North American Railcar Manufacturing Industry

Strong Backlog, New Orders Losing Steam

Robust Backlog to Support Deliveries. Revenues will continue to grow for the next 1-1.5 years as firms work through the record backlog of orders related to crude transportation. Significant order cancelations are unlikely given the current shortage of tank cars and regulation-induced retirements. However, firms may limit capacity growth as to prevent overcapacity following the depletion of the backlog.

Impending Tank Car Regulations will Support Retrofit and Replacement. Anticipated regulations requiring safer tank cars will require owners to retrofit the current fleet. As retrofits will be uneconomical for about 65,000 older cars, owners will be forced to write-down car assets and scrap cars, possibly by as early as 2017. As replacement cars are potentially already incorporated in the backlog, the retirements will not lead to new orders, rather supporting the current order volume.

New Tank Orders to Dry Up Due to Lower Crude Prices and Increased Uncertainty. New orders for tank cars and covered hoppers are likely to dry up given the uncertainty of low crude prices. Shippers are unlikely to invest in capital spending as the ramifications of the current price on is still unknown. Orders will again pick up if expected pipeline capacity is reduced.

Replacement Cycle to Support Industry at Base Level. Excluding tank cars, the replacement cycle for other railcars would support 37,000 in annual deliveries. The industry will shift focus on other railcar types which have largely been ignored as capacity has been used for crude-related cars.

Overweight Recommendation. The recent sell-off in the industry has been overdone. Our analysis predicts fewer order cancelations and higher delivery volumes. The DCF valuation of three largest companies in the industry implies that there is a 23% upside from the current valuation.

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

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January 26th, 2015

Yale SCHOOL OF MANAGEMENT

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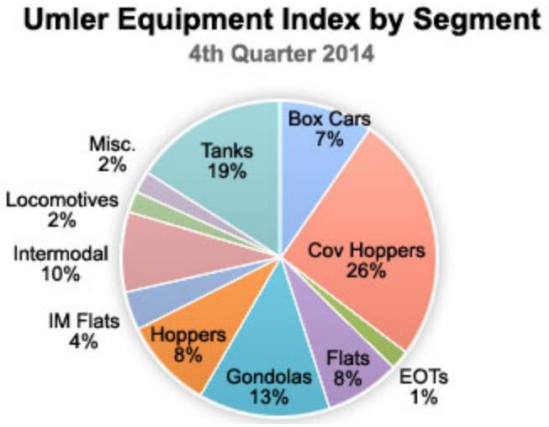
I. Industry Overview

Rolling Stock. North American railcar manufactures produce a variety of rolling stock that is used to transport goods such as coal, petroleum products, automobiles, grain and containers. The box car transports cargo such food products. Hopper cars can either be covered (grain, sand and fertilizer) or open-top (coal and aggregates). Gondola cars are primarily used for coal. Intermodal cars transport containers and trailers which can be loaded on ships and trucks. Tanks cars carry petroleum products and other liquid products.

Railcar Fleet. The North American railcar fleet is composed of 2,012,323 railcars as of the 4th quarter 2014[1]. Covered hoppers are the most popular car, representing 26% of the fleet.



Source: Railinc Rail Industries

Regulation. Railcar manufactures are regulated by Federal Bureau of Transportation and the Association of American Railroads (AAR) in the United States. The regulations govern safety standards for railcars and related equipment. The AAR certifies railcar manufactures, repair shops and component makers.

Raw Materials and Components. The manufacturing of railcars requires a significant amount of steel. In addition, a supply of specialty products such as wheels, brakes and axles are required. Manufactures generally establish long-term relationships with suppliers.

Customers. The primary customers for railcars are railroads, leasing companies, shippers, transportation companies and financial institutions. Railcar manufactures generally have long-term relationships with customers given the limited number of buyers. Historically, railroads owned most of the railcars; however, shippers are beginning to own a greater share of total fleet.

[1] Railinc Rail Industries https://www.railinc.com/rportal/railinc-indexes/-/blogs/umler-equipment-index-fourth-quarter-2014?_33_redirect

Related Industries. Railcar manufactures generally also compete in the leasing and the repair industries.

Railcar leasing is very competitive and includes financial institutions such as CIT Group and GE Capital. The industry also includes pure-play leasing firms GATX and Union Tank Car. These companies are both customers of railcar manufactures, but also compete with them to provide leasing. Leases are generally structured as long-term operating leases, which vary from one to twenty years and have fixed monthly payments. Lessors provide railcars to shippers and railroads.

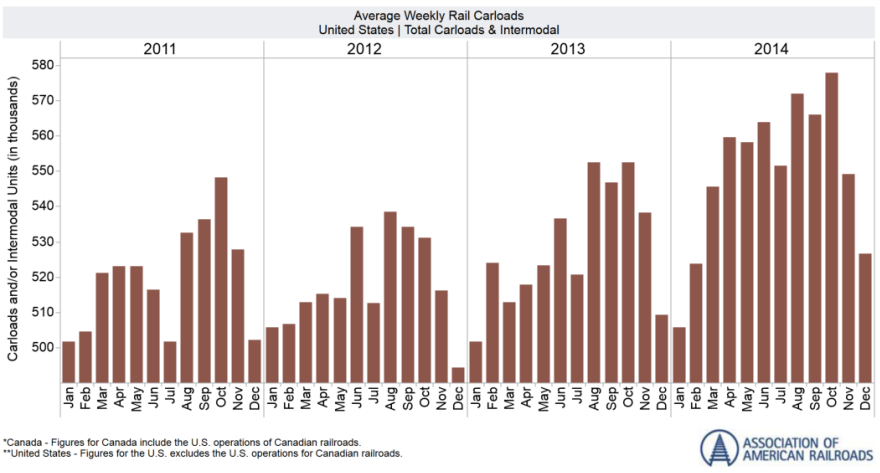
The railcar repair business is also competitive. The majority of rail maintenance is completed by repair facilities operated by the major railroads. However, railroads and shippers also contract work, especially heavy overhaul jobs to other suppliers. Both railcar manufactures and lessors operate repair facilities to support their own fleet and to provide services for contract. Other than the railroads, major industry players include GATX, Union Tank Car, GE Capital Rail Services, GBW Railcar Services (50% owned by Greenbrier companies) and FreightCar America.

Competitive Environment. The railcar manufacturing industry is competitive given little product differentiation and a high level of bargaining power among a small number of customers. There are four major railcar manufactures, in addition to a number of smaller firms that have entered the market. Some firms specialize in a certain type of railcars; American Railcar Industries focuses on coal cars. Yet other companies such Trinity, American Railcar and the Greenbrier Companies all compete in tanks cars, hoppers and intermodal. Overall, the manufactures compete based on price, quality, product features and customer service. Competition from outside North America is limited given high shipping costs and compliance with US standards.

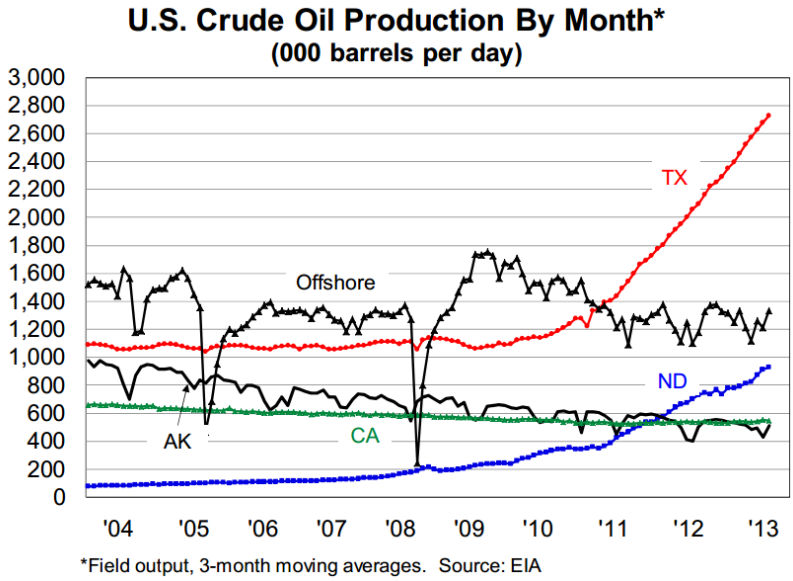
II. Drivers

The level of railcar manufacturing will be driven by overall rail traffic, crude by rail shipments, increased regulation for tank cars, the replacement of aging railcars, and the sustainability of the current backlog.

Rail Traffic. The railcar manufacturing industry is closely entwined with the greater railroad industry as a whole. Rail traffic is largely driven by economic activity, including exports and imports. Rail traffic has been increasing over the prior four years due to an improving economy, higher crop yields, and increased transportation of crude oil. In our projections, we assume stable economic growth of 3%-4%.

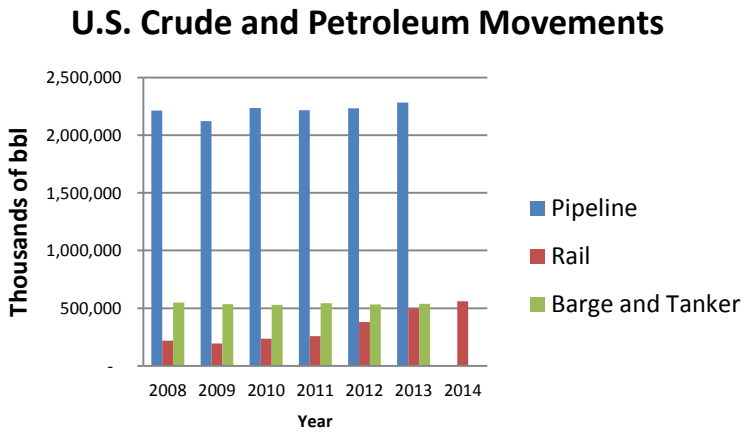


Crude by Rail. The shale oil revolution, particularly hydraulic oil extraction in Bakken fields near North Dakota, have increased US oil production in the past five years, and created demand for crude and petroleum shipping beyond existing pipeline capacity. Bakken production has been rising at 71% per year since 2009, combined with an overall growth of 16% per year total domestic production.



Bakken and Texas Oil Production. Source: U.S. Energy Information Administration

While pipeline, barge capacity and total movements per year remained steady at around 2.2 billion barrels and 530 million barrels respectively, rail shipments have been increasing at 30% per year since 2011. This increase mirrors the crude oil production boom, which also started in 2011. Excess demand for oil transportation by rail has greatly increased orders for new tank railcars.

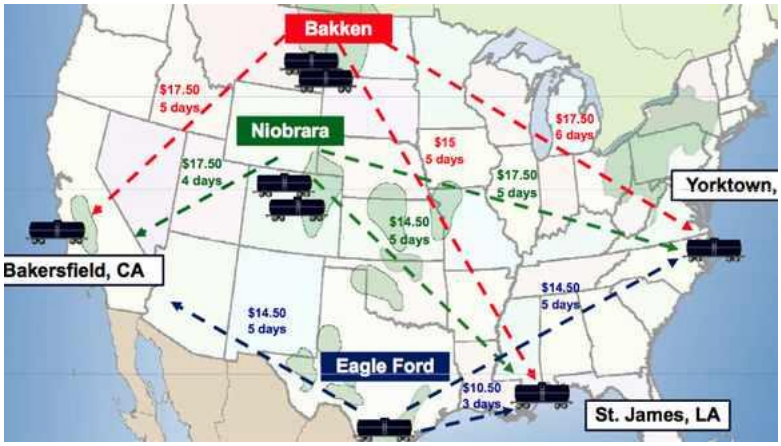


Source: US Energy Information Administration, American Association of Railroads

Each unpressurized tank railcar contains roughly 700 barrels of oil, which equates to about 30,000 gallons, at 42 gallons per barrel. All existing rail tracks suitable for freight transportation are also suitable

for carrying oil tank cars, albeit with proposed maximum speed limitations of 40 mph.[2] However, the additional infrastructure is required for a loading and unloading, therefore restricting the number of feasible destinations and distribution centers, while adding overhead to any new oil site.

Typical oil transit trains are dedicated to transporting oil for a single customer. The single use train therefore reduces complexities of shunting. Total transportation time between the Bakken oil fields and Louisiana is typically five days compared to up to 40 days for pipeline of the same volume. This is a huge advantage to the oil producers and refiners because far less working capital is required to be on standby while waiting for the oil.



Major transportation hubs, times, and costs per car. Source http://bakkenshale.com/

Competition from Pipelines. Existing pipeline infrastructure has provided transportation for roughly 2.2 billion barrels between PADD regions. While pipelines are the dominant method for transporting crude oil and petroleum derivatives by volume, capacity is constrained, while infrastructure for loading and unloading are set at a few fixed points, some of which are far from new exploration areas. There are plans to expand capacity in the next six years, with long-term expansion averaging about 0.5 million barrels per day, or 180 million barrels per year each year.

These pipeline projects face the same pressures from demand as to tank railcar orders, since additional capacity is driven mostly from new oil sites and increase production rates from Texas and North Dakota. Any decline or slowing of oil production will adversely affect prospects of future pipeline capacity.

[2] US Department of Transportation. U.S. DOT Announces Comprehensive Proposed Rulemaking for the Safe Transportation of Crude Oil, Flammable Materials. http://www.dot.gov/briefing-room/us-dot-announces-comprehensive-proposed-rulemaking-safe-transportation-crude-oil . Accessed 25 January 2014

Originating Region	2014-2020	2021-2025	2026-2030	2031-2035	2014-2035	Average Annual 2014-2035
U.S. and Canada	7.4	1.7	0.7	0.4	10.2	0.5
U.S.	5.2	-	0.3	-	5.4	0.2
Canada	2.2	1.7	0.4	0.4	4.7	0.2
Central	0.5	-	0.3	-	0.7	0.0
Midwest	2.7	-	-	-	2.7	0.1
Northeast	0.2	-	-	-	0.2	0.0
Offshore	-	-	-	-	-	-
Southeast	-	-	-	-	-	-
Southwest	1.7	-	-	-	1.7	0.1
Western	-	-	-	-	-	-
Arctic	-	-	-	-	-	-

Crude oil pipeline additional capacity expansion from known projects. Source: INGAA Foundaton. North American Midstream Infrastructure through 2035: Capitalizing on Our Energy Abundance. http://www.ingaa.org/file.aspx?id=21498

Forward-looking Implications of Depressed Oil Prices. For existing oil producers and new exploration projects, production is only justified if the price of oil is greater than the marginal cost of extraction combined with gradual financing of drilling projects.

Strengths of transporting oil by rail lie in its flexibility and geographical expansiveness of the freight rail network. Therefore, most of the beneficiaries of this service are companies that do not operate near well-established pipeline infrastructure, and don't have bandwidth allocated to the pipeline networks. These also the same companies that are most likely to postpone plans for new projects or scale back existing production, thereby reducing demand for rail shipments as well as new tank railcars.
Currently crude oil production has risen at an average of 500 million barrels per day since 2010, or 7.9% CAGR. If that growth were to halt to 0% for the next two years, orders for new tank cars could fall to replacement levels. But since 40% of the existing backlog is for tank cars, this would have very large implications on sales prospects for several manufacturers.

On the other hand, similar pricing pressures may also lead to new oil pipeline projects or alternative transportation expansion being delayed or canceled, resulting in less competition from pipelines and other means of moving oil.

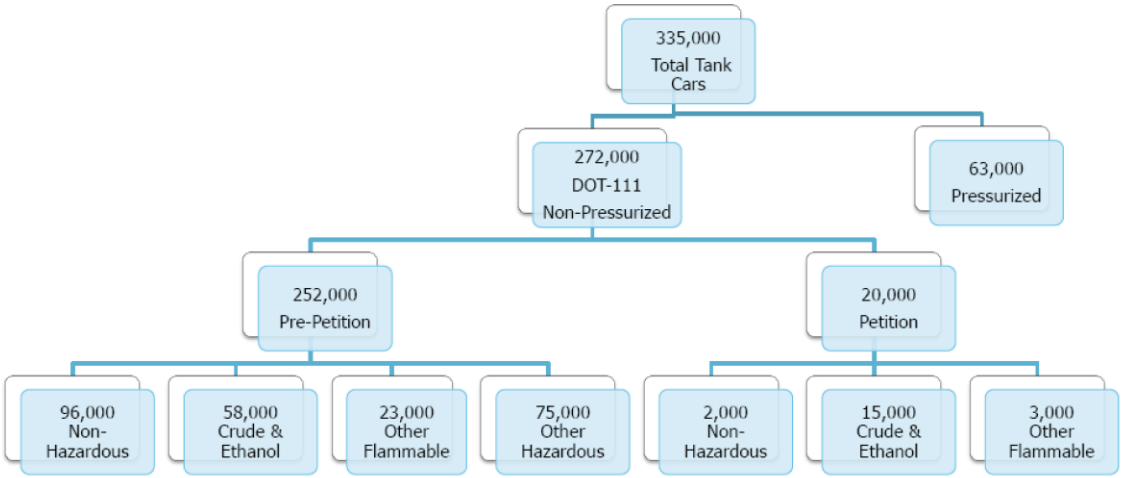
Tank Car Regulation. The industry is expecting increased regulations in transporting crude following a serious accident in Canada.

In July 2013, a freight train carrying crude oil from the Bakken derailed in the Canadian city of Lac-Megantic. The tank cars punctured, releasing crude that caught on fire. The resulting explosion led to 42 death and destruction of 40 buildings in the town's center[3].

The incident, combined with other crude train accidents, has led the Department of Transportation (DOT) to review safety standards for tank cars. In August, 2014 the DOT issued a number of proposals aimed at improving the safety measures of the tanks cars. Proposals include requiring a thicker outer shell (1/2 or 9/16th inches), improved values, installing a thermal blanket, and regulating slower train speeds in urban areas. Many stakeholders have commented on the proposal, including legislators and representatives of the communities along the route of crude-carrying trains who want the new regulations to go into effect starting in 2017. The DOT is expected to issue the final ruling on March 31, 2015; however, the decision has already been delayed and there are significant disagreements between stakeholders.

[3] http://www.bbc.com/news/world-us-canada-27387287

The regulation's effect on the industry will be dependent on the exact language of the regulation. There are currently 335,000 tank cars in the US fleet, 174,000 of which would most likely be affected by legislation as they primarily used to carry crude and other flammable liquids. About 18,000 of these tank cars were built after 2011 when more stringent standards went into effect, as thus will likely not be affected by the regulation. In addition, since the cost of retrofitting tank car will be about $27,000 to $46,700 per car (compared to $120,000 to $175,000 for a new car), owners will be incentives to retrofit rather than replace cars[4]. However, the regulation will likely expedite the retirement of 65,000 older tank cars where a retrofit is not economical feasible. A portion of these replacements may already be in the order backlog.



Source: Greenbrier Company Presentation November 2014

The proposed changes will benefit the entire railcar manufacturing and retrofitting industries. However, the costs will be borne by tank car owners. Greenbrier is already selling a tank car with a 9/16th in shell and could thus lead the industry for new tank cars. As the railroads own almost no tank cars, costs will fall on shippers and lessors that will be required to retrofit or replace their fleet of older cars.

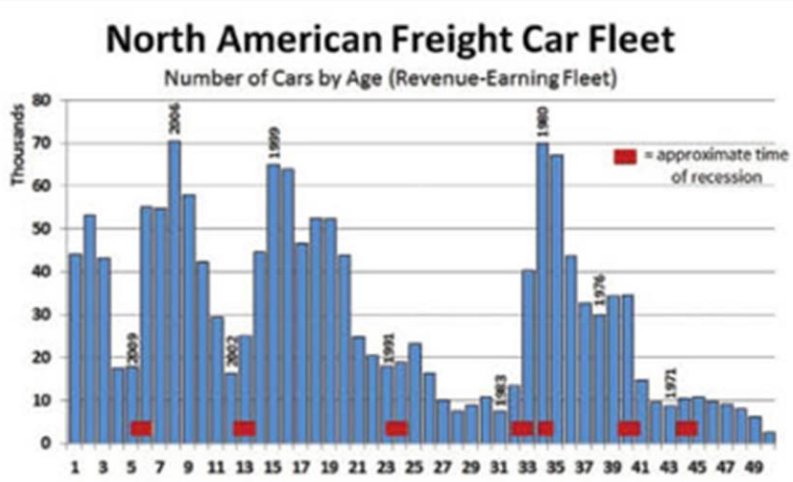
Replacement Cycle. The demand for new railcars is derived from both incremental growth of the fleet and replacement of old cars. The industry has recently been focusing on building new tank cars and hoppers for the fracking industry. However, given a consistent level of rail traffic, railcars will need to be replaced as they become unusable. Railcars generally have a useful life of about 40 years. Since 2004, the average age of the US railcar fleet has been around 20 years[5].

An analysis of the distribution of railcars by age shows that 373,484 cars, or 29% of the fleet is more than 31 years old. These railcars will need to be replaced within the next decade. Smoothing the replacement over a period of 10 years, the industry will need to replace about 37,000 cars per year (compared to 67,228 deliveries last year).

Railcar owners can temporarily delay costly replacement with increased maintenance as is generally done during recessions. However, upkeep of older cars becomes increasingly expensive.

[4] http://rsiweb.org/wp-content/uploads/2011/05/The-Brattle-Group-Report-for-the-RSI-CTC_A-Review-of-PHMSAs-Draft-RIA-for-HM-251_11-14-14.pdf

[5] http://www.progressiverailroading.com/mechanical/article/Rail-car-and-locomotive-statistics-Fleet-Stats-2014--40971



Source: Railway Age

Backlog. The current industry backlog provides the best indication of activity within the next year. The current backlog is 142,837 railcars, representing a 75% increase over the prior year. The entire industry delivered 67,228 railcars last year. If production rates stay constant, it will take over 2 years to work through the backlog without new orders. Manufacturing capacity increased by 27% over the prior year and thus is likely to grow again next year. However, manufactures may be cautious to expand capacity due to headwinds resulting from lower crude prices.

Railway Supply Institute, Inc.
ARCI 2014 - 4TH Quarter Reporting Statistics
REPORT OF ORDERS, DELIVERIES, AND BACKLOG
1/20/15

	ORDERS	DELIVERIES	BACKLOG	YTD ORDERS	YTD DELIVERIES
BOX CARS	800	61	4310	4335	692
COVERED HOPPERS					
Over 5500 c/f	875	749	10490	7250	2449
3500-5500 c/f	3802	1979	9856	11937	4481
Under 3500 cf	8627	4071	39835	49809	13402
OPEN-TOP HOPPERS					
Steel	16	150	1058	784	719
Aluminum	0	0	0	0	0
GONDOLAS					
GB Steel	1380	1162	2446	3063	2343
GT Steel	0	105	600	1500	900
GT Aluminum	0	0	195	195	0
FLAT CARS					
NON-INTERMODAL	1575	508	4171	5175	2767
INTERMODAL:					
NON-ARTICULATED	0	0	0	0	0
ARTICULATED					
*5-Unit Platforms	1870	995	5870	8690	3645
*Other Platforms	3522	330	6381	6918	537
TANK CARS	14964	8831	57625	38578	35293
OTHERS	0	0	0	0	0
TOTALS	37431	18941 **	142837 **	138234 **	67228 **

*For reporting purposes, one articulated platform is considered a car.
**Figures that do not track or reflect revisions to a prior quarter made subsequent to that quarter's reporting.

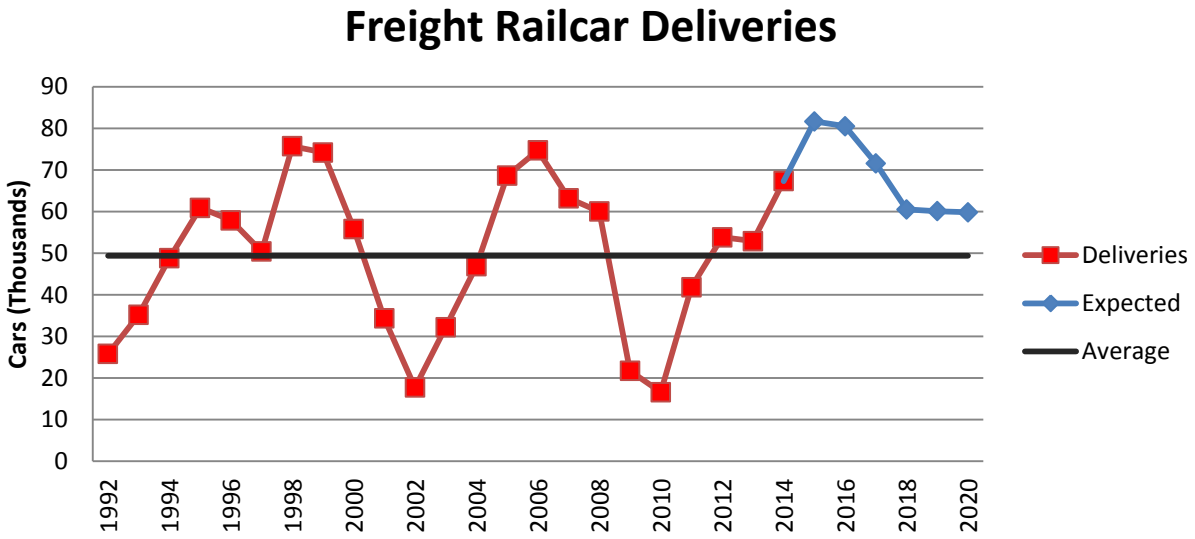
Source: Railway Supply Institute, Inc

About 40% of the backlog is composed of tank cars that may be used to carry crude oil. The drop in crude prices and reports of decreasing capital spending by E&P companies has raised fears that shippers will cancel their orders. Although order contracts differ between customers and firms, some contain deposits and/or take-or-pay provisions which reduce the likelihood of cancelation. Greenbrier Companies recently reported that they have seen very little desire to cancel thus far[6].

We believe that cancelation rates will be relatively low given the shortage of tank cars combined with impending requirement to replace a large portion of the tank car fleet.

III. Delivery Forecast

We forecast railcar deliveries using a combination of backlog data, replacement cycle information, and predictions of future drivers. We predict deliveries to increase 21% in 2015 but then decrease 1% in 2016 and 11% in 2017 and 15% in 2018. In 2019, we believe the market will reach a steady state slightly higher than 20 year average. We believe that that the deliveries cycle will not decrease immediately as witnessed in prior cycles do to the higher importance of global trade, especially imports into the Unites States.



We first analyze the backlog to project deliveries for the next two years. As noted previously, we believe that the decrease in crude prices will not lead to significant order cancelations due to regulation-induced tank car retirements and a shortage of cars for today's crude volumes. However, the marginal shipper may cancel their order as there is significant uncertainty surrounding new regulations and additional pipeline capacity. We therefore take a 20% haircut of the tank car orders and a 10% haircut on the under 3500 cf covered hoppers orders that could be used to transport fracking sand. We take a smaller haircut on the covered hoppers because they have many uses in addition to transporting sand, and could therefore be resold more easily.

[6] http://www.bloomberg.com/news/2015-01-23/rail-tank-car-orders-threatened-by-u-s-crude-collapse-freight.html

Backlog	2014	Crude Haircut
Box Car	4,310	4,310
Covered Hoppers	60,181	56,198
Open Hopper	1,058	1,058
Gondolas	3,241	3,241
Flat Car	16,422	16,422
Tank Car	57,625	46,100
Total	**142,837**	**127,329**

The 2015 deliveries are forecasted using backlog data, in combination with capacity restraints based on last year's production. For instance, although the backlog for covered hoppers is more than 60,000 units, the industry will not be able to produce that many units within one year. 2016 deliveries were forecasted using remaining backlog information, in combination with annual replacement needs based on the previously discussed replacement cycle. The replacement amount is adjusted for growth in the economy as more goods will need to be transported by rail as the economy grows.

However, we felt that some railcars would be produced at rates different than would be suggested by the replacement data. For instance, we believe that uncertainty surrounding new EPA regulation of carbon dioxide in existing coal power plants will cause shippers to delay replacement of gondola cars primarily used for shipping coal. Conversely, we believe there is pent up demand for covered hoppers (aggregates and agricultural products) and intermodal units that were not built as manufactures could receive higher rates building tank cars. Therefore, we believe that deliveries of these railcars will grow at a rate higher than suggested by the replacement needs. Our complete forecast is presented below.

Deliveries	2014A	2015E	2016E	2017E	2018E	2019E	2020E	Annual Replacement Needs
Box Car	692	761	5,786	5,988	6,198	6,198	6,198	5,590
Covered Hoppers	20,332	32,412	27,550	20,663	16,290	16,290	16,290	12,244
Open Hopper	719	791	4,656	4,819	4,988	4,988	4,988	4,499
Gondolas	3,243	3,241	4,076	6,328	6,549	6,549	5,094	6,563
Flat Car	6,949	7,644	8,408	11,772	16,480	23,072	24,226	3,225
Tank Car	35,293	36,792	30,000	22,000	10,000	3,000	3,000	4,385
Total	**67,228**	**81,641**	**80,476**	**71,569**	**60,505**	**60,097**	**59,796**	**37,348**

IV. Company Descriptions

The U.S. rail car manufacturing industry is composed of four publicly traded companies, which combined account for $9.2 billion of sales in the fiscal year ending 2014, as well as 92% of all new and refurbished freight rail car sales.

Trinity Industries (TRN)
Trinity Industries, Inc. provides industrial products and services for large volume transportation. It is divided into the following segments: rail manufacturing, railcar leasing and management, inland barge, energy equipment, and construction products. Trinity is the dominant manufacturer of railcars, having delivered 44% of total North American railcars in the year ending 2013. Trinity has the most diverse business segments out of all companies in the industry, where the rail group is responsible for 48% of total revenues, while the scene, and then barge, and other segments comprise 10 to 20% each. The

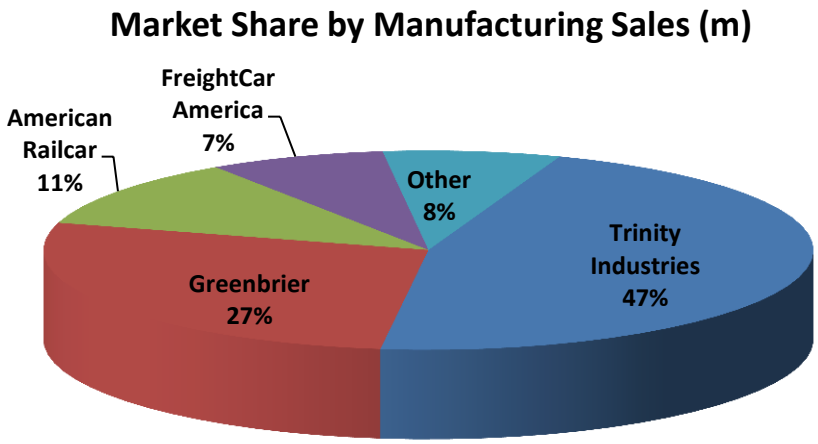
company has over 18,000 employees. Aside from achieving economies of scale from its size and a diversified set of business segments, Trinity is also the dominant manufacturer of tank railcars.

Greenbrier Companies (GBX)
Greenbrier Companies, Inc. manufactures and leases railroad freight cars of every type except coal in North America and some limited operations in Europe. For reporting purposes the company is divided into four segments: manufacturing, wheel services, refurbishment, and leasing. Manufacturing accounted for 74% of total revenue, while wheel and refurbishment accounted for 22%. The company has over 9000 employees

American Railcar Industries (ARII)
American Railcar Industries Inc. manufactures only hopper and tank railcars. Its business is divided into three segments: manufacturing, railcar leasing, and railcar services. Manufacturing is responsible for 86% of its total revenue, while leasing and railcar services comprise 10 and 4% respectively. The company has 2600 employees.

FreightCar America (RAIL)
FreightCar America, Inc. designs, manufactures, and sells rail cars for transporting non-liquid products. The company has a majority market share in new and refurbished coal railcars, which account for the majority of their sales for the past five years. The company operates through two segments, manufacturing and services, responsible for approximately 95% and 5% of sales respectively. The company has 800 employees.

Market Share and Concentration
The United States railcar manufacturing industry is highly concentrated. These four publicly traded companies represent 92% of total domestic sales in the last fiscal year. Market dominance has been fairly consistent as well, though with recent demand for oil tanker railcars, Trinity has outpaced the rest of the competition as the dominant manufacturer. This trend may continue for the next year as backlog orders are fulfilled, but there is greater uncertainty in the 2 to 5 year horizon as to whether domestic oil producers will continue to drive this increased demand.



Source: 10-K, 10-Q Filings, Association of American Railroads

Business Segments by Sales
With the exception of Trinity, most rail car manufacturers are fairly specialized and do not have significant businesses aside from manufacturing. The type of freight cars is partly complimentary, with

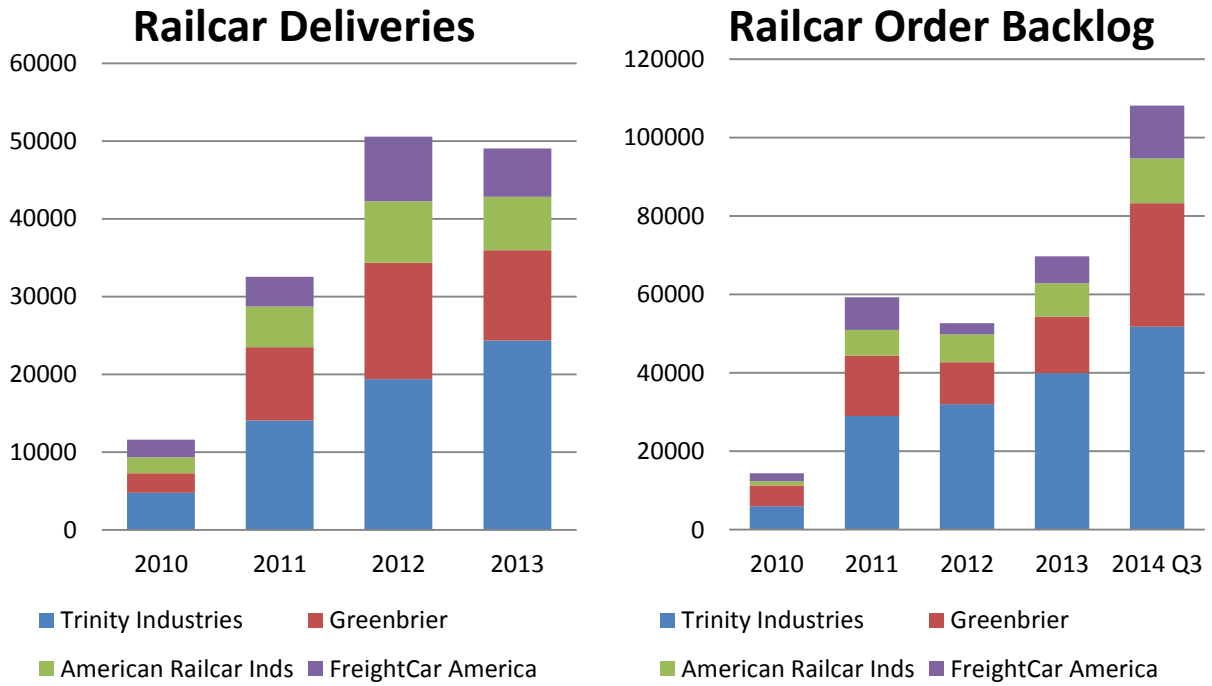
Trinity and Greenbrier producing the majority of pressurized and unpressurized tank cars, while FreightCar America produces cars only for transporting dry or boxed goods. Most sales are domestic, with some additional sales in Mexico, Canada, and Europe.

Company	Employees	Manufacturing	Leasing	Servicing	Other	US Sales	International Sales
Trinity Industries	18460	48%	15%	0%	37%	97%	3%
Greenbrier	9244	74%	4%	22%	0%	91%	9%
American Railcar	2663	86%	4%	10%		98%	2%
FreightCar America	819	87%		13%		93%	7%

Company Operating Segments. Source: 10-K and 10-Q Filings

Demand, Deliveries, and Operations

A surge in orders since 2010 has resulted in backlog balances greater than deliveries for any given year. Companies are trying to cope with this expansion by increasing their manufacturing capacity, with some financing inventory and equipment through debt issuances. Management has also stated that there is additional capacity in Trinity and Greenbrier through bringing non-operational facilities online and increasing staff hours.



Source: 10-K, 10-Q Filings

Since the recession, asset turnover has been depressed compared to historical averages. The average market cap weighted asset turnover has decreased from 1.8 in 2003 to 0.8 in 2013. This can be partly attributed to the recession itself, during which new orders vanished. Since the recovery, this ratio remains low due to an asset base acquired at higher costs, and expansion needed to fulfill much higher demand.

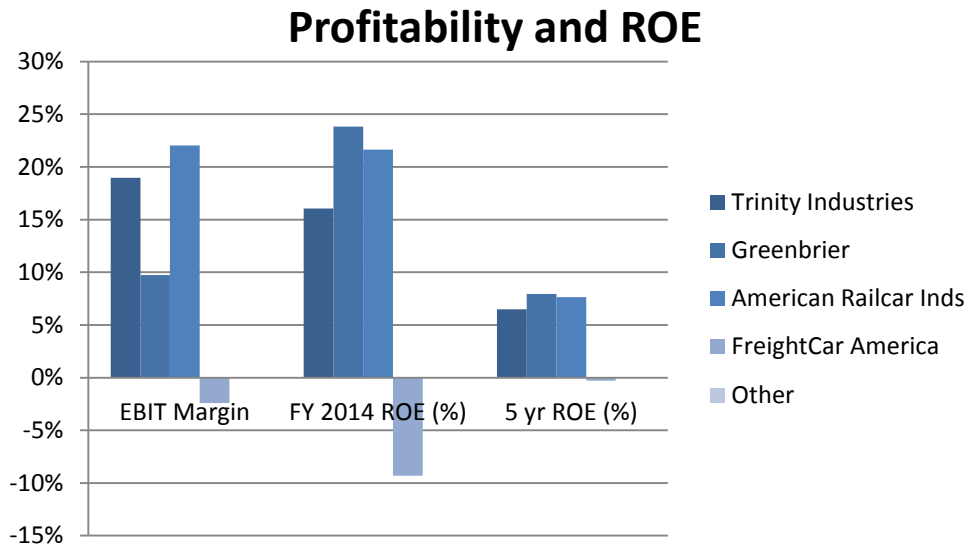
This trend of low turnover can continue into the future as companies continue to bring new facilities online and acquire more capital.

Inventory turnover has remained relatively steady, with less variation between companies now compared to pre-2008. We project this average of 5x to be the steady state minimum inventory turnover for the industry, as all orders are being delivered as soon as possible with very little stock remaining. To the contrary, inventory turnover may increase unexpectedly if orders, such as those of tank cars, decrease over the next 2 to 5 years.

Finances. Both income and profitability are highly variable, which is caused by the highly seasonal nature of orders driven by short term customer demand, combined with long delivery times and specific working capital requirements for each type of car ordered.

Name	Fiscal Period End	Market Cap (m)	Enterprise Value (m)	Sales (m)	Manufacturing Sales (m)
Trinity Industries	09/30/2014	4,108.8	7,442.5	5,764.6	2,767.0
Greenbrier	11/30/2014	1,421.3	1,859.3	2,208.1	1,634.0
American Railcar Inds	09/30/2014	1,103.9	1,308.8	779.6	670.5
FreightCar America	09/30/2014	295.3	214.8	465.8	442.5
Average		*940.2*	*1,127.6*	*1,151.2*	*1,378.5*
Total		*6,929.3*	*10,825.4*	*9,218.1*	*5,514.0*

Comps Source: 10-Q, 10-K Filings, FactSet Data Systems



Source: 10-K, 10-Q Filings

Return on equity is historically closer to 5%, though it has increased dramatically in recent years, thanks to a favorable backdrop of economic expansion and easier credit. Trinity and Greenbrier nearly doubled long term debt, and all companies enjoyed more predictable streams of increasing orders that led to a reduction in working capital and better production line utilization. The resulting effects led to a steady net profit margin increase from an average of 3% in 2009 to 12% across the manufacturers.

5 Year Average ROE Decomposition 2009-2014	TRN	GBX	ARII	RAIL
Asset Turnover (x)	0.54	1.20	0.73	1.03
x Pretax Margin (%)	6.20	3.74	4.99	-3.25
= Pretax Return on Assets (%)	3.53	5.26	5.76	-0.23
x Tax Rate Complement (1-Tax Rate)		58.20		
= Return on Assets (%)	1.94	2.49	3.54	-0.14
x Equity Multiplier (Assets/Equity)	3.05	3.48	2.14	1.77
= Return on Equity (%)	6.48	7.95	7.64	-0.28

Figure 1: DuPont Decomposition – 5 yr avg ROE: Source: Company 10-K, 10-Q

V. Industry Valuation

DCF Valuation.

We calculated a basic industry valuation using a discounted cash flow valuation of the three major companies in the industry that make up more than 85% of the market share. The individual cash flow calculations can be found in the respective reports published along with this industry report.

	Derivied Value of Equity	Market Value of Equity
TRN	8,034,200	5,612,994
GBX	2,406,152	1,962,097
ARII	842,718	1,115,428
Total	**11,283,070**	**8,690,519**

Above, we summarized the derived value of equity from each report along with the market value of equity. According to the derived valuation, there is a 23% upside from the current market valuation.

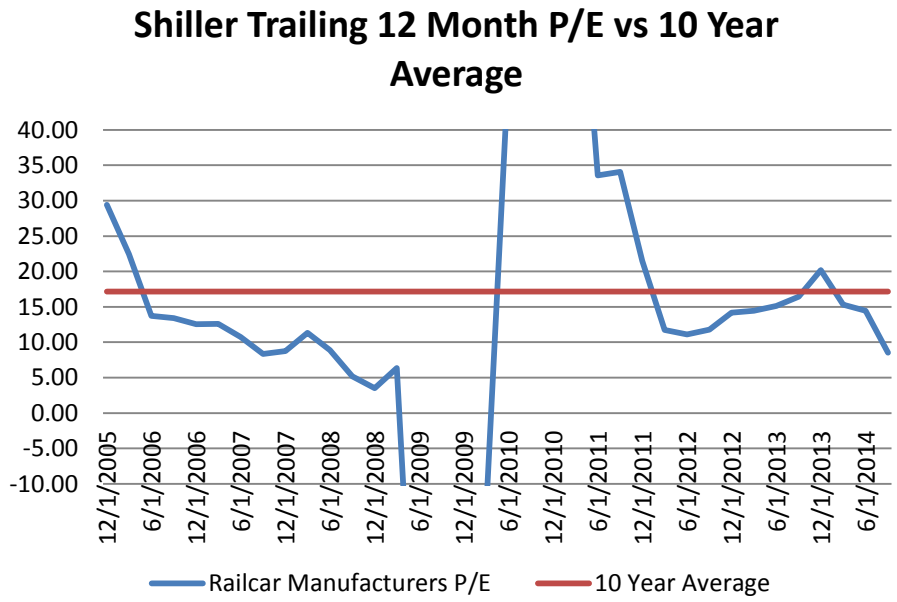
Shiller P/E.

In order to check our valuation, we also used a short term rolling 12 month and 10 year Shiller price to earnings, since recent economic expansion and greater profits may understate the P/E. Justification for more using a more stable valuation also comes from the relative stability of the industry, where technology and productivity has not undergone any fundamental shifts in the past decade.

Methodology

1. For all four represented companies, we recorded 10 years of quarterly net income.
2. Using the standard consumer price index, we adjusted all values for inflation to today, using a cumulative inflator. We used the CPI rather than core CPI in order to capture price changes related to energy, which is positively correlated with sales and market value of these companies.
3. We computed a total weighted average of market capitalization and sales of each company, and adjusted for inflation.

Historical Valuation Trends



The current industry P/E of 8.5 compares to an average of 17.15 for the last 10 years, and a current Industrials sector Shiller P/E of 23.70[7]. With the exception of the 2008 recession, P/E has been relatively stable between 5% and 20%. The current low valuation based on the last quarter's earnings and market cap is largely correlated with industrywide decreases in expected tank car orders for crude oil transport, due to the second half decline in oil prices. While there is little impact to next year's orders deliveries, the market may be pricing in a decrease in future orders from oil producers due to decreased oil exploration and production growth.

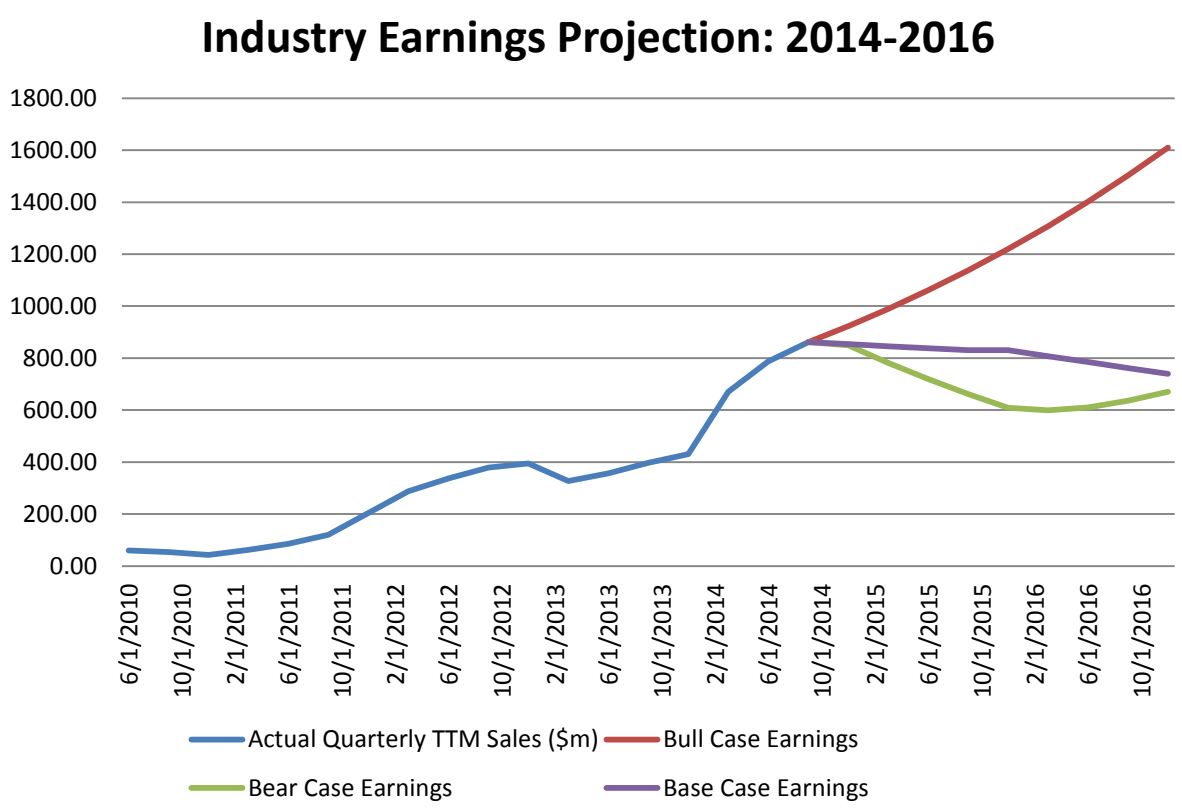
Forward P/E Forecast

To forecast a forward statement, we examined crude oil prices as a key driver of demand for tank cars and subsequently about 40% of new orders and order growth. Using WTI crude and forecasts as a proxy, a deflator is calculated by taking the ratio of crude prices relative to 2011 to Q2 2014 averages when steady prices correlated with an equally steady CAGR in sales and new orders. Crude prices are assumed to eventually mean-revert, and are forecasted using a reversion to mean multiplier that weights the current price against the past 3 year average price at a weight of 2/3 and 1/3 respectively:

$$P_t = \frac{2}{3}P_{t-1} + \frac{1}{3}\bar{P}_{\{t-1,t-2,\ldots,t-11\}}$$

The following graph shows the three scenarios of sales growth, one with no adjustment for oil tank car demand, another with the deflator in effect, multiplying the historical CAGR by the deflator, and the last computed using forecasted railcar deliveries.

[7] Bloomberg Intelligence



Quarterly TTM Earnings Projections for 2014 Q4 to 2016

Base Case: Current delivery trends continue reliably from the known backlog of cars, and revenue is recognized as backlog orders are delivered. Given the oil depression, we estimated vastly reduced new orders consistent with earlier-discussed mandatory regulatory replacements and a slowdown in oil production expansion. Constant returns to scale is assumed, and industry revenue is compared for the past 15 years against railcar deliveries using OLS regression.[8] The following model is obtained and used to extrapolate future revenue.

$$Real\ Earnings = 1217.25 + 85.97 \times Deliveries$$

Sales are in 2014 millions of dollars, and deliveries are units of railcars in thousands. Earnings are then calculated from the extrapolated sales using an industry profit margin based on the past five years of economic expansion profitability growth of 1.8% per year, at 11.1% in 2015, we estimate future earnings below.

Year	Deliveries	Estimated Sales ($m)	Estimated Earnings ($m)
2015	73.6	$7,546.75	$830.14
2016	64.0	$6,722.44	$739.47
2017	44.1	$5,008.82	$550.97
2018	45.8	$5,153.45	$566.88

[8] Additional information in appendix

Bear Case: Backlog tank car orders are cancelled, no revenue is recognized, and depressed oil prices halt expansion indefinitely into the future, resulting in only replacement tank car orders to meet safety regulation requirements. Sales are subsequently driven by non-oil tank car sales.

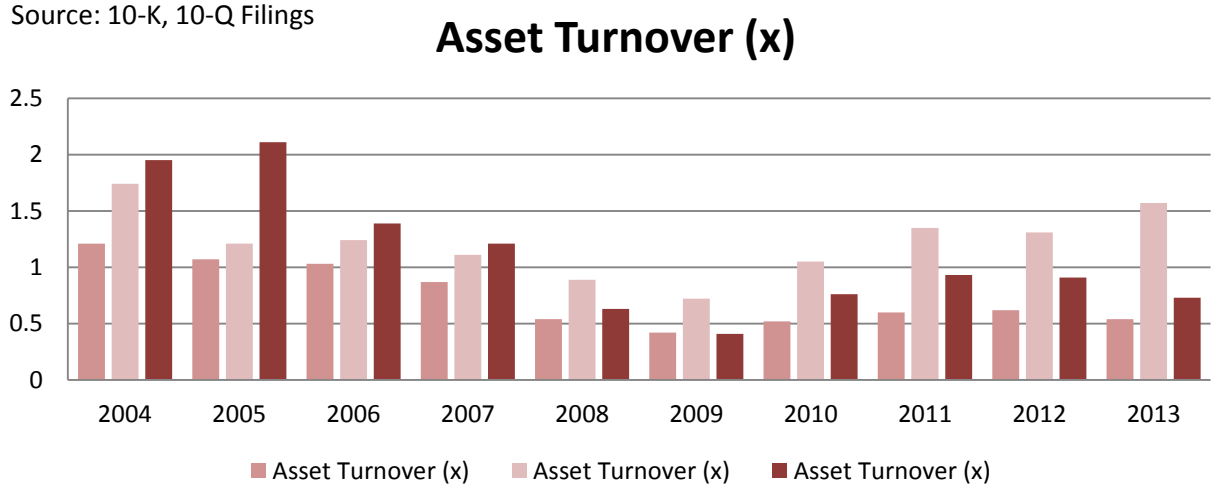
Bull Case: The bull case assumes that there is minimal impact from oil prices on oil expansion and subsequent demand for moving crude oil by rail. In addition to the current backlog, new orders for all types of cars will continue to grow as the order cycle is prolonged.

Risks to Valuation

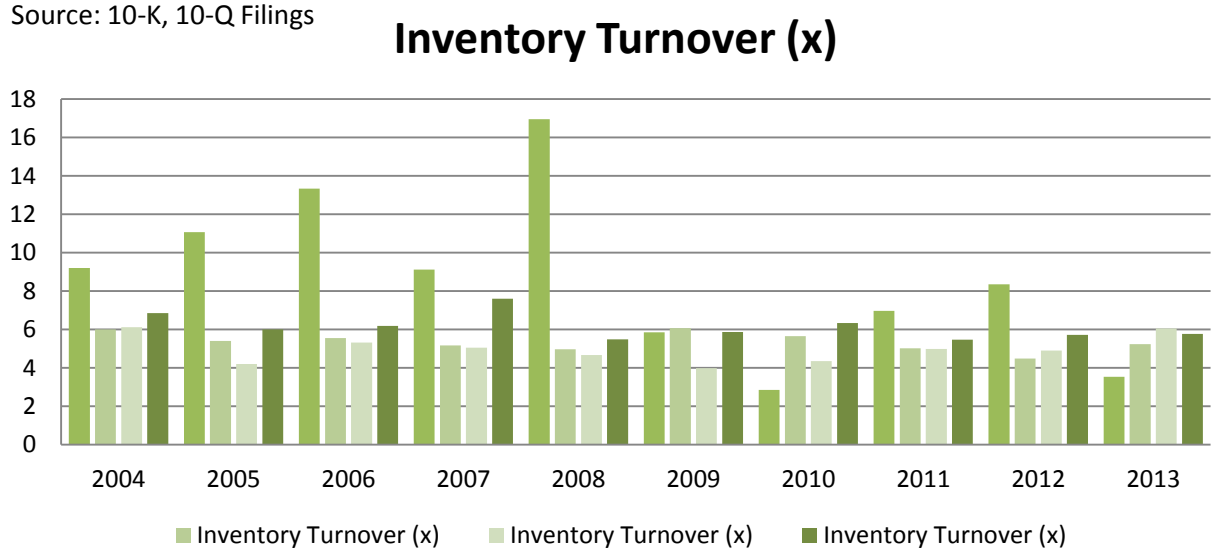
- Given the high percentage of new orders and subsequent backlog allocated to tank cars for oil transport, future sales are highly dependent on both the cost of oil as a driver for domestic oil production. The future uptrend in orders may reverse if oil prices remain depressed for a longer period of time and cost domestic producers to slow production or cancel new projects.
- Similarly, completion of new pipeline projects, particularly those linking up the Bakken fields, such as the Dakota Access Pipeline, which scheduled to come online in 2016. This will alleviate the need for oil producers and refiners to transport oil by rail, therefore potentially decreasing future tank car orders.
- Current stability of unit orders seems to be the exception rather than the norm looking at the past 10 years of orders. All four companies have been enjoying increasing profitability from this stability and the ensuing optimization of their manufacturing lines. Therefore, efficiency gains such as the decrease in assets and inventory turnover may be temporary, and therefore fail to predict future profitability.
- Order shipments, while seasonal, has had very wild quarterly variations year over year. The latest quarterly new order and sales data from the four companies may not be entirely comparable, given the different timing of their fiscal years and information release.
- Given the small number of companies and high concentration within the freight rail car manufacturing industry, overall industry performance may be subject to event risks, and the default or unexpected performance of a single company may impact industry supply in unforeseen ways.

VI. Appendix

Source: 10-K, 10-Q Filings



Source: 10-K, 10-Q Filings



Deliveries	2014	2015	2016	2017	2018	Note	Replacement Needs
Box Car	692	761	5786	5988	6198		5590
Covered Hoppers	20332	22365	29849	13116	13575		12244
Open Hopper	719	791	4656	4819	4988		4499
Gondolas	3243	3241	4076	4921	5094	Less Coal	6563
Flat Car	6949	7644	8408	9249	9712	More trade	3225
Tank Car	35293	38822	7278	4698	4862		4385
Total	67228	73951	60053	42792	44428		37348

Valuation Ratios

LTM 2014 Q3	EBIT	EBITDA	EV/EBIT	EV/EBITDA
Trinity Industries	1,092.5	1,319.3	6.81x	5.64x
Greenbrier	215.3	256.8	8.64x	7.24x
American Railcar Inds	171.8	203.5	7.62x	6.43x
FreightCar America	-11.2	-0.9	--	--
Average	*125.3*	*153.2*	*8.13x*	*6.84x*
Total	*1,468.4*	*1,778.8*		
Comps Source: 10-Q, 10-K Filings, FactSet Data Systems				

Industry P/E ratios for transportation are consistently in the 205-28 range for the last 12 months. Auto and truck manufacturing, which is similar to railcar manufacturers in being upstream from transportation, is similarly valued today, but future earnings expectations are buoyed by low fuel costs.

Industry	Number of firms	Current PE	Trailing PE	Forward PE	Aggregate Mkt Cap/ Net Income	Aggregate Mkt Cap/ Trailing Net Income	Expected growth - next 5 years
Air Transport	22	47.14	28.11	14.42	14.65	10.9	34.73%
Auto & Truck	22	13.55	15.06	29.57	10	13.03	21.93%
Transportation	21	26.9	25.11	27.2	23.79	24.55	14.76%
Transportation (Railroads)	10	29.89	25.81	18.65	22.15	20.46	12.68%
Trucking	30	51.68	27.84	23.78	31.28	25.31	18.77%
Total Market	**7887**	**72.13**	**60.49**	**35.25**	**18.36**	**18.06**	**15.12%**

Source: NYU Stern: PE Ratio by Sector (US). Estimates source: Zacks Research Consensus Estimate (equal weight average of all broker coverage EPS estimates)

Quarter	Actual Quarterly TTM Sales ($m)	Projected Earnings on CAGR Only ($m)	WTI Crude Oil	Oil Cum. Price Change	Oil Deflator	Deflated Earnings Projection ($m)
6/30/2010	60.04		75.63			
9/30/2010	53.72		79.97	0.06		
12/31/2010	43.21		91.38	0.21		
3/31/2011	62.84		106.72	0.41		
6/30/2011	86.42		95.42	0.26		
9/30/2011	119.76		79.20	0.05		
12/30/2011	204.39		98.83	0.31		
3/30/2012	287.56		103.02	0.36		
6/29/2012	336.69		84.96	0.12		
9/28/2012	379.21		92.19	0.22		
12/31/2012	395.10		91.82	0.21		
3/29/2013	326.61		97.23	0.29		
6/28/2013	357.14		96.56	0.28		
9/30/2013	397.67		102.33	0.35		
12/31/2013	430.03		98.42	0.30		
3/31/2014	670.45		101.58	0.34		
6/30/2014	787.08		105.37	0.39		
9/30/2014	861.30		91.16	0.21		
12/31/2014		923.32	45.02	-0.20	0.92	849.68
3/31/2015		989.82	45.00	-0.20	0.92	781.82
6/30/2015		1061.10	45.00	-0.20	0.92	719.39
9/30/2015		1137.52	45.00	-0.20	0.92	661.93
12/31/2015		1219.44	45.00	-0.20	0.92	609.07
3/31/2016		1307.26	56.87	-0.04	0.98	598.66
6/30/2016		1401.41	63.82	0.05	1.02	610.43
9/30/2016		1502.33	68.01	0.10	1.04	635.97
12/31/2016		1610.52	70.30	0.13	1.05	670.29

Figure 2: Future Earnings Projections. WTI Oil price source: FactSet Systems, Sales Data Source: 10-Q

Year		Nominal S	Deliveries	CPI % Change	*CPI Non-Ann*	Cumul. CPI multiplier	Real Sales	TRN	GBX	ARII	RAIL
2014		9213.4	67.3	2			9213.4	5,765	2,203	780	465.8
2013		7161	52.9	1	*101.61%*	101.61%	7276.292	4,365	1,755	751	290.4
2012		7013.1	53.8	2.07	*101.46%*	103.09%	7230.051	3,812	1,812	712	677.4
2011		5324.4	41.8	3.14	*102.07%*	105.23%	5602.735	3,075	1,243	519	487
2010		3369.5	16.6	1.64	*103.14%*	108.53%	3656.975	2,189	764	274	142.9
2009		4271.9	21.7	-0.32	*101.64%*	110.31%	4712.401	2,575	1,025	423	248.5
2008		6728.2	60	3.81	*99.68%*	109.96%	7398.235	3,883	1,290	809	746
2007		6572.1	63.2	2.87	*103.81%*	114.15%	7501.923	3,833	1,224	698	817
2006		6263.9	74.7	3.22	*102.87%*	117.42%	7355.327	3,219	954	646	1,445
2005		5461.4	68.6	3.37	*103.22%*	121.21%	6619.497	2,902	1,024	608	927
2004		3764.3	46.9	2.67	*103.37%*	125.29%	4716.282	2,198	729	355	482
2003		2330.3	32.2	2.3	*102.67%*	128.63%	2997.581	1,433	435	218	244
2002		2187.3	17.7	1.6	*102.30%*	131.59%	2878.347	1,487	306	169	226
2001		804.3	34.3	2.82	*101.60%*	133.70%	1075.342	-	594		210
2000		619	55.8	3.37	*102.82%*	137.47%	850.9356	-	619		

Total earnings vs units of trucks delivered, adjusted for inflation

```
. regress realsales deliveries

      Source |       SS       df       MS              Number of obs =      15
-------------+------------------------------           F(  1,    13) =    9.19
       Model |  37442316.3     1  37442316.3           Prob > F      =  0.0097
    Residual |  52992873.5    13  4076374.89           R-squared     =  0.4140
-------------+------------------------------           Adj R-squared =  0.3689
       Total |  90435189.8    14  6459656.42           Root MSE      =    2019

------------------------------------------------------------------------------
   realsales |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  deliveries |   85.97399   28.36761     3.03   0.010     24.68949    147.2585
       _cons |   1217.249   1435.973     0.85   0.412    -1884.982    4319.479
------------------------------------------------------------------------------
```

Shiller P/E Calculation Details

				Net Income ($m)				Net Income (Today's Dollars)					Market Cap ($m)				Market Cap (Today's dollars)				
Quarter Ending	CPI	*CPI Non-Ann*	Cumul. CPI multiplier	TRN	GBX	ARII	RAIL	TRN	GBX	ARII	RAIL	Trailing 12 Month Total	TRN	GBX	ARII	RAIL	TRN	GBX	ARII	RAIL	Industry P/E
12/31/2014	1.2	*100.30%*	100.30%																		
9/30/2014	1.79	*100.44%*	100.74%	$144.1	$32.8	$23.8	$6.4	$145.2	$33.0	$24.0	$6.5	$861.3	$4,372.4	$1,491.9	$1,099.6	$317.4	$4,404.9	$1,503.0	$1,107.8	$319.8	8.5
6/30/2014	2.06	*100.51%*	101.26%	$158.9	$47.4	$32.2	$1.6	$160.9	$48.0	$32.6	$1.6	$787.1	$7,293.0	$1,957.1	$1,578.4	$401.8	$7,384.8	$1,981.7	$1,598.2	$406.8	14.4
3/31/2014	1.4	*100.35%*	101.61%	$218.9	$33.6	$20.8	-$7.0	$222.4	$34.1	$21.1	-$7.1	$670.5	$6,820.3	$1,525.6	$1,447.1	$302.2	$6,930.3	$1,550.2	$1,470.4	$307.0	15.3
12/31/2013	1.22	*100.30%*	101.92%	$108.6	$15.6	$24.4	-$12.3	$110.7	$15.9	$24.8	-$12.5	$430.0	$5,578.2	$1,169.8	$1,495.3	$280.2	$5,685.3	$1,192.3	$1,524.0	$285.6	20.2
9/30/2013	1.54	*100.38%*	102.31%	$96.0	$15.4	$21.0	-$0.9	$98.2	$15.7	$21.5	-$1.0	$397.7	$4,219.9	$876.3	$976.9	$320.8	$4,317.4	$896.6	$999.4	$328.2	16.4
6/28/2013	1.43	*100.36%*	102.67%	$82.3	$20.7	$23.6	-$3.4	$84.5	$21.3	$24.3	-$3.5	$357.1	$3,541.8	$633.9	$837.7	$249.1	$3,636.6	$650.8	$860.1	$255.8	15.1
3/29/2013	1.67	*100.41%*	103.10%	$70.0	-$56.0	$17.9	-$2.6	$72.2	-$57.8	$18.5	-$2.7	$326.6	$3,021.7	$638.4	$715.5	$204.6	$3,115.3	$658.2	$737.7	$210.9	14.5
12/31/2012	1.9	*100.47%*	103.59%	$65.6	$13.8	$24.5	-$1.0	$67.9	$14.3	$25.3	-$1.0	$395.1	$3,590.1	$551.3	$998.0	$262.4	$3,718.9	$571.0	$1,033.8	$271.8	14.2
9/28/2012	1.69	*100.42%*	104.02%	$61.1	$10.4	$14.0	$4.8	$63.6	$10.8	$14.6	$5.0	$379.2	$2,833.4	$519.7	$677.5	$268.6	$2,947.3	$540.6	$704.8	$279.4	11.8
6/29/2012	1.92	*100.48%*	104.52%	$65.5	$7.4	$13.4	$5.6	$68.5	$7.7	$14.0	$5.8	$336.7	$2,364.6	$392.2	$605.1	$213.1	$2,471.4	$409.9	$632.5	$222.8	11.1
3/30/2012	2.81	*100.70%*	105.24%	$52.9	$19.1	$12.0	$9.7	$55.7	$20.1	$12.6	$10.2	$287.6	$1,973.4	$375.7	$578.7	$275.1	$2,076.9	$395.4	$609.0	$289.6	11.7
12/30/2011	3.34	*100.82%*	106.11%	$54.2	$17.7	$5.1	$8.5	$57.5	$18.7	$5.4	$9.0	$204.4	$2,692.0	$674.8	$502.0	$269.1	$2,856.6	$716.0	$532.7	$285.5	21.5
9/30/2011	3.73	*100.92%*	107.09%	$31.9	$14.5	$4.0	-$2.4	$34.2	$15.5	$4.3	-$2.6	$119.8	$2,455.9	$592.1	$511.0	$250.4	$2,630.0	$634.0	$547.2	$268.1	34.1
6/30/2011	3.38	*100.83%*	107.98%	$30.0	$12.6	$0.6	$0.2	$32.4	$13.6	$0.6	$0.2	$86.4	$1,749.2	$437.7	$328.4	$172.3	$1,888.8	$472.7	$354.6	$186.0	33.6
3/31/2011	2.12	*100.53%*	108.55%	$24.2	-$3.3	-$5.3	-$1.3	$26.3	-$3.6	-$5.8	-$1.4	$62.8	$2,849.7	$655.6	$500.7	$303.0	$3,093.3	$711.7	$543.5	$328.9	74.4
12/31/2010	1.22	*100.30%*	108.88%	$17.4	-$0.6	-$7.9	-$3.5	$18.9	-$0.6	-$8.5	-$3.8	$43.2	$2,929.9	$622.2	$533.0	$388.4	$3,190.1	$677.5	$580.3	$422.9	112.7
9/30/2010	1.23	*100.31%*	109.21%	$29.8	-$2.3	-$6.3	-$4.7	$32.5	-$2.5	-$6.8	-$5.1	$53.7	$2,123.5	$410.5	$471.7	$345.6	$2,319.1	$448.3	$515.2	$377.4	68.1
6/30/2010	1.79	*100.44%*	109.70%	$18.4	$10.0	-$5.9	-$1.3	$20.2	$11.0	-$6.5	-$1.4	$60.0	$1,774.9	$255.3	$334.0	$293.5	$1,947.0	$280.0	$366.4	$322.0	48.6
3/31/2010	2.34	*100.58%*	110.33%	$2.0	$4.6	-$7.0	-$3.3	$2.2	$5.0	-$7.7	-$3.6	-$177.3	$1,414.1	$313.0	$257.3	$270.0	$1,560.2	$345.3	$283.9	$297.9	-14.0
12/31/2009	1.49	*100.37%*	110.74%	$14.7	-$4.8	$10.5	-$5.6	$16.3	-$5.3	$11.6	-$6.1	-$178.6	$1,580.8	$157.5	$259.0	$288.3	$1,750.7	$174.4	$286.9	$319.3	-14.2
9/30/2009	-1.61	*99.60%*	110.29%	$23.2	-$3.2	$1.1	$1.1	$25.6	-$3.6	$1.2	$1.2	-$135.9	$1,381.3	$183.3	$234.8	$236.8	$1,523.4	$202.2	$258.9	$261.2	-16.5
6/30/2009	-0.94	*99.76%*	110.03%	-$209.4	$6.7	$1.1	$7.0	-$230.4	$7.4	$1.2	$7.7	-$45.1	$1,363.2	$220.0	$226.0	$290.4	$1,500.0	$242.1	$248.7	$319.5	-51.3
3/31/2009	-0.18	*99.95%*	109.98%	$40.3	-$50.5	$2.7	$2.6	$44.3	-$55.6	$3.0	$2.9	$280.1	$1,112.8	$128.6	$176.0	$200.9	$1,223.9	$141.4	$193.5	$220.9	6.4
12/31/2008	1.6	*100.40%*	110.42%	$44.6	-$6.9	$7.6	$8.3	$49.2	-$7.6	$8.4	$9.2	$369.6	$746.7	$62.8	$162.5	$209.0	$824.6	$69.4	$179.5	$230.7	3.5
9/30/2008	5.25	*101.29%*	111.84%	$91.5	-$3.3	$7.5	$7.4	$102.3	-$3.7	$8.3	$8.3	$392.5	$1,251.3	$126.2	$224.3	$217.6	$1,399.5	$141.1	$250.9	$243.4	5.2
6/30/2008	4.31	*101.06%*	113.03%	$85.6	$7.4	$6.2	-$0.9	$96.8	$8.3	$7.0	-$1.0	$397.2	$2,097.0	$333.0	$341.7	$348.1	$2,370.2	$376.3	$386.2	$393.5	8.9
3/31/2008	4.14	*101.02%*	114.18%	$65.6	$8.1	$10.1	-$10.2	$74.9	$9.3	$11.6	-$11.7	$408.3	$2,833.1	$435.9	$357.5	$422.3	$3,234.9	$497.7	$408.1	$482.2	11.3
12/31/2007	4.03	*100.99%*	115.32%	$78.5	$1.4	$7.9	-$16.6	$90.5	$1.6	$9.1	-$19.2	$451.7	$2,157.2	$430.1	$433.1	$406.6	$2,487.6	$496.0	$499.4	$468.9	8.7
9/28/2007	2.35	*100.58%*	115.99%	$87.2	$2.6	$4.9	$8.7	$101.1	$3.1	$5.6	$10.1	$478.0	$2,259.7	$358.9	$410.1	$413.5	$2,620.9	$416.2	$475.6	$479.6	8.4
6/29/2007	2.67	*100.66%*	116.75%	$69.0	$13.2	$11.0	$11.5	$80.6	$15.4	$12.9	$13.4	$483.1	$3,055.8	$475.1	$469.1	$451.3	$3,567.7	$554.6	$547.7	$526.9	10.8
3/30/2007	2.43	*100.60%*	117.46%	$59.1	$13.0	$13.5	$23.0	$69.4	$15.3	$15.9	$27.0	$508.8	$3,532.3	$510.0	$830.8	$586.7	$4,148.9	$599.0	$975.8	$689.1	12.6
12/29/2006	1.97	*100.49%*	118.03%	$57.8	-$6.1	$6.1	$34.0	$68.2	-$7.2	$7.2	$40.1	$473.8	$3,366.1	$455.3	$633.0	$590.3	$3,973.1	$537.3	$747.2	$696.8	12.6
9/29/2006	3.34	*100.82%*	119.00%	$55.4	$1.9	$11.0	$36.8	$65.9	$2.2	$13.1	$43.8	$428.8	$2,816.0	$590.5	$721.9	$703.2	$3,351.1	$702.7	$859.1	$836.8	13.4
6/30/2006	3.92	*100.97%*	120.15%	$63.4	$12.3	$10.8	$36.6	$76.2	$14.8	$13.0	$44.0	$375.6	$2,566.1	$443.2	$617.4	$669.2	$3,083.2	$532.5	$741.8	$804.1	13.7
3/31/2006	3.69	*100.91%*	121.25%	$37.0	$10.7	$7.3	$21.4	$44.9	$12.9	$8.8	$25.9	$279.4	$3,218.4	$552.1	$702.2	$700.9	$3,902.2	$669.4	$851.4	$849.9	22.5
12/30/2005	3.67	*100.91%*	122.34%	$25.4	$8.6	$0.2	$17.6	$31.1	$10.5	$0.3	$21.5	$208.1	$2,860.9	$598.4	$743.8	$799.5	$3,500.2	$732.2	$909.9	$978.1	29.4
9/30/2005	3.82	*100.94%*	123.50%	$33.1	$8.0		$17.0	$40.9	$9.9	$0.0	$21.0		$2,177.1	$423.5	$0.0	$604.4	$2,688.6	$523.0	$0.0	$746.4	
6/30/2005	2.92	*100.72%*	124.39%	$21.8	$10.6		$9.2	$27.1	$13.2	$0.0	$11.4		$2,060.9	$446.6	$0.0	$511.1	$2,563.6	$555.5	$0.0	$635.7	
3/31/2005	3.04	*100.75%*	125.32%	$6.0	$9.0		$1.9	$7.5	$11.3	$0.0	$2.4		$1,543.9	$413.6	$0.0	$248.5	$1,934.8	$518.4	$0.0	$311.5	
				-$3.0	$4.8		-$9.4	$0.0	$0.0	$0.0	$0.0		$1,346.5	$404.8	$0.0	$42.7	$0.0	$0.0	$0.0	$0.0	
																				Average:	*17.2*

Figure 3: Shiller P/E Ration Calculations. Source: Bureau of Labor Statistics, 10-Q, FactSet

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