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LONG-TERM PERFORMANCE OF CORPORATE INVERSIONS SINCE 2004

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ABSTRACT

This paper conducts a study on the short and long-term equity performance of companies that have undergone corporate inversion since Section 7874, which considerably redefined the mechanisms of inversion. Prior studies have concluded only mixed market reaction to the announcement of inversion, on average, despite evidence that these transactions result in long-term effective tax rate reductions. Because equity prices should immediately correct for any changes in long-term expectations, one would expect the market to react positively to the announcements. Meanwhile, a concurrent study by Elizabeth Chorvat has identified that pre-2004 inversions have created statistically and economically significant long-term outperformance. Many of the costs associated with inversion, especially post-2004 inversion, are difficult to accurately define. The continued prevalence of inversion, coupled with the enigmatic nature of inversion costs, suggests more recent inversions may also be mispriced. Utilizing a Fama and French 5 Factor Model, this study identifies -4.47% of average long-term annualized abnormal returns for companies that have undergone inversion since 2004. Coupled with both the positive market reaction to post-2004 inversion announcements and Chorvat's findings, this suggests that the market may initially underestimate the costs of inversion associated with Section 7874 at the time of announcement.

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Chapter 1

Introduction

With one of the highest corporate tax rates in the world, there is lucrative incentive for U.S. corporations to exploit opportunities to lower their effective tax rates. Also known as tax inversion or expatriation, corporate inversions allow companies to legally avoid certain taxes by altering the location of their tax domicile. In addition to having one of the highest corporate tax rates, the U.S. also has what is known as a *worldwide* tax system. Thus, these corporations may utilize an inter-company lending technique known as earnings stripping after re-domiciling, which allows them to further reduce taxes by shifting American earnings to more tax-friendly regions. Since the government identified these techniques in the 1980s, it has sought measures to eliminate the practices by reducing the incentives to do so. While these policies have increased the costs to invert and created obstacles to make the practice more difficult, the phenomenon still exists today.

Corporate inversions and the tax policies surrounding the practice have been a point of emphasis in the most recent presidential election, reiterating their continued prevalence and importance as a matter of national interest. About 50 companies have inverted in the past 10 years, and close to 20 more have been announced in the past two years (Cortes). This practice arose in the 1980s and the government has been in a perpetual cat-and-mouse game to eliminate the practice by reducing the incentives to invert ever since, but have they succeeded or do the benefits of inversions persist?

Many studies have concluded varying political, economic, and societal impacts of inversion. While there are clear benefits and deterrents, this thesis aims tackle the consequences of inversion to the company through the lens of the equity markets. By inverting, firms can dramatically lower their effective tax rates by reducing taxes on both international and American-derived earnings. Despite these long-term benefits, the costs associated with the transaction such as taxes, integration, and regulation may offset the

benefits. This uncertainty is likely the reason that previous studies have concluded that equity markets have historically had mixed reactions to inversion announcements.

This thesis will analyze the long-term effects of corporate inversion on shareholder value. Because firms are still choosing to invert, a benefit or incentive must exist that has not yet been identified or is currently being mispriced by the market on average. A concurrent study by Elizabeth Chorvat is analyzing the impact of pre-2004 inversions on long-term shareholder value, while this thesis will examine post-2004 inversions. Since the implementation of Section 7874 of the US Tax Code in 2004, inversions have taken a more strategic form. So-called single-company inversions have become almost obsolete, while merger-related inversions are still quite prevalent. Because the benefits of inversion are largely long-term while the costs are largely short-term, one may suspect that inverted companies will outperform peers in the long-run. Many acknowledge the competitive advantage given by inversion, but the anomaly still exists. Theoretically, inverted firms with increased cash flow can invest internally to grow themselves to drive long-term outperformance as well as distribute cash through stock buybacks and dividends.

Consequently, the following research is an update of existing studies on short-term and pre-announcement returns, but extends this research to focus on long-term shareholder returns. If long-term outperformance is identified, this legitimizes companies' efforts to invert, provides another lens for regulatory examination, and suggests evidence against efficient markets. While corporate inversions may be coming to an end following recent legislation (though this has not worked in the past), evidence of inefficiency is compelling nonetheless. Additionally, the results can be applied to previously inverted firms in the market. Finally, this data may be used in the context of new regulation to draw conclusions regarding the potential effectiveness of the reforms and thus implications on equity performance.

This study aims to prove that companies which have re-domiciled through corporate inversions since 2004 will outperform in the long-run. Following the review of previous literature on corporate inversions, this hypothesis will be tested through an examination of 25 inversions since 2004. The long-

term study will be primarily done utilizing a Fama and French 5 factor regression model to identify historical abnormal returns. In addition, the window surrounding the announcement of these inversions will be studied to identify if there was significant market reaction to the inversion announcement, on average. This short-term study will be conducted through a Fama and French model with momentum. After examining these short and long-term excess returns, conclusions will be drawn regarding the potential for mispricing, effectiveness of 2004 tax reforms, and the costs and benefits of inversion on shareholders.

Chapter 2

Review of Existing Literature

In an attempt to analyze the practice of inversions and the underlying factors causing it, academics have resorted to a broad range of studies to address precisely why companies expatriate. Some researchers have focused on the tax policy itself, and why it ultimately encourages inversion. Others went further to examine the subsequent legislation that has taken place over the past 35 years in an effort to curb inversion. Studying companies that underwent inversion and examining how the practice actually affects the financials of these firms allowed further insights into why managers choose to do this. By focusing on company financials, specifically reductions in effective tax rates, researchers aimed to quantify the benefits of inversion. Many other studies have concluded varying political, economic, and societal impacts of inversion. But because there are many so many forces at work, a more comprehensive measure was needed to analyze the overall consequence of inversion to the firm. Equity performance at the time of announcement was the logical place to look. The immediate equity reaction should indicate the perceived all-inclusive costs and benefits of inversion. Despite the continued prevalence of inversion, initial studies indicated that the market's reaction to inversion was not strongly positive, but instead largely mixed. This perplexed many and was the emphasis of research for much of the 2000s. Studies have turned to managerial incentives, behavioral economics, and other financial metrics in pursuit of the true causes of inversion. Most recently, however, a new wave of inversions has sparked renewed interest in the field. Merger-related inversions have become increasingly prevalent, and researchers are now beginning to study the causes, mechanics, and performance of this type of inversion.

This review of existing literature will provide the basis for the subsequent research. This research will aim to further existing studies to show how companies that re-domicile through merger-related

corporate inversion will perform in the long-run. This stems previous studies concluding an absence of abnormal stock returns immediately following the announcement of inversion, yet the continued prevalence of inversion in addition to well-documented long-term tax benefits of inversion. Specifically, regulation has created onerous financial burdens in an effort to prevent inversions, and there is inherent risk involved in any significant corporate restructuring; however, these costs are largely short-term in nature, while the benefits are realized over the long-term and allow for financial and competitive advantages. Additionally, the most cutting edge research is indicating that standalone inversions may lead to long-term outperformance. Thus, this review will start by examining research on tax policy and inversion regulation. This will lead to the societal and economic impacts of inversions. Next, it will include the impacts of inversion on the corporation, untimely focusing on equity performance. Then, this review will analyze potential causes of inversion and alternative explanations for the inversion performance. Finally, it will split from the single-company inversions that have been the focus for so many years, and concentrate on the newest research surrounding merger-related inversions, with an aim at examining equity performance. This review will ultimately conclude by providing a basis for benchmarking, as it examines broader research on merger and international acquisition success.

Policy: The Structure and Costs of Inversion

By first analyzing the tax policies that both lead to inversion and those that have been put in place to nullify it, researchers have been able to examine the push-and-pull factors that corporations consider when deciding to invert. This foundation of knowledge can be used to examine the broader effects tax policy has on corporate effective tax rates, which can be extrapolated to apply to inversions.

Corporate inversion, or expatriation, is defined by the U.S. Department of the Treasury as “a transaction through which the corporate structure of a U.S.-based multinational group is altered so that a new foreign corporation, typically located in a low- or no-tax country, replaces the existing U.S. parent

corporation as the parent of the corporate group” (U.S. Department of the Treasury 1). In this thorough investigative report published by the Department of the Treasury in 2002, the government even acknowledges this is a burden to corporations. Despite identifying this, the government has chosen to enact policy to prevent it, as opposed to seeking internal improvements to the tax code. These measures taken by the government are in large part responsible for the costs associated with inversions today. In the 1980s, the government enacted measures to recognize dividend income as earnings. In the 1990s, there was a key ruling to make parent companies recognize gains on subsidiary stock if it distributed stock in exchange for its own stock. Because of these rules, gains to shareholders on the company’s existing shares must be realized and taxed immediately when a company decides to invert, which places significant cost on shareholders. These costs are inherently higher in stocks that have performed well. In 2002, the government decided to discourage inversions through the Homeland Security Act, where it added a clause preventing government contracting with inverted firms (Chiu 727). In 2004, expatriation law was altered dramatically with US Tax Code Section 7874. This law was made to essentially ban inversions through stringent ownership and taxation regulation. However, a major loophole existed, which allowed corporations to manipulate voting rights and share value to invert. Additionally, at this time, the government required that firms must generate substantial business in the inversion location in order to invert, but corporations have exploited this vague language to an extent (Chiu 730). While these regulations were effective in increasing costs to invert and limiting traditional inversion, companies continue to find ways around them. As a result, inversions since 2004 have a distinctly different structure and are typically more strategic in nature.

Scrutiny once again picked up in 2014, as Congress proposed three bills targeting corporate inversion. Regulation has been slow to go through, and partisan efforts as well as constitutionality issues are largely to blame. The Republican Party blames inversions on the corporate tax system, and they suggest lower corporate tax rates as the solution. Democrats, in contrast, wish to continue tightening rules to make inversions less attractive. Without official legislation being passed, executive action has been

taken to prevent certain corporate practices that usually enable inversion (Chiu 736). Most recently, the Obama Administration announced the use of a three-year look-back period when analyzing inversions. Following the announcement, Pfizer and Allergan immediately withdrew their attempt to merge. Chiu argues, however, that “absent a means to address the push-and-pull factors underlying the incentive to invert, corporations can find ways to evade the Treasury Department guidelines and continue to invert” (742).

Johannes Voget provides a macroscopic lens to view the relationship of this government regulation to the incentive structure of inversion. In a study examining relocating firms from 1997 to 2007, the author finds that increased controlled foreign corporation legislation increases the number of firms relocating (Voget 1067). This means the incentive to relocate is correlated with the regulatory environment in that country, as expected. Voget goes on to find evidence showing that the presence of certain tax laws makes firms more likely to relocate their corporate headquarters. Specifically, Voget shows that “a 10 percentage points decrease in the foreign subsidiaries’ tax burden of a U.S. multinational would imply a 2.2 percentage points increase in the probability that its headquarters would relocate abroad within the next decade” (1079). While this is somewhat obvious, the journal brings empirical evidence indicating the pervasiveness of tax avoidance, and its direct relationship to the inherent costs surrounding it.

Many of the academics that have examined corporate inversions have provided quantitative and qualitative insights into the explicit costs of inversion. Most obvious are the direct tax costs of performing this transaction. This is largely a result of the stringent policies the government has enacted over the past 30 years that have created significant regulatory hurdles to invert. Investors are assessed capital gains taxes on any increase in the market value of ownership from purchase to the time when the shares are exchanged following the transaction (Butterfield 654). In a 2002 study, Mihir Desai and James Hines also examine the potential costs associated with withholding taxes on dividends. In addition to these capital gains and withholding taxes, corporate restructurings are an inherently costly initiative. Thus, when

examining merger-related inversions, one must also consider the restructuring costs, acquisition costs, and regulatory costs. However, these short-term explicit costs are typically easy to quantify, and thus the market should price them in with relative ease. Consequently, while short-term tax costs are most apparent and perhaps most significant, most academic research has focused on intangible costs.

The source of the debate surrounding the value of inversions is not typically on the explicit costs, but frequently on the less obvious costs of inversion. In their 2002 note, Sieda and Wempe highlight these costs as differences in shareholder rights internationally, political costs, unpatriotic imaging, damaging press, and increased scrutiny from regulators (Seida, "Market"). In fact, Obama renounced corporate inversions as unpatriotic within his recent executive action. While this impairment to image may certainly exist, the inability of researchers to quantify this has resulted in most citing it as a potential cost, but there is a lack of empirical evidence to suggest it. Moreover, in the report "Corporate Inversions and Fair Play," Butterfield and Orchard make a case that it is not unpatriotic to invert at all. They argue that it is not patriotic to pay more taxes and is actually just fiscally irresponsible. They go on to argue that not only is it in the best interest of shareholders to pay less taxes, but it is actually in the best interest of all stakeholders, including the government. American policy, they state, should encourage American business no matter where it operates. However, Butterfield and Orchard do acknowledge that companies that are unwilling to pay American taxes may not deserve the benefits of American protection, economic environment, and government contracts (Butterfield 655).

Another implicit cost that researchers have identified is the potential for agency problems. Because of the complicated tax structure and relation to mergers, inversions may provide an incentive for managers to invert even if they do not expect it to be in the best interest of shareholders. This is a possible explanation frequently cited to address the anomaly that inversions continue to occur despite a seeming lack of shareholder benefits. In fact, Desai and Dharmaphala perform a study that finds that tax avoidance in general does benefit firm value, but the results were not significant enough to draw conclusions on the 900 firms analyzed (541). Specifically, the authors analyze the firm governance implications of tax

avoidance and observe that well governed firms will benefit from tax avoidance, but agency problems in poorly governed firms may offset tax savings (546). This is one of the few pieces of literature to thoroughly examine and quantify an intangible aspect of tax inversion and its benefits/costs to firm value. Elizabeth Chorvat also cites differing interests of shareholders and corporate managers in her paper that attempts to explain the anomaly of the shareholder benefits of inversion. However, Chorvat then goes on to assert that while managers may be acting in their own interest, they may also play a completely different role in inversion. Chorvat believes management could potentially capitalize on undervalued stock by inverting, which would instead be exploiting the information asymmetry between managers and shareholders to the benefit of shareholders (Chorvat, "You Can't" 501). While intangible costs are likely to exist for corporate inversions, the lack of empirical evidence and many opposing viewpoints make discerning these costs difficult.

These persistent, intangible costs and risks are the most likely to weigh on performance in the long-run. They may explain the more quantifiable findings of Cortes, Gomes, and Gopalan. These authors conclude that inverted firms have higher bid-ask spread, less institutional ownership, and that investors put a lower value on the cash on their balance sheet in the long-run. In fact, they determine that the weaker rule of law in the country of inversion is a significant contributor to abnormal negative returns (Cortes 34). Similarly, Lusch, Seida, and Watson also find evidence of long-run non-tax costs associated with companies that underwent single-company corporate inversions (36). Yet, the examination of how these costs affect firm value still provides a challenge.

Policy has not only driven firms to invert, but also acted as a deterrent from inversion. Largely as a result of increased regulatory scrutiny, there are more costs inherent with inversions than ever before. Short-term costs include initial taxes and restructuring as well and many unquantifiable costs and considerations. Additionally, only little academic research has been done on the long-term costs of inversion. Despite these costs, corporations continue to invert. As a result, the bulk of study surrounding

corporate inversion focuses instead on the benefits of inversion, and how investors ultimately perceive the cost/benefit relationship in such a strategic move.

Financial and Equity Performance

While the costs of inversion are suspected to be quite nebulous, the incentive to expatriate is far more concrete. In fact, it is almost definitional of inversion. Corporations invert to lower their effective tax rate. Many believe this is done not only through lowering foreign taxes on foreign earnings, but also by lowering taxes on U.S. earnings. The latter technique, known as earnings stripping, is still a source of much debate. This section will focus on the studies that have analyzed the financial and economic impact to firms that choose to expatriate, ultimately aiming to show the effect of inversion on equity performance.

To determine the effectiveness of inversion, many studies have focused on investigating whether inverting firms actually lower their effective tax rate, and leverage this to determine what techniques are used and how effective they are in offsetting costs. Cortes, Gomes, and Gopalan conclude that inverted firms have a 7-8% lower effective tax rate than counterparts based on a holistic examination of firms that inverted between 1996 and 2013 (32). In their 2004 piece “Effective Tax Rate Changes and Earnings Stripping Following Corporate Inversion,” Jim Seida and William Wempe use a more detailed study of 12 firms to discern similar results. They find that these firms experience substantial declines in effective tax rates following inversion, with an average 11.6% reduction (825). They go on to conclude that despite management suggestions, inversion related effective tax rate reductions could not merely be the result of tax savings for foreign sourced income, indicating that the firms were utilizing earnings stripping. Interestingly, Desai and Hines found in a paper two years earlier that avoidance of domestic taxes, also known as earnings stripping, is not always the primary incentive of inversion (Desai, “Expectations” 429). Despite this, some more recent research such as Lusch, Seida, and Watson’s work finds evidence of

earnings stripping over the long-run (35). Although there is friction to this point between many of the studies over the past decade, it is not critical in examining market reactions. More importantly, nearly all studies have indicated that firms that invert do indeed lower their effective tax rates dramatically.

Moving towards the most relevant research in the field, there have been a plethora of studies that have examined equity market reactions to corporate inversion. This is because researchers believe the equity markets should immediately indicate whether there is perceived long-term benefit to inverting that outweighs the inherent costs. Despite the vast number of studies, the results remain indeterminate. Paving the way in 2002, Mihir Desai and James Hines published the most extensive research on inversions of the time, the reference for all subsequent studies. First, the authors conduct extensive research to determine where the benefits of inversion lie. They find that in certain cases, “market participants expect foreign inversion to be accompanied by a reduction in tax liabilities on U.S. source income, since savings associated with the taxation of foreign income alone cannot account for the changed valuations” (Desai “Expectations” 409). In the authors’ analysis of market reactions from 1993-2002, only 8 of 19 companies experienced positive abnormal returns, with an average of only 1.7% increase in share price, which was not significantly significant (430). This was the first indication that inverting may not be as beneficial as once thought, but many other studies with varying sample sets and methodologies followed.

Shortly after this finding in 2002, Seida and Wempe confirmed the lack of a significant positive reaction, but also provided other insights. In a short research note, they examine the cumulative abnormal returns of 19 firms around inversion announcements, and conclude that pre-Autumn 2001, the market generally reacted to inversions positively; after this date, however, the market did not view inversions as favorably. The authors postulate this was a result of both September 11th and the Enron collapse shifting public sentiment on expatriation (Seida “Market” 1098). The topic continued to gain traction, as the rampant prevalence of inversion conflicted with these lack of results. In fact, Seida and Wempe went on to publish a more thorough report in 2004 where they examined the effective tax rate changes previously discussed. The authors note that “the market appears to incorporate anticipated inversion benefits into

share prices,” but “the inability of research to detect a significant market reaction to board approval of inversions yet document significant reaction to shareholder approval is perplexing” (Seida “Effective” 824). In conclusion, Seida and Wempe note that tax savings are associated with price reactions and are “to some extent” reflected in market prices, but the sample size was disappointingly limited. Also, the authors find that “profit margins increase substantially” for inverted firms (815).

Next, Cloyd, Mills, and Weaver examined the phenomenon in 2003. They conduct the most thorough analysis of valuation and shareholder benefits in academic research of the time. The purpose of the research was ultimately to conclude if share price reactions are positive in order to determine if the inversion trend would continue in the absence of additional tax legislation. They find no evidence to suggest that share prices increase in response to inversion announcements. In fact, average share price did not increase, but actually decreased in response to announcement (Cloyd 103). With the benefit of hindsight since the research in 2003, it is now known that inversions have continued despite additional tax legislation. Because this is counter-intuitive, the authors analyze returns in the month preceding the announcement date to see if the market anticipated the announcement. After finding no compelling evidence, they examine one, three, and six-month returns following announcement to determine if share prices did not react due to uncertainty. The authors ultimately conclude that there are “no obvious shareholder benefits from expatriations” after analyzing announcement period returns (Cloyd 87). It is worth noting that Seida and Wempe came out in 2003 to release another research note analyzing all of these papers. They dissect many potential problems with the papers. First, they assert that market reaction surrounding both board and shareholder approval should be examined. Next, they find problem with the test processes themselves, and specifically hone in on the samples used. The notes believe that the 4 companies with the largest CARs in the sample should all be dismissed for various reasons, and conclusions drawn from the full sample are incredulous. Seida and Wempe also point out that Cloyd, Mills, and Weaver’s failure to detect evidence of a market reaction does not necessarily demonstrate the absence of such an effect (Seida “The Market’s” 1146).

Despite these beliefs, the results of the initial wave of studies have been reiterated by more recent research in the field. Rao examines the equity market's reaction to inversion in 2015 as a means to determine the after-tax cash flows related to inversion. He finds that the market reaction to the announcement of inversions is "largely mixed" both before and after the key legislation (Rao 1094). Cortes, Gomes, and Gopalan also found in his 2015 paper that 45% of firms to expatriate experience a decline in share price following the announcement, consistent with Desai and Hines. Then, the authors investigate to find that the change in market value was less than expected cost savings for 60% of firms (Cortes 34). This not only furthers the inconclusiveness of immediate market reaction, but also goes on to reiterate the prevalence of intangible costs during inversion. In 2016, Khurana and Neuman also observe an insignificant, negative market reaction to the announcement of single company inversions (32).

This lack of result has become the focus of most recent research. Specifically, why do companies continue to invert despite a lack of observable shareholder benefits? While some suggestions such as agency problems and the inability to accurately predict costs are possible, other researchers have begun to examine the possibility of market inefficiency at the time of announcement. The Cloyd, Mills, and Weaver study of 2003 was the first to suspect this, so they sterilized announcement results by including pre and post announcement time frames while examining market reactions. Even still, no shareholder benefits were realized in the one, three, and six months following announcement (Cloyd 89). There were multiple potential flaws here, such as the restricted six-month time frame. Moreover, they compare long-term returns to the broader market, not adjusting for risk factors. Within the study, the authors even note that certain firms were affected "greatly by industry effects" (Cloyd 105).

With the most recent inversion wave, academic research has once again resumed in the field with the benefit of a longer timeframe for analysis. Lusch, Seida, and Watson analyze the long-run tax and financial performance of single company inverters from 1994 to 2002. The distinction here of single company inverters from merger-related inverters is key. As a result of 2004 legislation, inversions post 2004 take a much more strategic form. As opposed to just altering domicile, modern inversions typically

are considered merger-related inversions, as the target must make up a substantial portion of the combined post inversion assets. The paper examines 10 years of post-inversion data for single company inverters to find that inverted firms realize lower book effective tax rates and lower cash tax burdens relative to U.S. competitors over the long-term (Lusch 35). Also, these firms experienced a reduction in volatility of effective tax rates. However, non-tax related costs cause inverters to significantly underperform peers on both pre-tax and after-tax accounting rates of return with inferior pre-tax and after-tax earnings performance, despite the long-run tax advantage (Lusch 36). They conclude this is a result of long-term non-tax costs, as many prior studies speculated.

Furthering this research in long-term performance of single company inverters, Elizabeth Chorvat studies long-term excess returns of these transactions. She asserts, similarly to her previous paper, that corporate managers may take advantage of what they perceive as a mispricing by inverting, and by doing so managers are in fact acting in the best interest of shareholders, despite the lack of immediate market reaction (Chorvat, "Expectations" 3). She includes extensive robustness tests and is able to conclude statically and economically significant excess returns of 225% in the years following transaction, or about 15% annually, for firms inverting between 1993 and 2002 (Chorvat, "Expectations" 22). When sensitizing to compare with firms in the same industry, as Cloyd's research did not, Chorvat finds that this explains half of the excess return; however, even in this more appropriate comparison, there are excess returns of over 100% (19). So, despite a multitude of previous evidence suggesting no abnormal positive reaction from the market immediately following an inversion announcement, these firms outperform significantly over the long-run. This indicates that the long-term cash and competitive advantages hypothesized by some exceed the nebulous long-term costs, and potentially implies market mispricing at the time of announcement.

Studies over the past decade have indicated that firms benefit from significant tax savings as a result of expatriation, despite varying explanations for the fundamental drivers of this. Regardless, markets typically react with mixed signals following the announcement of inversion, indicating that the

cost previously discussed meet or exceed these benefits on average. This creates a unique anomaly, where corporate managers continue to undergo a risky and exhausting process despite repeated proof indicating a lack of shareholder benefit. More recently, however, researchers are beginning to examine the long-term effects of inversion. Initial studies are indicating mixed underlying motives, but the potential for widespread market mispricing and significant long-term outperformance of inversions exists.

Merger-Related Inversion

As a result of critical legislation in 2004, corporate inversions since have taken a significantly different form from those prior to these laws. Specifically, a law was made to essentially ban inversions through stringent ownership and taxation regulation. Additionally, the government required that firms must generate substantial business in the inversion location in order to invert, but some of the vague legal verbiage has been exploited (Chiu 730). Khurana and Neuman examine this in their study that compares the two types of inversions, and they are able to conclude that the 2004 tax reforms “successfully eliminated inversions without a business purpose” (Khurana 32). Because of the many considerations and transaction structures that are inherently different with strategic mergers, it is pertinent to examine post-2004 inversions separately when analyzing corporate inversions.

Nirupama Rao achieves this distinction in his 2015 study, which attempts to examine the economic impacts of corporate inversions. He argues that the 2004 legislation was actually counterproductive, inhibiting true inversions and encouraging more strategic mergers (1075). As a result, loss of U.S. business activity is actually more likely now, and foreign expenditure is actually higher for inverted companies. Furthermore, “only after 2004 do firms that invert continue to increase their foreign shares of employment and investment after their first year with a non-U.S. domicile” (1094). This allows one to conclude that the economic and strategic considerations as well as the subsequent operations are clearly distinct pre and post 2004 legislation. Despite this, many of the incentives are consistent across

both types of inversions. Johannes Voget comes to this conclusion as part of his paper analyzing international tax policy and tax domicile relocation. He realizes that taxes attempting to ban expatriation must apply to all firms, which will inevitably skew the incentive pool in all cross-border mergers and acquisitions (Voget 1079). Consequently, it appears that merger-related corporate inversions and single company inversions are structurally different, but have underlying similarities and are prompted by similar stimuli.

Inder Khurana and Stevanie Neuman studied this relationship comprehensively for the first time in October 2016. This paper analyzes the typical firm characteristics of both single company and merger-related inversions. They detect that firm characteristics do vary between the two types of inversion, as they make the same observation as Rao regarding business activity within merger-related inversion (Khurana 5). Nevertheless, Khurana and Neuman also find evidence suggesting the two inversion types are both fundamentally related to tax avoidance, as expected. Notably, however, they conclude “merger-related inversions are related, at least to some extent, to non-tax factors, whereas single company inversions appear to be completed solely to obtain tax benefits” (Khurana 6). These non-tax factors likely include growth opportunities and global competition. As a consequence of distinctions made in this study, academic research on inversions will likely delineate between the two types of inversion moving forward.

Because many of the long-term benefits of single company inversions are consistent with those for merger-related inversions, it is worth studying whether a similar anomaly exists in the equity market as previously observed in the single company case. Recall, multiple studies have found mixed to no market reaction at the time of announcement for single company inversions; however, initial indications from Chorvat’s results indicate that single company inverters outperform in the long-run. Examining market reactions to announcement of merger-related inversions is the first step to discern if the anomaly still exists. Rao’s 2015 study indicates that market reactions were “largely mixed” immediately following the announcement both prior to and after the key 2004 legislation (Rao 1094). Though Cortes, Gomes, and Gopalan do not separate the two types of inversion, they also observe a lack of consistently positive

market reactions following inversions for the entire period from 1996-2013 (Cortes 34). Conversely, Khurana and Neuman find significantly distinct market reactions to the announcement of single company versus merger-related inversions. They detect a significant positive reaction to merger-related inversions, but an insignificant negative reaction to single company inversions. This suggests that the market perceives the costs and benefits of these two types of inversions differently on average (Khurana 32). Currently, there is some tension within existing research in regards to the immediate effect of merger-related inversion announcements on equity performance. While a lack of positive reaction would certainly provide intuitive motive to study long-term performance as in the single company case, the identification of possible long-term outperformance in the single company case certainly provides compelling enough motive for study given the underlying similarities.

In studying this long-term merger-related inversion performance, it will be critical to have appropriate and credible benchmarks for comparison. First, examining how mergers perform on average will provide a frame of reference. Devos, Kadappakkam, and Krishnamurthy study how mergers aim to create value for shareholders in their research regarding taxes, market power, and efficiency improvements as explanations for synergies. They find that collectively mergers create roughly 10% in value, which is statistically significant. Within this, the majority of value creation was the result of operational changes, not financial synergies. In fact, tax savings resulted in slightly less than 20% of the value created (Devos 1181). It is worth noting that this study analyzed firms between 1980 and 2004, furthering Bradley, Desai, and Kim's similar results on firms from 1963 to 1984. This is critical because the majority of merger-related inversions take place after 2004, so one may expect tax synergies and tax motives for mergers to increase after 2004.

A multitude of studies have concluded varying results on the overall effectiveness of mergers in general. Bouwman, Fuller, and Nain examine academic studies in aggregate to determine that in traditional M&A, acquirers tend to experience negative abnormal returns relative to peers in the short and long-term (Bouwman 9). Nevertheless, these observations seem quite sensitive and dependent on

underlying measures such as motive, economic conditions, and valuation (Bouwman 10). Richard Schoenberg also examines the overall performance of corporate mergers, but with an emphasis on the measures used to define success. He evaluates the mean success rates of acquisitions using these different methodologies, finding that each metric (quantitative and qualitative) independently found a mean success rate between 44-56% (Schoenberg 361). Another interesting finding in this piece is that “ex-ante capital market reactions to an acquisition announcement exhibited little relation to corporate managers’ ex-post assessment,” which demonstrates the “information asymmetry that can exist between investors and company management, particularly regarding implementation aspects” (Schoenberg 361). This information asymmetry, which also arose during the examination of single company corporate inversions, could provide reason to suspect market mispricing for merger-related inversions as well at the time of announcement.

Narrowing these observations to international mergers, Doukas and Travlos study the impacts of foreign acquisitions on shareholder wealth. This study determines markets react in an insignificant, negative manner to acquisitions of foreign firms where the acquirer already operates in the target country. Moreover, acquisitions by domestic firms expanding internationally result in insignificant, but positive, abnormal returns. Conversely, acquisitions by multinationals into countries where the company does not currently operate result in significant, positive abnormal returns (Doukas 1173). While these acquisitions are not inversions, it does provide increased support to Khurana’s claim that merger-related inversions result in an immediate positive market reaction.

While mergers generally and foreign acquisitions specifically lack positive statistically significant benefits on average, the possibility for mispricing of merger-related corporate inversion still exists. The market appears to react similarly to both merger-related corporate inversions and foreign acquisitions. This is expected, as numerous studies find have found that merger-related inversions typically retain a non-tax motive. Despite this, there are clearly also tax motives that, similar to single company inversions, that may provide long-term benefits that are mispriced by the market at the time of announcement.

Conclusion

Existing literature has extensively analyzed the potential causes, consequences, and short-term equity performance of corporate inversions. The U.S. tax code has been analyzed thoroughly, and many academics have focused on both how it has changed and how should be changed moving forward to address expatriation. Others have shown that both the past and current tax codes provide meaningful incentive to invert. Specifically, long-term tax reductions have been proven as a result of moving corporate headquarters to more tax friendly domiciles; however, it has been demonstrated that there are inherent explicit and implicit costs associated with inversion. As a result of the enigmatic cost and benefit structure, equity markets have historically had mixed reactions to the announcement of corporate inversion. This lackluster shareholder reaction, on average, leads itself to an anomaly. To answer why corporate managers continue to pursue inversion despite a lack of benefit to shareholders, some academics have turned to behavioral economics or agency problems, while recent research has turned to analyzing long-term returns of these transactions. Initial studies indicate that single-company corporate inversions have outperformed peers as well as the broader market significantly in the long-run.

Recent research has made the distinction to separate pre-2004 corporate inversions from those that have taken place since the key regulatory reforms that year. Inversions taking place after 2004 typically take a distinctly different form from those prior. Specifically, these inversions typically have some strategic, non-tax motive, resulting in a more merger-related structure. Despite this non-tax motive, these transactions are taking place, at least in part, to lower effective tax rates. Standard mergers as well as international acquisitions historically have also had mixed market reactions both at the time of event and in long-term success rates. Though research in the field of merger-related inversion is relatively new, the similarities to single company inversion provide compelling enough reason for further study. Specifically, the long-term performance of merger-related corporate inversions needs additional examination to determine if similar anomalies exist.

Identifying long-term outperformance of merger-related inversions would legitimize companies' efforts to invert, and suggest the information asymmetry expected by some academics. Additionally, studying these more prevalent inversions provides another lens for regulatory examination. With the likelihood of significant tax reform and repatriation efforts by the coming administration, this research can help determine the potential effectiveness of the reforms and implications on equity performance. In the case that these reforms result in a complete elimination of corporate inversions (though this has not worked in the past), this study may find evidence of market inefficiency and information asymmetry surrounding the announcements of significant corporate strategic initiatives. Findings from this inefficiency could be extrapolated to other major event inefficiencies, and would further the field of research against efficient markets. Finally, by examining long-term performance of past inversions, conclusions can be drawn regarding the potential financial and competitive advantages this corporate structure allows for. These results can then be applied to previously inverted firms in the market if conclusive.

Chapter 3

Research Methodology

In order to further the current body of academic research surrounding corporate inversions, this study will examine the long-run performance of inversions taking place since 2004. Specifically, it will analyze the long-term equity returns of companies that have inverted since the pivotal Section 7874 legislation in 2004 in an effort to determine the overall shareholder benefits of modern day inversions. This performance will be observed through a variety of statistical methods, replicating many of the techniques used by Elizabeth Chorvat in her paper titled "Expectations And Expatriations: A Long-Run Event Study," which analyzes pre-2004 inversions. In addition to examining long-run returns, the window surrounding the announcement of inversion will be examined. Some of the most prominent pieces of

academic research in the field have conducted similar announcement studies, but have found largely mixed results. This short-term analysis will provide insight to the perceived long-term effects of inversion by the market, as well as context for the long-term findings. Ultimately, this research aims to further the understanding of the performance of corporate inversions, the effectiveness of tax policy, the possibility of market anomalies.

Hypothesis

Companies that re-domicile through corporate inversions since 2004 will outperform in the long-run. This stems previous studies concluding no abnormal stock returns immediately following the announcement of inversion, yet the continued prevalence of inversion in addition to well documented long-term tax benefits of inversion. Specifically, regulation has created onerous financial burdens in an effort to prevent inversions, and there is inherent risk involved in any significant corporate restructuring; however, these costs are largely short-term in nature, while the benefits are realized over the long-term and allow for financial and competitive advantages. While mergers since Section 7874 in 2004 are more merger-related in nature, concurrent studies indicate that single company corporate inversions that took place prior to 2004 have historically been mispriced at the time of announcement, as new evidence indicates that they outperform peers in the long-run on average.

Sample Selection

In order to form the sample set, a list of potential inversion transactions since 2004 was compiled using SEC filings, media announcements, and prior academic research. A Bloomberg list of 84 corporate inversions from 1982 until today was used as the basis for sample. This sample was restricted to inversions that closed after 2004 and prior to 2016. Inversions prior to 2004 were excluded because they

faced vastly different tax policy. Inversions taking place in 2016 were excluded for a lack of sufficient data. Of the 48 inversions remaining, 17 either re-domiciled through other means or were the spinoff of a prior inversion. Bloomberg defines these remaining inversions as “a U.S. company shifts its place of incorporation to another country without undergoing a change in majority ownership,” which is consistent with the views of this study (“Tracking Tax Runaways”). The list was then refined through the analysis of other recent academic research, such as Khurana and Neuman’s 2016 paper and Chorvat’s 2016 research. Also, the definition set forth by the U.S. Department of the Treasury which states “a transaction through which the corporate structure of a U.S.-based multinational group is altered so that a new foreign corporation, typically located in a low- or no-tax country, replaces the existing U.S. parent corporation as the parent of the corporate group” was used as a benchmark (U.S. Department of the Treasury). After doing diligence on the remaining companies and ensuring sufficient data, a sample of 25 companies remained for analysis.

Table 1 provides a summary of the final sample. Of the 25 inversions, 22 have taken place since 2010, indicating the pervasiveness of recent inversions. Additionally, many of the companies have re-domiciled in historically common tax havens, such as Bermuda, Ireland, and the Cayman Islands. It is also worth noting that many of the inversions took place within the healthcare and insurance industries.

Data Collection

The empirical tests conducted in this study utilize stock return data. Most of this data was obtained using CRSP accessed on Wharton Research Data Services. These returns were used in all of the empirical calculations, including the adjusted stock prices in Table 3. The data used to run the Fama and French 5 Factor model and the Fama and French with momentum model was attained from Kenneth French’s website. French uses the 1-month Treasury bill as the assumed risk free rate in his model, which he attained from Ibbotson and Associates. Yahoo Finance was used to source S&P500 Total Return data

seen in Table 3 as well as to categorize the inversion companies by industry as seen in Table 1. In addition, Factset was used for inversion diligence, as well as for the dates of announcement, approval, and deal closure seen in Tables 1, 2, and 3.

The following adjustments were made when analyzing the data: Actavis (ACT) now trades as Allergan (AGN) since the two companies merged in 2015. As a result, AGN return data was used following the merger. Livanova (LIVN) traded formerly as Cyberonics (CYBX) prior to its inversion. Thus, CYBX returns data was used for computations of returns pre-deal closure, including for returns surrounding the announcement date. Theravance BioPharma (TBPH) traded as Theravance Pharmaceuticals (THRX) prior to its inversion. Thus, THRX returns data was used for computations of returns pre-deal closure, including for returns surrounding the announcement date. Additionally, Tim Horton's (THI) underwent two inversions in the given time frame. As a result, the THI inversion long-term returns end when the Restaurant Brands (QSR) long-term returns calculations begin to avoid double counting. Finally, Ensco (ESV) and Tronox (TROX) did not trade prior to closure of the inversion, so long-term performance was computed from the date of deal closure, as opposed to from the date of announcement. The long-term study uses all 25 companies. However, because of the adjustments noted above or a lack of CRSP data, the sample for the event study around the date of announcement was reduced to 21 companies, excluding CVEO, ESV, QSR, and TROX.

Empirical Methods

The empirical methodology in this study is similar to that conducted by Elizabeth Chorvat's "Expectations And Expatriations: A Long-Run Event Study." However, instead of using the Fama and French 3 Factor Model and the Fama and French Industry Model, as Chorvat does, this study primarily uses the Fama and French 5 Factor Model (FF5F) to compute long-run excess returns. The FF5F Model calculates excess returns using the following formula:

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + e_{it}$$

Much like Fama and French's 3 Factor Model, the 5 Factor Model attempts to capture all market returns using risk factors, five in this case. These risk factors are the original beta from the Capital Asset Pricing Model, SMB, HML, RMW, and CMA. Beta captures the market risk premium. SMB (small minus big) accounts for the size premium. HML (high book-to-market minus low book-to-market) accounts for valuation differences. RMW (robust minus weak) accounts for differences in profitability. CMA (conservative minus aggressive) accounts for the differences in low and high investment stocks. Together, the model attempts to amend for the inability of CAPM to explain past market returns. By construction these risk factors are the explanatory risk factors, so there is no need to benchmark against peers. Overall, the model captures between 63% and 93% of cross-sectional variation in expected returns. When the regression is run, any return not explained by the model is captured in "a" or alpha, which is considered excess return (Fama and French). Note that this model was run using daily return data, so the results were also annualized within Table 2.

In addition to the Fama and French model, a more basic approach was taken to calculate long-term excess returns. Excess returns in Table 3 is calculated as S&P 500 total returns minus stock returns. S&P 500 total returns were calculated as $(SP500TR_{\text{End of Period}} - SP500TR_{\text{Beginning of Period}}) / SP500TR_{\text{Beginning of Period}}$. SP500TR includes dividends, and it was used because dividends were included in the adjusted share prices in Table 3. Stock returns were calculated as $(\text{Adj. Price}_{\text{End of Period}} - \text{Price}_{\text{Beginning of Period}}) / \text{Price}_{\text{Beginning of Period}}$. In the calculation of adjusted stock price, it is assumed that dividends are reinvested. Also, note that the end of the period is the sooner of the last day the stock traded and 12/30/16, as this was the most recent available data.

In addition to the two long-term returns analyses conducted, research was also done surrounding the date of announcement. While the purpose of this study is to identify potential long-term excess returns, it is important to contextualize this by studying short-term returns. Specifically, the impetus of this thesis was the lack of initial shareholder reaction to inversion announcements, despite the prevalence

and economic benefits. A plethora of prior studies have been conducted both pre and post-2004 with mixed and inconclusive results for announcement period returns.

The short-term event study was conducted with assistance from Wharton Research Data Services. First, using a Fama and French model with momentum, this study computes excess returns over the period 100 days prior to 100 days post inversion announcement. The momentum feature of this model was not used in the long-run study, as in a period larger than 12 months it has been shown to be explained by HML (Chorvat). The results of this study are summarized in graph and table in Figure 1. This chart and table show the mean cumulative abnormal (CAR), or excess, returns over the 200-day period for the 21 companies included in the short-term study. Additionally, the same model was run for +/- 1 day and +/- 5 days surrounding the announcement. These results are summarized and shown on an instance-by-instance basis in Figure 2.

Finally, a comparison of long-term and short-term results was completed. This study attempts to determine how well the market captured long-term shareholder benefits as the time of announcement. Because the results indicated that the market does react significantly to inversion announcements, this was done to see if these short-term returns were a predictor of future returns. Regressions were run and correlations were computed between the short-term and long-term returns, and the results are shown in Table 4. For example, a positive intercept indicates the market underestimated the long-run shareholder benefits of inversion, while a negative intercept indicates the market overestimated the shareholder benefits of inversion. Additionally, correlation in conjunction with p-values can be used to determine how closely initial market reaction was to long-term performance, relative to other inversions.

Results

The results of this study indicate that corporate inversions since 2004 underperform the market, on average. Specifically, as seen in Table 2, the results of the Fama and French 5 Factor model indicate

that on average these corporate inversions experienced excess returns of -4.47% annually. Of these results, only 4 were statistically significant with 90% confidence (two with positive excess returns and two with negative excess returns). Moreover, the more basic approach to calculating long-term excess returns yielded similar results. Period excess returns compared to the S&P 500 are seen in Table 3. On average, corporate inversions abnormally returned -39.97% from the date of announcement to the end of the holding period, or -6.46% annualized. Furthermore, with both methodologies 13 of 25 companies experienced negative excess returns. Consequently, this study concludes that there are no long-term positive abnormal returns of inversions since 2004, on average. Instead, results indicate that there may in fact be long-term negative abnormal returns.

In the short-run analysis, this study yielded very different results. In theory, share price immediately after announcement should incorporate all perceived costs and benefits of inversion. Turning to Figure 1, corporate inversions since 2004 experience positive excess returns of 9.46% in the 200-day period surrounding the announcement of inversion, consistent with Khurana and Neuman's findings on merger-related inversions. This shows, unlike studies of pre-2004 inversions, that the market perceives the long-term benefits of post-2004 inversions more favorably at the time of announcement. Moreover, these stocks experienced average excess returns of 3.74% and 5.5% in the 2 and 10-day periods surrounding announcement. To further these results, the low correlation coefficient and R-squared in Table 4 indicates that there is almost no correlation between announcement returns and long-term returns, reaffirming the market's efficiency at the time of announcement.

In summary, these results do not confirm the hypothesis. This hypothesis was dependent on the findings of previous studies, which indicated a lack of an obviously positive market reaction to the announcement of inversion. However, this study finds a significantly positive market reaction to announcement in similarity with Khurana and Neuman. This discredits some of the reason to suspect market mispricing, which was in large part the premise of the hypothesis. Comparing these results to Chorvat's, which found significant long-term positive excess returns of pre-2004 inversions, one may

suspect that the 2004 tax policy was effective in discouraging inversions. However, due to the continued prevalence of inversions, as well as the announcement window outperformance observed, this is difficult to conclude. Another issue with these results is the potential for sampling bias. As a result of such a small sample, it is possible to obtain results simply by chance. Also, the long-term portion of this study uses data starting at close the day of announcement. Therefore, any immediate reaction to the market is not captured. This was by design, as any investor would need to wait until after announcement to capitalize on this strategy. Additionally, under the assumption that markets did not accurately reflect the long-term benefits of inversion at the time of announcement, it should have no impact on proving the hypothesis. Conversely, a positive immediate reaction was observed, so results may have been affected. In summary, the potential existence of immediate market reaction and lack of long-term outperformance are logical, yet compelling, and demand further study moving forward.

Table 1: Sample Details

Company	Ticker	Year of Inv.	Country of Reincorporation	Sector	Industry
Actavis Plc	ACT	2013	Ireland	Healthcare	Drugs - Generic
Argo Group International Holdings Ltd.	AGII	2007	Bermuda	Financials	P&C Insurance
Alkermes Plc	ALKS	2011	Ireland	Healthcare	Drug Delivery
Aon Plc	AON	2012	England	Financials	Insurance Broker
Civeo Corp.	CVEO ¹	2014	Canada	Services	Business Services
Endo International Plc	ENDP	2014	Ireland	Healthcare	Drug Manufacturers
Enesco Plc	ESV ¹	2009	England	Basic Materials	Oil & Gas Drilling & Exploration
Eaton Corp. Plc	ETN	2012	Ireland	Industrial Goods	Diversified Machinery
Horizon Pharma Inc.	HZNP	2014	Ireland	Healthcare	Drugs - Generic
Jazz Pharmaceuticals Plc	JAZZ	2012	Ireland	Healthcare	Biotechnology
Liberty Global Plc	LBTYK	2013	England	Media	Telecommunications
Livanova Plc	LIVN	2015	England	Healthcare	Medical Appliances & Equipment
Medtronic Inc.	MDT	2015	Ireland	Healthcare	Medical Appliances & Equipment
Mylan Inc.	MYL	2015	Netherlands	Healthcare	Drugs - Generic
Perrigo Co. Plc	PRGO	2013	Ireland	Healthcare	Drugs Related Products
Restaurant Brands Int. Inc.	QSR ¹	2014	Canada	Services	Restaurants
Rowan Cos. Plc	RDC	2012	England	Basic Materials	Oil & Gas Drilling & Exploration
Stratasys Ltd.	SSYS	2012	Israel	Technology	Computer Peripherals
Steris Plc	STE	2015	England	Healthcare	Medical Appliances & Equipment
Theravance Biopharma Inc.	TBPH	2014	Cayman	Healthcare	Biotechnology
Tim Hortons Inc.	THI	2009	Canada	Services	Restaurants
Tronox Ltd.	TROX ¹	2012	Australia	Basic Materials	Chemicals
Tower Group International Ltd.	TWGP	2013	Bermuda	Financials	P&C Insurance
Valeant Pharmaceuticals Intl. Inc.	VRX	2010	Canada	Healthcare	Drug Delivery
Wright Medical Group NV	WMGI	2015	Netherlands	Healthcare	Medical Appliances & Equipment

¹CVEO, ESV, QSR, and TROX were not used for the short-term analysis, due to a lack of data and the reasons stated in the Data Collection section

Table 2: Regression Results

Company	Ticker	Inversion Announced	P-value	Daily Excess Return (α)	Annualized Excess Returns
Actavis Plc	ACT ¹	5/20/2013	0.4178	0.0418	11.12
Argo Group International Holdings Ltd.	AGII	3/14/2007	0.6549	0.0117	3.00
Alkermes Plc	ALKS	5/9/2011	0.0910	0.1072	31.01
Aon Plc	AON	1/13/2012	0.2686	0.0253	6.58
Civeo Corp.	CVEO	9/29/2014	0.1832	-0.3211	-55.53
Endo International Plc	ENDP	11/5/2013	0.4804	-0.0836	-19.01
Enesco Plc	ESV	12/23/2009 ²	0.0718	-0.1002	-22.33
Eaton Corp. Plc	ETN	5/21/2012	0.3840	-0.0258	-6.31
Horizon Pharma Inc.	HZNP	3/19/2014	0.3614	0.1357	40.73
Jazz Pharmaceuticals Plc	JAZZ	9/19/2011	0.3679	0.0477	12.76
Liberty Global Plc	LBTYK	2/5/2013	0.4832	-0.0299	-7.27
Livanova Plc	LIVN ³	2/26/2015	0.6594	-0.0402	-9.63
Medtronic Inc.	MDT	6/15/2014	0.6249	0.0179	4.63
Mylan Inc.	MYL	7/14/2014	0.6048	-0.0438	-10.45
Perrigo Co. Plc	PRGO	7/29/2013	0.3650	-0.0575	-13.49
Restaurant Brands Int. Inc.	QSR	12/12/2014 ²	0.4767	0.0493	13.22
Rowan Cos. Plc	RDC	3/8/2012	0.0602	-0.1140	-24.98
Stratasys Ltd.	SSYS	4/16/2012	0.4004	-0.0768	-17.60
Steris Plc	STE	10/13/2014	0.8847	0.0071	1.82
Theravance Biopharma Inc.	TBPH ⁴	4/25/2013	0.6789	0.0386	10.22
Tim Hortons Inc.	THI	8/17/2009	0.0069	0.0962	27.41
Tronox Ltd.	TROX	6/15/2012 ²	0.3742	-0.0980	-21.89
Tower Group International Ltd.	TWGP	7/30/2012	0.1007	-0.3079	-54.03
Valeant Pharmaceuticals Intl. Inc.	VRX	6/21/2010	0.9348	0.0067	1.69
Wright Medical Group NV	WMGI	10/27/2014	0.4736	-0.0568	-13.35
				Average:	-4.47

Note: Returns shown in %, See Data Collection section for adjustments

¹ACT now trades as AGN

²ESV, QSR, TROX use date of deal closure

³LIVN previously traded as CYBX

⁴TBPH previously traded as THRX

Table 3: Long-Term Returns

	Inversion Announced	Price Day of	S&P TR Day of	Adj. Price EoP	S&P TR EoP	Returns	S&P Returns	Excess Returns	Ann. Return	Ann. S&P Return	Ann. Excess Return
ACT ¹	5/20/2013	127.15	2950.53	210.01	4278.66	65.17	45.01	20.15	20.43	11.71	8.72
AGII	3/14/2007	34.15	2147.18	68.34	4278.66	100.11	99.27	0.84	11.29	9.44	1.85
ALKS	5/9/2011	15.19	2277.30	55.58	4278.66	265.90	87.88	178.02	41.84	13.06	28.78
AON	1/13/2012	46.28	2214.73	118.21	4278.66	155.43	93.19	62.24	22.44	15.08	7.36
CVEO	9/29/2014	12.84	3602.09	2.23	4278.66	-82.65	18.78	-101.44	-40.75	8.87	-49.62
ENDP	11/5/2013	56.22	3149.96	16.47	4278.66	-70.70	35.83	-106.54	-12.10	10.56	-22.66
ESV	12/23/2009 ²	42.24	1855.50	12.13	4278.66	-71.29	130.59	-201.88	-8.01	14.28	-22.28
ETN	5/21/2012	42.09	2278.24	77.33	4278.66	83.72	87.81	-4.08	17.27	16.17	1.09
HZNP	3/19/2014	16.02	3353.29	16.18	4278.66	1.00	27.60	-26.60	35.98	9.03	26.95
JAZZ	9/19/2011	43.74	2053.74	109.03	4278.66	149.29	108.34	40.96	27.98	15.87	12.11
LBTYK	2/5/2013	62.21	2657.76	71.22	4278.66	14.48	60.99	-46.50	5.94	14.20	-8.26
LIVN ³	2/26/2015	66.60	3877.85	44.97	4278.66	-32.48	10.34	-42.81	-9.56	6.22	-15.78
MDT	6/15/2014	60.03	3509.54	75.19	4278.66	25.25	21.92	3.33	10.84	8.85	1.99
MYL	7/14/2014	51.24	3585.37	38.15	4278.66	-25.55	19.34	-44.88	-3.44	8.48	-11.92
PRGO	7/29/2013	125.17	2994.45	84.32	4278.66	-32.63	42.89	-75.52	-7.92	11.51	-19.43
QSR	12/12/2014 ²	35.46	3609.06	48.90	4278.66	37.90	18.55	19.34	22.44	9.48	12.96
RDC	3/8/2012	36.04	2355.01	19.48	4278.66	-45.96	81.68	-127.64	-4.35	14.41	-18.76
SSYS	4/16/2012	41.21	2365.65	16.54	4278.66	-59.86	80.87	-140.73	-1.21	14.40	-15.61
STE	10/13/2014	56.56	3417.01	69.69	4278.66	23.21	25.22	-2.01	12.89	11.20	1.69
TBPH ⁴	4/25/2013	30.92	2801.28	40.43	4278.66	30.77	52.74	-21.97	22.94	13.28	9.66
THI	8/17/2009	29.29	1602.06	92.73	3663.10	216.58	128.65	87.93	27.03	17.91	9.12
TROX	6/15/2012 ²	144.25	2355.01	68.31	4278.66	-52.64	81.68	-134.33	4.49	15.51	-11.02
TWGP	7/30/2012	21.71	2406.99	2.98	3611.52	-86.28	50.04	-136.32	-48.55	22.68	-71.23
VRX	6/21/2010	46.90	1851.55	36.21	4278.66	-22.79	131.09	-153.87	14.33	14.94	-0.62
WMGI	10/27/2014	31.86	3581.82	23.77	4278.66	-25.39	19.45	-44.85	-6.67	9.93	-16.60
								Average:	-39.97	Average:	-6.46

Note: Returns shown in %, Prices shown in U.S. Dollars, See Data Collection section for adjustments

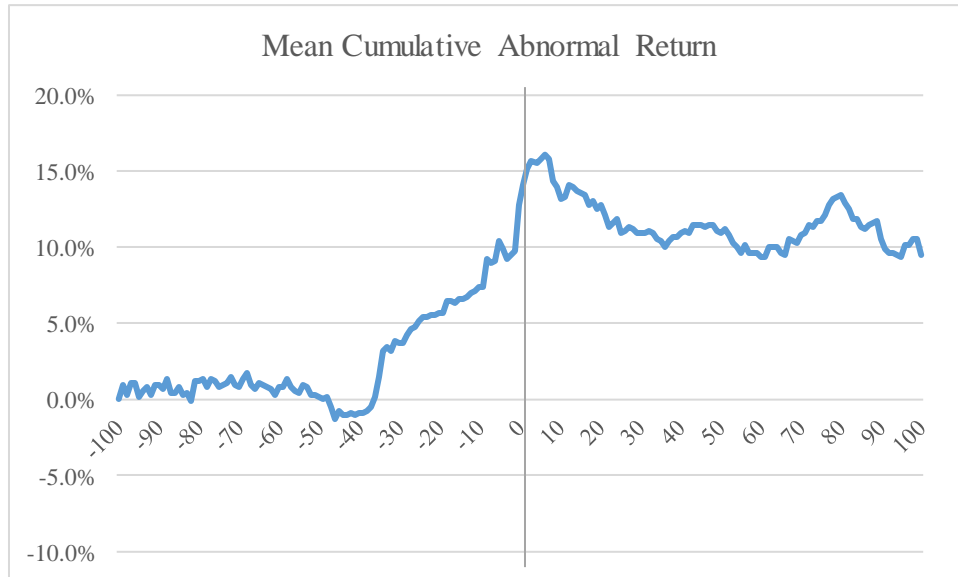
¹ACT now trades as AGN

²ESV, QSR, TROX use date of deal closure

³LIVN previously traded as CYBX

⁴TBPH previously traded as THRX

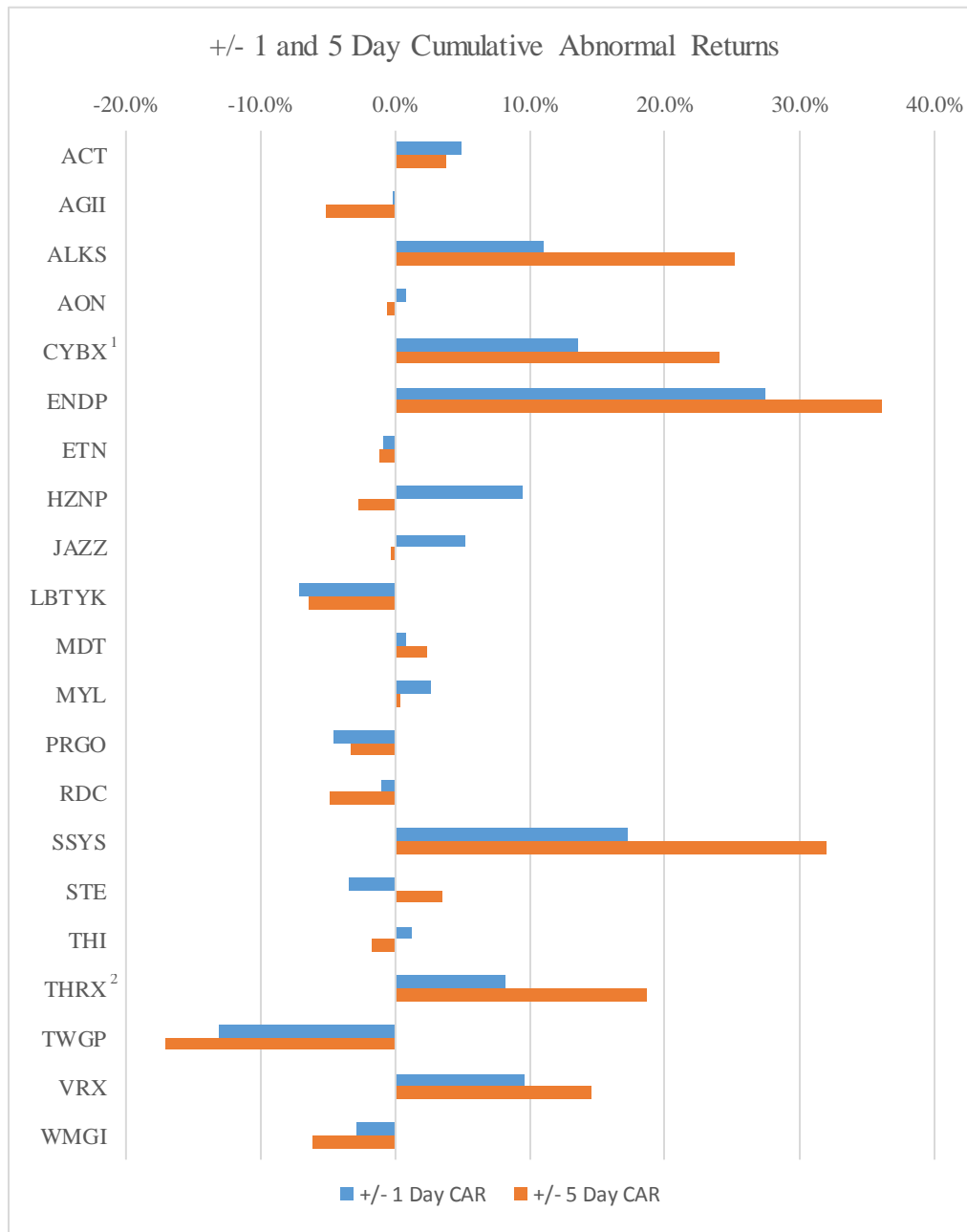
Figure 1: Short-Term 200 Day Announcement Returns



100 Days After Announcement (show in %)	
Mean CAR	9.46
Mean Total Return	33.90

Note: Returns shown in %, CVEO, ESV, QSR, and TROX were not used for the short-term analysis, See Data Collection section for adjustments

Figure 2: Short-Term 2 & 10 Day Announcement Returns



Mean CAR (in %)	
+/- 1 Day	3.74

Note: Returns shown in %, CVEO, ESV, QSR, and TROX were not used for the short-term analysis

¹CYBX is now LIVN

²THRX is now TBPH

Table 4: Comparison of Short-Term and Long-Term Excess Returns

	Correlation	Intercept	R squared	P-value
+/- 1 Day and +/- 5 day	0.9040	-0.02	0.8173	0.9867
+/- 1 Day and LT	0.2917	-6.90	0.0851	0.1759
+/- 5 Day and LT	0.1902	-5.85	0.0362	0.2532

Note: CVEO, ESV, QSR, and TROX were not used for the short-term analysis

Chapter 4

Conclusion

As long as there have been taxes, there have been methods to avoid paying them. While some may call this unpatriotic, others may say it is simply economically efficient. While some believe this is a result of a flawed tax system, others argue that these loopholes exist for a reason. Regardless of motive, the question remains whether evading taxes as a corporation ultimately benefits shareholders. Whether the costs incurred are structural, reputational, or regulatory, costs certainly are associated with tax avoidance. Corporate inversions are no different. American companies that invert attempt to evade paying the high domestic and international taxes levied by the U.S. Government by relocating their tax domicile abroad. This allows them to not only lower taxes on foreign earnings, but also may allow them to lower their U.S. tax base through a technique known as earnings stripping. Recognizing the pervasiveness of inversion, the government took large strides towards eliminating the practice with the implementation of Section 7874 of the tax code that levied significant costs on those companies attempting to invert. While the practice of inversion halted temporarily following the new laws, another inversion wave has commenced as corporations once again exploit gaps in the policy. Despite this increase in recent inversions, the onerous costs associated with the practice make it difficult to determine whether inversions are truly beneficial to shareholders.

In an effort to capture whether shareholders actually benefit from inversion, this study analyzes short and long-term equity performance surrounding and following the announcement of inversion since 2004. Previous studies have indicated that announcement period returns of inversion are mixed, and lack a significantly positive market reaction. This is compelling, because managers continue to invert, and do so claiming to be acting in the best interest of shareholders. Perhaps the managers understand something

the market initially does not. Perhaps there are long-term benefits of inversions that exceed the immediate short-term costs. This study hypothesized a lack of positive short-term market reaction, and instead a significant long-term outperformance of corporate inversions due to initial mispricing by the market. This data could be used to draw conclusions regarding the potential for inefficiency, effectiveness of 2004 tax reforms, and the costs and benefits of inversion on shareholders.

While this study aimed to find evidence of market inefficiency, the results may suggest the opposite, or even inefficiency in the opposite direction. In the short-term, markets reacted positively, on average. In fact, during the 100 days preceding and 100 days following the announcement of inversions, the sample of companies in the study experienced cumulative abnormal returns of 9.46%. Moreover, 3.74% and 5.25% of the outperformance took place in the 2 and 10-day windows surrounding inversion. This suggests that the market priced in effective tax rate reductions almost immediately after the announcement. The results of the short-term portion of this study are similar to Khurana and Neuman's findings, but differ from other previous studies. This renders the results of the long-term portion of this study much less compelling for purposes of the hypothesis, invalidating the assumption that markets did not react favorably to inversion announcements, on average. Initial reflection leads one to believe that the market still deems that the benefits of post-2004 corporate inversions exceed the costs. This suggests that the government's attempt to essentially ban inversions by imposing onerous costs was ineffective. It also suggests that managers are not acting in self-interest as some have suggested, but in fact are acting in the best interest of shareholders when deciding to invert. Another compelling result from the data was the reaction of the market prior to the announcement of inversion. Much of the cumulative abnormal returns occurred in the roughly 40 days leading up to the announcement of inversion. This can be used as fodder for the stronger forms of market efficiency, suggesting information leakage and market anticipation. It is worth noting, however, that the market did not react immediately positively to all of the inversions. In fact, 8 of the 21 companies' shareholders reacted negatively to the announcement of inversion in the 1-day preceding and 1-day following inversion. Moreover, 11 of the 21 companies' shareholders reacted

negatively to the announcement of inversion in the 5-day preceding and 5-day following inversion. So, depending on the measure considered, one may still conclude that the results of inversion were largely mixed following the announcement of inversion.

In the event that the market's reaction to inversion was mixed, studying long-term performance may suggest evidence of market mispricing at the time of announcement. Further suggesting this mispricing, a concurrent study by Elizabeth Chorvat indicates that pre-2004 corporate inversions significantly outperform their peers and the market in the long-run. Despite this, the results of this study indicate considerably different results for post-2004 inversions. Using the Fama and French 5 Factor model to calculate long-term excess returns, this study observed long-term negative cumulative abnormal returns of -4.47% annualized. The simplified excess returns approach confirmed this results, indicating negative annualized excess returns of -6.46%. Regardless of whether short-term returns were mixed or positive, these long-term results nullify the hypothesis. In fact, this result suggests that the market overreacted to the announcement of inversion initially, and corrected this over the long-term. Additionally, when comparing this result to Chorvat's, it suggests that the government's 2004 policy was effective. Most notably, this suggests that the enigmatic costs of post-2004 inversion are initially underestimated by the market, but are realized over the longer-term. Moreover, this suggests that inversions may not be in the best interest of shareholders, and indicates that the agency problems other academics have suggested during inversions may exist.

While these results are contradictory to the hypothesis, they are not entirely surprising. Since 2004, inversions have had to take a more strategic nature, due to the regulation that essentially banned single-company corporate inversions. The immediate positive response of the market may be in response to the strategic, or non-tax, motives of the deal, considering other inversions have seen only mixed market reaction. Additionally, there are inherent risks and massive structural and regulatory costs that go into any sort of M&A activity, especially those that are cross-border in nature. Thus, the theoretical cash flow advantages gained from lowering effective tax rates may be inconsequential over the long-term compared

to the initial costs. Furthermore, these additional cash flows are often trapped overseas by current regulation, and repatriating that cash can involve making up the taxes avoided. Because of this, shareholders may never see the additional cash resources. Moving internationally can also cause nebulous non-tax costs that may persist over the long-term, including reputational and agency costs. These potentially explain the lack of correlation between long and short-term results as well as the market appearing to overestimate the benefits of merger-related inversion within the announcement window. Thus, the results of this study are not what were anticipated; yet, they still provide a compelling platform for future research.

Some limitations of this study include the limited sample size, varied availability of long-term returns, and volatile announcement period returns. Like any study with a relatively limited sample set, the possibility of sample bias exists. That is, it is possible that any results attained are purely by chance because of the random subset of companies that was chosen, and not inherent to the properties of inversion. Another sampling issue is that the short-term and long-term studies have slightly different data sets, as per the reasons noted in the Data section. While this does not directly impact conclusions for this study's purposes, it does make it difficult to draw direct conclusions between the short and long-term results. Additionally, while studying long-term returns, this study utilizes as much data that is available. However, that varies by company from as much as 10 years of data to as little as 1 year of data. Additionally, many inversions are currently or have only very recently received regulatory approval, so they were unable to be included in this study. Another source of potentially imprecise conclusions is the volatility of returns surrounding the date of announcement. Firms that announce inversion are undergoing significant transformation, and thus the markets often respond significantly the day of, or even preceding, the announcement. The purpose of the long-term portion of this study was to identify long-term outperformance related to financial and competitive advantages of lowering one's effective tax rate. As a result, long-term period returns are calculated starting on the day after announcement. Thus, the returns do not capture the day-of-announcement market reaction. This was by design, as the study was seeking

long-term abnormal returns related to a market mispricing, and also was under the assumption of most previous research that indicated a lack of significantly positive market reaction to announcement.

However, this slightly diminishes the ability to conclude that inversions are not in the best interest of shareholders if the market does react positively immediately, as was ultimately found in this study's announcement period analysis.

To improve upon this study's results and further the body of research surrounding corporate inversions, future research may consider a variety of objectives. Most obviously, as more time elapses, more data will be available for those companies that have recently or are currently in the process of undergoing inversion. Also, a direct comparison of short and long-term performance of pre-2004 single-company corporate inversions and post-2004 merger-related corporate inversions would be compelling. This would allow direct conclusions on both the effects and effectiveness of Section 7874. Despite a plethora of existing research on insider information, this study also provides another lens to examine the effect of insider information on pre-announcement returns. The results seem to clearly indicate that the market knew of inversion prior to announcement date, as Figure 1 depicts. Finally, the evidence in this study suggests that after an initial positive reaction by the market, post-2004 corporate inversions actually underperform. Further studies can analyze whether this is the result of the merger-related nature of these inversions or perhaps the existence of long-term non-tax costs or risks associated with an international tax domicile. Specifically, an attempt to quantify the enigmatic costs associated with inversion would be noteworthy. As a whole, the practice of studying merger-related inversions post-2004 is very new in nature, and this study's compelling findings provide a springboard for more research moving forward.

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