Corporate Tax Rates:
Causes for Tax Rate Discrepancies at the Firm Level

Matthew G. Zanotta

Abstract

This paper examines the relationship between a corporation's tax rate and a number of different variables. The variables chosen were assets, sales, property, plant, and equipment (PPE), inventory, research and development (R&D), and return on assets (ROA). The model incorporates each of these variables to find a correlation to corporate tax rates. These specific variables were chosen to represent firm size (assets at book value), financial leverage, capital structure (PPE to assets), and inventory investment (inventory to assets). The other two variables, R&D (R&D to net sales), and profitability (ROA) were chosen because of their direct value. The results from the research highlight a few variables with strong correlations to tax rates, while others remained neutral.

Keywords: Corporate Tax, Inversion

1.0 INTRODUCTION

The motivation for this study was provided by the economic and political subject of corporate tax inversion. Due to high corporate tax rates in America, many companies have decided to go "international." Once they declare themselves a foreign company, they are responsible for that nation's tax rate, not America's. The reason "international" appears in quotation marks is because many of these companies meet minimal requirements to declare themselves foreign. Depending on how you look at it, you could either call these corporations smart, or unethical. On one hand, they are experiencing enormous profit because they pay less tax. On the other hand, however, the American government loses billions of dollars each year because of these practices.

The aim of this study eventually became an examination of what could make tax rates so harsh. Why are some companies subject to more scrutiny than others? Which variables are most closely correlated with a high tax rate, and why? These are some of the questions that stem from the overarching topic of corporate tax inversion.

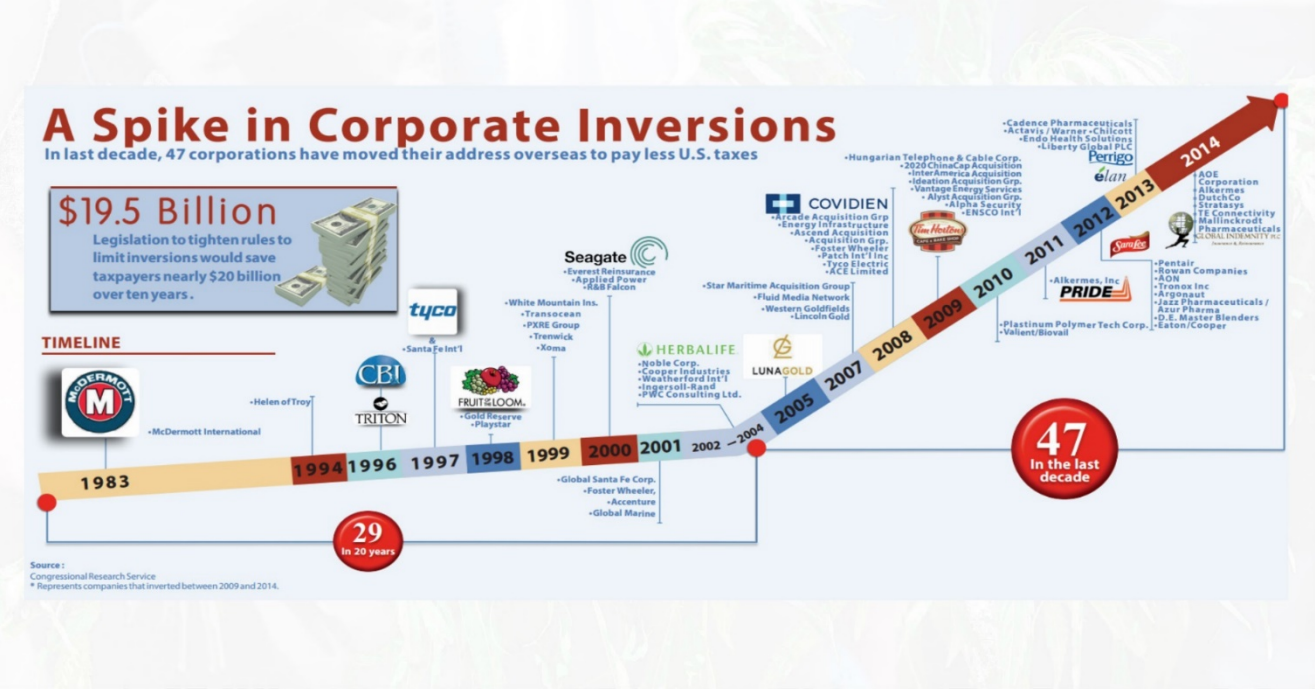
Efforts have been made by the American government to combat tax inversion. The government loses billions of dollars each year because of corporations that invert their taxes to low-tax "safe-havens." The newest actions by the American government have been aimed at making inversions harder to accomplish and less profitable. The former will reduce inversions, while the latter will deter companies from desiring to "relocate." At the head of these efforts lies the United States' Treasury Department. The Treasury is constantly taking action under different tax codes. In recent history, it seems as if corporations are finding more loopholes after each set of codes that is reformed. The advantage that the Treasury experiences is that their tax changes take effect immediately. Any deal that doesn't close by the end of the day is subject to the reform made. Most other government agencies do not experience this efficiency.

2.0 CORPORATE TAX TRENDS

There is an estimation of at least 30 new inversions to take place by the end of 2015. Treasury officials hope that new tax rules will cause companies to re-examine their costs and benefits. Any inversion deal stopped is money saved for the United States government.

Burger King, inc. is a perfect example of how it all works. After months of trying to buy out smaller foreign restaurants, the corporation kept getting blocked by the Treasury's reform laws on tax. Burger King, inc. realized they would have to spend more money to make more money. The result? An $11 billion dollar deal to take over Tim Horton's, inc. In December of 2014, the merger went through and Burger King Worldwide, inc., became a Canadian corporation operating under Restaurant Brands International.

The attempted Chiquita Brands International inc. (Charlotte, NC), and Fyffes PLC merger is a great example of the United States' Treasury Department blocking tax inversion. A merger between the two companies would have created the world's largest banana seller. The motivation to merge was brought about by potential tax savings. The safe-haven was to be in Ireland (home of Fyffes), which sees much lower tax rates than the United States. However, it was ruined by changes in U.S. tax rules.



Many pharmaceutical companies have tried to invert their taxes. New Treasury Department tax rules caused AbbVie inc. to terminate its $54 billion inversion deal with Shire PLC (Ireland).

Image courtesy of Bloomberg.com

3.0 LITERATURE REVIEW

There were many different facets of corporate tax inversion and tax rate analysis that stemmed from this study. Inversion is a growing trend among U.S. business culture so there were papers very relevant to this topic. The nation is losing so much money as a whole, while individuals profit.

Gupta and Newberry (1997) provided the foundation for tax rate analysis. Using micro-level data, they were able to produce a model that showed tax rates to be inconsistent with firm size. This was surprising because firm size is what many economists would automatically correlate with tax rates. Instead, they found that most influence is found when examining a firm's capital structure, asset mix, and performance. These variables, which include measurable such as research and development, inventory, and property, plant, and equipment were shown to have a very close relationship to a corporation's tax rate.

Graham (1996) had a similar study that focused on the best measures of corporate tax rates. His aim was more on the financial analysis of capital costs, financing policy, corporate hedging, and corporate reorganizations. Graham used a marginal tax rate to represent firms and further the financial analysis. Research by Scholes and Wolfson (1992) was used to expand the understanding of the marginal tax rate and its "ramifications." Results of the study showed that the marginal tax rate is a great tool, except for its incredibly difficult-to-calculate code. Evidence suggested that a proxy for marginal tax rate would be recommended. Thus, Gupta and Newberry (1997) would go on to use the effective tax rate, an easier variable to calculate.

Devereux (2007) took tax rates and put them into real-life use. In his study, he examined the international competition over corporate taxes. He described how this competition can cause companies to declare foreign ownership or merge to avoid higher taxes. This makes sense in a country such as the United States with an extremely large corporate tax rate. As Devereux describes it, policy makers are concerned about a "race to the bottom," in terms of the tax rates. The lower tax rate will likely receive the winning bid for a multi-billion dollar company.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 DATA

The data employed for this research came from the *FactSet* database. Panel data from 2004 to 2013 was compiled to run a regression analysis, as well as a logarithmic regression, fixed effects regression, descriptive statistics, and a correlation analysis.

4.2 EMPIRICAL METHODOLOGY

$$TR = \beta\mathbf{0} + \beta\mathbf{1}SIZE + \beta\mathbf{2}LEV + \beta\mathbf{3}CAPINT + \beta\mathbf{4}INVINT + \beta\mathbf{5}RDINT + \beta\mathbf{6}ROA$$

With this adapted model, the dependent variable is the tax rate of the firm. The dependent variables were firm size (SIZE), sales (LEV), asset mix (CAPINT, INVINT, and RDINT), and firm performance (ROA).

Firm size (SIZE) was represented by each firm's total assets. This was chosen to measure the reach each firm has. Generally, the more assets each firm owns, the larger their company is. Other options such as employee intensity may not accurately measure the size of the firm because this is not necessarily associated with the wealth or influence a firm may hold. The financial leverage of each company (LEV) was calculated dividing sales by total assets. The sales a company brings in accurately depicts their financial strength. A company with a higher sales to assets ratio generally generates more profit than a lesser company. Capital intensity was found by using each company's value of property, plant, and equipment to total assets. With this variable, we were able to conclude how much capital each firm had invested. Another piece of the asset-mix was inventory intensity. This was found by measuring inventory to total assets. The intensity of a firm's research and development was measured by the research and development expenditure to net sales.

5.0 EMPIRICAL RESULTS

As you can see in Tables 1.0 and 1.1 below, the regression analysis returned encouraging results. Four of the six independent variables returned P-values that could be used for analysis.

The only two which were unable to produce a correlation were sales and ROA. Assets, PPE, Inventory, and R&D all returned usable P-values with varying correlation coefficients.

Assets was by far the most interesting result, although the correlation was not the strongest. The P-value was a firm 0.000957, with a weak -4.6E-05 for the correlation coefficient. In this particular case, however, the negative sign is much more interesting that the depth of the coefficient. There aren't many economic analysts that would predict an increase in assets to correlate with smaller taxes. One would assume the opposite. However, American corporations are operating in unequal capacities. Speaking to business ethics, the more assets you hold, the more taxes you should be able to pay. In America, however: the more assets you hold, the more able you are to find political and economic loopholes to generate more profit. This would be an extremely interesting ethical dilemma to research. Although it was outside the scope of this particular study, the topic fits in neatly with corporate tax inversion for future empirical analysis.

A positive correlation came through property, plant, and equipment, or PPE. The P-value was 0.003415. The correlation coefficient was positive, at 0.000184. This result is much expected. The property, plant, and equipment a firm holds is continuously taxed by the government. The more PPE they use, the higher their tax rate would be. This is why many firms choose to outsource their labor and infrastructure to foreign nations that have lower costs.

Another positive correlation was found in inventory intensity. A weaker P-value at 0.080519 produced a correlation coefficient of 0.000976. So, although the correlation was not as strong as many economists would anticipate, it was indeed indicative of a higher tax rate. The more inventory a firm holds, the more they will be taxed on those products and the more space they will need to hold their inventory.

A separate regression was run using the logarithm of the tax rate, as suggested by Gupta and Newberry (1997). With this regression, an additional correlation appeared in the form of research and development. At a 0.031193 P-value and a correlation coefficient of -2.1E-05, R&D matched criteria. Although the coefficient is rather weak, the P-value is strong.

Table 1.0 Random Effects Regression

	Coefficients	*andard Err*	*t Stat*	*P-value*
Intercept	30.78594	2.588195	11.89476	1.62E-23
Assets	-4.6E-05	1.37E-05	-3.36825	0.000957
Sales	-4E-05	3.09E-05	-1.30089	0.195253
Ppe	0.000184	6.17E-05	2.974161	0.003415
Inventory	0.000976	0.000555	1.759338	0.080519
R&D	-0.00065	0.000709	-0.92053	0.358743
ROA	-0.11229	0.144102	-0.77926	0.437029

Table 1.1 LogTax Regression

	Coefficients	*andard Err*	*t Stat*	*P-value*
Intercept	1.484906	0.034823	42.64148	8.06E-87
Assets	-2.2E-07	1.85E-07	-1.21292	0.227031
Sales	7.69E-08	4.15E-07	0.18515	0.853357
PPE	1.03E-06	8.31E-07	1.237063	0.217959
Inventory	5.6E-06	7.46E-06	0.749611	0.45464
R&D	-2.1E-05	9.54E-06	-2.17464	0.031193
ROA	-0.00313	0.001939	-1.61573	0.108213

6.0 CONCLUDING REMARKS

A lot is being done to combat corporate tax inversion. Much of the weight lies on the shoulders of the U.S. Treasury department, since our President's hands are tied by battles in Congress. The Treasury is able to immediately put new tax codes into place, so they are the government's best chance at deterring inversions. Much of the support for inversions and "free markets" comes from wealthy representatives of the right wing who do what they can to make sure laws aren't passed through congress that hinder their supporters best interests. Many of these wealthy CEO's could be the reason those politicians were elected to represent in the first place, so now they return the favor by ensuring profit for their supporters. What President Obama has been trying to do for the last several years is enact a plan that would require a minimum business percentage (say 51%) to take place on foreign soil. This should be the only way those corporations are allowed to pay tax rates under those foreign nations. This policy seems like a fair and ethical one, but it has received much opposition since discussions began.

The data compiled was significant enough to draw a few conclusions from in terms of variable correlation. The only unexpected correlation came from assets, representing the size of the firm. An explanation offered would infer that bigger corporations are able to swing political power in their favor, resulting in lower tax rates. This is yet another unethical corporate tax dilemma that America faces. The United States is not operating under a free market economy, but rather the delusion of one. Large corporations own it.

Appendix A: Variable Description and Data Source

Variable	**Description**	**Data Source**
Assets	Size of the company	FactSet
Sales	Firm's Power	FactSet
PPE	Equipment	FactSet
Inventory	Invested assets	FactSet
R&D	Future investment	FactSet
ROA	Profitability relative to assets	FactSet

Appendix B: Variable Expected Sign

Variable	Expected Sign
Assets	+
Sales	+
PPE	+
Inventory	+
R&D	-
ROA	+

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