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The Effect Of Competitive Advantages On Corporate Tax Avoidance: A Determinant Or Excuse?

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THE EFFECT OF COMPETITIVE ADVANTAGES ON CORPORATE TAX AVOIDANCE:

A DETERMINANT OR EXCUSE?

A Dissertation
presented in partial fulfillment of requirements
for the degree of Doctor of Philosophy
in the Patterson School of Accountancy
The University of Mississippi

by

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ABSTRACT

Recently, managers of U.S. corporations have explained the motivation behind engaging

in extreme and public forms of tax avoidance (i.e. corporate inversions) as addressing the

inability to gain or maintain global competitive advantages (Security 2014, 1). While prior

research explores how a corporation's overall business strategy can affect tax avoidance behavior

(Higgins et al. 2015) and measures the effects of different components of competitive advantages

on tax avoidance (Kubick et al. 2015; Gao et al. 2015), how total global competitive advantages

impact tax avoidance remains an unanswered empirical question. Therefore, this study considers

the following research questions:

RQ1: How does the effective tax rate of a corporation affect the future competitive
advantages of a corporation?

RQ2: How do competitive advantages affect future tax avoidance?

To address these questions, this dissertation uses competitive effort proxies derived from

accounting data (Dickinson and Sommers 2012), to develop a composite score measuring the

corporation's total global competitive advantages and examines the impact of total global

competitive advantages on different proxies for tax avoidance. The results of several univariate

and multivariable tests indicate that while effective tax rate measurements do not appear to

inhibit the competitive advantages of corporations, corporate executives behave as if they *believe*

the tax rate hinders their ability to compete; as competitive advantages rise, so does the

likelihood that the corporation will engage in tax avoidance activities. However, a trend reversal

occurs and those corporations with the highest competitive advantages decrease tax avoidance

activities. An analysis of the corporations that invert show that they actually decrease in their

competitive advantages in the second year after the inversion, which makes them significantly

lower than their closest industry peers based on profitability. This study adds to the growing

research on the determinants of tax avoidance. It also develops a new composite measurement of

total global competitive advantages, which can be useful to future research in strategic

management. The results of these analyses should also be of interest to legislators. Corporations

continually call for legislation to overhaul the tax code; before doing so, legislators should be

aware of the true determinants of problems (such as inversions) before trying to devise a

solution.

DEDICATION

To God be the glory!

To my wife, Jennifer, for your unending love, faith, and encouragement. You kept me going when I thought continuing would be impossible. This pursuit would not have been possible without you, my love.

To my children, for your unconditional love and for exuding qualities that have helped me maintain focus on my jobs as a scholar and a dad:

Madilyn – analytical thinking and intellect;

Micah – pure joy and laughter;

Matthew – curiosity and boldness.

To my parents, Dale and Donita, for always believing in me with every pursuit. Your instruction and confidence in me made me believe I could achieve anything.

To my brother, Jody, for your lasting friendship and the constant reassurance you provided, even in the midst of difficult times.

To my college adviser, Margaret Hoskins, for suggesting I consider a career in academia. Your recommendation was key to my interest in pursuing a PhD.

To countless other friends and family members for your words of encouragement. Your support helped solidify the support I received from the others already mentioned.

LIST OF ABBREVIATIONS

ATF   Americans for Tax Fairness

BEPS   Base Erosion and Profit Shifting

BTD   Book-Tax Differences

CA   Competitive Advantage

CEO   Chief Executive Officer

CFO   Chief Financial Officer

CSR   Corporate Social Responsibility

DC   Dynamic Capabilities

ETR   Effective Tax Rate

FF48   Fama-French 48

FIN   Financial Accounting Standards Board Interpretation Number

GAAP   Generally Accepted Accounting Principles

HHI   Herfindahl-Hirschman Index

IOE   Industrial Organizational Economics

IRC   Internal Revenue Code

IRS   Internal Revenue Service

MA   Managerial Ability

MNC   Multinational Corporation

OECD   Organisation for Economic Co-operation and Development

PCM   Price-Cost Margin

RBV   Resource-Based View

RNOA   Return on Net Operating Assets

U.S.   United States

ACKNOWLEDGEMENTS

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I. INTRODUCTION

Any one may so arrange his affairs that his taxes shall be as low as possible; he is not bound to choose that pattern which will best pay the Treasury; there is not even a patriotic duty to increase one's taxes. ~ Judge Learned Hand[1]

Tax reform is a major topic of the popular press. Politicians, corporations, and American citizens call for reform to achieve "tax fairness." Predictably, each interested party has a different view of how to achieve tax equity. Corporations are the biggest target of criticism because news media communicates how some corporations enjoy large profits and pay no tax, a paradox that highlights tax avoidance activities. Burman and Slemrod (2013) state, "most Americans say corporations do not pay their fair share of taxes." Yet in the landmark corporate-reorganization case of *Helvering vs. Gregory* quoted above, Judge Learned Hand remarks that no taxpaying entity has an obligation to pay more tax than is legally required. Judge Hand also stated in the same opinion that a transaction must have both economic substance and a business purpose other than tax avoidance. Corporate executives claim there is a business purpose to avoid taxes: competitive advantages. Therefore, the underlying question that this dissertation analyzes is whether corporations participate in tax avoidance activities in order to gain or maintain competitive advantages.

Two organizations devoted to tax equity are The RATE Coalition[2] and Americans for Tax Fairness. The RATE Coalition, a group comprised of 35 corporations, advocates lowering corporate tax rates because of the many ways it would benefit the U.S. The primary benefit they address is competition: they feel with lower tax rates, U.S. corporations could be more

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[1] Helvering v. Gregory, 69 F. 2d 809 (2nd Cir. 1934)
[2] RATE is an acronym for "Reforming America's Taxes Equitably"

competitive with corporations based in other nations [(Coalition 2016), (Coalition 2015)].
Americans for Tax Fairness is an organization supported by 425 national and state-based
organizations that is devoted to supporting a "tax system that works for all Americans" (Fairness
2013a). At the top of the "Issues" page on its website, Americans for Tax Fairness states the
following: "As corporate profits are getting higher, corporate taxes are getting lower. Some huge
corporations — like Boeing, General Electric and Verizon — have paid NO federal taxes in
some recent years" (Fairness 2013b). While the RATE Coalition and Americans for Tax
Fairness have the similar goal of tax equity, their agendas are quite different. Americans for Tax
Fairness criticizes large corporations for not paying enough tax while the RATE Coalition argues
the tax code hinders competitive advantages for large corporations. One of the most criticized
tax avoidance techniques is moving profits outside of the U.S. to avoid U.S. taxes. Of the ten
corporations cited by Americans for Tax Fairness for avoiding taxes, they indicated eight of
them had significant profits overseas, which are untaxed until repatriated to the United States.
Groups like Americans for Tax Fairness and government groups target the use of tax havens for
offshore operations.

The U.S. is one of the 34 nations that comprise the membership of the Organisation for
Economic Co-operation and Development (OECD), a global organization devoted to the
economic and social well-being to people around the world. One of the current initiatives of the
OECD is the Base Erosion and Profit Shifting (BEPS) Project, which "refers to tax planning
strategies that exploit these gaps and mismatches in tax rules to artificially shift profits to low or
no-tax locations where there is little or no economic activity, resulting in little or no overall
corporate tax being paid" (OECD 2015). Therefore, shifting income to other jurisdictions is a
problem that affects many countries, including the U.S. Shifting profits is one matter; another

matter entirely is shifting citizenship, which is the effect of a transaction called a corporate inversion.

The tax news media has recently been focusing on the corporate inversion, an extreme tax avoidance technique, because a few well-known corporations were exploring this option (e.g. Walgreens, Inc.). Inversions have recently become popular, despite attempts by Congress and the Internal Revenue Service (IRS) to halt them. An inversion changes the legal domicile of a corporation from a high-tax jurisdiction to a lower tax jurisdiction. According to the list compiled by Rao (2015), 81 American corporations have completed an inversion transaction to redomicile overseas to Ireland, Great Britain, and other countries since 1982. Predictably, many Americans citizens and politicians oppose these moves. President Obama referred to corporate inversions as "unpatriotic loopholes" (Obama 2014).

Despite all the negative criticism, corporate executives of the inverting corporations contend these transactions are necessary. When Mylan, Inc. moved its headquarters to the Netherlands, Chief Executive Officer (CEO) Heather Bresch commented: "If you put on your business hat, you can't maintain competitiveness by staying at a competitive disadvantage...The odds are just not in your favor" (Security 2014, 1). Not only does the RATE Coalition argue that the U.S. corporate tax rate inhibits global competition, they also specifically mention corporate inversions as "the latest examples of U.S. companies moving their legal home elsewhere to help lower U.S. tax bills" (Coalition 2015, 3). With business becoming more global, these transactions have attracted the attention of the U.S. government; legislative action is sure to follow.

In summary, many Americans are very vocal about their objection to corporate tax avoidance activities. Defenders of avoidance strategies maintain that corporations cannot be

globally competitive with such high U.S. tax rates. Therefore, this dissertation empirically examines if corporations engage in tax avoidance schemes to obtain competitive advantages.

Prior Research

Tax avoidance has been a rapidly growing area of tax research in recent years. In their review of the tax literature, Shackelford and Shevlin (2001) called for more research into tax aggressiveness; Hanlon and Heitzman (2010) identified the research stream of corporate tax avoidance (which encompasses tax aggressiveness) as one of the main areas of tax research in accounting. The main research areas of tax avoidance deal with its determinants, consequences, and measurements.

Of the main areas of tax avoidance research, the determinants stream has likely seen more contributions than the others. Determinants of tax avoidance include executive compensation, manager incentives, common board affiliations, shared audit firms, and corporate governance. Higgins et al. (2015) find that corporations following an innovation strategy tend to engage in more tax avoidance and with riskier techniques. Kubick et al. (2015) discover that the corporations with the most market power tend to engage in more tax avoidance activities. While innovation and market power would be considered dimensions of a corporation's competitive advantages, they do not encompass all dimensions of competitive advantages. Furthermore, increased innovation and market power both accompany enhanced willingness to accept risk. While these studies are important and bring understanding to tax avoidance, corporations deriving competitive advantages in other ways may not exhibit similar tax avoidance behavior.

Two commentaries by tax law professors discuss inversions and the effects of competitive advantages on U.S. multinational corporations (MNCs). Interestingly, these professors take the exact opposite view. Melnik (2004) agrees with much of the popular press

that U.S. MNCs are at a competitive disadvantage, in large part due to the fact that the U.S. taxes worldwide income instead of using a territorial system like most other developed countries.[3] He goes on to say that corporate inversions are not a fundamental problem, but a wakeup call. Until the U.S. amends its tax laws to allow corporations to adequately compete with their international counterparts, issues like corporate inversions will continue.

In stark contrast to this view, Kleinbard (2014) believes competitiveness has nothing to do with corporations choosing inversion transactions. He discusses examples of recent inversions and illustrates how competition could not have been a motivating factor. While both articles present strong arguments, neither empirically investigated the effects of competitive advantages (or lack thereof) on these corporations.

Competitive advantage as defined and used in this study relies on strategic management theories. There are three main paradigms in the strategy literature describing the sources of competitive advantages. The first approach is the resource-based view; this view focuses within the organization to determine how efficiently it employs its resources. The industrial organization economics perspective focuses on how well organizations are able to respond to external pressures. Finally, the concept of dynamic capabilities considers how well management uses resources to respond to an ever-changing environment. Each of these perspectives illuminates a portion of a corporation's competitive advantages. Chapter II further outlines these concepts.

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[3] Other countries employing a worldwide tax system in the OECD are Chile, Greece, Ireland, Israel, Korea, and Mexico. See http://www.liftamericacoalition.com/territorial-and-worldwide-tax-systems-in-the-oecd/.

Research Questions

This dissertation empirically tests the claim that corporations engage in tax avoidance techniques to obtain a global competitive advantage by exploring two broad research questions.[4] Before determining whether corporations avoid taxes to gain or maintain competitive advantages, the dissertation will first explore how taxes affect the competitive advantages of the corporation.

> **RQ1:** How does the effective tax rate of a corporation affect the future competitive advantages of a corporation?

Corporate executives indicate the U.S. tax rate inhibits their ability to compete globally and cite the inability to gain or maintain competitive advantages as a reason to complete an inversion transaction. Therefore, a corporation's competitive advantages, or lack thereof, may influence the decision whether to engage in tax avoidance activities. The next research question will explore the effect of a corporation's competitive advantage on tax avoidance.

> **RQ2:** How do competitive advantages affect future tax avoidance?

Methodology

To examine these questions empirically, creation of a variable measuring the total competitive advantages of the corporation is necessary. Using corporate financial information, Dickinson and Sommers (2012) created six competitive efforts proxies developed from the industrial organization economics theory of competitive advantages. They added these proxies to the four traditional resource-based proxies. All ten proxies significantly predicted future profitability. Using these proxies for competitive efforts designed to capture different dimensions of competitive advantages, this research creates and validates a composite competitive advantage score. Since defenders of corporate tax avoidance cite a loss of *global*

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[4] Multi-part hypotheses to these research questions are fully developed in chapter three.

competitiveness, the calculation of the composite score uses observations from both the Compustat North America and Compustat Global databases.

After the creation of the composite score, the study uses it as the dependent variable in a regression to determine how the effective tax rate influences competitive advantages to answer the first research question. The examination of the second research question will use a series of tests employing multiple proxies for tax avoidance. The sample size of corporate inversions with required data is low; therefore, this tax avoidance proxy conducts univariate tests on these observations. These tests compare the competitive advantage scores of the inversion corporations (pre- and post-inversion) to the means of their ten closest matches based on profitability in the same industry-year.

To model a more aggressive type of tax avoidance like the inversion, this study uses a proxy developed by Wilson (2009) for the probability that a corporation engages in tax sheltering activities. As is common in the literature, this study also uses effective tax rate measures as tax avoidance proxies to determine the effects of competitive advantages on less aggressive types of avoidance.

Findings

The results of the tests used to address the first research question indicate that current-year ETR does not appear to negatively impact the future competitive advantages of the corporation. Using both GAAP and Cash ETRs as independent variables in separate regressions, the results reveal a slight initial decline in future competitive advantages as ETR increases; however, this trend reverses and continues an upward slope for the majority of the observations. This finding is opposite from the hypothesized direction; one explanation for this outcome is

investors may be more willing to invest in corporations with higher ETR because they perceive that these corporations pay their "fair share" of taxes.

With regard to the second research question, this dissertation first considers the tax avoidance technique of the corporate inversion. Univariate tests show no significant difference in either competitive advantages or ETR between corporations that execute an inversion transaction and their ten closest industry peers two years before the inversion. Additionally, supplemental analyses suggest that the corporate inversion does not improve competitive advantages. In the second year following the inversion, the mean competitive advantage score of inverting corporations is significantly lower than the mean score of their closest industry peers.

Due to the small sample size of corporate inversions, this study extends the second research question to four tax-avoidance proxies commonly used in the literature. Overall, the findings suggest that competitive advantages have a positive relationship with future tax avoidance; however, around the median of the competitive advantage score, less aggressive tax avoidance techniques begin to decline, suggesting that corporations engage in tax avoidance activities to promote themselves in the top half of their industry. An alternate explanation is that by the time a corporation advances into the top half of competitive advantages, they have used all less-aggressive techniques available to them, thus begin to decline in avoidance activities.

The more aggressive proxy of tax sheltering probability also experiences a decline in tax avoidance; however, this decline begins at the 90th percentile of competitive advantages, not at the median. Corporations in the highest decile being more aware of the potential loss of reputation if tax-sheltering activities are exposed, which would explain this decline; higher competitive advantages could potentially lead to increased scrutiny by the IRS, other regulatory agencies, and investors.

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Limitations

There are several limitations to this study. First, the inferences drawn about corporate competitive advantages are dependent upon how well the composite score captures competitive advantages. While this study considers many elements of competitive advantages and creates a score based on each element separately, it is possible the score does not completely capture total competitive advantages. Due to the nature of tax research, the study is inherently limited by using financial statement data to proxy for tax-related variables of interest. However, this dissertation uses multiple proxies in an effort to triangulate the results.

Importance and Contribution

The results of this study should be important to tax policymakers. One of the main reasons given for inversion transactions is to increase the corporation's global competitiveness. By extension, other types of tax avoidance could be related to competitiveness, as well. Knowing that corporate income taxes do not appear to hinder the globally competitive standing of domestic companies should help legislators and policymakers in designing appropriate laws to address corporate tax reform.

This study should also be important to the academic community. The competitive advantage composite score will allow academics to use a single variable that assesses overall competitive advantages, not just one dimension of a corporation's competitive advantages. This score will also help bridge the academic research areas of accounting and strategic management. With regard to the tax avoidance implications, knowing how competitive advantages are related to tax avoidance activities should help identify which firms are more likely to engage in aggressive tax avoidance schemes. Further, most studies have focused on either the personal gain of managers and shareholders or the social responsibility of the corporations to determine

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which corporations avoid taxes. This study adds to a growing part of the literature regarding how income taxes affect (and are affected by) the operations of the corporation, specifically in an effort to sustain competition. The results also have significance for tax and accounting professionals by identifying additional characteristics of corporations that resort to extreme tax avoidance activities and the risks/consequences that may result.

Organization

The remainder of the dissertation is organized as follows: Chapter II contains a review of the relevant literature in competitive advantages and tax avoidance. Chapter III develops the hypotheses used in the study and will present the methodology chosen to test these hypotheses. The results of statistical analyses are presented in Chapter IV. The dissertation will conclude with chapter V, which includes a brief discussion of the dissertation, its results, and implications.

II. LITERATURE REVIEW

Corporate tax avoidance is an area of interest for both the academic community and popular press. Despite the claim that U.S. corporations need tax reform to compete globally, most American citizens believe corporations are not paying their fair share of the U.S. tax bill. In defense of a very public form of tax avoidance called a corporate inversion, business leaders declare that they cannot adequately compete globally because of the high tax rate and worldwide tax system in the U.S.; therefore, they feel they must reposition themselves in a jurisdiction with lower tax rates and territorial tax systems. No known studies to date have empirically explored the possibility that the U.S. tax code impacts overall global competitive advantages or that the level of overall global competitive advantages can impact the possibility of future tax avoidance activities. Therefore, this dissertation investigates these questions. Before doing so, this chapter reviews the prior literature to effectively develop the hypotheses used in the study.

The remainder of this chapter is divided into three main sections: a review of the competitive advantage literature, a review of the proxies used in tax avoidance literature, and a review of the determinants of tax avoidance.

Competitive Advantages

For the purposes of this dissertation, the definition used for "competitive advantage" is as explained by Porter (1985): "organizational factors that enable a firm to outperform its competitors" (Mooney 2007, 111). While there may be a plethora of sources from which a corporation can derive its competitive advantages, this dissertation will focus on three main categories: the industrial organization economics perspective, the resource-based view, and the

dynamic capabilities view. Dickinson and Sommers (2012) provide the structure for the IOE and RBV approaches discussed below.

Industrial Organization Economics Perspective

The industrial organization economics perspective (IOE) is a theory within the market-based view of competitive advantages that considers factors external to the corporation, such as its position within its industry, as the primary source of the corporation's competitive advantages. The corporation's ability to make itself distinct from its rivals determines its strategic position and, therefore, gains competitive advantages. This perspective argues a corporation's performance is affected by its behavior, which is affected by the structure of the industry.

The most popular theory arising from the IOE paradigm is the five forces model proposed by Porter (1979). This model identifies external forces from which a corporation must defend itself through competitive actions. These five forces are threat of new entrants, bargaining power of buyers, bargaining power of suppliers, threat of substitute products or services, and intensity of competitive rivalry.

Resource-Based View

Contrary to the IOE, the resource-based view (RBV) approach focuses internally. Penrose (1959) originally developed the theoretical basis of the RBV. The concept was first proposed by Wernerfelt (1984) and later popularized by Barney (1991). The RBV proposes four necessary attributes for the corporation to obtain competitive advantages; the resources must be valuable, rare, inimitable, and not substitutable.

This approach takes the emphasis off the external market in which the corporation operates and focuses on the resources available to the corporation. While some research

identifies the RBV as a component that belongs nicely within the IOE (Mahoney and Pandian 1992), others discount the RBV and describe its many flaws.

Priem and Butler (2001b) argue that even if a resource is valuable, rare, inimitable, and not substitutable, it still may not help the corporation generate competitive advantages because the value of a resource is dependent upon the product market in which the corporation competes. The RBV, as previously stated, only considers the resources within the corporation; it places little to no emphasis on the external market. Priem and Butler (2001b) further assert that the RBV is tautological. Barney (1991) says that a valuable resource can be a source of competitive advantage; Priem and Butler (2001b) say this logic is necessarily true if the terms "valuable" and "competitive advantage" are defined by the same terms. Priem and Butler (2001b), a rebuttal to Barney (2001), which is a rebuttal to the original argument made in Priem and Butler (2001a), concede that the RBV has potential to be a theory of strategic management, but many dimensions of its arguments must be explored further. Additionally, they comment,

> Resources, representing what can be done by the firm, and the competitive environment, representing what must be done to compete effectively in satisfying customer needs, are both essential in the strategy-making process. (Priem and Butler 2001b, 64)

Therefore, while the RBV may have merit, resources alone cannot explain the sources of a corporation's competitive advantages.

Dynamic Capabilities

Prahalad and Hamel (1990) also argue against the IOE perspective, further developing the capabilities extension of the RBV:

> the real sources of advantage are to be found in management's ability to consolidate corporate wide technologies and production skills into competencies that empower individual businesses to adapt quickly to changing opportunities. (81)

Teece et al. (1997) integrated this and other prior research to construct the concept of dynamic capabilities (DCs), another source of competitive advantages, described as an internal reaction to

the ever-changing external environment. The DC view is the external environment changes and the firm should develop specific but flexible resource management capabilities, which makes it an extension of the RBV (Teagarden and Schotter 2013). The firm should use competencies for developing short-term competitive positions, which should then be developed into more sustainable, long-term competitive advantages.   The definition of DC given by Teece et al. (1997) is "the ability to integrate, build, and reconfigure internal and external competencies to address rapidly-changing environments." These capabilities include knowledge, learning, and absorptive capacity.

> The term dynamic stands for the ability to renew and realign competencies along the requirements of the changing business environment. Capabilities, on the other hand, refer to the role of management in adapting, integrating, and reconfiguring the internal and external organizational expertise, resources, and functional know-how of a firm to match the conditions of the changing environment. (Teagarden and Schotter 2013, 101)

Eisenhardt and Martin (2000) say DCs include "well-known organizational and strategic processes like alliancing and product development whose strategic value lies in the ability to manipulate resources into value-creating strategies." Further, although they assert that the DCs enhance the long-term competitive advantages, which lie in resource configuration (i.e. the DCs alone do not achieve competitive advantages), Grant (1996) indicates these capabilities "have been deemed critical to success in hypercompetitive markets" (375).

In a recent study, Lin and Wu (2014) discuss that, in dynamically-changing environments, the DC of a corporation explains a corporation's competitiveness more effectively than the RBV (Teece et al. 1997; Eisenhardt and Martin 2000; Lin and Wu 2014). Using survey data, Lin and Wu (2014) determine that using the RBV in conjunction with the DC of a corporation better determines performance than do either of them alone.

Tax Avoidance & Tax Aggressiveness: Proxies

Following the most recent literature, this study defines tax avoidance as "the reduction of explicit taxes," with "explicit taxes" meaning a direct levy by the government (Hanlon and Heitzman 2010, 137). This definition spans a wide spectrum from investing in municipal bonds to tax evasion. Tax aggressiveness is a subjective term with varying degrees; it is simply a subset of tax avoidance considered to use more extreme techniques. While the adoption of accelerated depreciation might be considered aggressive, it would likely be seen as less aggressive than shifting profits overseas to a tax haven through some loophole in the Internal Revenue Code (hereafter, Code). Tax aggressiveness is not analogous to tax evasion; tax aggressiveness includes extreme, yet legal, methods of tax avoidance.[5]

Tax return data is confidential; therefore, most academic studies must rely on proxies derived from publicly available financial statement information. Hanlon (2003) and others discuss the problems of relying on proxies calculated from financial statements. However, Hanlon and Heitzman (2010) discuss how using actual tax return data may not always provide a better proxy; for example, consolidation rules for financial statements prepared under generally accepted accounting principles (GAAP) versus the rules to prepare the tax return are largely different. Additionally, using a U.S. return for a multi-national corporation (MNC) will only provide U.S. data, not data from operations within other countries.

Hanlon and Heitzman (2010) express concern regarding the different measurements for the constructs of tax avoidance and tax aggressiveness and discuss the many proxies developed as well as the costs and benefits of each. They also encourage researchers to study the different

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[5] For simplicity (and following prior literature), this dissertation will use the term "tax avoidance" and "tax aggressiveness" interchangeably.

proxies very carefully; not all proxies are appropriate for all research questions.[6] Additionally, the majority of the measurements commonly used in the literature can only detect non-conforming tax avoidance, or a technique treated differently for book and tax purposes. Conforming tax avoidance would include a tax avoidance measurement where financial accounting income is reduced as a result of the tax avoidance technique.

Effective Tax Rates

One measurement used in most any study of tax avoidance is some derivation of the corporation's effective tax rate (ETR). Of course, not knowing taxable income, calculating the actual ETR is not possible. However, the literature widely accepts two main calculations for ETR: GAAP ETR and Cash ETR.

GAAP ETR is calculated by dividing total tax expense from the income statement by pre-tax income (adjusted for special items). Again, pre-tax income is a financial statement measurement of income, not taxable income. Therefore, due to differences in book income and tax income as well as tax credits, this measurement may not adequately reflect a corporation's true effective tax rate.

Cash ETR divides total cash paid for taxes (taken from the statement of cash flows) by pre-tax income. Accrual accounting teaches that an expense incurred does not equate to cash paid; therefore, this applies to tax expense versus tax paid. One of the problems associated with using Cash ETR is the tax paid during the year may reflect taxes paid for different periods.

Of the studies that use both GAAP and cash measurements of ETR, some find the results differ between the two [e.g. (Armstrong et al. 2012), (Robinson et al. 2010)]. This is not terribly surprising since the calculations are imperfect. However, a recent survey revealed that 84

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[6] This review will discuss the proxies most used in the literature. For a more complete list, see Hanlon and Heitzman (2010) or Lietz (2013).

percent of top management cares at least as much about GAAP ETR as they do about cash taxes paid (Graham et al. 2011; Graham et al. 2014). Therefore, in some situations, corporations might manage income tax expense to obtain a more attractive GAAP ETR while giving little to no consideration about how much cash is actually paid for income taxes. Because of the benefits and limitations of both ETR measurements, reporting both measurements has been standard in most tax avoidance studies.

Dyreng et al. (2008) developed a proxy that uses Cash ETR over the course of several years, which they call the long-run cash effective tax rate. They conjecture that using annual tax rates instead of long-term rates leads to incorrect conclusions about corporate behavior. Because of this research, long-run cash *and* GAAP ETRs have become more prevalent. Typically, the ETR measurements will not automatically signal aggressive types of tax avoidance as a corporation's ETR could be lower for many reasons, some of which would not be considered aggressive.

Book-Tax Differences

The proxy for book-tax differences (BTDs) attempts to measure the difference in book income and tax income. Generally, total BTDs are calculated by first grossing up tax expense using the statutory tax rate and then subtracting this estimate of taxable income from pre-tax financial income. Other variations of BTD include estimating both permanent and temporary BTDs. Naturally, these measurements are related to ETR measurements.

Much like the accruals literature developed a measurement of discretionary accruals, there have been attempts to develop a discretionary measurement of BTDs. Desai and Dharmapala (2006) first regress total accruals on BTDs. Then they take the unexplained portion of the regression and interpret it as a measurement of tax shelter activity. While a few recent studies use this measurement, most will use it in conjunction with DTAX, a discretionary

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measurement of BTDs developed by Frank et al. (2009). DTAX is the error term (unexplained portion) in a regression where the dependent variable is a measurement of permanent differences.

Tax Shelters

Wilson (2009) identifies corporations engaged in tax shelters and uses the years associated with tax sheltering activity to identify characteristics about the corporations employing this strategy. He finds these corporations posses larger book-tax differences and more aggressive financial reporting. Based on these and other characteristics, he develops a prediction model of tax shelter activity to use in the population of corporations in his sample. Overall, Wilson finds corporations with active tax shelters and strong corporate governance exhibit positive abnormal returns, consistent with the avoidance technique being used for wealth creation for shareholders.

> While it is possible that tax sheltering itself is the source of the wealth creation, it is also possible the combination of good governance and active tax sheltering is simply a sign of strong incentive alignment between managers and shareholders that leads to superior performance. (Wilson 2009, 993)

Another discovery from the Wilson (2009) study is that the corporate tax shelter firm years identified in his study all had significantly higher BTDs than two sets of matched control firms. He suggests that researchers can use very high BTDs as an indicator of tax aggressiveness.

In a follow-up paper, Lisowsky (2010) uses confidential tax return data to corroborate and expand Wilson's model. One limitation to using Wilson's model is that it represents a probability that a corporation engages in shelters based on characteristics of corporations that are known to have participated in a tax shelter; therefore, a high probability does not indicate that the corporation actually engaged in tax avoidance. On the other hand, using a dichotomous variable with one representing actual corporations known to have engaged in tax shelters introduces

potential selection bias and endogeneity issues (Hanlon and Heitzman 2010).[7] In contrast to ETR and BTD measures, the tax shelter proxy is designed to capture more aggressive tax avoidance.

Unrecognized Tax Benefits (UTBs)

Financial Accounting Standards Board Interpretation Number (FIN) 48 requires disclosure of the balance of unrecognized tax benefits, which is also used as a proxy for tax avoidance. The balance potentially sheds light on the uncertainty of the tax position, which could be indicative of tax avoidance. However, this is a financial accounting accrual, often used in earnings management studies. Hanlon and Heitzman (2010) indicate this proxy might not capture tax avoidance at all in certain situations.

Dunbar et al. (2010) compare nine of the most common tax avoidance proxies to determine if they capture the same construct. Surprisingly, the measures appear to be different from each other. Nevertheless, each of these measures has its place in tax avoidance research. The trend in the literature has been to employ three, often more, proxies of tax avoidance in an attempt to triangulate the results (Lennox et al. 2013).

Inversions

Inversions are, indisputably, an extreme and public form of corporate tax avoidance. Since it is public and controversial, corporate disclosures often give reasons for completing these transactions. The most cited reason is due to lack of global competitive advantages.

McDermott, Inc. was a Delaware corporation with corporate headquarters in New Orleans, Louisiana. In 1982, its management announced they would execute a transaction that would convert the American company into a Panamanian company. Its Panamanian subsidiary

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[7] A corporation that is able to otherwise avoid taxes may not need to use a tax shelter while a corporation that cannot avoid taxes via another method may be more susceptible to engage in sheltering activity.

acquired the parent corporation, making the Panamanian company the new parent and the

American company the new subsidiary; the company inverted the parent-subsidiary relationship

(Sartori 2010). In its Prospectus in 1982, McDermott gave a very clear reason behind the

transaction: they wanted to "reinvest and redeploy earnings from operations outside the United

States without subjecting such earnings to United States income tax" (as cited in Hines Jr. 1991,

463). Therefore, the basic reason McDermott chose to expatriate was tax avoidance.

Before this transaction set a trend, the Tax Reform Act of 1986[8] targeted the type of

transaction McDermott executed, which was a stock-for-stock transfer. Nevertheless, the 1990s

brought more inversions, despite the additional tax burdens placed on the shareholders and the

attention these transactions received for being "paper transactions," not really changing the

underlying economics of the corporation and thus lacking in economic substance and business

purpose. Between McDermott's completed inversion in 1983 and 2001, 29 corporations

implemented a corporate inversion. After the events of September 11, 2001, many corporations

decided against inversions due to patriotic demonstrations. (Sartori 2010)

In 2002, there were at least six bills presented to Congress to stop inversion transactions

(Avi-Yonah 2002). In 2004, the American Jobs Creation Act included IRC section 7484 as an

"anti-inversion provision" (Sartori 2010). Even so, 47 corporations have inverted between 2004

and 2014.[9]

While academic research on corporate inversions is somewhat limited, there are studies

that provide insight into these transactions. For example, one study found that inverting firms

have "large, sizeable foreign assets, extensive debt, and face lower foreign tax rates" (Desai and

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[8] Internal Revenue Code (IRC) section 1248(i)
[9] See Appendix A for graphical illustration, provided by the House Ways and Means Committee, retrieved online at
http://democrats.waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/A_Spike_in_Corporate_Inversions.pdf.

Hines Jr. 2002, 428).   Desai and Hines Jr. (2002) also conclude that the managers of the inverting firms maximize shareholder wealth rather than share prices.   Conversely, Cloyd et al. (2003) find no shareholder benefits from executing these transactions; additionally, there was nothing to suggest that stock price increases in response to inversion announcements.   They also found these firms to be larger and have higher ETRs than the median firms within their respective industries.   Seida and Wempe (2004) observe substantially lower ETRs after the inversion takes place.

Rego (2003) finds that U.S. MNCs have lower worldwide ETRs when compared to other U.S. corporations.   Interestingly, she also finds that, within a subsample of U.S. MNCs only, higher domestic pre-tax income was associated with lower ETRs and higher foreign pre-tax income left corporations with higher ETRs.   This finding appears inconsistent with U.S. MNCs declaring the U.S. tax rate as the reason for corporate inversions.

In their 2015 Memorial Day Congressional Recess Packet, the RATE Coalition published excerpts from research conducted by Gordon Gray, the Director of Fiscal Policy of the American Action Forum, on the reasons why the U.S. needs corporate tax reform.   In his comments, Gray states that the "corporate income tax...includes a very high rate and worldwide base, two features that put it at odds with international norms and harm the growth and competitiveness of the U.S." (Coalition 2015, 2). Bauer et al. (2012) find that corporations within the information and communication technology industry operating in countries with more attractive tax policies and government subsidies generally outperform their competitors in other countries.   They further assert that the average global corporation outperforms the average U.S. corporation.   However, Atwood et al. (2012) find less tax avoidance when the worldwide approach is used (as opposed

to a territorial approach) when comparing the government structure of several different countries. The U.S. is one of only six OECD countries that still use a worldwide system.

With regard to the competitiveness of the inverting firm, little academic research exists. Melnik (2004) argues that the United States tax laws place multinational corporations (MNCs) at a competitive disadvantage. Yet, Kleinbard (2014) takes the opposite stance and contends the tax laws working in conjunction with financial accounting principles actually benefit these MNCs. After analyzing a few specific inversion cases, Kleinbard further asserts that competitiveness is not the real reason corporations invert; the main reasons corporations invert are the need to use offshore cash without tax consequences, disgust with Congress, and herd behavior. Only considering the foreign effective tax rate, Grubert (2012) finds the foreign ETRs do not seem to promote competitiveness.

Tax Avoidance & Tax Aggressiveness: Determinants

Since an inversion is a method of tax avoidance and corporations have cited competitiveness as a reason for inverting, it follows that competitiveness could be a reason why corporations avoid taxes in other, more traditional methods. A portion of the tax avoidance literature focuses on the consequences of tax avoidance, such as increased IRS-proposed audit adjustments (Mills 1998) and decreased future profitability (Katz et al. 2013). However, since competitive disadvantages would be considered a determinant for avoidance, the majority of this review focuses on what the literature has found as determinants of tax avoidance.

Executive compensation and managerial incentives have been found to be determinants of corporate tax avoidance. The first study to explore this potential determinant directly was Phillips (2003), who finds that manager compensation on an after-tax basis leads to lower ETRs; however, the effect was not the same for CEOs. Similarly, Armstrong et al. (2012) find tax

director incentives have a strong, negative relationship to the level of GAAP ETR, but no significant relationship to any other tax avoidance measurement, including Cash ETR. Like Phillips, they also find no significant relationship between CEO compensation and tax avoidance.

Gaertner (2014) revisits these results originally documented in Phillips (2003) following Dyreng et al. (2010), who find CEOs have the most influence on corporate policies, including the extent of tax avoidance. Finding the tests conducted in Phillips (2003) had low statistical power, Gaertner (2014) increases the sample size and finds a significantly negative relationship between CEOs on both GAAP and Cash ETRs. Also, Brown et al. (2015) find that boards award managers that realize lower ETRs with higher bonus pay, but only when the bonus contracts include a tax incentive. Finally, Rego and Wilson (2012) also find that CEO and Chief Financial Officer (CFO) equity risk incentives have a significant, positive relationship with tax avoidance. The literature, therefore, suggests that incentivized CEOs, CFOs, and lower-level managers will engage in tax avoidance activities. Additionally, CEOs that exude a sense of overconfidence will also tend to avoid more tax (Chyz et al. 2015).

There are many corporate characteristics associated with tax avoidance. During the years between 1998 and 2004, MNCs did not have to disclose the geographic location of earnings; therefore, Hope et al. (2013) test and find results suggesting that managers perceive this non-disclosure helps hide tax avoidance, therefore they engage in tax avoidance activities to a larger degree.

Characteristics of a corporation's auditing firm can also imply greater tax avoidance. McGuire et al. (2012) find that if the external auditing firm is a "tax expert[10]," the corporation

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[10] The study designates an audit firm as a "tax expert" by annual tax market share, measured by total tax services fees charged by the audit firm in a given industry and city.

has a greater tendency to avoid taxes. Yet Klassen et al. (2016) discover that corporations either preparing their own returns or hiring a different firm than their external auditor to prepare the tax return engage in higher tax avoidance. Corporations with higher-quality internal information[11] are more likely to avoid taxes (Gallemore and Labro 2014) and corporations with tax-related internal control weaknesses are associated with less tax avoidance (Bauer 2015).

The effect of corporate governance is another subset of the determinants of tax avoidance. Desai and Dharmapala (2006) develop a theory that strong corporate governance can diminish the effects of high-powered incentives on tax sheltering. However, Blaylock (2015) finds a positive relationship between tax avoidance and future performance, which is not moderated by the governance of the corporation. These results are consistent with tax avoidance being a value-enhancing activity, not within the corporate governance framework developed by Desai and Dharmapala (2006).

Related to corporate governance, corporate social responsibility (CSR) has been found as a determinant of tax avoidance. Excessively irresponsible CSR scores increase the likelihood of tax avoidance (Hoi et al. 2013), but only when corporations face a lower level of current or future earnings (Watson 2015). Davis et al. (2016) find similar results, but also suggest that CSR and tax payments act as substitutes.

When the tax department is evaluated as a profit center (as opposed to a cost center), Robinson et al. (2010) find tax avoidance in the GAAP ETR but not in Cash ETR. Brown (2011) finds evidence suggesting that corporations have an increased probability in engaging in tax shelters if they share board members with other corporations which are engaged in tax shelters (network ties via board interlock). Brown and Drake (2014) find additional evidence

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[11] This study defines corporations with high internal information quality as those with "centralized and standardized business transaction processing, short reporting cycle times, and integrated data across business units and geographical locations" (Gallemore and Labro 2014, 3).

between tax avoidance and network ties; corporations with strong network ties via board interlocks with low-tax corporations also tend to have low Cash ETRs; this effect is strengthened when the firms are similar in strategy, in operation, and when they engage the same auditor. Even religiosity has been researched as a determinant of tax avoidance. Boone et al. (2013) find that the more religious counties in the U.S. are less likely to engage in tax avoidance activities.

With regard to a corporation's overall business strategy, Higgins et al. (2015) find it has an impact on the level and aggressiveness of tax avoidance, specifically corporations following an innovation strategy engage in more tax avoidance activities (and more risky activities) than a corporation following a cost-leadership strategy. Another study by Gao et al. (2015) corroborates this evidence by finding higher innovation productivity and innovation quality are related to increased levels of tax avoidance. While a corporation's business strategy provides information about the firm, both the business strategy and tax avoidance strategy are endogenous decisions. By considering the relative competitiveness of the firm to its industry, it is plausible that this exogenous factor (competitive advantages) due to endogenous decisions (business operations) prompts a corporation to make another endogenous decision (tax avoidance).

A recent study by Kubick et al. (2015) finds that a corporation's product market power within its industry is positively associated with tax avoidance. While a corporation's product market power is certainly one dimension of its total competitive advantage, it may not reflect a corporation's total competitive advantages. Market power represents one aspect of the IOE perspective. Furthermore, as the Kubick et al. (2015) study discusses, those with high market power have been shown to exude behaviors suggesting they feel more insulated from negative outcomes, thereby willing to accept a higher level of risk with regard to many aspects of business, including tax avoidance. Finally, depending on the market structure, corporations with

higher market power may not enjoy sustainable profit advantages (Grant 1996). While an important and informative study, it is unclear whether a corporation's total competitive advantages have any relationship to its level of tax avoidance.

Cai and Liu (2009) find a significant relationship between the competitiveness of the industry and tax avoidance; the more competitive the industry, the more corporations engage in tax avoidance.[12] Additionally, Bennett et al. (2013) find that market competition can drive corporations to engage in "corrupt or unethical activities."

This dissertation is considering the managerial ability measurement developed by Demerjian et al. (2012) to be a component of competitive advantages, namely dynamic capabilities. Francis et al. (2013) explore the relationship between managerial ability (using the Demerjian measure) and tax avoidance; they find a significantly negative relationship, meaning the better able the manager, the less tax avoidance. They explain this relationship by indicating that high-ability managers turn resources into revenues more efficiently, therefore they do not have to spend time on tax avoidance activities. Interestingly, although Francis et al. (2013) and Kubick et al. (2015) explore the effects of different components of a corporation's competitive advantages, they find opposing results. Instead of focusing on one aspect of competitive advantages, this study considers multiple sources of a corporation's competitive advantage and combines them into one composite score to determine the effect of the overall competitive advantages of the corporation on its tax avoidance activities.

This chapter outlined prior literature related to competitive advantages and tax avoidance. The following chapter uses this discussion to develop the hypotheses for the dissertation and presents the methodology by which to test them.

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[12] A significant distinction from the current study is that Cai and Liu (2009) focus on competition as measured by market concentration; the current study considers the competitive advantages measured at the corporation level.

III. HYPOTHESIS DEVELOPMENT AND METHODOLOGY

This dissertation seeks to determine the effects of a corporation's overall global competitive advantages on tax avoidance. Business leaders claim that high tax rates lead to low competitive advantages, which lead to tax avoidance activities. Therefore, this dissertation first tests whether corporate tax rates have a significant effect on a corporation's competitive advantages. Specifically, are corporation executives correct in asserting that the tax rates inhibit their ability to gain or maintain a global competitive advantage? The dissertation then seeks to discover if a corporation's competitive advantages are significantly indicative of tax avoidance activities.

The Effect of Effective Tax Rate on Competitive Advantages

To determine if a corporation's tax rate is related to competitive advantages, this study investigates the relationship of the ETR to the competitive advantage score. U.S. corporate executives claim they have competitive disadvantages partially because of high tax rates. Lower competitive advantages lead to lower profits and, by extension, lower taxes. However, corporations that are able to develop high competitive advantages may also find ways to circumvent taxes. Therefore, it is possible to have low ETRs associated with both low and high total competitive advantages.

This dissertation first considers the GAAP ETR as a potential determinant of the global competitive advantages of the corporation. Recall the GAAP ETR is calculated by dividing total tax expense from the income statement by pre-tax financial income. Given a low competitive advantage score, a low GAAP ETR is expected. Dickinson and Sommers (2012)

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find the most beneficial position with regard to competitive efforts leads to higher profitability in

the next year; therefore, as competitive advantages rise, profitability rises. If profitability rises,

so should GAAP ETR. However, acknowledging the claims of the corporations, competitive

advantages could begin to decline at certain higher levels of GAAP ETR. In summary, while the

expectation for GAAP ETR is to increase as competitive advantages increase, the first hypothesis

also conjectures a reversal, or decline, in competitive advantages at higher levels of ETR.

> **H1a**: The GAAP effective tax rate will have a positive relationship with the competitive
> advantage score; however, this trend reverses at the highest levels of ETR,
> indicating after some maximum ETR, the corporation begins to lose competitive
> advantages.

Much of the prior literature that examines a research question with GAAP ETR also

examines Cash ETR. Cash ETR is calculated by dividing total cash paid for taxes by pre-tax

financial income. Depending on the research question, results could differ between GAAP ETR

and Cash ETR measurements. For example, Robinson et al. (2010) find GAAP ETR to be

significantly lower in corporations that evaluate its tax department as a profit center yet find no

significant relationship with Cash ETR. Armstrong et al. (2012) find similar results when

exploring the terms in a tax director's compensation contract: there is a significantly negative

relationship with the GAAP ETR but no significant relationship with Cash ETR. Both of these

studies examined research questions that incentivized employees to report lower tax expense.

With regard to the effect competitive advantages have on a corporation's tax rate, this

study expects different findings between GAAP and Cash ETRs, as well. The media often

criticizes highly successful corporations for paying no tax yet having extremely large profits.

This apparent phenomenon indicates that while the Cash ETR would be at or near zero percent,

the GAAP ETR will likely be higher.[13]   Intuitively, decreasing any type of cost that does not

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[13] Recall GAAP ETR considers all tax expense, which includes deferred taxes.

have a direct impact on sales (e.g. advertising expense) should help a corporation's competitive advantages (e.g. economies of scale). Considering cash taxes paid from the resource-based view of competitive advantages, the less cash paid for taxes should translate into higher competitive advantages for the corporation.

H1b: The cash effective tax rate will have an inverse relationship with the competitive advantage score.

The Effect of Competitive Advantages on Tax Avoidance

This dissertation measures tax avoidance with five methods. Due to imprecise proxies of tax avoidance, the literature generally uses several proxies in an effort to triangulate the results (Lennox et al. 2013). The proxies proposed for this study are the corporate inversion, GAAP ETR, Cash ETR, and two measurements of tax shelter activities.

Corporate Inversions

The corporate inversion setting presents two unique contributions to this study. First, when corporations cite a loss of competitive advantages because of high tax rates in the U.S., they generally refer to inversions as a solution to the problem. Secondly, there is a single point in time when these transactions take place; therefore, the inversion setting provides a distinct tax avoidance event in which competitive advantages can be measured before and after. Because of the uniqueness of this setting, this dissertation will provide a separate set of hypotheses for the inversion measurement of tax avoidance.

As discussed in chapter II, a disagreement exists in the literature about the connection between competitive advantages and the reason corporations choose to complete an inversion transaction. Melnik (2004) states that a lack of competitiveness plagues U.S. MNCs due to the provisions of the tax code, specifically the fact that the U.S. uses a worldwide tax system. However, Kleinbard (2014) disagrees, arguing that competitiveness has nothing to do with

inversions; in fact, he mentions that the intersection of GAAP and tax rules give U.S.

multinational corporations many advantages, not disadvantages.

Due to this disagreement in the literature regarding the competitive advantages of

inverting corporations, the formal hypothesis below is stated in the null.

> **H2a**: An inverting corporation's competitive advantages are no different from the competitive advantages of its closest industry peers in the years before the inversion is completed.

Unique to the inversion setting, the next hypothesis seeks to discover if the inverting

firms gain competitive advantages relative to their industry peers in the years following the

inversion. Prior literature finds a substantial decrease in ETR from pre- to post-inversion (Seida

and Wempe 2004). Prior literature also finds find that, in one specific industry, the average

foreign corporation outperforms the average U.S. corporation (Bauer et al. 2012). Since tax rates

decrease post-inversion, which is why the corporations inverted in the first place, it follows that

global competitive advantages should increase.

> **H2b:** An inverting corporation's competitiveness increases in the years following the inversion more than its closest industry peers.

Other Tax Avoidance Methods

While the inversion measurement of tax avoidance provides a nice setting by having a

distinct and observable event, the setting is small and the avoidance technique is among the most

extreme. Outside of the inversion setting, corporations still attribute higher tax rates in the U.S.

as decreasing their competitive advantages. Therefore, the next hypothesis, presented in four

parts, will explore the effects of competitive advantages on other methods of tax avoidance.

The next hypothesis is analogous to H2a above. As hypothesized with the inversion

transactions, low competitive advantages in a prior year might signal an attempt at tax avoidance

in the current year. Conversely, high competitive advantages in the prior year might signal less

tax avoidance in the current year. Consistent with this position, Francis et al. (2013) find that managerial ability, a component of competitive advantage, is negatively related to tax avoidance. The higher managerial ability (i.e. higher dynamic capabilities, a form of competitive advantage), the less likely the corporation is to engage in tax avoidance activities.

Other academic studies, however, indicate that firms at the highest levels of certain competitive efforts tend to avoid more taxes. For example, Kubick et al. (2015) find a positive relationship with product market power and tax avoidance, indicating the higher a corporation's market power, the more likely it is to engage in tax avoidance. Additionally, Bauer (2015) finds corporations with tax-related internal control weaknesses are associated with less tax avoidance; subsequent remediation of these weaknesses leads to higher tax avoidance. In other words, as a corporation's internal control becomes stronger, it avoids more taxes.

In summary, two competitive efforts, market power and managerial ability, provide conflicting results for their effects on tax avoidance. This study will combine multiple competitive efforts into one total global competitive advantage score and determine its effect on tax avoidance behavior. Considering these results and the statements issued by corporations, the following directional hypothesis is presented in alternative form:

> **H3a:** In general, the higher the competitive advantages of the corporation at the end of the prior year, the less tax avoidance; however, this trend reverses at the highest levels of competitive advantages, indicating increased tax avoidance.

While dynamic capabilities are expected to improve a corporation's competitive advantages, the proxy proposed to be used in this study does not exist for the global database. Consequently, the competitive advantage score does not contain the dimension of dynamic capabilities. Dynamic capabilities is tested, however, as a separate determinant of tax avoidance. As stated in chapter II, the descriptions of dynamic capabilities are very similar to the construct

of managerial ability, a measurement created by Demerjian et al. (2012). Therefore, this dissertation will use the managerial ability measurement as a proxy for a corporation's dynamic capabilities.

As previously mentioned, Francis et al. (2013) find a negative relationship between tax avoidance and managerial ability. They interpret this finding as higher-ability managers are more efficient in turning resources into revenues; as a result, they spend less effort on attempts to avoid taxes. While high-ability managers may be efficient with converting resources to revenues, it is very likely they are also efficient with other aspects of the business, such as tax planning. A corporation's taxes are also costs that, if the opportunity presents itself, can be avoided in legal ways; an efficient manager would attempt to maximize income by all legal means possible. Given this argument and the results of previous studies, it follows that while there may be a negative relationship between managerial ability and tax avoidance, there is a reversal of this trend for the highest-able managers. This hypothesis is stated formally below:

H3b: Managerial ability has a negative relationship with tax avoidance; however, this trend reverses for the highest-levels of managerial ability, indicating a positive relationship with tax avoidance.

The first part of this chapter developed the three multi-part hypotheses proposed for this dissertation. The next and final section of this chapter will outline the proposed methodology to test the aforementioned hypotheses.

METHODOLOGY

This dissertation seeks to ascertain if a corporation's competitive advantages impact its tax avoidance tendencies. To date, there are no known variables that claim to capture the total competitive advantages of a corporation. To that end, this dissertation develops a composite score for a corporation's competitive advantages using competitive effort proxies found in the

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literature.[14] The higher the score, the higher the competitive advantages of the firms relative to their industry peers. After this score is created, it is used in multiple specifications to determine how competitive advantages are affected by tax rates and whether or not competitive advantages (or lack thereof) have an impact on the tax avoidance activities of corporations.

The Competitive Advantage Score

Traditional competitive effort proxies in the literature focused on the first of Porter's five forces; in this force, Porter attempts to combine a resource-based approach with market-based factors. These proxies are economies of scale, product differentiation, innovation, and capital requirements. To address the other four forces, Dickinson and Sommers (2012) construct expanded competitive effort proxies within the IOE paradigm: power over suppliers, power over customers, and credible threat of expected retaliation (how well a corporation can respond to the threat of substitute products and the intensity of competitive rivalry). They combine these new proxies with the traditional proxies in a model to predict future profitability; all ten proxies significantly predict future profitability controlling for firm age and size.[15] These proxies are described in Table 1 below; each is calculated using accounting data found on the corporations' financial statements.

Market power is another competitive effort discussed in the literature within the IOE paradigm (Peress 2010; Kubick et al. 2015; Acito et al. 2015). This construct describes the ability of corporations to influence the marketplace in the areas of price, quality, and other factors. Competitive advantages are likely to increase with an increase in the corporation's market power, yet Grant (1996) maintains market power may not provide sustainable profit advantages in some market structures. A common proxy for market power is the price-cost

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[14] See Piotroski (2000) and Higgins et al. (2015) for other examples of composite score creation.

[15] Each of the expanded competitive efforts has two proxies. These six proxies added to the four traditional proxies equals a total of ten competitive effort proxies used in the Dickinson and Sommers (2012) study.

margin (PCM), also known as the Lerner Index (Peress 2010). Acito et al. (2015) use both PCM

and Market Share to proxy for market power.

Table 1				
Traditional Competitive Effort Proxies				
Proxy	**Calculation**	**Description**	**Competitive Effort**	**Directionality[16]**
Cost of Sales Ratio (CoS)	COGS/SALE	Cost of Goods Sold divided by Net Sales	Economies of Scale	−
Advertising Intensity (AdvInt)	XAD/SALE	Advertising Expense divided by Net Sales	Product Differentiation	+
Innovation Intensity (Innov)	(XRD+AM)/SALE	Sum of Research and Development Expense and Patent Amortization Expense divided by Net Sales	Innovation	+
Capital Intensity (CapInt)	DP/SALE	Depreciation Expense divided by Net Sales	Capital Requirements	−
Expanded Competitive Effort Proxies				
Proxy	**Calculation**	**Description**	**Competitive Effort**	**Directionality**
Operating Liability Leverage (OLLev)	OL/NOA	Operating Liabilities divided by Net Operating Assets	Power Over Suppliers	+
Inventory Turnover (InvTurn) (inverse)	INVT/COGS	Cost of Goods Sold divided by Inventory	Power Over Suppliers	−
Accounts Receivable Turnover (AR Turn) (inverse)	RECT/SALE	Accounts Receivable divided by Net Sales	Power Over Customers	−
Market Share (MktShr)	SALE/ FF48SALE	Firm-specific sale divided by total sales revenues for all firms within the industry year.	Power Over Customers	+
Financial Leverage (FLev)	NFO/CSE	Net Financial Obligations divided by Common Stockholders' Equity	Credible Threat of Expected Retaliation	−
Excess Funds (ExFunds)	NFA/NOA	Net Financial Assets divided by Net Operating Assets	Credible Threat of Expected Retaliation	+

To measure dynamic capabilities, this dissertation uses the measurement created for

managerial ability. In the paper that creates this measurement, Demerjian et al. (2012) state that

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[16] Directionality follows the theory described by (and/or findings of) Dickinson and Sommers (2012).

it is based on the efficiency in transforming corporate resources into revenues relative to the firm's industry peers. Additionally, they

> expect more able managers to better understand technology and industry trends, reliably predict product demand, invest in higher value projects, and manage their employees more efficiently than less able managers. In short, [they] expect more able managers to generate higher revenue for a given level of resources or, conversely, to minimize the resources used for a given level of revenue (i.e., to maximize the efficiency of the resources used). (Demerjian et al. 2012, 1229)

Given the descriptions of dynamic capabilities and managerial ability, this study treats these two concepts as one in the same. At the very least, managerial ability includes dynamic capabilities within its description. Knowledge, learning, absorptive capacity, response to change in external environment – all these characteristics are found in people. When considering the business unit, these characteristics would be indicative of the abilities of management personnel. Even the definition of "capabilities" given by Teagarden and Schotter (2013) refers to the role of management. Therefore, this study will consider the third category of competitive advantages, dynamic capabilities, and managerial ability to be the same construct.

On the lead author's website, Demerjian et al. (2012) make the managerial ability measurement publicly available.[17] While this dissertation obtains this measurement to use as the proxy for dynamic capabilities, the measurement is not available for the observations contained in the Compustat Global Database. Therefore, this study uses the managerial ability proxy for dynamic capabilities as a separate variable and not a component of the global competitive advantage score.

Creating the Composite Score

The first step in creating the composite competitive advantage score is to calculate and regress each individual proxy separately on future return on net operating assets (RNOA) using

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[17] http://faculty.washington.edu/pdemerj/data.html

the model in Dickinson and Sommers (2012) to determine both the significance of the proxy in isolation and its positive or negative relationship.[18] Then, the proxies are individually ranked into deciles with one representing the value of the proxy that predicts the lowest future RNOA and ten representing the highest value. Ranks are computed within the corporations' industry-years, with industry determined using the Fama-French 48 (FF48) industry classifications (Fama and French 1997).

The next step is to determine the presence of monotonicity by graphing the mean RNOA within each decile for each proxy. The slope of a monotonic line is continually increasing; this signifies that with the increase in decile, the mean RNOA also increases. Stated alternatively, as the competitive efforts increase, future RNOA increases. Non-monotonicity in the graph could potentially indicate problematic issues, such as diminishing returns; therefore, the proxy would have to either be transformed or omitted from the score.

The ranked proxies that demonstrate monotonicity are added together to create the competitive advantage score (CA). If all ten proxies are significant and show monotonicity, the minimum CA will be ten and the maximum will be 100. In an effort to validate the score, this analysis will estimate the following future profitability regression modeled in Dickinson and Sommers (2012) by replacing all ten proxies with the single CA score to determine both its statistical and economic significance:[19]

$$RNOA_{t+1} = \alpha_0 + \alpha_1 CA_t + \alpha_2 RNOA_t + \alpha_3 \Delta RNOA_t + \alpha_4 GNOA_t + \alpha_5 Size_t + \alpha_6 LC_t + \varepsilon \quad (1)$$

There are several advantages to creating this composite score. The composite score should help further link the strategic management literature with accounting research. While assessing the different components of competitive advantage in isolation can provide insight, a

[18] Each proxy description, along with its predicted directionality, is included in Table 1.
[19] See Appendix B for variable definitions.

quantifiable measurement derived from accounting data to assess the overall competitive

advantages of the corporation could answer numerous research questions. Also, while Dickinson

and Sommers (2012) used all ten proxies together in a regression, they were used as independent

variables; creating the composite score will allow future research to use competitive advantages

as a dependent variable. Since the economy is becoming increasingly global and the most recent

inverting corporations cite a lack of *global* competitiveness, the CA score is created using data

from both Compustat North America and Compustat Global databases.

Test of Hypothesis 1

The first hypothesis states that the ETR of the corporation will affect the competitive

advantages of the corporation. Specifically, an increase in GAAP ETR will increase competitive

advantages until a maximum ETR value, at which time an increase in ETR will lower the

competitive advantages of the corporation. However, H1b predicts a negative relationship

between Cash ETR and competitive advantages. To examine these hypotheses, this dissertation

uses the regression model below:

$$CA_{t+1} = \beta_0 + \beta_1 ETR_t + \beta_2 ETR_t^2 + \beta_3 CA_t + \beta_4 RNOA_t + \beta_5 Size_t + \beta_6 LC_t + \varepsilon^{[20]} \quad (2)$$

This model will explore how the effective tax rate in the current year influences the

competitive advantages of the following year. As previously stated, ETR is measured using both

GAAP and Cash ETRs. H1a predicts a positive relationship between ETR and CA; if supported,

β_1 will be significantly positive. Since H1a also hypothesizes a decline in CA with an increase

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[20] All continuous variables in all regressions will be winsorized at 1 and 99. Following the literature, ETRs will be winsorized at 0% and 100%. Since the CA score is calculated by industry-year, all other variables will be industry adjusted by subtracting the industry median from the raw value of the variable. Additionally, the standard errors will be clustered by firm and year.

in ETR, the quadratic term for ETR is entered into the model.[21] If this conjecture is supported, the β_2 will be significantly negative. H1b predicts that as Cash ETR increases, CA decreases; therefore, this result would suggest a significantly negative β_1 coefficient.

The current year's CA score is included as a control variable; the competitive advantages of the current year should have some bearing on the competitive advantages of next year. Also, since Dickinson and Sommers (2012) find significance in each of the ten competitive efforts proxies in determining future RNOA, it follows that RNOA in the current period would have an effect on the competitive advantages of the corporation in the next period; therefore, current year RNOA is also used as a control variable in this model. Following Dickinson and Sommers (2012), the model also includes size as a control variable for competitive advantages.

The final variable in the model will control for a corporation's life cycle stage. LC is a series of four indicator variables for the growth, introduction, shakeout, and decline life cycle stages (the mature stage is the reference stage). Dickinson (2011) developed a proxy for the stages of a corporation's life cycle based on cash flow patterns within the operating, investing, and financing activities sections of the statement of cash flows.

> Business firms are evolving entities, with the path of evolution determined by internal factors (e.g., strategy choice, financial resources, and managerial ability) and external factors (e.g., competitive environment and macroeconomic factors). Firm life cycles are distinct phases that result from changes in these factors, many of which arise from strategic activities undertaken by the firm (Dickinson 2011, 1969).

Gaining competitive advantages requires strategic activities (possibly including tax avoidance techniques) by the corporation; therefore, it follows that corporations within the same life cycle would have similar internal and external pressures that might help explain competitive

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[21] Quadratic terms are most often used to model the non-linear effect of variables in social science literature (Dawson 2013). Since ETR is expected to reverse its trend at some maximum level, this would signify a non-linear relationship.

advantages and/or their motivations to avoid taxes. While Dickinson and Sommers (2012) control for age of the corporation, Dickinson (2011) finds the life cycle measurement to be a better proxy for age. Additionally, the tax avoidance literature has begun to use the Dickinson model as a control variable (Katz et al. 2013; Drake 2015).

Test of Hypothesis 2

The second hypothesis investigates the effects of competitive advantages on tax avoidance within the inversion scenario. This dissertation identifies inverting corporations using the list provided in Rao (2015), which updated the original list compiled by Desai and Hines Jr. (2002).

For this study, the inverting corporations' competitive advantage score is measured for the two years prior to the inversion year because the completion of an inversion can be complex and take some time as corporate management would need to discuss possibilities with tax consultants and find a target before the negotiations even take place. Therefore, the point at which the corporation would assess the competitiveness of the business would be at least one year before the actual inversion. Using two years before the inversion should ensure a more reliable competitive advantage score.

There have been only 81 inversions to date, which is a relatively small number. Of these firms, many were private corporations where data is not available; therefore, tests conducted for H2a and H2b use univariate tests of means. Specifically for H2a, each inversion firm is matched to its ten closest neighbors with regard to RNOA by industry (FF48) two years before the inversion transaction. Then, the inversion firms' CA scores are compared to the mean of their neighbors in the two years before the inversion. For H2b, the change in CA score for each inversion firm from two years before inversion to one, two, and three years after the inversion

will be compared to its closest neighbors. If firms invert to gain competitive advantages, the difference between the mean CA change in the ten neighbors and the CA change in the inversion firms should be positive and significantly different from zero.

Test of Hypothesis 3

The final hypothesis consists of two parts and also explores how competitive advantages affect future tax avoidance. While the second hypothesis considered the inversion transaction as the only tax avoidance measurement, this hypothesis considers four other methods of tax avoidance.

The following model is used to test H3a:

$$TaxAvoid_t = \beta_0 + \beta_1 CA_{t-1} + \beta_2 CA_{t-1}^2 + \beta_i Controls + \varepsilon \qquad (3)$$

H3a predicts CA is negatively related to tax avoidance but also predicts a trend reversal at the highest levels of tax avoidance; accordingly, a quadratic term is also included in the analysis. Therefore, β_1 is expected to be significantly negative and β_2 is expected to be significantly positive.

The variable TaxAvoid is measured four ways: two variations of the tax shelter proxy, GAAP ETR, and Cash ETR. Like an inversion, tax shelter use is an aggressive form of tax avoidance.   The first of the two tax shelter proxies, pSHELTER, calculates the probability of the corporation engaging in a tax shelter by using the Wilson (2009) model:

$$pSHELTER = -4.30 + 6.63(BTD) - 1.72(LEV) + 0.66(Size) + 2.26(ROA) + 1.62(MNC)$$

$$+1.56(R\&D)^{22} \qquad (4)$$

This is the probability of the corporation engaging in a tax shelter expressed as a continuous variable. To model the most extreme tax avoidance, the second proxy ranks the

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[22] See Appendix B for variable definitions.

pSHELTER variable into quintiles; the highest quintile is assigned a one in the indicator variable, SHELTER, while all other quintiles are assigned a zero (Rego and Wilson 2012). Control variables will include variables proven in the literature to be determinants of tax shelters.[23] Since this second proxy is designed to model the most extreme tax avoidance only, β_1 is expected to be significantly positive while β_2 is expected to be insignificant.

GAAP ETR and Cash ETR are the final two TaxAvoid proxies. Both variables are calculated as originally described and subtracted from one to have similar interpretations with other models for the direction of the coefficients.[24] These measurements of tax avoidance do not necessarily represent aggressive avoidance, but it is plausible that corporations might also engage in less aggressive tax avoidance techniques as a response to competitive disadvantages in the prior period.

To ensure any significant results for CA are not due to industry-level competition, this dissertation uses HHI as a control variable. HHI is a proxy for industry competition, measured by the Herfindahl-Hirschman Index, which is a statistical measurement of concentration and is often used in competition studies (Newton et al. 2013; Cai and Liu 2009). HHI is calculated by summing the squares of all the corporate market shares within an industry year. A higher value of this HHI calculation signifies less market concentration (or less competition). So, HHI is reverse coded by subtracting the calculated HHI value from one, much like the ETR variable described before. Since Cai and Liu (2009) find corporations in more competitive industries tend to engage in more tax avoidance, β_5 is expected to be significant and positive.

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[23] This model will control for NOL, CAPX and LC. Other models will also control for ROA, Size, MNC, LEV, and RD. Consistent with Rego and Wilson (2012), these are used to calculate the pSHELTER variable, therefore not entered as control variables in the regression. See Appendix B for variable definitions.

[24] The ETR variables are winsorized to range from zero percent to 100 percent. With respect to ETRs, the higher the ETR, the lower the implied tax avoidance. Therefore, to have the coefficients for the independent variables follow a directional path where a positive coefficient means greater tax avoidance, the proxy is reverse-coded by subtracting the ETR from one.

The second part of the third hypothesis introduces the dynamic capabilities proxy, managerial ability, into the model. [25] As previously mentioned, this proxy is unavailable for the global database; consequently, it cannot be used as a component of the global competitive advantages composite score. The sign of β_3 is expected to be significantly negative (consistent with prior literature and predictions of the coefficients on CA hypothesized with H3a). This hypothesis also predicts a reversal; therefore, β_4 is expected to be positive. The model to test H3b is presented below:

$$TaxAvoid_t = \beta_0 + \beta_1 CA_{t-1} + \beta_2 CA^2_{t-1} + \beta_3 MA_{t-1} + \beta_4 MA^2_{t-1} + \beta_i Controls + \varepsilon \quad (5)$$

Conclusion

The purpose of this dissertation is to determine the effect of a corporation's total global competitive advantages on its tax avoidance activities. Corporations claim they are at competitive disadvantages due to the high U.S. tax rates and worldwide tax system. Corporations that have engaged in inversion transactions, an extreme and public form of tax avoidance, cite that they cannot effectively compete in the global marketplace because of the disadvantages of the U.S. tax system. While many studies provide theoretical reasons or case studies on the legitimacy of these claims, the literature has not reached a consensus. This study contributes to this debate by empirically analyzing the effects of effective tax rates on a corporation's competitive advantages and, subsequently, the competitive advantages on a corporation's tax avoidance activities.

Before any analysis is completed, the total global competitive advantages of the corporation is summarized in a composite score. After creating the composite score, this dissertation then determines how competitive advantages of the corporation react to the effective

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[25] This measurement is publicly available from the lead author's website
http://faculty.washington.edu/pdemerj/data.html

tax rate. In addition to analyzing the inverting corporations, this study also examines the effect of competitive advantages on four tax avoidance proxies found in the extant literature. Specifically, this study hypothesizes as competitive advantages increase, tax avoidance decreases but with a trend reversal among the corporations with the highest competitive advantage scores. Following prior literature, as the managerial abilities of the corporation increases (a proxy for the dynamic capabilities of the corporation), tax avoidance is expected to decrease; however, an increase in tax avoidance is expected at the highest levels of dynamic capabilities. The next chapter contains the results from these analyses and provides interpretations and implications of the data.

IV. RESULTS

This dissertation evaluates the impact of a corporation's total global competitive advantages on its tax avoidance activities. While the academic literature has explored this conjecture (Melnik 2004; Kleinbard 2014), no known studies have investigated it empirically. Before investigating this supposition, this study first develops a composite score measuring the total global competitive advantages of the corporation and determines what influence, if any, tax rates have on a corporation's competitive advantages. With regard to tax avoidance activities, this dissertation explores the effect of competitive advantages on proxies for tax avoidance used in the literature, namely the GAAP ETR, Cash ETR, along with corporate inversions, and the probability of tax sheltering activities.

Creating the CA Composite Score

There are two main theories behind the sources of competitive advantages. The industrial organization economics (IOE) perspective suggests external forces, such as the corporation's position within its industry, drive a corporation's competitive advantages. The resource-based view (RBV) argues that internal factors, such as the value and inimitability of its products, create competitive advantages for the corporation. An extension of the resource-based view, dynamic capabilities (DC), is also becoming a popular theory within the competitive advantage literature regarding the source of a corporation's competitive advantages. Dynamic capabilities are the abilities of a corporation's management to adapt its strategy to an ever-changing business environment.

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No known measurements have been created to encompass the total competitive advantages of a corporation. Therefore, to create the competitive advantage composite score, this dissertation uses measurements developed in the prior literature to proxy for competitive efforts found within both of the main paradigms of competitive advantage sources.[26] Dickinson and Sommers (2012) develop six proxies derived from the IOE perspective and add them to the four traditional proxies derived from the RBV. All ten proxies significantly predict future profitability in their study. Therefore, this dissertation examines these ten proxies, along with a proxy for market power, to develop one measurement to capture the total competitive advantages of the corporation.

As discussed in previous chapters, corporate executives are concerned with how the U.S. tax system inhibits their global competitive advantages. Therefore, this study uses both Compustat North America and Compustat Global databases to determine competitive efforts. Creating this measurement requires several steps, outlined as follows:

1. Use the Dickinson and Sommers (2012) regression model to determine statistical significance and verify expected directionality of each proxy.[27]

2. Rank each proxy into deciles by Fama-French 48 industry year. If the directionality from step one above is negative, the proxy is ranked in descending order.

3. Graph the mean future RNOA by decile for each proxy and check for a monotonically increasing graph.

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[26] Due to data limitations, the dynamic capabilities concept of competitive advantages will not be included in the composite score; the proxy associated with this paradigm is analyzed separately.

[27] Dickinson and Sommers (2012) did not use global data; therefore, this step tests whether their results extend to a global population.

4. Add the rank (one to ten) for each significant and monotonically increasing proxy that creates the composite score.

5. Divide the composite score by its maximum value to get a percentage, which provides a more meaningful interpretation of the score.

Table 2 provides details for the composition of the sample used in constructing the CA composite score. The sample includes non-regulated corporations with available data in Compustat North America and Compustat Global for the years from 1989 through 2014. To ensure there is at least one observation within each industry-year decile to create the score, the analysis excludes corporations within industry-years comprised of less than ten total observations. To avoid a small denominator effect, observations with denominators of scaled variables less than one are excluded from the sample. Firm years that experience a net loss are also excluded.

Table 2	
Sample Construction for CA Score Creation	
Corporations with no missing year variable or SIC code	699,798
Less regulated industries	(242,137)
Less industry-years with fewer than 10 total observations	(150)
Less small denominators and net loss observations	(152,923)
Less missing values for variables in regression	(139,457)
	165,131

Notes: Table 2 presents the details of the sample obtained from merging the Compustat North America and Compustat Global databases. The sample period ranges from 1990 through 2013. Years 1989 and 2014 are used for lag and lead data and, therefore, excluded from the analysis. The year 1989 is the second year that both cash flow data and global data are available; the sample period starts in 1989 instead of 1988 due to potential issues arising from the first year of reporting cash flow data.

Table 3 presents the descriptive statistics for these tests, which appear consistent with prior literature; median RNOA (unadjusted) is 10.97 percent while Dickinson and Sommers (2012) find 10.4 percent. Two distinct differences exist between the sample data used this study compared to Dickinson and Sommers (2012): 1) this study uses a more recent time period (1990 – 2013 vs. 1979 – 2003) and 2) this study's sample consists of global corporations meeting specified criteria while the sample in Dickinson and Sommers (2012) consists of only U.S. corporations with stocks traded on the three major exchanges.

Table 3 Descriptive Statistics – CA Score Creation					
	Mean	Std Dev	25th Pctl	50th Pctl	75th Pctl
RNOA (unadj)	0.183	0.251	0.057	0.110	0.202
RNOA	0.110	0.259	-0.016	0.037	0.130
ΔRNOA	0.130	0.539	-0.056	0.041	0.193
GNOA	0.219	0.569	-0.025	0.080	0.264
Size	0.724	2.609	-1.124	0.433	2.377
Cos	0.660	0.183	0.555	0.695	0.796
AdvInt	0.002	0.011	0.000	0.000	0.000
Innov	0.016	0.036	0.000	0.001	0.014
CapInt	0.047	0.050	0.018	0.033	0.056
OLLev	0.667	0.802	0.258	0.433	0.741
InvTurn	0.239	0.261	0.074	0.178	0.311
ARTurn	0.211	0.157	0.115	0.180	0.267
FLev	0.373	1.015	-0.207	0.153	0.633
ExFunds	0.314	0.805	0.000	0.000	0.255
PCM	0.006	0.167	-0.065	-0.002	0.071
MA	0.012	0.129	-0.069	0.004	0.085

Notes: This table presents descriptive statistics for 165,131 firm-year observations from 1990 through 2013. (Managerial ability [MA] has fewer observations [46,878] due to data limitations.) See Table 1 for descriptions of the competitive efforts proxies and Appendix B for all other variable definitions. Consistent with prior literature, values of zero were given to observations with missing data for advertising expense, R&D expense, patent amortization expense, depreciation expense, inventory, or accounts receivable. Values of zero were also given to missing data in observations for investment and advances other, preferred stock, preferred treasury stock, preferred dividends in arrears, marketable securities adjustment, interest and related income, retained earnings cumulative translation adjustment, preferred dividends, and minority interest. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 4 presents regression results of each individual proxy on future RNOA to determine the significance of each proxy's predictive value to future RNOA and verify the expected directionality of the proxy.

Statistically significant proxies include Cost of Sales (CoS), Innovation Intensity (Innov), Capital Intensity (CapInt), Operating Liability Leverage (OLLev), Accounts Receivable Turnover (ARTurn), Financial Leverage (FLev), Excess Funds (ExFunds), Price-Cost Margin (PCM), and Managerial Ability (MA). Of these, OLLev, ExFunds, PCM, and MA are positively related to future RNOA, which leaves CoS, Innov, CapInt, ARTurn, and FLev negatively related. All proxies follow the anticipated directionality except Innov.

After the confirmation of the directionality for each proxy's relationship to future RNOA, the next step ranks the proxies into deciles. If the proxy has a negative relationship to future RNOA, the proxy is ranked in descending order. Therefore, each proxy should have the "best" values in the tenth decile.

Appendix C presents graphs that display the mean future RNOA by each proxy decile to test for monotonicity. Since negatively related proxies are ranked in descending order (even if the proxy is not statistically significant), each graph should show a line with a continually increasing slope. If the line is not continually increasing, it is not considered to be monotonic. All proxies that are both statistically significant and monotonic are included in the score.

The proxies with monotonically increasing graphs are: CoS, CapInt, OLLev, ARTurn, FLev, PCM, and MA. Note that both OLLev and FLev increase only slightly through each decile until the last two or three deciles where mean RNOA increases more dramatically; this should bias against the decile ranking instead of biasing toward it.

		Table 4											
		Regression of One-Year-Ahead Industry-Adjusted Return on Net Operating Assets on Current Industry-Adjusted Competitive Effort Proxies											
		CoS		**AdvInt**		**Innov**		**CapInt**		**OLLev**		**InvTurn**	
		Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Intercept		0.027	11.2***	0.028	11.4***	0.029	11.3***	0.030	12.1***	0.023	11.5***	0.028	11.8***
CoS	(−)	-0.039	-4.9***										
AdvInt	(+)			-0.056	-0.8								
Innov	(+)					-0.151	-2.8***						
CapInt	(−)							-0.216	-10.6***				
OLLev	(+)									0.048	16.1***		
InvTurn	(−)											-0.002	-0.7
RNOA		0.637	21.5***	0.640	21.7***	0.641	21.9***	0.634	21.5***	0.576	21.4***	0.640	21.7***
ΔRNOA		-0.010	-6.1***	-0.010	-5.9***	-0.010	-5.9***	-0.010	-5.9***	-0.010	-5.7***	-0.010	-6.0***
GNOA		-0.116	-16.6***	-0.116	-16.6***	-0.116	-16.6***	-0.116	-16.6***	-0.102	-17.9***	-0.116	-16.6***
Size		0.001	1.0	0.000	0.5	0.000	0.6	0.000	0.5	-0.002	-2.2**	0.000	0.5
LCD_I		-0.022	-4.5***	-0.024	-5.1***	-0.025	-5.2***	-0.027	-5.6***	-0.024	-5.3***	-0.024	-5.1***
LCD_G		0.000	-0.1	0.000	-0.1	0.000	-0.1	0.001	0.3	0.002	0.6	0.000	-0.1
LCD_S		-0.023	-10.7***	-0.024	-10.8***	-0.024	-10.8***	-0.025	-11.2***	-0.029	-13.9***	-0.024	-10.6***
LCD_D		-0.071	-15.2***	-0.074	-15.7***	-0.074	-15.7***	-0.075	-16.2***	-0.079	-18.3***	-0.073	-15.8***
Adj. R^2		0.384		0.383		0.383		0.384		0.404		0.383	

		ARTurn		MktShr		FLev		ExFunds		PCM		MA	
		Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Intercept		0.029	12.2***	0.028	11.8***	0.030	13.1***	0.022	9.8***	0.028	11.8***	0.030	9.1***
ARTurn	(−)	-0.042	-6.5***										
MktShr	(+)			-0.048	-0.4								
FLev	(−)					-0.010	-9.1***						
ExFunds	(+)							0.050	14.3***				
PCM	(+)									0.076	6.9***		
MA	(+)											0.126	13.7***
RNOA		0.638	21.7***	0.640	21.7***	0.630	21.9***	0.550	24.0***	0.632	21.5***	0.565	19.6***
ΔRNOA		-0.010	-6.0***	-0.010	-6.0***	-0.010	-5.9***	-0.011	-6.8***	-0.009	-5.6***	-0.005	-1.5
GNOA		-0.115	-16.6***	-0.116	-16.6***	-0.114	-16.9***	-0.097	-19.8***	-0.116	-16.6***	-0.099	-11.5***
Size		0.000	0.5	0.000	0.6	0.001	0.8	-0.001	-0.8	0.000	0.4	0.004	5.2***
LCD_I		-0.021	-4.4***	-0.024	-5.1***	-0.021	-4.3***	-0.027	-6.1***	-0.022	-4.3***	-0.052	-6.7***
LCD_G		0.000	0.1	0.000	-0.1	0.001	0.4	-0.002	-0.9	-0.001	-0.4	-0.004	-0.9
LCD_S		-0.023	-10.1***	-0.024	-10.8***	-0.025	-11.6***	-0.036	-21.1***	-0.023	-10.0***	-0.028	-5.2***
LCD_D		-0.069	-13.8***	-0.074	-15.9***	-0.073	-15.8***	-0.083	-20.8***	-0.069	-14.7***	-0.124	-11.7***
Adj. R^2		0.384		0.383		0.385		0.404		0.385		0.312	

Notes: Table 4 presents the parameter estimates and test statistics based on the regressions of 165,131 firm-year observations for the following regression model: $RNOA_{t+1} = \alpha_0 + \alpha_1 Proxy_t + \alpha_2 RNOA_t + \alpha_3 \Delta RNOA_t + \alpha_4 GNOA_t + \alpha_5 Size_t + \alpha_6 LC_t + \varepsilon$

t-Statistics are computed by clustering the standard errors by corporation and year. All continuous variables are winsorized at the 1st and 99th percentiles. See Table 1 and Appendix B for variable definitions. ***, **, * denote statistical significance at 1%, 5%, and 10%, respectively. The competitive effort of managerial ability (MA) has a reduced number of observations (46,878) due to its unavailability with global corporations.

Proxy graphs that do not indicate monotonicity include: AdvInt, Innov, InvTurn, MktShr, and ExFunds. Looking again at Table 3, AdvInt has a zero value at the 25th, 50th, and 75th percentiles; recall that if advertising expense was missing for an observation, the value was set to zero. Since the Compustat Global database does not populate advertising expense, over 75 percent of the values for this variable are zero. The insignificance of AdvInt is, therefore, understandable. Due to its insignificance and resulting lack of monotonicity, AdvInt is not included in the composite score. The Innov proxy has a similar problem with almost 50 percent of the sample having missing data for research and development expense. While the proxy is significant in Table 4, its graph is not monotonically increasing until the seventh decile where it dramatically increases. Therefore, this proxy is not used in the composite score.

InvTurn is insignificant in predicting future RNOA and its graph is not monotonic. However, OLLev meets both criteria. Since both InvTurn and OLLev are meant to capture the competitive effort of power over suppliers, only OLLev will be included in the score to proxy for this effort. The ExFunds proxy is signifiant and has a mostly monotonic graph; however, deciles one through four are not monotonic. This proxy is meant to capture the competitive effort of credible threat of expected retaliation. The FLev proxy also captures this effort, has statistical significance, and has a monotnoic graph. Therefore, FLev will be used to proxy for the credible threat of expected retaliation and the ExFunds proxy is excluded.

Surprisingly, the MktShr proxy is both insignificant and has a non-monotonic graph. Like MktShr, ARTurn is a proxy for power over customers. Acito et al. (2015) use both MktShr and PCM to proxy for market power. Therefore, since they have both statistical significance and a monotonic graph, ARTurn and PCM are both included in the composite score.

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The combination of these results lead to including the following competitive efforts proxies into the global competitive advantage composite score (CA): CoS, CapInt, OLLev, ARTurn, FLev, and PCM. These proxies represent the competitive efforts of economies of scale, capital requirements, power over suppliers, power over customers, and credible threat of expected retaliation; therefore, this score provides a comprehensive measurement of competitive advantages. To calculate the score, the six significant, monotonic proxy deciles are simply added together, giving a possible raw CA score range from 6 to 60. To better interpret the meaning behind the score, the raw value of the score is linearly transformed by dividing the score by 60, its maximum value, which will express the competitive advantages as a percentage.

Correlation coefficients for the sample appear in Table 5. While the majority of the individual competitive efforts proxies are significantly correlated with the CA score and with each other, most correlations are relatively low. The highest correlation noted is between ExFunds and FLev (Spearman coefficient = -0.88); since these are constructed to capture the same competitive effort in opposite directions, a high negative correlation is expected. No other correlations exceed ± 0.55. Therefore, each competitive effort proxy appears to capture specific characteristics of the corporation; the CA score combines these characteristics into one variable.

Table 6 Panel A presents descriptive statistics for the CA score. The mean is 54.7 percent and the median is 53.3 percent. As expected, the minimum value of the CA score is 10 percent (6 divided by 60) and the maximum score is 100 percent (both untabulated). Panel B presents the results of the same regression used in Table 4 but including the newly-created CA composite score percentage in place of the competitive efforts proxies.

Table 5
Pearson and Spearman Correlation Coefficients: CA Score Creation
n = 165,131

	CA	AdvInt	Innov	CapInt	OLLev	ExFunds	CoS	InvTurn	ARTurn	MktShr	FLev	PCM	RNOA$_{t+1}$	RNOA	ΔRNOA
CA		0.11	0.15	-0.13	0.34	0.42	-0.38	0.01	-0.31	-0.02	-0.41	0.21	0.44	0.45	0.23
AdvInt	0.10		0.06	-0.02	-0.02	0.00	-0.16	0.02	-0.12	-0.04	0.03	-0.08	0.02	0.03	0.04
Innov	0.08	0.09		0.08	0.02	0.19	-0.36	0.08	0.06	-0.02	-0.15	0.08	0.05	0.11	0.11
CapInt	-0.17	-0.02	0.13		-0.20	-0.10	-0.45	-0.05	0.05	-0.02	0.11	0.33	-0.08	-0.09	-0.03
OLLev	0.42	-0.01	0.13	-0.35		0.53	0.13	-0.12	0.02	0.03	-0.22	-0.06	0.37	0.32	0.16
ExFunds	0.52	0.00	0.13	-0.14	0.32		-0.12	-0.07	-0.02	-0.01	-0.37	0.04	0.45	0.45	0.26
CoS	-0.37	-0.16	-0.24	-0.45	0.18	-0.12		-0.20	-0.05	0.05	0.09	-0.41	-0.16	-0.19	-0.13
InvTurn	0.00	0.03	0.09	-0.01	-0.17	-0.07	-0.18		0.13	-0.03	0.02	0.07	-0.05	-0.05	-0.03
ARTurn	-0.33	-0.18	0.17	0.04	0.04	0.05	-0.04	0.11		-0.04	-0.03	0.07	-0.09	-0.04	-0.03
MktShr	0.00	-0.06	0.14	-0.04	0.20	0.02	0.14	-0.05	-0.04		0.02	-0.01	-0.01	-0.02	-0.02
FLev	-0.55	0.01	-0.15	0.13	-0.30	-0.88	0.13	0.06	-0.07	0.01		-0.03	-0.20	-0.22	-0.12
PCM	0.26	-0.07	0.04	0.27	-0.13	0.05	-0.43	0.05	0.06	-0.07	-0.05		0.15	0.15	0.06
RNOA$_{t+1}$	0.47	0.04	0.01	-0.10	0.21	0.28	-0.17	-0.05	-0.10	-0.01	-0.29	0.21		0.55	0.29
RNOA	0.52	0.06	0.02	-0.13	0.19	0.32	-0.21	-0.05	-0.08	-0.06	-0.33	0.24	0.62		0.55
ΔRNOA	0.30	0.04	0.03	-0.08	0.12	0.21	-0.13	-0.04	-0.05	-0.04	-0.21	0.13	0.32	0.52	

Notes: Pearson correlation coefficients are presented above the diagonal and Spearman below. Significant correlations at $p < 0.05$ are bolded.

The coefficient for CA is both positive and significant at value of 0.335. If a corporation were to increase competitive advantages by five percent (or three points out of 60), the coefficient indicates that its future RNOA increases by 1.675 percent ($0.05 \times 0.335 = 0.01675$). Given that the mean future industry-adjusted RNOA is 6.57 percent (untabulated), an addition of 1.675 percent increases the mean RNOA by approximately 25 percent ($6.57 + 1.675 = 8.245$; $8.245 \div 6.57 = 1.25$). Therefore, this increase suggests the CA score is economically significant.

Table 6					
Panel A: Descriptive Statistics					
	Mean	**Std Dev**	**25th Pctl**	**50th Pctl**	**75th Pctl**
CA	0.547	0.118	0.467	0.533	0.617
Panel B: Results of Regression					
	Coeff	**t-stat**			
Intercept	-0.157	-20.6	***		
CA	0.335	24.0	***		
RNOA	0.555	19.2	***		
ΔRNOA	-0.008	-4.9	***		
GNOA	-0.104	-16.6	***		
Size	0.001	0.8			
LCD_I	-0.002	-0.5			
LCD_G	0.008	3.3	***		
LCD_S	-0.019	-9.1	***		
LCD_D	-0.052	-11.1	***		

Notes: Panel A presents descriptive statistics for 165,131 firm-year observations from 1990 through 2013. The CA score is the result of adding togther the deciles of the competitive efforts (CoS, CapInt, OLLev, ARTurn, Flev, and PCM) then and dividing by the maximum possible score, 60.

Panel B presents the parameter estimates and test statistics based on the regressions of 165,131 firm-year observations for the following regression model:

$$RNOA_{t+1} = \alpha_0 + \alpha_1 CA_t + \alpha_2 RNOA_t + \alpha_3 \Delta RNOA_t + \alpha_4 GNOA_t + \alpha_5 Size_t + \alpha_6 LC_t + \varepsilon$$

t-Statistics are computed by clustering the standard errors by firm and year. All continuous variables are winsorized at the 1st and 99th percentiles. See Table 1 and Appendix B for variable definitions. *** denotes statistical significance at 1%.

Consistent with Dickinson and Sommers (2012), contemporaneous RNOA, change in RNOA, and growth in NOA are all significant predictors of future RNOA and in the same direction as they reported. The life cycle dummy variables suggest that corporations in the growth stage have the highest future RNOA, followed by the mature and introduction stages, which are not statistically different from each other.

The results of the correlations and regression analysis indicate the CA score is a significant and unique proxy for the total global competitive advantages of a corporation. The tests for the hypothesis used in this dissertation will rely on the CA score's measurement to determine the influence effective tax rate measurements have on corporations' competitive advantages and how corporations' competitive advantages (or lack thereof) influence their tax avoidance activities.

Hypothesis 1 Results

Executives call for corporate tax reform, citing the inability to remain globally competitive because of the high tax rates and worldwide system of the U.S. tax code. Therefore, the first hypothesis seeks to examine the effect of corporations' tax positions on their competitive advantages. Due to the differing calculations of GAAP and Cash ETRs, Hypothesis 1 consists of two parts: one part hypothesizing the effect of GAAP ETR on CA and the second part hypothesizing the effect of Cash ETR on CA. As originally stated in chapter III, the first part hypothesizes that the GAAP effective tax rate will have a positive relationship with the competitive advantage score; however, this trend reverses at the highest levels of ETR, indicating after some maximum ETR, the corporation begins to lose competitive advantages. The second part of Hypothesis 1 states that the cash effective tax rate will have an inverse relationship with the competitive advantage score.

The sample used for these regressions includes all observations from the Compustat North America and Compustat Global databases with sufficient data. Table 2 reports 304,588 observations in the sample for the CA variable construction. Of this sample, 126,922 observations did not have sufficient data for the regressions; therefore, the final sample consists of 177,666 observations. Table 7 presents descriptive statistics of all variables used in all hypotheses while Table 8 shows correlations.

	Mean	**Std Dev**	**25th Pctl**	**50th Pctl**	**75th Pctl**
Table 7					
Descriptive Statistics: Hypothesis 1					
CA_{t+1}	0.554	0.118	0.467	0.550	0.633
CA	0.557	0.118	0.467	0.550	0.633
GAAP ETR	0.277	0.176	0.157	0.280	0.375
GAAP ETR^{IA}	0.002	0.172	-0.101	0.002	0.087
GAAP ETR$^{2\,IA}$	0.030	0.067	0.002	0.009	0.031
Cash ETR	0.139	0.192	0.000	0.028	0.248
Cash ETR^{IA}	0.115	0.191	0.000	0.003	0.215
Cash ETR$^{2\,IA}$	0.050	0.127	0.000	0.003	0.047
RNOA^{IA}	0.129	0.271	-0.006	0.050	0.152
Size^{IA}	0.862	2.523	-0.921	0.533	2.423

Notes: This table presents descriptive statistics for 177,666 firm-year observations from 1990 through 2013. See Appendix B for variable definitions. All observations are recorded at time *t* unless otherwise noted. By construction, CA is industry-adjusted. The superscript "IA" denotes the variable was industry-adjusted by subtracting the median value from the variable in each industry-year (industry defined using the Fama French 48 categorization scheme). ETR variables were truncated (winsorized) at 0 and 1 before being industry-adjusted. All other continuous variables are winsorized at the 1st and 99th percentiles.

The mean CA scores for year *t* and *t+1* are almost identical. The Pearson (Spearman) correlation for CA at these periods is 0.85 (0.84). This suggests that the CA score does not greatly vary from year to year. The table reports somewhat lower mean GAAP and Cash ETRs than what much of the tax literature presents. Since this sample includes global corporations,

Table 8
Pearson and Spearman Correlation Coefficients: Hypothesis 1
n = 177,666

	CA_{t+1}	CA	GAAP ETR	Cash ETR	GAAP ETR^{IA}	GAAP $ETR^{2\,IA}$	Cash ETR^{IA}	Cash $ETR^{2\,IA}$	$RNOA^{IA}$	$Size^{IA}$	LCD_I	LCD_G	LCD_S	LCD_D
CA_{t+1}		0.85	0.04	0.03	0.03	-0.09	0.03	-0.02	0.39	-0.06	-0.16	-0.10	0.04	-0.05
CA	0.84		0.02	0.02	0.02	-0.12	0.02	-0.04	0.47	-0.07	-0.17	-0.07	0.03	-0.07
GAAP ETR	0.07	0.06		0.21	0.96	0.44	0.21	0.21	-0.16	0.16	-0.02	-0.04	0.00	-0.01
Cash ETR	0.06	0.06	0.15		0.17	0.02	0.98	0.86	-0.02	-0.20	0.01	-0.01	-0.03	-0.01
GAAP ETR^{IA}	0.07	0.06	0.93	0.10		0.45	0.17	0.19	-0.16	0.18	-0.02	-0.05	0.00	-0.01
GAAP $ETR^{2\,IA}$	-0.11	-0.15	-0.09	-0.24	-0.05		0.03	0.16	-0.09	0.06	0.02	-0.01	0.05	0.05
Cash ETR^{IA}	0.06	0.07	0.17	0.91	0.11	-0.24		0.87	-0.03	-0.19	0.01	-0.01	-0.03	0.00
Cash $ETR^{2\,IA}$	0.06	0.06	0.15	0.91	0.12	-0.22	0.74		-0.06	-0.11	0.03	-0.01	0.00	0.02
$RNOA^{IA}$	0.44	0.53	-0.21	0.10	-0.21	-0.19	0.08	0.07		-0.10	-0.02	0.03	0.01	0.00
$Size^{IA}$	-0.06	-0.07	0.15	-0.27	0.17	0.08	-0.24	-0.24	-0.15		-0.04	-0.02	0.01	0.00
LCD_I	-0.16	-0.17	-0.03	0.00	-0.04	0.02	0.00	0.00	-0.03	-0.05		-0.19	-0.09	-0.04
LCD_G	-0.10	-0.08	-0.04	0.01	-0.06	-0.02	0.00	0.01	0.04	-0.02	-0.19		-0.21	-0.10
LCD_S	0.04	0.03	-0.02	-0.05	-0.01	0.06	-0.04	-0.05	-0.03	0.01	-0.09	-0.21		-0.05
LCD_D	-0.05	-0.06	-0.03	-0.03	-0.02	0.05	-0.02	-0.02	-0.04	0.00	-0.04	-0.10	-0.05	

Notes: Pearson correlation coefficients are presented above the diagonal and Spearman below. Significant correlations at p < 0.05 are bolded.

lower mean ETRs are expected since the U.S. has the highest statutory tax rate in the world. Untabulated results indicate ETRs for U.S. corporations only are consistent with prior literature descriptive statistics.

Multivariable Results

The regression results displayed in Table 9 indicate that, for both GAAP ETR (Hypothesis 1a) and Cash ETR (Hypothesis 1b), corporations' one-year-ahead CA increase as ETR increases with no subsequent decrease at higher levels of ETR. The coefficient on ETR indicates that increases in ETR decrease competitive advantages (GAAP ETR 0.007, p<0.01; Cash ETR is not significant). However, the coefficient on the quadratic term shows a trend reversal, suggesting that as effective tax rates rise, so do competitive advantages (GAAP ETR 0.022, p<0.01; Cash ETR 0.018, p<0.01). These findings do not confirm the hypothesis, nor are they consistent with the statements from corporate executives. These results suggest that the GAAP and Cash ETRs do not impede the competitive advantages of corporations. Figure 1 (2) provides a graphical representation of the relationship between GAAP ETR (Cash ETR) and CA in the next year while keeping all other variables in the regression at their respective means. For those corporations with lower ETRs, the graphs indicate a loss in competitive advantages with increases in GAAP and Cash ETR; however, Table 9 reports this trend is not statistically significant with Cash ETR and does not appear to be economically significant to either GAAP or Cash ETR. The loss of competitive advantages is less than one-half of one percent in both cases. Interestingly, current-year profitability (proxied by industry-adjusted RNOA) does not significantly predict future competitive advantages. Its insignificance is likely due to the current-year CA of the corporation, which significantly predicts the CA next year; this along with the large and significant correlation coefficients suggests that the CA score

changes little from year to year, making the statistical significance of other variables (like ETR) even more compelling.

Table 9						
Results of Regression of Effective Tax Rates on Future Competitive Advantages						
	GAAP ETR			**Cash ETR**		
	Coeff	**t-stat**		**Coeff**	**t-stat**	
Intercept	0.089	33.9	***	0.089	29.0	***
ETR	0.007	3.3	***	-0.004	-1.2	
ETR^2	0.022	5.9	***	0.018	4.3	***
CA	0.840	168.8	***	0.841	168.6	***
RNOA	0.000	0.3		0.000	-0.2	
Size	0.000	-1.0		0.000	0.1	
LCD_I	-0.011	-12.1	***	-0.011	-11.9	***
LCD_G	-0.010	-18.6	***	-0.011	-18.2	***
LCD_S	0.001	2.0	*	0.001	2.2	**
LCD_D	0.001	0.8		0.001	0.9	
Adjusted R^2	0.7183			0.7182		

Notes: Table 9 presents the parameter estimates and test statistics based on the regressions of 177,666 observations taken from the Compustat North America and Compustat Global databases. The regression model is as follows:

$$CA_{t+1} = \beta_0 + \beta_1 ETR_t + \beta_2 ETR_t^2 + \beta_3 CA_t + \beta_4 RNOA_t + \beta_5 Size_t + \beta_6 LC_t + \varepsilon$$

t-Statistics are computed by clustering the standard errors by firm and year. All variables (excluding life cycle dummy variables) are industry adjusted. GAAP and Cash ETRs are truncated (winsorized) to zero and one before adjusting for industry. All other continuous variables are winsorized at the 1st and 99th percentiles. See Table 1 and Appendix B for variable definitions. ***, **, * denote statistical significance at 1%, 5%, and 10%, respectively.

Robustness Check

As a robustness check, these regressions were conducted without industry-adjusting the ETR variables, RNOA, and size; all inferences remain the same (untabulated). Since U.S. corporations express concerns with respect to competitive advantages, the regressions were also conducted with an indicator variable for U.S. companies. Untabulated results, again, reveal the same inferences as the initial tests provide. Also, the coefficient for the indicator variable for U.S. companies is significantly positive, indicating the U.S. corporations attain more competitive

advantages in the next year than their global counterparts while controlling for the effective tax

rate and profitability.

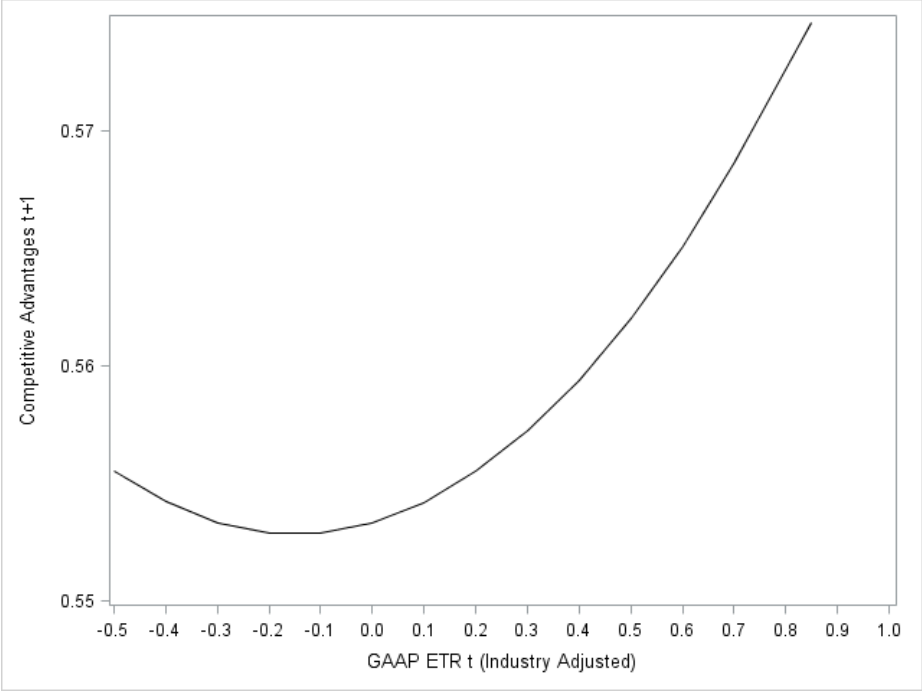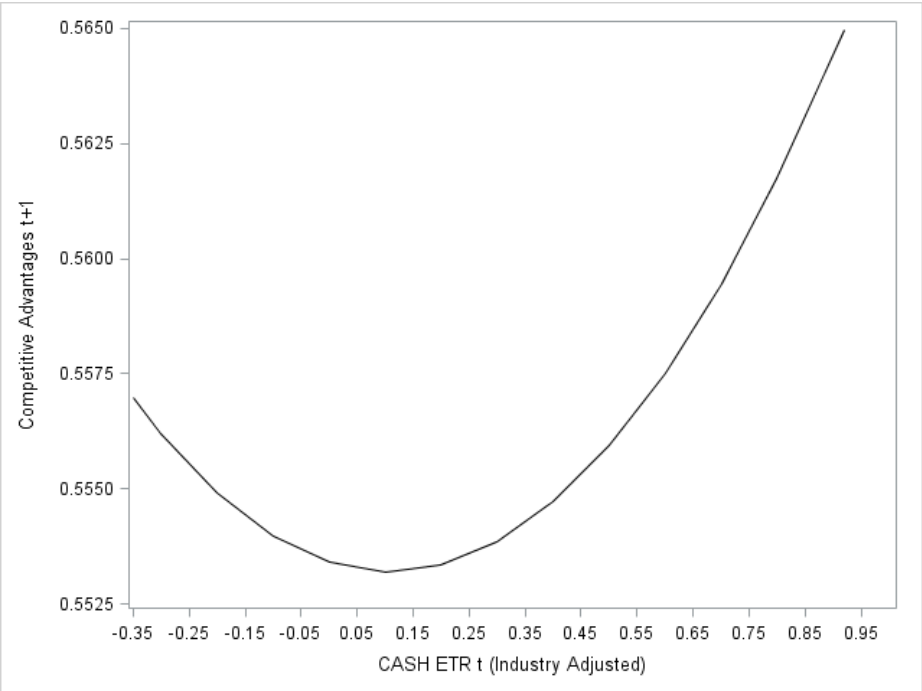Figure 1. The Effect of GAAP ETR on Future Competitive Advantages.

Figure 2. The Effect of Cash ETR on Future Competitive Advantages.

Hypothesis 2 Results

When citing reasons behind inversion transactions, corporate executives usually point to the U.S. tax code inhibiting their abilities to compete globally. The first part of Hypothesis 2 states that an inverting corporation's competitive advantages are no different from the competitive advantages of its closest industry peers in the years before the inversion is completed. Since the unique setting of an inversion allows exploration in both pre- and post-inversion periods, the second part of Hypothesis 2 conjectures that an inverting corporation's competitiveness increases in the years following the inversion more than its closest industry peers.

Sample

Appendix D includes the list of corporations used in this dissertation; Rao (2015) compiled a complete list of corporate inversions, which updates the list in Desai and Hines Jr. (2002). Although there are 81 corporations on the Rao (2015) list, the final sample only includes 26, outlined in Table 10.

Univariate Results

Since there are so few inversions with sufficient available data, the tests for Hypotheses 2a and 2b are univariate tests of means. Table 11 summarizes the results of these tests.

Table 10 Inversions Sample Construction	
Inversion Sample from Rao (2015)	81
2015 Inversions (data unavailable)	(7)
Inversions before 1989	(1)
Private Corps/No Information	(15)
Insufficient Data	(32)
Final Sample	26

Hypothesis 2a, presented in the null, states there is no difference in the CA score for the inverting corporation and its closest industry peers in the years prior to the inversion. While Melnik (2004) suggests corporations choose inversion transactions because the tax code hinders their competitive advantages, Kleinbard (2014) argues against this conjecture. $CADiff_{t-2}$ is the difference in means of the CA score between an inverting corporation and its closest ten U.S. neighbors (based on profitability) measured two years before the inversion. The negative difference presented in Table 11 suggests that, on average, the corporations choosing inversion transactions had lower competitive advantages than their ten closest competitors, although this difference is not significantly different from zero (-0.01, t-stat -0.84).

Additionally, the $ETRDiff_{t-2}$ variable indicates that there is no significant difference in the effective tax rates of the inverting corporation when compared to its ten closest peers two years prior to the inversion (-0.01, t-stat -0.42). While the negative mean suggests the inverting corporations had lower ETRs, there is no significant difference.

The CADiff variables measures the differences in an inverting corporation's CA score compared to its industry peers in each of the three years following the inversion. In year two following the inversion, the inverting corporations have significantly *lower* CA scores than their peers (-0.06, $p<0.01$). This result is corroborated by results of the variable ∆Diff; this variable measures the difference of the changes in the CA score from two years before the inversion to years one, two, and three following the inversion between the inverting corporation and its ten closest industry peers. This result shows that, on average, inverting corporations lose five percent of their competitive advantages from two years prior to the inversion to two years after the inversion when compared to their closest industry peers (-0.05, $p<0.01$). While years one and three following inversion are not statistically significant, they are also negative, indicating a

loss of competitive advantages.   If the inverting corporations choose inversions to gain competitive advantages, they do not accomplish this goal in the three years following the inversion. The ETRDiff variables for the two years following the inversion are significantly lower than their peers, which is consistent with prior literature (-0.16 and -0.12, p<0.01). However, year three does not show a significant difference.

Table 11				
Univariate Tests of Means - Corporate Inversions				
Variable	**N**	**Mean**	**t-stat**	
CADiff$_{t-2}$	20	-0.01	-0.84	
CADiff$_{t+1}$	16	-0.04	-1.63	
CADiff$_{t+2}$	14	-0.06	-3.28	***
CADiff$_{t+3}$	10	-0.02	-0.88	
ΔDiff$_{t+1}$	16	-0.02	-1.70	
ΔDiff$_{t+2}$	14	-0.05	-3.09	***
ΔDiff$_{t+3}$	10	-0.03	-0.99	
ETRDiff$_{t-2}$	20	-0.01	-0.42	
ETRDiff$_{t+1}$	16	-0.16	-4.79	***
ETRDiff$_{t+2}$	14	-0.12	-4.76	***
ETRDiff$_{t+3}$	10	-0.02	-0.30	

Notes: The CADiff variables are the mean differences of the CA score between an inverting corporation and its ten closest matches. The *t-2* measures two years before the inversion transaction while *t+1*, *t+2*, and *t+3* measures 1, 2, and 3 years after the inversion transaction. ΔDiff is the difference in means of the change in CA score of the inverting corporation and its ten closest matches, measured from two years before the inversion transaction to years 1, 2, and 3 after inversion. ETRDiff variables measure the differences of the effective tax rates between an inverting corporation and its ten closest matches. The *t-2* measures two years before the inversion transaction while while *t+1*, *t+2*, and *t+3* measures 1, 2, and 3 years after the inversion transaction. *** and ** denote statistical significance at the p < 0.01 and p < 0.05 levels, respectively.

These results indicate that while corporations that chose to invert lowered their effective tax rates significantly lower than their peers, their competitive advantages did not increase as a

result of the inversion. In fact, their competitive advantages significantly decreased in the post-inversion periods.

Hypothesis 3 Results

Hypothesis 3 extends the effects of competitive advantages on tax avoidance by using four commonly-used proxies for tax avoidance. This first part of this hypothesis predicts that, in general, the higher the competitive advantages of the corporation at the end of the prior year, the less tax avoidance; however, this trend reverses at the highest levels of competitive advantages, indicating increased tax avoidance. The second part of the third hypothesis considers the dynamic capabilities perspective of competitive advantages, using managerial ability as a proxy. Specifically, it states that managerial ability has a negative relationship with tax avoidance; however, this trend reverses for the highest-levels of managerial ability, indicating a positive relationship with tax avoidance.

Four common proxies for tax avoidance serve as the dependent variables in these tests: 1) GAAP ETR; 2) Cash ETR; 3) the probability of the corporation engaging in a tax shelter (Wilson 2009); and 4) an indicator variable denoting the highest quintile of corporations on the probability of sheltering (Rego and Wilson 2012). The first two proxies mentioned represent general tax avoidance while the latter two represent tax avoidance that is more aggressive.

Sample, Descriptive Statistics, and Correlations

The sample for Hypothesis 3 consists of only U.S. corporations; motivations for tax avoidance in other countries, especially for tax sheltering activities, may not be comparable among the different tax jurisdictions around the world. The sample consists of 34,432 observations; these observations originate from the initial CA score global sample (304,588),

after subtracting observations from non-U.S. corporations (239,779) and observations with missing values for the regression analyses (30,377).

	Mean	Std Dev	25th Pctl	50th Pctl	75th Pctl
Table 12					
Descriptive Statistics: Hypothesis 3					
pSHELTER	0.61	1.76	-0.76	0.44	1.89
Shelter	0.24	0.43	0.00	0.00	0.00
GAAP ETR	0.32	0.14	0.27	0.35	0.39
Cash ETR	0.28	0.18	0.15	0.27	0.37
CA_{t-1}	0.58	0.11	0.50	0.57	0.65
CA^2_{t-1}	0.35	0.14	0.25	0.32	0.42
HHI_{t-1}	0.81	0.22	0.74	0.91	0.94
MA_{t-1}	0.02	0.13	-0.06	0.01	0.09
MA^2_{t-1}	0.02	0.03	0.00	0.01	0.02
NOL	0.30	0.46	0.00	0.00	1.00
CAPX	0.07	0.08	0.03	0.05	0.09
RNOA	0.21	0.25	0.08	0.14	0.23
ROA	0.11	0.07	0.06	0.09	0.15
Size	6.21	1.89	4.84	6.11	7.46
MNC	0.40	0.49	0.00	0.00	1.00
LEV	0.17	0.16	0.02	0.14	0.28
R&D	0.03	0.05	0.00	0.00	0.03
LCD_I	0.05	0.22	0.00	0.00	0.00
LCD_G	0.35	0.48	0.00	0.00	1.00
LCD_S	0.07	0.25	0.00	0.00	0.00
LCD_D	0.01	0.09	0.00	0.00	0.00

Notes: This table presents descriptive statistics for 34,432 firm-year observations from 1991 through 2014. See Appendix B for variable definitions. All observations are recorded at time t unless otherwise noted. ETR variables were truncated (winsorized) at 0 and 1. All other continuous variables are winsorized at the 1st and 99th percentiles.

Table 12 reports descriptive statistics for the sample. The mean CA score at year *t-1* (0.58) approximates the reported CA score of the full global sample in Table 6 (0.55). GAAP and Cash ETR means are 32 percent and 28 percent, respectively; these values are consistent

with prior research and approximate the U.S. statutory rate of 35 percent. Shelter, pShelter, and other variables are also consistent with prior research.

	pSHELTER	Shelter	1-GAAP ETR	1-Cash ETR	CA_{t-1}	MA_{t-1}	HHI_{t-1}
pSHELTER		**0.77**	**0.13**	**0.13**	**0.17**	**0.03**	-0.01
Shelter	**0.74**		**0.12**	**0.10**	**0.13**	**0.02**	0.01
1-GAAP ETR	**0.23**	**0.22**		**0.38**	0.00	**-0.04**	0.00
1-Cash ETR	**0.14**	**0.11**	**0.38**		**-0.05**	**-0.05**	**-0.05**
CA_{t-1}	**0.16**	**0.13**	**0.03**	**-0.08**		**0.21**	-0.01
MA_{t-1}	**0.03**	**0.02**	**-0.05**	**-0.08**	**0.21**		0.01
HHI_{t-1}	**0.04**	**0.04**	0.00	**-0.06**	0.01	0.01	

Table 13
Pearson and Spearman Correlation Coefficients: Hypothesis 3 (Selected)
n = 34,432

Notes: Pearson correlation coefficients are presented above the diagonal and Spearman below. Significant correlations at $p < 0.05$ are bolded. GAAP and Cash ETR variables are reverse coded (subtracted from 1) to more easily compare to the other tax avoidance variables. The higher the value of (1-ETR), the higher the tax avoidance.

The correlations shown in Table 13 suggest that CA and MA (managerial ability, a proxy for the dynamic capabilities component of competitive advantages) are significantly related, but not highly correlated (Pearson and Spearman 0.21). Additionally, all four tax avoidance proxies are significantly and positively correlated with each other. Consistent with prior literature, the correlations are relatively low (except for Shelter and pShelter, derived from the same equation). This suggests that while each proxy may capture tax avoidance, they potentially capture different aspects of tax avoidance. The CA score is positively correlated with the most aggressive tax avoidance proxies and GAAP ETR while negatively correlated with Cash ETR. Similarly, MA is positively correlated with the most aggressive tax avoidance proxies and negatively correlated with the general tax avoidance proxies.

Table 14
Results of Regression of Competitive Advantages on Future Tax Avoidance

Panel A: Tests of Hypothesis 3a using Competitive Advantages only

	1 - GAAP ETR			1 - Cash ETR			pShelter			Shelter		
	Coeff	**t-stat**		**Coeff**	**t-stat**		**Coeff**	**t-stat**		**Coeff**	**z-stat**	
Intercept	0.61	23.87	***	0.71	18.25	***	-3.46	-8.26	***	-7.51	-10.18	***
CA_{t-1}	0.38	4.41	***	0.10	0.98		11.92	8.35	***	18.83	7.63	***
CA^2_{t-1}	-0.35	-4.70	***	-0.24	-2.65	**	-8.21	-6.64	***	-13.52	-6.60	***
HHI_{t-1}	-0.01	-1.55		-0.04	-3.24	***	-0.09	-0.64		0.01	0.06	
NOL	0.02	6.62	***	0.05	10.98	***	0.90	15.33	***	1.04	15.23	***
CAPX	0.00	0.11		0.15	6.39	***	-0.83	-3.27	***	-1.40	-3.11	***
RNOA	0.14	15.10	***	0.12	16.31	***	0.37	3.52	***	0.39	3.23	***
ROA	-0.57	-26.54	***	-0.16	-4.14	***	-	-		-	-	
Size	0.00	0.47		0.00	3.12	***	-	-		-	-	
MNC	0.02	4.90	***	-0.01	-1.62		-	-		-	-	
LEV	-0.03	-2.21	**	0.05	4.20	***	-	-		-	-	
R&D	0.28	11.27	***	0.39	10.99	***	-	-		-	-	
LCD_I	-0.02	-5.82	***	-0.05	-6.49	***	-1.16	-18.33	***	-1.65	-11.89	***
LCD_G	-0.01	-5.62	***	0.00	-0.57		-0.27	-7.48	***	-0.39	-7.82	***
LCD_S	-0.02	-3.90	***	-0.03	-5.29	***	-0.33	-6.03	***	-0.38	-5.08	***
LCD_D	-0.04	-2.92	***	-0.09	-6.03	***	-1.01	-7.32	***	-1.21	-4.29	***
Adjusted/Pseudo R^2	0.100			0.070			0.119			0.083		

Panel B: Tests of Hypothesis 3b using Competitive Advantages and Managerial Ability

	1 - GAAP ETR			1 - Cash ETR			pShelter			Shelter		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat		Coeff	z-stat	
Intercept	0.60	23.55	***	0.70	17.95	***	-3.53	-8.31	***	-7.63	-10.36	***
CA_{t-1}	0.39	4.49	***	0.10	0.96		12.09	8.45	***	19.11	7.79	***
CA^2_{t-1}	-0.35	-4.76	***	-0.23	-2.52	**	-8.36	-6.78	***	-13.76	-6.78	***
MA_{t-1}	-0.02	-1.79	*	-0.08	-6.07	***	-0.03	-0.13		-0.06	-0.21	
MA^2_{t-1}	0.12	2.65	**	0.26	4.68	***	1.35	1.41		1.69	1.57	
HHI_{t-1}	-0.01	-1.49		-0.04	-3.15	***	-0.09	-0.61		0.01	0.09	
NOL	0.02	6.66	***	0.05	11.12	***	0.90	15.41	***	1.04	15.28	***
CAPX	0.00	-0.01		0.15	6.25	***	-0.85	-3.32	***	-1.42	-3.17	***
RNOA	0.14	14.93	***	0.11	15.50	***	0.36	3.37	***	0.38	3.09	***
ROA	-0.57	-26.13	***	-0.14	-3.74	***	-	-		-	-	
Size	0.00	0.46		0.00	3.18	***	-	-		-	-	
MNC	0.02	4.88	***	-0.01	-1.73	*	-	-		-	-	
LEV	-0.03	-2.27	**	0.05	4.22	***	-	-		-	-	
RD	0.28	11.21	***	0.39	10.99	***	-	-		-	-	
LCD_I	-0.02	-5.69	***	-0.05	-6.23	***	-1.16	-18.53	***	-1.66	-11.96	***
LCD_G	-0.01	-5.59	***	0.00	-0.36		-0.27	-7.51	***	-0.39	-7.80	***
LCD_S	-0.02	-4.04	***	-0.03	-5.52	***	-0.33	-6.06	***	-0.38	-5.14	***
LCD_D	-0.04	-2.93	***	-0.09	-6.05	***	-1.02	-7.34	***	-1.21	-4.32	***
Adjusted/Pseudo R^2	0.100			0.073			0.120			0.084		

Notes: Table 14 presents the parameter estimates and test statistics based on the regressions of 36,525 observations taken from the Compustat North America database. The regression model is as follows: $TaxAvoid_t = \beta_0 + \beta_1 CA_{t-1} + \beta_2 CA^2_{t-1} + \beta_3 MA_{t-1} + \beta_4 MA^2_{t-1} + \beta_i Controls + \varepsilon$

t-Statistics are computed by clustering the standard errors by firm and year. GAAP and Cash ETRs are truncated (winsorized) to zero and one before reverse coding, which subtracts the ETRs from one to more easily compare to the other tax avoidance variables. The higher the value of (1-ETR), the higher the tax avoidance.. All other continuous variables are winsorized at the 1st and 99th percentiles. See Appendix B for variable definitions. ***, **, * denote statistical significance at 1%, 5%, and 10%, respectively.

Multivariable Results

Table 14 Panel A presents the results of Equation (3) testing Hypothesis 3a. These results suggest inferences opposite of the hypothesized outcome. Note in the ETR models that the linear trend is positive, suggesting that as prior-year competitive advantages increase, the current-year's tax avoidance increases (GAAP ETR 0.38, p<0.01; Cash ETR 0.10, not significant).[28] The significantly negative quadratic trend for both ETR models, on the other hand, indicates a reversal of the linear trend, indicating less avoidance (GAAP ETR -0.35, p<0.01; Cash ETR -0.23, p<0.05).

While both CA variables in both models exhibit the same directionality, the interpretation of the results is not exactly the same. Note that while the CA coefficient for the GAAP ETR model is positive and significant, the same variable for the Cash ETR model is not significant. Figure 3 graphically illustrates the relationship between the CA variables and GAAP ETR. The graph illustrates that a corporation at the mean of all other explanatory variables will engage in more tax avoidance, at least for financial statement purposes, until it reaches approximately 56 percent, just below the median.[29] Above a CA score of 56 percent, the corporation engages in less tax avoidance as CA increases. These results suggest that corporations actively engage in tax avoidance behavior if they possess low competitive advantages as compared to the others in their industry year. However, when their advantages increase past the median, they less-actively pursue avoidance techniques.

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[28] Recall that GAAP ETR and Cash ETR are reverse coded (subtracted from 1) for comparability to Shelter variables and clearer interpretation; a higher value of (1-ETR) indicates higher tax avoidance.

[29] By differentiating the ETR with respect to CA_{t-1} (while all other variables are held constant at their respective means), the maximum point of the parabola occurs where CA_{t-1} equals 55.7 percent (rounded). The median CA_{t-1} score as presented in Table 12 is 56.7 percent (rounded).

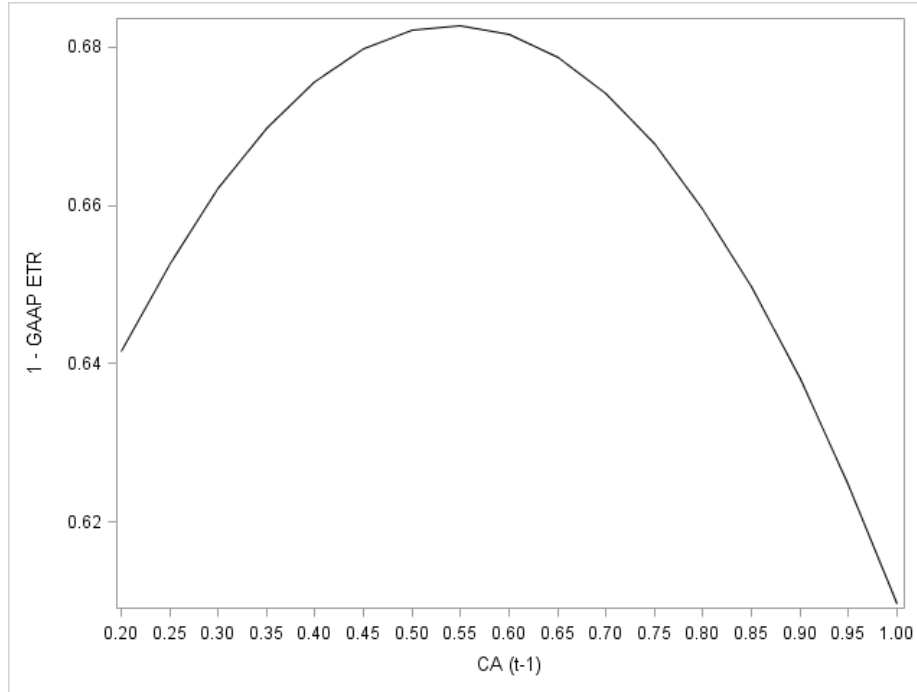Figure 3. The Effect of Competitive Advantages on Future Tax Avoidance (GAAP ETR).

Figure 4 depicts the graph for the relationship between the CA variables and Cash ETR. Note the positive coefficient on the linear trend of CA is not significant; only the negative quadratic trend coefficient is significant. Therefore, Figure 4 depicts a downward sloping line, declining at a higher rate as CA increases. Unlike the GAAP ETR model, corporations do not appear to increase cash tax avoidance activities as CA rises.

According to Graham et al. (2011), corporate executives view avoiding tax expense on the income statement as important as avoiding the cash payment of taxes. They conjecture that GAAP ETR is important because it potentially affects stock prices or compensation contracts. They also speculate that GAAP ETR is an important benchmark when comparing the corporation to its foreign competitors. It is conceivable that, with regard to a corporation's competitive advantages, the corporation is more concerned with avoiding tax expense rather than tax payments, which would explain the difference in the GAAP and Cash ETR models.

Additionally, others have noted differences between these two proxies of general tax avoidance (e.g. Armstrong et al. 2012; Robinson et al. 2010) .

Figure 4. The Effect of Competitive Advantages on Future Tax Avoidance (Cash ETR).
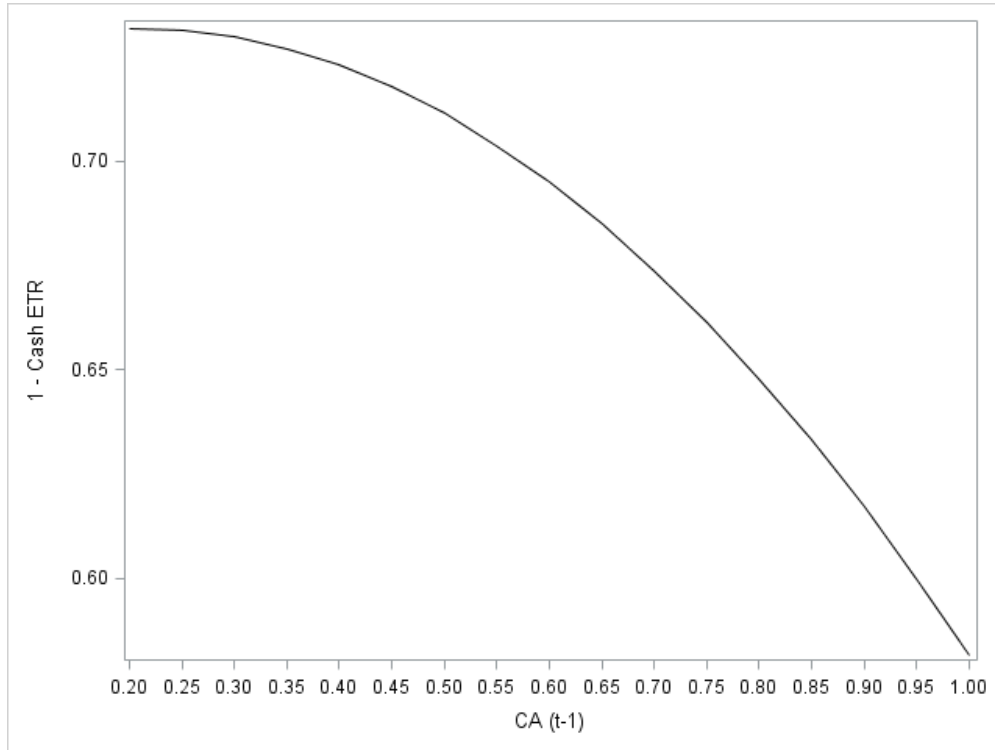
The results for the models where Shelter and pShelter are the dependent variables indicate a similar outcome. The linear trend for CA_{t-1} is significantly positive (pShelter 11.92 p<0.01; Shelter 18.83 p<0.01), indicating that as a corporation's competitive advantages increase, it is more likely to engage in tax sheltering activities. The significantly negative quadratic trend (pShelter -8.21 p<0.01, Shelter -13.52 p<0.01) reveals a reversal, showing that at a certain level of competitive advantages, corporations are less likely to engage in tax sheltering activities. These results are consistent with both dependent variables for tax sheltering: the continuous variable indicating the probability a corporation will engage in a tax shelter and the dichotomous variable indicating corporations in the highest quintile of probability. Inferences from these tests are comparable to the GAAP ETR results: as a corporation increases in its

competitive advantages, it is more likely to engage in tax sheltering activities. However, the

maximum avoidance occurs at a CA score higher than in the GAAP ETR model. Figure 5

depicts the relationship of CA to pShelter.

Figure 5. The Effect of Competitive Advantages on Future Tax Avoidance (pShelter).
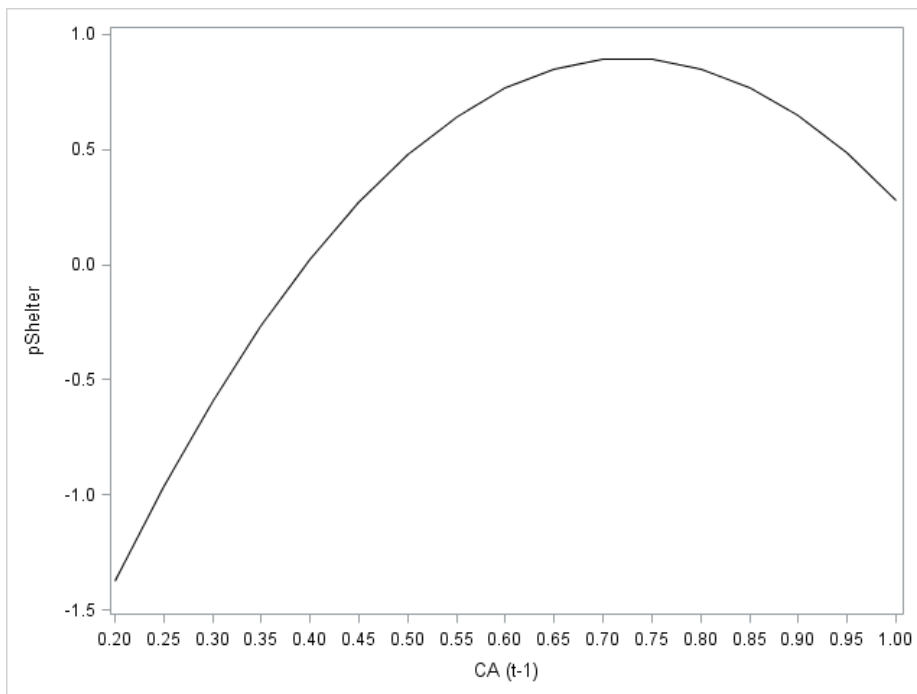
Recall that pShelter and Shelter are proxies for the most aggressive forms of tax

avoidance. The curve increases to where the maximum point of aggressiveness occurs where

CA approximates 72 percent, just below the 90th percentile of the variable.[30] Interestingly, the

top ten percent of corporations on the CA score significantly decrease in the likelihood of

engaging in tax sheltering activities. While somewhat puzzling, other studies have observed a

phenomenon called the "under-sheltering puzzle" (Desai and Dharmapala 2006; Hanlon and

Heitzman 2010; Gallemore et al. 2014; Weisbach 2002), meaning many corporations do not take

advantage of tax sheltering opportunities. Gallemore et al. (2014) explore the possibility that

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[30] By differentiating the pShelter with respect to CA_{t-1} (while all other variables are held constant at their respective means), the maximum point of the parabola occurs where CA_{t-1} equals 72.3 percent (rounded). The 90th percentile of CA_{t-1} score (untabulated) is 73.3 percent (rounded).

corporations (and their executives) sustain reputational costs from aggressively avoiding taxes. While they do not find support for their hypothesis, they note that this effect may still exist but they were unable to find it due to lack of power in their tests. An effect of reputational costs would certainly be logical in this situation where the highest ten percent of corporations on the competitive advantages spectrum begin to decrease in the probability of tax sheltering.

While the results for the tests do not confirm Hypothesis 3a, they are compelling. In summary, they suggest that as corporations increase in competitive advantages, they will increase tax avoidance activities until they place in the top half of their respective industries. For more aggressive tax avoidance techniques, the results suggest that as corporations increase in competitive advantages, they have higher probabilities of engaging in tax shelters until they reach the top ten percent of their respective industries.

The industry concentration variable, HHI, is insignificant in all models except Cash ETR. This insignificance indicates that the competitive advantages of the corporation outweigh the industry's concentration. (Kubick et al. (2015) make similar inferences.) Additionally, the significance of the competitive advantage variables persists while controlling for profitability (RNOA and ROA). Each life cycle variable in each model is both negative and significant with the exception of the growth stage in the Cash ETR model. This indicates that corporations in the mature stage of firm life cycle are more likely to avoid taxes than the other stages.[31]

The regression analysis on Equation (5), which adds the variable for managerial ability, a proxy for the dynamic capabilities component of competitive advantages, reveals the same inferences for the CA score, HHI, and life cycle variables as discussed above. The coefficient on the linear trend for the MA variable is significant and negative in both the GAAP and Cash ETR

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[31] The insignificance of LCD_G in the Cash ETR model suggests that corporations in growth and mature stages do not avoid cash payment of taxes differently from each other.

models (GAAP ETR -0.02, p<0.10; Cash ETR -0.08, p<0.01). This suggests that as managerial ability increases, tax avoidance decreases. (Francis et al. (2013) reach the same conclusion.) However, the significantly positive quadratic trend coefficient suggests a trend reversal (GAAP ETR 0.12, p<0.05; Cash ETR 0.26, p<0.01); this indicates that at a certain level of managerial ability, tax avoidance activities actually increase. These results are consistent with Hypothesis 3b.

Figure 6 shows the relationship between MA_{t-1} and tax avoidance using the GAAP ETR model.[32] Using differentiation of GAAP ETR with respect to MA_{t-1} on the regression equation (holding all other explanatory variables constant at the mean) indicates ETR is at its lowest when MA_{t-1} is approximately 0.09. Since an MA_{t-1} score of 0.09 is the value at the 75th percentile of the variable, this suggests that managerial ability at the highest 25 percent of corporations will tend to avoid taxes more while the lower 75 percent will decrease tax avoidance as they increase in their ability. The graph for the Cash ETR model looks almost identical to the graph in Figure 6, therefore not presented. The minimum avoidance occurs where MA_{t-1} approximates 0.16.

The Shelter models do not have significant linear or quadratic trend coefficients for the MA score. This insignificance suggests that while managerial ability helps predict general tax avoidance, it does not help predict aggressive tax avoidance. These results suggest that as managers increase in their abilities, managing taxes occurs after addressing other areas of the business first. Yet there is no difference in the ability of the manager when considering the probability of engaging in tax sheltering activities.

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[32] As with the previous graphs, all other explanatory variables (including CA_{t-1} variables) are held constant at their mean values.

Figure 6. The Effect of Managerial Ability on Future Tax Avoidance (GAAP ETR).
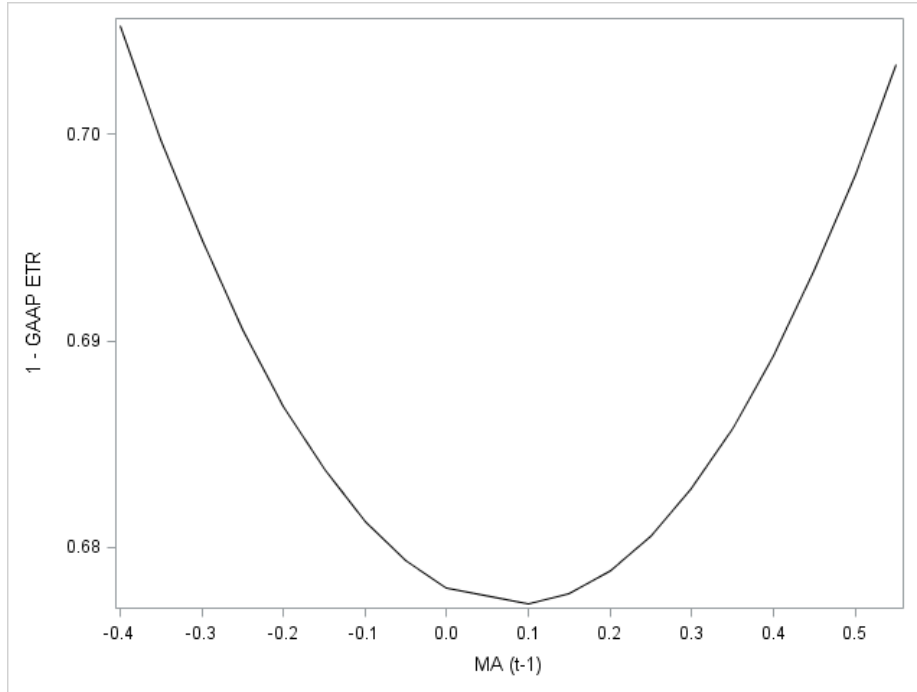
Note that the directionality and significance of the coefficients for CA did not substantially change with addition of the MA score, which suggests that CA (proxy for the combination of the IOE and RBV perspectives of competitive advantages) and MA (proxy for the DC perspective of competitive advantages) capture unique components of a corporation's total competitive advantages. Additionally, the linear and quadratic trends of these variables are in opposite directions, which is another indication that they capture unique characteristics of a corporation's competitive advantages.

Summary of Results

This dissertation first creates a variable measuring the competitive advantages of a corporation by analyzing 11 competitive efforts proxies and combining six of these proxies together into one composite score (CA). This variable is both statistically and economically significant in predicting future profitability.

After the CA score creation, this dissertation uses the variable to determine the effect of corporate income taxes on the competitive advantages of a corporation. While corporate executives cite the high statutory tax rate as one of the reasons why corporations cannot effectively compete globally, empirical analysis suggests the opposite. As the corporate tax rate increases, so do future competitive advantages.

Next, this dissertation focuses on the effect competitive advantages have on future tax avoidance. Using several univariate and multivariable tests with five proxies for tax avoidance, the results indicate that tax avoidance occurs in corporations with lower levels of competitive advantages; however, the trend begins to decline at the higher levels of competitive advantages. For general tax avoidance, once the corporation's competitive advantages exceed the median, they tend to decrease avoidance activities. However, the more aggressive types of avoidance begin the decline around the 90th percentile of competitive advantages; this indicates that as competitive advantages increase, the probability of tax sheltering also increases until it reaches the highest ten percent of the CA score, where it starts to decline.

Managerial ability, however, has the opposite effect on general tax avoidance. As managerial ability increases, tax avoidance decreases until it reaches the highest quartile of managers; the corporations in the highest quartile begin to engage in tax avoidance activities. Interestingly, managerial ability is not significant for the more aggressive types of tax avoidance.

The tax aggressive technique of the corporate inversion is unique in that it occurs only once; therefore, researchers may assess characteristics of these corporations (such as competitive advantages) both before and after the event. Many of these corporations justify their choice to invert by stating they cannot compete globally because of the U.S. tax system. Considering these corporations in the years leading up to the inversion, their competitive advantages were not

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statistically different from their peers. After the inversion transaction, the inverting corporations significantly decreased their effective tax rates. However, these corporations did not improve their competitive advantages. In fact, the competitive advantages significantly *decreased* after the inversion.

This chapter presents the creation of the global competitive advantage composite score and the results of the tests conducted on the hypothesis. The next chapter will conclude by summarizing these findings as well as discussing the study's limitations and future research opportunities.

V. CONCLUSION

Corporations are often the target of criticism in the popular press for their tax avoidance activities. Mainstream media often depicts corporations as lifeless entities that avoid paying their "fair share" of taxes, even though economists agree the burden of the corporate income tax is actually borne by either their shareholders, employees, or customers (Graetz 2008; Burman and Slemrod 2013). Corporate executives retaliate, most often indicating that their corporations cannot be globally competitive because of the high statutory tax rate and worldwide tax system of the U.S. tax code.

First, this research empirically tests this primary argument made by corporate executives in favor of corporate tax reform or in defense of tax avoidance techniques such as the corporate inversion: the U.S. tax system inhibits its corporations to compete globally. Then, it also considers the possibility that the global competitiveness of the corporation could influence tax avoidance activities; leaders of inverting corporations state that they inverted because they could not be globally competitive. While prior literature has addressed these issues with regard to corporate inversions, no known studies have analyzed it empirically. Furthermore, the research does not reach a consensus regarding how the corporate tax rate affects the global competitiveness of corporations. Melnik (2004) states that corporations avoid taxes via inversions because they cannot adequately compete due to the restrictive U.S. income tax code, while Kleinbard (2014) argues that competitiveness has nothing to do with the inversion decision.

The literature explores many other determinants of tax avoidance, including executive compensation, managerial incentives, and corporate social responsibility. Evidence indicates that if managers are incentivized based on post-tax measurements, they will be more likely to avoid taxes. Also, corporations with irresponsible corporate social responsibility are more likely to avoid tax when they are facing lower levels of current or future earnings. Recent literature considers certain *dimensions* of competitive advantages, such as market power and managerial ability. However, the results differ depending on the dimension studied. No known study considers total competitive advantages as a determinant of tax avoidance.

Before determining the effects of income taxes on competitive advantages or competitive advantages on corporate tax avoidance, this dissertation creates a global competitive advantage composite score (CA). Eleven proxies for competitive efforts were tested and analyzed in preparation for this score that considers both the industrial organizational economics (IOE) perspective and resource-based view (RBV) of competitive advantages. The analysis suggests that six competitive effort proxies are good candidates to combine into one composite score: cost of sales, capital intensity, operating liability leverage, accounts receivable turnover, financial leverage, and price-cost margin. Each observation was ranked into deciles by industry year for each proxy; the rankings (from one to ten) were then added together and divided by the maximum score possible (60) to obtain a percentage.

By using the equation modeled by Dickinson and Sommers (2012) to regress future profitability on ten competitive efforts proxies, this study substitutes the new CA score in the place of the ten proxies. The score significantly helps predict future profitability and the coefficient suggests the variable is also economically significant. The CA score is the main variable of interest in the findings of the hypotheses discussed below.

The remainder of this chapter summarizes the dissertation by reviewing each hypothesis, its methodology, and its findings. It also discusses the limitations of the study and potential avenues for future research.

Summary of Findings

Hypothesis 1 predicts how effective tax rates affect a corporation's future competitive advantages. The first part of the hypothesis considers GAAP ETR and predicts that as ETR increases, so does a corporation's competitive advantages until ETR reaches some maximum value; at this point, the hypothesis predicts competitive advantages will decline. The second part of the hypothesis considers Cash ETR and predicts an inverse relationship with future CA.

The sample used for this hypothesis is obtained from the Compustat North America and Compustat Global databases from the years 1989 through 2014. Since the hypothesis for GAAP ETR predicts a trend reversal, the equation includes both ETR and ETR^2 as explanatory variables. Other explanatory variables include current year CA, profitability, size, and indicator variables for firm life cycle. Neither hypothesis is confirmed in the hypothesized direction, but both tests show a significantly *positive* relationship with future CA. As ETR increases, so does a corporation's competitive advantages.

For these tests, all variables are industry adjusted by subtracting the median value of the respective industry year using the Fama-French 48 industry classification. Robustness checks reveal that inferences remain the same without industry adjusting these variables. The sample for Hypothesis 1 includes both U.S. and global corporations, but supplemental tests using an indicator variable for U.S. corporations provide similar results. In fact, the indicator variable coefficient for U.S. corporations is positive, indicating U.S. corporations increase in competitive advantages more than international corporations with increases in prior year ETR. Therefore, the

U.S. income tax system, measured with GAAP and Cash effective tax rates, does not appear to be inhibiting the competitive advantages of corporations; ETR appears to *improve* competitive advantages. Perhaps the higher ETR conveys a signal that the corporation pays its "fair share," which could enhance the interest in the corporation of both consumers and investors.

In the second and third hypotheses, this dissertation uses competitive advantages as an independent variable to help explain tax avoidance activities. The first (and the most aggressive) method of tax avoidance used is the corporate inversion. Corporate executives that choose this overt method of tax avoidance by moving their headquarters outside of the U.S. will generally feel pressure to provide an explanation for their actions. In a recent public statement, one CEO declared that her corporation could not be globally competitive given the restrictions of the U.S. tax code (Security 2014). Given this information, this study divides the second hypothesis into two parts. Hypothesis 2a predicts no difference in the competitive advantages of the inverting corporations when compared to their closest industry peers (measured by profitability) in the two years prior to the inversion transaction while Hypothesis 2b predicts a larger increase in competitive advantages for inverting corporations relative to their closest industry peers in the years following the inversion.

To date, 81 corporations have inverted in the U.S. (Rao 2015). Due to limitations, data are only available for 26 of these corporations;[33] therefore, the tests in Hypothesis 2 are univariate, comparing the CA score of each inverting corporation to ten of its closest industry peers in the same year matched on profitability. These tests find confirmation for Hypothesis 2a: two years prior to the transaction, inverting corporations had a mean CA score that was not significantly different from the mean of their peers. However, the competitive advantages of the

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[33] See Appendix D for the list of inverting corporations used in the study.

inverting corporations significantly *decreased* relative to their industry peers, which leads to the rejection of Hypothesis 2b.

Supplemental analyses indicate that the ETRs of the inverting corporations were not significantly different from their closest industry peers two years before the inversion. In the post-inversion period, however, the mean ETR is significantly lower for the inverting corporations when compared to their closest industry peers. The findings from Hypothesis 2 and its supplemental tests corroborate the findings of Hypothesis 1; effective tax rates do not appear to hinder the corporation's competitive advantages. Additionally, even an extreme tax avoidance technique like the inversion, which significantly reduces ETR, does not appear to improve a corporation's competitive advantages.

Since the Hanlon and Heitzman (2010) review, tax researchers have increased efforts on studying tax avoidance/aggressiveness, especially with regard to its determinants. Prior literature has researched different components of competitive advantages as determinants of tax avoidance but has not explored total competitive advantages. Also, the studies on these separate components of competitive advantages report opposing results. Considering these opposing results, Hypothesis 3a conjectures that as the CA score increases, tax avoidance will generally decrease. Then, at the highest levels of competitive advantages, corporations will reverse this trend and increase tax avoidance activities.

Since U.S. corporations likely have different motivations for tax avoidance than corporations domiciled in other countries, these tests consider only U.S. corporations. As mentioned previously, the proxy for the dynamic capabilities paradigm of competitive advantages, managerial ability, is not available for the observations in the Compustat Global database. Therefore, dynamic capabilities are not represented in the CA score, but they are

tested in conjunction with the CA score in this hypothesis in Hypothesis 3b, which predicts a generally negative relationship with tax avoidance and a subsequent reversal at the highest levels of managerial ability.

Following prior literature, this dissertation uses four tax avoidance proxies as the dependent variable in multivariable tests. The first two proxy for general tax avoidance (GAAP ETR and Cash ETR) while the last two proxy for more aggressive forms of avoidance (Shelter and pShelter). Results for the CA score are opposite from the hypothesized direction; as competitive advantages increase, so do tax avoidance activities. Corporations above the median (90th percentile) tend to decrease in their general avoidance (aggressive avoidance) activities the following year. These results indicate that corporate leaders use tax avoidance to gain competitive advantages.

Managerial ability, on the other hand, behaves as hypothesized for general tax avoidance proxies. As managerial ability increases, corporate executives are not inclined to avoid taxes as much the next year. Managers with ability at the highest 25 percent of the sample will increase tax avoidance activities with increases in managerial ability. This effect is not significant with regard to the more aggressive tax avoidance proxies that explore the probability of tax sheltering activities. These results suggest that as managers increase their abilities, they are less concerned with avoiding taxes and are potentially addressing other areas of the business; however, the most-able managers seem to go back to managing taxes, perhaps after the other issues have been addressed and the overall state of the corporation has become more efficient. Additionally, the results indicate that a manager's ability has no effect on the probability that the corporation will be involved in tax sheltering activities.

Untabulated supplemental analyses explored the possibility of an interaction between the CA score (a proxy for the competitive advantages as measured under the IOE and RBV paradigms) and managerial ability (a proxy for the competitive advantages measured under the dynamic capabilities paradigm). Since the results of these variables trend in opposite directions, these variables may interact, giving more insight to their separate effects. However, the results of an interaction are not significant. Table 15 presents a summary of these results.

Taken together, the results from these analyses seem to suggest that, even though a higher tax rate actually has a positive relationship with a corporation's competitive advantages, corporate leaders behave as if they *believe* the tax rate inhibits their competitiveness. General tax avoidance (proxied by effective tax rates) increases with increases in prior-year competitive advantages for corporations below the median CA score. The corporations above the median CA score decrease general tax avoidance activities. As prior-year competitive advantages increase, extreme tax avoidance (proxied by the probability the corporation engages in a tax shelter) also increases. As indicated with general tax avoidance, extreme avoidance also declines at higher levels of competitive advantages, but in the highest decile of competitive advantages, not the upper half.

One explanation of the subsequent decrease in general tax avoidance for the corporations in the upper half of competitive advantages is that corporate executives simply want to be in the top 50 percent of their industry and avoid taxes to help accomplish this feat. Given the results associated with extreme avoidance, the more likely explanation is that corporations in the top 50 percent of competitive advantages may have exhausted all less-aggressive methods available to them. The decline in extreme tax avoidance for corporations in the top ten percent of competitive advantages is consistent with the "under-sheltering puzzle" with a potential loss of

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Table 15
Summary of Results

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Hypothesis 1 - ETR's effect on Future Competitive Advantages

Variable of Interest	Expected Direction	Actual Direction	Interpretation
GAAP ETR	+	−	As ETR increases, future CA decreases
GAAP ETR^2	−	+	The linear trend reverses, indicating a positive relationship with future CA
Cash ETR	−	ns	Initially, there is no change in future CA with increases in ETR.
Cash ETR^2	ns	+	The linear trend reverses, indicating a positive relationship with future CA

Hypothesis 2 - Comparison between Inverting Corps and their Closest Industry Peers

Variable of Interest	Expected Direction	Actual Direction	Interpretation
CA$_{t-2}$	none	none	Inverting corporations have CA scores very similar to their closest industry peers two years before the inversion.
CA$_{t+2}$	+	−	Inverting corporations have significantly lower CA scores two years following the inversion.

Hypothesis 3 - CA's effect on Future Tax Avoidance

Variable of Interest	Expected Direction	Actual Direction	Interpretation
CA	−	+	As CA increases, so does the likelihood of tax avoidance.
CA^2	+	−	The linear trend reverses, indicating a negative relationship with tax avoidance at higher levels of CA.
MA	−	−	As MA increases, tax avoidance decreases.
MA^2	+	+	The linear trend reverses, indicating a positive relationship with tax avoidance at higher levels of MA.

Note: This table summarizes the main results from the tests performed in all hypotheses. Chapter III includes the description of each test and chapter IV presents the results in greater detail.

reputational capital as a reason these corporations are less likely to use extreme measures to avoid corporate income tax.

In the much smaller inversion setting, this study shows that in the periods after the inversion (i.e. tax avoidance technique), although the ETR is significantly lower than their industry peers, the inverting corporations do not gain competitive advantages. In fact, their competitive advantage score is also significantly lower than their closest industry peers two years following the inversion.

It is important to note that corporations have different opportunities for tax avoidance strategies depending on certain characteristics of the corporation, such as industry. Some corporations are, therefore, more limited in tax planning opportunities than others. For example, inversions seem to be more prevalent in certain industries (e.g. pharmaceuticals) than others.

Limitations

As with all empirical research, this dissertation has its limitations. First, the observations used in the analyses only consist of publically traded corporations and must meet certain minimum criteria. To the extent these corporations differ from private companies or corporations excluded from the analysis due to lack of data availability, the results of this study may not generalize to the full population.

Using a proxy for any variable also has its limitations. Six different proxies create the CA score, which is a proxy for competitive advantages of a corporation. Important aspects of competitive advantages may be either immeasurable or otherwise omitted from this composite score; thus, the score may not capture true total global competitive advantages as intended. Further, this composite score is untested.

Since tax return data are not available, this study (like others in its genre) must compute proxies that rely on publically available financial statement data to approximate tax variables, such as the effective tax rate and tax avoidance proxies. Although used in many tax avoidance studies, the proxies of pShelter and Shelter are estimated probabilities that corporations will engage in a tax shelter; they do not identify actual corporations that engage in tax shelters. As previously discussed and following prior research, this dissertation attempts to mitigate this limitation by using four tax avoidance proxies in the multivariable regression analyses.

Although this study followed prior literature with regard to control variables, the regression models only explained a small percentage of the variation in tax avoidance. Therefore, any missing or unexplained variables not included in the regression analyses could present omitted variable bias to the results.[34]

Contribution

The findings of this study contribute to the academic literature in financial accounting, strategic management, and tax research. This dissertation creates a variable from financial accounting data to proxy for total global competitive advantages. The competitive advantage literature is primarily qualitative in nature; thus, this study provides a tool (the CA score proxy) to help encourage more empirical research in the competitive advantages stream of the strategic management literature. Additionally, this dissertation adds to the growing literature on determinants of tax avoidance.

Corporate executives may also find these results enlightening. While they may believe, and often state, that the U.S. tax code is a detriment to their global competitiveness, the results of this study do not appear to confirm this supposition. In particular, the inversion strategy does not

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[34] Similar studies in prior literature had comparable adjusted R^2 values.

seem to be effective. Given the negative stigma resulting from an inversion, corporate executives may wish to reconsider this option, especially in the wake of increasing regulations.

Finally, U.S. tax policy makers should also find this research informative. Tax policy changes continually, often in response to legal methods corporations (and individuals) use to avoid taxes (e.g. corporate inversions). Before providing a solution to the perceived problem, policy makers should understand the true determinants of the problem.

Future Research

With the creation of the CA score, future research possibilities are vast. Research could consider how competitive advantages affect 1) stock price, 2) the ability to obtain loans, or 3) the audit effort exerted by an auditing firm auditing the corporation's financial statements. Future research in tax avoidance could consider the total competitive advantages when exploring the "under-sheltering puzzle," specifically with regard to reputational costs. Fear of damage to corporate reputation is a logical explanation as to why the tax sheltering probability begins its decline at the highest ten percent of competitive advantages. Finally, research could explore how holding non-repatriated earnings overseas affects competitive advantages of corporations, specifically for those corporations that invert. While the effective tax rate does not appear to affect competitive advantages, the tax bill on repatriated earnings could dissuade corporate decision makers from bringing the cash back to the U.S. and affecting their competitive advantages.

Conclusion

Although U.S. corporate leaders are correct in asserting that the U.S. has the highest statutory rate in the world, this dissertation does not find empirical evidence to support their claim that the tax rate suppresses their global competitiveness. In fact, these results indicate an

improvement in competitive advantages with increases in effective tax rates. However, there is some indication that corporate executives *believe* that the tax system has a detrimental effect on their global competitive advantages. Corporations in the lower half of competitive advantage scores tend to increase general tax avoidance activities as their competitive advantages increase. The first 90 percent of corporations continually increase in the probability of extreme tax avoidance via tax shelters.

In his most-quoted legal opinion, Judge Learned Hand stated that tax avoidance should have a business purpose other than just tax avoidance. Global competitive advantages, while arguably a legitimate business purpose, do not appear to be impeded by the U.S. tax code; this renders global competitive advantages as an inadequate business purpose for a defense of tax avoidance. Therefore, these results could be enlightening to future discussions of corporate tax reform.

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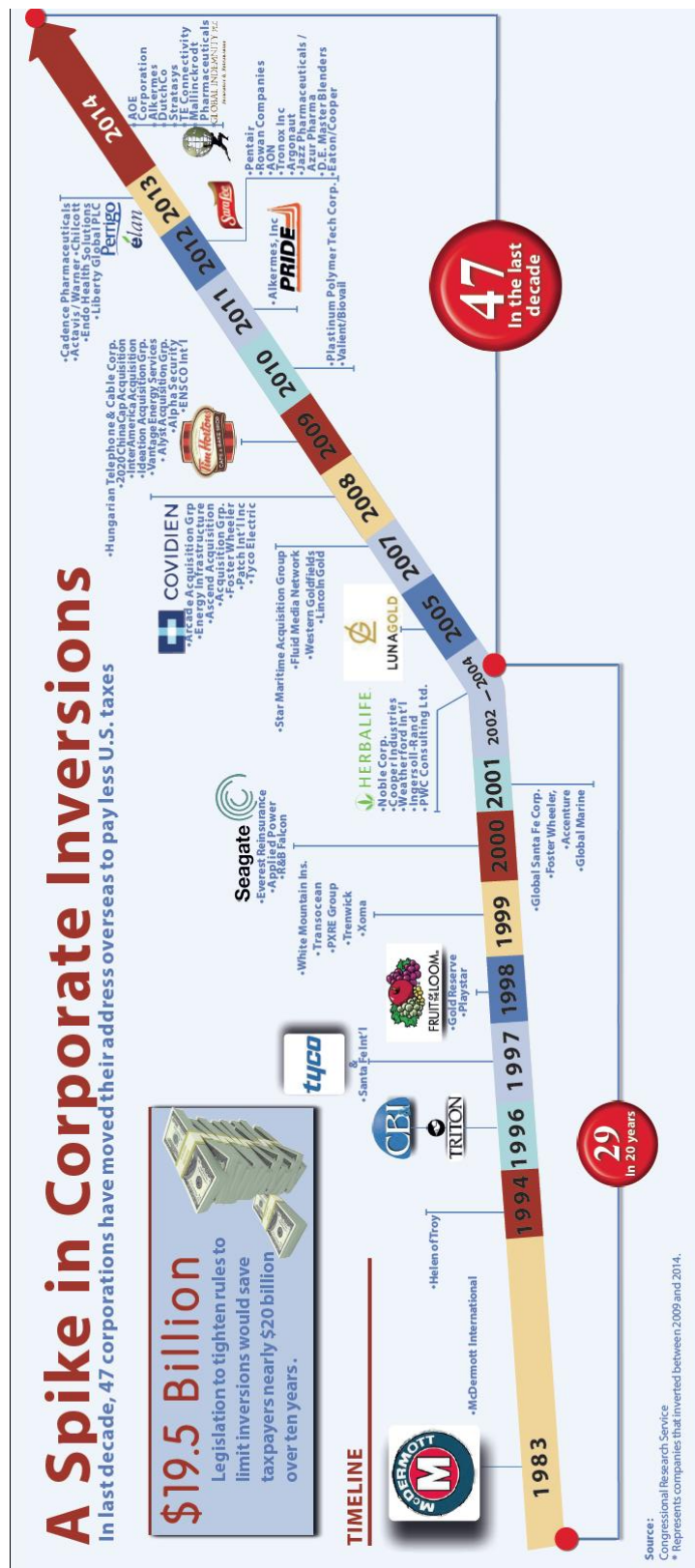
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LIST OF APPENDICES

APPENDIX A – INVERSIONS GRAPH

Inversions Graph

A Spike in Corporate Inversions
In last decade, 47 corporations have moved their address overseas to pay less U.S. taxes

$19.5 Billion
Legislation to tighten rules to limit inversions would save taxpayers nearly $20 billion over ten years.

TIMELINE

47 In the last decade

29 In 20 years

Source:
Congressional Research Service
* Represents companies that inverted between 2009 and 2014.

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APPENDIX B –VARIABLE DEFINITIONS

List of Variable Definitions

Variable	**Definition** (Superscript [*] - calculation found in *Variables used in Calculations* section of this list. Superscript [c] – variable obtained directly from Compustat)
CA Score Variables	
RNOA	Return on Net Operating Assets; Operating Income (OI[*]) divided by Net Operating Assets (NOA[*]) in time *t-1*; industry-adjusted by subtracting the median RNOA for each industry (FF48) year
CA	Competitive Advantage Score; Sum of the decile ranks of competitive effort proxies by industry (FF48) year
ΔRNOA	Change in RNOA from time *t-1* to *t*
GNOA	Growth in Net Operating Assets; (Net Operating Assets (NOA[*]) in time *t* divided by Net Operating Assets (NOA[*]) in time *t-1*) − 1
Size	Natural log of total assets (AT[c]) at time *t-1*
LC	Indicator variable for firm life cycle stage; Uses Dickinson measure (Dickinson 2011), which assigns life cycle stages by cash flow patterns
Tax Avoidance Measures	
GAAP ETR	Total tax expense (TXT[c]) divided by (pre-tax income [PI[c]] minus special items [SPI[c]]); industry-adjusted
Cash ETR	Taxes paid (TXPD[c]) divided by (pre-tax income [PI[c]] minus special items [SPI[c]]); industry-adjusted
pSHELTER	Probability a corporation engages in a tax shelter; $=-4.30 + 6.63(BTD) - 1.72(LEV) + 0.66(Size) + 2.26(ROA) + 1.62(MNC) + 1.56(RD)$ - see (Wilson 2009) (Each variable in this equation can be found in the *Control Variables* section of this list.)
SHELTER	Indicator variable set to 1 for the highest quintile of pSHELTER and 0 otherwise.
Other Variables of Interest	
MA	Dynamic capabilities, proxied by managerial ability; Data obtained from publicly available website[35] (Demerjian et al. 2012)
HHI	Herfindahl-Hirschman Index measure of competition; Sum of the squares of corporate-level market shares $$\sum_{i=1}^{n} \left(\frac{SALE_i}{TTL\_Sale} \right)^2$$ Where *n* is the number of corporations within an industry year, *SALE* is pulled from Compustat, *TTL_Sale* is the total sales of each industry (FF48) year.

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[35] http://faculty.washington.edu/pdemerj/data.html

Control Variables

NOL   Net operating loss;
Indicator variable set to "1" if tax loss carryforward ($TLCF^c$) is greater than 0; variable set to 0 otherwise.

CAPX   Capital Expenditures;
Capital Expenditures ($CAPX^c$) divided by total assets (AT^c) at time *t-1*

ROA   Return on Assets;
Pre-tax income (PI^c) divided by total assets (AT^c)

MNC   Indicator variable set to 1 if corporation has foreign income ($PIFO^c$) greater than 0; variable set to 0 otherwise

LEV   Leverage
Total long-term debt ($DLTT^c$) divided by total assets (AT^c)

RD   Research and Development;
Research and Development Expense (XRD^c) divided by total assets (AT^c) at time period *t-1*.

[*]*Variables used in Calculations*

OI   Operating Income;
Comprehensive Net Income (CNI^*) plus Net Financial Expense (NFE^*) (Dickinson and Sommers 2012)

NOA   Net Operating Assets;
Net Financial Obligation (NFO^*) plus Common Equity (CSE^*) plus minority interest (MIB^c) (Dickinson and Sommers 2012)

CNI   Comprehensive Net Income;
Net Income (NI^c) – Preferred Dividends (DVP^c) + Change in Marketable Securities Adjustment (MSA^c) + Change in Retained Earnings Cumulative Translation Adjustment ($RECTA^c$)

NFE   Net Financial Expense;
(Interest expense ($XINT^c$) × (1 minus the marginal tax rate)) plus preferred dividends (DVP^c) minus (Interest income ($IDIT^c$) × (1 minus the marginal tax rate)) plus marketable securities adjustment (MSA^c) at time *t-1* minus marketable securities adjustment (MSA^c) at time *t*

NFO   Net Financial Obligation;
Financial Obligations (FO^*) minus Financial Assets (FA^*)

CSE   Common Equity;
Total common equity (CEQ^c) plus preferred treasury stock ($TSTKP^c$) minus preferred dividends in arrears ($DVPA^c$)

FO   Financial Obligations;
Debt in current liabilities (DLC^c) plus total long-term debt ($DLTT^c$) plus preferred stock ($PSTK^c$) minus preferred treasury stock ($TSTKP^c$) plus preferred dividends in arrears ($DVPA^c$)

FA   Financial Assets;
Cash and short-term investments (CHE^c) plus Long-term receivables, investments and advances to affiliated companies ($IVAO^c$)

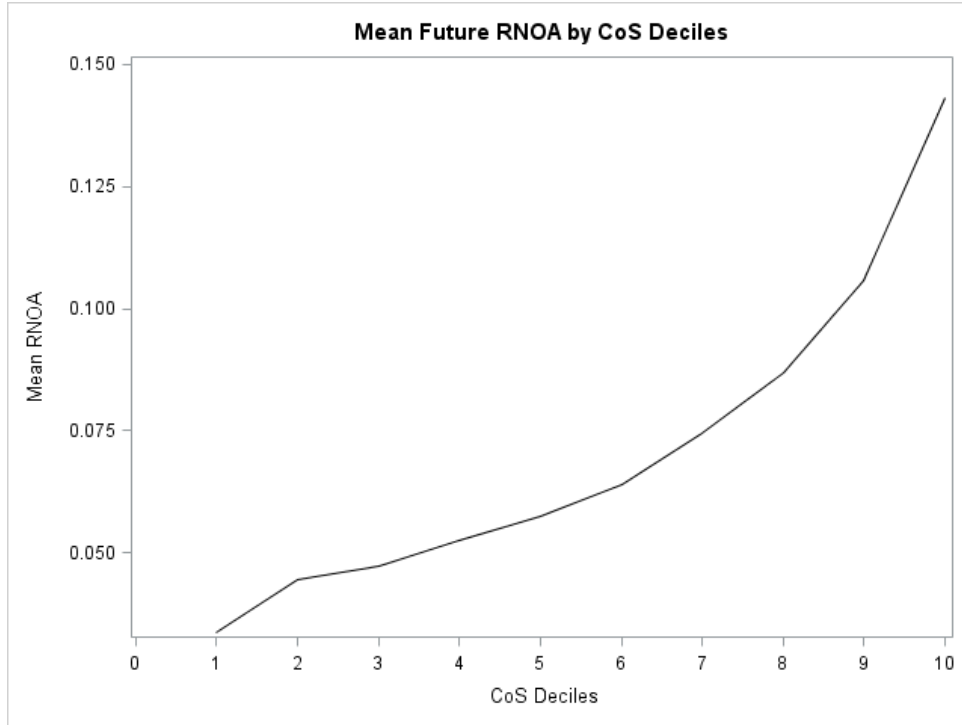APPENDIX C – COMPETITIVE EFFORT PROXY GRAPHS
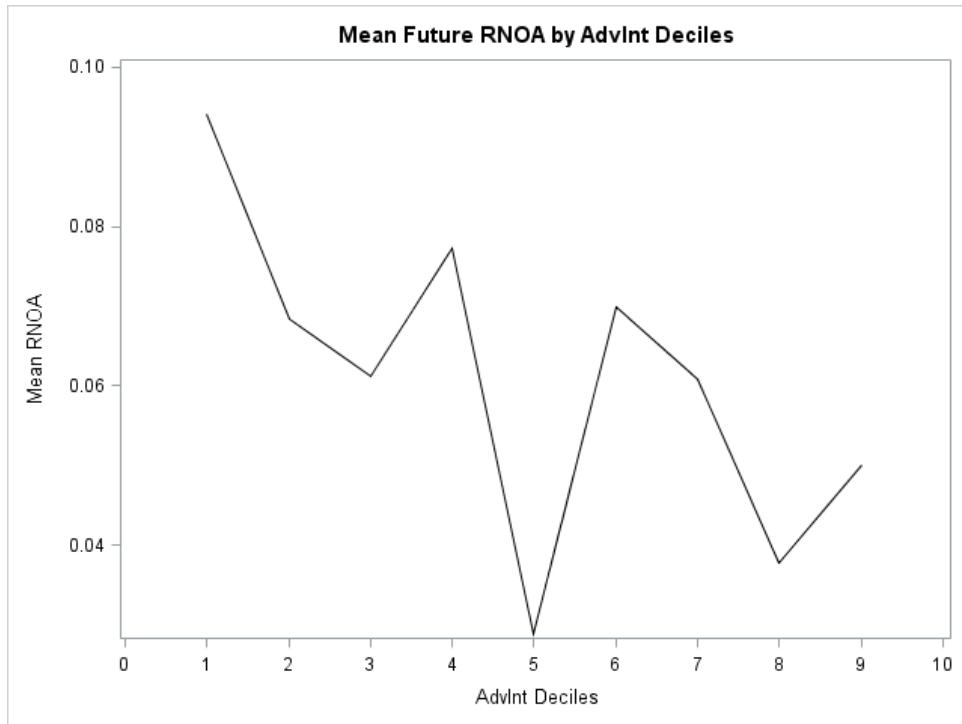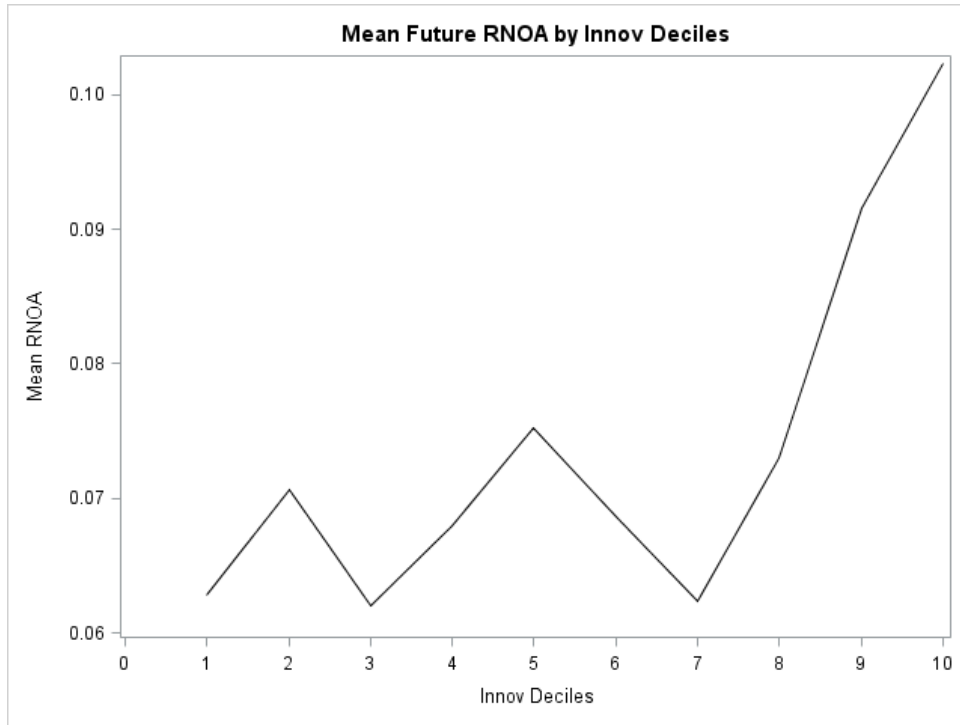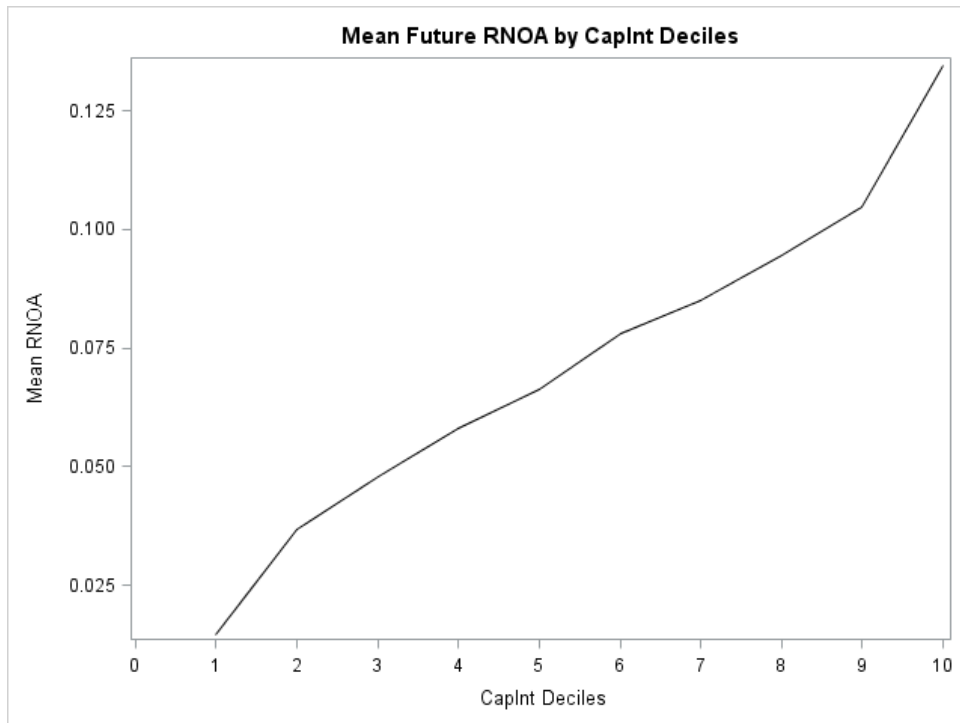
Figure C.1

Figure C.2

Figure C.3

Mean Future RNOA by Innov Deciles

Figure C.4

Mean Future RNOA by CapInt Deciles

Figure C.5

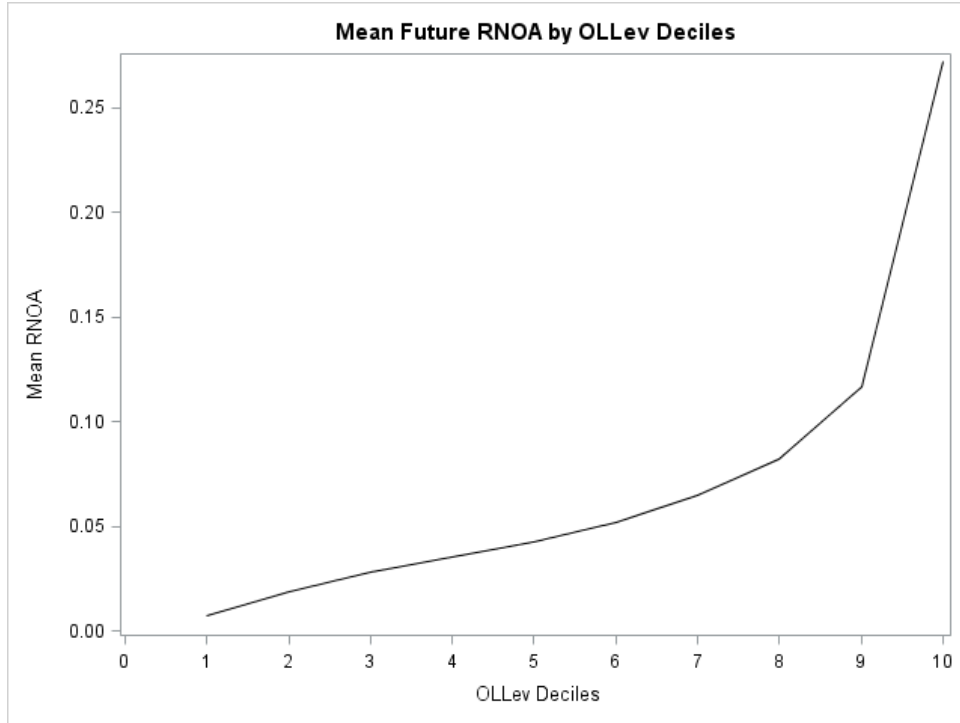**Mean Future RNOA by OLLev Deciles**
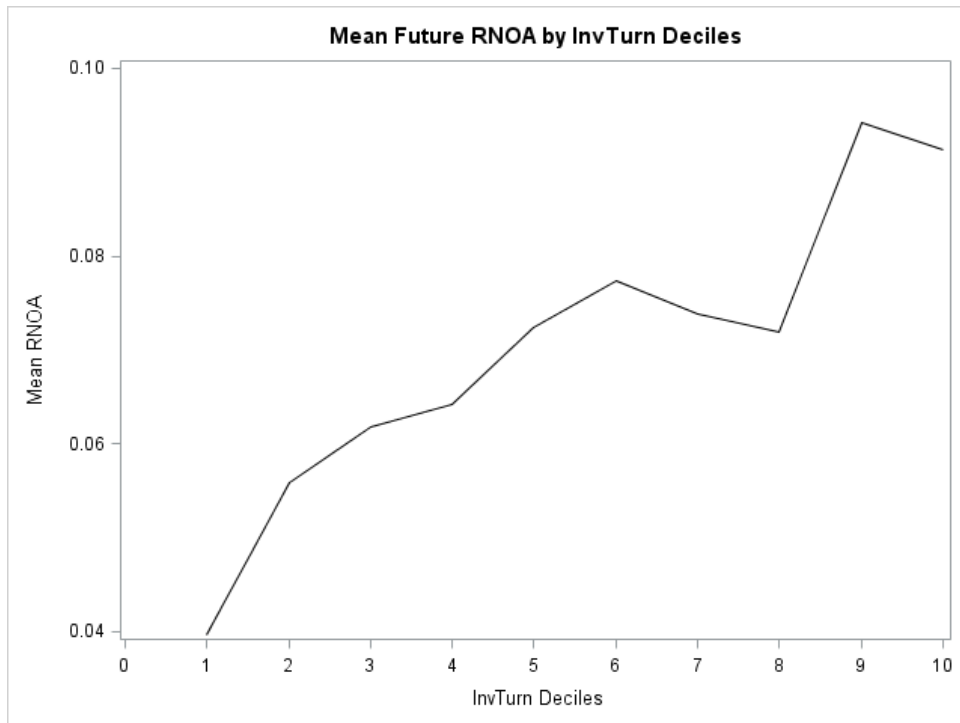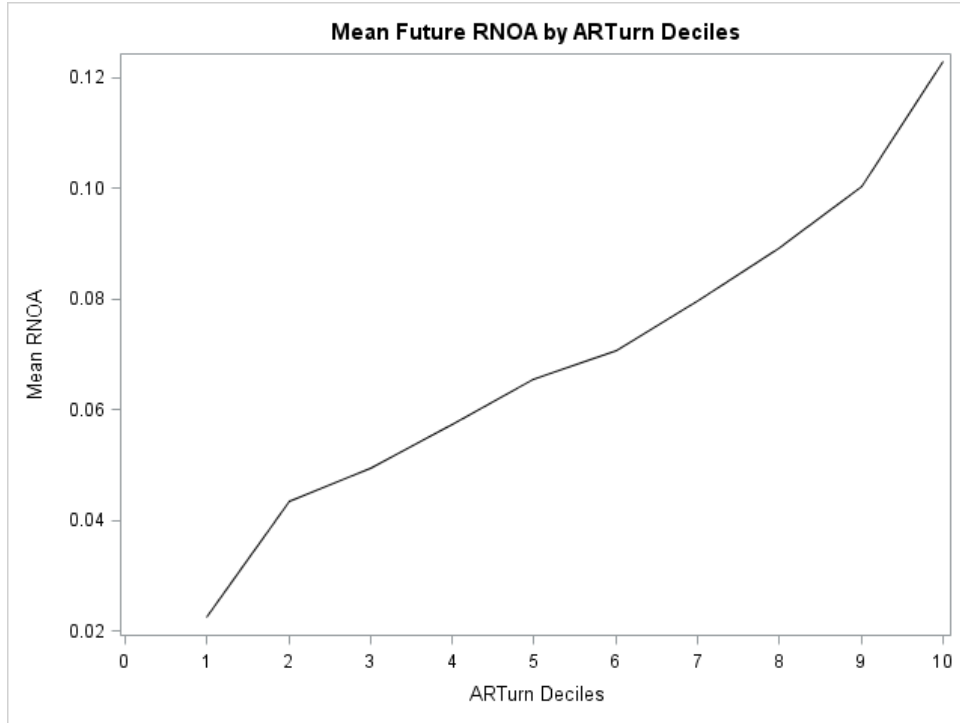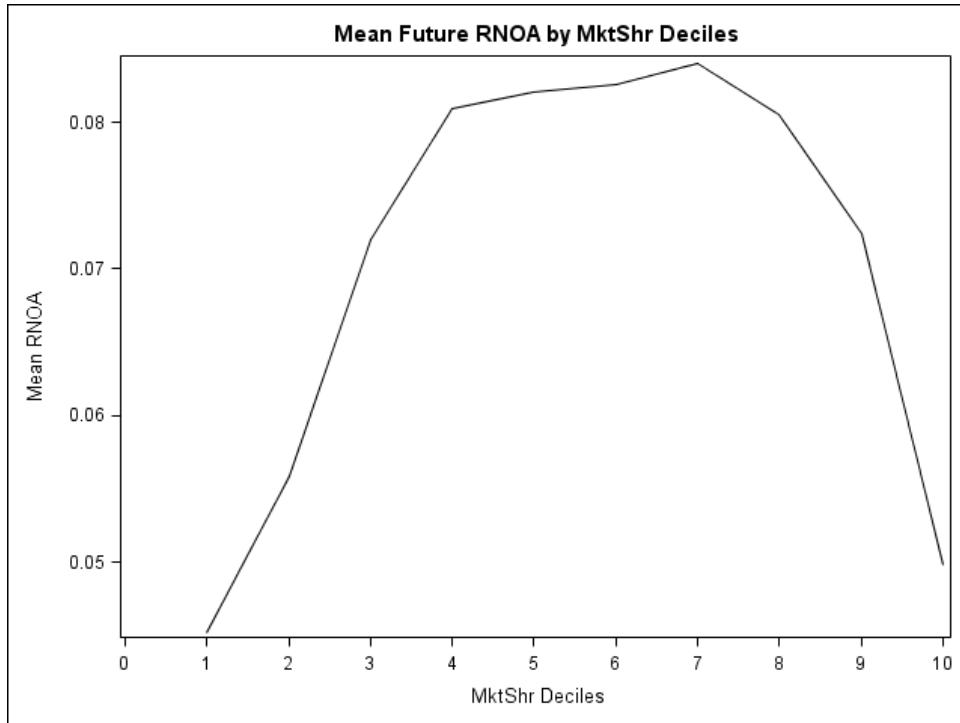
Figure C.6

Mean Future RNOA by InvTurn Deciles
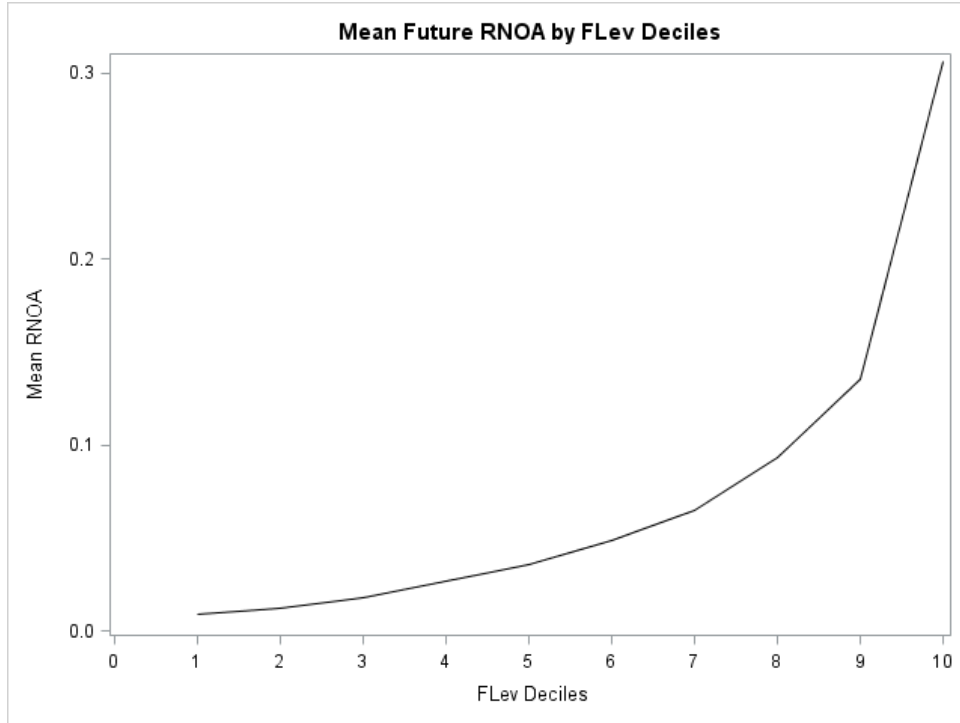
Figure C.7

Figure C.8
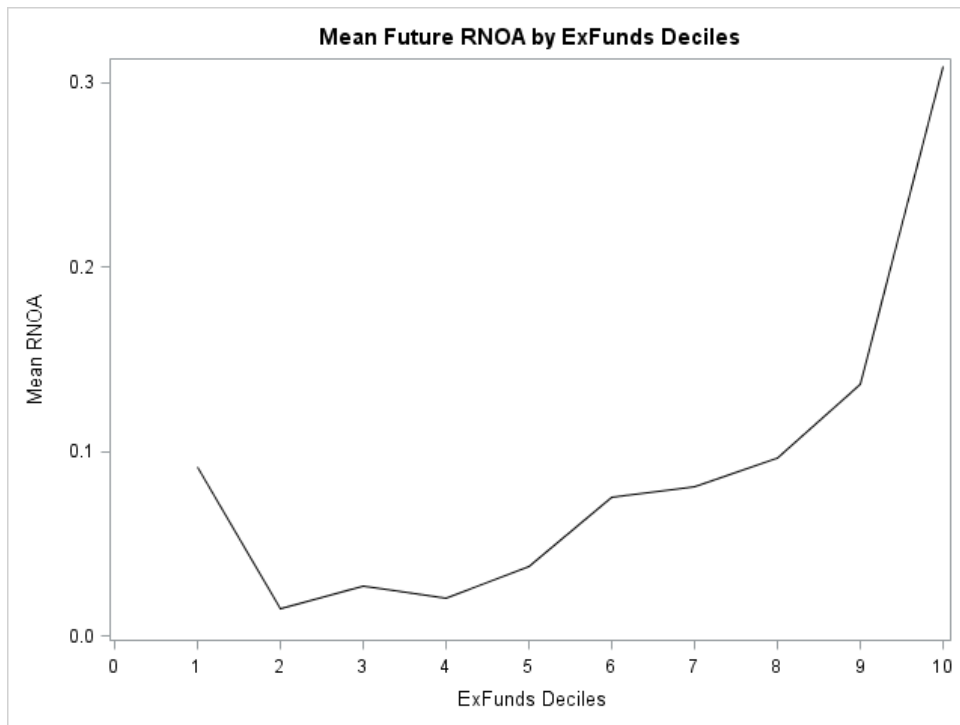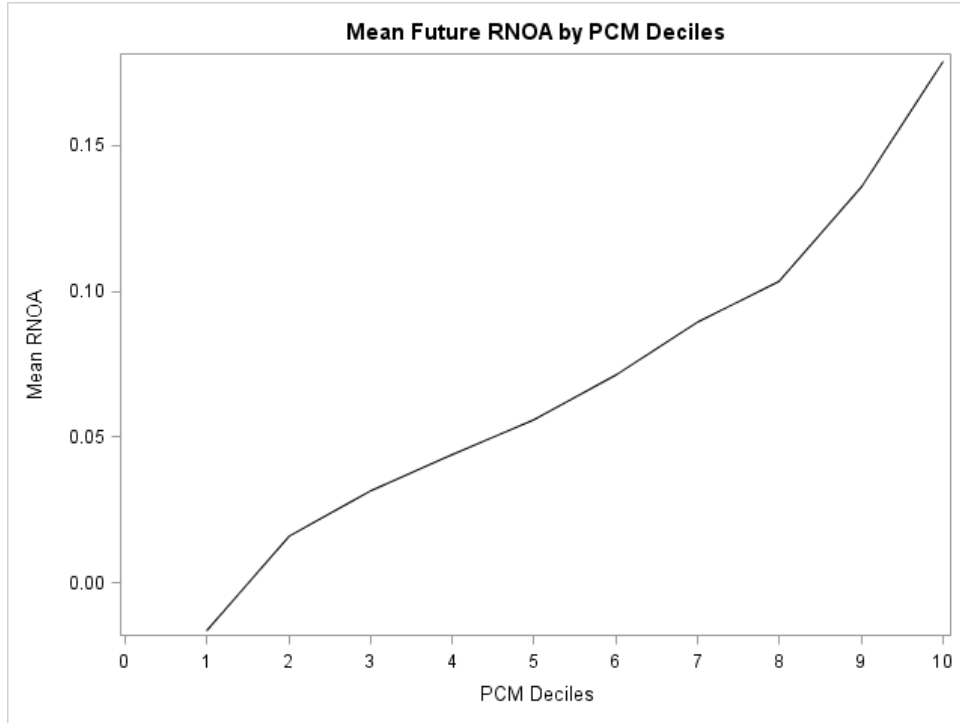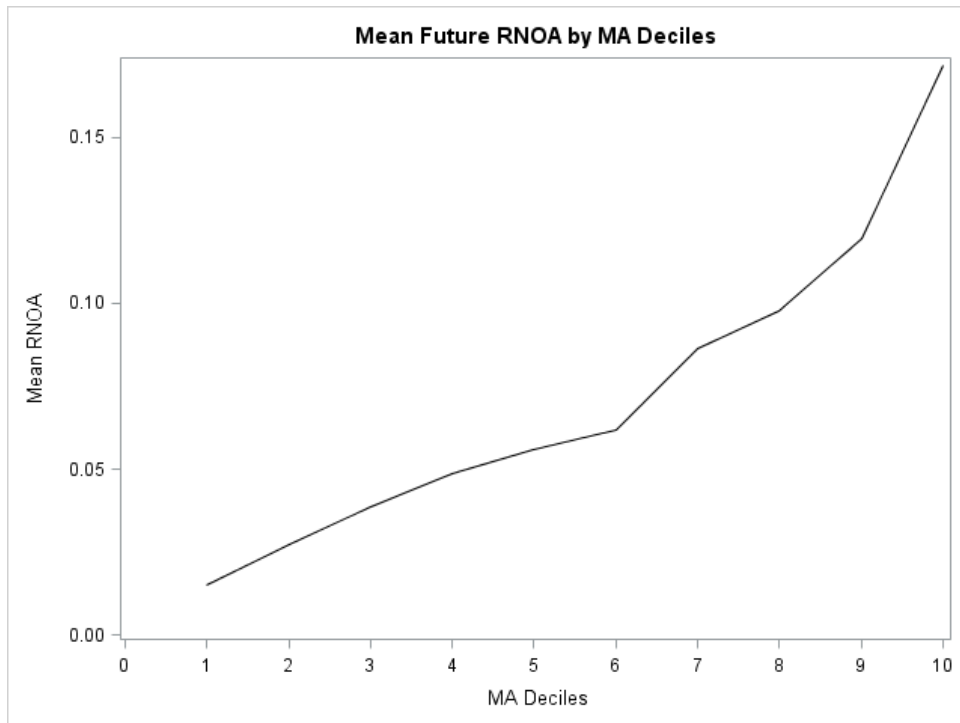
Figure C.9

Figure C.10

Figure C.11

Figure C.12

APPENDIX D – LIST OF CORPORATE INVERSIONS

Table D.1
Selected Corporate Inversions from 1993 to 2014

Firm Name	TICKER	Announce Date	Destination	Business Description	Transaction Detail
Helen of Troy Ltd.	HELE	12/30/93	Bermuda	Helen of Troy sells licensed personal care products and accessories under the Vidal Sassoon and Revlon brand names, as well its own WIGO, Karina, and Helen of Troy brands. Hair care items include hair dryers, curling irons, brushes, rollers, and mirrors; other products include women's shavers and foot massagers (Dr.Scholl's, Carel, Hotspa).	Taxable Stock Transfer
Triton Energy Ltd.	OIL	02/08/96	Cayman	Triton Energy Limited is a Dallas-based international oil and gas exploration and production company with major oil and gas assets in West Africa, Latin America and Southeast Asia.	Taxable Stock Transfer
Chicago Bridge & Iron Co. NV	CBI	12/18/96	Netherlands	Chicago Bridge & Iron makes flat-bottom tanks, cryogenic tanks, pressure vessels, natural gas processing plants, and elevated tanks for the petroleum, chemical, and water industries.	Subsidiary IPO
Santa Fe International	GSF	06/01/97	Cayman	GlobalSantaFe is a leading offshore drilling contractor and was formed by the combination of Global Marine and Santa Fe International. The company provides both turnkey drilling and drilling management services. Government-owned Kuwait Petroleum owns 29% of GlobalSantaFe.	Subsidiary IPO
Transocean Ltd.	RIG	03/15/99	Switzerland	Transocean, one of the world's leading offshore drilling contractors, specializes in deepwater drilling. The company was formed in 1999 when Transocean Offshore merged with Sedco Forex, which had been spun off from Schlumberger. It has expanded with the acquisition of rival R&B Falcon.	Taxable Stock Transfer
APW Ltd.	APW	01/27/00	Bermuda	APW Ltd. provides design services and manufacturing of integrated electronic enclosure systems to original equipment manufacturers. The Company provides enclosures, power supplies, thermal management systems, backplanes, and cabling either as stand alone products and as an integrated custom system provided with product design, supply chain management, and assembly and test services.	Subsidiary Spin-Off
Tycom Ltd.	TCM	03/10/00	Bermuda	Tycom, Ltd. provides undersea fiber optic networks and services, and engages in the design, engineering, manufacturing, installation, and maintenance of those networks.	Subsidiary IPO
Cooper Industries Plc	CBE	06/11/01	Ireland	Cooper Industries makes electrical products, tools, hardware, and metal support products.	Taxable Stock Transfer (M&A-related)

Ingersoll-Rand Plc	IR	10/16/01	Ireland	Ingersoll-Rand, known for having made the tools and machinery that carved the faces on Mount Rushmore, makes refrigeration equipment, locks and security systems, construction and industrial equipment used for infrastructure improvements, and industrial equipment used to increase productivity.	Taxable Stock Transfer
Nabors Industries Ltd.	NBR	01/02/02	Bermuda	Nabors Industries is one of the world's largest drilling contractors, with more than 530 land drilling rigs and 930 land workover rigs and includes 44 offshore platform rigs, 15 jack-ups, and three barge drilling rigs. Nabors also provides oil field hauling, engineering, and construction services.	Taxable Stock Transfer
Noble Corp. Plc	NE	01/31/02	England	Noble Drilling provides deepwater oil and gas contract drilling services through a fleet of 53 offshore rigs, including three submersibles, three drillships, 13 semisubmersibles, and 34 jack-ups. Subsidiary Triton Engineering provides engineering and consulting services.	Taxable Stock Transfer
Herbalife Ltd.	HLF	04/10/02	Cayman	Herbalife International is a global nutrition company that develops, markets and sells nutrition, weight management and skincare products. It was acquired by Whitney & Co. and Golden Gate Capital in 2002. In 2014, the FTC opened an investigation into Herbalife after allegations that the company constituted a pyramid scheme.	Asset
Covidien Plc	COV	06/07/07	Ireland	Covidien is a healthcare products company and manufacturer of medical devices and supplies. It was formerly the healthcare division of Tyco International and was purchased by Metronic Plc in 2015.	Subsidiary Spin-Off
TE Connectivity Plc	TEL	06/07/07	Switzerland	TE Connectivity Ltd. designs and manufactures connectors and sensors for the automotive, industrial equipment, data communication systems, aerospace, defense, and energy industries, among others. TE Connectivity was formerly the electronics division of Tyco International.	Subsidiary Spin-Off
Alitsource Portfolio Solutions SA	ASPS	05/13/09	Luxembourg	Altisource provides financial services including debt collection and asset management to the real estate, mortgage and consumer debt industries. Formerly a subsidiary of the Florida- based Ocwen Financial Corporation, Altisource spun off in 2009.	Subsidiary Spin-Off
Tim Hortons Inc.	THI	06/29/09	Canada	Tim Hortons Inc. is a Canadian multinational fast casual restaurant known for its coffee and doughnuts. In 1995, the company merged with Wendy's, although Tim Hortons continued to operate as a separate subsidiary. The two companies split with Tim Hortons' IPO in 2006. In 2014, Burger King announced its intent to acquire Tim Hortons.	Taxable Stock Transfer

Samsonite SA	SAMC	09/02/09	Luxembourg	Samsonite International S.A. is the world's largest travel luggage company, principally engaged in the design, manufacture, sourcing and distribution of luggage, business and computer bags, outdoor and casual bags, and travel accessories throughout the world. Its primary brands include the Samsonite, American Tourister, High Sierra, Hartmann, Lipault, and Speck brand names.	Financial Reorganization (Bankruptcy)
Ensco Plc	ESV	11/09/09	England	Ensco Plc is an international provider of offshore oil, gas, and well drilling services to energy companies and others in the petroleum industry.	Financial Reorganization
Jazz Pharmaceuticals PLC	JAZZ	05/19/11	Ireland	Jazz Pharmaceuticals PLC (a merger of Jazz Pharmaceuticals and Azur Pharma PLC) is a biopharmaceutical company which specializes of identifying, developing and commercializing pharmaceutical products.	Taxable Stock Transfer (M&A-related)
Tronox Ltd.	TROX	09/26/11	Australia	Tronox Limited is a global leader in the mining, production and marketing of inorganic minerals and chemicals. The company operates two vertically integrated divisions: Titanium dioxide (TiO2) and Alkali Chemicals. Tronox also has an electrolytic and specialty chemicals division that provides innovative products to the energy storage, paper, automotive, and pharmaceutical industries.	Taxable Stock Transfer
Mallinckrodt Plc	MNK	12/15/11	Ireland	Mallinckrodt Pharmaceuticals develops, manufactures, and distributes specialty pharmaceuticals that are used in the treatment of pain, autoimmune diseases, and central nervous system disorders.	Subsidiary Spin-Off
Rowan Cos. PLC	RDC	02/28/12	England	Rowan is a global provider of offshore contract drilling services. Its fleet includes four ultra-deepwater drillships and 30 jack-up rigs. It operates worldwide in the Gulf of Mexico, Trinidad, North Sea, Southeast Asia, Mediterranean, Middle East and Southeast Asia.	Taxable Stock Transfer
Stratasys Ltd.	SSYS	04/16/12	Israel	Stratasys manufactures 3D printing equipment and materials used to create models and prototypes for new product design and testing, to build finished goods in low volume, for research purposes, and for personal or entertainment use.	Taxable Stock Transfer (M&A-related)
Eaton Corp. PLC	ETN	05/21/12	Ireland	Eaton is a power management company that provides energy- efficient solutions to help its customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably.	Taxable Stock Transfer (M&A-related)
Perrigo Co. PLC	PRGO	07/29/13	Ireland	Perrigo Company, PLC is a leading global healthcare supplier that develops, manufactures and distributes over-the-counter (OTC) and generic prescription (Rx) pharmaceuticals, infant formulas, nutritional products, animal health, dietary supplements, active pharmaceutical ingredients (API), and medical diagnostic products	Taxable Stock Transfer
Paragon Offshore PLC	PGN	09/24/13	England	Paragon Offshore is a leading provider of standard specification offshore drilling units serving the oil and gas industry. Its fleet consists of 32 jackup rigs, 4 drillships, and 2 semisubmersible ships.	Subsidiary Spin-Off

Note: This table is derived from Table 1 of Rao (2015). It includes the corporate inversions with available data to test in Hypothesis 2.

ANDREW D. ALMAND, CPA

Patterson School of Accountancy • 200 Conner Hall • University, MS 38655

EDUCATION AND CERTIFICATION

      M.B.A., Henderson State University, May 2003
      Thesis: Auditing the Auditors: Peer Reviews and their Impact on Accounting
          Cumulative Grade Point Average 4.00

      B.B.A. Accounting, Henderson State University, May 2002
      Summa Cum Laude, Honors College Scholar
          Cumulative Grade Point Average 3.95; Accounting GPA 4.0

CPA License, State of Arkansas, April 30, 2004

RESEARCH

Primary Interest: Taxation; Secondary Interest: Financial; Methodology: Archival

Dissertation

The Effect of Competitiveness on Corporate Tax Avoidance: A Determinant or Excuse?
      Chair: Tonya Flesher
      Committee: Victoria Dickinson, Brett Cantrell, and John Bentley
      Proposal: April 8, 2016

Published Research

All-States' Guide to the Marketplace Fairness Act (with Tonya Flesher of the University of
      Mississippi), *Taxes: The Tax Magazine*, November 2014
The Role of Social Media in Hiring Decisions (with L. Tyler Williams of the University of
      Mississippi), *Journal of Information Systems Technology and Planning*, 2014
Remote Sales Tax: An Assessment of Revenue Fairness in Mississippi (with Tonya Flesher of
      the University of Mississippi), *State Tax Notes*, December 2013

Working Papers

Estimation of Discretionary Accruals Incorporating Firm Life Cycle (with Brett Cantrell and
      Victoria Dickinson of the University of Mississippi)
The Effect of Group Identity on Tax Compliance (with Kendall Bowlin and J. Shaw of the
      University of Mississippi)
John Stillé, Jr.: The Early Accounting Records of a Successful Eighteenth-Century Philadelphia
      Merchant (with Laurie Barfitt of Western New Mexico University and Dale L. Flesher of
      the University of Mississippi)

SCHOLARLY PRESENTATIONS

Remote Sales Tax: An Assessment of Revenue Fairness in Mississippi
> University of Mississippi Workshop, University, MS, November 2013

John Stillé, Jr.: The Early Accounting Records of a Successful Eighteenth-Century Philadelphia Merchant,
> AAA Southeast Regional Meeting, Nashville, TN, April 2013

CONFERENCES ATTENDED

American Accounting Association/Deloitte Foundation/J. Michael Cook Doctoral Consortium,
> Delegate from University of Mississippi, June 2015

2015 FARS Mid-Year Meeting, Nashville, TN – Doctoral Consortium Participant

2015 AAA Annual Meeting, Chicago, IL

OTHER PRESENTATIONS

Bible Budgeting Basics
> Center Fork Missionary Baptist Church, Hot Springs, AR, March 2012

Budgeting Basics
> Henderson State University Campus Recreation Center, Arkadelphia, AR, Feb 2012

The Grayest of the Gray: Ethics in Accounting
> DeGray Chapter of Arkansas Society of CPAs, Hot Springs, AR, November 2011

Bible Budgeting Basics
> Center Fork Missionary Baptist Church, Hot Springs, AR, April 2011

SSARS 19: Changes Ahead
> DeGray Chapter of Arkansas Society of CPAs, Hot Springs, AR, November 2010

International Financial Reporting Standards: A World of Questions
> DeGray Chapter of Arkansas Society of CPAs, Hot Springs, AR, October 2009

Risk Assessment Standards: A High Level Overview
> DeGray Chapter of Arkansas Society of CPAs, Hot Springs, AR, November 2007

How to Give an Effective Presentation
> DeGray Chapter of Arkansas Society of CPAs, Hot Springs, AR, November 2005

International Accounting: Numbers Aren't Just Numbers
> Southern Regional Honors Conference, Atlanta, GA, March 2002
> Arkansas Undergraduate Research Conference, Arkadelphia, AR, April 2002

Taxation: Catalyst of Conflict or Deliverance from Destitution?
> Southern Regional Honors Conference, Nashville, TN, March 2001
> Arkansas Undergraduate Research Conference, Arkadelphia, AR, April 2001

RELEVANT PROFESSIONAL EXPERIENCE

Instructor of Accounting

University of Mississippi   *Oxford, MS*   *August 2012 – Present*

Courses taught:
> Introduction to Accounting Principles I and II
> Average Teaching Evaluation Rating: 4.55 on a 5-point scale
>> (15 sections, 398 evaluations, 53.5% reporting)

Reporter

State of Mississippi   *Jackson, MS*   *June 2013 – December 2013*
2013 Revenue Fairness Study Group
Researched the implications to the State of Mississippi of the Marketplace Fairness Act of 2013
     and authored the report of the Group, which was presented to the Governor of Mississippi,
     Lieutenant Governor of Mississippi, Mississippi Secretary of State, and Speaker of the
     Mississippi House of Representatives

Instructor of Accounting

Henderson State University   *Arkadelphia, AR*   *August 2008 – May 2012*
Courses taught:

Principles of Accounting A	Federal Income Tax
Principles of Accounting B	Advanced Federal Income Tax
Intermediate Accounting II	Business Information Systems

Other duties included:
- Interim MBA Director – December 2011 – May 2012
- Member of Admissions & Adjustments Committee – Fall 2011 - May 2012
- Co-Advisor for School of Business Club – Spring 2010 - May 2012
- Director of School of Business Experience Portfolio – Fall 2009 - May 2012
- School of Business Curriculum Committee Member – Fall 2009 - May 2012
- Co-Advisor for Heart & Key, Service Organization – Fall 2009 - May 2012
- Director of Internships – Fall 2011
- Member of General Education Committee – Fall 2010 – Spring 2011
- Member of Scholarship and Appeals Committee – Fall 2009 – Spring 2010
- Honors College Faculty – Fall 2009 – Spring 2010
- Member of School of Business Dean Search Committee – Summer 2009

Senior Accountant

Spann & Associates, Ltd.   *June 2002 – August 2008*
Hot Springs, AR
Main duties included:

Bookkeeping and payroll for clients	Research tax/accounting issues
Auditing and attestation engagements	Assistance with peer reviews
Supervising and assisting staff members	
Individual and corporate tax work and planning	

Accounting experience with:

Manufacturing Industry	Medical Offices
Employee Benefit Plans	Charitable Organizations
Construction Contractors	Real Estate Industry

Treasurer & Board Member

Center Fork Missionary Baptist Church   *September 2009 – June 2012*
Hot Springs, AR
Main duties included:

Bookkeeping	Payroll	Budgetary analysis

Treasurer (Pro Bono)
Arkansas Association of Charitable Clinics   *February 2006 – June 2010*
Hot Springs, AR
Main duties included:
      Bookkeeping   Payroll   Financial reporting

PROFESSIONAL ORGANIZATIONS

American Accounting Association, 2013 - Present
American Institute of Certified Public Accountants, 2003 - Present
Arkansas Society of Certified Public Accountants, 2003 - 2012
DeGray Chapter of Arkansas Society of CPAs – Education Liaison, 2010 - 2011
DeGray Chapter of Arkansas Society of CPAs – President, 2009
DeGray Chapter of Arkansas Society of CPAs – Vice President, 2008
DeGray Chapter of Arkansas Society of CPAs – CPE Chairman, 2005, 2006, 2007

DOCTORAL AWARDS AND HONORS

Graduate School Summer Research Assistantship, 2015
AAA/Deloitte/J. Michael Cook Doctoral Consortium Fellow, 2015
Doctoral Teaching Award, 2015
Graduate Achievement Award, School of Accountancy, 2014
Phi Kappa Phi Honor Society, 2014

COLLEGE AWARDS AND HONORS (SELECTED)

Alpha Epsilon Lambda, Graduate Honor Society, 2003
Stella Spoon Outstanding Accounting Student Scholarship Recipient, 2001-2002,
      2000-2001, 1999-2000
Beta Gamma Sigma, Honorary Business Organization, HSU Charter Member, 2001
Alpha Chi, Honorary Academic Organization, Vice President, 2001-2002
Cleo Echols Service Above Self Award, Arkadelphia Rotary Club, 2001-2002
Who's Who Among Students in American Universities and Colleges, 2001-2002
      2000-2001