

Union Pacific Railroad (UNP)

Cost issues forced PSR. Attainable opportunities but cautiously optimistic

Initiate at "Hold", TP \$141

Executive Summary

As one of the industry leaders, UNP is strong in fundamentals but has cost issues

After two years of underperformance, UNP reported 6.5% revenue growth in 2017 as a result of improved market conditions. In 2018, growth continued with 10 YoY% in 3Q'18. We think Union Pacific can grow its top-line number by leveraging its industry leading position and capturing the industry-wide opportunities in both freight volume and pricing.

If benchmarking past successful examples, cost reductions could reach \$1B/year

We think cost issues forced the management to introduce "Unified Plan 2020". Even though lacking quantitative guidance, by benchmarking CNI, CP and CSX, cost reduction opportunities over \$1B/year is attainable from labor productivity and asset utilization improvements, assuming a successful PSR implementation

But we are cautiously optimistic about the company's long-term prospects

However, we are doubtful if the current management team is able to execute the "Unified Plan 2020" because they don't have any relevant experiences in PSR implementations. And we are uncertain about the creditworthiness of Union Pacific because of the increase in financial leverage and the funding sources of shares repurchase program.

Initiate at "Hold"; Target price \$141

Thus, we estimate a net income of \$5.9B, \$6.5B and \$7.0B from 2018 to 2020. Valuation models (DCF, Forward PE, Forward EV/EBITDA) return a target price of \$141.31 per share, indicating a potential downside of 4%. Initiate at 'Hold'.

Company View – Hold

Market Price (\$): 147.45

As of Dec. 7th, 2018

Target Price (\$): 141.31

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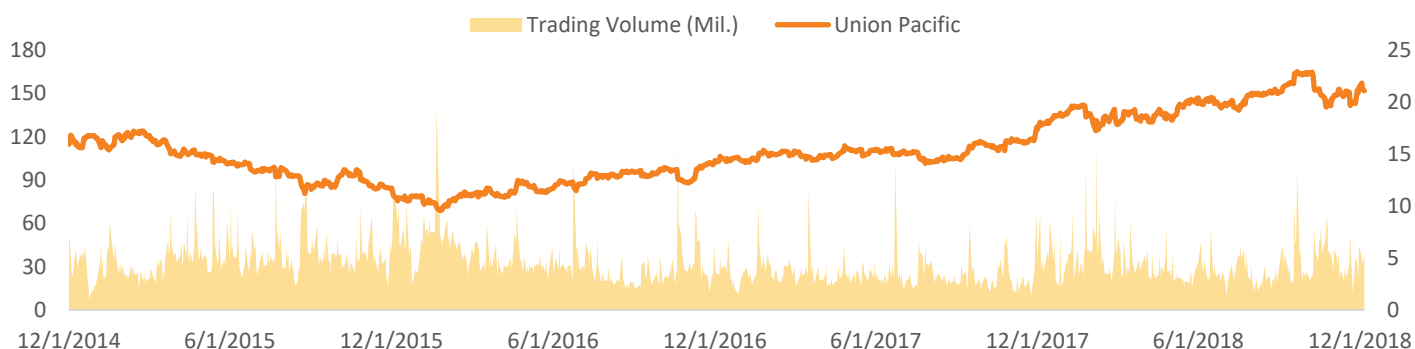


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MANAGEMENT

December 10th, 2018



Source: Bloomberg;
Trading volume is at the secondary Y-axis

* Please see the disclaimer at back of this report for important information

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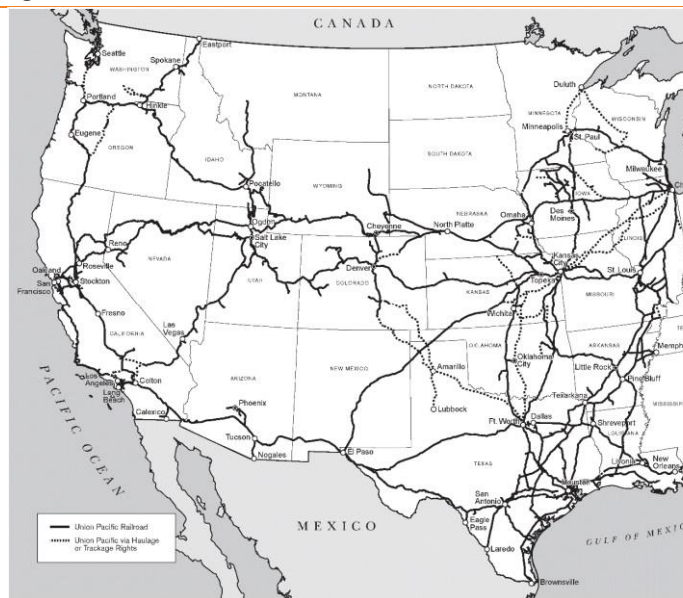
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Brief Overview of Union Pacific

Union Pacific Railroad Company (UNP) is Class I railroad operating in U.S. Company operates 32,122 route miles linking Pacific Coast and Gulf Coast ports with the Midwest and eastern U.S. gateways and providing several corridors to key Mexican gateways. UNP serves the Western two-thirds of the country.

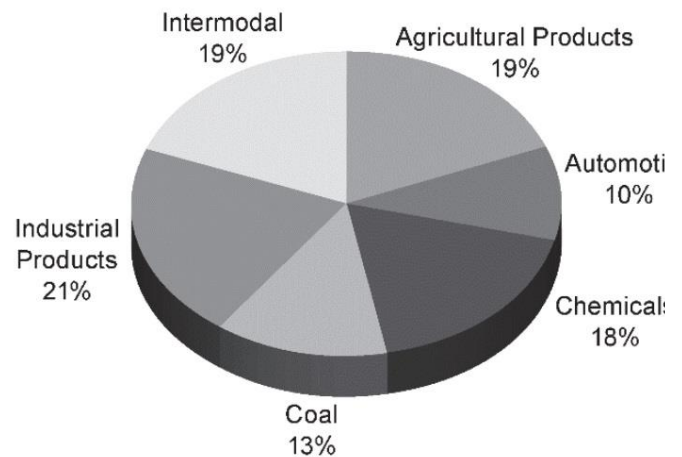
Its freight traffic consists of bulk, manifest, and premium business. Bulk traffic primarily consists of coal, grain, soda ash, ethanol, rock and crude oil shipped in unit trains – trains transporting a single commodity from one origin to one destination. Manifest traffic includes individual carload or less than train-load business involving commodities such as lumber, steel, paper, food and chemicals. The transportation of finished vehicles, auto parts, intermodal containers and truck trailers are included as part of company’s premium business.

Figure 1: Union Pacific Network



Source: Union Pacific FY2017 10-K

Figure 2: Freight revenue breakdown by business units, FY2017



Source: Union Pacific FY2017 10-K

After 2 years of revenue decline, in 2017 UNP showed 6.5 % growth to \$19.8 billion driven by volume growth of 2%, higher fuel surcharge revenue, and core pricing gains. Growth in frac sand, coal, and intermodal shipments more than offset declines in grain, crude oil, finished vehicles, and rock shipments.

Table 1: Union Pacific revenue breakdown by business units, 2013 – 2017

In Mil. \$	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Revenue	21,963	23,988	21,813	19,941	21,240
Freight Revenue	20,684	22,560	20,397	18,601	19,837
Industrial Products	3,822	4,400	3,808	3,348	4,078
Intermodal	4,030	4,489	4,074	3,714	3,835
Agricultural	3,276	3,777	3,581	3,625	3,685
Chemicals	3,501	3,664	3,543	3,474	3,596
Coal	3,978	4,127	3,237	2,440	2,645
Automotive	2,077	2,103	2,154	2,000	1,998
Other Revenue	1,279	1,428	1,416	1,340	1,403

Source: Company Data

In 2018, third quarter revenue increase by about 10% YoY and first nine-month revenue increased by 8% YoY. Changes are driven by 6% volume growth, a 4% increase in average revenue per car (ARC), resulting from higher fuel surcharge revenue and core pricing gains, partially offset by negative mix of traffic. Growth in shipments of intermodal, auto parts, petroleum products, industrial chemicals, rock, plastics, and finished vehicles more than offset declines in frac sand and coal shipments. Disruptions caused by Hurricane Harvey in the third quarter of 2017 also positively impacted year to year volume growth.

Table 2: Union Pacific quarterly revenue by business units in 2018

In Mil. \$	Q3 2018	YoY% Change	9M 2018	YoY% Change
Revenue	5928	9.62%	15790	8.14%
Freight Revenue	5558	10.06%	14750	8.45%
Premium	1714	18.21%	4313	13.15%
Industrial Products	1497	13.07%	3922	8.98%
Energy	1214	0.83%	3285	6.48%
Agricultural	1133	5.69%	3230	3.56%
Other Revenues	370	3.35%	1040	3.65%

Source: Company Data

Operating expenses also have negative CAGR, in 2017 increased by \$510 million compared to 2016 driven by higher fuel prices, inflation, \$86 million of expenses related to the third quarter workforce reduction plan, depreciation, contract services, and volume related costs.

In 2018, third quarter expenses increased by 10 % and first nine months expenses increase by 8 % due to higher fuel prices, volume-related costs, network operational challenges, increased state and local taxes, depreciation, and inflation. Higher environmental costs also contributed to the expenses increase.

Table 3: Operating expenses, 2013 – Q3 2018, in millions of dollars

In Mil. \$	2013	2014	2015	2016	2017	9M'18	YoY Change	Q3'18	YoY Change
Operating Expense	14,517	15,235	13,761	12,669	13,179	10,768	8.43%	3,659	9.72%
Compensation and benefits	5,076	4,807	5,161	4,750	4,984	3,776	1.97%	1,262	2.02%
Fuel	3,534	3,539	2,421	2,258	2,363	1,891	40.70%	659	46.44%
Purchase services and materials	2,315	2,558	2,012	2,038	20,105	1,861	4.67%	632	2.76%
Depreciation	1,777	1,904	2,013	1,489	1,891	1,636	4.01%	547	3.60%
Equipment and other rents	1,235	1,234	1,230	1,137	888	803	-2.55%	272	-1.09%
Other	849	924	924	997	948	801	12.98%	287	24.78%

Source: Company Data

In 2018 outlook, UN managers reported expected CAPEX at level \$3.3 billion for 2018, which is 5 % increase compare to 2017. However, in third quartal report, the CAPEX sum was reduced to approximately \$3.2 billion, which is \$100 million lowers. Management explained this reduction by timing of infrastructure renewal projects and work equipment receipts.

Table 4: Capital Expenditure in 2018, in millions of dollars

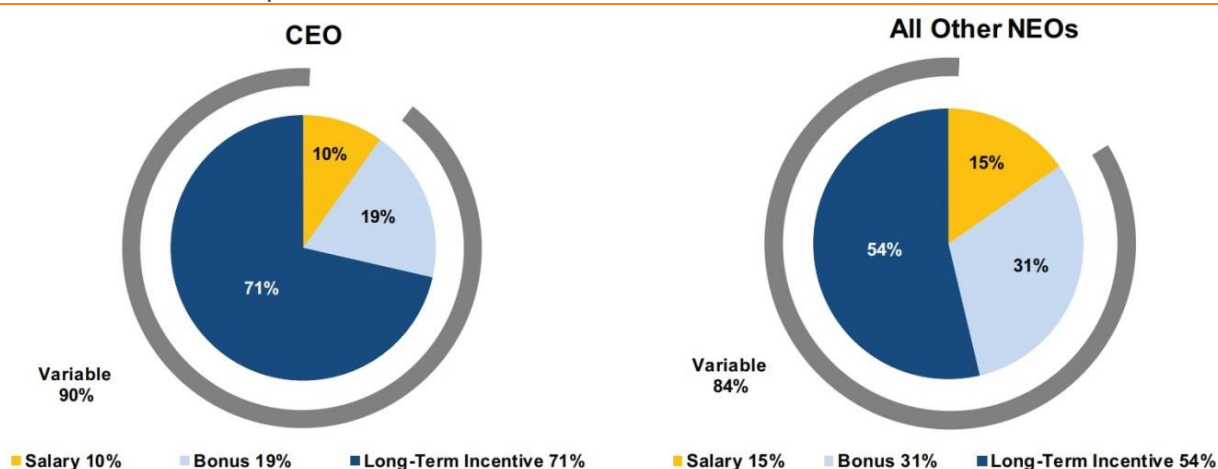
	Q3 2018	YoY Change	9M 2018	YoY Change
Capital Expenditures	776	-1.77%	2379	2.06%
Other	19	-54.76%	262	-53.82%
Positive Train Control	39	-54.12%	138	12.32%
Locomotives and freight cars	107	-17.05%	176	87.50%
Capacity and commercial facilities	129	67.53%	430	18.37%
Track	482	5.47%	1373	-4.37%

Source: Company Data

Management Team

UNP CEO/President/Chairman, Lance M. Fritz, took office in February 2015. During his tenure in office, the total annual return on UN stock is 19.71 % while peers average total annual return over this period is 18.29 % (Source: Bloomberg). UNP CFO, Robert M Knight Jr, was named as No. 1 CFO in the Airfreight and Surface Transportation sector in the Institutional Investor 2014, 2015, 2016, 2017 and 2018 rankings.

Figure 3: Union Pacific Executive Compensation Structure



Source: Union Pacific Proxy Statement, 2018

In 2018, UN implemented new executive's compensation system. Besides base salary, it includes annual cash incentive award: 80 % depends on UN operational performance and 20% based on the Company's business objectives and individual executive performance. Long-term incentives include performance stock unit (50%) based on 3-year average ROIC, stock options (40%) and retention stock units (10%). The aim of new system is to prevent/eliminate "agency problem" between managers and shareholders' interests.

Recent financial results and institutional ownership

The EPS of Union Pacific showed confident growth during first 9 months 2018, increased by 40.52 % YTD. Also, since Q4 2016, the company has been consistently outperforming the market expectations.

Figure 5: UNP EPS forecast vs Actual EPS

	FQ4'16	FQ1'17	FQ2'17	FQ3'17	FQ4'17	FQ1'18	FQ2'18	FQ3'18
Consensus	1.34	1.23	1.38	1.49	1.54	1.65	1.94	2.09
High	1.39	1.26	1.4	1.55	1.56	1.69	1.97	2.16
Low	1.29	1.19	1.32	1.46	1.5	1.62	1.91	2.03
Actual	1.39	1.32	1.45	1.55	1.53	1.68	1.98	2.15
YoY Growth	6%	14%	24%	14%	10%	27%	37%	39%

Source: NASDAQ, Company Data

But in the most recent quarter, 17 out of 20 largest institutional investors of Union Pacific reported selling ownership of the company's stocks, with total net sell position of 10 million shares.

Table 6: Top 20 Institutional Ownership

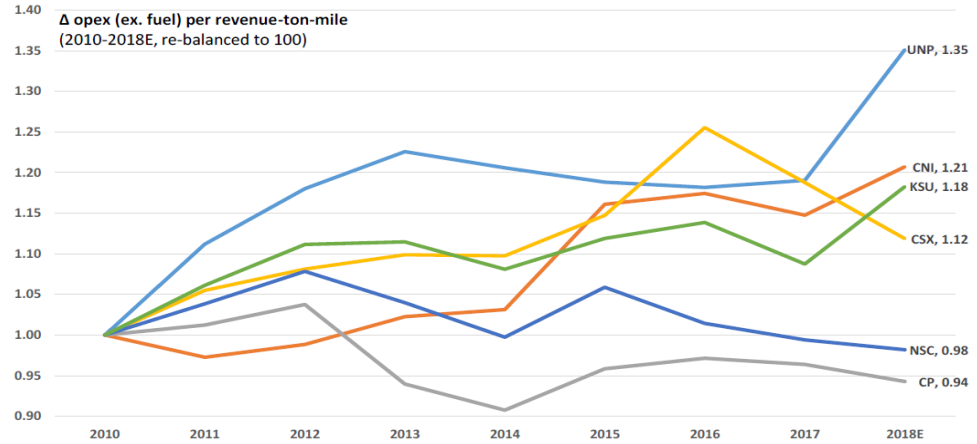
Institutional Investor	Ownership (Mil. of Shares)	Change (Mil. of Shares)
Vanguard Group Inc.	60.10	-1.61
BlackRock Inc.	46.99	-3.10
State Street Corp	30.73	-0.24
Wellington Management Group LLP	25.54	-1.84
Capital Group Cos Inc	20.59	-3.46
Morgan Stanley	15.89	0.86
FMR LLC	14.46	2.14
Bank of America Corp	13.04	-0.32
Sun Life Financial Inc	11.83	-0.43
JPMorgan Chase & Co	11.29	-3.67
Dodge & Cox	10.05	-0.08
UBS AG	9.64	-0.64
Geode Capital Management LLC	8.95	0.00
Norges Bank	8.33	-0.04
Ameriprise Financial Inc	8.13	-0.39
Northern Trust Corp	8.01	-0.81
Egerton Capital UK LLP	7.96	4.68
Bank Of New York Mellon Corp.	7.71	-0.32
Teachers Insurance & Annuity Assoc	7.62	-0.43
Wells Fargo & Co	7.05	-0.39

Source: 13-F, Company Data

Recent revenue growth is offset by stagnant cost level, thus rolling out Precision Scheduled Railroading (PSR)

Even though the company recorded strong top-line growth in first three quarters this year, the performance is still undermined by the stagnant level of cost. The cost issue is more significant when other major class I railroads all realized cost efficiency improvements. The operating expense (less fuel costs) of Union Pacific is expected to increase by 35% from 2010 to the end of 2018, the highest among class I railroads.

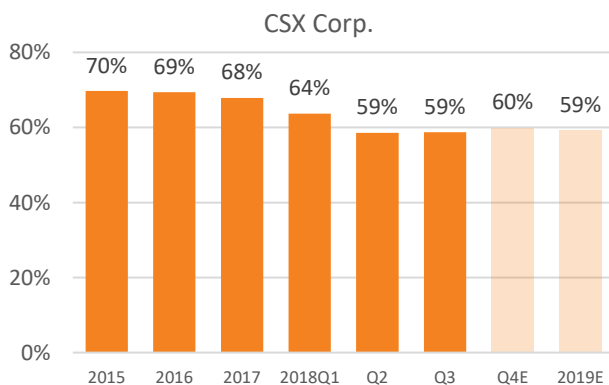
Figure 4: Union Pacific's operating expense is expected to increase the highest from 2010 to 2018



Source: Company Data

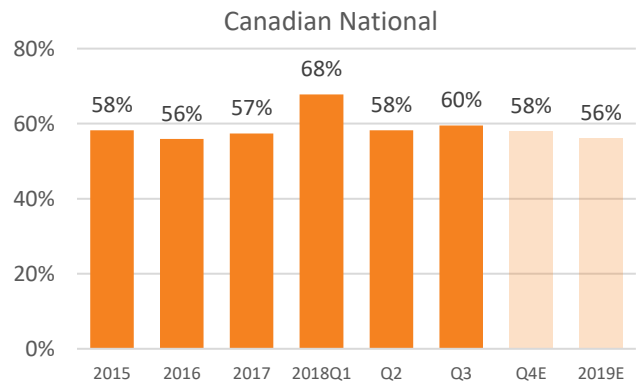
Also, we specifically looked at Canadian National and CSX Corp. earlier this year, both companies exhibited cost efficiency improvements to a lower cost level. But, the operating ratio of Union Pacific is expected to remain around 62%. The underperformance in cost management has put the management team under significant pressure from the board and investors.

Figure 5: CSX Corp. operating ratio, 2015 – 2019E



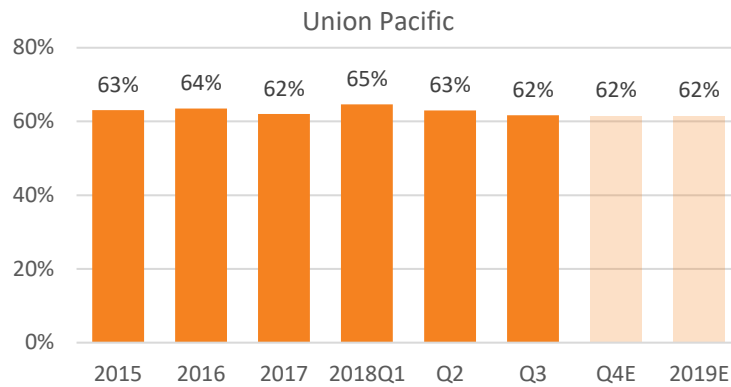
Source: Company Data, Analyst Forecast

Figure 6: Canadian National operating ratio, 2015 – 2019E



Source: Company Data, Analyst Forecast

Figure 7: Union Pacific operating ratio, 2015 – 2019E



Source: Company Data, Analyst Forecast

As a result, starting from October 2018, the company reacted by attempting to roll out Precision Scheduled Railroading (PSR) operating model called “Unified Plan 2020”. Similar to other railroads that implemented PSR, Union Pacific is expected to increase operating efficiency, reduce network complexity and improve service reliability for customers. However, the company is very cautious regarding the operating model modification that Union Pacific hasn’t released any detailed and quantitative PSR targets up to date.

Table 7: Union Pacific “Unified Plan 2020” Principles

PSR Principles

Shifting the focus of operations from moving trains to moving cars.

Minimizing car dwell, car classification events and locomotive power requirements.

Utilizing general-purpose trains by blending existing train services.

Balancing train movements to improve the utilization of crews and rail assets.

Source: Company Release

Cost reduction plans are feasible. Also, opportunities are measurable if benchmarking past successful examples

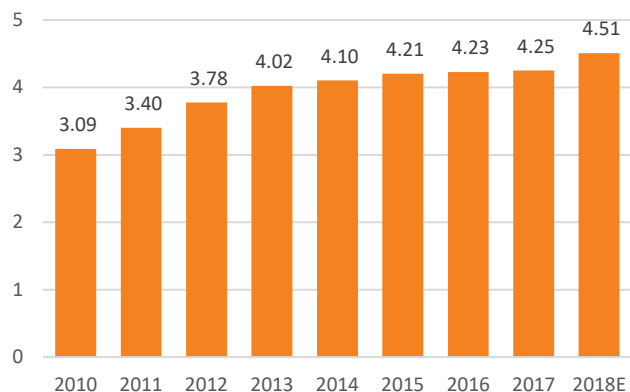
As one of the top two class I railroads in the industry, the company has one of the most extensive railroad networks, and a well-diversified freight mix. The company has been able to continuously leverage its strong industry position and charge a gradually increasing price to its customers, which ensures the company to continue boosting the revenue level through 2020. Under the assumptions of relatively stable top-line performances and little pressures, we believe the PSR adoption and associated cost reduction initiatives would be feasible to implement as Unified Plan 2020 gradually rolls out.

Figure 8: Freight volume outlook, 2018 – 2019



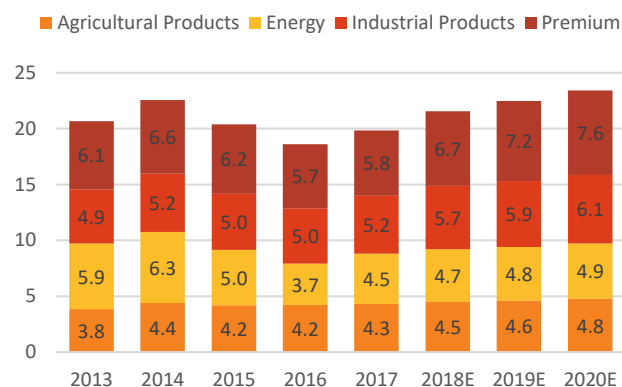
Source: Company Q3 18’ Result Presentation

Figure 9: Per ton-mile price of UNP has been increasing...



Source: Company Data, Analyst Forecast

Figure 10: ... which will drive future revenue growth



Source: Company Data, Analyst Forecast

Since the company hasn't released a detailed guidance regarding the expected outcome of Unified Plan 2020, we can only estimate the potential cost savings by benchmarking the successful results from three other class I railroads that previously underwent similar PSR operating model modifications, despite the differences in network designs, locations, and cost structures. Canadian National and Canadian Pacific have implemented, and CSX Corp. is implementing PSR model. It's noticeable from their success that cost savings primarily originate from labor and asset utilization improvement caused by overall operating productivity improvement.

Cost savings could originate from labor force. During Canadian Pacific's PSR implementation, management was able to reduce headcount by 5,000 (25% of total labor force). Also, CSX's management team has made significant progress and is working toward reducing headcount by 4,000 (15% of total labor force). In Canadian National's case, the management team retained the headcount but grew the business by 80% from 2003 to 2008. Thus, for Union Pacific, we estimate a scenario where the company will cut 20% of its labor force during the implementation of Unified Plan 2020. Under the 2018 expected Salaries, Wages and Employee Benefits level of 5.05 billion dollars, the headcount shrinkage would be equivalent to an annual cost saving over 1 billion dollars.

Table 8: If implemented successfully, we expect an annual labor cost saving over \$1B from UNP

Labor Cost Reduction Estimate

Canadian Pacific's # of Employees, FY2012	19,505
Announced Reductions	5,000
% of Total	25.63%
CSX's # of Employees, FY2017	27,178
Announced Reductions	4,000
% of Total	14.72%
Union Pacific's # of Employees, 3Q' FY18	42,323
Assumed Reductions	20%
Number of Employees Reduced	8,465
Salaries Wages and Employee Benefits, Mil. \$ FY18E	5,052
Estimated Savings in Labor Cost, Mil. \$	1,010

Source: Company Data, Analyst Forecast

Another source of cost saving is asset utilization. Based on the reported number of 2017, the revenue ton-mile per locomotive for Canadian National and Canadian Pacific is almost 100% higher than the level of Union Pacific. It's reasonable to estimate that, under PSR, the Union Pacific's revenue ton-mile/locomotive will trend up toward the level of two Canadian railroads. It indicates the opportunity to remove certain number of locomotives off track, and thus reduce both fuel expense and depreciation expense. As a result, it's clear that improvements in labor productivity and asset utilization would mean significant cost reductions opportunities for Union Pacific in the future.

Table 9: UNP's locomotive productivity is half the level of CN and CP in 2017

	Revenue ton-miles	Locomotives	Revenue ton-mile / Locomotive
Union Pacific	466,721	8,573	54.44
Canadian National	237,098	2,250	105.38
Canadian Pacific	142,540	1,400	101.81

Source: Company Data

We are cautiously optimistic about the company's long-term prospects

Until the streak is broken, Hunter Harrison and his associates are needed for a successful PSR implementation. But UNP employs none.

However, we are not fully committed to the PSR cost reduction scenario discussed above and long-term prospects of the company because of distrust in current management team, and doubtful capital structure plan of the company.

We mentioned in our earlier analysis that current management team is under the board's scrutiny for underperformance in reducing costs. Thus, we believe it's at least worthwhile speculating that the current management team introduced the Unified Plan 2020 because, being under significant pressure, they had to make a move to stabilize their leadership positions. But the PSR plan rolled out prematurely, which directly caused the lack of overall quantitatively-defined targets.

Moreover, we doubt if the current management team is able to execute the PSR implementation. All previous three successful examples of PSR implementations share one thing in common that they were all engineered by Hunter Harrison and his associates. In other words, until the streak is broken, Hunter Harrison's associates are the prerequisite for a successful PSR business model transition. But no one, under Union Pacific's current management team, has had any previous affiliations with a successful PSR implementation team. We think it's less probable that Union Pacific will succeed in implementing the cultural-changing business model, unless external assistance is brought in and in charge of the transition.

Lever up to repurchase share?

Another factor that shakes our commitment to the company is the doubtful capital structure plan. On the company's 2018 investor day, Union Pacific announced firstly, the company intends to increase its financial leverage by maintain its Debt/EBITDA ratio up to 2.7 times (up from 2.0 times) through 2020. And secondly, the company intends to repurchase shares worth about 20 billion dollars through 2020.

We think the financial policy changes will put the company in a situation where they need to borrow money to repurchase shares. From the share repurchase perspective, the 20 billion repurchase target is well beyond our estimated level of after dividend free cash flows (1.2 billion) over the same period. It means the company wouldn't fulfill the goal unless borrowing money from external sources. From the financial leverage perspective, if operating at maximum 2.7 times Debt/EBITDA ratio, our estimated 2020 EBITDA level of 12 billion dollars would enable the company to double the size of its 2017 year-end long-term debt, which would undoubtedly hamper the creditworthiness of the company.

Table 10: Union Pacific will be short of 8.3 million dollars if fully repurchasing shares worth \$20B

Share Repurchase (Mil. \$)	2018E	2019E	2020E
Free Cash Flow before Dividend	5,235	5,650	5,965
Net Income	5,904	6,527	7,002
Dividend Payout Ratio		40%	
Less: Expected Dividend	2,361	2,611	2,801
Free Cash Flow after Dividend	3,542	3,916	4,201
Share Repurchase Value		20,000	
Cash Shortage		8,340	

Source: Company Data, Analyst Forecast

Forecast, valuation and investment recommendation

Recall our industry report that we believe railroad industry still possesses positive prospects considering the U.S. macroeconomy forecast, and advantageous competition landscape against cross-industry rivals. Based on our earlier analysis, we think it is reasonable to argue that, with the help of gradual roll-out of “Unified Plan 2020” Union Pacific should be able to grow its top-line number by leveraging its industry leading position and capturing the industry business opportunities in both freight volume and pricing power.

However, we are not fully committed to long-term prospects of the company. Firstly we are uncertain if the company is able to execute the PSR implementation because the current management seems to prematurely introduce the plan for being under significant pressure, and doesn't have the relevant experiences in PSR implementations. Secondly, the doubtful capital structure plan announced by company earlier this year makes us believe the company intends to significantly lever up financial leverages and repurchase shares by borrowing money, which hamper the creditworthiness of Union Pacific.

Our industry report suggests an industry revenue growth of 7.45% in 2018. Meanwhile, our revenue forecast of Union Pacific returns a forecasted 2018 revenue of 22.94 billion dollars, which indicates a 8.0% revenue growth and fits our analysis. We estimate a 2018 net income of 5.9 billion dollars. Besides expected improvements in revenue, federal tax cut is another major factor driving net income growth that the effective corporate tax rate is estimated at 23% starting from 2018.

Figure 11: We estimate a \$22.94 billion revenue and \$5.9 billion net income in 2018

Union Pacific Consolidated Income Statement					Actual			Forecast						
USD (\$) in Millions	12/31/ 2013	12/31/ 2014	12/31/ 2015	12/31/ 2016	12/31/ 2017	1Q FY18A	2Q FY18A	3Q FY18A	4Q FY18E	12/31/ 2018	12/31/ 2019	12/31/ 2020	12/31/ 2021	12/31/ 2022
Revenue	21,963	23,987	21,813	19,941	21,240	5,475	5,672	5,928	5,964	22,940	23,907	24,912	25,627	26,950
Agricultural Products	3,848	4,404	4,195	4,209	4,303	1,098	1,114	1,133	1,129	4,474	4,632	4,796	4,927	5,084
Energy	5,872	6,342	4,967	3,715	4,497	1,173	1,111	1,214	1,247	4,745	4,791	4,936	4,988	5,304
Industrial Products	4,862	5,226	5,009	4,964	5,204	1,340	1,437	1,497	1,394	5,668	5,897	6,135	6,392	6,724
Premium	6,102	6,587	6,226	5,713	5,833	1,511	1,655	1,714	1,803	6,683	7,159	7,558	7,937	8,555
Total Freight Revenue	20,684	22,559	20,397	18,601	19,837	5,122	5,317	5,558	5,573	21,471	22,376	23,317	24,244	25,667
Other	1,279	1,428	1,416	1,340	1,403	353	355	370	391	1,469	1,531	1,595	1,383	1,283
Expense														
Salaries Wages and Employee Benefits	4,807	5,076	5,161	4,750	4,984	1,273	1,241	1,262	1,276	5,052	5,128	5,180	5,717	5,931
Purchase Services and Materials	2,315	2,558	2,421	2,258	2,363	599	630	632	643	2,504	2,628	2,736	2,836	2,969
Depreciation	1,777	1,904	2,012	2,038	2,105	543	546	547	550	2,186	2,297	2,406	2,508	2,614
Fuel	3,534	3,539	2,013	1,489	1,891	589	643	659	665	2,556	2,424	2,554	2,455	2,696
Equipment and Other Rents	1,235	1,234	1,230	1,137	888	266	265	272	276	1,079	1,165	1,190	1,242	1,260
Other	849	924	924	997	948	266	248	287	258	1,059	1,061	1,007	361	161
Total Expense	14,517	15,235	13,761	12,669	13,179	3,536	3,573	3,659	3,668	14,436	14,703	15,072	15,120	15,631
Operating Income	7,446	8,752	8,052	7,272	8,061	1,939	2,099	2,269	2,296	8,504	9,204	9,840	10,507	11,319
Interest Expense	(526)	(561)	(622)	(698)	(719)	(186)	(203)	(241)	(245)	(875)	(660)	(660)	(660)	(660)
Other Income - Net	128	151	226	192	290	(42)	42	48	40	88	158	156	153	164
Earnings Before Income Taxes	7,048	8,342	7,656	6,766	7,632	1,711	1,938	2,076	2,091	7,717	8,703	9,336	10,000	10,823
Income Tax Benefit (Expense)	(2,660)	(3,163)	(2,884)	(2,533)	3,080	(401)	(429)	(483)	(500)	(1,813)	(2,176)	(2,334)	(2,500)	(2,706)
Net Earnings	4,388	5,179	4,772	4,233	10,712	1,310	1,509	1,593	1,590	5,904	6,527	7,002	7,500	8,117

Source: Company Data, Analyst Forecast

In terms of valuations, we utilized three valuation approaches, with a detailed discounted cash flow (DCF) analysis, and two other multiples pricing techniques. We only presented part of the DCF model tables in the write-up, please refer to the DCF spreadsheet for detailed modeling input information. Our estimated free cash flow was adjusted for capitalized operating lease commitments and their respective interest payments, and was derived from self-calculated net operating profits after taxes (NOPAT). In our model, we tried to reflect the company's financial strategy, where the annual capital expenditure is close to 15% of the respective annual revenue, and long-term debt level is below 2.7x EBITDA. The free cash flow of the company jumps up to 5.24 billion dollars in 2018 because of tax savings by adopting the new lowered federal corporate tax rate.

Figure 12: Free cash flow forecast, 2018 – 2022

Union Pacific Free Cash Flow	Actual				Forecast				
	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/31/2022
USD \$ in Millions									
Revenue	23,987	21,813	19,941	21,240	22,940	23,907	24,912	25,627	26,950
Operating Expenses	13,331	11,749	10,631	11,074	12,250	12,405	12,666	12,612	13,017
Depreciation Expenses	1,904	2,012	2,038	2,105	2,186	2,297	2,406	2,508	2,614
Operating Lease Interest	68	56	49	39	40	40	44	44	46
Adjusted EBIT	8,684	7,996	7,223	8,022	8,464	9,164	9,797	10,463	11,273
Operating Cash Taxes	3,293	3,012	2,704	3,024	1,989	2,291	2,449	2,616	2,818
NOPAT	5,392	4,984	4,519	4,998	6,475	6,873	7,347	7,847	8,455
Depreciation	1,904	2,012	2,038	2,105	2,186	2,297	2,406	2,508	2,614
Gross Cash Flow	7,296	6,996	6,557	7,103	8,661	9,171	9,753	10,355	11,068
Change in Operating Working Capital	231	(81)	(400)	145	37	19	26	161	479
Change in Net Capital Expenditure*	4,427	4,606	3,561	3,321	3,333	3,493	3,652	3,789	3,961
Change in Capitalized Operating Leases	(201)	(272)	(180)	(225)	24	(9)	92	11	48
Change in Other Net Operating Assets	269	155	(363)	115	32	18	19	141	36
Gross Investment	4,727	4,408	2,617	3,356	3,426	3,521	3,788	4,102	4,525
Free Cash Flow	2,569	2,588	3,940	3,747	5,235	5,650	5,965	6,253	6,544

* Includes depreciation due to net property
Source: Company Data, Analyst Forecast

In terms of the weighted average cost of capital calculation process, the cost of debt of the company was derived from the weighted average yield to maturity of all the outstanding long-term debt with an outstanding amount close to 21.65 billion dollars. Meanwhile, the cost of equity was derived from a CAPM model. The risk free rate is the yield of 5-yr U.S. treasury note, and the beta was re-levered from the average unlevered beta of all the North American Class I railroads. We included a 5.5% market risk premium after considering multiple sources including investment banks, accounting agencies, and academic professionals.



Figure 13: DCF Valuation

Union Pacific Valuation USD (\$) \$ in Millions	Today	Forecast					Terminal Value
		12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/31/2022	
Free Cash Flow		5,234.84	5,650.12	5,964.99	6,252.89	6,543.91	
Terminal Value							145,944.22
Present Value of Cash Flows		5,139.63	4,878.48	4,785.76	4,661.61	4,533.21	101,100.90
Terminal Growth Rate	3.00%						
WACC	7.62%						
Operating Value	125,099.58						
Add: Non-operating Assets	4,278.50						
Enterprise Value	129,378.09						
Less: Debt and Equivalents	27,228.88						
Equity Value	102,149.21						
Shares Outstanding (M)	730						
Equity Value per Share	139.93						

Source: Company Data, Analyst Forecast

After discounting free cash flows and terminal value, we reached a per share equity value close to 140 dollars, which is roughly 5% below its closing price as of December 7th. We further conducted a sensitivity analysis on both terminal value and eventual per share equity value. We found that there exists a 48 dollar downside and 120 dollar upside fluctuations due to change in the variables of growth rate and weighted average cost of capital. Thus, we decided to introduce alternative pricing measurements in order to hedge the DCF pricing volatility.

Figure 14: Terminal value matrix (DCF)

USD (\$) in Millions		Growth Rate				
		2.00%	2.50%	3.00%	3.50%	4.00%
WACC	6.62%	144,527	162,868	186,279	217,196	259,921
	7.12%	130,409	145,236	163,663	187,183	218,245
	7.62%	118,803	131,048	145,944	164,457	188,087
	8.12%	109,094	119,386	131,687	146,653	165,252
	8.62%	100,853	109,629	119,968	132,327	147,361

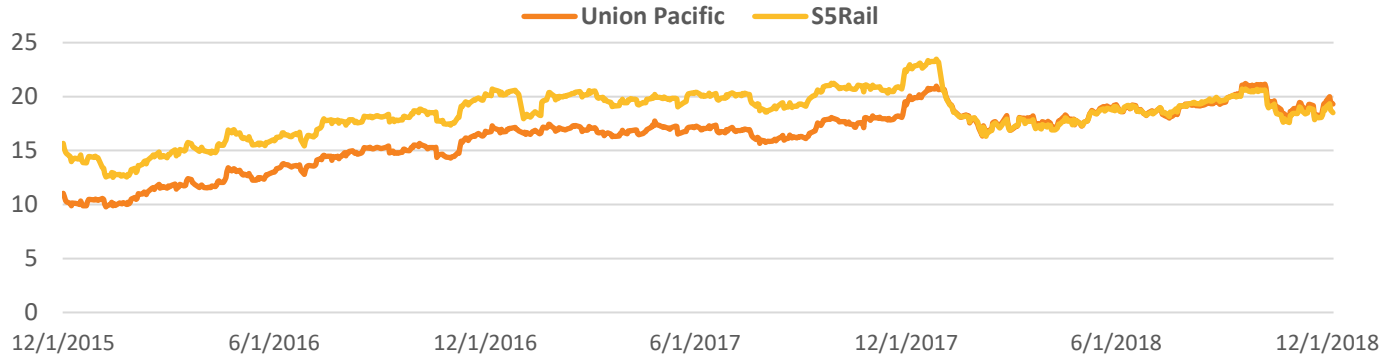
Source: Analyst Forecast

Figure 15: Equity value per share matrix (DCF)

Equity Value per Share Matrix		Growth Rate				
		2.00%	2.50%	3.00%	3.50%	4.00%
WACC	6.62%	146.01	164.24	187.52	218.26	260.74
	7.12%	128.53	142.93	160.83	183.68	213.85
	7.62%	114.17	125.79	139.93	157.50	179.92
	8.12%	102.17	111.71	123.12	136.99	154.24
	8.62%	91.98	99.94	109.30	120.50	134.12

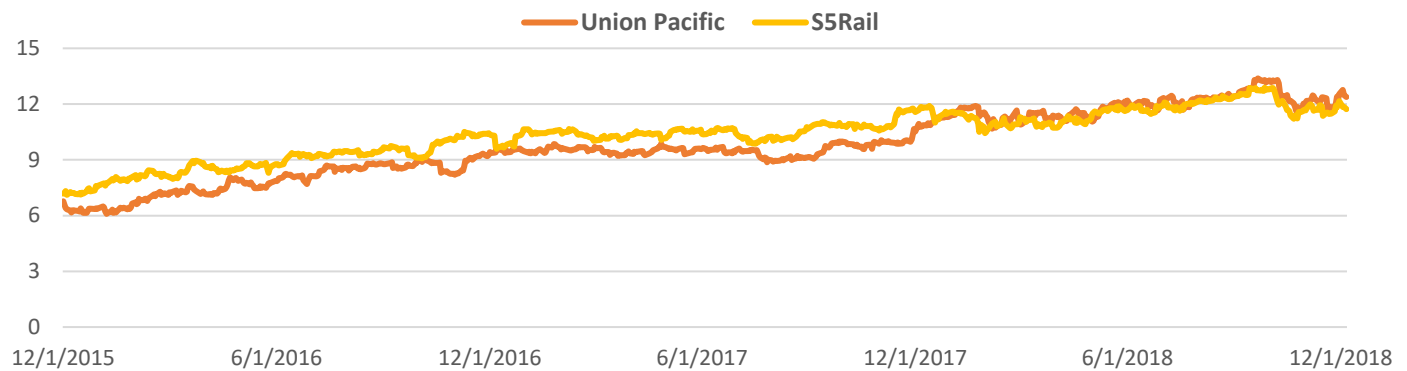
Source: Analyst Forecast

Figure 16: We value Union Pacific at 20x forward PE



Source: Company Data, Bloomberg

Figure 17: We value Union Pacific at 12.5x forward EV/EBITDA



Source: Company Data, Bloomberg

Besides DCF, we also utilized forward PE and forward EV/EBITDA into our valuation process. For forward PE, we arrive at a target price of 145 dollars per share based on our estimated 2018 net income of 5.9 billion dollars and 18x forward PE multiples. The current industry is being priced at 18.5x forward PE multiple, we believe, for Union Pacific, 18x forward PE multiple is an adequate level considering our concern about the company’s long-term uncertainty. Based on the similar investment thesis of continuous improving operation performance, we also would like to argue a 12x forward EV/EBITDA pricing multiple is adequate, which yields a target price of 138 dollars per share.

Lastly, we took an equal weight of three target prices from all pricing mechanisms applied and arrived at our eventual per share target price of 141.31 dollars, which reflects a potential downside of 4.2%, based on the market close price of December 7th, 2018. Thus, our thesis, analysis and valuation make it sufficient to issue a “Hold” recommendation for the company.



Table 11: Three valuation approaches yields an equal weight per share target price of \$75

Valuation Approach	DCF	Forward PE	Forward EV/EBITDA
2018 Forecast Value (\$Mil.)	-	5,904	10,690
Pricing Multiple (x)	-	18	12
Enterprise Value (\$Mil.)	129,378	-	128,280
Less: Debt and Equivalents (\$Mil.)	27,229	-	27,229
Equity Value (\$Mil.)	102,149	106,263	101,051
Shares Outstanding (Mil.)		730	
Equity Value per Share	139.93	145.57	138.43
Target Price (Equal Weight)		141.31	
Market Price (Oct. 26 th)		147.45	
Potential Downside		4.17%	

Source: Analyst Forecast



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