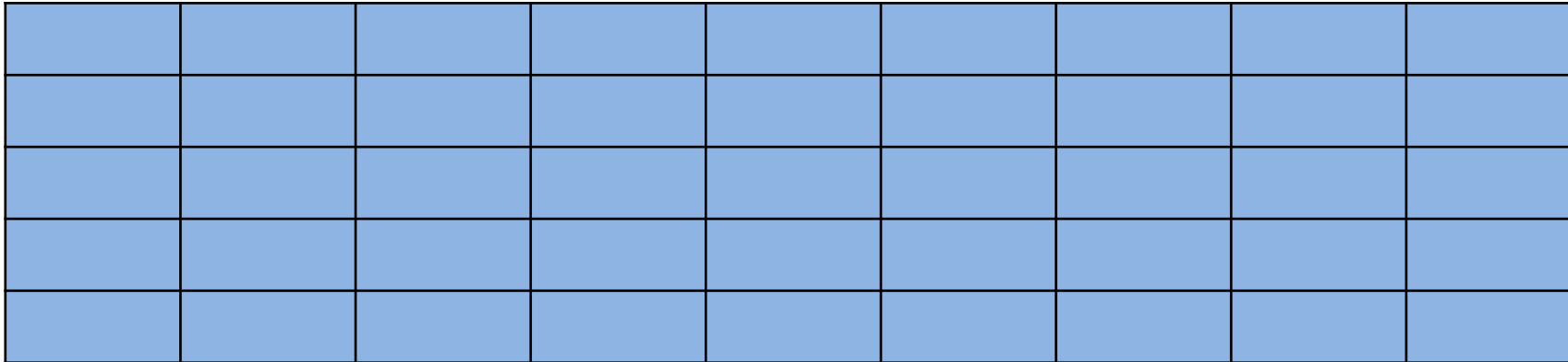


Brainteaser

Problem:

- How many rectangles are there?



- Mentorship Apps are live!

bit.ly/QFSMentorship

Brainteaser

Answer:

- There are 675 rectangles
- There are 11 vertical lines and 6 horizontal lines
- A rectangle is made up of 2 vertical lines & 2 horizontal lines
- This becomes a question of combinatorics
- # rectangles = $\binom{10}{2} \binom{6}{2} = \frac{10*9}{2} * \frac{6*5}{2} = 45 * 15 = 675$

Market Update

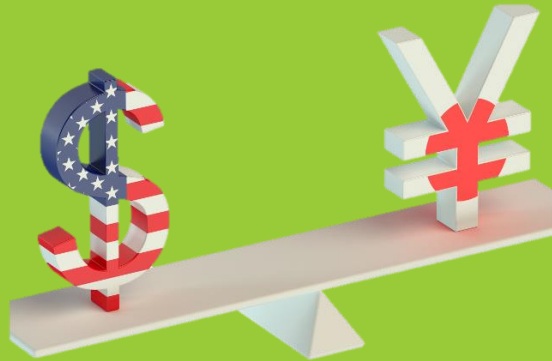
10/3/17 to 10/9/17

- ECB – upcoming meeting and possibly more clarification on how the end of QE will proceed
- US Economy – NFPs, unemployment drops to 4.2% (below NAIRU?) another rate hike for December is basically priced in (~90%)
- Spain – Catalan secession

Pitches of the Month

October 10, 2017

USD *JPY*



Multi-Strategy Portfolio
Quantitative Finance Society
Maximilian Xue



QUANTITATIVE
FINANCE
SOCIETY

The Big Picture



- **US Dollar is cheap**
- Opportunities that can drive the upside
- **JPY is the best short**
- Loose monetary policy
- Asymmetric political upside

Long USD



- **Why are we Dollar Strong?**
 - Unwind of Sell-Off Events
 - 'Merica vs Europe
 - Steeper Fed Rate Hikes
 - Inflation Optimism
 - Hurricanes
 - Trump

Why did the US Dollar Trade Down?

Unwind of Trump Rally

Capital Outflows to Europe



Unwind of Trump Rally

- Trump wins election during end of 2016
- USD rallies on expectation of significant economic growth
- Such as infrastructure spending, tax cuts, and financial deregulation
- Many promises fail to materialize
- Investors lose confidence and look to other markets



DXY

Capital Outflows to Europe

- Europe becomes attractive market relative to US
- Due to economic growth and positive stock performance
- Investors move money from US to Europe
- USDEUR is one of most popular currency pairs
- Big hit on US Dollar due to Euro Bulls



EURUSD

'Merica vs Europe

- Recent events creates uncertainty in the Euro Zone
 - Catalonia's desire for independence and Germany's recent election
 - Could drive investors back to US
 - USD fundamentally more attractive currency
 - 1.00-1.25% Interest Rate vs 0.00% Interest Rate
 - High expectations for Fed to raise rates vs no expectation for ECB to raise rates
-

Fed Rate Hikes

- Markets very dovish and pricing out steeper rate hikes due to inflation data, hurricanes, capital outflows, etc.
- Fed continues to forecast interest rate hikes and only marginally revised projected Fed funds rates for 2019 (2.8% vs 3%)
- Fed ends QE stimulus and set October to start shrinking \$4.5 trillion stockpile of assets
- Market expectations change fast based on Fed commentary and key economic indicators
- Means that any slight positive outlook have big effects on market expectations

Fed Rate Hikes Continued

- Before September meeting and Fed commentary, the market was only expecting 20-25% chance of a rate hike before year end
- Shortly after, market priced over 60% expectation of rate hike (~90% now)
- Interesting to note that unlike BOC, Fed usually only hikes when market expectations are over 60-65%
- Nature of Fed incentive to hike whenever possible if they think it won't hurt the economy
- Wants "tools in its toolbox" where higher rates means more room to cut
- If Fed thinks it can effectively hike rates without damaging economy, it will do so=> gives more control over the economy

What's causing the debate/uncertainty?

Inflationary Data

Impact of Hurricanes



Unusual Low Inflation

- Low inflation figures are key reason why there's uncertainty with rate hikes
 - Many believe inflation going through transitory phase where increases in job gains will drive inflation higher and more spread out wage inflation
 - Common idea that increase in wage inflation may not equal consumer inflation
 - Most liquidity from wage inflation going to higher earning people who save
 - more than spend=> leads to higher asset price inflation over consumer inflation
 - However, increasing competition for workers increases wage growth and weekly hours
 - Environment of labor demand and worker shortage drives up wage increase
-

Unusual Low Inflation Continued

- Transitory phase should go away and wage inflation more spread out among income class
 - Spread out wage inflation should increase consumer spending and drive consumer inflation
 - 2% is general inflation benchmark, any inflationary figure above that gives compelling case for rate hikes
 - Unemployment rate forecasted at 4.3% by end of year shows tightening labor market
 - Fed unwilling to freeze interest rates to stay ahead of any inflation that rising wages should generate
 - Any positive inflation trend heavily drives up rate hike probability
-

Hurricane Impact on Growth

- Many afraid that the multiple hurricanes deteriorated economic job growth
 - What comes down must go up and every action has a reaction
 - Hurricanes stall Q3 growth but could boost Q4 growth and raise inflation due to higher gas prices and efforts at recovery (home building, etc.)
 - We see it as short term effect, where growth is expected to stabilize by mid-2018
 - Markets pricing heavy impact by hurricanes but high variance on estimates of how much hurricanes will actually trim growth (range from .5%-1.7%)
 - Overall, Hurricane impact should be short term event, not long-term influence
-

BONUS: Trump's New Tax Policy

- Proposed tax reform stirs economic growth by cutting corporate taxes, simplifying tax brackets, doubling tax deductions for most Americans
 - Translates to higher discretionary spending that drives consumer spending
 - Greater consumer spending catalyzes inflation growth
 - Possible repatriation holiday gives companies breaks on profits earned overseas as companies bring earnings back home at sharply reduced rates
 - Would create a massive inflow of foreign currency to the US Dollar and drive up USD demand
-

Short JPY



- **Why are we short Yen?**
 - Abenomics
 - Olympics
 - Hedge Funds
 - Snap Election
 - Confidence and Growth

Abenomics and Loose Monetary Policy

- Japan committed to loose monetary policy to keep rates low
 - Way to boost competitive exports and inflate economy
 - BoJ dedicated to keeping bond rates low
 - Follows Abe's economic expansion plan to promote economic growth and increase inflation
 - Dedication to grow economy following almost 2 decades of stagnation and deflation
-



Olympics 2020

- Year 2020 is generally regarded as year to showcase success of Abenomics
 - Coincidentally same year Tokyo is hosting Summer Olympics
 - Government focused on improving transportation systems and infrastructure to accommodate visitors and showcase progress of Japanese economy
 - Projects are capital intensive and require low interest rates to finance
 - Timeline reinforces motive to keep rates low to boost economic growth
-



Hedge Fund Carry Trade Trend

- Bullish global sentiment prompts hedge funds to invest in riskier emerging markets
 - Taking advantage of Japan's low rates to borrow and buy other currencies with higher yields and selling off Japanese bonds
 - Japan generally regarded as safe-haven currency
 - Easing global tensions and focus on emerging economies drives down JPY demand
-



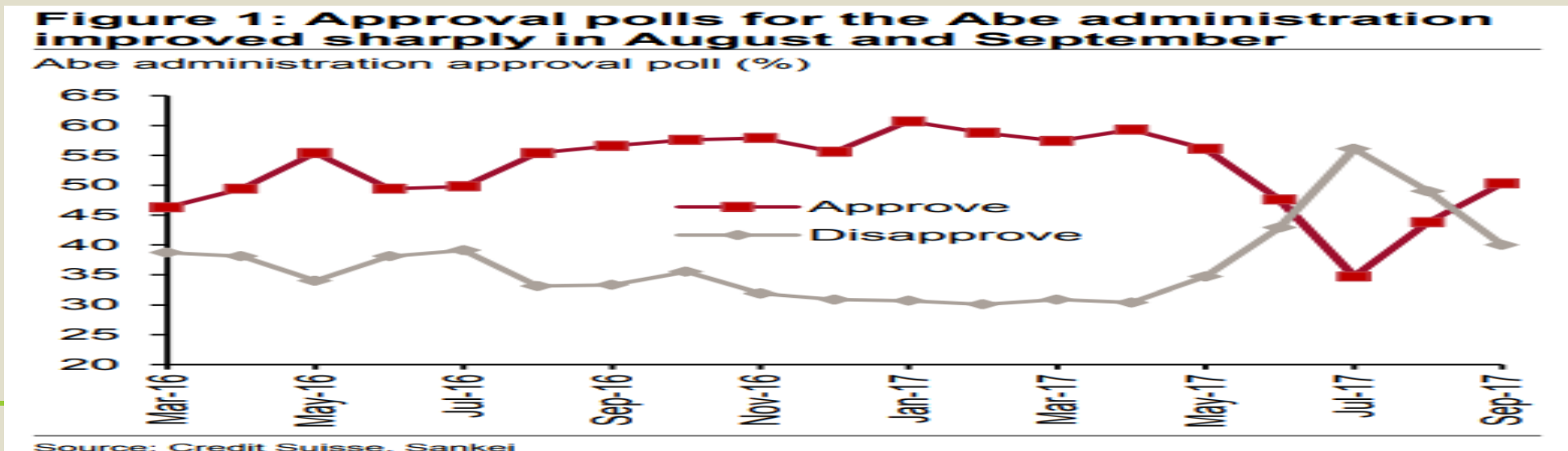
Low Japanese Bond Yield Cycle

- Japanese government determined to keep bond yields close to 0%
 - However, as hedge funds are selling off Japanese bonds, drives yields up
 - BoJ has to buy more bonds to offset yield increase
 - Requires printing more currency to buy bonds
 - Greater supply devalues JPY
 - As JPY becomes cheaper and Japanese bonds less valuable, hedge funds more inclined to borrow
 - Creates a cycle
-



Japanese Snap Election

- Recent increased ratings for Abe prompted him to announce snap election
- Snap election is election called earlier than expected (Oct 22 vs December 2018)
- Abe called snap election to capitalize on increased approval ratings for handling NK tensions and weak opposition parties



Political Asymmetrical Upside

- Market reaction was minimal following official announcement and initially Abe had majority of expected votes
- Shows that a snap election and Abe win is priced in
- Thus, any political uncertainty where an Abe loss benefits our trade as investors sell off on political uncertainty
- Interestingly, there's been greater opposition against Abe for calling snap election and increased popularity for opposition party led by Tokyo governor Yuriko
- Could benefit our trade in the short-term

High Levels of Confidence and Wage Growth

- To win election, Abe most likely reiterates the consecutive periods of growth and confidence of large manufacturers at the highest level in a decade
 - Strong export figures for Japanese manufacturers increased sentiment that increased profits would translate to significant pay increases
 - Areas with the largest improvements is in machinery and areas related to high capital expenditures
 - Improvement in areas involved in high capital expenditures adds to the argument of keeping rates low to allow cheaper financing for expansion
-

High Levels of Confidence and Wage Growth

- Improvement in small and medium-sized companies also point to a broadening of better conditions
 - Stronger domestic demand supported by public investment is lifting mood among smaller companies
 - Sharp and broad-based improvement in business sentiment suggests the economic expansion is gaining staying power and long-term trend
 - Increased profits to corporations of all ranges and focus on allocating gains to wage increase should strengthen consumer spending
-



Abe's Consumption Tax Hike

- The main political contention to Abe and a contradictory policy to Abenomics is a planned hike in consumption taxes scheduled to take effect 2019/2020
 - Many fear that a hike in consumption tax would deter consumer spending and economic growth
 - However, assuming that Abe follows through with using the revenue generated from the rate hike to spend on education and child-rearing that have value-add to the economy rather than paying higher pensions or paying back debt, there should be no deflationary effect
-

Abe's Consumption Tax Hike

- Balanced-budget multiplier effect- Theoretically, taxing and spending the same amount shouldn't have any deflationary impact
 - Due to the rise in Yuriko's popularity (opposition to consumption rate), high possibility that Abe relaxes the consumption tax hike or fulfills his promise to use the revenue for economic value-add purposes
 - Very likely tax revenue wouldn't be used to pay off debt as the government abandoned their balance surplus target by fiscal year 2020
 - If increased company profits translates to higher wages, should mitigate consumption tax hike impact
 - Overall, consumption tax hike should have lower than anticipated effect
-

BONUS: Euro Bulls benefit short JPY

- One of the most common exchange currency trades for JPY is the EUR
 - Shorting JPY is good way for investors to express Bullish Euro sentiment
 - Further Bullish Euro sentiment creates disproportionately larger capital inflows to EUR from JPY compared to other currencies
 - Makes JPY relatively less attractive
-



BONUS: Dovish BoJ Governor Candidates

- Governor Haruhiko Kuroda's term is up in April and is likely to be replaced by candidates who support more loose monetary policies
- Good because more national cohesion for loose monetary policy and reduced political opposition



Alternatives




- **Alternative: DXY**
 - DXY tracks US dollar index (UDSX)
 - Measures value of USD relative to value of basket of currencies of U.S.'s most significant trading partners

Short JPY

vs

Long DXY

- Long DXY makes sense for our long USD sentiment
 - However, DXY is weighted ~58% to Euro
 - We want to be as less exposed to EUR as possible due to Bullish Euro sentiment
 - DXY also 11.9% weighted to GBP and 9.1% weighted to CAD
 - These governments implying hawkish sentiment on interest rate normalization/ reducing QE stimuli
 - Upside for DXY could be lower than for USD/JPY
- 

That's all Folks!

Thanks for listening!

CSX Corp (CSX)

Long Pitch

October 10, 2017



Overview

Making the Most of QFS

1. Company Overview
2. Industry Overview
3. E. Hunter Harrison
4. Why This Opportunity Exists
5. Risks
6. Valuation

CSX	
Price	\$52.76
Diluted S/O	924
Total Debt	11,825
(-) Cash	(620)
(+) Market Cap	48,750
(+) Noncontrolling Interest	15
EV	59,970
TTM EV/EBITDA	12.4x
18E EV/EBITDA	9.4x
17E EV/EBITDA	11.3x

Company Overview

What does CSX do?

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 - Also encompasses coke and iron ore, and coal that is to be exported to deep water port facilities
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- Intermodal (15.6% of revenues):
 - Taking shipments to railyards to be transported by rail or to customer after being transported by rail

Company Overview

What does CSX do?

CSX	FY 2013	FY 2014	FY 2015	FY 2016
Chemicals	15.8%	17.2%	17.7%	19.8%
Agricultural Products	8.4%	8.9%	9.2%	11.6%
Automotive	10.1%	9.6%	10.0%	11.4%
Forest Products	6.4%	6.5%	6.7%	7.0%
Metals	5.4%	5.5%	5.1%	6.4%
Minerals	3.6%	3.6%	4.0%	4.2%
Phosphates and Fertilizers	4.4%	4.2%	4.1%	4.2%
Coal	24.1%	22.5%	19.5%	16.6%
Intermodal	14.1%	14.1%	14.9%	15.6%
Other	3.3%	3.3%	4.1%	3.3%

Industry Overview

How do railroads operate? What are they exposed to?

Industry Overview

How do railroads operate? What are they exposed to?

- Operating Ratios
 - Total Expenses / Total Sales

OPERATING RATIOS				
	2013	2014	2015	2016
CSX	0.71	0.71	0.70	0.69
NSC	0.71	0.69	0.73	0.69
CP	0.77	0.65	0.60	0.59
KSU	0.69	0.69	0.67	0.65
UNP	0.66	0.64	0.63	0.64

Industry Overview

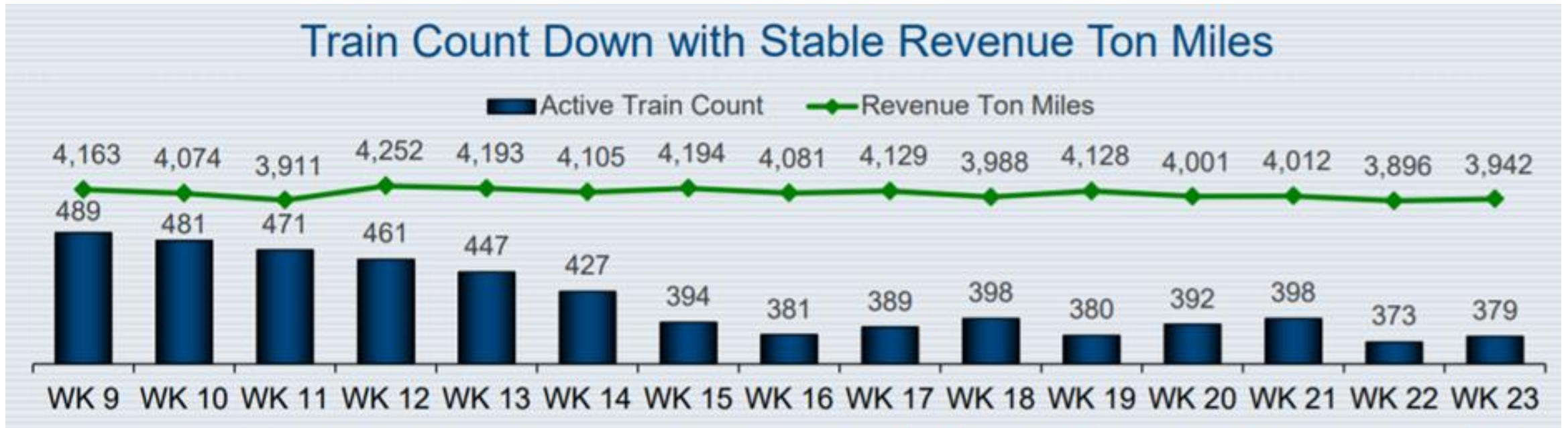
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Industry Overview

How do railroads operate? What are they exposed to?

- Competition against other transportation methods (substitutes)?
 - Railroads handle 44% of all inter-city freights (2010)
 - More scalable than trucking and more dynamic than barge

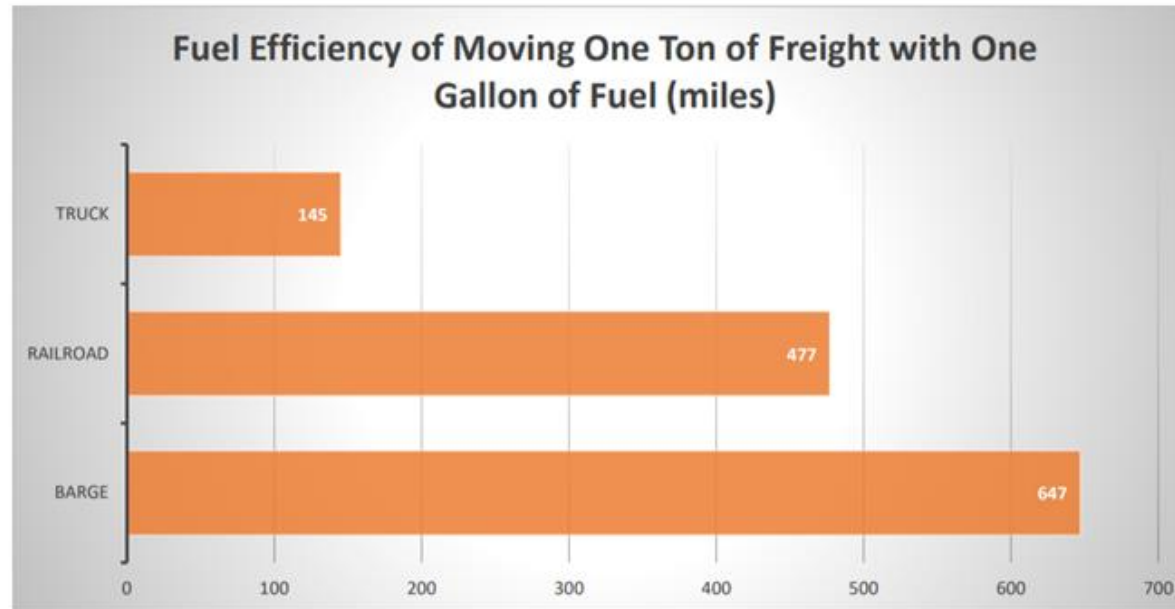
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Modal Comparison

Fuel efficiency: Barge vs. Railroad vs. Truck



Source: Texas Transportation Institute

E. Hunter Harrison and CSX's Future

CSX Corp's Superstar CEO and what he means for the company's future.

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- E. Hunter Harrison is the king of railroad CEOs
- His specialty is in implementing precision railroading
 - There are many ways to do it wrong, E Hunter Harrison knows how to do it right
 - E.g. NSC in 2015

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 - E.g. NSC in 2015
- His ruthlessness and business sense are what make the changes he makes possible
 - Chicago yard and progress thus far
- What does this mean for CSX?
 - Massive earnings power increase in what is already a fantastic business

Why This Opportunity Exists

If this is so good, why haven't others seen it?

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- Second order thinking
 - Good investing is about establishing differentiated views
 - Price reflects the market's average valuation
 - If all other investors have the same information I do (and probably more), why is my valuation different from theirs?

Why This Opportunity Exists

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 - Good investing is about establishing differentiated views
 - Price reflects the market's average valuation
 - If all other investors have the same information I do (and probably more), why is my valuation different from theirs?
- Sell-side is expecting E. Hunter Harrison to act fast
 - In reality, turning a railroad around takes years
 - Service disruptions are common and should be expected
 - Also looking at metrics that do not seem very important

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Risks

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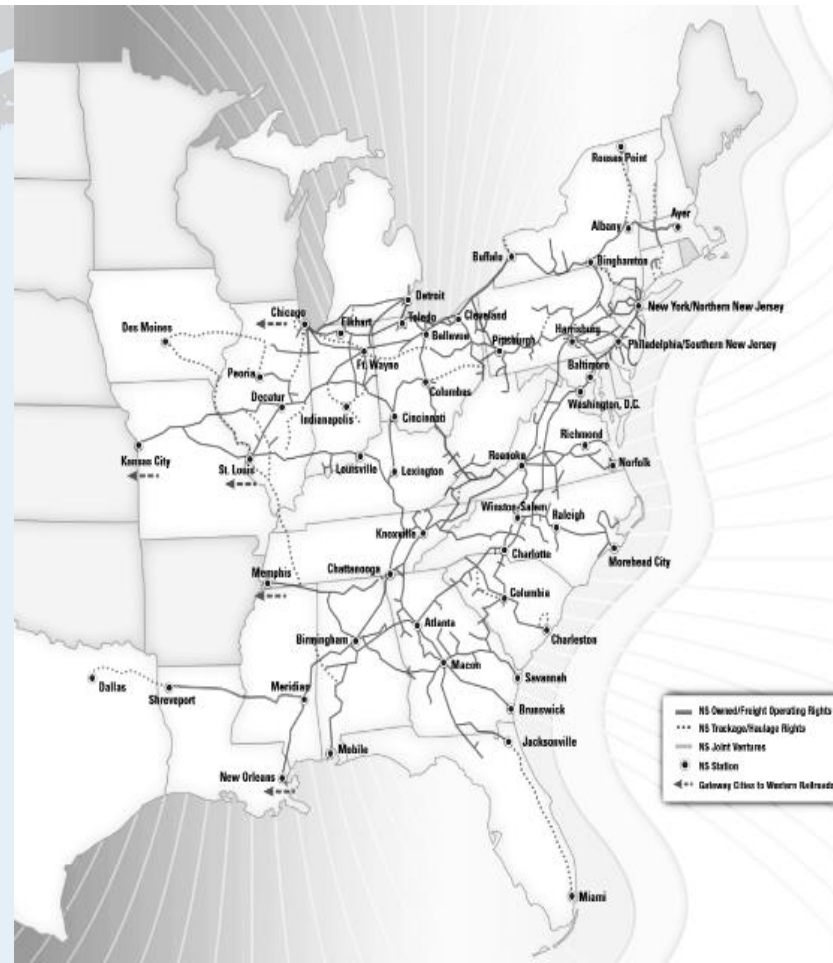
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Risks

How could my upside potential be limited?

- Diminished quality of service
 - Precision railroading theoretically improves service, but in reality does not

2012

- 1.) Union Pacific Railroad
- 2.) BNSF Railway
- 3.) CSX Transportation
- 4.) Norfolk Southern Railway
- 5.) Canadian National Railway
- 6.) Kansas City Southern Railway
- 7.) Canadian Pacific Railway

2013

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Risks

How could my upside potential be limited?

- E. Hunter Harrison's health
- Lack of incentive to perform

As CSX Vote Looms, Investors Worry About CEO Hunter Harrison's Health

By Jacquie McNish, Paul Ziobro and Joann S. Lublin | Published May 17, 2017 | [Features](#) | Dow Jones Newswires

As CSX Corp. officials talk with investors and analysts ahead of a key shareholder vote next month, they are being confronted with the same awkward question: How is the health of the railway's new chief executive, Hunter Harrison?

Since the 72-year-old Mr. Harrison won an activist battle to take the helm at CSX earlier this year, company watchers have been puzzled by the outspoken railway maverick's low profile. He appears no more than a few days a week at CSX's Jacksonville, Fla., headquarters and he has been spotted using a portable, over-the-shoulder oxygen system, say people familiar with the matter.

Valuation

Some made-up numbers that act as pretend proof I am right.

VALUATION	BEAR	BASE	BULL
2019 Revenues	\$9,994	\$12,129	\$12,708
Operating Ratio	0.67	0.62	0.56
Total Expenses	6,696	7,520	7,117
Depreciation	1,109	1,346	1,411
as % of revenues	11.10%	11.10%	11.10%
FY 2019E EBITDA	4,407	5,955	7,002
EBITDA Margin	44.1%	49.1%	55.1%
Discounted EBITDA	3,925	5,303	6,236
Terminal EV/EBITDA	8.5x	12.0x	13.0x
Terminal EV	33,363	63,642	81,067
(-) Debt	11,825	11,825	11,825
(+) Cash	(620)	(620)	(620)
Terminal Market Cap	22,158	52,437	69,862

2017E EBITDA	4,914	5,242	5,294
Taxes	(1,173)	(1,297)	(1,316)
CapEx	(2,100)	(2,100)	(2,100)
Increase in NWC	(16)	(16)	(16)
2017 FCF	1,624	1,830	1,862
Discounted FCF	1,587	1,788	1,819
2018E EBITDA	3,865	5,896	6,361
Taxes	(742)	(1,496)	(1,668)
CapEx	(2,000)	(2,000)	(2,000)
Increase in NWC	(20)	(20)	(20)
2018 FCF	1,103	2,380	2,672
Discounted FCF	1,029	2,220	2,493
Market Cap	24,774	56,445	74,174
Share Price	\$26.81	\$61.09	\$80.28
Probability	15%	50%	35%
Implied Share Price		\$62.66	
Upside		18.8%	

COMP TABLE	SUMMARY				EV/EBIT		EV/EBITDA	
	Price	Shares	Mkt Cap	EV	2016	TTM	2016	TTM
CSX	\$52.76	924	48,750	59,970	17.7x	17.1x	12.8x	12.4x
NSC	\$130.59	290	37,819	46,450	15.1x	14.3x	11.3x	10.8x
CP	\$165.54	147	24,318	32,502	12.6x	12.2x	10.1x	10.1x
KSU	\$104.13	106	11,013	13,447	16.4x	15.6x	12.0x	11.4x
UNP	\$113.88	807	91,924	106,398	14.6x	13.8x	11.4x	10.9x
Median			37,819	46,450	15.1x	14.3x	11.4x	10.9x
Mean			41,940	51,753	14.7x	14.0x	11.2x	10.8x

Announcements

- Mentorship Apps are live!
 - bit.ly/QFSMentorship
 - Rolling admission – last day to apply is Friday, 10/13