



Cardinal Hardware: Regarding a Freight Rebate Program

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Regarding a Freight Rebate Program: Contents

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Background

Cardinal Hardware Freight Rebate Program

- Freight rebate
- Fixed rebate
 - Neglects diesel prices
- Variable rate change qualifier
 - Considers the cost of diesel

Audit

- 1 decade history, 1 quarter forecast
- Supplier Spend Dollars
- Diesel Price
- Compare fixed versus optimum variable rebate
- Recommendations for Q1 2017

Forecasts: Contents

Supplier Spend Dollars

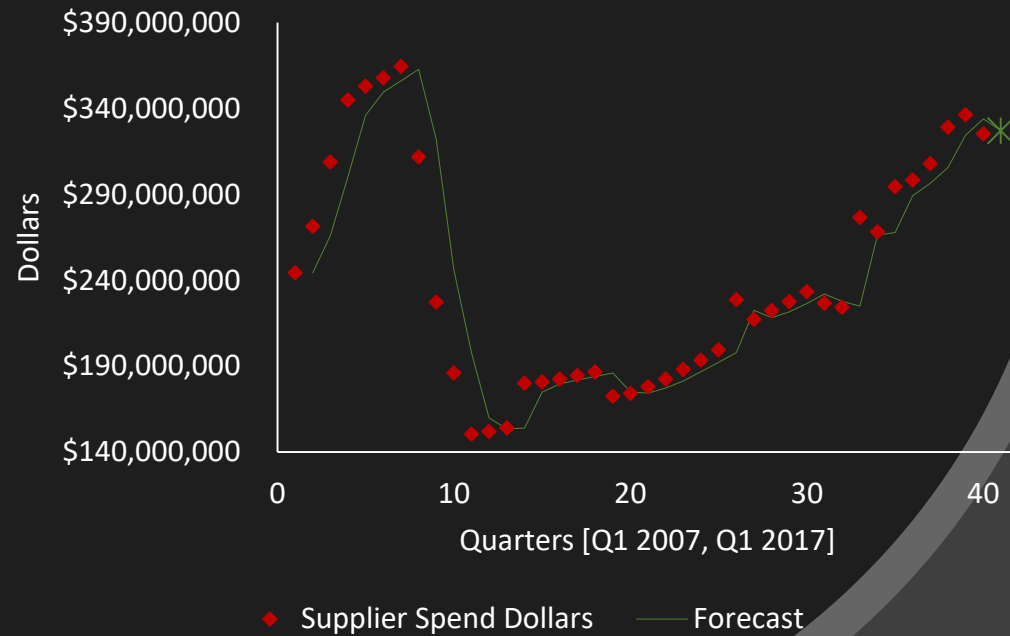
- Snapshot of supplier spend dollars for 2016 & Forecast

Diesel Prices

- Leading indicators & variable selection
- 3 competing models, best MAPE 6.44%

Forecasts: Supplier Spend Dollars for 2016 & Forecast

Total Supplier Spend Dollars with Forecast



Average MAPE across all contracts = 8.32%

Supplier ID	Supplier Name	Q1-2016	Q2-2016	Q3-2016	Q4-2016
1	Acme Bearings	\$ 7,020,603	\$ 7,181,873	\$ 8,023,013	\$ 8,257,107
2	Alexander Safety	\$ 4,461,824	\$ 4,544,647	\$ 4,780,349	\$ 4,827,489
3	Anvil Hammer Pipes	\$ 546,660	\$ 535,859	\$ 589,148	\$ 619,085
4	Braided Fasteners	\$ 2,890,275	\$ 2,969,129	\$ 3,224,007	\$ 3,327,586
5	Cameron	\$ 3,923,233	\$ 3,875,691	\$ 4,298,929	\$ 4,313,101
6	Capital Safety Net	\$ 25,955,007	\$ 24,661,096	\$ 25,181,118	\$ 25,892,589
7	Chester Fried Fasteners	\$ 6,790,231	\$ 7,321,422	\$ 7,666,196	\$ 7,611,112
8	Christian Jarl	\$ 8,475,517	\$ 8,899,055	\$ 9,632,118	\$ 9,621,685
9	Clean Hands Enterprises	\$ 3,567,541	\$ 3,307,936	\$ 3,489,513	\$ 3,638,946
10	Derek Jackson Smith	\$ 23,263,955	\$ 25,718,084	\$ 26,840,869	\$ 28,150,288
11	DOMESTIC SCALES INC	\$ 10,215,220	\$ 9,945,444	\$ 10,128,561	\$ 10,083,789
12	Donna's Gas and Lubricants	\$ 4,040,109	\$ 3,895,112	\$ 3,835,242	\$ 3,914,954
13	Dow Jones Power Tools	\$ 2,867,101	\$ 2,648,337	\$ 2,770,577	\$ 2,750,207
14	Dupont Dew and Lube	\$ 1,819,007	\$ 1,816,581	\$ 1,787,041	\$ 1,838,081
15	Dutchboy Paint Supply	\$ 3,375,613	\$ 3,318,787	\$ 3,571,788	\$ 3,767,790
16	Faith Corporation	\$ 3,392,430	\$ 3,275,344	\$ 3,615,487	\$ 3,772,328
17	Flintstone Corporation	\$ 2,039,469	\$ 2,229,071	\$ 2,521,956	\$ 2,663,579
18	Hefel Plastics	\$ 6,376,515	\$ 7,012,173	\$ 7,712,991	\$ 8,042,472
19	International Fastener	\$ 7,621,009	\$ 7,043,085	\$ 7,148,255	\$ 7,398,875
20	ITW Nucornette	\$ 4,276,955	\$ 4,439,762	\$ 4,579,854	\$ 4,570,954
21	ITW Tola	\$ 3,735,651	\$ 3,743,648	\$ 3,895,073	\$ 4,082,675
22	Jed Construction	\$ 1,396,821	\$ 1,492,989	\$ 1,572,904	\$ 1,601,630
23	Kingdom Lighting	\$ 1,194,450	\$ 1,317,740	\$ 1,428,706	\$ 1,485,854
24	Konradt Fasteners	\$ 2,064,711	\$ 1,902,555	\$ 2,063,773	\$ 2,129,682
25	Krane Kyle Enterprises	\$ 12,379,452	\$ 13,821,875	\$ 14,904,578	\$ 15,485,325
26	Loctite Air Solid Zachary	\$ 16,190,497	\$ 17,807,902	\$ 18,422,778	\$ 19,288,814
27	Lunzer Abrasives	\$ 517,295	\$ 500,839	\$ 553,181	\$ 577,240
28	Marissa Marketing	\$ 1,020,442	\$ 958,659	\$ 953,847	\$ 968,128
29	McCallum Steel	\$ 1,438,037	\$ 1,356,833	\$ 1,490,284	\$ 1,516,974
30	Metabo Gruse	\$ 1,752,894	\$ 1,956,244	\$ 1,964,801	\$ 1,950,777
31	Metallica Metals	\$ 1,320,232	\$ 1,247,546	\$ 1,351,029	\$ 1,371,726

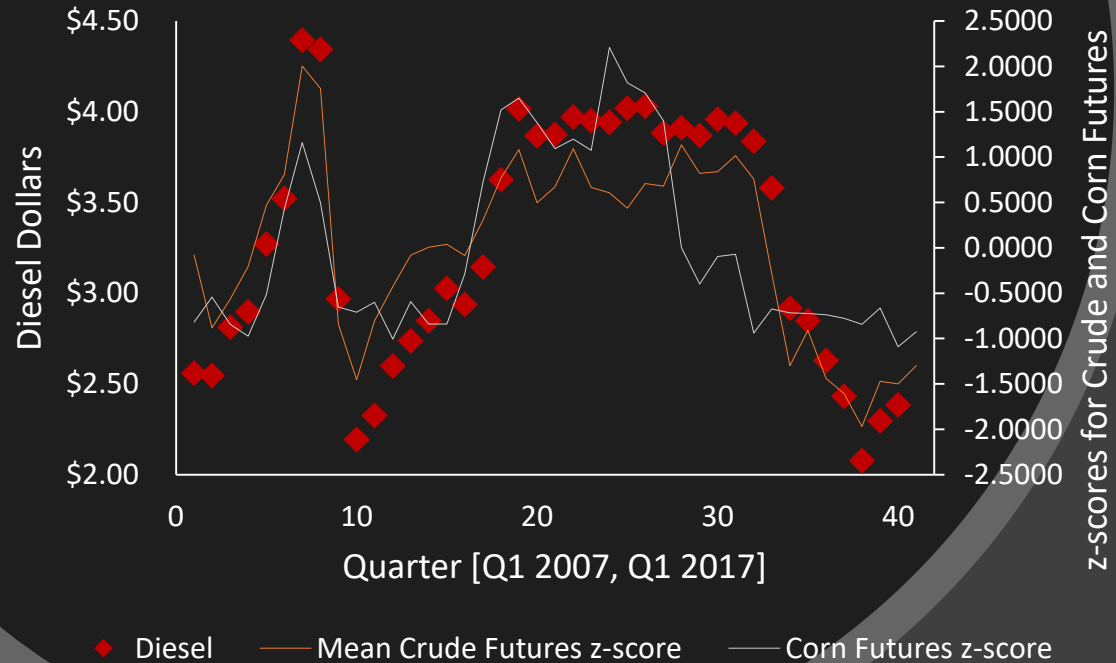
Index	Lag 1 Cross Correlation
Oil Pipeline Volume	-0.595
Waterborne Transportation	0.322
Transportation Index	0.173
Average U.S. Crude Oil Futures	0.876
Corn Futures	0.763

Forecasts: Diesel Prices – Leading Indicators & Variable Selection

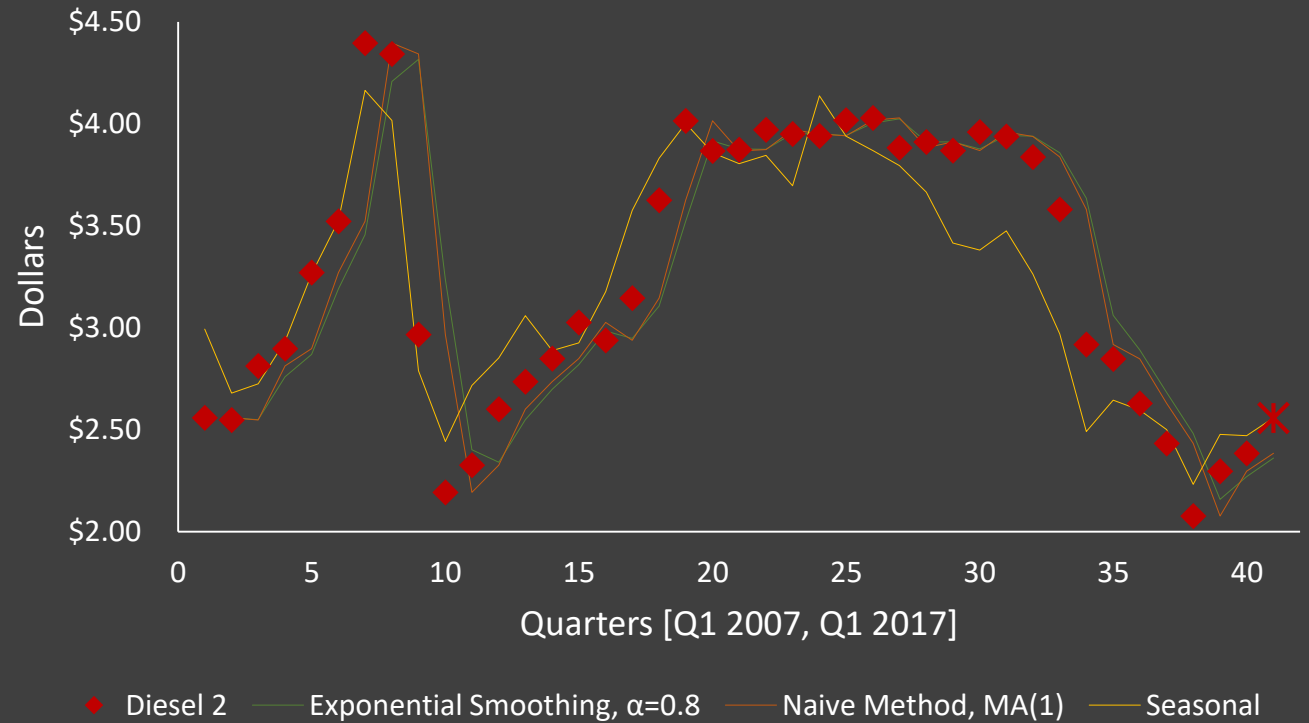
- Simply regress one variable onto another variable after detrending; read the correlation coefficient, r .
- Square r for the percent of variance in one variable explained by the other variable.
- Diesel 2 prices (U.S. Energy Information Administration, 2019e)
- Transportation index & sub indices (Bureau of Transportation Statistics, 2019)
- U.S. crude oil futures (U.S. Energy Information Administration, 2019a, 2019b, 2019c, 2019d)
- U.S. corn futures (Investing.com, n.d.)

Forecasts: Diesel Prices – 3 Competing Models

Diesel Overlay with Mean Crude Oil and Corn Futures



Diesel 2 Prices with Forecasts



Model	MAPE (%)
Naïve method (MA(1))	7.62
Exponential smoothing, $\alpha=0.8$	8.38
Seasonal regression	6.44

Freight Rebate



Freight Rebate Findings



Freight Rebate Considerations



Freight Rebate Breakdown

Freight Rebate Findings

Fixed Rebate

- \$267 M over decade
- \$6.67 M \pm \$1.84 M per quarter
- Changeovers = special case

Variable % Qualifier

- Optimized at 3.7%
- + \$75.1 M (minus unknowns) over decade
- \$8.55 M \pm \$2.81M/quarter
- Q1 2017 loses \$0.58 M vs. Fixed
- Changeovers: 53% of quarters
- No changeover Q1 2017

Optimized for Q1 2017

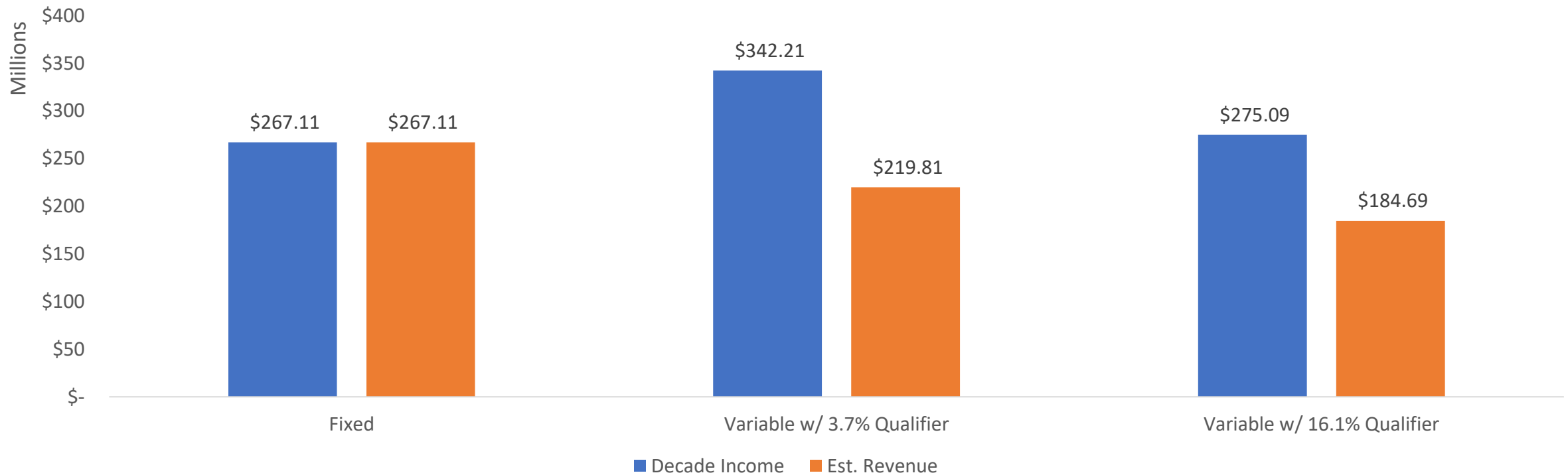
- 16.1% maximizes Q1 2017 rebate revenue
- +\$7M vs. Fixed
- Changeovers: 13% of quarters
- No changeover Q1 2017

Freight Rebate Considerations

- Growth economy projected to increase spend and diesel in Q1 2017.
- No reason why diesel shouldn't continue to increase, on average.
- Unknown unknowns for variable rates in changeover costs. Know of small companies that pay \$2M in legal fees per quarter.
- Assume changeover cost is \$2M/quarter additional when there is a changeover.
- Assume the same proportion of changeovers over the next decade as the decade of interest, 53% for a 3.7% variable % qualifier, and 13% for a 16.1% qualifier.
- No market comparison to assess risk of suppliers switching distributors upon changing to a variable rate
- Assume rebate % starts at the fixed rates for each supplier

Freight Rebate Breakdown

Projected Decade Income for 2007 Decade Before and After Assumed Fees



Conclusion

- With the assumed fees per changeover, it is more economical to keep the fixed rebates.

Summary



50 suppliers



Cardinal Hardware Freight picks up shipments from suppliers



Suppliers pay a small rebate to compensate for shipping costs



Each supplier has a different rebate amount.



??? Is it more economical to change to a variable rebate???



10 years of history for Rebates, Supplier Spend, Diesel Prices, Crude Oil Futures, Corn Futures



Forecast Q1 2017



Solution: Given assumptions, it is not more economical to change to a variable rate.

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