axiomatic Data

Pension Contributions and Corporate Financial Performance:

Signals from Form 5500 Data

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Key Findings:

- Statistically significant correlations were found between contributions to defined contribution pension plans and corporate financial performance for Russell 3000 companies.
- Employer contributions were found to be more correlated with financial performance than participant contributions, consistent with findings from a research paper by T. Rowe Price[1].
- Companies with higher contributions per employee were found to be more likely to have higher revenue and EBITDA per employee, accounting for company size, age, and industry.
- Above findings were found to hold for all industry sectors, except Professional, Scientific and Technical Services[2], which has little correlation between EBITDA and pension contributions per employee[3].

Introduction:

Axiomatic Data aggregates plan level Form 5500 filings and creates a consistent, high quality, point-in-time database of company level benefits information. Form 5500 Filings are a disclosure tool used to satisfy annual reporting requirements by public and private companies in the U.S. for employee benefit plans under ERISA and the Internal Revenue Code. These employee benefit plans cover both pension and welfare plan benefits. This whitepaper examines the correlation between contributions to defined contribution pension plans for the Russell 3000 universe in the Axiomatic database and 2018 fiscal year revenue and EBITDA performance of those companies.

Pension Plan Contributions:

Companies can sponsor defined benefit pension plans, defined contribution pension plans, or both. A defined benefit pension plan provides a specified payment amount in retirement while a defined contribution pension plan allows employees and employers to contribute and invest funds over time to save for retirement. As the risk is on employers in a defined benefit pension plan, over time most companies have shifted to only offering defined contribution pension plans. Thus, this study only looks at contributions to defined contribution pension plans.

A defined contribution (DC) pension plan is a retirement plan in which employees contribute either a fixed amount of their pay or percentage of their pay toward an account which is intended to fund their

[1] (https://www.troweprice.com/content/dam/retirement-plan-services/pdfs/insights/Valueof401k-White-Paper.pdf)

[2] Industry Sector is defined by sector identified on company's most recent Form 5500 filing.

[3] This is possibly driven by the industry subsector Other Professional, Scientific, and Technical Services which contains many biotech companies.

retirement. The company may match some portion of the employee contribution as an additional benefit. An example of a match formula would be an employer matching 50% of employee contributions up to a cap of 6% of compensation. Employer matching contributions can be either discretionary or non-discretionary. When employer matching contribution is discretionary, the formula can be changed annually. Additionally, employers can set up their pension plan to make non-elective (profit sharing) contributions regardless of whether the employee has made any contributions themselves.

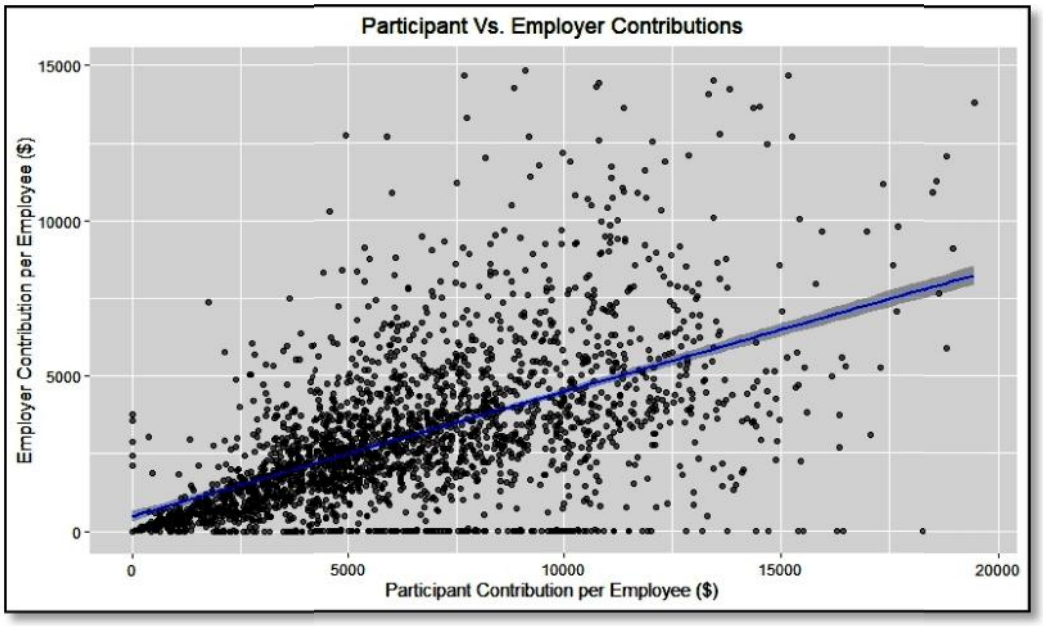

Figure 1

Comparing per employee participant contributions vs. employer contributions in Figure 1 above, we see a strong correlation between participant and employer contributions. On examining the Russell 3000 companies, we found that employer contributions and participant contributions per employee are significantly correlated with a correlation coefficient of 0.58. This makes sense considering the fact that employers generally contribute to these defined contribution plans, based on a percentage of employee contributions.

Correlation with Revenue:

We now examine the relationship between employer and participant contributions with revenue per employee. Examining Figure 2 below, we see that both employer and participant contributions per employee are correlated with revenue per employee. Employer contributions per employee has a correlation coefficient of .36 while participant contributions have a correlation coefficient of .29. From a high-level view, we observe that participant contributions and employer contributions are both correlated with revenue per employee, and employer contributions are more strongly correlated.

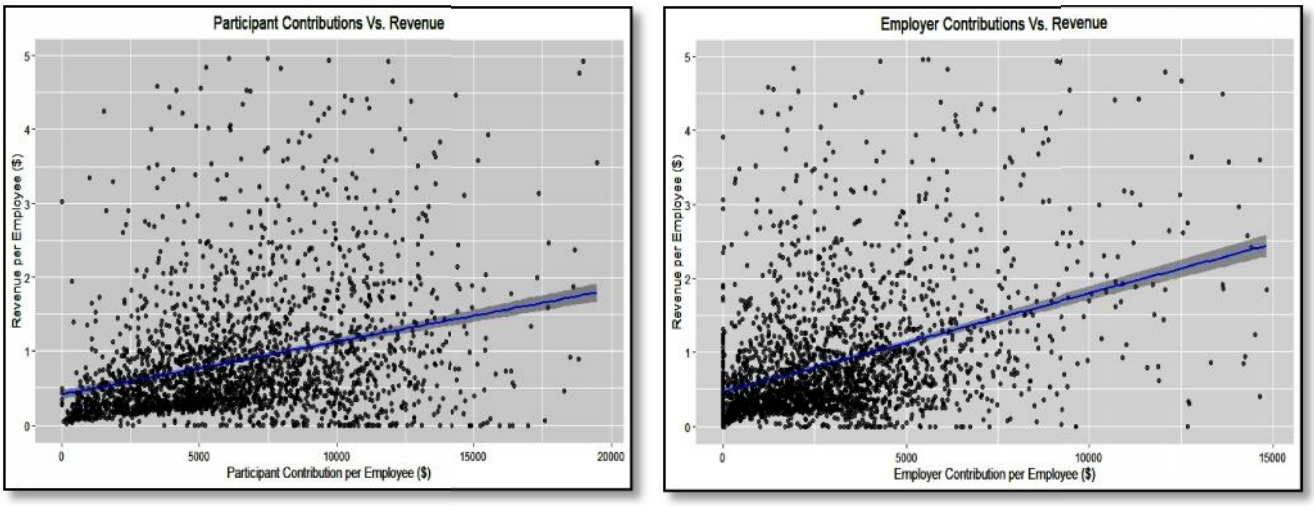

Figure 2

While contributions are found to be significantly correlated with revenue per employee, we want to control for other variables that might have an impact on the above relationship. Figure 3 below demonstrates the impact of industry sector on the relationship between employer contributions per employee and revenue per employee. Plotted are median values of employer contributions per employee compared to revenue per employee. The point in the bottom left corner represents the industry sector "Accommodation and Food Services". As this sector is labor intensive and employees in this industry sector do not earn high wages, it therefore makes sense that employer contributions are low. Table 3 in the appendix shows values of participant and employer contributions by industry sector along with revenue and EBITDA per employee.

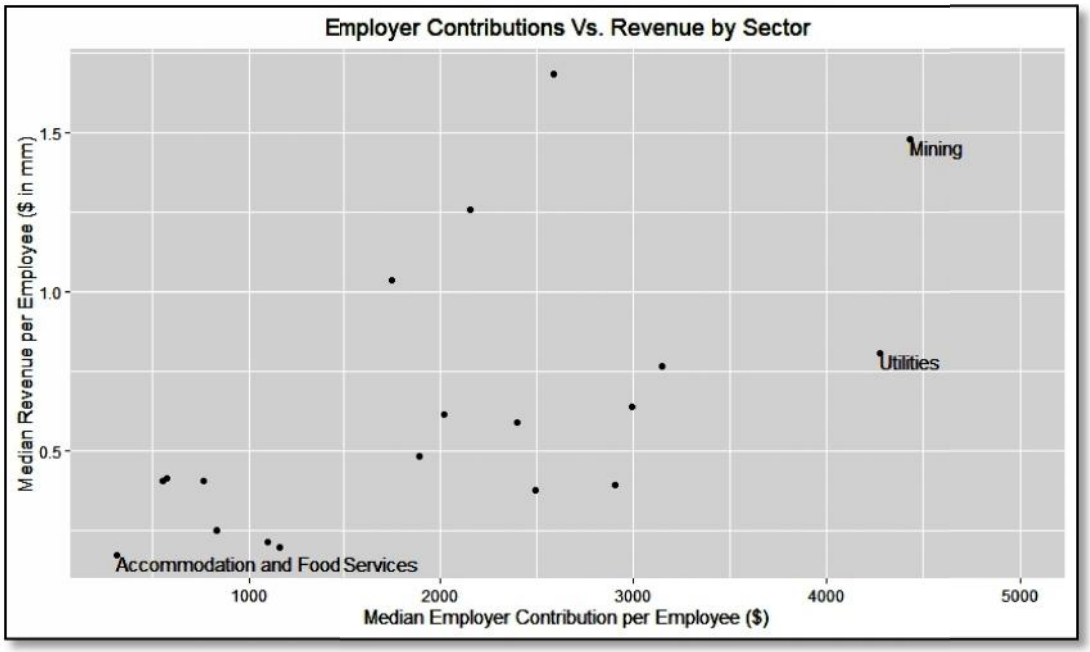

Figure3

To further understand the correlation between company and employee contributions to pension plans and revenue per employee, we performed regression analysis to isolate the impact of employer and employee contributions. Regression results indicated that regardless of industry sector, number of employees, and age of the company, employer and participant contributions per employee are positively correlated with higher revenue per employee. Furthermore, employer contributions per employee have a larger impact on revenue per employee than participant contributions. Number of employees did not enter as a statistically significant variable in the model.

```
Coefficients:
                                                Estimate Std. Error t value Pr(>|t|)
(Intercept)                                    5.332e-01  9.901e-02   5.385 7.90e-08 ***
Various Industry Impacts
cl_pens_dfn_contrib_emplr_contrib_per_act_partcp  1.150e-04  1.768e-05   6.506 9.26e-11 ***
cl_age_old_plan                               -4.571e-03  1.033e-03  -4.423 1.01e-05 ***
cl_pens_dfn_contrib_partcp_contrib_per_act_partcp  7.465e-05  1.023e-05   7.293 4.02e-13 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.027 on 2546 degrees of freedom
Multiple R-squared:  0.3937,    Adjusted R-squared:  0.3818
F-statistic: 33.07 on 50 and 2546 DF,  p-value: < 2.2e-16
```

Table 1

Correlation with EBITDA:

Additionally, we examined whether there is correlation between participant and employer contributions per employee with EBITDA per employee. Employer contributions per employee has a correlation coefficient of .20 with EBITDA while participant contributions have a correlation coefficient of .03. Examining Figure 4 below, we see how employer contributions per employee is positively correlated with revenue per employee.

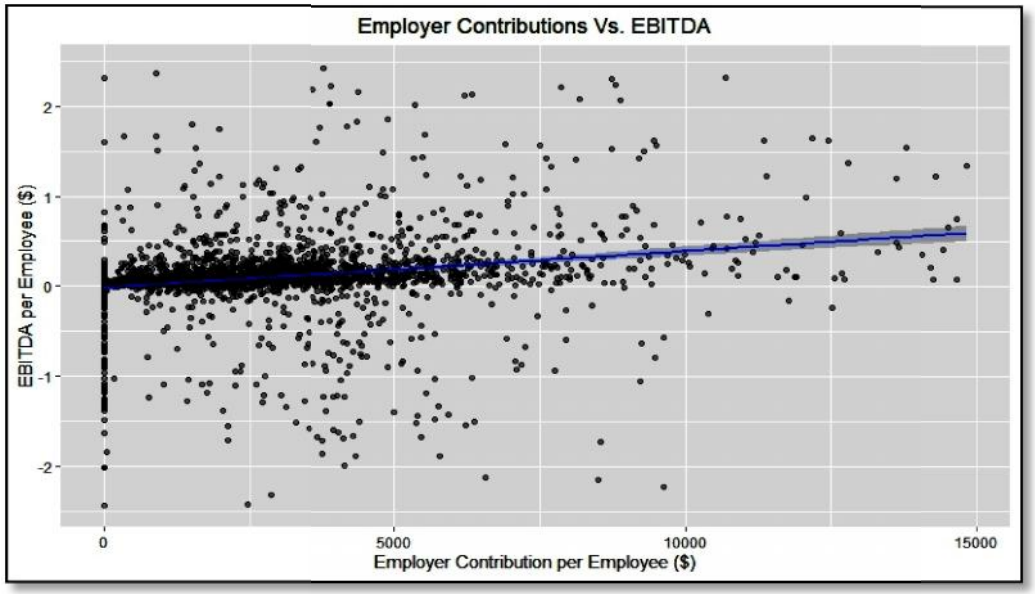

Figure 4

Figure 5 below illustrates the impact of industry sector on the relationship between employer contributions per employee and EBITDA per employee. Plotted are median values of employer contributions per employee compared to EBITDA per employee. The outlier point with roughly $600k in EBITDA per employee is from the Real Estate industry sector. This is caused by the high number of Real Estate Investment Trusts (REITs) which have a lower number of employees in the managing REIT itself. Table 1 in the appendix shows values of participant and employer contributions along with revenue and EBITDA per employee.

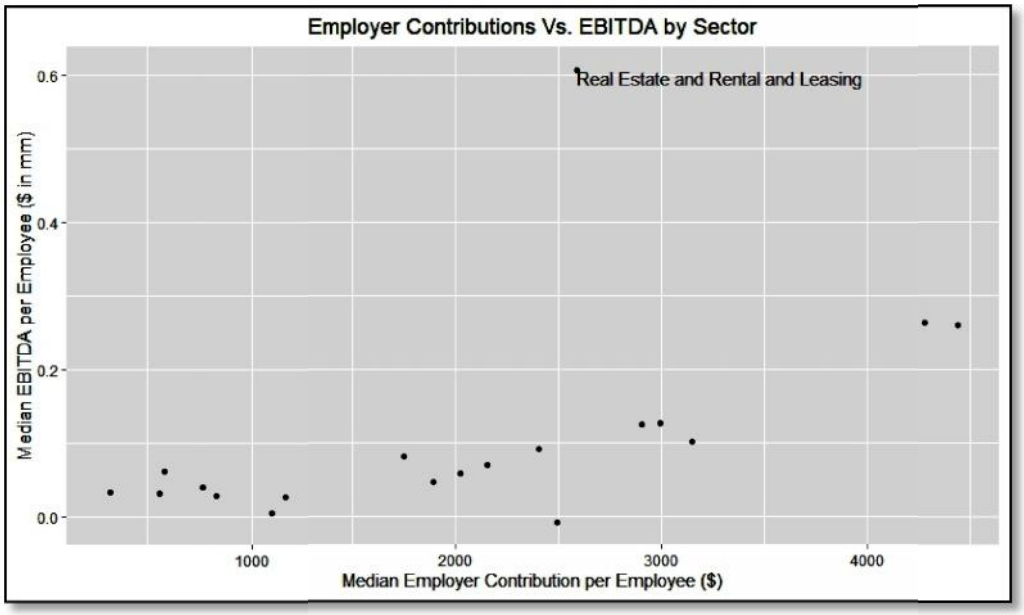

Figure 5

We performed regression analysis to isolate the impact of employer contributions. Regression results indicated that employer contributions per employee are positively correlated with higher EBITDA per employee. Unlike the regression model for revenue, company age and participant contributions per employee were not statistically significant variables. Table 2 below shows results of the final regression model.

```
Coefficients:
                                            Estimate Std. Error t value Pr(>|t|)
(Intercept)                                2.832e-02  1.353e-02   2.093 0.036463 *
Various industry impacts
cl_pens_dfn_contrib_emplr_contrib_per_act_partcp  3.688e-05  3.108e-06  11.864  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.3654 on 2461 degrees of freedom
Multiple R-squared:  0.3741,    Adjusted R-squared:  0.3662
F-statistic: 47.44 on 31 and 2461 DF,  p-value: < 2.2e-16
```

Table 2

Contrary to what is seen with revenue per employee, the relationship between EBITDA per employee and employer contributions does not hold up for all industry sectors. One such exception is the Professional, Scientific, and Technical Services industry sector. The two main subsectors within that sector are Computer Systems Design and Related Services and Other Professional, Scientific, and Technical Services. The subsector Other Professional, Scientific, and Technical Services contains many biotech companies. Figure 7 below plots employer contributions per employee vs. EBITDA per employee for these two industry subsectors.

We see that for the subsector Other Professional, Scientific, and Technical Services, many companies do not make pension plan employer contributions, and many of these companies have negative EBITDA. This is likely due to the sector containing many biotechnology companies. Small biotechnology companies often spend millions of dollars on research to come up with promising products which they patent, but then must wait years for FDA approval to monetize their research. In the meantime, they continue to have research and development expenses and report large losses. We suspect these biotechnology companies contribute to pension plans in order to attract talent in a competitive industry. On the other hand, for the subsector Computer Systems Design and Related Services, we notice a positive relationship between EBITDA and employer contributions.

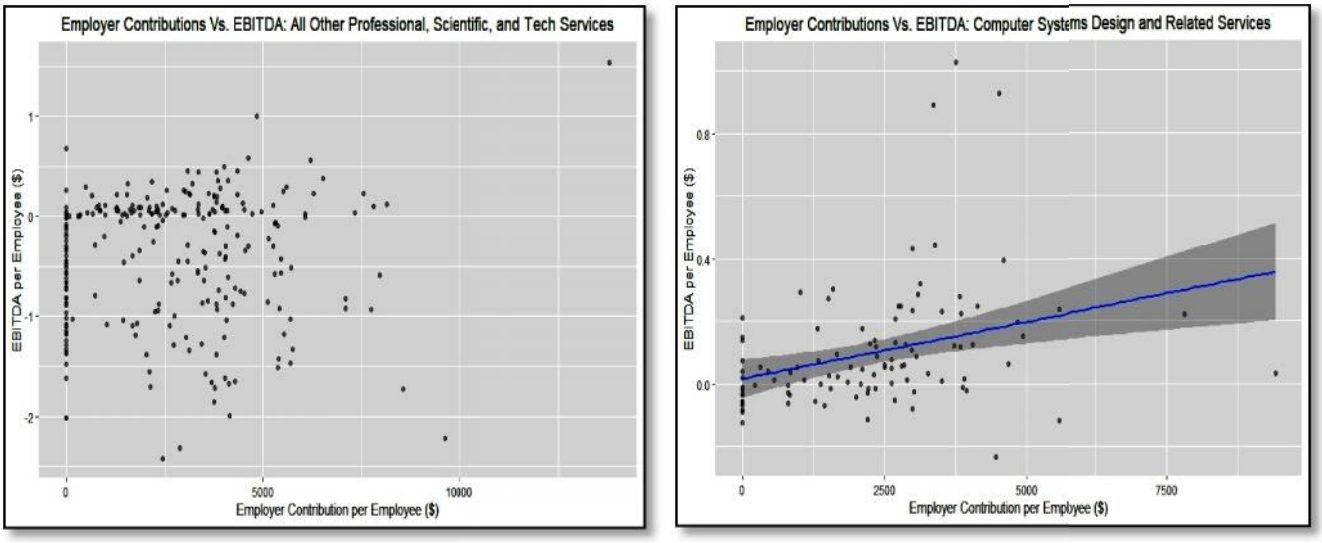

Figure 6

Summary:

Examining the Russell 3000 companies in the Axiomatic database, this study analyzed the relationship between contributions to defined contribution pension plans and corporate financial performance. Controlling for factors such as company size, industry, and age, we observed positive correlation between both employer and participant contributions as well as both revenue and EBITDA per employee. We observed a positive correlation between participant contributions and revenue, but no statistically significant relationship was found between participant contributions and EBITDA.

Appendix:

Industry Sector per Employee Metrics:

Industry Sector	Participant Contributions	Employer Contributions	Revenue	EBITDA
Accommodation and Food Services	$ 1,323	$ 317	$ 175,211	$ 32,904
Retail Trade	$ 1,566	$ 554	$ 405,186	$ 31,163
Arts, Entertainment, and Recreation	$ 1,365	$ 579	$ 415,390	$ 62,343
Administrative and Support and Waste Management and Remediation Services	$ 3,066	$ 766	$ 408,566	$ 39,515
Educational Services	$ 3,054	$ 831	$ 251,269	$ 27,779
Health Care and Social Assistance	$ 4,449	$ 1,097	$ 215,707	$ 4,860
Other Services	$ 2,141	$ 1,161	$ 198,796	$ 27,535
Wholesale Trade	$ 4,163	$ 1,754	$ 1,035,820	$ 82,485
Agriculture, Forestry, Fishing and Hunting	$ 2,739	$ 1,897	$ 482,806	$ 45,968
Transportation and Warehousing	$ 4,089	$ 2,024	$ 616,800	$ 58,670
Construction	$ 5,277	$ 2,158	$ 1,258,598	$ 70,582
Information	$ 7,169	$ 2,404	$ 592,187	$ 92,234
Professional, Scientific, and Technical Services	$ 8,590	$ 2,498	$ 378,625	$ (7,450)
Real Estate and Rental and Leasing	$ 6,677	$ 2,589	$ 1,686,908	$ 607,011
Finance and Insurance	$ 5,186	$ 2,905	$ 393,110	$ 125,517
Management of Companies (Holding Companies)	$ 5,593	$ 2,997	$ 639,970	$ 126,007
Manufacturing	$ 6,479	$ 3,149	$ 768,076	$ 101,636
Utilities	$ 8,419	$ 4,277	$ 807,871	$ 262,993
Mining	$ 6,813	$ 4,437	$ 1,479,538	$ 260,288

Table 3

Methodology Notes:

- This study used Fiscal Year 2018 data for Russell 3000 companies which were active as of December 1, 2018. Corporate financial data was combined with Axiomatic data from December 2018.
- The analysis ensured that there was only 1 data point for companies which had multiple tickers in the Russell 3000 (i.e. GOOGL was eliminated as GOOG was already mapped).
- Employment figure used in denominator of per employee calculations was number of active employees eligible for a defined contribution pension plan.
- Industry related indicator variables were created based on Form 5500 industry classification, which is self-selected by the companies.