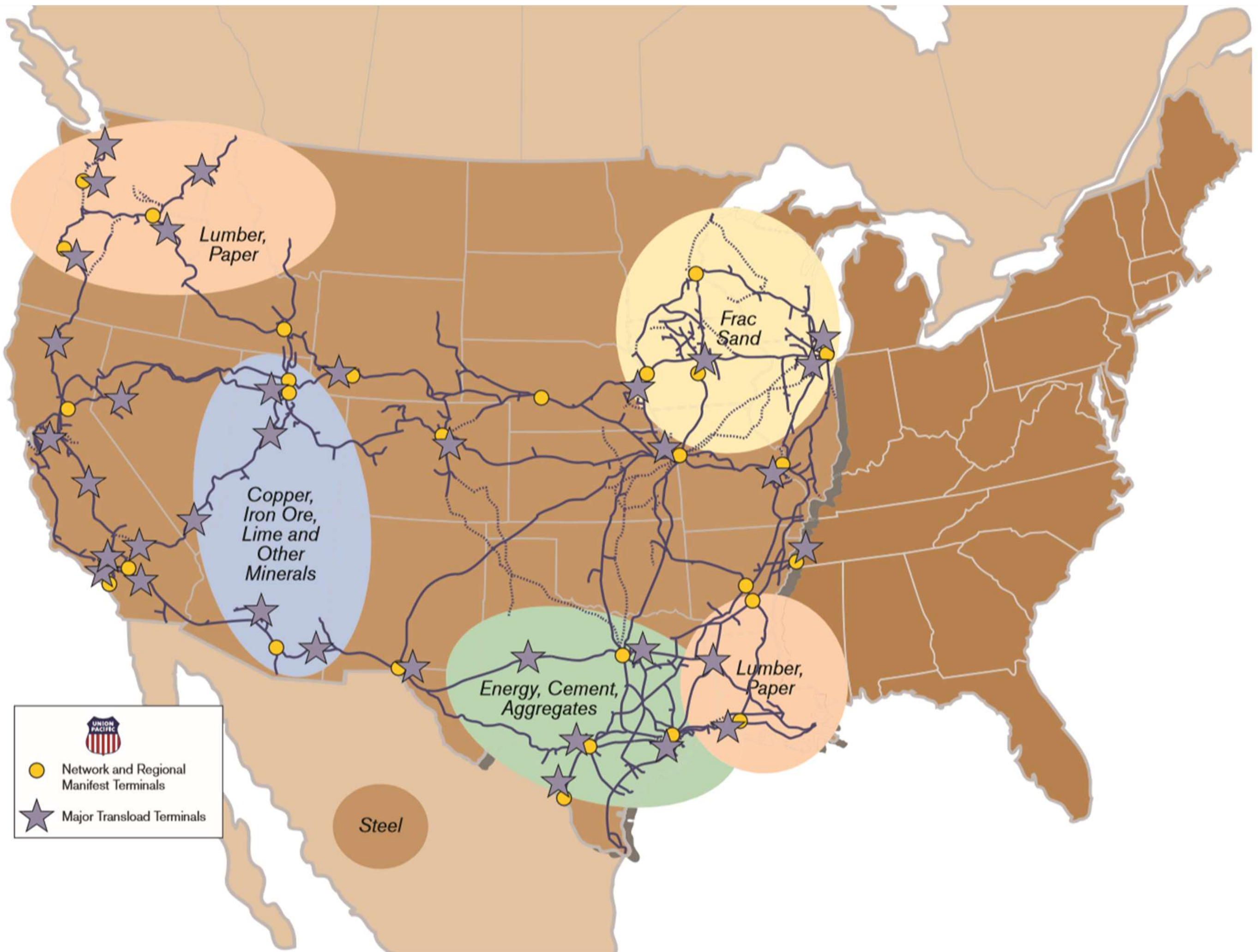

Figure 12. Source: 2015 Union Pacific Factbook

Roughly half of Union Pacific's Industrial freight is related to construction-related items (cement, "aggregates" – rocks and pebbles, and lumber). Probably another quarter of the business is related to energy production – the carriage of fracking sand and steel used in energy mining.

In another report, we laid out our reasoning for being suspicious that the Trump Administration will be able to push through the massive infrastructure bill promised during the election. However, were this stimulus come to pass, that and the construction of a southern border wall would, at least, increase demand for construction-related items.

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Intermodal – Roughly One-Fifth of Revenues

Lane density based on carloadings. Line thickness depicts traffic density.

Figure 13. Source: 2015 Union Pacific Factbook

The split between international and domestic Intermodal traffic is roughly half and half. The thick line coming in from the Port of Los Angeles and Long Beach represents the containers filled with Asian beach sandals, flat screen TVs, and other nick-knacks that us consumers are so crazy about.

President Trump has threatened a 45% tariff on Chinese exports; if this were to happen, it is not hard to imagine that thick river flowing out of Los Angeles drying up. A drop of 20% in the 50% of International Intermodal freight that represents 20% of Union Pacific revenues implies a revenue headwind of 2 percentage points.

In our report on the Investment Implications of the Trump Presidency, we point out that, in addition to trade frictions, the sum total of Trump's economic policies – were they to be implemented as described so far – will likely result in an inflationary environment (see this news story about the likely effect at the checkout line of a move of Apple device production to the US). If this were to happen, we believe that there would likely be a fall in domestic consumption, and this would impact the other half of Union Pacific's Intermodal freight volume.

In total, the effects of the new Trump Administration's economic and trade policies are likely to be much more damaging to Union Pacific than they are to be helpful. Agriculture, Automotive, and Intermodal – three of the most important freight categories – are likely to be hurt; Chemicals may not be affected one way or another; Industrial transport may increase due to building projects; Coal is in a secular downtrend.

With this analysis of the demand environment complete, we move on to an analysis of Union Pacific's profits.

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Profitability

Note that we assess profitability using our favored measure – Owners' Cash Profits (OCP) – a measure similar to Buffett's concept of "Shareholder Earnings."

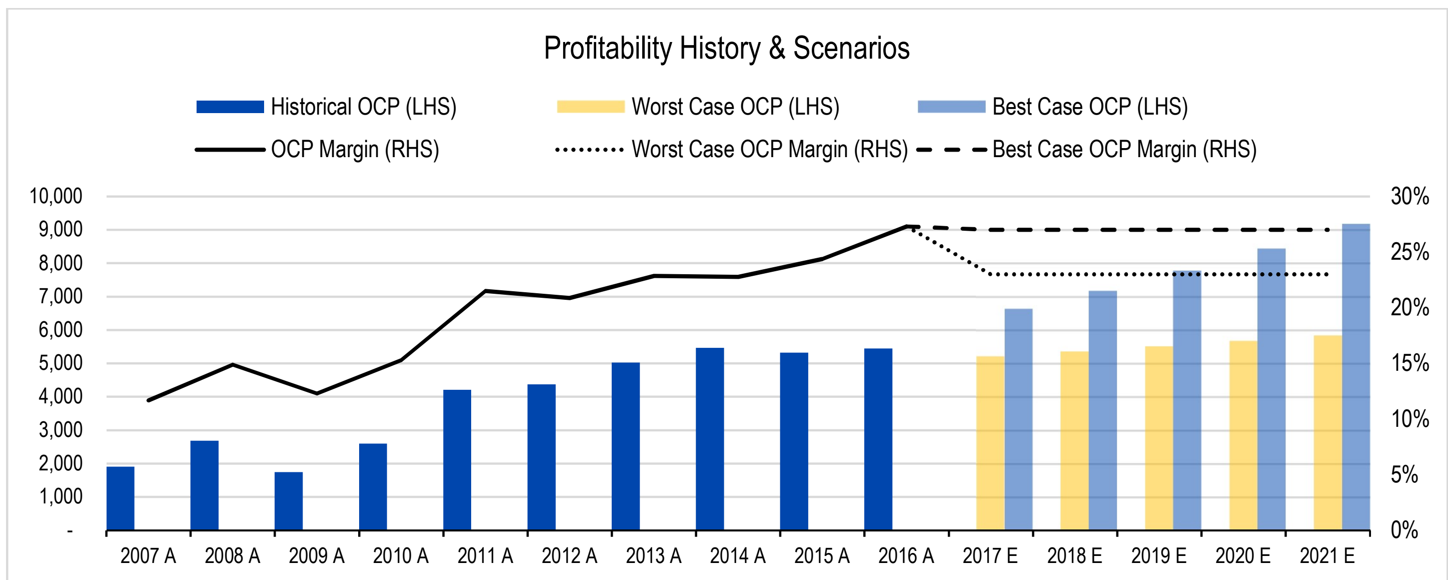

Figure 14. Source: Company Statements, IOI Analysis

Union Pacific's 2016 profitability was outstanding – coming in at the very high end of our range. Our analysis of the company's 2016 financial statements suggests that Union Pacific is managing its working capital carefully, perhaps due to an internal realization of tougher times ahead.

Our best- and worst-case profitability assumptions (27% and 23% OCP margin, respectively) are identical to the scenarios used in our spring 2016 valuation.

Investment Level

Expansionary Cash Flow is IOI's measure of investment spending net of asset sales and divestments.

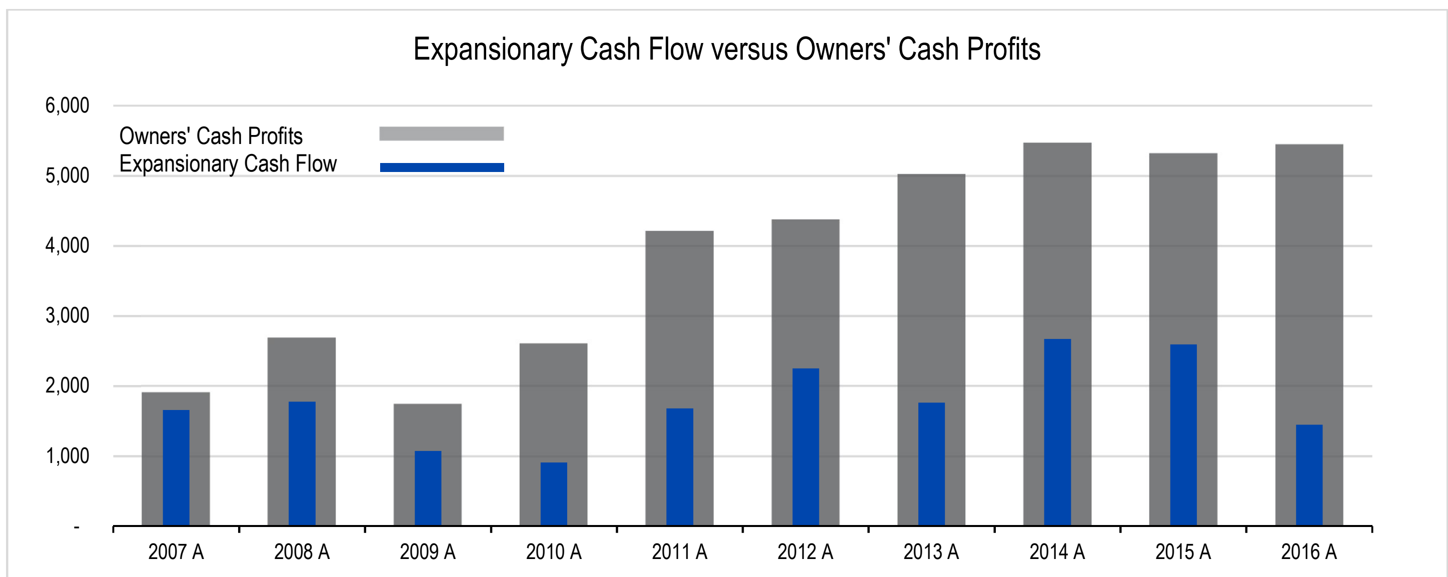

Figure 15. Source: Company Statements, IOI Analysis

Union Pacific's relatively low level of investment in 2016 – spending only 27% of its owners' profits in comparison to our short-term forecast of 45% – also suggests that the firm may try to be conserving cash in advance of tougher business conditions. Investment level is a critical element of short-term Free Cash Flow to Owners, so we will continue to check our assumptions against actual spending.

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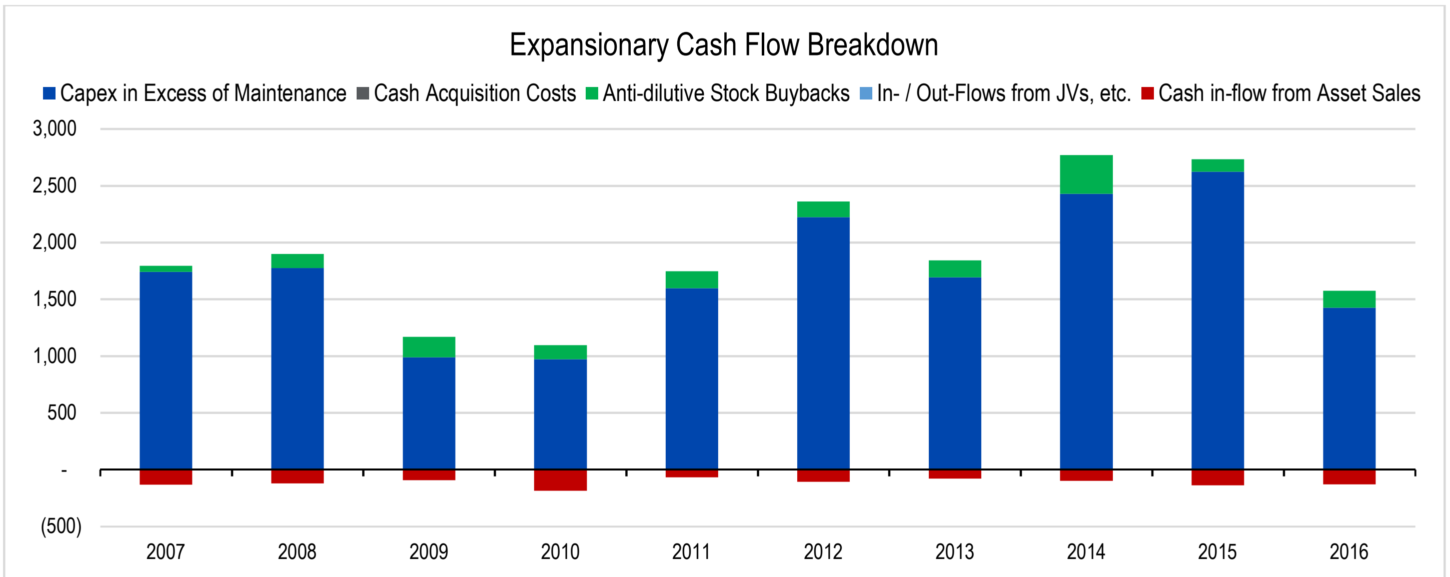

Figure 16. Source: Company Statements, IOI Analysis

Asset sales look about typical for 2016, as do cash flow associated with anti-dilutive stock buybacks. The biggest difference in investment spending is the cash spent on capital expenditures in excess of those needed to maintain the business as a going concern. Note the similarity of this spending pattern to capital expenditures in 2009 and 2010. This chart gave extra credence to our belief that the managers are preparing for more difficult operating conditions.

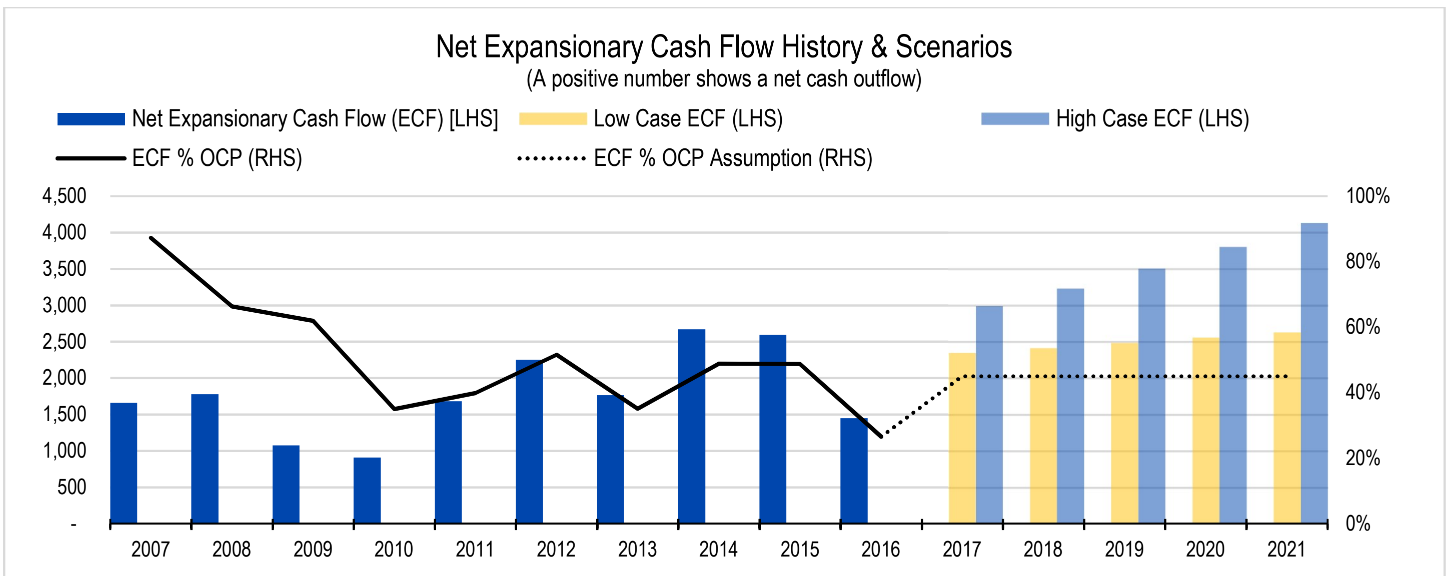

Figure 17. Source: Company Statements, IOI Analysis

The proportional decrease in investment low spending in 2016 is clear from this image. Reading through the 4Q 2016 conference call transcripts, the firm suggests that its 2017 capital plan is going to be down from 2016. If we cut 2017 expansionary spending as a percentage of Owners' Cash Profits, our fair value range moves up by around $2 per share, which we would consider within a reasonable margin of error. If we are wrong about the firm's normalized level of necessary investment spending, our fair value estimate range will be too low.

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Investment Efficacy

Corporate investments lead to profit growth. IOI measures profit growth versus the standard yardstick of nominal GDP growth to assess the efficacy of the company's past investments.

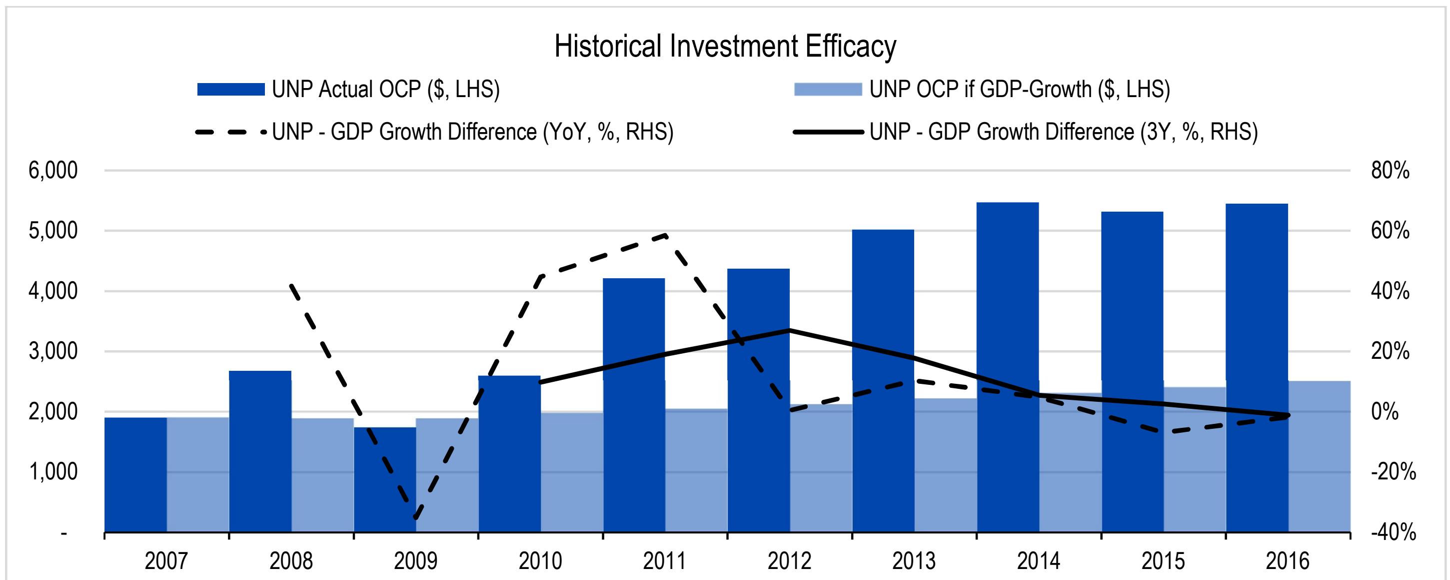

Figure 18. Source: Company Statements, Bureau of Economic Analysis, IOI Analysis

Looking at Union Pacific's investment efficacy using this 10-year window and a fixed starting point, it appears extremely strong. However, notice that the most dramatic jump of UNP's profits in comparison to nominal GDP occurs in 2011 and is subsequently much less notable.

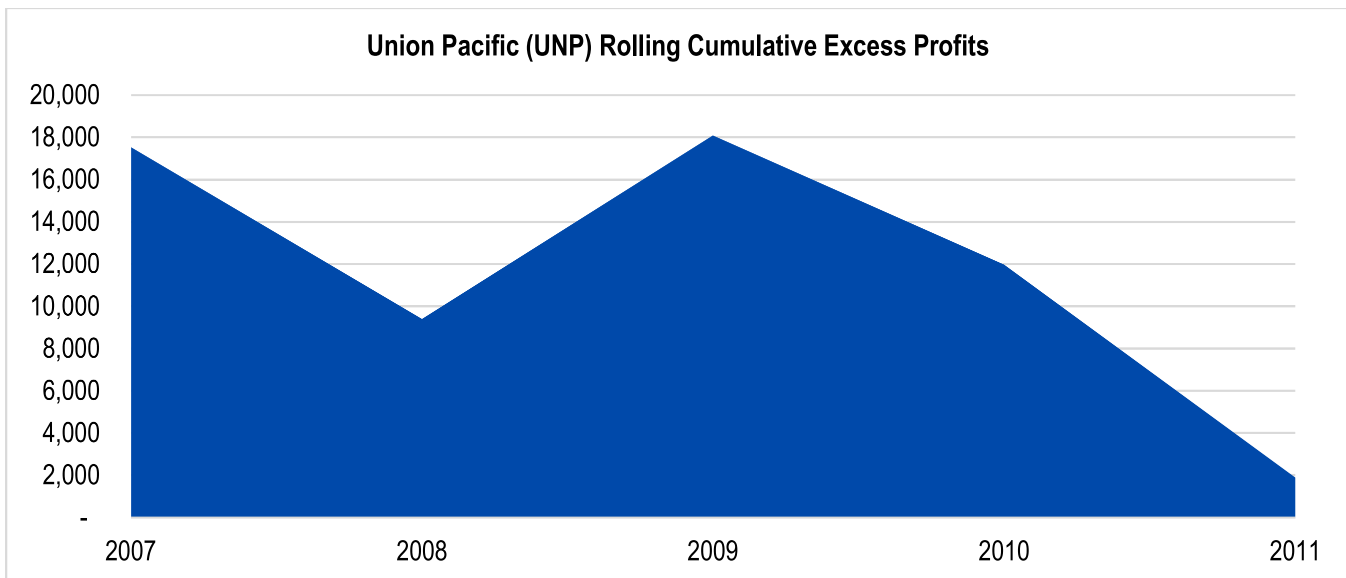

Figure 19. Source: Company Statements, IOI Analysis

The graph which we call the Rolling Cumulative Excess Profits view (explained fully in this post) shows the fall off in profit growth outperformance as time goes on. What this means is that the companies early investments – in 2007 and 2008, for example – generated high levels of subsequent growth, but that the companies later investments – especially those in 2011 – generated much more modest growth in the subsequent period. We believe that the lowest hanging fruit in Union Pacific's operating world has already been picked, so future profit growth is more likely to be closer to the growth of the economy overall.

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Free Cash Flow to Owners

[Free Cash Flow to Owners (FCFO)] is the metric IOI uses to value companies. It equals Owners' Cash Profits less Net Expansionary Cash Flow.

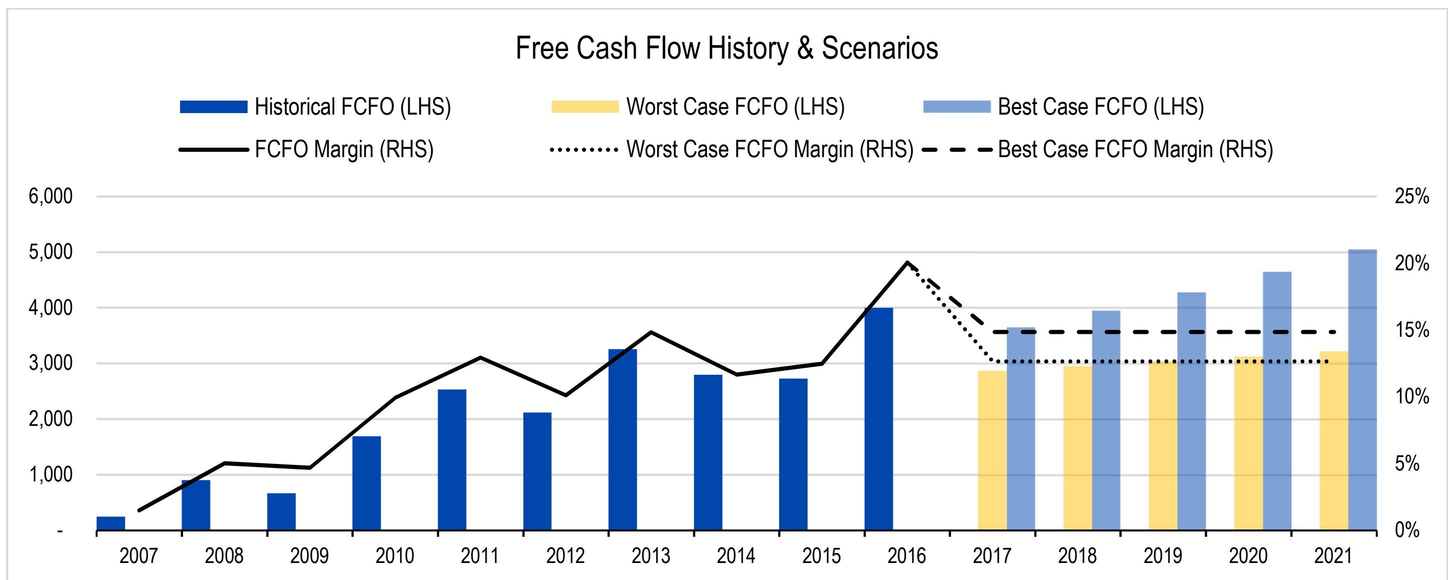

Figure 20. Source: Company Statements, IOI Analysis

Our best-case scenario sees the firm generating $18.8 billion of FCFO over the next five years compared to $16.2 billion over the last 10 years. Our worst-case scenario sees the firm generating $10.6 billion over the next 10 years.

Balance Sheet Effects

In our original valuation of Union Pacific, we wrote about the positive effect of a lax and friendly regulatory environment as a positive "Balance Sheet Effect" for the company.[1] We believed that the regulatory environment effectively cut the discount rate being used by market participants to discount Union Pacific's future cash flows. At the time we made our original valuation, shares were trading in the upper-$80 per share range, and while this was above our fair value range (indicating a high conviction investment opportunity), we recommended only a speculative position due to the positive Balance Sheet Effects.

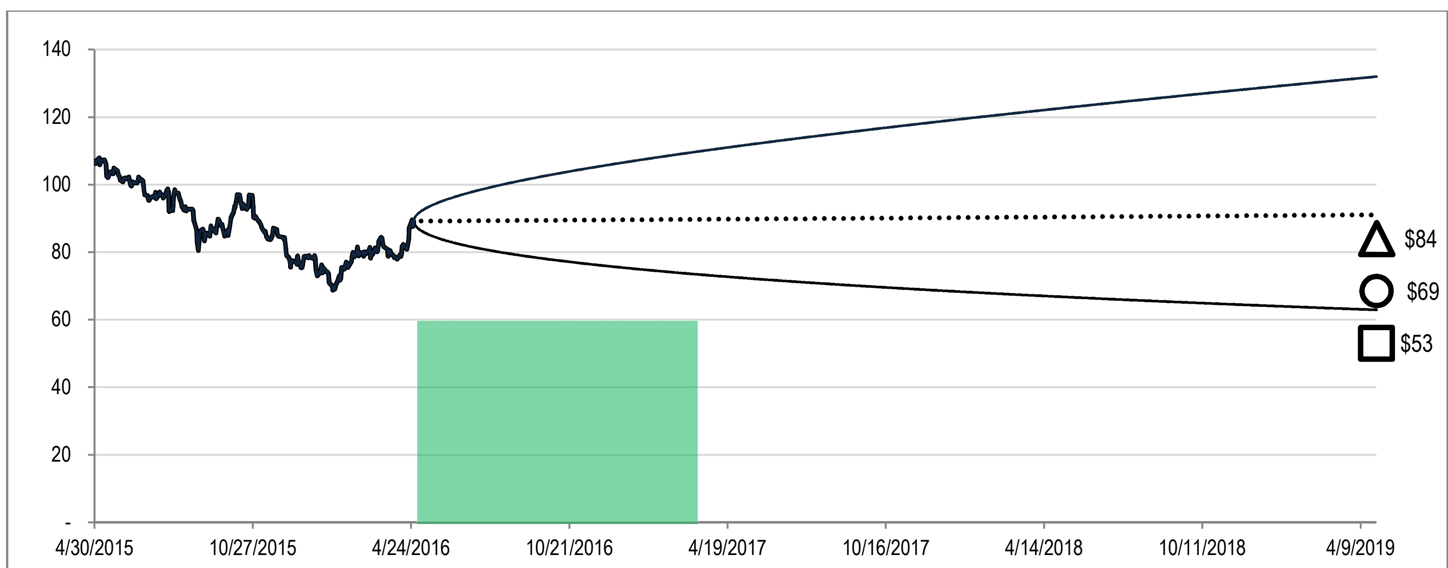

Figure 21. Source: CBOE, YCharts, IOI Analysis (April 2016). We think the valuation range shown is likely much closer to UNP's actual valuation range.

[1] We define a Balance Sheet Effect as an asset or liability that is not listed anywhere on the Balance Sheet, but which nevertheless effects the value of the firm. Please see pp. 108-111 of The Intelligent Option Investor for examples.

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This caution served us well, as the price of the shares continued to rise and presently fluctuate in the mid $100 / share range.

At present price levels, the shares are clearly – from our perspective – overvalued, and what's more, a protectionist populist president now resides in the White House. As mentioned in our comments regarding the demand environment, we believe the policies of the Trump administration will create a strong negative influence on Union Pacific's operations if enacted or even if expected to be enacted.

The risk of large-scale trade disruption effectively acts as a negative Balance Sheet Effect counteracting the positive effect of the lax regulatory environment, in our opinion, which is why we have published this as a high conviction investment.

Prior Operational Forecasts versus 2016 Actual Results

One of the most important abilities to investing is to know when your understanding of a company's value is right or wrong. The only way to do that is by assessing past forecasts with the actual operational performance of the firm. We look at actual values for three key short-term metrics – Revenues, Profits, and Free Cash Flow to Owners – since our first valuation in April 2016.

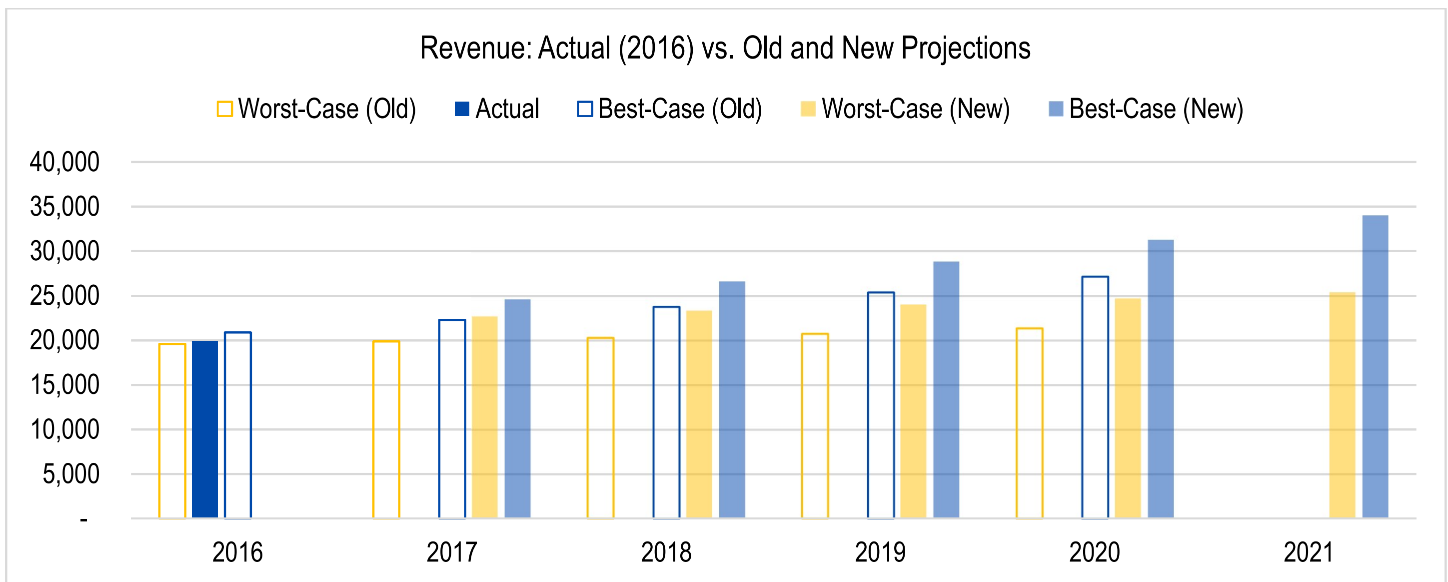

Figure 22. Source: Company Statements, IOI Analysis

Actual 2016 revenues came in at $19.941 million, just $300 million shy of the midpoint between our best- and worst-case revenue scenarios. We consider this a big win: revenues are the manifestation of the demand environmnet for a firm, and the fact that actual revenues were so firmly in the middle of our projections suggests that our understanding of the demand environment is good.

We believe our present revenue projections to be too high, as explained in the first page of this report. Notice that our old Best-Case revenue assumptions for 2017 are actually lower than our new Worst-Case revenue assumptions for that year. We are purposely goosing our revenue growth assumptions in order to stress test our valuation.

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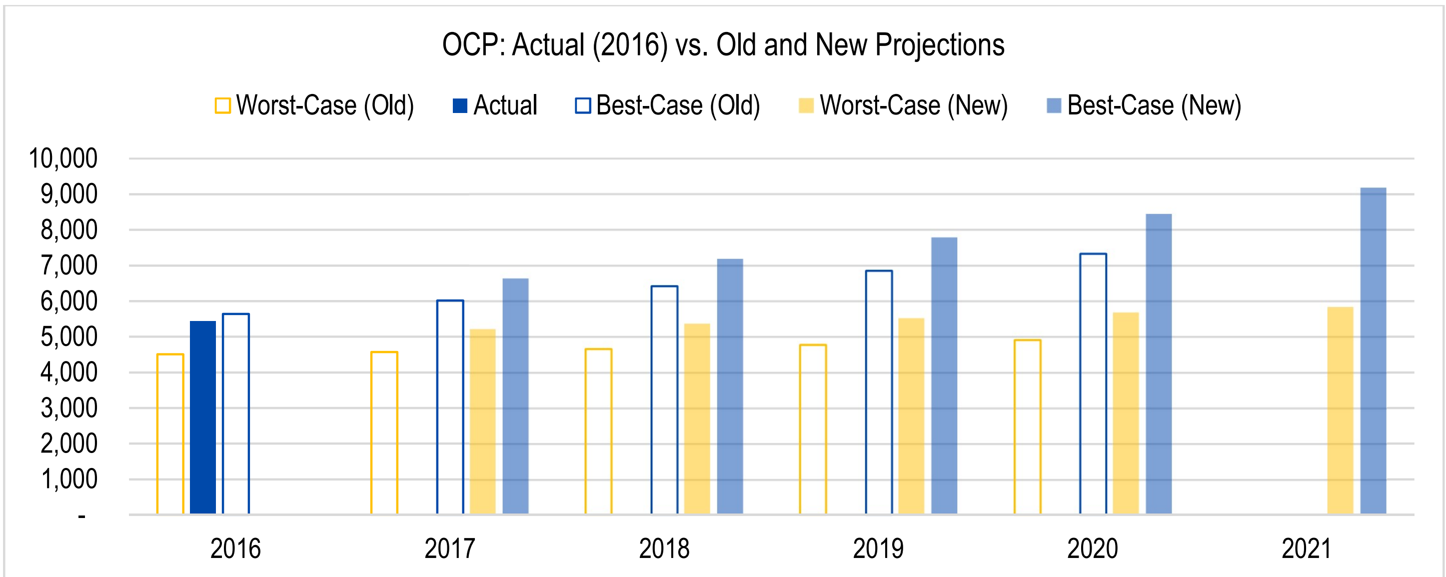

Figure 23. Source: Company Statements, IOI Analysis

We noted above that the firm seems to be managing working capital so as to maximize cash generation and the effect of this effort is visible in this graph. Actual OCP was very close to our Best-Case OCP scenario, despite revenues having fallen slightly short. Our new worst-case projections imply an average OCP growth of 1% per year through 2021 from the elevated level recorded in 2016. Our new best-case projections imply an average OCP growth of 11% per year over the same period.

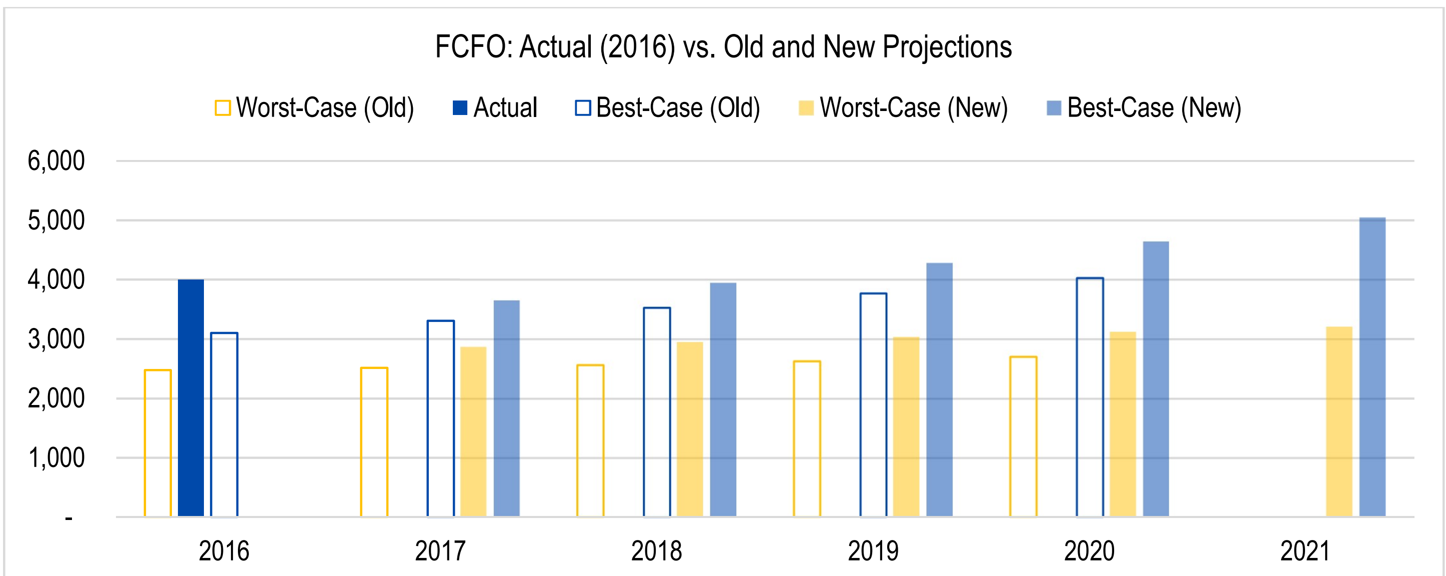

Figure 24. Source: Company Statements, IOI Analysis

FCFO is one measure over which management teams have a great deal of control once profits are generated because management teams get to decide what investment spending is done. As mentioned above, the company cut its investment spending in a dramatic way, so our FCFO projection – which was based on a normalized spending level of 45% of owners' profits – was too low even in the best case.

While it is possible for a company to cut back on investment spending temporarily, to do so for an extended time means that future profit growth should be impinged. Many times, a company that underspends on investments for a year or two will try to make up for the underspending at a later time by spending a greater proportion of profits. We think this is likely in Union Pacific's case.

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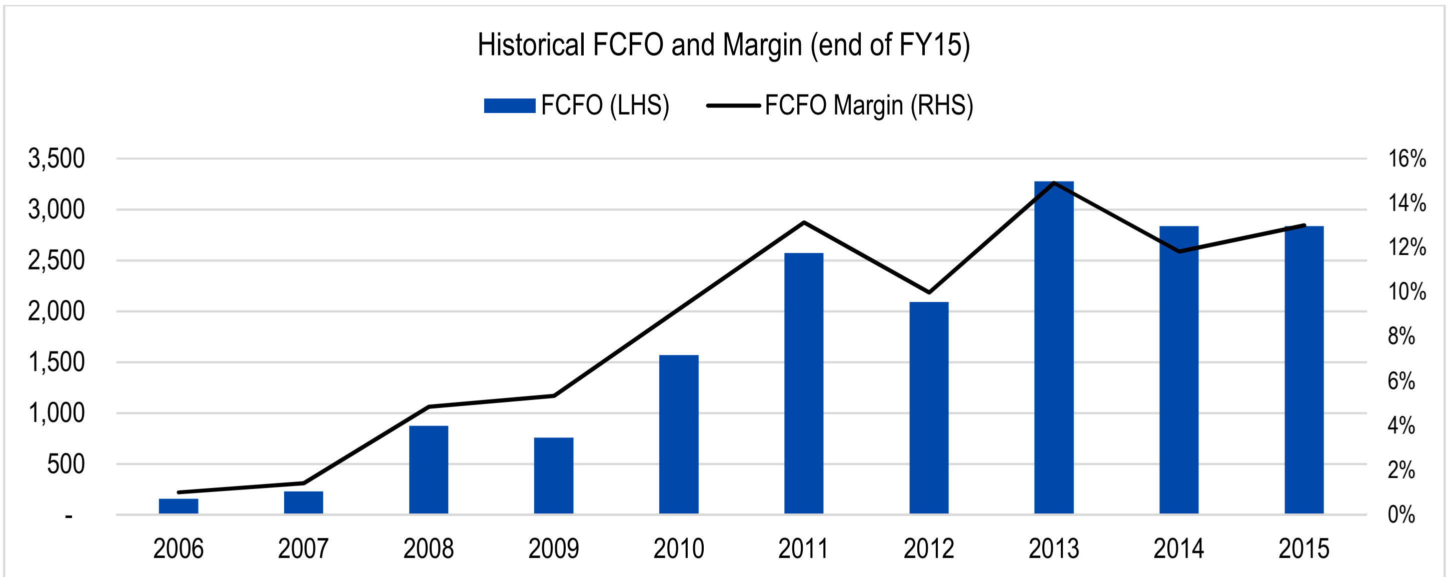

Figure 25. Source: Company Statements, IOI Analysis

Historical FCFO only broke the $3 billion mark once in Union Pacific's history, and its average FCFO Margin during the 2011-2015 period (the historical data available to us when we made our first valuation) was 13%. In contrast, Union Pacific generated $4 billion of FCFO in 2016, which implied an FCFO margin of 20%. We do not believe this cash flow generation is sustainable.

Our newest valuation model implies a normalized FCFO Margin of between 13%-15% for worst- and best-cases respectively. This level is consistent with the backward-looking average of 14% on a 5-year lookback and is much higher than the 10% average on a 10-year lookback.

Investment Structuring

The option investment we highlighted was what we would term a "Bearish Diagonal," using a short-tenor bearish call spread to subsidize a long-tenor bearish put option. A graphical represntation of this investment is shown below:

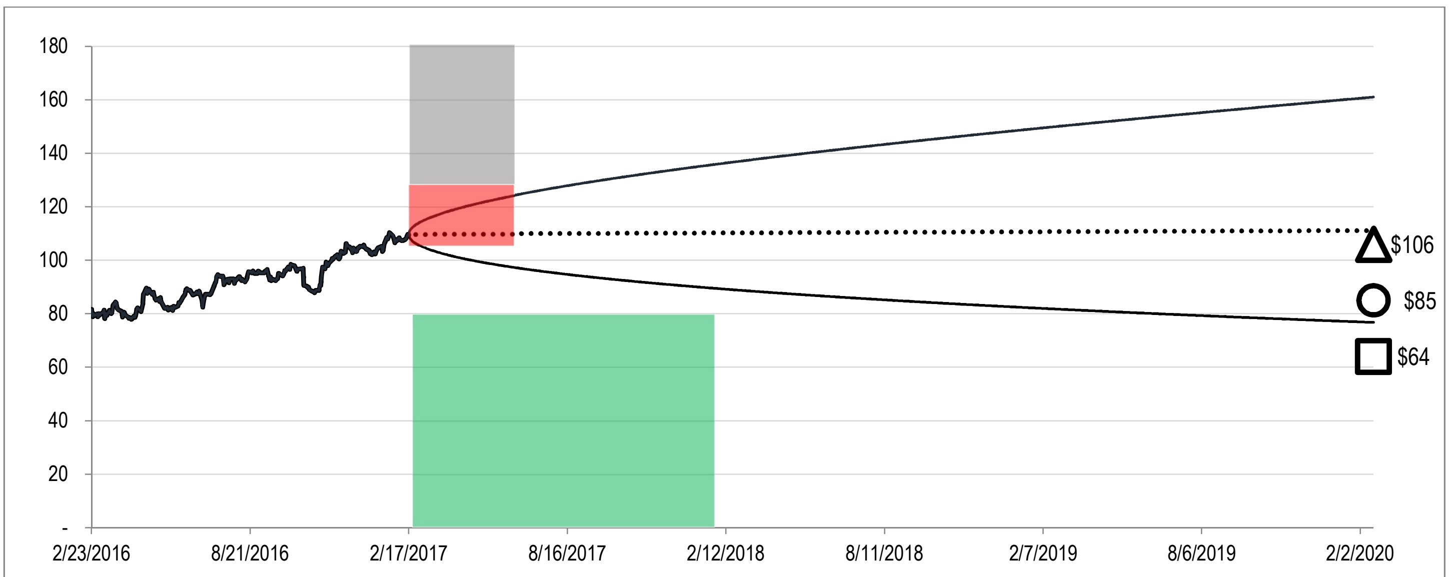

Figure 26. Source: CBOE, YCharts, IOI Analysis

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A tabular view of the investment is shown below:

B / S	P / C / S	Strike	Exp.	Premium
Sell	Call	105.00	JUN 16, '17	$5.95
Buy	Call	125.00	JUN 16, '17	($0.55)
Buy	Put	80.00	JAN 18, '18	($5.35)
Bearish "Diagonal"				$0.05

The sold call spread more than subsidizes the purchase of the long-tenor put option, meaning an investor receives a $5 per contract credit on the investment and that the original Effective Sell Price (ESP) of the investment was a nickel under where the stock was trading at the time. If the stock price moves up, the investor stands to lose, at maximum, the difference between the two call strike prices: $2,000 per contract.

This is a high-leverage investment. If the sold call spread expires worthless, the remaining structure – the long put option, is essentially free to the investor. As such, if the stock price falls and the investor takes profit, the return on the investment would be undefined (i.e., infinite on a percentage basis).

In line with our conception of an investment as a “meal” comprising several parts, we also like the idea of purchasing an ITM put option as a more lightly-levered element to this position. We decided personally to enter the diagonal position and to increase our exposure to this investment using the ITM put option if and when Union Pacific’s share price increased. A visual representation of the ITM put option would look like this:

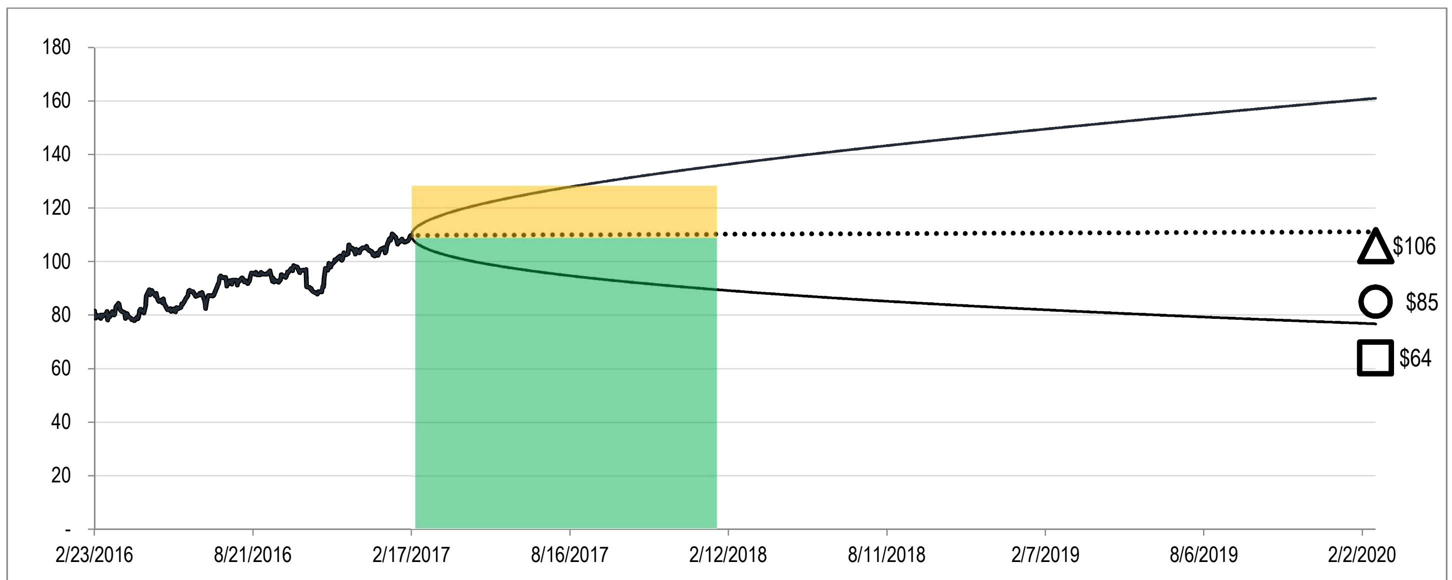

Figure 27. Source: CBOE, YCharts, IOI Analysis

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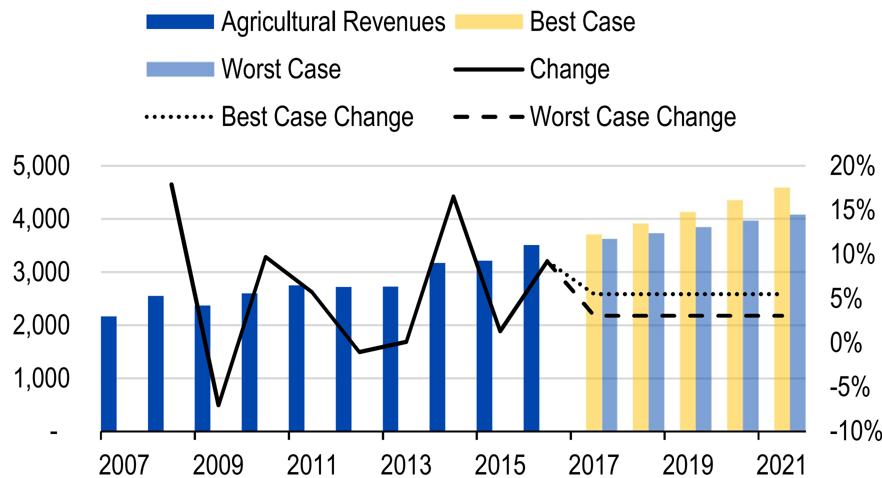
Segment-Level Revenue Projections

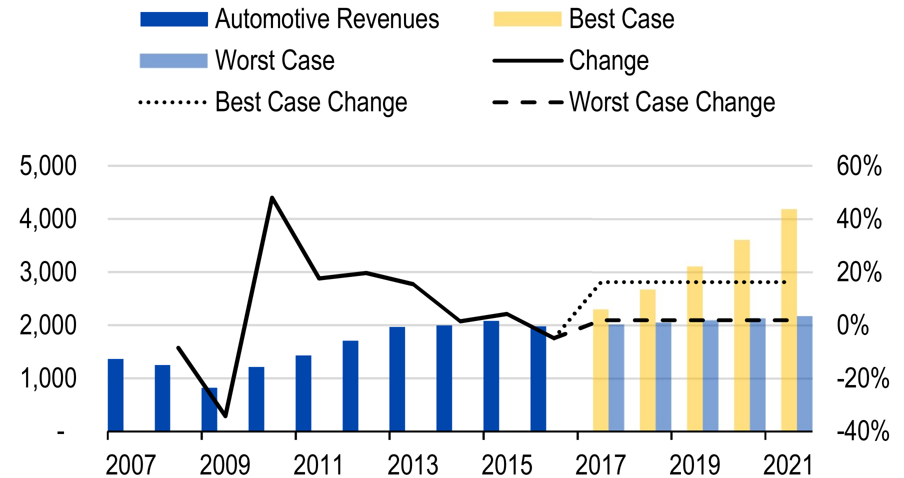
In all the figures below, "Best / Worst Case" represents the best- and worst-case average annual growth rate in fuel surcharge-adjusted revenues of each freight type. the "Historical Max / Min" figures represent the maximum and minimum five-year medians over a period of nine years unless otherwise noted. Our best- and worst-case projections are based on a build-up from Revenue Ton-Miles and Revenues / Ton-Mile. Interested IOI members are encouraged to review the build-ups in the "Revenue Model" tab of the IOI Integrated Valuation Model for Union Pacific.



Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
6	3	6	0

Potential trade frictions and / or renegotiation of the NAFTA treaty with Mexico have the potential to have a negative effect on Agricultural freight volumes that we believe would be unlikely to be able to be made up for with price increases.

In addition, tighter control of immigration (not only illegal immigration, but H1-B visas as well) and a generally less-welcoming toward foreign residents will likely have some effect on population growth. It goes without saying that a large proportion of agricultural workers are undocumented workers, so a mass round-up of illegal immigrants, as has been discussed by the Trump administration, has the potential to disrupt agricultural production volumes as well.



Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
16	2	18	4

The historical maximum figure is affected by the Cash-for-Clunkers demand coming out of the Great Recession. The last annual value was a drop in revenues of (5)%.

Considering how deeply the US auto industry's supply chain relies upon low-cost Mexican manufacturing labor, interruption of NAFTA would have a large impact upon volumes. Also, inflationary pressures from Trump's proposed simulative programs might create a lessening of demand for automobiles in the US.

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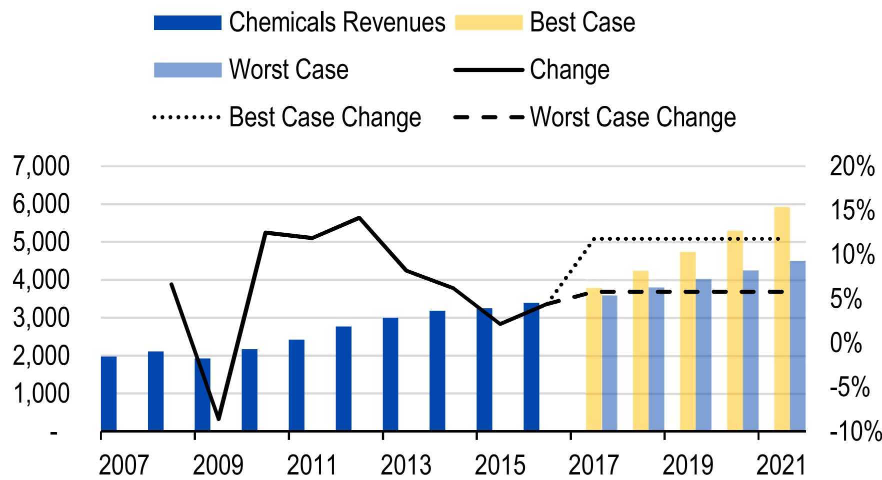
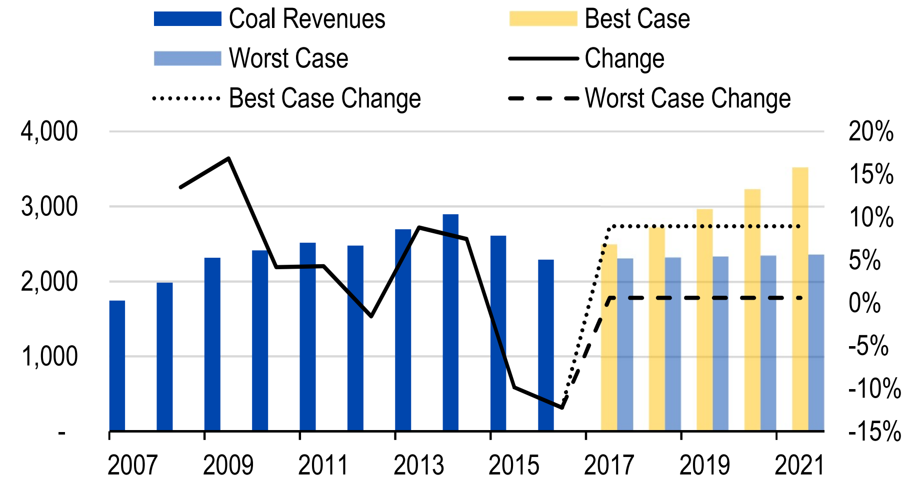


Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
12	6	12	6

The freight category we believe will be least affected by the new administration's trade policies, our best-case revenue growth assumptions are identical to those recorded during the bounce back just after the Great Recession.



Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
9	1	4	-2

We believe that there are physical and economic constraints to the use of coal to generate electricity in the US, as discussed in this report. Even our worst-case scenario represents an optimistic view of coal volumes and pricing.

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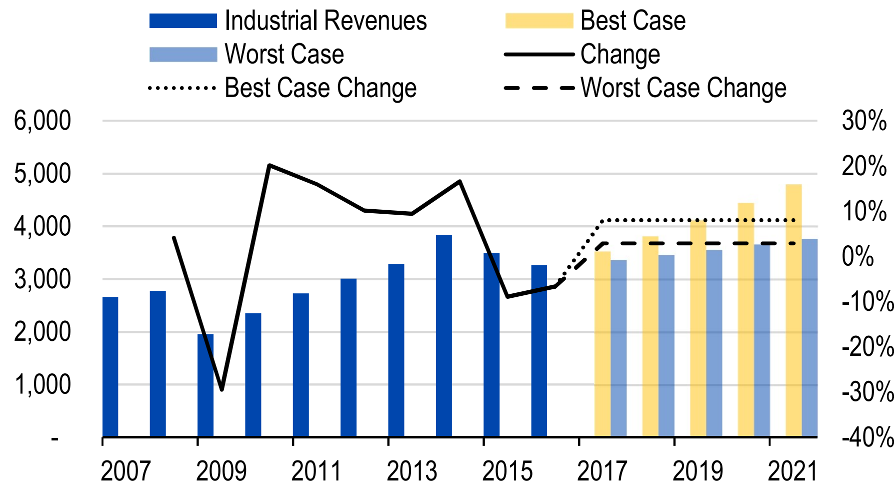
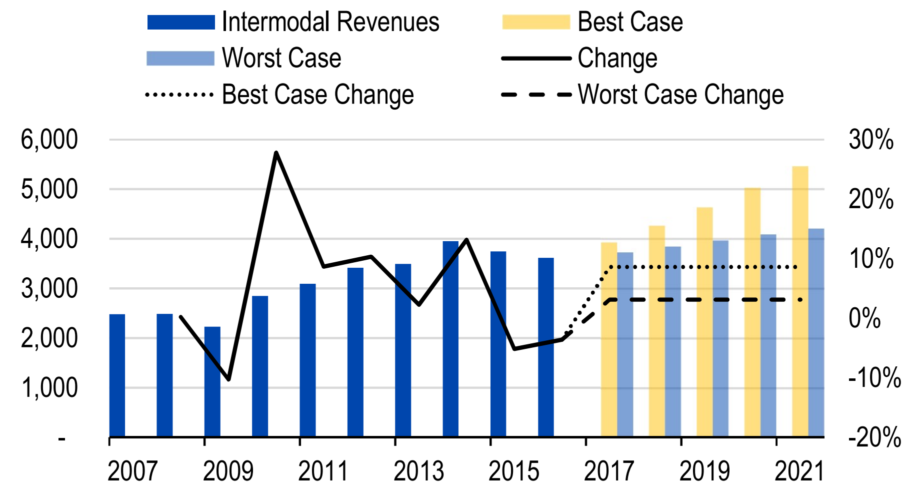


Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
8	3	16	9

Industrial revenues are influenced by fracking activity. Over the last two years, Industrial freight revenues have fallen by an average of 8% per year due to low oil and gas prices. If oil and natural gas prices were to rise substantially, this would help Union Pacific in two ways: first, it would likely prompt an increase in shipping volumes of fracking sand; second, it would make coal a more competitive fuel stock for electricity generation.

An increase in construction (border wall, infrastructure projects) would also likely boost Union Pacific's Industrial freight volumes and revenues.



Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
9	3	10	2

Intermodal is an important business for Union Pacific, making up nearly 20% of fuel surcharge-adjusted revenues. Clearly, any disruption to international trade would have a large negative effect on Union Pacific, as detailed in this report.

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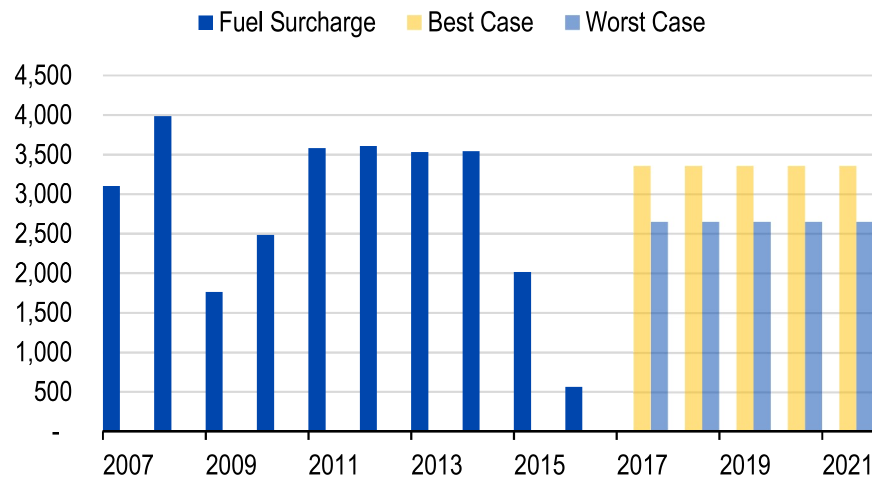
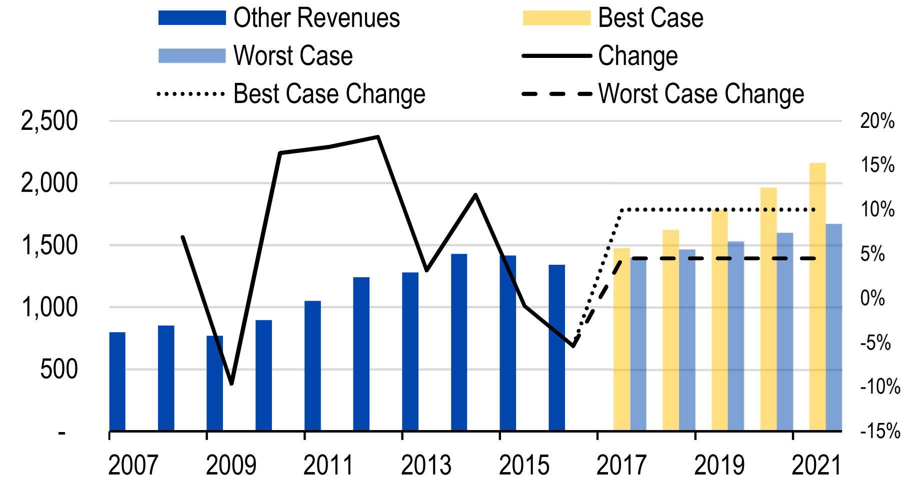


Best Case	Worst Case	Historical Max	Historical Min
$3,350 million	$2,651 million	$3,350 million	$2,651 million

For our fuel surcharge assumptions, we simply used the maximum and minimum five-year median values recorded over the past 11 years (6 observations).



Best Case (%)	Worst Case (%)	Historical Max (%)	Historical Min (%)
10	4	16	3

Recent Other Revenues have seen declines, due to overall falling transport volumes.

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