Report to the Utilities and Transportation Commission

Recommendation on methodology for deriving operating ratio for solid waste haulers.

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TG-131255 - Inquiry into methods for setting rates for solid waste collection companies

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Executive Summary

This report presents the concerns of staff with the current model the Washington's Utility and Transportation Commission uses to derive rates for regulated solid waste companies, known as the Lurito Gallagher Model. These concerns include, among other things, outdated financial data. The use of old data results in a significant inaccuracy in the computed allowed return on equity for the regulated companies. This report discusses and evaluates rate-making alternatives to the Lurito Gallagher Model. These alternatives include the Bell and Associates' Economic Cost Model, the updating of the Lurito Gallagher Model with current data, using different financial models such as the Capital Asset Pricing Model, or adopting a new model all together. The report concludes by recommending the adoption of a new model.

The new model, referred to as the *DuPont Formula Model* for identification purposes, reflects updated data and tax rates and a modified approach to computing recommended allowed overall return on investment. The proposed approach results in the reduction of the average weighted cost of capital by approximately three percent from the current Lurito Gallagher Model while reducing the average company return on equity by seven percent.[1]

Staff filed this report to allow review of staff's proposed model and alternatives by the state's regulated solid waste collection companies and interested parties. Staff supports all parties being given the opportunity to:

- Test the DuPont Formula Model,
- Review and evaluate the model's associated data,
- Provide the commission with comments, observations, and suggestions.

[1] For example: For a company financed with a 45 percent equity capital structure and a 2.4 asset turnover ratio, the change from the current Lurito Gallagher Model to the DuPont Formula Model results in a reduction of the average return on equity from 24.6 percent to 17.3 percent.

Introduction

For the last five years, commission staff has taken on the task of updating or replacing the financial model presently used to compute the allowed rates of return for regulated solid waste collection companies. Referred to as the Lurito Gallagher Model after its sponsoring witnesses, the model is actually a 1987 update of a financial model first used to set rates for Washington's trucking industry in the 1960s.[2]

In its July 2013 *Notice of Opportunity to File Written Comments,* the commission requested comments on three rate setting approaches for its solid waste collection companies:[3]

1) Retain the Lurito Gallagher Model, correcting and updating it with current data;
2) Switch to the Capital Asset Pricing Model (CAPM);
3) Develop a new alternative financial model.[4]

Staff has now completed its review and analysis of these options. Staff supports the adoption of a new alternative financial model. The proposed model, which staff developed, updates and expands on the foundations of the Lurito Gallagher Model. For example, while both the staff proposed model and the Lurito Gallagher Model use the DuPont Formula, a well-recognized financial formula that employs the proven relationship between business risk and earnings to derive return on investment,[5] the staff proposed model uses current and improved proxy data and different benchmarks to derive what staff would argue is the appropriate average weighted cost of capital.

Comments received early in the rulemaking from both the Washington Refuse and Recycling Association and Waste Management, Inc., discussed support of the current model and the difficulty of commenting on an alternative in the abstract, as no alternative had yet been proposed.

Staff Analysis and Evaluation.

The remainder of the report reviews the options provided in the Notice of Rulemaking, offers support for the selection of the recommended model, discusses the supporting proxy data used by the recommended model, and, finally, compares the results of the DuPont Formula Model approach to the results produced by the Lurito Gallagher Model.

Review of Options

As noted above, in its 2013 *Notice of Opportunity to File Written Comments,* the commission asked for comments on three rate-setting approaches that could be used to set a fair return for Washington's regulated solid waste collection companies. In its review of options, staff discusses

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[2] The original model was an application of a methodological approach developed by David Kosh, a then nationally recognized expert in transportation economics. The commission has used Kosh's operating ratio approach since 1968.

[3] The terms "solid waste collection companies" and "solid waste hauling companies" are the same and are used interchangeably throughout the report.

[4] The rate base approach was originally offered in the notice, but in later comments and workshop discussions the approach was categorically rejected as a workable replacement for the current Lurito Gallagher Model.

[5] Though an extended DuPont Formula can be used to derive return on equity (ROE), we use a truncated DuPont Formula to derive return on investment (ROI), *i.e., (EBIT/revenue) * (revenue/investment) = ROI.*

those and, in addition, staff includes consideration of the recommendations of the commission-retained consulting firm Bell and Associates.

Options:

1) Consider Bell and Associates report recommendations;
2) Retain the Lurito Gallagher Model, correcting and updating it with current data;
3) Switch to the Capital Asset Pricing Model (CAPM); or
4) Develop a new alternative financial model.

Staff's comments and conclusions are described below.

1) Bell and Associates Report Recommendations.

In 2014, the commission retained consultants to evaluate the Lurito Gallagher Model and, if needed, provide a proposal for an alternative model. In January 2015, the consultant, Bell and Associates, filed its report (Bell Report).[6] The report concluded the difference between its updated Lurito Gallagher Model and the current Lurito Gallagher Model was minor, and any data update by the commission was of little importance.[7]

However, as an alternative to the Lurito Gallagher Model, the Bell Report proposed the use of a new "Economic Cost Model." A model that, according to its authors, provides a return on investment based on both an operating ratio and a "reasonable return" on property, plant, and equipment.[8]

The Bell Report argues that the operating ratio approach reflected in the Lurito Gallagher Model does not adequately cover the economic costs of new investments. However, the Bell Report authors do not distinguish the economic costs of new investments from the financial costs used in the Lurito Gallagher model; staff believes there no real material difference between the two costs for ratemaking purposes. Staff argues that the commission already provides for recovery of all costs routinely incurred by regulated companies, including those costs of new investments.

As a solution to their perceived issue of the model's failure to recover economic costs of new investments, the authors of the Bell Report recommend a new approach to derive a "more appropriate methodology" for the state's regulated haulers.[9] The suggested approach uses operating ratio combined with an explicit return on property, plant, and equipment.[10] However, this approach improperly combines two distinct theories of cost of capital: comparable earnings standard and capital attraction standard. The first relies on accounting-based earnings where the latter is market based. There is no literature supporting the combination of the two approaches. In fact, experts consider them to be standalone alternatives and mutually exclusive approaches, i.e., a proceeding might use methods within each approach individually but not commingle both into a

[6] Bell and Associates, "Solid Waste Rate Setting Methodology" (final report, December 15, 2014)
[7] Ibid, Section 6.2, pg. 16
[8] Ibid, Section 4.0, pg. 10
[9] Ibid, Section 1.1, pg. 1
[10] Ibid, Formula (13) pg. 11

hybrid approach.[11] Staff further argues that the combining of both the comparable earnings approach (operating ratio) and capital attraction approach (rate base) results in form of double recovery of return on investment.

It is staff opinion that the Bell Report alternative approach should not be considered as a practical replacement for the Lurito Gallagher Model. Staff's rejection is supported by (1) the proposed approach's combination of the comparable earnings standard and capital attraction standard to derive a fair return;[12] (2) the lack of support for the alternative approach in any academic or published literature; and (3) the report authors' lack of supporting data for their recommendation to allow replication.

2) Retain the Lurito Gallagher Model with Updated Current Data.

The two comments the commission received both expressed the opinion that the current model has been working for decades and that there was no reason to change. However, nether comment recognized or suggested the current model's data needed updating. In order to evaluate the impact of maintaining the current model, staff updated the Lurito Gallagher Model with current data using only transportation companies as proxies rather than the sample of energy companies and a handful of transportation companies originally included in the model[13] The end results produced by the updated model, which staff updated to include changes in tax rates and proxy data, resulted in returns that were similar to, not surprisingly, the recommended DuPont Formula Model return.

The differences between the two models stem from the way each model recognizes the impact of capital structure and provision of income taxes on the allowed return.[14] As will be discussed later, staff concludes that even though the returns provided by an updated Lurito Gallagher Model may under some circumstances, actually produce lower returns, the DuPont Formula Model not only provides, the correct return on equity, it also provides proper business and financial incentives to the company to maintain an optimal capital structure.

3) Capital Asset Pricing Model (CAPM).

The CAPM uses a measure of market volatility called "beta" to derive a market-required return on equity. Normally, beta is measured using proxy companies from commercially-available financial databases such as Standard & Poor's or Compustat.[15] CAPM has shown itself to be useful when combined with other cost of capital approaches such as the Discounted Cash Flow model, but its use is limited to large utilities. More importantly, studies have shown that smaller traded

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[11] Roger A. Morin, *Regulatory Finance Utilities' Cost of Capital*, (Public Utilities Reports, Inc. 1994), pg. 28-29.
[12] Ibid, pg.393.
[13] The model's creators, Richard Lurito and Kenneth Gallagher, arranged this data by group. Staff's update does not smooth the data by averaging as discussed later.
[14] The provision of income taxes was not fully evaluated in the comparison between the two models. If the commission decides to continue to use the Lurito Gallagher Model it should be aware that since the model currently provides normalized income taxes in rates, accumulated deferred taxes should be deducted from a solid waste hauler's asset base recognizing the interest-free loan from the government associated with the deferred taxes created from the use of accelerated deprecation— the reduction to the asset base is currently not recognized.
[15] It is impossible to measure the beta of a small, non-publicly traded company because market beta requires active market price data for its equity instruments.

companies, as measured by market capitalization, earn higher equity returns than predicted by the CAPM.[16] The understatement, commonly referred to as the "size effect," would result in rates being set below a fair return and in under-earning by regulated companies.

Since most transportation companies the commission regulates maintain relatively small capitalization profiles, it can be expected that CAPM would result in understated equity returns. It is because of the CAPM model's propensity to underestimate a market-based rate of return for smaller companies that staff rejected consideration of the model.

4) Develop a New Alternative Financial Model.

Since federal deregulation of trucking and the dismantling of the Interstate Commerce Commission in the 1980s, the academic debate around the use of operating ratio in the development of fair return on investment in the transportation industry has all but disappeared. However, the discussion is still relevant. For the most part, those earlier debates either highlighted the failings of the rate base approach to produce reasonable returns for the transportation industry or argued that the operating ratio approach has a propensity to produce excess returns and supported the use of the rate base approach.

Staff's proposed model successfully addresses those concerns by building upon the same financial concepts used by the Lurito Gallagher Model. Rather than introducing an entirely new or novel approach, the proposed DuPont Formula Model builds on the same comparable earnings approach with which that the Lurito Gallagher Model uses to derive a reasonable return on investment, an approach that Washington's solid waste collection companies and the commission are already familiar.

The comparable earnings standard has its roots in *Federal Power Commission v. Hope Natural Gas Company*, a 1944 U.S. Supreme Court case,[17] where Justice William Douglas described the importance of having "…enough revenue not only for operating expenses but also for the capital costs of the business."[18] In the opinion, he set the landmark regulatory standard that a return "*…should be commensurate with returns on investments in other enterprises having corresponding risks.*"[19] The standard is still relevant today and is used in both the Lurito Gallagher Model and the staff proposed model.

The Supreme Court defined capital costs to include debt service and dividends, finding that allowed returns on capital must provide sufficient returns to assure investor and creditor confidence in the financial integrity of the company. Ensuring a sufficient return allows companies to maintain appropriate credit and attract capital.

Nationally recognized cost-of-capital expert Dr. Roger Morin describes the comparable earnings approach as a method that provides a return on investment equal to what would have been earned

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[16] Rolf W. Banz, The relationship between return and market value of common stocks, (1980)
[17] 320 U.S. 591, 64 S.Ct. 281, 88 L.Ed. 333.
[18] 320 U.S. 591 at 603.
[19] *Id.*

had the investor invested in other businesses with comparable risk.[20] By design, staff's proposed model provides returns consistent with the Supreme Court's decision and Dr. Morin's definition.

The proposed model develops a fair return for each company through the application of the DuPont Formula—a formula that uses a proven relationship between asset turnover ratio (a measure of risk) and profit margin (a measure of earnings) to derive a supportable return on investment that can be used to set rates.[21] The end result is a statistically-sound derivation of a risk-adjusted rate of return.

[20] Roger A. Morin, Regulatory Finance Utilities' Cost of Capital, (Public Utilities Reports, Inc. 1994), pg. 393.
[21] The DuPont Formula *(ROI=PM*AT)* decomposes the return on investment (*ROI)* into two components, profit margin (*PM)* and asset turnover *(AT).* The formula, which is widely recognized, is commonly used in financial statement analysis and has been found useful in predicting future earnings. Mark Soliman, *The Use of DuPont Analysis by Market Participants*, Accounting Review (Vol 83 No. 3 2008).

DuPont Formula Model Design

Staff's proposed DuPont Formula Model, named after the root formula, derives a return on investor-supplied capital using a company's asset investments. This approach addresses a long-cited criticism that the operating ratio fails to provide a relationship between a return and a company's investment but instead provides a nonsensical "return on revenue." In contrast, the DuPont Formula computes operating ratio based on measurable risk and a supported investment base.

The DuPont Formula Model derives an operating ratio that translates into a weighted average cost of capital before interest or income taxes.[22] The use of a weighted average cost of capital before interest or income taxes effectively shifts the financial risk of a company's selected financial structure away from the rate payer to the company, creating a strong incentive for the company to optimize its capital.

Description of Proxy Selection

The proposed DuPont Model uses regression results derived from a set of proxy companies. Staff downloaded the most recent seven years of each proxy company's selected financial data from the Standard & Poor's research portal. The use of the Standard & Poor's system allowed staff to target transportation industry financial information whereas the prior commission model, e.g., Lurito Gallagher, evaluated broad market portfolios including a wide selection of industries and risk profiles, resulting in an imprecise measure of the cost of capital of the solid waste collection industry.

TABLE 1

SIC Category \ Code	Count
TRANSIT & PASSENGER TRANS 4100	14
TRUCKING,COURIER SVC,EX AIR 4210	46
TRUCKING, EXCEPT LOCAL 4213	95
AIR TRANSPORT, SCHEDULED 4512	186
AIR COURIER SERVICES 4513	20
AIR TRANSPORT, NONSCHEDULED 4522	52
PIPE LINES, EX NATURAL GAS 4610	100
NATURAL GAS TRANSMISSION 4922	216
NATURAL GAS TRANSMIS & DISTR 4923	133
NATURAL GAS DISTRIBUTION 4924	182
WATER SUPPLY 4941	94
SANITARY SERVICES 4950	9
REFUSE SYSTEMS 4953	42
HAZARDOUS WASTE MANAGEMENT 4955	27
Grand Count	1,216

Selecting only transportation industry companies as proxies creates a portfolio of comparable companies that arguably all face similar risks inherent to the transportation industry, including solid waste collection companies. The selection criteria limits the proxy portfolio to companies that load, transport, and deliver, without changing or converting that which is transported. Staff selected companies using the Standard Industrial Classification (SIC) system which classifies companies by the services provided.[23]

Staff's final analysis uses 1,216 data points representing 230 companies from 14 SIC groupings (Table 1). To safeguard the integrity

[22] Earnings Before Interest and [income] Taxes (EBIT).
[23] Review of the transportation database allowed the exclusion of SIC groupings that obviously are not comparable to solid waste collection services, such as taxicabs, warehousing, and storage.

of the data, groups with incomplete data or obviously incorrect data were removed during initial review, along with any companies that constituted extreme outliers. Each grouping was also tested statistically using the Chow test[24] to confirm its fitness as a subset in the representative sample.

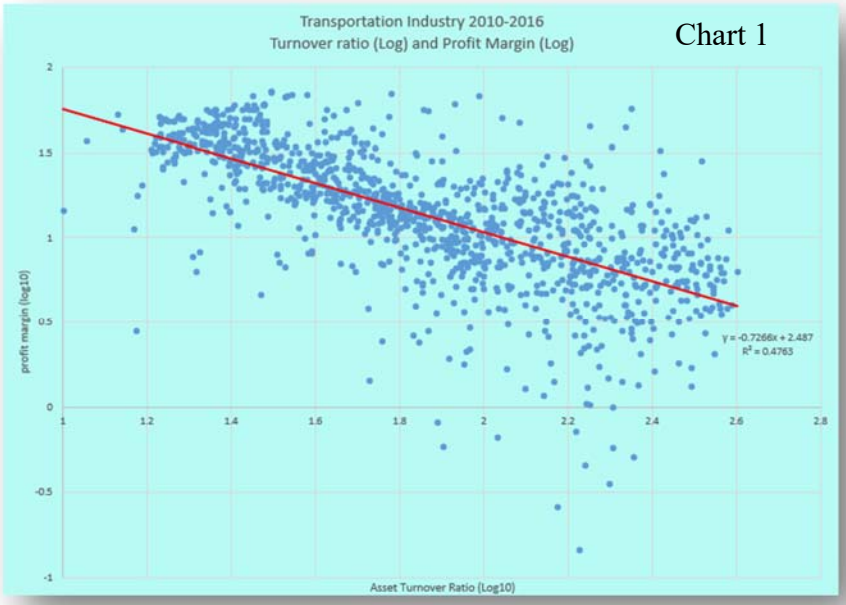
Proxy Analysis

Using data for 230 transportation companies, staff analyzed earnings data to develop a statistical relationship between asset turnover ratio, the independent variable, and profit margin, the dependent variable. This proven relationship is used to derive a return on investment based on earnings of competitive transportation companies, the same relationship reflected in the DuPont Formula.

Chart 1 shows the regression results of the analysis using the 1,216 data points representing the seven-year period of 2010–2016. The resulting linear regression line-of-best-fit was computed using log10 transformed data.[25]

The projected profit margin ($P_{m)}$ can be derived using the $\beta+m(x)$ formula once a company's asset turnover ratio has been computed. The derived profit margin, when combined with investment, provides the return on investment expected to be earned by a regulated solid waste hauler. The expected return is commensurate with returns on investments for other enterprises having corresponding risks, i.e., other transportation companies.

Chart 1



The line of best fit is described as $\beta+m(x)$, a Y intercept and slope of a line or, as in this case: 2.487 + -0.727(X)

[24] The Chow test looks for differences between two or more regressions associated with subsets. It is commonly used to measure for a structural change in some or all of the regression parameters. If there is no significant structural change, the subset is included in the data set. If there is, it is considered not associated with the data set and rejected.

[25] The transformation of data using logarithms, as used here, allows for the use of linear regression on data that has exponential characteristics. The log-transformation can reveal a relationship between two variables that, without the transformation, would remain hidden. The DuPont model's regression results are Log-10 based whereas the Lurito Gallagher Model is based on a natural log transformation. Both results are similar.

Strengths of Proposed Model

The proposed model is more than merely reflecting the change in corporate tax rates and the updating the 40-year old data set used by Lurito Gallagher. It is distinctive from the traditional Lurito Gallagher Model in four different aspects:

a) It derives capital costs and earnings before interest and income taxes (EBIT),
b) It does not recognize income taxes or debt costs as inputs to the computation of a fair return,
c) It uses a comparable seven-year data set, and
d) It does not average data in order to smooth results.

5) Derives capital costs and earnings before interest and income taxes.

The proposed DuPont Formula Model is designed to compute total revenue requirement based on EBIT. The DuPont Formula Model is indifferent as to income tax status or current embedded weighted cost of debt, i.e., interest costs. By contrast, the Lurito Gallagher Model deducts the cost of a solid waste company's debt from its proxy group's weighted cost of capital to derive an equity return. In addition, the Lurito Gallagher Model computes its cost of equity using a highly leveraged, 34.4 percent equity ratio, resulting in an overstated and expensive equity return for the regulated company.[26]

The proposed model's use of a return before interest and income taxes is based on the theory developed by Professors Franco Modigliani and Merton Miller. The commonly-called Modigliani and Miller Theorem holds that the weighted average cost of capital does not change as capital structure changes.[27] The pair showed the value of a company is in its operations, not in the method used to finance those operations. For example, Modigliani and Miller showed that as debt increases, equity shareholders perceive higher risk and expect a higher return, thereby increasing the cost of equity. But, because the equity component would make up a smaller portion of the total capital structure due to the higher debt load, the weighted cost of equity may actually decrease. Therefore, in spite of increased costs for both debt and equity, the overall average weighted cost of capital would remain close to the pre-leveraged structure.[28]

In addition, the DuPont Formula Model assumes the proxy companies will, as a group, reflect the optimal cost of capital. The model assumes the specific capital structures financing the operations of the proxy companies are not relevant to the computation of revenue requirement because the average weighted cost of capital reflected in the data should be optimal and consistent with the Modigliani and Miller theorem. Simply put, the weighted cost of capital is not materially affected by capital structure.

6) Does not explicitly recognize income taxes or debt costs.

The DuPont Model provides a return equal to the EBIT of the proxy companies at related risk levels measured by asset turnover ratio. Although the model does not explicitly recognize income tax or debt costs, it does provide a provision for both in its computed operating ratio.

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[26] The 34.4 percent is the average equity ratio of the Lurito and Gallagher proxy group.
[27] Franco Modigliani and Merton Miller both were awarded Nobel prizes in economics in 1985 and 1990 respectively.
[28] The theory was further enhanced to adjust the cost of equity to recognize the tax shielding effects of debt. For our purposes, the effects are not material enough to significantly change the estimated cost.

By computing an overall return based on earnings before interest and income taxes, financial risk is shifted to the company and away from the ratepayer. For example, if a company's management decides to heavily leverage its operations, it must work within the interest coverages provided by its bank. Since rates would not go up for coverage purposes, the company would be constrained by the market, not by a regulator.

As for tax elections, the DuPont model is indifferent to whether a company is a non-taxable, flow-through entity such as a partnership or sub-S corporation or whether it is a fully taxable "C" corporation. Revenue requirement would be set to allow the opportunity to earn a fair return on investment as reflected by the industry. To the extent management is able to reduce income taxes or optimize its capitalization, it is in the owners benefit. In turn, ratepayers benefit from a financially healthy operation.

7) Uses a comparable seven-year data set.

In the design of the DuPont Model, three different time series were considered: ten-year, seven-year, and five-year. Since the model uses historical data, the earnings allowed to the industry will inherently reflect a lag. For example, if inflation becomes a factor in the near future, it would be expected that earnings would start to increase to offset the effects of inflation. But growing earnings would only have minimal effect on the proxy data in the first few years because the change would represent only one or two years of a given data set.

A shorter range, possibly the five-year period, would help mitigate the lag. However, discussions with solid waste haulers and their representatives revealed concerns that too short of a sample period, such as the suggested five-year period, could result in the introduction of volatile rates. On the other hand, the model would be almost non-reactive if the sample period was too long, such as the 10-year range reflected in the Lurito Gallagher Model.

Staff believes the seven-year range used in the proposed model is a reasonable compromise, providing stability as well as sensitivity to economic changes.

8) Does not average data in order to smooth results.

The Lurito and Gallagher Model averages the proxy data. According to testimony by Lurito and Gallagher, their regression analysis used average profit margin and average capital turnover ratio for ten groups of firms. The groupings were based on ranges of asset turnover ratio.[29] The log linear regression was then computed using the averaged groupings and resulted in a before-tax profit margin.[30]

The industry has suggested that data used in the current model also be averaged. However, it recommends averaging data using company profit margin and asset turnover ratio to develop a single set of data for each company. It is the averaged data that would then be regressed. The industry's logic is that companies with longer financial histories will have data weighed more heavily over companies with shorter operating histories because they have a more data points.

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[29] Direct Testimony of Kenneth Gallagher and Richard Lurito, Docket 900657 at 22:1-25.

[30] One of the commonly discussed concerns with the Lurito Gallagher Model is its use of averaged data. It was the main reason the Lurito Gallagher data set had a very high R^2 of 0.95, not because its data was very highly correlated.

Staff disagrees. Staff feels that the data is the data, and that a short operating history does not, in itself, disqualify company data or require smoothing, nor does it introduce bias into the regression analysis. In fact, staff argues averaging data as suggested by the industry introduces distortion into regression results. Staff sees more disadvantages than advantages to smoothing data by averaging.

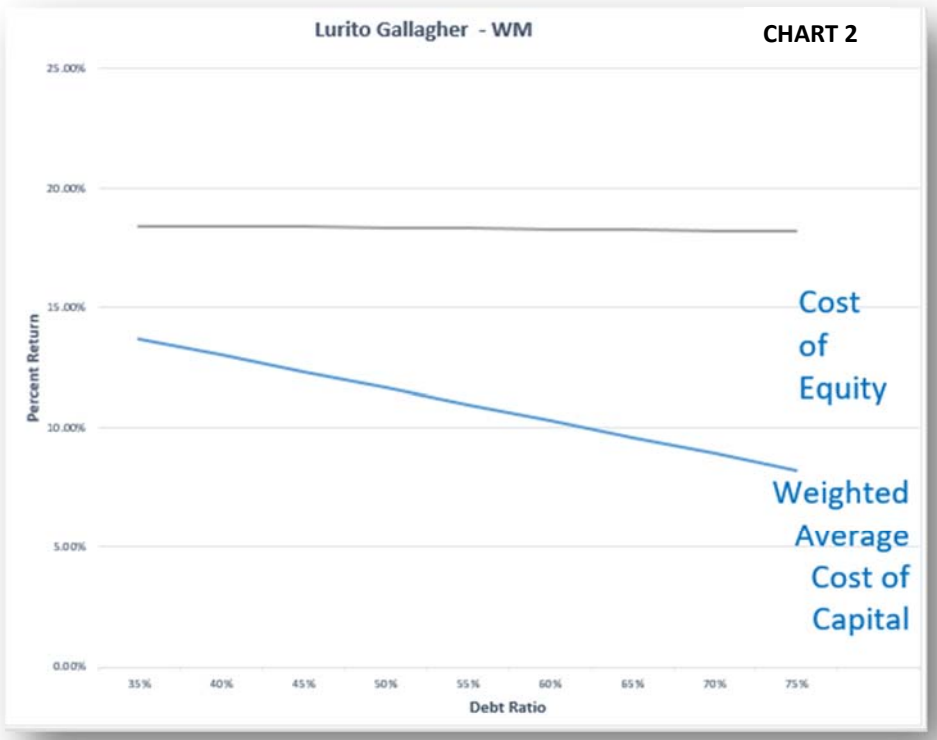
Lurito Gallagher Model Results

The commission has relied on the Lurito Gallagher Model to derive a return on investment for solid waste collection companies for almost three decades. As with the DuPont Formula Model discussed later, the model also uses the DuPont formula as the basis its results. However, the Lurito Gallagher Model used the formula to derive a return on equity whereas, the DuPont Formula Model derives a Weighted Average Cost of Capital. Although similarities exist, now that the Lurito Gallagher Model's data is updated, clear differences can now be observed.

An Equity Focused Method. The Lurito Gallagher Model derives a weighted average cost of capital (WACC) using the DuPont Formula. Then from that value, the model removes the proxy group's weighted cost of debt that reflects the proxy group's 70 percent debt ratio. The end result is the cost of equity. This value is then used in the model's final WACC computation.

The LG model focuses on computing a cost of equity that is indifferent to capital structure. In other words, the model's final capital costs provides the same return on equity whether or not the company is highly leveraged or equity rich, contrary to standard financing theory. It is an axiomatic financial principle that as debt increases, debt coverage ratios decrease, increasing financial risk which increases the cost of equity as the company becomes more and more leveraged. Depending on the capital structure of the regulated solid waste hauler, the Lurito Gallagher Model will most likely either understate or overstate the cost of equity.

At the same time, the WACC produced by model decreases with the increase in debt. As the model recognizes the larger portion of lower cost debt without any change to the cost of equity, the weighted cost decreases. The reduction in the WACC is also contrary to the tenets of finance, more specifically the Modigliani and Miller Theorem discussed earlier.



Lurito Gallagher Return Profile

To illustrate, the data used for Waste Management in the comparisons shown in Attachment C were also used in Chart 2 except for the independent variable (x-axis) - capital structure. Chart 2 shows the results of the analysis. As the debt ratio increases, the equity return remains the same with WACC decreasing as specified in the above discussion.

DuPont Formula Model Results

With the current data in the Lurito Gallagher Model reflecting a high inflationary period, it should be no surprise that the returns provided in staff's proposed DuPont Formula Model are lower.

The DuPont Formula Model produces, on the average, a 6.6 percent reduction to the equity return of a company with debt making up 55 percent of its capital structure at a 2.4 asset turnover ratio. The reduction changes the current average return on equity from 24.9 percent to a 17.3 percent return on equity.[31] The 6.6 percent reduction is a composite of two factors. [32]

[31] Although the DuPont Formula Model sets revenue requirement based on earnings before income taxes and interest, an individual company's return on equity can be mathematically computed based on its capital structure and the cost of embedded debt.

[32] A table comparing Revenue and Returns generated by the different models for six various sized regulated companies is included as Attachment C.

First, there is a 4.95 percent reduction associated with the updated data set, which recognizes the current low inflation rate. The additional 1.7 percent reduction is associated with the elimination of highly leveraged average capital structures when computing the proxy return on equity.

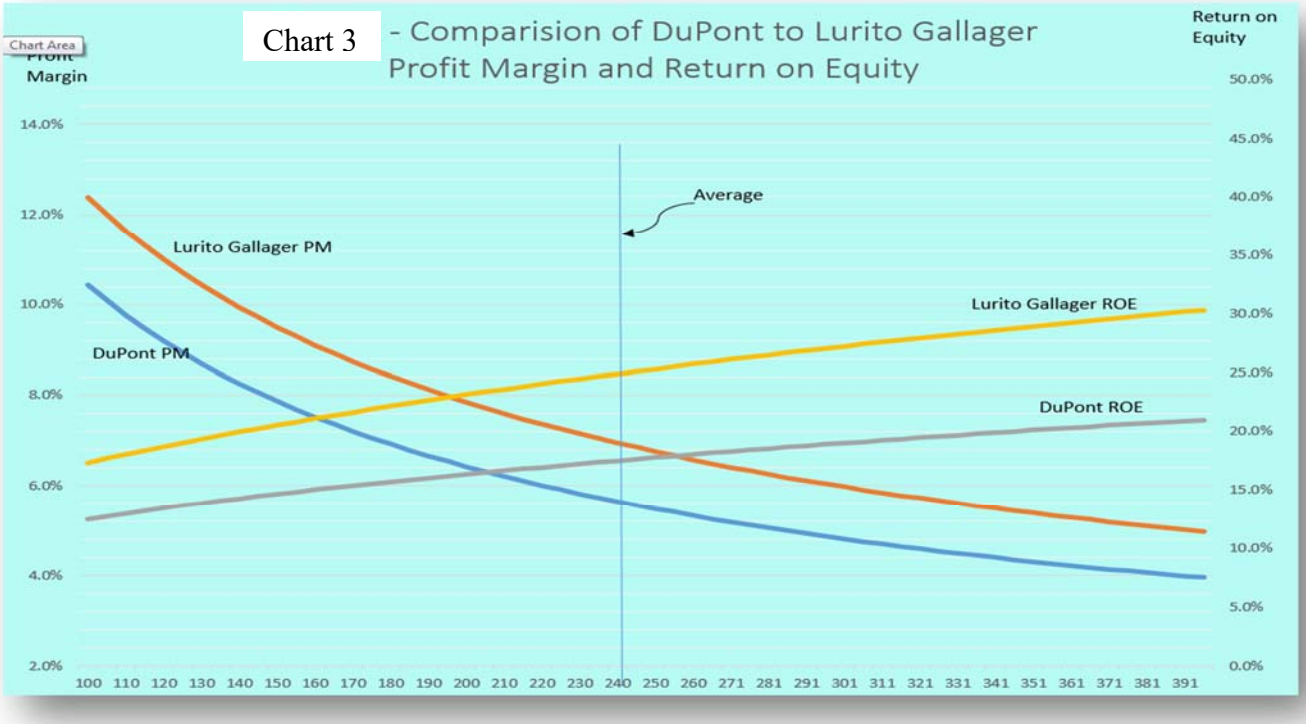
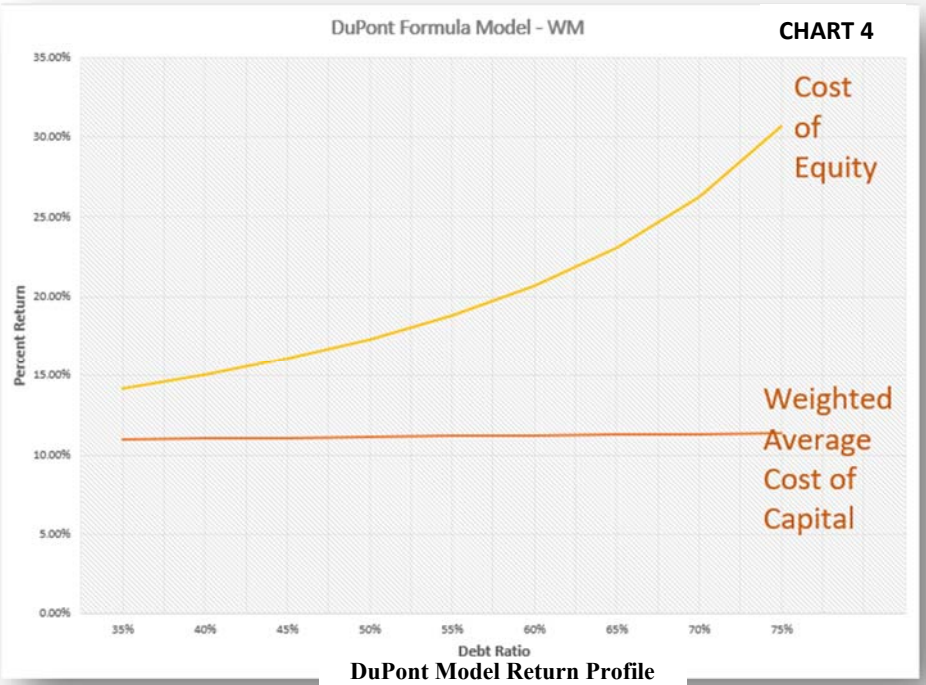


Chart 3 shows the return on equity and profit margins for various asset turnover ratios for both the DuPont Formula Model and the Lurito Gallagher Model. The results show that as the asset turnover ratio increases, profit margin decreases and return on equity increases. Increasing equity cost reflecting increasing asset turnover is consistent with the idea that business risk increases as asset turnover increases.[33] It also highlights the decrease in equity returns that solid waste companies will experence with the use of the new regression numbers and the elimination of the leverge premium. The DuPont data set reflects a historical period of low growth and inflation, with the average inflation rate equaling 1.6 percent.

A WACC Focused Method. In contrast to the cost-of-equity focused Lurito Gallagher Model, the DuPont Formula Model is WACC focused. That is, the model's purpose is to develop the proper WACC, while the return of equity is simply a fallout number.

[33] The updated Lurito Gallagher Model produces, for the same capital structure, returns higher than the DuPont Formula Model because the leverage premium remains even under the new data set.



DuPont Model Return Profile

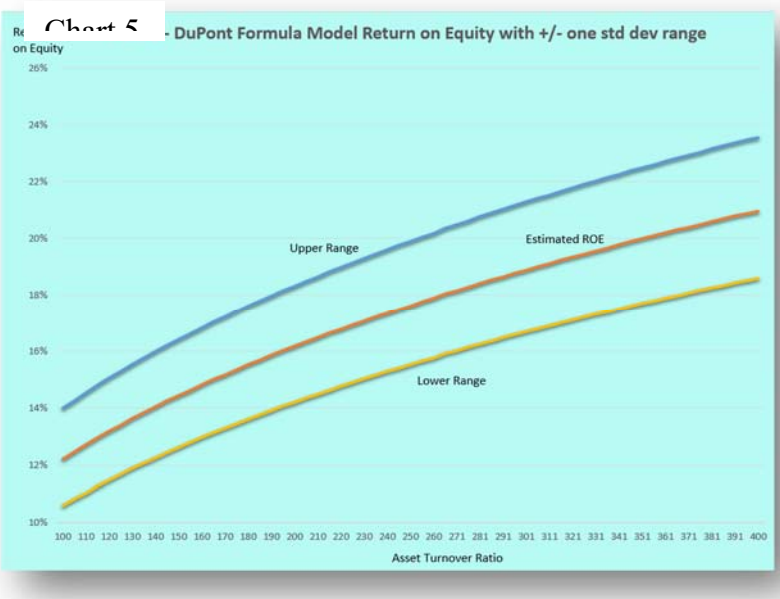
The results of the DuPont Formula Model reflect the opposite of the Lurito Gallagher Model. That is, as the capital structure becomes more leveraged and more risky, the cost of equity increases, as would be expected. However, WACC remains effectively level (Chart 4). [34]

Range of Return

As with any cost of capital study, the commission should have the option to consider a range of returns. Staff proposes in its model a range of +/- one standard deviation associated with the regression's y-intercept coefficient, as shown in Chart 4. [35] The recommendation provides a supportable range of returns that the commission may use in its consideration of a fair return. For example, the commission may decide to consider an adjustment upward to recognize an expected increase in inflation or downward for poor management or customer service.

[34] WACC increases slightly as leverage increases reflecting the impact of increase of deductible interest expense on income tax.

[35] The y-intercept's standard deviation, 0.039, is based on a robust standard error estimation which compensates for the data's heteroscedasticity. ($R^2 = 0.4763$)



Model Comparison

The adoption of the DuPont Formula Model would update the statistical basis from which the commission has regularly developed rates for its regulated solid waste collection companies. However, in contrast to the current Lurito Gallaher Model, the DuPont Formula Model would allow companies to maintain their selected or imposed capital structures without penalty or reward, effectively shifting financial risk from the ratepayer to the company.

Although the respective approaches are similar on many levels, the DuPont and Lurito Gallagher Models have distinctive differences. Table 2 outlines the most important differences.

Table 2

DuPont Formula Model	Lurito Gallagher Model
Current financial data (2009–2016)	Outdated financial data (1968–1977)
Proxies: transportation companies	Proxies: public utilities, airlines, and delivery services
Earnings before interest and income taxes	Equity return computed / debt actual
Data of individual companies	Company data averaged
Log10 based regression	Natural-Log based regression
End of period investment base	Average period investment

Staff's proposed model is more current, designed to incentivize companies to become more financially efficient, and produces returns that comport to financial principles. In contrast to the Lurito Gallagher Model, the DuPont Model does not reward inefficient financing by providing higher returns, nor does it eliminate the economic incentive for using more efficient or innovative financing.

Summary

There are two primary methods for estimating the cost of capital for regulated industries: the market approach and comparable earnings approach. The market approach uses market trading data to derive an estimate and is commonly used with utilities, whereas the comparable earnings approach uses earnings of comparable-risk companies to estimate a regulated company's cost of

capital. Traditionally, transportation companies use comparable earnings as a measure of fair return. Revenue requirement is then set using operating ratios.

After five years of studying the Lurito Gallagher Model, alternative models, and different inputs to the models, staff seeks to resolve the issues in this rulemaking by moving to an updated approach for the determination of return on investment for solid waste collection companies. Staff believes there are only three alternatives: (1) Update the current Lurito Gallaher model with the deduction of deferred taxes from investment; (2) allow companies to file using a method the companies support through testimony, such as CAPM or the traditional 93 percent operating ratio; or (3) adopt the DuPont Formula Model with commission modifications,

Conclusion and Next Steps

It is the staff's option that the current Lurito Gallagher Model requires replacement. Not only does the model's data require updating because of its use of outdated financial data, but the model produces results that are not consistent with basic financial principles. Staff recommends the DuPont Formula Model be used for setting rates because the model generates a reasonable operating ratio based on investment reflecting earnings comparable in the transportation industry.

The regulated solid waste collection industry, along with other interested parties, will have the opportunity to review the DuPont Formula Model and provide written comments, suggestions, or observations. After the comment period, the commission will convene a workshop seeking further discussion and comments. It will be only after public input that the commission will decide to either maintain the status quo, issue a policy statement, or simply adjudicate a rate filing. Regardless of its final decision, the commission should require its selected model to be updated on a regular bases with data that is current and comparable.

"…for the inescapable imperfections of regulation, the only available remedy is to try to make it work better."

Alfred Kahn, The Economics of Regulation principles and institutions Vol II, (New York, Wiley 1971), p 329.

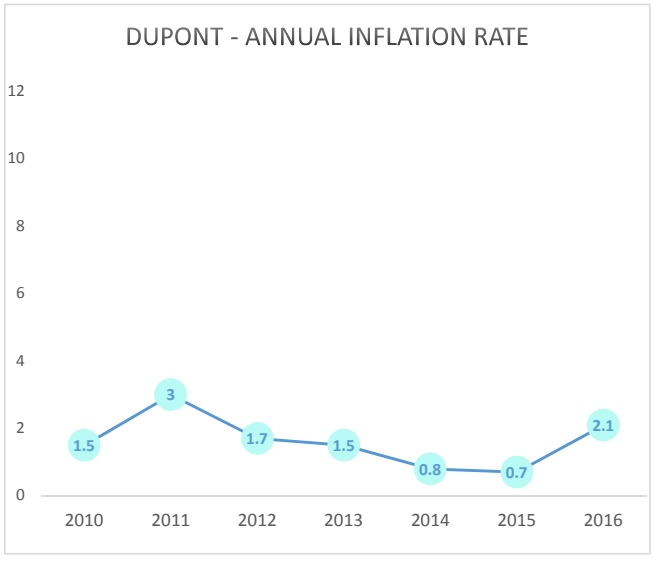
Attachment A – Annual Inflation Rates Comparison

Attachment A - Annual Inflation Rates Comparison
Prepared by: Danny Kermode
Docket TG-131255

DuPont Formula Data

Year	Inflation
2010	1.5
2011	3
2012	1.7
2013	1.5
2014	0.8
2015	0.7
2016	2.1

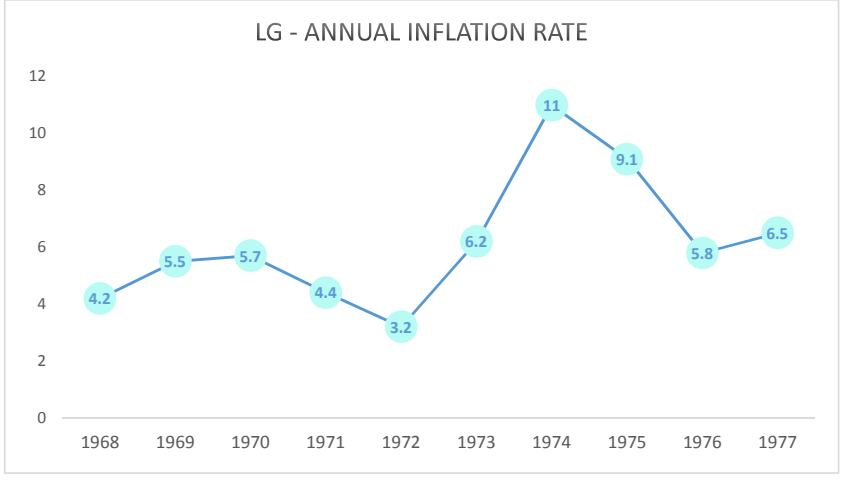
Average	1.6



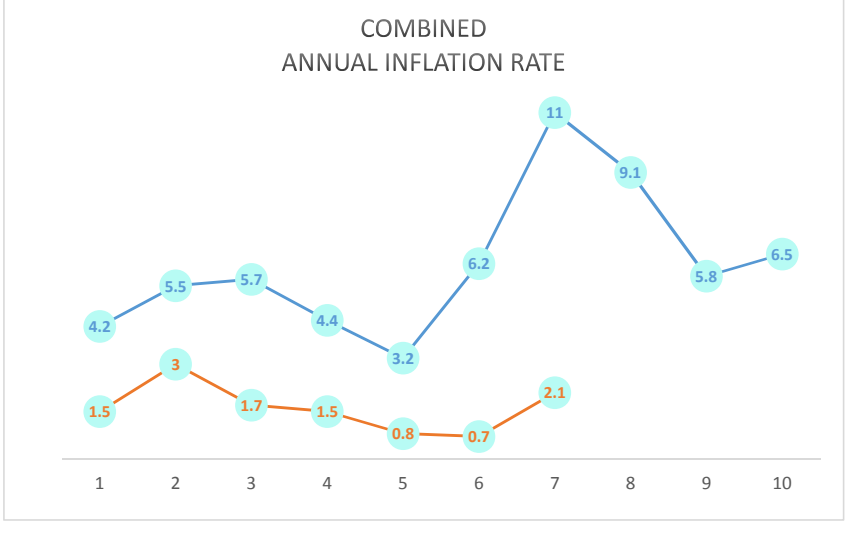
Lurito Gallagher Data

Year	Inflation
1968	4.2
1969	5.5
1970	5.7
1971	4.4
1972	3.2
1973	6.2
1974	11
1975	9.1
1976	5.8
1977	6.5

Average	6.2



*** Inflation Rates in Percent**



Source:

http://www.usinflationcalculator.com/inflation/historical-inflation-rates/

last accessed April 20, 2018

Attachment B1 – Results Comparison DuPont and Lurito Gallagher by Asset Turnover

Attachment B-1 Comparison of DFM to LG results
Seven Year - Individual Data - 21% tax rate
Prepared by: Danny Kermode
Docket TG-131255

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
X	1 - (c)	$ß_1 + [(a)(m_1)]$	(a)/100*(b)	*fn 1*	1 - (g)	$ß_2 + [(a)(m_2)]$	(a)/100*(b)	*fn 2*			(e) - (i)	(n) - (l)	(e) - (j)

	DuPont Formula Method				Lurito Gallagher Method							
Turnover Ratio	Profit Margin	Operating Ratio	WACC (EBIT)	After tax ROE[1]	Profit Margin	Operating Ratio	WACC (EBIT)	After Tax ROE[2]	Leveraged After Tax ROE[3]	Updated Data - Change in after tax ROE	Capital Structure - Change in after tax ROE	Total Change in after tax ROE
100	10.81%	89.19%	10.81%	12.2%	12.81%	87.19%	12.81%	15.7%	16.9%	-3.51%	-1.20%	-4.71%
105	10.43%	89.57%	10.95%	12.5%	12.39%	87.61%	13.01%	16.1%	17.3%	-3.60%	-1.23%	-4.83%
110	10.09%	89.91%	11.09%	12.7%	12.00%	88.00%	13.20%	16.4%	17.7%	-3.70%	-1.25%	-4.95%
115	9.77%	90.23%	11.23%	13.0%	11.64%	88.36%	13.39%	16.7%	18.0%	-3.79%	-1.28%	-5.06%
120	9.47%	90.53%	11.36%	13.2%	11.31%	88.69%	13.57%	17.1%	18.4%	-3.87%	-1.30%	-5.18%
125	9.19%	90.81%	11.49%	13.4%	11.00%	89.00%	13.74%	17.4%	18.7%	-3.96%	-1.33%	-5.29%
130	8.93%	91.07%	11.61%	13.6%	10.71%	89.29%	13.92%	17.7%	19.0%	-4.04%	-1.35%	-5.39%
135	8.69%	91.31%	11.73%	13.8%	10.43%	89.57%	14.08%	18.0%	19.3%	-4.13%	-1.37%	-5.50%
140	8.46%	91.54%	11.85%	14.0%	10.18%	89.82%	14.25%	18.3%	19.6%	-4.21%	-1.39%	-5.60%
145	8.25%	91.75%	11.97%	14.2%	9.93%	90.07%	14.41%	18.5%	19.9%	-4.28%	-1.41%	-5.70%
150	8.05%	91.95%	12.08%	14.4%	9.71%	90.29%	14.56%	18.8%	20.2%	-4.36%	-1.44%	-5.80%
155	7.86%	92.14%	12.19%	14.6%	9.49%	90.51%	14.71%	19.1%	20.5%	-4.44%	-1.46%	-5.89%
160	7.68%	92.32%	12.29%	14.8%	9.29%	90.71%	14.86%	19.3%	20.8%	-4.51%	-1.48%	-5.99%
165	7.51%	92.49%	12.40%	15.0%	9.09%	90.91%	15.01%	19.6%	21.1%	-4.58%	-1.49%	-6.08%
170	7.35%	92.65%	12.50%	15.2%	8.91%	91.09%	15.15%	19.8%	21.3%	-4.66%	-1.51%	-6.17%
175	7.20%	92.80%	12.60%	15.4%	8.74%	91.26%	15.29%	20.1%	21.6%	-4.73%	-1.53%	-6.26%
180	7.05%	92.95%	12.69%	15.5%	8.57%	91.43%	15.43%	20.3%	21.9%	-4.80%	-1.55%	-6.35%
185	6.91%	93.09%	12.79%	15.7%	8.41%	91.59%	15.56%	20.6%	22.1%	-4.86%	-1.57%	-6.43%
190	6.78%	93.22%	12.88%	15.9%	8.26%	91.74%	15.69%	20.8%	22.4%	-4.93%	-1.59%	-6.52%
195	6.65%	93.35%	12.97%	16.0%	8.11%	91.89%	15.82%	21.0%	22.6%	-5.00%	-1.60%	-6.60%
200	6.53%	93.47%	13.06%	16.2%	7.97%	92.03%	15.95%	21.2%	22.9%	-5.06%	-1.62%	-6.68%
205	6.42%	93.58%	13.15%	16.3%	7.84%	92.16%	16.07%	21.5%	23.1%	-5.13%	-1.64%	-6.76%
210	6.30%	93.70%	13.24%	16.5%	7.71%	92.29%	16.20%	21.7%	23.3%	-5.19%	-1.65%	-6.84%
215	6.20%	93.80%	13.33%	16.6%	7.59%	92.41%	16.32%	21.9%	23.6%	-5.25%	-1.67%	-6.92%
220	6.10%	93.90%	13.41%	16.8%	7.47%	92.53%	16.44%	22.1%	23.8%	-5.31%	-1.69%	-7.00%
225	6.00%	94.00%	13.49%	16.9%	7.36%	92.64%	16.55%	22.3%	24.0%	-5.37%	-1.70%	-7.08%
230	5.90%	94.10%	13.57%	17.1%	7.25%	92.75%	16.67%	22.5%	24.2%	-5.43%	-1.72%	-7.15%
235	5.81%	94.19%	13.65%	17.2%	7.14%	92.86%	16.78%	22.7%	24.4%	-5.49%	-1.73%	-7.23%
240	5.72%	94.28%	13.73%	17.3%	7.04%	92.96%	16.90%	22.9%	24.6%	-5.55%	-1.75%	-7.30%
245	5.64%	94.36%	13.81%	17.5%	6.94%	93.06%	17.01%	23.1%	24.9%	-5.61%	-1.76%	-7.37%
250	5.55%	94.45%	13.89%	17.6%	6.85%	93.15%	17.11%	23.3%	25.1%	-5.67%	-1.78%	-7.44%
255	5.48%	94.52%	13.96%	17.8%	6.75%	93.25%	17.22%	23.5%	25.3%	-5.72%	-1.79%	-7.51%
260	5.40%	94.60%	14.04%	17.9%	6.66%	93.34%	17.33%	23.7%	25.5%	-5.78%	-1.81%	-7.59%
266	5.31%	94.69%	14.12%	18.0%	6.56%	93.44%	17.45%	23.9%	25.7%	-5.85%	-1.82%	-7.67%
271	5.24%	94.76%	14.20%	18.2%	6.48%	93.52%	17.56%	24.1%	25.9%	-5.90%	-1.84%	-7.74%
276	5.17%	94.83%	14.27%	18.3%	6.40%	93.60%	17.66%	24.2%	26.1%	-5.95%	-1.85%	-7.80%
281	5.10%	94.90%	14.34%	18.4%	6.32%	93.68%	17.76%	24.4%	26.3%	-6.01%	-1.86%	-7.87%
286	5.04%	94.96%	14.41%	18.5%	6.24%	93.76%	17.86%	24.6%	26.5%	-6.06%	-1.88%	-7.94%
291	4.97%	95.03%	14.48%	18.7%	6.17%	93.83%	17.96%	24.8%	26.7%	-6.11%	-1.89%	-8.00%
296	4.91%	95.09%	14.54%	18.8%	6.10%	93.90%	18.05%	24.9%	26.8%	-6.16%	-1.90%	-8.07%
301	4.85%	95.15%	14.61%	18.9%	6.03%	93.97%	18.15%	25.1%	27.0%	-6.21%	-1.92%	-8.13%
306	4.80%	95.20%	14.68%	19.0%	5.96%	94.04%	18.24%	25.3%	27.2%	-6.27%	-1.93%	-8.19%
311	4.74%	95.26%	14.74%	19.1%	5.90%	94.10%	18.34%	25.4%	27.4%	-6.32%	-1.94%	-8.26%

Weighted Average Cost of Capital (EBIT)

DuPont Formula	13.70%
LG Model	16.87%
Range	-3.17%

Return on Equity (ROE)

Average ROE - DuPont	17.30%
Average ROE - LG	24.60%
Change in Average ROE	-7.30%

ROE Change Reconciliation

Updated Data - Average Change	-5.56%
Capital Structure - Average Change	-1.74%
Total Average change	-7.30%

Assumptions:

[1] Equity capitalization *(eq%)*	45.00%
Average debt cost *(rd)*	7.00%
Weighted cost of debt *(wrd)*	3.85%
After-tax ROE = *(((d)-wrd)*tr))/eq%*	
[2] LG Tax Rate at 21% (tr)	
[3] LG Tax Rate at 35%	

DuPont Formula Method

Regression Coefficients	
Y-intercept	2.487
Slope	0.7266
Log 10	

Lurito Gallagher Method

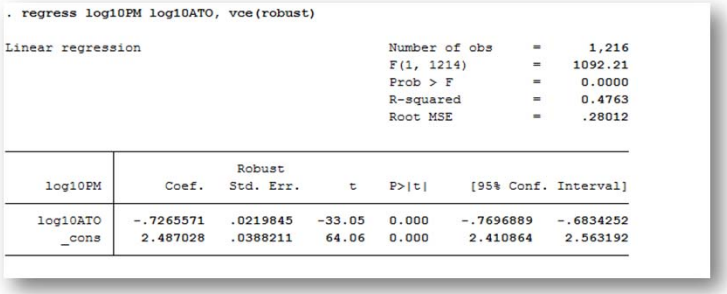
Regression Coefficients	
Y-intercept	5.6985
Slope	0.68367
Natural Log	

Example Capital Structure

Debt	55%
Equity	45%

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
X	1 - (c)	$ß_1 + [(a)(m_1)]$	(a)/100*(b)	*fn 1*	1 - (g)	$ß_2 + [(a)(m_2)]$	(a)/100*(b)	*fn 2*			(e) - (i)	(n) - (l)	(e) - (j)

	DuPont Formula Method				Lurito Gallagher Method							
Turnover Ratio	**Profit Margin**	**Operating Ratio**	**WACC (EBIT)**	**After tax ROE[1]**	**Profit Margin**	**Operating Ratio**	**WACC (EBIT)**	**After Tax ROE[2]**	**Leveraged After Tax ROE[3]**	**Updated Data - Change in after tax ROE**	**Capital Structure - Change in after tax ROE**	**Total Change in after tax ROE**
316	4.69%	95.31%	14.81%	19.2%	5.83%	94.17%	18.43%	25.6%	27.6%	-6.37%	-1.95%	-8.32%
321	4.63%	95.37%	14.87%	19.3%	5.77%	94.23%	18.52%	25.8%	27.7%	-6.41%	-1.97%	-8.38%
326	4.58%	95.42%	14.93%	19.5%	5.71%	94.29%	18.61%	25.9%	27.9%	-6.46%	-1.98%	-8.44%
331	4.53%	95.47%	14.99%	19.6%	5.65%	94.35%	18.70%	26.1%	28.1%	-6.51%	-1.99%	-8.50%
336	4.48%	95.52%	15.06%	19.7%	5.59%	94.41%	18.79%	26.2%	28.2%	-6.56%	-2.00%	-8.56%
341	4.43%	95.57%	15.12%	19.8%	5.54%	94.46%	18.88%	26.4%	28.4%	-6.61%	-2.01%	-8.62%
346	4.39%	95.61%	15.18%	19.9%	5.48%	94.52%	18.97%	26.5%	28.6%	-6.65%	-2.03%	-8.68%
351	4.34%	95.66%	15.24%	20.0%	5.43%	94.57%	19.05%	26.7%	28.7%	-6.70%	-2.04%	-8.74%
356	4.30%	95.70%	15.30%	20.1%	5.38%	94.62%	19.14%	26.8%	28.9%	-6.75%	-2.05%	-8.80%
361	4.25%	95.75%	15.35%	20.2%	5.33%	94.67%	19.22%	27.0%	29.0%	-6.79%	-2.06%	-8.85%
366	4.21%	95.79%	15.41%	20.3%	5.28%	94.72%	19.31%	27.1%	29.2%	-6.84%	-2.07%	-8.91%
371	4.17%	95.83%	15.47%	20.4%	5.23%	94.77%	19.39%	27.3%	29.4%	-6.88%	-2.08%	-8.97%
376	4.13%	95.87%	15.53%	20.5%	5.18%	94.82%	19.47%	27.4%	29.5%	-6.93%	-2.09%	-9.02%
381	4.09%	95.91%	15.58%	20.6%	5.13%	94.87%	19.55%	27.6%	29.7%	-6.97%	-2.10%	-9.08%
386	4.05%	95.95%	15.64%	20.7%	5.09%	94.91%	19.64%	27.7%	29.8%	-7.02%	-2.11%	-9.13%
391	4.01%	95.99%	15.69%	20.8%	5.04%	94.96%	19.72%	27.9%	30.0%	-7.06%	-2.13%	-9.19%
396	3.98%	96.02%	15.75%	20.9%	5.00%	95.00%	19.80%	28.0%	30.1%	-7.11%	-2.14%	-9.24%
400	3.95%	96.05%	15.79%	21.0%	4.96%	95.04%	19.86%	28.1%	30.2%	-7.14%	-2.14%	-9.29%



```
. regress log10PM log10ATO, vce(robust)

Linear regression                               Number of obs     =      1,216
                                                F(1, 1214)        =    1092.21
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4763
                                                Root MSE          =     .28012

------------------------------------------------------------------------------
             |               Robust
     log10PM |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log10ATO |  -.7265571   .0219845   -33.05   0.000    -.7696889   -.6834252
       _cons |   2.487028   .0388211    64.06   0.000     2.410864    2.563192
------------------------------------------------------------------------------
```

Attachment B2 – Computation of WACC/ ROE Range (Std. Deviation)

Attachment B-2 Computation of ROE Range
Seven Year - Individual Data - DFM 21% tax rate
Prepared by: Danny Kermode
Docket TG-131255

Computation of WACC / ROE Range

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
X	1 - (c)	$ß_1 + [(a)(m_1)]$	(a)/100*(b)		1 - (g)	$ß_2 + [(a)(m_2)]$	(a)/100*(b)		(e) - (h)
		DuPont Formula Method - Upper				**DuPont Formula Method - Lower**			
Turnover Ratio	**Profit Margin**	**Operating Ratio**	**WACC (EBIT)**	**After tax ROE[1]**	**Profit Margin**	**Operating Ratio**	**WACC (EBIT)**	**After Tax ROE[1]**	**Range of after-tax ROE**
100	11.82%	88.18%	11.82%	14.0%	9.89%	90.11%	9.89%	10.6%	3.40%
105	11.41%	88.59%	11.98%	14.3%	9.54%	90.46%	10.02%	10.8%	3.44%
110	11.03%	88.97%	12.13%	14.5%	9.22%	90.78%	10.15%	11.1%	3.49%
115	10.68%	89.32%	12.28%	14.8%	8.93%	91.07%	10.27%	11.3%	3.53%
120	10.35%	89.65%	12.42%	15.1%	8.66%	91.34%	10.39%	11.5%	3.57%
125	10.05%	89.95%	12.56%	15.3%	8.41%	91.59%	10.51%	11.7%	3.61%
130	9.77%	90.23%	12.70%	15.5%	8.17%	91.83%	10.62%	11.9%	3.65%
135	9.50%	90.50%	12.83%	15.8%	7.95%	92.05%	10.73%	12.1%	3.69%
140	9.26%	90.74%	12.96%	16.0%	7.74%	92.26%	10.84%	12.3%	3.72%
145	9.02%	90.98%	13.08%	16.2%	7.55%	92.45%	10.94%	12.5%	3.76%
150	8.80%	91.20%	13.21%	16.4%	7.36%	92.64%	11.04%	12.6%	3.80%
155	8.60%	91.40%	13.32%	16.6%	7.19%	92.81%	11.14%	12.8%	3.83%
160	8.40%	91.60%	13.44%	16.8%	7.03%	92.97%	11.24%	13.0%	3.86%
165	8.21%	91.79%	13.55%	17.0%	6.87%	93.13%	11.34%	13.1%	3.90%
170	8.04%	91.96%	13.67%	17.2%	6.72%	93.28%	11.43%	13.3%	3.93%
175	7.87%	92.13%	13.77%	17.4%	6.58%	93.42%	11.52%	13.5%	3.96%
180	7.71%	92.29%	13.88%	17.6%	6.45%	93.55%	11.61%	13.6%	3.99%
185	7.56%	92.44%	13.99%	17.8%	6.32%	93.68%	11.70%	13.8%	4.02%
190	7.41%	92.59%	14.09%	18.0%	6.20%	93.80%	11.78%	13.9%	4.05%
195	7.28%	92.72%	14.19%	18.1%	6.08%	93.92%	11.87%	14.1%	4.08%
200	7.14%	92.86%	14.29%	18.3%	5.97%	94.03%	11.95%	14.2%	4.11%
205	7.02%	92.98%	14.38%	18.5%	5.87%	94.13%	12.03%	14.4%	4.13%
210	6.89%	93.11%	14.48%	18.7%	5.77%	94.23%	12.11%	14.5%	4.16%
215	6.78%	93.22%	14.57%	18.8%	5.67%	94.33%	12.19%	14.6%	4.19%
220	6.67%	93.33%	14.66%	19.0%	5.57%	94.43%	12.26%	14.8%	4.21%
225	6.56%	93.44%	14.75%	19.1%	5.48%	94.52%	12.34%	14.9%	4.24%
230	6.45%	93.55%	14.84%	19.3%	5.40%	94.60%	12.41%	15.0%	4.27%
235	6.35%	93.65%	14.93%	19.5%	5.31%	94.69%	12.49%	15.2%	4.29%
240	6.26%	93.74%	15.02%	19.6%	5.23%	94.77%	12.56%	15.3%	4.32%
245	6.16%	93.84%	15.10%	19.8%	5.15%	94.85%	12.63%	15.4%	4.34%
250	6.07%	93.93%	15.19%	19.9%	5.08%	94.92%	12.70%	15.5%	4.36%
255	5.99%	94.01%	15.27%	20.0%	5.01%	94.99%	12.77%	15.7%	4.39%
260	5.90%	94.10%	15.35%	20.2%	4.94%	95.06%	12.84%	15.8%	4.41%
266	5.81%	94.19%	15.44%	20.4%	4.86%	95.14%	12.92%	15.9%	4.44%
271	5.73%	94.27%	15.52%	20.5%	4.79%	95.21%	12.98%	16.0%	4.46%
276	5.65%	94.35%	15.60%	20.6%	4.73%	95.27%	13.05%	16.1%	4.48%

Average Return on Equity

Upper Range	**19.55%**
Lower Range	**15.24%**
Range	**4.31%**
Current	*24.60%*

Average WACC

Upper Range	**14.98%**
Lower Range	**12.53%**
Range	**2.45%**
Current	*16.87%*

DuPont Formula Method - Upper Range

Regression Coefficients	
Y-intercept ($ß_1$)	**2.525821**
Slope (m_1)	**0.7266**
Log 10	

DuPont Formula Method - Lower Range

Regression Coefficients	
Y-intercept ($ß_2$)	**2.448179**
Slope (m_2)	**0.7266**
Log 10	

Assumptions:

[1] Equity capitalization (*eq%*)	45.00%
Average debt cost (*rd*)	7.00%
Weighted cost of debt (*wrd*)	3.85%
Tax Rate (*tr*)	21%
After-tax ROE = *(((d)-wrd)*tr))/eq%*	

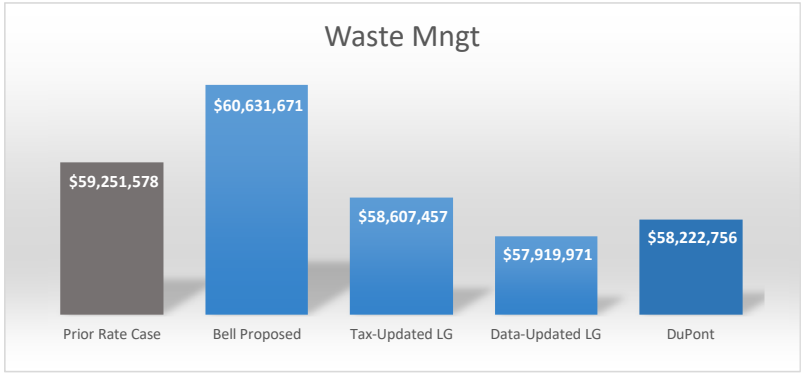
281	5.58%	94.42%	15.68%	20.8%	4.67%	95.33%	13.11%	16.3%	4.51%
286	5.51%	94.49%	15.75%	20.9%	4.61%	95.39%	13.17%	16.4%	4.53%
291	5.44%	94.56%	15.83%	21.0%	4.55%	95.45%	13.24%	16.5%	4.55%
296	5.37%	94.63%	15.90%	21.2%	4.49%	95.51%	13.30%	16.6%	4.57%
301	5.31%	94.69%	15.98%	21.3%	4.44%	95.56%	13.36%	16.7%	4.59%
306	5.24%	94.76%	16.05%	21.4%	4.39%	95.61%	13.42%	16.8%	4.61%
311	5.18%	94.82%	16.12%	21.5%	4.33%	95.67%	13.48%	16.9%	4.63%
316	5.12%	94.88%	16.19%	21.7%	4.28%	95.72%	13.54%	17.0%	4.65%
321	5.07%	94.93%	16.26%	21.8%	4.24%	95.76%	13.60%	17.1%	4.67%
326	5.01%	94.99%	16.33%	21.9%	4.19%	95.81%	13.66%	17.2%	4.69%
331	4.95%	95.05%	16.40%	22.0%	4.14%	95.86%	13.71%	17.3%	4.71%
336	4.90%	95.10%	16.46%	22.1%	4.10%	95.90%	13.77%	17.4%	4.73%
341	4.85%	95.15%	16.53%	22.3%	4.05%	95.95%	13.82%	17.5%	4.75%
346	4.80%	95.20%	16.60%	22.4%	4.01%	95.99%	13.88%	17.6%	4.77%
351	4.75%	95.25%	16.66%	22.5%	3.97%	96.03%	13.93%	17.7%	4.79%
356	4.70%	95.30%	16.73%	22.6%	3.93%	96.07%	13.99%	17.8%	4.81%
361	4.65%	95.35%	16.79%	22.7%	3.89%	96.11%	14.04%	17.9%	4.83%
366	4.60%	95.40%	16.85%	22.8%	3.85%	96.15%	14.09%	18.0%	4.84%
371	4.56%	95.44%	16.92%	22.9%	3.81%	96.19%	14.15%	18.1%	4.86%
376	4.52%	95.48%	16.98%	23.0%	3.78%	96.22%	14.20%	18.2%	4.88%
381	4.47%	95.53%	17.04%	23.2%	3.74%	96.26%	14.25%	18.3%	4.90%
386	4.43%	95.57%	17.10%	23.3%	3.70%	96.30%	14.30%	18.3%	4.91%
391	4.39%	95.61%	17.16%	23.4%	3.67%	96.33%	14.35%	18.4%	4.93%
396	4.35%	95.65%	17.22%	23.5%	3.64%	96.36%	14.40%	18.5%	4.95%
400	4.32%	95.68%	17.27%	23.6%	3.61%	96.39%	14.44%	18.6%	4.96%

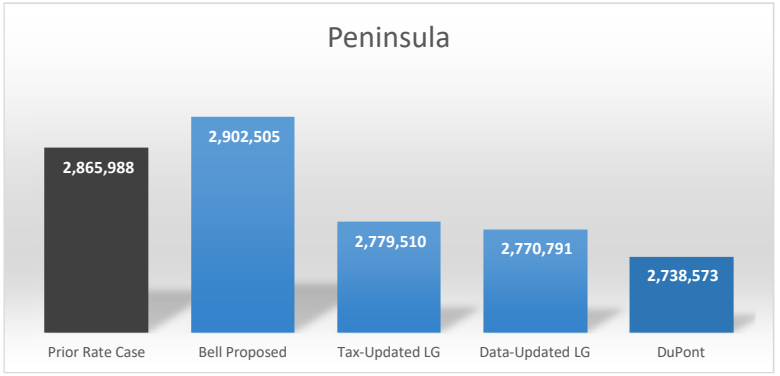
```
. regress log10PM log10ATO, vce(robust)

Linear regression                               Number of obs     =      1,216
                                                F(1, 1214)        =    1092.21
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4763
                                                Root MSE          =     .28012

------------------------------------------------------------------------------
             |               Robust
      log10PM |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     log10ATO |  -.7265571   .0219845   -33.05   0.000    -.7696889   -.6834252
        _cons |   2.487028   .0388211    64.06   0.000     2.410864    2.563192
------------------------------------------------------------------------------
```

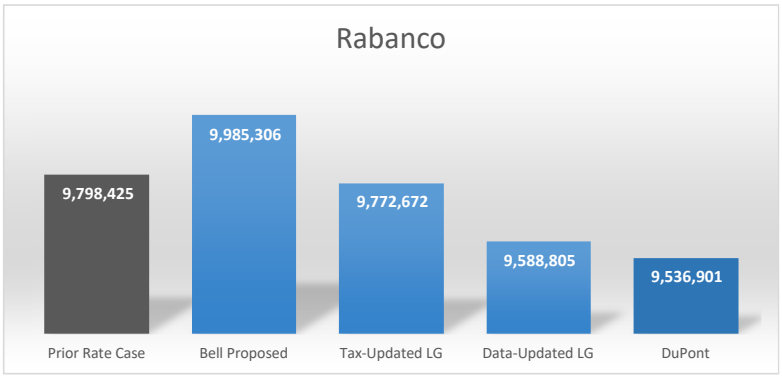
Attachment C –Revenue / Return on Equity - Model Comparisons

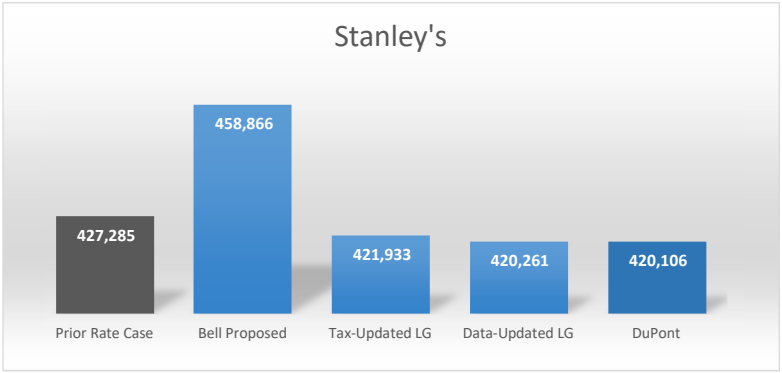
Revenue Requirements - Model Comparison

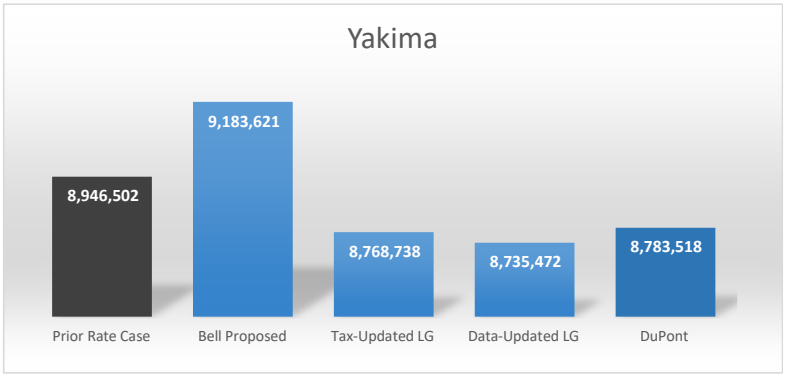
Attachment C-1

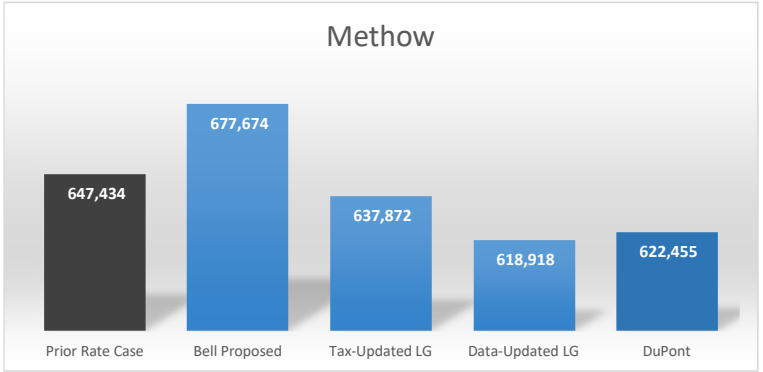






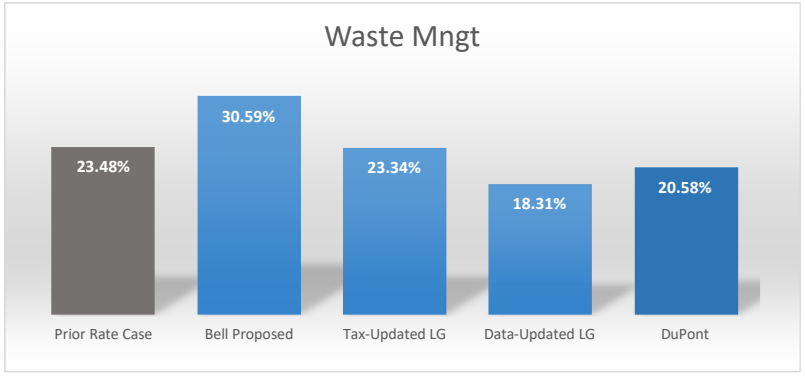


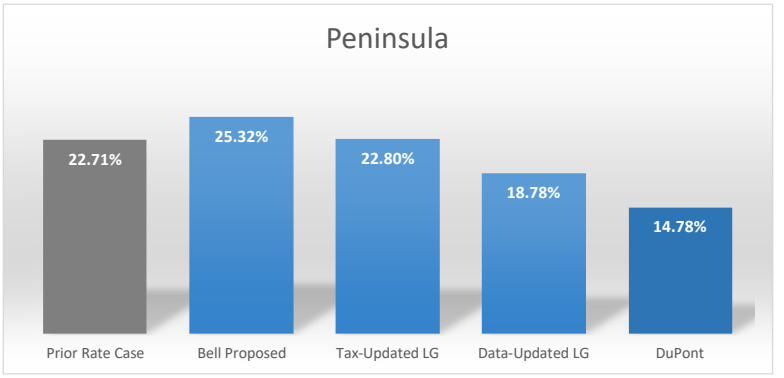


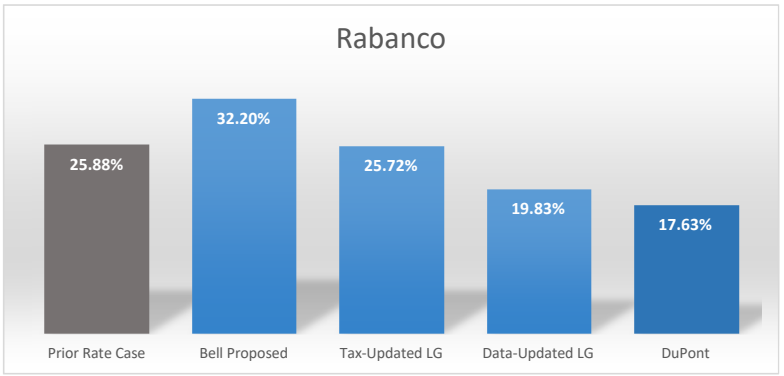


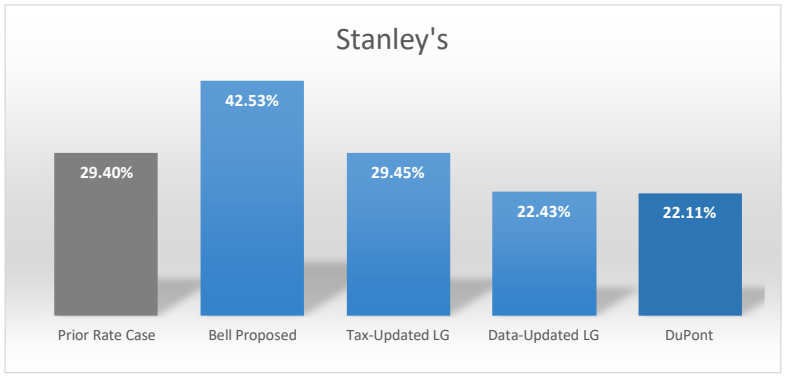
Return on Equity (ROE) - Model Comparison

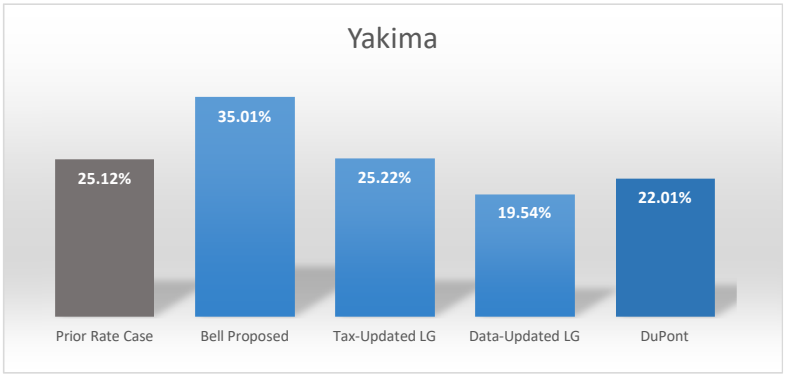
Attachment C-2

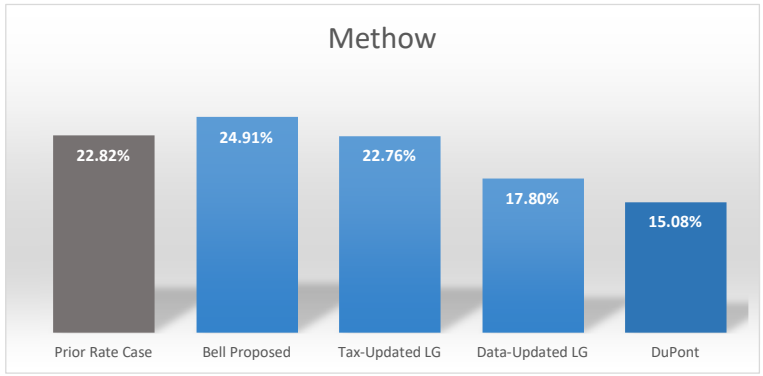












Attachment D – Company Listing by SIC Transportation Category

Attachment D - Company Listing by SIC Transportation Category
Prepared by: Danny Kermode
Docket TG-131255

Category	Name
AIR COURIER SERVICES	AIR TRANSPORT SERVICES GROUP
AIR COURIER SERVICES	CARGOJET INC
AIR COURIER SERVICES	FEDERAL EXPRESS CORP
AIR COURIER SERVICES Count	3
AIR TRANSPORT, NONSCHEDULED	AIR METHODS CORP
AIR TRANSPORT, NONSCHEDULED	ALPINE AIR EXPRESS INC
AIR TRANSPORT, NONSCHEDULED	ATLAS AIR WORLDWIDE HLDG INC
AIR TRANSPORT, NONSCHEDULED	BRISTOW GROUP INC
AIR TRANSPORT, NONSCHEDULED	CHC GROUP LTD
AIR TRANSPORT, NONSCHEDULED	DISCOVERY AIR INC
AIR TRANSPORT, NONSCHEDULED	ERA GROUP INC
AIR TRANSPORT, NONSCHEDULED	HNZ GROUP INC
AIR TRANSPORT, NONSCHEDULED	PHI INC
AIR TRANSPORT, NONSCHEDULED Co	9
AIR TRANSPORT, SCHEDULED	AIR CANADA
AIR TRANSPORT, SCHEDULED	AIR FRANCE-KLM -ADR
AIR TRANSPORT, SCHEDULED	AIRTRAN HOLDINGS INC
AIR TRANSPORT, SCHEDULED	ALASKA AIR GROUP INC
AIR TRANSPORT, SCHEDULED	ALLEGIANT TRAVEL CO
AIR TRANSPORT, SCHEDULED	AMERICAN AIRLINES GROUP INC
AIR TRANSPORT, SCHEDULED	AMERICAN AIRLINES INC
AIR TRANSPORT, SCHEDULED	AVIANCA HOLDINGS SA -ADR
AIR TRANSPORT, SCHEDULED	AZUL SA -ADR
AIR TRANSPORT, SCHEDULED	CHINA EASTERN AIRLINES -ADR
AIR TRANSPORT, SCHEDULED	CHINA SOUTHN AIRLS LTD -ADR
AIR TRANSPORT, SCHEDULED	CHORUS AVIATION INC
AIR TRANSPORT, SCHEDULED	COPA HOLDINGS SA
AIR TRANSPORT, SCHEDULED	DELTA AIR LINES INC
AIR TRANSPORT, SCHEDULED	DEUTSCHE LUFTHANSA AG -ADR
AIR TRANSPORT, SCHEDULED	EXCHANGE INCOME CORP
AIR TRANSPORT, SCHEDULED	GOL LINHAS AEREAS INTEL -ADR
AIR TRANSPORT, SCHEDULED	GREAT LAKES AVIATION LTD
AIR TRANSPORT, SCHEDULED	HAWAIIAN HOLDINGS INC
AIR TRANSPORT, SCHEDULED	INTL CONSOL AIRLINES GP -ADR
AIR TRANSPORT, SCHEDULED	JETBLUE AIRWAYS CORP
AIR TRANSPORT, SCHEDULED	LATAM AIRLINES GROUP SA -ADR
AIR TRANSPORT, SCHEDULED	PINNACLE AIRLINES CORP
AIR TRANSPORT, SCHEDULED	REPUBLIC AIRWAYS HLDGS INC
AIR TRANSPORT, SCHEDULED	RYANAIR HOLDINGS PLC -ADR
AIR TRANSPORT, SCHEDULED	SKYWEST INC

Category	Name
AIR TRANSPORT, SCHEDULED	SOUTHWEST AIRLINES
AIR TRANSPORT, SCHEDULED	SOUTHWEST AIRLINES-PROFORMA
AIR TRANSPORT, SCHEDULED	SPIRIT AIRLINES INC
AIR TRANSPORT, SCHEDULED	TAM SA -ADR
AIR TRANSPORT, SCHEDULED	UNITED AIRLINES INC
AIR TRANSPORT, SCHEDULED	UNITED AIRLINES INC -OLD
AIR TRANSPORT, SCHEDULED	UNITED CONTINENTAL HLDGS INC
AIR TRANSPORT, SCHEDULED	US AIRWAYS GROUP INC
AIR TRANSPORT, SCHEDULED	WESTJET AIRLINES LTD
AIR TRANSPORT, SCHEDULED Count	35
HAZARDOUS WASTE MANAGEMENT	AVALON HOLDINGS CORP
HAZARDOUS WASTE MANAGEMENT	CHINA INDL WASTE MANAGEMENT
HAZARDOUS WASTE MANAGEMENT	CLEAN HARBORS INC
HAZARDOUS WASTE MANAGEMENT	HERITAGE-CRYSTAL CLEAN INC
HAZARDOUS WASTE MANAGEMENT	MARSULEX INC
HAZARDOUS WASTE MANAGEMENT	PERMA-FIX ENVIRONMENTAL SVCS
HAZARDOUS WASTE MANAGEMENT	US ECOLOGY INC
HAZARDOUS WASTE MANAGEMENT	7
NATURAL GAS DISTRIBUTION	ALABAMA GAS CORP
NATURAL GAS DISTRIBUTION	ATMOS ENERGY CORP
NATURAL GAS DISTRIBUTION	CHANGFENG ENERGY INC
NATURAL GAS DISTRIBUTION	CHENIERE ENERGY PTNRS LP LLC
NATURAL GAS DISTRIBUTION	ENBRIDGE GAS DISTRIBUTION
NATURAL GAS DISTRIBUTION	ENBRIDGE INC
NATURAL GAS DISTRIBUTION	ENERGEN CORP
NATURAL GAS DISTRIBUTION	FORTISBC HOLDINGS INC
NATURAL GAS DISTRIBUTION	GAS NATURAL INC
NATURAL GAS DISTRIBUTION	LACLEDE GAS CO
NATURAL GAS DISTRIBUTION	METROGAS SA -ADR
NATURAL GAS DISTRIBUTION	MICHIGAN CONSOLIDATED GAS CO
NATURAL GAS DISTRIBUTION	NATIONAL FUEL GAS CO
NATURAL GAS DISTRIBUTION	NEW JERSEY RESOURCES CORP
NATURAL GAS DISTRIBUTION	NICOR INC
NATURAL GAS DISTRIBUTION	NORTH SHORE GAS CO
NATURAL GAS DISTRIBUTION	NORTHERN ILLINOIS GAS
NATURAL GAS DISTRIBUTION	NORTHWEST NATURAL GAS CO
NATURAL GAS DISTRIBUTION	ONE GAS INC
NATURAL GAS DISTRIBUTION	PACIFIC ENTERPRISES INC
NATURAL GAS DISTRIBUTION	PEOPLES GAS LIGHT & COKE CO
NATURAL GAS DISTRIBUTION	PIEDMONT NATURAL GAS CO
NATURAL GAS DISTRIBUTION	PUBLIC SERVICE CO OF N C
NATURAL GAS DISTRIBUTION	QUESTAR GAS CO
NATURAL GAS DISTRIBUTION	RGC RESOURCES INC
NATURAL GAS DISTRIBUTION	SOUTH JERSEY INDUSTRIES INC
NATURAL GAS DISTRIBUTION	SOUTHERN CALIFORNIA GAS CO

Category	Name
NATURAL GAS DISTRIBUTION	SOUTHERN CO GAS
NATURAL GAS DISTRIBUTION	SOUTHERN UNION CO
NATURAL GAS DISTRIBUTION	SPIRE INC
NATURAL GAS DISTRIBUTION	WASHINGTON GAS LIGHT CO
NATURAL GAS DISTRIBUTION	WGL HOLDINGS INC
NATURAL GAS DISTRIBUTION Count	32
NATURAL GAS TRANSMIS & DISTR	CENTERPOINT ENERGY RES CORP
NATURAL GAS TRANSMIS & DISTR	CHESAPEAKE UTILITIES CORP
NATURAL GAS TRANSMIS & DISTR	CHINA NATURAL GAS INC
NATURAL GAS TRANSMIS & DISTR	COLORADO INTERSTATE GAS CO
NATURAL GAS TRANSMIS & DISTR	CORNING NATURAL GAS HLDG CP
NATURAL GAS TRANSMIS & DISTR	DELTA NATURAL GAS CO INC
NATURAL GAS TRANSMIS & DISTR	DOMINION GAS HOLDINGS LLC
NATURAL GAS TRANSMIS & DISTR	ENLINK MIDSTREAM PARTNERS LP
NATURAL GAS TRANSMIS & DISTR	EQT CORP
NATURAL GAS TRANSMIS & DISTR	KINDER MORGAN INC
NATURAL GAS TRANSMIS & DISTR	KINDER MORGAN INC -PROFORMA
NATURAL GAS TRANSMIS & DISTR	ONEOK INC
NATURAL GAS TRANSMIS & DISTR	PACIFIC NORTHERN GAS LTD
NATURAL GAS TRANSMIS & DISTR	QUESTAR CORP
NATURAL GAS TRANSMIS & DISTR	SOUTH JERSEY GAS CO
NATURAL GAS TRANSMIS & DISTR	SOUTHERN NATURAL GAS CO
NATURAL GAS TRANSMIS & DISTR	SOUTHWEST GAS HOLDINGS INC
NATURAL GAS TRANSMIS & DISTR	SOUTHWESTERN ENERGY CO
NATURAL GAS TRANSMIS & DISTR	SPECTRA ENERGY CORP
NATURAL GAS TRANSMIS & DISTR	TARGA RESOURCES CORP
NATURAL GAS TRANSMIS & DISTR	UNION GAS LTD
NATURAL GAS TRANSMIS & DISTR	VALENER INC
NATURAL GAS TRANSMIS & DISTR	VECTREN CORP
NATURAL GAS TRANSMIS & DISTR Co	23
NATURAL GAS TRANSMISSION	AMERICAN MIDSTREAM PRTNRS LP
NATURAL GAS TRANSMISSION	ANTERO RES MIDSTRM MGMT
NATURAL GAS TRANSMISSION	ATLAS PIPELINE PARTNER LP
NATURAL GAS TRANSMISSION	AZURE MIDSTREAM PARTNERS LP
NATURAL GAS TRANSMISSION	BG GROUP PLC -ADR
NATURAL GAS TRANSMISSION	BOARDWALK PIPELINE PRTNRS-LP
NATURAL GAS TRANSMISSION	COLUMBIA PIPELINE GROUP INC
NATURAL GAS TRANSMISSION	COLUMBIA PIPELINE PRTNRS LP
NATURAL GAS TRANSMISSION	CONE MIDSTREAM PARTNERS LP
NATURAL GAS TRANSMISSION	COPANO ENERGY LLC
NATURAL GAS TRANSMISSION	CRESTWOOD MIDSTREAM PTNRS LP
NATURAL GAS TRANSMISSION	DOMINION ENRG MIDSTRM PRT LP
NATURAL GAS TRANSMISSION	DUNCAN ENERGY PARTNERS LP
NATURAL GAS TRANSMISSION	EL PASO CORP
NATURAL GAS TRANSMISSION	EL PASO NATURAL GAS CO

Category	Name
NATURAL GAS TRANSMISSION	EL PASO PIPELINE PARTNERS LP
NATURAL GAS TRANSMISSION	ENABLE MIDSTREAM PARTNERS LP
NATURAL GAS TRANSMISSION	ENERGY TRANSFER EQUITY LP
NATURAL GAS TRANSMISSION	ENERGY TRANSFER PARTNERS -LP
NATURAL GAS TRANSMISSION	ENLINK MIDSTREAM LLC
NATURAL GAS TRANSMISSION	EQT GP HOLDINGS LP
NATURAL GAS TRANSMISSION	EQT MIDSTREAM PARTNERS LP
NATURAL GAS TRANSMISSION	INERGY MIDSTREAM -LP
NATURAL GAS TRANSMISSION	KINDER MORGAN ENERGY -LP
NATURAL GAS TRANSMISSION	MIDCOAST ENERGY PARTNERS LP
NATURAL GAS TRANSMISSION	NISKA GAS STORAGE PARTNERS
NATURAL GAS TRANSMISSION	NORTHWEST PIPELINE CORP
NATURAL GAS TRANSMISSION	ONEOK PARTNERS -LP
NATURAL GAS TRANSMISSION	PAA NATURAL GAS STORAGE LP
NATURAL GAS TRANSMISSION	PANHANDLE EASTERN PIPE LINE
NATURAL GAS TRANSMISSION	PENNTEX MIDSTREAM PRTNRS LP
NATURAL GAS TRANSMISSION	QEP MIDSTREAM PARTNERS LP
NATURAL GAS TRANSMISSION	QUESTAR PIPELINE CO
NATURAL GAS TRANSMISSION	SOUTHCROSS ENERGY PRTNRS LP
NATURAL GAS TRANSMISSION	SOUTHERN STAR CENTRAL CORP
NATURAL GAS TRANSMISSION	SPECTRA ENERGY PARTNERS LP
NATURAL GAS TRANSMISSION	TALLGRASS ENERGY GROUP LP
NATURAL GAS TRANSMISSION	TALLGRASS ENERGY PRT LP
NATURAL GAS TRANSMISSION	TARGA RESOURCES PARTNERS LP
NATURAL GAS TRANSMISSION	TRANSCANADA CORP
NATURAL GAS TRANSMISSION	TRANSCONTINENTAL GAS PIPE LN
NATURAL GAS TRANSMISSION	TRANSPORTDRA GAS SUR -ADR B
NATURAL GAS TRANSMISSION	WESTERN GAS EQUITY PRTNRS LP
NATURAL GAS TRANSMISSION	WILLIAMS COS INC
NATURAL GAS TRANSMISSION Count	44
PIPE LINES, EX NATURAL GAS	ANDEAVOR LOGISTICS LP
PIPE LINES, EX NATURAL GAS	BUCKEYE PARTNERS LP
PIPE LINES, EX NATURAL GAS	ENBRIDGE ENERGY PRTNRS -LP
PIPE LINES, EX NATURAL GAS	GREEN PLAINS PARTNERS LP
PIPE LINES, EX NATURAL GAS	HOLLY ENERGY PARTNERS LP
PIPE LINES, EX NATURAL GAS	INTER PIPELINE LTD
PIPE LINES, EX NATURAL GAS	KINDER MORGAN CANADA LIMITED
PIPE LINES, EX NATURAL GAS	MAGELLAN MIDSTREAM PRTNRS LP
PIPE LINES, EX NATURAL GAS	MPLX LP
PIPE LINES, EX NATURAL GAS	NOBLE MIDSTREAM PARTNERS LP
PIPE LINES, EX NATURAL GAS	PBF LOGISTICS LP
PIPE LINES, EX NATURAL GAS	PEMBINA PIPELINE CORP
PIPE LINES, EX NATURAL GAS	PHILLIPS 66 PARTNERS LP
PIPE LINES, EX NATURAL GAS	SANCHEZ MIDSTREAM PARTNRS LP
PIPE LINES, EX NATURAL GAS	SHELL MIDSTREAM PARTNERS LP

Category	Name
PIPE LINES, EX NATURAL GAS	SUNOCO LOGISTICS PARTNERS LP
PIPE LINES, EX NATURAL GAS	TRANSMONTAIGNE PARTNERS LP
PIPE LINES, EX NATURAL GAS	USD PARTNERS LP
PIPE LINES, EX NATURAL GAS	VALERO ENERGY PARTNERS LP
PIPE LINES, EX NATURAL GAS Count	19
REFUSE SYSTEMS	ADVANCED DISPOSAL SERVICES
REFUSE SYSTEMS	CASELLA WASTE SYS INC -CL A
REFUSE SYSTEMS	PRECICION TRIM INC
REFUSE SYSTEMS	PROGRESSIVE WASTE SOLUTIONS
REFUSE SYSTEMS	REPUBLIC SERVICES INC
REFUSE SYSTEMS	TEXCOM INC
REFUSE SYSTEMS	WASTE CONNECTIONS INC
REFUSE SYSTEMS	WASTE MANAGEMENT INC
REFUSE SYSTEMS	WCA WASTE CORP
REFUSE SYSTEMS Count	9
SANITARY SERVICES	ALEXCO RESOURCE CORP
SANITARY SERVICES	COVANTA HOLDING CORP
SANITARY SERVICES Count	2
TRANSIT & PASSENGER TRANS	MTR CORP LTD -ADR
TRANSIT & PASSENGER TRANS	STUDENT TRANSPORTATION INC
TRANSIT & PASSENGER TRANS Count	2
TRUCKING, EXCEPT LOCAL	CELADON GROUP INC
TRUCKING, EXCEPT LOCAL	CONTRANS GROUP INC
TRUCKING, EXCEPT LOCAL	COVENANT TRANSPORTATION GRP
TRUCKING, EXCEPT LOCAL	HEARTLAND EXPRESS INC
TRUCKING, EXCEPT LOCAL	HUNT (JB) TRANSPRT SVCS INC
TRUCKING, EXCEPT LOCAL	KNIGHT TRANSPORTATION INC
TRUCKING, EXCEPT LOCAL	MARTEN TRANSPORT LTD
TRUCKING, EXCEPT LOCAL	MULLEN GROUP LTD
TRUCKING, EXCEPT LOCAL	OLD DOMINION FREIGHT
TRUCKING, EXCEPT LOCAL	P.A.M. TRANSPORTATION SVCS
TRUCKING, EXCEPT LOCAL	PATRIOT TRANSPORTATION HLDG
TRUCKING, EXCEPT LOCAL	SAIA INC
TRUCKING, EXCEPT LOCAL	TRAILER BRIDGE INC
TRUCKING, EXCEPT LOCAL	TRIMAC TRANSPORTATION LTD
TRUCKING, EXCEPT LOCAL	USA TRUCK INC
TRUCKING, EXCEPT LOCAL	VITRAN CORP INC
TRUCKING, EXCEPT LOCAL	WERNER ENTERPRISES INC
TRUCKING, EXCEPT LOCAL Count	17
TRUCKING,COURIER SVC,EX AIR	BLUEKNIGHT ENERGY PRTNRS LP
TRUCKING,COURIER SVC,EX AIR	CON-WAY INC
TRUCKING,COURIER SVC,EX AIR	ENTREC CORP
TRUCKING,COURIER SVC,EX AIR	FORWARD AIR CORP
TRUCKING,COURIER SVC,EX AIR	PRO-TRANS VENTURES INC
TRUCKING,COURIER SVC,EX AIR	SCHNEIDER NATIONAL INC

Category	Name
TRUCKING,COURIER SVC,EX AIR	SWIFT TRANSPORTATION CO
TRUCKING,COURIER SVC,EX AIR	TFI INTERNATIONAL INC
TRUCKING,COURIER SVC,EX AIR	TITANIUM TRANSPORTATION GP
TRUCKING,COURIER SVC,EX AIR	UNITED PARCEL SERVICE INC
TRUCKING,COURIER SVC,EX AIR	ZTO EXPRESS (CAYM) INC -ADR
TRUCKING,COURIER SVC,EX AIR Coun	11
WATER SUPPLY	AMERICAN STATES WATER CO
WATER SUPPLY	AMERICAN WATER WORKS CO INC
WATER SUPPLY	AQUA AMERICA INC
WATER SUPPLY	AQUAVENTURE HOLDINGS LTD
WATER SUPPLY	ARTESIAN RESOURCES -CL A
WATER SUPPLY	CALIFORNIA WATER SERVICE GP
WATER SUPPLY	CASCAL NV
WATER SUPPLY	CONNECTICUT WATER SVC INC
WATER SUPPLY	CONSOLIDATED WATER CO INC
WATER SUPPLY	GLOBAL WATER RESOURCES INC
WATER SUPPLY	GOLDEN STATE WATER CO
WATER SUPPLY	MIDDLESEX WATER CO
WATER SUPPLY	PENNICHUCK CORP
WATER SUPPLY	SJW GROUP
WATER SUPPLY	UNITED UTILITIES GRP PLC-ADR
WATER SUPPLY	VEOLIA ENVIRONNEMENT -ADR
WATER SUPPLY	YORK WATER CO
WATER SUPPLY Count	17
Grand Count	230

Chart 1 – Line of Best Fit - All Transportation Data

Chart 1

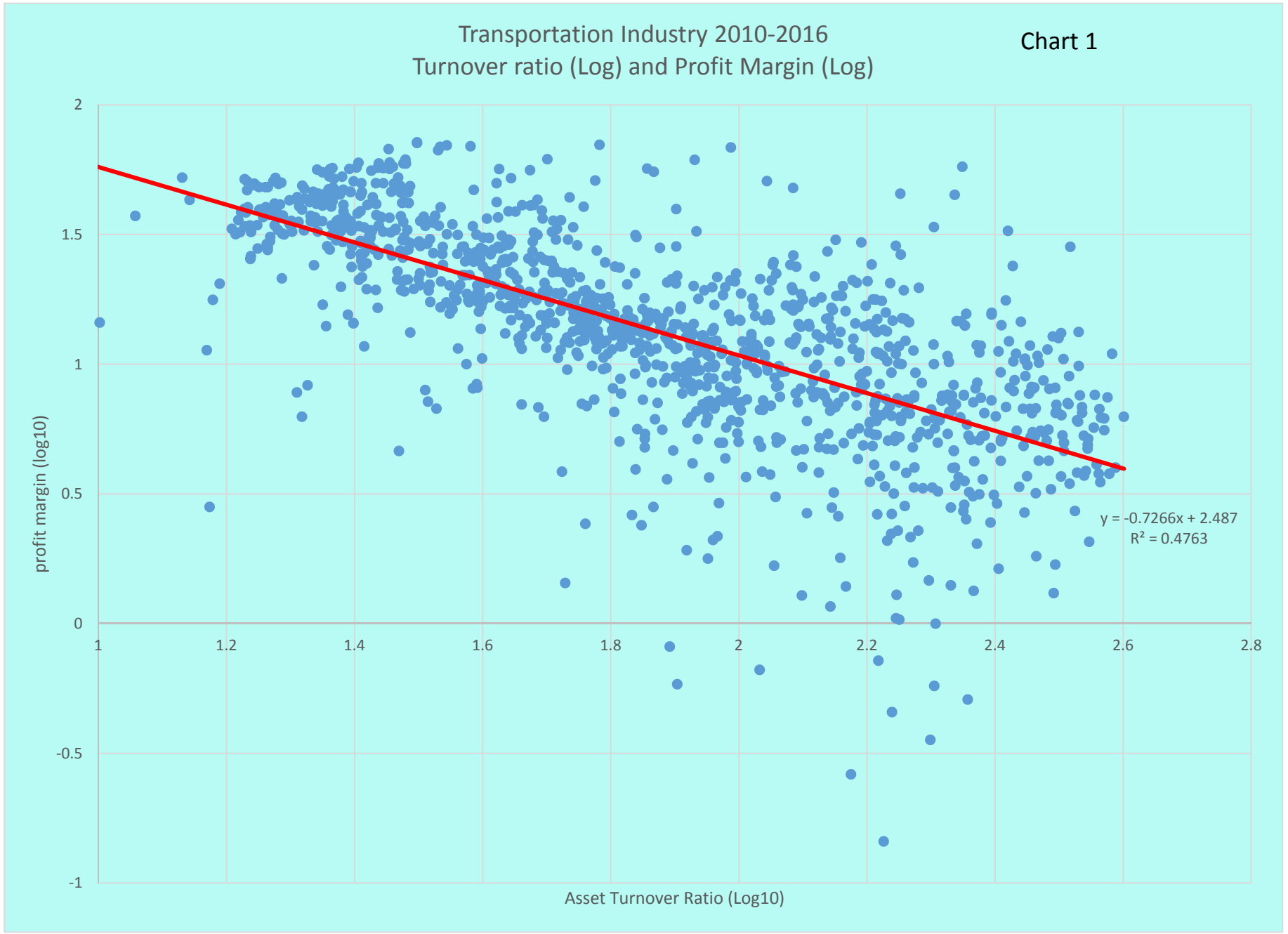
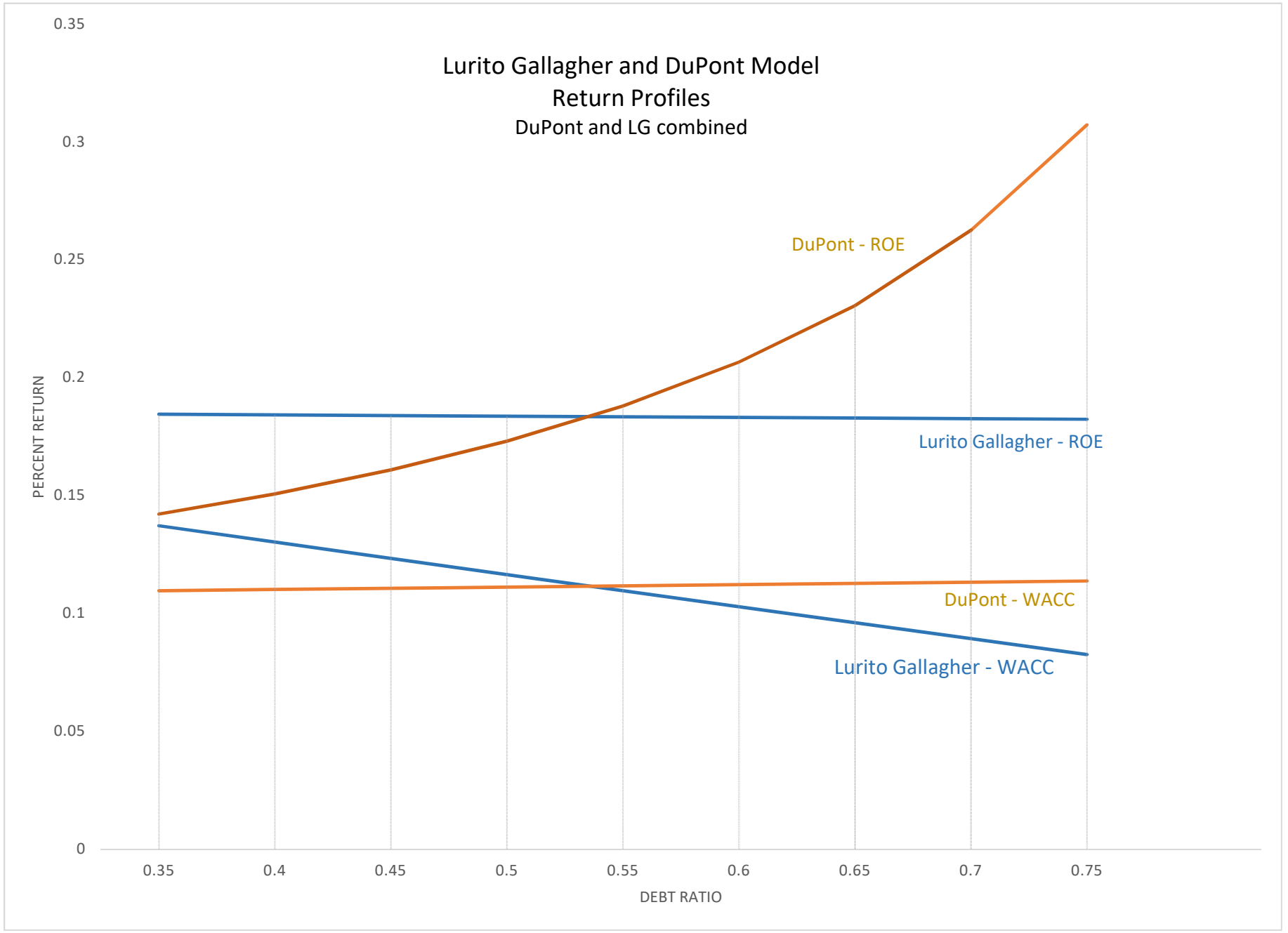
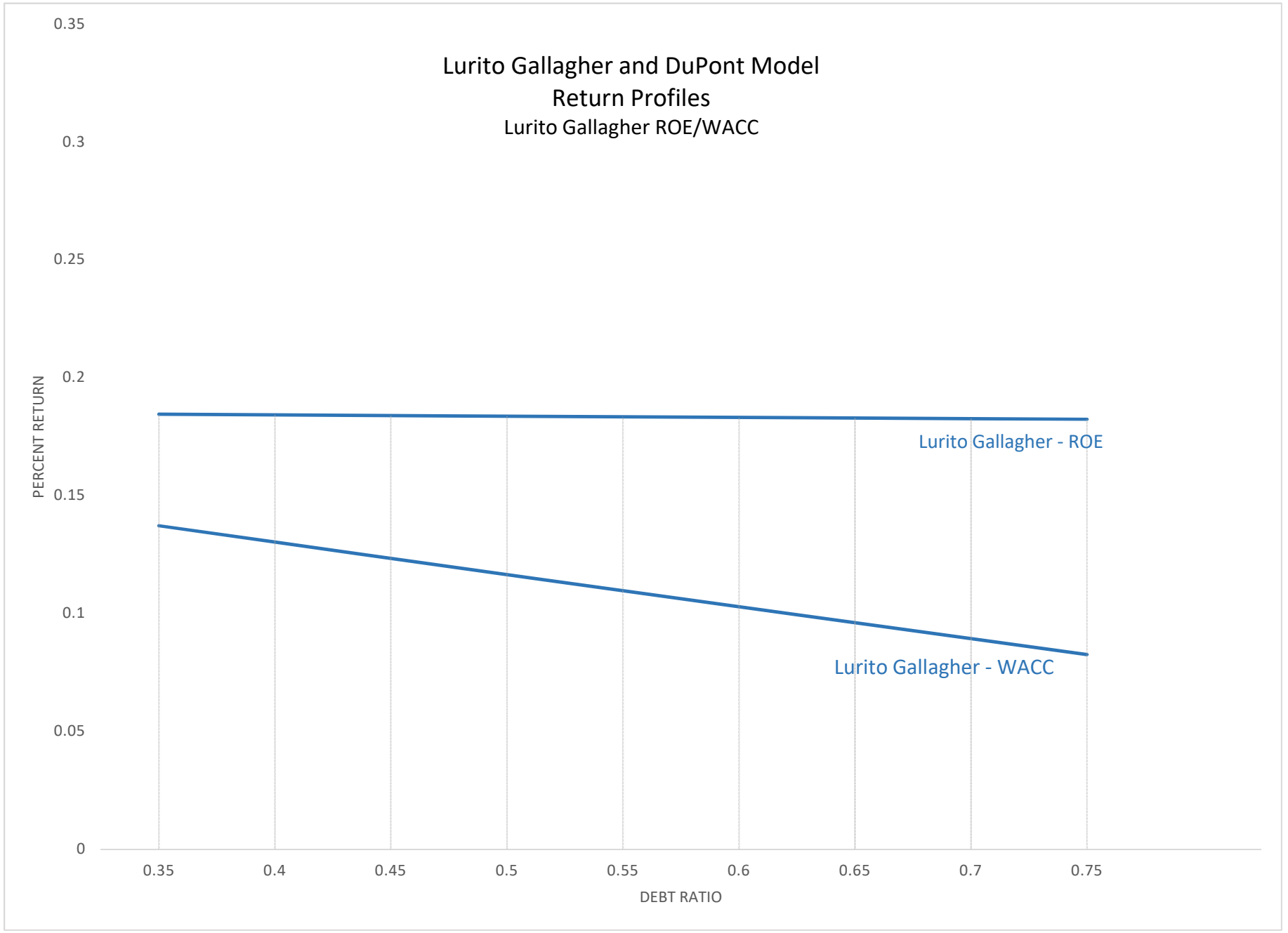

Transportation Industry 2010-2016
Turnover ratio (Log) and Profit Margin (Log)
profit margin (log10)
Asset Turnover Ratio (Log10)
2
1.5
1
0.5
0
-0.5
-1
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
y = -0.7266x + 2.487
R² = 0.4763

Chart 2 and 4 –Return Profiles


Lurito Gallagher and DuPont Model
Return Profiles
DuPont and LG combined
DuPont - ROE
Lurito Gallagher - ROE
DuPont - WACC
Lurito Gallagher - WACC
PERCENT RETURN
DEBT RATIO
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75


Lurito Gallagher and DuPont Model
Return Profiles
Lurito Gallagher ROE/WACC
PERCENT RETURN
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
DEBT RATIO
Lurito Gallagher - ROE
Lurito Gallagher - WACC

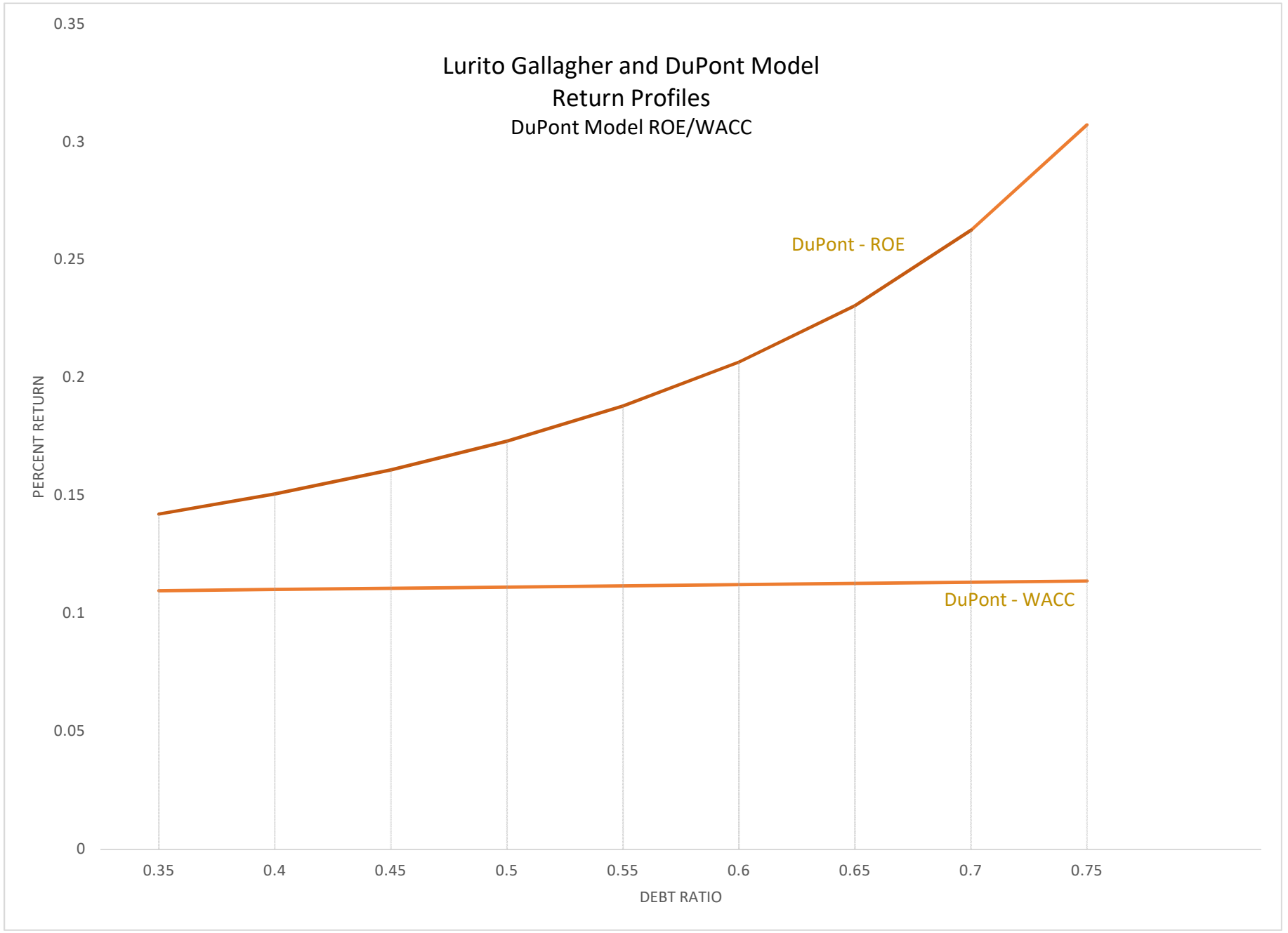

Lurito Gallagher and DuPont Model
Return Profiles
DuPont Model ROE/WACC
DuPont - ROE
DuPont - WACC
PERCENT RETURN
DEBT RATIO
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75

Chart 3 – Comparison Lurito Gallagher to DuPont ROE and Profit Margin

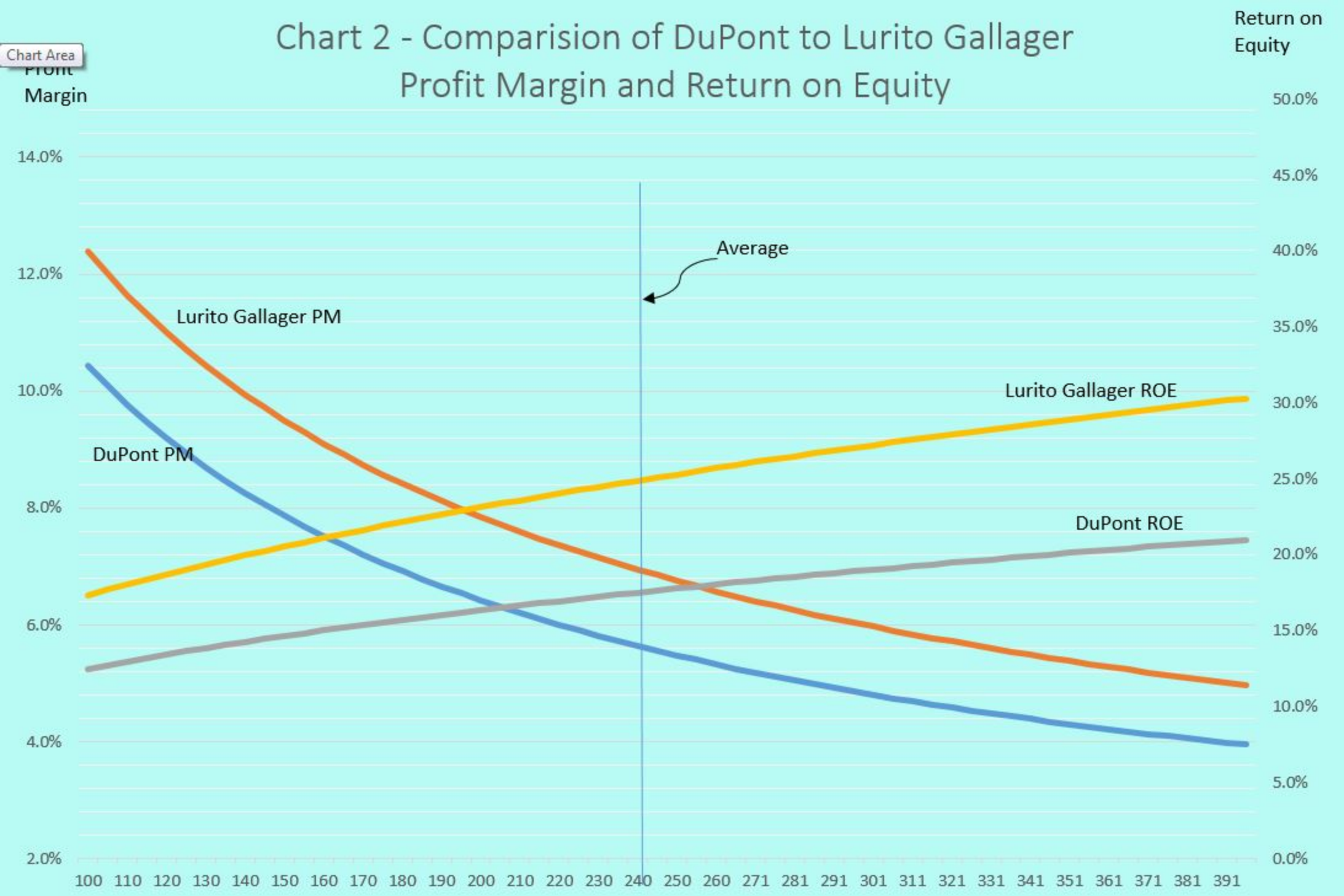


Chart 2 - Comparision of DuPont to Lurito Gallager
Profit Margin and Return on Equity
Chart Area
Profit Margin
Return on Equity
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
50.0%
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
Average
Lurito Gallager PM
DuPont PM
Lurito Gallager ROE
DuPont ROE
100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 271 281 291 301 311 321 331 341 351 361 371 381 391

Chart 5 – DuPont ROE Range using Standard Deviation

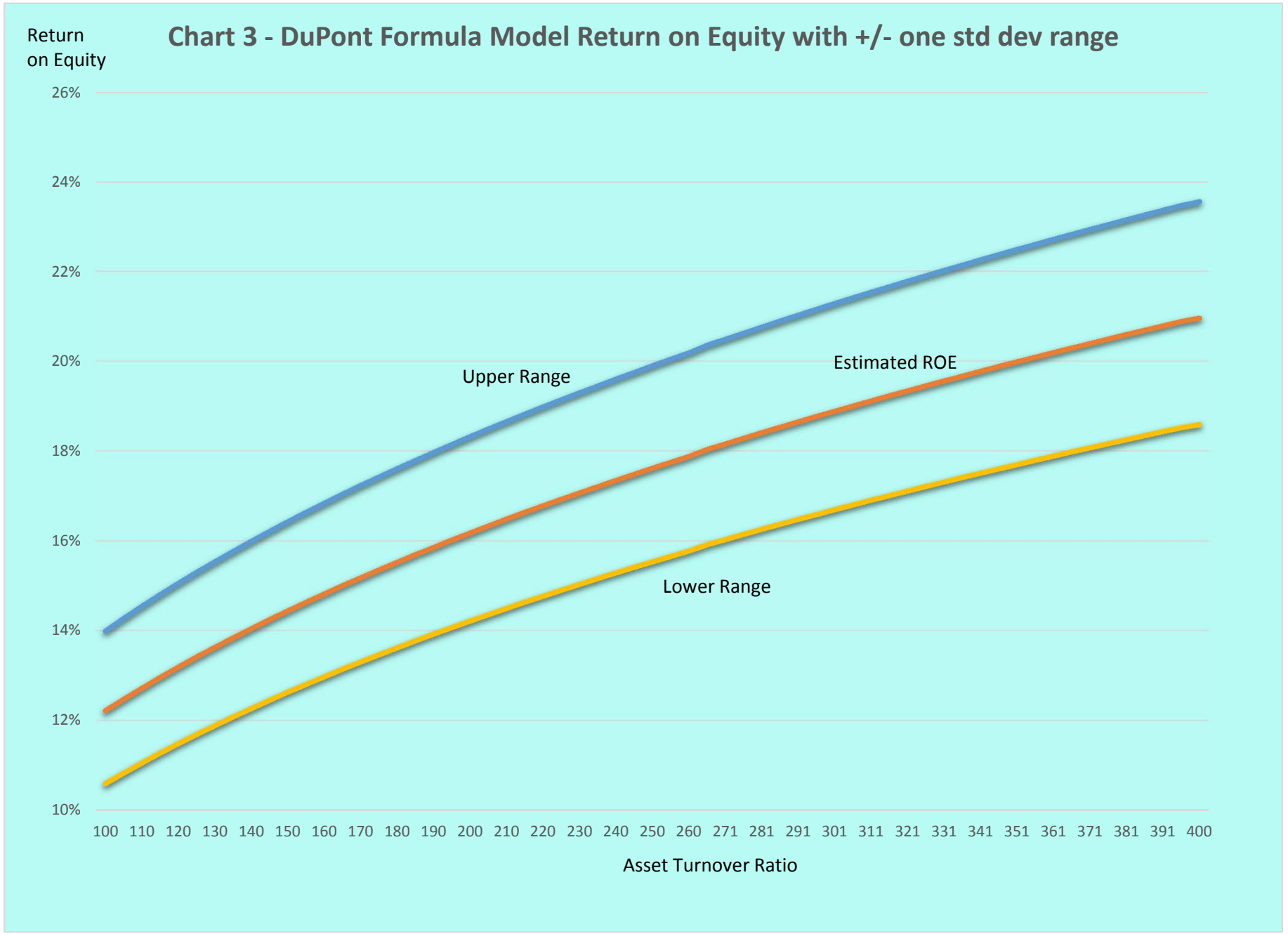


Chart 3 - DuPont Formula Model Return on Equity with +/- one std dev range
Return on Equity
26%
24%
22%
20%
18%
16%
14%
12%
10%
Upper Range
Estimated ROE
Lower Range
100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 271 281 291 301 311 321 331 341 351 361 371 381 391 400
Asset Turnover Ratio