The Impact of Private Equity Ownership on Portfolio Firms' Corporate Tax Planning

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The Impact of Private Equity Ownership on Portfolio Firms' Corporate Tax Planning ABSTRACT: This study investigates whether private equity (PE) ownership influences tax avoidance at private firms. Prior research documents that PE firms create economic value in their portfolio firms by actively monitoring portfolio firm management and by implementing effective financial and operating strategies within their portfolio firms. Given PE firms' focus on value creation, we examine whether PE firms influence the extent and types of tax avoidance at their portfolio firms as an additional source of economic value. We document that PE-backed private firms engage in significantly more income tax avoidance and have lower marginal tax rates than other private firms. We find greater tax savings for PE-backed private firms that are either *majority*-owned or owned by *large* PE firms, consistent with PE ownership stake, expertise, and resources serving as important factors in the tax practices of portfolio firms. We infer that PE firms view tax planning as an additional source of economic value in their portfolio firms, where the benefits outweigh any potential reputational costs associated with corporate tax avoidance.

Keywords: *Private equity; ownership structure; tax avoidance; tax planning; book-tax differences; cash effective tax rates; marginal tax rates.*

Data Availability: Data are available from sources identified in the text.

I. INTRODUCTION

Prior accounting research compares the tax avoidance of public and private firms. These studies generally find evidence consistent with private firms engaging in more tax planning that is book-tax conforming – and thus reduces both book and taxable income – compared to public firms. These results are attributed to private firms' lower financial reporting costs and their willingness to report lower financial income to reduce income taxes (e.g., Cloyd et al. 1996; Beatty and Harris 1998; Mikhail 1999; Badertscher et al. 2010).¹ However, prior research provides limited evidence on the factors that drive variation in tax avoidance across private firms. In this study, we examine whether tax avoidance varies across private firms based upon different private ownership structures. In particular, we investigate whether private equity (PE) ownership influences tax avoidance at private firms.

Private equity (PE) firms, such as The Blackstone Group, The Carlyle Group, and Kohlberg Kravis & Roberts, manage investment funds that generally buy mature businesses via leveraged buyout (LBO) transactions. We refer to these acquired businesses as "portfolio firms" or "PE-backed firms". While evidence in prior research suggests that PE firms create economic value in their portfolio firms through effective monitoring and control of portfolio firms' management and operations (e.g., Cao and Lerner 2009; Kaplan and Stromberg 2009; Masulis and Thomas 2009), little is known about the tax planning at PE-backed firms. PE firms have become an important component of U.S. capital markets, since they have participated in more than one-third of initial public offerings and in more than one-quarter of U.S. mergers in recent years (Katz 2009). Given PE firms' importance in the U.S. capital markets and their focus on value creation, we investigate whether PE firms utilize tax planning at their portfolio firms as an

¹ In contrast to private firms, public firms are generally subject to additional scrutiny from diffuse equity investors, financial analysts, and regulators, such as the SEC and stock exchanges. Public firms are also exposed to stock market repercussions related to financial disclosures, while private firms are not (e.g. Givoly et al. 2010).

additional source of economic value, and test whether PE-backed private firms engage in more tax avoidance than other privately-held firms.

We focus on tax avoidance as a source of value for several reasons. First, recent research suggests that corporate tax departments were increasingly viewed as profit centers during the 1990s and early 2000s (e.g., Crocker and Slemrod 2005; Robinson et al. 2010). This view of tax departments as profit centers complements PE firms' focus on value creation at portfolio firms, since successful tax planning can generate substantial tax savings that benefits both present and future shareholders (e.g., Graham and Tucker 2006; Wilson 2009). Second, recent editorials suggest that PE firms excel at tax avoidance (e.g., Hutton 2009; Lumbis 2009), and also claim that PE firms aggressively manage the tax liabilities of their portfolio firms (*Behind the Buyout* 2007). Given their close monitoring and control over portfolio firms (e.g. Cotter and Peck 2001), PE firms likely influence the tax practices of their portfolio firms. While prior research documents that PE-backed portfolio firms substantially reduce their tax liabilities through extensive debt financing (e.g. Kaplan 1989; Kaplan and Stromberg 2009), prior research does not investigate other types of tax avoidance at these firms.

We compare the tax practices of PE-backed private firms to those of other privately-held firms. To make these comparisons, we compile samples of private firms with publicly-traded debt that are: 1) majority- or minority-owned by PE firms (majority or minority PE-backed firms), or 2) owned by the company's management or employees (non-PE-backed firms). While these different types of private firms are similar in many respects, including their smaller agency costs due to concentrated equity ownership, lower financial reporting pressure, and a greater reliance on debt financing than publicly-traded firms (e.g., Renneboog and Simons 2005; Katz 2009; Givoly et al. 2010), they are different in at least two important dimensions. First, as repeat

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players in the debt and equity markets, PE firms are likely concerned with their reputations as creators of economic value (e.g., Cao and Lerner 2009). These reputational considerations may cause PE firms to *discourage* aggressive tax avoidance at portfolio firms, since aggressive tax avoidance can impose net costs on both firms and shareholders (e.g., Desai and Dharmapala 2009; Hanlon and Slemrod 2009; Chen et al. 2010). Second, PE firms have substantial expertise and resources at their disposal (e.g., Cao and Lerner 2009; Kaplan and Stromberg 2009), which *enhance* their ability to promote tax strategies that create economic value at portfolio firms. Thus, it is an empirical question whether the net impact of PE reputational considerations and PE expertise and resources causes PE-backed private firms to engage in more or less tax avoidance than other private firms.

We utilize three measures of tax avoidance that reflect tax planning that reduces a firm's tax liability without reducing the firm's financial income (i.e., book-tax *non*conforming tax planning). This type of tax planning includes standard tax practices that do not violate income tax rules (e.g., locating subsidiaries in low-tax foreign countries), as well as aggressive tax strategies that are considered abusive by the IRS and the Treasury Department (e.g., sale-in-lease-out transactions). However, these three measures do not reflect tax planning that reduces both book and taxable income (i.e., book-tax *conforming* tax planning), including the tax benefits of debt financing. Thus, we also use simulated marginal tax rates and the ratio of cash taxes paid to cash flow from operations as additional proxies for corporate tax avoidance that reflect both conforming and nonconforming tax planning.² Finally, we hand-collect tax footnote information

 $^{^{2}}$ Although marginal tax rates are not commonly used in accounting research as a measure of tax avoidance, it is the only commonly used tax measure that reflects both conforming and nonconforming tax planning. The ratio of cash taxes paid to cash flow from operations was recently proposed by Hanlon and Heitzman (2010) as a measure of tax avoidance that reflects book-tax conforming tax strategies (see also Dyreng et al. 2010).

from audited financial reports, to gain a better understanding of the nonconforming tax strategies used by private firms.

Our results indicate that PE-backed firms engage in significantly more nonconforming tax planning and have lower marginal tax rates and ratios of cash taxes paid to cash flow from operations than other private firms. These results hold despite controls for factors known to cause variation in tax avoidance across firms, including current year profitability, net operating loss carryforwards (NOLs), foreign income, leverage, and size. We also predict that majority PE ownership and ownership by large PE firms are factors that should magnify both the reputational concerns and the ability of PE firm expertise and resources to influence the tax practices at portfolio firms. As a result, we compare the tax avoidance of majority- versus minority-owned PE-backed firms, and the tax avoidance of private firms that are owned by large versus small PE firms. We find that majority PE-backed firms engage in more tax avoidance than minority PE-backed firms, and portfolio firms that are owned by large PE firms. Lastly, results from the tax footnote analyses are consistent with portfolio firms using sale and leaseback transactions, foreign operations, tax-exempt investments, and tax credits to reduce their income taxes.

Taken together, our results are consistent with PE firms having the resources and expertise to promote greater tax avoidance at their portfolio firms, and this effect is more prevalent for portfolio firms that are either *majority*-owned or owned by *large* PE firms. Our results are also consistent with the benefits of tax planning by PE-backed firms outweighing the associated costs, including any reputational costs associated with aggressive tax avoidance. Thus, PE ownership in general – and *majority* PE ownership and *large* PE ownership in particular –

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generate greater tax benefits than other private ownership structures. We infer that PE firms view tax planning as an additional source of economic value in their portfolio firms.

Our study makes several contributions to the accounting and finance literatures. First, although private firms are important components of the U.S. economy, little is known about the tax practices of private firms with different ownership structures, primarily due to the lack of publicly available financial information.³ We utilize financial statement information for private firms with publicly-traded debt to further our understanding of tax practices at large, private companies. Second, Shackelford and Shevlin (2001) note that little is known about the cross-sectional differences in the willingness of firms to minimize taxes, and point out that insider control and other organizational features, such as ownership structure, are important but understudied factors that impact corporate tax avoidance. Hence, our study furthers our understanding of the impact of ownership structure on income tax avoidance.

Finally, our research is important because of the growing significance of PE firms for the U.S. capital markets. The cumulative capital commitments to non-venture capital PE firms in the U.S. between 1980 and 2006 are estimated to be close to \$1.4 trillion (Stromberg 2008). In addition, approximately \$400 billion of PE-backed transactions were announced in both 2006 and 2007, representing over two percent of the total capitalization of the U.S. stock market in each of these years (Kaplan 2009). Despite a decline in PE transactions since 2007, experts maintain that PE firms have become a permanent component of U.S. investment activity (e.g., Kaplan 2009; Kaplan and Stromberg 2009). While prior research examines the governance, operational management, long-term performance, and financial reporting quality of PE-backed

³ Ninety-nine percent of the companies operating in the United States are private (AICPA 2004) and therefore are not required to register under the Securities Act of 1933. Hence, prior tax research was primarily limited to the comparison of public and private firms in regulated industries or to the use of survey data (e.g. Penno and Simon 1986; Cloyd et al. 1996; Beatty and Harris 1998; Mikhail 1999) and did not explore different ownership structures *within* private firms.

portfolio firms (e.g. Cao and Lerner 2009; Kaplan and Stromberg 2009; Katz 2009; Masulis and Thomas 2009; Acharya et al. 2010), little is known about PE-backed portfolio firms' tax practices. Given the strong criticisms of PE firms' investment policies and tax treatment, regulators, investors, and researchers will benefit from a deeper understanding of the extent to which PE firms create economic value in portfolio firms through tax planning.⁴

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Private Equity Firms

PE firms have received much attention in recent years due to their substantial impact on merger and acquisition activity and their generous tax treatment in the U.S. and other countries. PE firms, which are typically organized as limited partnerships, manage investment funds (PE funds) that generally acquire majority control of mature, profitable businesses via LBOs (see Figure 1). These transactions often involve substantial amounts of debt, resulting in highly leveraged portfolio firms. PE funds have limited life spans (approximately 10 years) and typically receive a 20 percent share (i.e., 'carried interest') of any gains generated by the sale or IPO of their portfolio firms, in addition to an annual management fee (Kaplan and Stromberg 2009). While the management fees are taxed as ordinary income (tax rate is 35 percent), the carried interest is taxed as long-term capital gain (tax rate is 15 percent). This tax treatment of carried interest, as well as the fact that some PE firms have been able to avoid corporate taxation once they file for an initial public offering (e.g., The Blackstone Group) has provoked numerous

⁴ The rapid growth of the PE industry has raised concerns regarding anticompetitive behavior, excessive tax benefits, and stock manipulations in this sector (see Katz (2009) and Section II for further discussion). PE-backed initial public offerings (IPOs) have been the subject of particular scrutiny, as PE firms have been criticized for pushing over-leveraged portfolio firms too quickly into the public market (Cao and Lerner 2009).

negative press reports,⁵ proposed changes to federal income tax laws,⁶ and several academic studies (e.g. Fleischer 2007, 2008; Knoll 2007; Cunningham and Engler 2008; Lawton 2008).

PE Firm Management of Portfolio Firms

The generally negative view of the tax benefits enjoyed by PE firms contrasts other characteristics associated with their management of portfolio firms. PE firms typically take a concentrated ownership stake and operational control of their portfolio firms with the intent of substantially improving the performance of their investments. They implement performance-based managerial compensation, highly leveraged capital structures, and active corporate governance at their portfolio firms. Most large PE firms also hire professionals with operating backgrounds and industry experience to work with portfolio firm managers (Gadiesh and MacArthur 2008; Kaplan and Stromberg 2009; Acharya et al. 2010).

General partners of PE firms are actively involved in the strategic direction of portfolio firms. They typically have operational control over the company through their control of the board of directors, and PE firm partners also act as advisors to portfolio firm management. PE firm partners use their control to alter company policies, to remove underperforming executives, and to challenge management to perform better (Masulis and Thomas, 2009). In fact, PE partners do not hesitate to replace poorly performing managers at their portfolio firms (Kaplan and Stromberg 2009; Acharya et al. 2010).

Prior research documents that PE firms have considerable control over the boards of their portfolio firms and are more actively involved in portfolio firm governance than the boards of

⁵ Editorials have inflamed public opinion by accusing PE firm owners and managers as having excessively low tax rates (e.g., Kinsley, *TIME*, July 19, 2007; Murray, *The Wall Street Journal*, June 20, 2007), and pointing out that the substantial wealth generated by PE firms can "pay for sophisticated tax planning" (e.g., Beck, *Legal Times*, November 19, 2007), including the use of offshore investment companies based in tax havens (Hutton 2009; Lumbis 2009).

⁶ Most recently, leading up to the *American Jobs and Closing Tax Loopholes Act of 2010*, the Senate debated changes to the taxation of carried interest (from capital gains to ordinary income tax treatment).

most public firms. Portfolio firm boards are typically comprised of the CEO, PE firm partners, and outside industry experts. These board members advise portfolio firm management on strategic considerations, and monitor and motivate the management team (Cotter and Peck 2001; Jensen 2007; Masulis and Thomas 2009). Portfolio firm boards are considered more effective than public company boards, since part-time independent directors in public firms are not as incentivized as full-time PE partners (Gilson and Whitehead 2008; Masulis and Thomas 2009).⁷

Prior research documents that portfolio firms' boards are smaller than comparable public firms' boards, and they meet more frequently via both formal and informal meetings (Cornelli and Karakas 2008; Kaplan and Stromberg 2009; Masulis and Thomas 2009). Due to the extensive due diligence performed by PE firm partners prior to an acquisition, the specialized internal reporting requirements imposed by PE firms, and the operational focus of portfolio firm boards, portfolio firm managers generally have superior information available for effective and timely decision-making (Jensen 2007; Masulis and Thomas 2009). In sum, prior research indicates that PE firms exercise substantial control and effective corporate governance at their portfolio firms, which leads to superior financial performance relative to non-PE-backed firms.

Hypothesis Development

A priori, it is not clear whether PE-backed private firms will engage in more or less tax avoidance than non-PE-backed, private firms. Indeed, PE- and non-PE-backed private firms are similar in many dimensions, including their lower agency costs due to concentrated stock ownership, lower financial reporting pressure, and extensive reliance on debt financing relative to public firms (e.g. Katz 2009). However, PE- and non-PE-backed private firms differ in at least

⁷ These findings also apply to the comparison of PE-backed firms to other *private* firms: "Compared to other private companies, private-equity-backed companies are more likely to recruit professional management, replace underperforming management, and introduce performance-based pay that is more strongly tied to long-term performance" (Strömberg 2009, page 8).

two important dimensions. First, PE-backed private firm owners are subject to greater reputational concerns than non-PE-backed private firm owners. Second, PE-backed private firm owners are often more sophisticated and possess greater expertise and resources than non-PEbacked private firm owners. We discuss the potential impact of these two institutional differences on private firms' tax avoidance in the paragraphs that follow.

Because PE firms are 'repeat players' in the debt and equity capital markets,⁸ they likely have greater reputational concerns than other owners of private firms (Cao and Lerner 2009). In contrast, non-PE-backed firms are typically stand-alone firms that raise capital for only their own firm. Thus, PE firms that tarnish their own reputation by owning / managing / governing over portfolio firms that engage in risky behaviors – including risky tax avoidance – can affect their ability to exit their investments (e.g., via an IPO or a sale to another private buyer) not only in the tax aggressive portfolio firm, but also in other portfolio firms. Similarly, a tarnished reputation can also affect a PE firm's ability to raise debt and equity for future acquisitions (e.g. Jensen 2007; Kaplan 2009; Kaplan and Stomberg 2009; Masulis and Thomas 2009).⁹ Non-PE-backed firms are not subject to such severe reputational concerns.

We acknowledge that not all tax avoidance is so aggressive that it would tarnish a PE firm's reputation. However, excessive tax avoidance could suggest that deception on a firm's tax return extends to other managerial actions, and that management is dishonest with investors, as well. Desai and Dharmapla (2006) conjecture that complex tax shelter transactions that are

⁸ PE firms regularly raise debt and equity capital to finance acquisitions of portfolio firms (approximately \$1.4 trillion in capital commitments between 1980 and 2006, according to Stromberg (2008)) and later sell these same portfolio firms in initial public offerings or to other buyers.

⁹ The following passage from Masulis and Thomas (2010), page 239, clearly illustrates that point: "Private-equity investors have strong reputational constraints on their behavior because they are involved in a number of separate LBO deals at any point in time. Any actions they take that adversely affect debt holders in one of their firms are likely to harm the ability of their other portfolio companies to attract additional debt capital. Moreover, their ability to attract future LBO deals is likely to be adversely affected because their future access to debt will be constrained and potential firms considering going private will be wary of working with them as a consequence."

designed to obscure the economic substance of such transactions may also obscure a firm's financial reporting and increase the opportunities for managerial rent extraction. Building on this conjecture, Chen et al. (2010) argue that dominant owner-managers of family-owned firms are willing to forgo the benefits of aggressive tax planning, to avoid the potential non-tax (reputational) cost of a stock price discount, which could be imposed by minority shareholders that believe tax aggressiveness masks rent extraction by the family owner-managers. Consistent with tax aggressiveness imposing reputational costs, Hanlon and Slemrod (2009) provide empirical evidence that the public disclosure of participation in a tax shelter transaction is associated with significant and negative stock returns and hence, diminishing firm value.

Thus, PE firms risk reputational costs if their portfolio firms are labeled as overly tax aggressive. When portfolio firms 'go public,' they could be valued at a discount by investors due to concerns about contingent income tax liabilities. Alternatively, PE firms' cost of capital, and their ability to raise additional debt and equity, could be directly affected by tax avoidance if the capital markets view PE firms as imposing excess risk on portfolio firms. These reputational considerations are intensified in light of recent public scrutiny of the favorable tax treatments from which PE firms benefit (e.g. the taxation of carried interest), and suggest that PE-backed private firms may engage in *less* tax avoidance than other private firms that are not subject to similar reputational concerns.

The other dimension in which PE-backed private firms differ from other private firms is the fact that their owners (i.e., PE firms and PE firm partners) generally possess greater expertise and resources than other private firm owners. In fact, prior research describes PE firms and PE firm partners as highly talented, experienced, and sophisticated managers of portfolio firms due to their financial, governance, and operational engineering strategies (Masulis and Thomas 2009;

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Strömberg 2009; Kaplan and Stromberg 2009). Many CEOs of PE-backed firms are affiliated with – or nominated by – PE firm owners. They also more frequently have financial backgrounds in addition to industry expertise, as compared to CEOs of non-PE-backed firms (Fraser-Sampson 2007). PE firm partners that serve on portfolio firm boards often possess considerable financial skills and experience from other PE firm investments. They have substantial knowledge of portfolio firm management due to the extensive due diligence that occurs when portfolio firms are initially acquired (Jensen 2007; Masulis and Thomas 2009), and they often replace ineffective senior managers at portfolio firms with hand-picked, experienced replacements. PE firms compensate portfolio firm directors with high-powered equity incentives, which allow them to recruit financially sophisticated individuals that are strongly motivated to monitor portfolio firm managers (Masulis and Thomas 2009). Lastly, PE firms allocate financial resources to their portfolio firms to maximize value creation on behalf of investors (Lauterbach et al. 2007; Diamond 2009).

The greater expertise and resources of PE firms should affect the tax strategies that they and their portfolio firms employ. Over the past 20 years, successful tax strategies have increasingly required greater financial and operational resources, as well as in-house tax expertise and/or the use of high-priced tax consultants, to execute complex tax avoidance schemes (e.g., Crocker and Slemrod 2005; Robinson et al. 2010). In essence, recent, aggressive tax avoidance requires a minimum level of corporate "sophistication," where sophistication implies access to managerial expertise. Consistent with this link between corporate sophistication and tax avoidance, Dyreng et al. (2010) find evidence that firms with more sophisticated managers (i.e., those with an MBA degree) have lower cash effective tax rates than firms with less sophisticated managers. Fraser-Sampson (2007) states that PE firm partners often have

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accounting, investment banking, or management consulting backgrounds. Partners with these backgrounds are more likely to facilitate and promote aggressive tax avoidance at portfolio firms than partners with other backgrounds (e.g., engineering or product development). More generally, PE firms have the financial resources and expertise to implement effective tax strategies at their portfolio firms. These arguments suggest that PE-backed private firms may engage in *more* tax avoidance than other private firms due to the greater expertise and resources of their PE firm owners.¹⁰

In sum, PE-backed private firms differ from other private firms with respect to their greater reputational concerns and to the greater expertise and resources of their private owners. While their greater reputational concerns suggest that PE-backed firms engage in *less* tax avoidance than other private firms, the superior expertise and resources of their private owners suggest that PE-backed firms engage in *more* tax avoidance than other private firms. Thus, our first hypothesis is non-directional:

H1: PE-backed private firms exhibit systematically different levels of tax avoidance than non-PE-backed private firms.

Evidence that PE-backed private firms engage in *more* tax avoidance than non-PE-backed private firms would be consistent with PE firm expertise and resources outweighing PE firm reputational concerns with respect to their net impact on tax avoidance at PE-backed firms relative to other private firms.

¹⁰ To buttress this argument, we had informal conversations with several partners at a Big 4 accounting firm, as well as a CFO of a PE-backed firm, who confirmed that PE firms focus on cash conservation through tax planning more than other private firms. The Big 4 accounting firm partners indicated that PE firms are their most tax aggressive group of private firm owners. One partner stated, "PE firms are the most aggressive in shopping for the best tax deals across the globe." He described a situation where his client transitioned from management-ownership to PE-ownership and how different the PE firm owner's approach was toward taxes, compared to that of the prior owners. For example, when the firm was management-owned, the management team did not have the business acumen or the desire to enter into complex tax transactions. However, once the firm was purchased by the PE firm, the PE firm immediately took control of the board of directors and hired a team of tax consultants to generate tax savings at the newly acquired portfolio firm.

H1 compares the tax practices of PE-backed firms and non-PE-backed firms. However, PE firms are likely to have the greatest impact on their portfolio firms when they have a majority ownership stake, which would provide greater opportunities for close monitoring and control of portfolio firms relative to a minority ownership stake (e.g. Cao and Lerner 2009; Kaplan and Stromberg 2009; Katz 2009). As a consequence, PE firms with a majority ownership stake are more likely to influence a portfolio firm's tax strategies than PE firms with a minority stake. However, whether majority PE-backed firms engage in more or less tax avoidance than minority PE-backed firms still depends on the *net* impact of PE firms' greater reputational concerns and PE firms' greater expertise and resources on the tax avoidance at portfolio firms. Thus, our second hypothesis is also non-directional:

H2: Private firms that are majority-owned by PE firms exhibit systematically different levels of tax avoidance than private firms that are minority-owned by PE firms.

Evidence that majority-owned PE-backed private firms engage in *more* tax avoidance than minority-owned PE-backed private firms would be consistent with majority ownership stakes (relative to minority ownership stakes) enhancing the impact of PE firm expertise and resources on tax avoidance at portfolio firms.

Cao and Lerner (2009) and Katz (2009) argue that PE firm size is a suitable proxy for PE reputational concerns. That is, large PE firms, with more assets under management, likely have greater reputational concerns than smaller PE firms, since large PE firms have greater capital at risk and engage in more leveraged buyouts and initial public offerings than small PE firms. These greater reputational concerns of large PE firms could *discourage* aggressive tax avoidance at portfolio companies. However, large PE firms also likely have greater expertise and resources than smaller PE firms. Prior research shows that large PE firms regularly outperform smaller PE firms, consistent with their ability to create financial value through operational improvements at

their portfolio firms (e.g., Kaplan and Schoar 2005; Acharya et al. 2010).¹¹ It follows that the greater expertise and resources of large PE firms (relative to small PE firms) should also enhance their ability to promote *greater* tax avoidance at their portfolio firms. Thus, our last hypothesis compares the tax avoidance of private firms that are owned by large vs. small PE firms. Similar to prior hypotheses, our third hypothesis is non-directional:

H3: Private firms that are owned by large PE firms exhibit systematically different levels of tax avoidance than private firms that are owned by small PE firms.

Evidence that private firms that are owned by large PE firms engage in *more* tax avoidance than private firms that are owned by small PE firms would be consistent with PE firm size enhancing the impact of PE firm expertise and resources on portfolio firms' tax strategies.

III. RESEARCH DESIGN

Measures of Corporate Tax Avoidance

We rely on several measures of corporate tax avoidance because different measures reflect different types of tax planning and degrees of tax aggressiveness. Three measures reflect book-tax *non*conforming tax planning,¹² which reduces a firm's income tax liability but not its financial income, and two measures reflect both conforming *and* nonconforming tax planning. Evidence from prior accounting research indicates that private firms engage in more conforming tax avoidance than public firms, likely due to private firms' lower financial reporting costs. Nonetheless, we also utilize measures of nonconforming tax avoidance because our sample of

¹¹ Prior literature documents that large PE funds, which build superior reputations with lenders, are able to obtain cheaper loans and less restrictive debt covenants than other borrowers (see Demiroglu and James 2010; Ivashina and Kovner 2010; Kaplan and Stomberg 2009).

¹² Book-tax *non*conforming tax planning includes the utilization of research and development tax credits, locating operations in a low-tax foreign country, shifting income recognition from high-tax to low-tax locations, engaging in synthetic lease transactions (that are treated as operating leases for financial reporting purposes and capital leases for tax purposes), and utilizing non-corporate entities to generate deductions or losses that reduce consolidated taxable income. Each of these transactions affects book and taxable income differently, generating temporary or permanent book-tax differences.

private firms is subject to some financial reporting pressure, which may lead to the use of nonconforming (rather than conforming) tax strategies.¹³

Our first proxy for nonconforming tax planning is an estimate of the difference between a firm's pretax book income and its taxable income, also referred to as total book-tax differences or *BTD*. Evidence from several studies suggests that book-tax differences reflect a variety of tax avoidance activities (e.g., Mills 1998; Desai 2003; Wilson 2009). Despite such evidence, this proxy for tax avoidance has limitations. Manzon and Plesko (2002) and Hanlon (2003) identify firm specific characteristics associated with book-tax differences that are not necessarily reflective of corporate tax planning. For example, firms with large capital expenditures likely have significant book-tax differences due to depreciation. In addition, results in Phillips et al. (2003) and Hanlon (2005) indicate that temporary book-tax differences are associated with earnings management activities. To the extent that earnings management and innate firm characteristics unrelated to tax avoidance are the primary determinants of book-tax differences, book-tax differences will be a noisy measure of tax avoidance.

Many tax strategies generate permanent book-tax differences, including tax avoidance through low tax foreign operations. The majority of cases of tax sheltering examined by Wilson (2009) resulted in permanent book-tax differences. Further, the U.S. Congress Joint Committee on Taxation (1999), Weisbach (2002), and Shevlin (2002) describe the ideal tax shelter as creating permanent, rather than temporary, book-tax differences. Frank et al. (2009) adjust permanent differences to reflect only those differences that reflect managerial discretion.¹⁴ Thus,

¹³ Our sample of private firms is subject to some financial reporting pressure due to their publicly-traded debt and their owners' anticipation of these firms either going public via IPO or being sold to another buyer.

¹⁴ Specifically, Frank et al. (2009) regress total permanent differences on nondiscretionary items unrelated to tax planning that are known to cause permanent differences. The nondiscretionary items include intangible assets and state tax expense, among others. Frank et al. (2009) use the residual from the regression as a proxy for tax aggressiveness, which they refer to as *DTAX*. See the Appendix for a detailed discussion of the computation of this variable.

our second measure of nonconforming tax avoidance is discretionary permanent differences, *DTAX*, as computed by Frank et al. (2009). This measure is also subject to several limitations. *DTAX* excludes tax strategies that defer income recognition or accelerate expense recognition for tax relative to book purposes (i.e., that create temporary book-tax differences). And similar to discretionary accrual models, *DTAX* attempts to model 'normal' and 'abnormal' behavior for a firm, and thus is subject to many of the same criticisms as discretionary accrual models. Nonetheless, Frank et al. (2009) show that both *DTAX* and *BTD* are associated with actual cases of tax sheltering.

Our third measure of nonconforming tax planning is the cash effective tax rate (*CASH_ETR*) introduced by Dyreng et al. (2008). We calculate *CASH_ETR* as the sum of cash income taxes paid over years *t*-2 to year *t*, divided by the sum of pretax book income less special items over years *t*-2 to year *t*.¹⁵ Dyreng et al. (2008) describe how this measure of tax avoidance has several advantages over the traditional effective tax rate (ETR) (i.e., the ratio of total tax expense to pretax income). First, *CASH_ETR* is not affected by changes in tax reserves, also known as the tax cushion.¹⁶ So regardless of whether a firm provides a tax reserve on its balance sheet, the lower cash tax payments associated with aggressive tax positions will be reflected in a lower *CASH_ETR*. Second, the *CASH_ETR* measure is reduced by the tax benefit associated with employee stock options and therefore provides a better measure of the firm's true tax burden than the traditional ETR measure. Despite these advantages, *CASH_ETR* still contains

¹⁵ We have insufficient time series data for each firm to follow the methodology in Dyreng et al. (2008), which computes *CASH_ETR* over 5- and 10-year time intervals. Thus, we compute *CASH_ETR* over a 3-year time period. The denominator is adjusted for special items since the vast majority of special items affect taxable income in a different time period than they affect book income.

¹⁶ A firm must record a tax contingency or tax cushion when there is a significant probability that the firm will pay a tax authority (e.g., the IRS) additional income tax related to a prior or current year tax return. For example, if the firm expects to pay additional income tax related to an IRS audit of a prior year tax return. This increase in the tax reserve will increase the firm's total tax expense, but does not reflect a true cash outflow for the firm, and thus current period tax expense is "overstated" from a cash flow perspective. See Cazier et al. (2009) for further discussion of income tax reserves.

some measurement error, as this measure does not control for nondiscretionary sources of booktax differences (e.g., depreciable and amortizable assets) and is biased downward for those firms that consistently manage their pretax book-income upward over extended periods of time.

Measures of nonconforming tax avoidance do not reflect tax planning that reduces a firm's book and taxable income. Such book-tax conforming tax planning can be accomplished via "real transaction management", such as accelerating research and development and advertising expenditures or deferring revenue recognition to future periods, or via "one-time transaction management," where companies sell assets to generate one-time gains or losses that affect book and taxable income in a similar manner.¹⁷ Prior research also demonstrates that the tax benefits of debt financing (which are typically book-tax conforming) are a major source of value in public-to-private transactions (e.g., Kaplan 1989; Schipper and Smith 1991). Thus, we use two measures of tax avoidance that reflect conforming and nonconforming tax planning. The first measure, proposed by Hanlon and Heitzman (2010) and Dyreng et al. (2010), is the ratio of cash taxes paid to cash flow from operations, which we refer to as CASH_ETR2. This measure reflects "one-time transaction management", which reduces cash taxes paid but not cash flow from operations. The second measure is simulated marginal tax rates (MTR), which are generally defined as the present value of income taxes that would be paid on an additional dollar of taxable income.¹⁸

One significant difference between *CASH_ETR2* and *MTR* and the nonconforming proxies for corporate tax avoidance is with respect to the types of tax strategies these measures reflect. In particular, *CASH_ETR2* and *MTR* jointly reflect the impact of all types of tax

¹⁷ For example, Klassen (1997) investigates whether firms are more or less willing to recognize gains associated with divested affiliated companies for both book and tax purposes.

¹⁸ We thank John Graham for allowing us to use his simulated marginal tax rates. Our analyses are based on marginal tax rates *after* interest expense to capture the tax benefits of debt financing. However, all results are similar (untabulated) when we re-run our analyses based on marginal tax rates *before* interest expense.

avoidance (including tax benefits of debt financing), while *BTD*, *DTAX*, and *CASH_ETR* only reflect nonconforming tax strategies. In addition, *MTR*, *BTD*, *CASH_ETR* and *CASH_ETR2* reflect both "temporary" and "permanent" tax strategies, while *DTAX* reflects only "permanent" tax strategies.¹⁹

Modeling the Impact of PE Ownership on Tax Avoidance Activity

To investigate whether PE ownership impacts a private firm's level of tax avoidance, we estimate equation (1) below, based on samples of PE-backed and non-PE-backed private firms.

$$TAX_{i} = \alpha_{0} + \alpha_{1}PE_BACKED_{i} + \alpha_{2}LOSS_{i} + \alpha_{3}LOSS \times PE_BACKED_{i} + \alpha_{4}NOL_{i} + \alpha_{5}NOL \times PE_BACKED_{i} + \alpha_{6}LEV_{i} + \alpha_{7}LEV \times PE_BACKED_{i} + \alpha_{8}RNOA_{i} + \alpha_{9}MNC_{i} + \alpha_{10}INTANG_{i} + \alpha_{11}EQ_EARN_{i} + \alpha_{12}SALES_GR_{i} + \alpha_{13}AB_ACCR_{i} + \alpha_{14}SGA_{i} + \alpha_{15}ASSETS_{i} + \alpha_{16}INV_MILLS_{i} + \alpha_{j}\Sigma_{i}YEAR_{i} + \alpha_{k}\Sigma_{l}INDUS_{i} + \varepsilon_{l}, \quad (1)^{20}$$

See the Appendix for a detailed definition of each variable included in equation (1). The

dependent variable, TAX, represents the five proxies for tax avoidance: BTD, DTAX,

CASH_ETR, CASH_ETR2 and MTR. We include an indicator variable, PE_BACKED, which

equals one if a PE firm has a majority or minority ownership stake in a private firm, and zero

otherwise. If PE-backed firms engage in more tax avoidance than non-PE-backed firms, then the

coefficient on *PE_BACKED* should be positive (negative) and significant in regressions where

BTD and DTAX (CASH_ETR, CASH_ETR2 and MTR) are the dependent variables.

Equation (1) includes controls for factors that affect a firm's tax avoidance activity, as documented by prior research (e.g., Manzon and Plesko 2002; Rego 2003; Dyreng et al. 2008; Frank et al. 2009; Wilson 2009; Chen et al. 2010). The first set of control variables, which includes *LOSS*, *NOL*, *RNOA*, and *LEV*, controls for a firm's need to tax plan. We include an

¹⁹ "Temporary" tax strategies reverse through time because they *temporarily* accelerate expense recognition or defer revenue recognition, while "permanent" tax strategies affect book and taxable income differently, and in a manner that is not expected to reverse (e.g., shifting income from a high-tax to a low-tax location).

²⁰ Regressions where *DTAX* is the dependent variable do not include *INTANG* and *EQ_EARN* because those variables are included in the estimation of *DTAX*, and thus are orthogonal to *DTAX*, by design.

indicator variable, LOSS, and the return on net operating assets (RNOA) as proxies for current profitability, since profitable firms have greater incentive to tax plan. We include an indicator variable for the presence of net operating loss carryforwards (NOL) at the beginning of the year, since firms with loss carryforwards have less incentive to engage in current year tax planning. We include a firm's leverage ratio (LEV) because firms with greater leverage have less need to tax plan due to the tax benefits of debt financing. We also interact *PE_BACKED* with *LOSS*, NOL, and LEV to control for any significantly different rates of LOSS, NOL, and LEV in PEbacked vs. non-PE-backed private firm-years.

We include an indicator variable for foreign operations (MNC) in equation (1), since firms with foreign operations have greater opportunities for tax avoidance by shifting income between high and low tax rate locations (e.g., Rego 2003). MNC equals one if a firm reports non-zero foreign income or foreign tax expense, and zero otherwise. We control for intangible assets (INTANG) and equity in earnings of unconsolidated affiliates (EQ_EARN) because these items often generate differences between book and taxable income and can thus affect our nonconforming measures of tax avoidance.^{21,22} We include sales growth (SALES_GR) in equation (1) because growing firms likely make larger investments in depreciable assets, which generate larger temporary book-tax differences. We control for firm size (ASSETS) because large firms enjoy economies of scale in tax planning, ²³ and we control for (SGA) because prior

²¹ We note that the Pearson correlation between intangible assets and property, plant, and equipment (*PPE*) is approximately 58 percent. Thus, we do not include both proxies for nondiscretionary sources of book-tax differences in equation (1). When we replace INTANG with PPE, results are qualitatively similar.

²² We note that intangible assets represent at least two different constructs. First, intangible assets are subject to different amortization rules for financial and tax reporting purposes; thus, to some extent, intangible assets generate nondiscretionary book-tax differences that are unrelated to intentional tax avoidance. Second, intangible assets are also frequently used to avoid income taxes; e.g., the placement of intangible assets in a low-tax jurisdiction allows firms to shift profits from high-tax jurisdictions to low-tax jurisdictions. Thus, intangible assets also capture a firm's ability to engage in multijurisdictional tax avoidance. By including *INTANG* in our regressions, we are biasing against finding significant results for our variables of interest (e.g., *PE_BACKED*). ²³ When we replace *ASSETS* with *SALES* our results remain qualitatively similar.

research shows that selling and administrative costs are associated with tax avoidance (Song and Tucker 2008). Finally, we include year (*YEAR*) and industry (*INDUS*) fixed-effects to control for fundamental differences in tax planning that may exist across years and industries.

Frank et al. (2009) find a strong positive relation between financial and tax reporting aggressiveness. Katz (2009) documents that PE-backed firms report more conservatively and engage in less earnings management compared to non-PE-backed firms. To the extent our test and control firms exhibit different financial reporting quality, we need to control for financial reporting quality in equation (1). Thus, we control for both timely loss recognition and earnings management by including *AB_ACCR* in equation (1). *AB_ACCR* is the amount of abnormal accruals after controlling for conservatism in our abnormal accruals calculation (see Ball and Shivakumar 2006).

Our last control variable is the inverse Mills ratio (*INV_MILLS*) from the first stage of the Heckman (1979) sample selection correction procedure. This two-stage estimation procedure corrects for any endogeneity associated with PE firm investment decisions (e.g., if the same characteristics that influence PE firm ownership are also correlated with portfolio firm tax avoidance).²⁴ In the first stage, we estimate the following probit regression, which predicts whether a private company is owned by a PE firm (*PE_BACKED*):

 $PE_BACKED = \beta_0 + \beta_1 BVE + \beta_2 RNOA + \beta_3 Q_RATIO + \beta_4 OPER_CYCLE + \beta_5 FIRM_AGE + \beta_6 CASH + \beta_7 CAP_EXP + \beta_8 BIG_AUDIT + \beta_9 LOSS + \beta_{10} NOL + \beta_{11} LEV + \beta_{12} MNC + \beta_{13} INTANG + \beta_{14} EQ_EARN + \beta_{15} SALES_GR + \beta_{16} AB_ACCR + \beta_{17} SGA + \beta_{18} ASSETS + \varepsilon$ (2)

See the Appendix for complete definitions of the variables included in equation (2), which is based on existing models of private investor financing and PE ownership. Specifically, models in Chou et al. (2006), Morsfield and Tax (2006), and Katz (2009) include proxies for

²⁴ See also Ball and Shivakumar (2005) and Givoly et al. (2010) for a similar methodological approach in the comparison of private and public firms.

firm size, growth, leverage, and profitability. Models in Beuselinck et al. (2009) and Katz (2009) include proxies for age, investments, and liquidity, and Katz (2009) also includes measures of audit quality, operating cycle, and a loss indicator variable in his model of PE ownership. Lastly, we include six variables from the second-stage of the Heckman procedure (*NOL*, *MNC*, *INTANG*, *EQ_EARN*, *SGA*, and *AB_ACCR*). We compute the inverse Mills' ratio for each firm-year observation based on the estimated coefficients for equation (2), and then include that variable in equation (1), the second stage of the Heckman estimation procedure.²⁵

IV. SAMPLE SELECTION AND EMPIRICAL RESULTS

Sample Selection

Our initial sample consists of private firms that have publicly-traded debt. Because their debt is public, these firms must file financial statements with the SEC, even though their equity is privately-held. We follow Katz (2009) and select all firm-year observations on Compustat in any of the 28 years from 1978 through 2005 that satisfy the following criteria: (1) the firm's stock price at fiscal year-end is unavailable, (2) the firm has total debt as well as total annual revenues exceeding \$1 million, (3) the firm is a domestic company, (4) the firm is not a subsidiary of another public firm, and (5) the firm is not a financial institution or in a regulated industry (SIC codes 6000-6999 and 4800-4900).

To ensure that the sample includes only private firms with public debt, we examine each firm and remove public firm observations (details provided in Table 1, Panel A). We further categorize each firm as being in one of the following categories: (1) PE majority-owned, defined as firms whose equity is majority-owned (i.e., more than 50 percent) by PE firms (according to Thomson Financials VentureXpert), (2) PE minority-owned, defined as firms whose equity is

²⁵ We estimate the Heckman (1979) two-stage procedure using Lee's (1979) switching simultaneous equation (see Maddala, 1983, Chapter 9). We obtain a 68 percent MacKelvey-Zavonia pseudo-R-square in the first-stage probit regression (see Table 4), which validates the relevance of our chosen control variables.

minority-owned (i.e., less than or equal to 50 percent) by PE firms, and (3) management- or employee-owned, defined as firms that do not have a PE sponsor and are at least 50 percent owned by founders, executives, directors, family members, or employees. To identify large and small PE firms we follow Katz (2009) and rank the PE firms according to total U.S. dollar investment during the years 1980-2005, utilizing the Thomson Financials VentureXpert. The resulting sample consists of 2,615 private firm-year observations and 523 private firms.

[PLACE TABLE 1 HERE]

To examine whether PE firms exert greater influence over the management and operations of portfolio firms than owners of other private firms, we hand-collected data regarding equity ownership, board composition, and CEO characteristics from SEC filings and the BoardEx database. To minimize the hand-collection process, we randomly selected three minority PE-backed firms²⁶ for each year in our sample and matched them with both majority PE-backed and non-PE-backed private firms in the same year and the same four-digit SIC code. If a match was not available in the same four-digit SIC code, we then found a match in the same three- (or two-) digit SIC code. Thus, our sample of hand-collected data includes 38 firms that are majority PE-backed, 38 firms that are minority PE-backed, and 38 firms that are non-PE backed. We also hand-collected tax footnote information from SEC financial filings for these same three sets of firms, to gain a better understanding of the nonconforming tax strategies used by our sample of private firms. (See supplemental analysis at the end of Section IV.)

Descriptive Statistics on Equity Ownership, Board Composition, and CEO Characteristics

 $^{^{26}}$ SFAS No. 109 significantly modified the accounting for income taxes and the related tax footnote disclosures. Thus, we hand-collected tax footnote data only for years since SFAS No. 109 went into effect (i.e., 1994 – 2005). To include *all* minority-PE-backed firms in our sample, we included four observations of minority PE-backed firms for fiscal years 1994 and 1995, instead of the three observations included for fiscal years 1996 – 2005.

As shown in Table 2, majority (minority) PE-backed firms have on average 83 (31) percent stock ownership in their portfolio firms and 62 (39) percent representation on portfolio firms' boards of directors. In addition, the chairman of the board is also a general partner of the PE firm owner for 29 (48) percent of the majority (minority) PE-backed firm-years, and the CEO was either nominated by – or is affiliated with – the PE firm owner for 58 (44) percent of the majority (minority) PE-backed firm-years. These statistics clearly demonstrate that once PE firms purchase portfolio firms, they have influence and control over the portfolio firm management team and board of directors, due to their large ownership stakes in portfolio firms.

With respect to other board characteristics, Table 2 shows that the boards of majority PEbacked firms tend to be larger than those of minority PE-backed and non-PE-backed firms.²⁷ While CEOs are typically also directors at most private firms, there are fewer instances where the CEO is also the chairman of the board for majority PE-backed firms (49 percent) as compared to minority PE-backed (70 percent) and non-PE-backed firms (66 percent). In addition, there are fewer insiders on boards for firms that are majority- or minority-owned by PE firms (30 and 45 percent, respectively), as compared to non-PE backed firms (59 percent). Taken together, the smaller number of non-independent directors and the more frequent separation of the CEO and the chairman of the board at majority PE-backed firms are characteristics generally associated with "better" corporate governance.²⁸

²⁷ This is consistent with the findings of Cornelli and Karakas (2008), who document that while boards of PEbacked firms are smaller than boards of comparable pubic firms, boards of private firms that have been taken private through leveraged buyouts tend to be larger than those of private firms that have been taken private through management buyouts.

²⁸ Firms that are minority owned by PE firms report the largest number of board meetings, but majority PE-backed firms are documented to have informal meetings in their offices, either as a substitute or in addition to formal board meetings (e.g. Kaplan and Stomberg 2009). Support for informal meetings can be found in our sample: (1) "The Compensation Committee did not hold any formal meetings during the fiscal year ended January 29, 2005. However, members of the Committee conferred with each other a number of times during the year." (Anvil Holdings Inc, 2004, DEF 14C Proxy Statement, filed 04/21/2005, page 5). (2) "Executive sessions or meetings of

With respect to CEO characteristics, Table 2 indicates that PE-backed firms tend to have CEOs that are younger, have fewer years of service, and are more likely to have a financial background compared to CEOs at non-PE-backed firms. Lastly, consistent with PE firms tying portfolio firm management compensation to portfolio firm performance, CEOs of PE-backed firms are more likely to receive stock options compared to CEOs of non-PE backed firms. In sum, the results in Table 2 suggest that PE firms have substantial influence on portfolio firm management and they utilize effective corporate governance strategies.

[PLACE TABLE 2 HERE]

Results for Tests that Compare PE-Backed and Non-PE-Backed Firm-Years

Table 3 presents descriptive statistics for our samples of PE-backed and non-PE-backed private firms.²⁹ Panel A contains the statistics for broad firm characteristics, while Panel B contains statistics for the measures of tax avoidance. There are two rows of data shown for each variable, where the first row (in bold) contains data for the PE-backed private firm-years and the second row (not in bold) contains data for the non-PE-backed private firm-years. Panel A shows that PE-backed private firms are significantly less profitable (e.g., *ROA*, *RNOA*, *CFO*, *LOSS*, and *NOL*) than non-PE-backed firms. This lower profitability (except for *RNOA*, which measures profitability but excludes the effect of leverage) could be driven in part by the heavy debt burden that PE portfolio firms are known to carry. In fact, the results in Panel A indicate that PE-backed private firms have significantly higher leverage ratios (e.g., mean *LEV* of 0.706 vs. 0.567) and incur greater interest expense (e.g., mean *INT_EXP* of 0.084 vs. 0.071) than non-PE-backed firms. Panel A also shows that PE-backed private firms are more likely to have foreign

non-management directors without management present are held regularly to discuss board policies, processes, practices and any other relevant matter." (Mortons Restaurant Group Inc., 10-K 2005, filed on 03/03/2006, page 87). ²⁹ We winsorize all continuous variables included in the regressions at the 1st and 99th percentiles. The t-statistics have been further adjusted to control for the clustering by multiple firm observations.

operations (*MNC*), report more total and intangible assets (*ASSETS* and *INTANG*), but fewer sales (*SALES*) and smaller abnormal accruals (*AB_ACCR*) than non-PE-backed firms. This latter result is consistent with Katz (2009), which finds that PE-backed private firms report lower abnormal accruals than non-PE-backed firms.

[PLACE TABLE 3 HERE]

Panel B presents descriptive statistics for the measures of tax avoidance. The results indicate that PE-backed firms engage in more tax avoidance than non-PE-backed firms. In particular, mean *BTD*, the proxy for the difference between a firms' pretax book income and its taxable income, is statistically higher (-0.019 vs. -0.034) for PE-backed than non-PE-backed private firm-years. Similarly, mean *DTAX*, another proxy for nonconforming tax avoidance, is also significantly higher (-0.052 vs. -0.076) for PE-backed firm-years, while the mean values for *CASH_ETR, CASH_ETR2*, and *MTR* are significantly lower (0.314 vs. 0.346, 0.140 vs. 0.166, and 0.123 and 0.211, respectively) for PE-backed firm-years.

Panel C presents Pearson and Spearman correlations between the *PE_BACKED* indicator variable and each measure of tax avoidance. Consistent with Panel B, the correlations in Panel C indicate that PE-backed private firm-years engage in more tax avoidance than non-PE-backed private firm-years. In addition, most of the correlations between the measures of tax avoidance are as expected (under the assumption that all five variables capture the same underlying construct). For example, *BTD* and *DTAX* should be positively associated with each other and negatively associated with the effective tax rate measures (*CASH_ETR, CASH_ETR2* and *MTR*). Similarly, the tax rate measures should be positively associated with each other. Contrary to expectations, *MTR* is positively related to total book-tax differences (*BTD*).³⁰

 $^{^{30}}$ The positive correlation between *MTR* and *BTD* is driven in part by firms with negative pre-tax income. Specifically, the correlation between *MTR* and *BTD* is 0.125 and significant for firms with negative pre-tax income.

Tables 4 and 5 contain regression results for tests of H1, which predicts that PE-backed private firms engage in different levels of tax avoidance than non-PE-backed firms. Table 4 contains the results for the first stage of the Heckman two-stage procedure, while Table 5 contains the results for the second stage of that procedure. The results in Table 4 indicate that many of the independent variables in the first stage regression are significantly associated with PE ownership, including *BVE*, *RNOA*, *Q_RATIO*, *OPER_CYCLE*, *BIG_AUDIT*, *NOL*, *LEV*, *MNC*, *INTANG*, and *ASSETS*. The results in Table 5 show that the coefficients on all five measures of tax avoidance are significant in the predicted directions, consistent with PE-backed private firms avoiding more income tax than non-PE-backed private firms. These results hold after controlling for firm profitability, leverage, and foreign operations, and suggest that PE firm expertise and resources outweigh PE firm reputational concerns with respect to their net impact on tax avoidance at PE-backed private firms.³¹

[PLACE TABLES 4 AND 5 HERE]

Several control variables are also significant in Table 5. Consistent with prior research

(e.g., Graham 1996), the coefficient on LEV is negative and significant in the CASH_ETR,

CASH_ETR2, and MTR regressions. This result suggests that firms that are more highly levered

and thus have greater interest expense tax deductions have lower cash and marginal tax rates.³²

In contrast, the correlation is 0.038 and not significantly different from zero for firms with positive pre-tax income. To evaluate whether our main results are sensitive to the inclusion of firms with negative pre-tax income, we perform several supplemental analyses, which we discuss in the following section. ³¹ The number of observations differs across most regressions due to different data requirements. The *BTD* and

⁵¹ The number of observations differs across most regressions due to different data requirements. The *BTD* and *DTAX* regressions are based on 2,115 observations that have the requisite Compustat data. The *CASH_ETR* and *CASH_ETR2* regressions are based on fewer observations (1,240 and 1,461, respectively) because we require firms to have positive cash taxes paid and pretax income over a multi-year time period in this regression. The *MTR* regression is based on just 1,142 observations because Graham's *MTR* data is not available for all observations included in the *BTD* and *DTAX* regressions.

³² It is difficult to interpret the coefficient on *LEV* in the *BTD* regression without more detailed analysis. One factor that would cause this coefficient to be positive is the use of debt to acquire depreciable assets, which would generate larger book-tax differences. In this case, the negative coefficient on *LEV*×*PE_BACKED* would reflect the fact that PE firms push debt onto portfolio firm balance sheets as part of the PE firm acquisition, but this debt is *not*

However, the significant and positive coefficients on $LEV \times PE_BACKED$ in these same regressions indicate that the greater debt financing of PE-backed firms causes them to engage in *less* tax avoidance, all else equal. The coefficients on *LOSS* and *NOL* are significantly negative in the *MTR* regression, consistent with firms with current and prior year losses having lower marginal tax rates. The coefficients on abnormal accruals (*AB_ACCR*) are positive and significant in the *BTD* and *DTAX* regressions. These results are consistent with Frank et al. (2009), which finds that financial and tax reporting aggressiveness are strongly positively related, and Phillips et al. (2003), which finds that temporary book-tax differences, which are embedded in *BTD*, reflect earnings management activity.³³ Finally, the coefficient on *INV_MILLS* is positive but not significant, consistent with sample selection bias having little impact on our coefficient estimates.^{34,35}

Results for Majority PE-Backed Private Firms vs. Minority PE-Backed Private Firms

We now turn to the results for tests of H2, which predicts that private firms with majority PE ownership engage in different levels of tax avoidance than private firms with minority PE ownership. We empirically capture majority PE ownership in *MAJORITY_PE*, which equals one if 50 percent or more of a company is owned by a PE firm, and zero otherwise. Table 6 contains the descriptive statistics that compare majority and minority PE-backed private firms. Panel A

associated with acquisitions of depreciable assets, thus causing PE-backed private firms to have a weaker positive association between *LEV* and *BTD*.

³³ Consistent with Katz (2009), our Table 3 results indicate that PE-backed firms engage in less earnings management than non-PE backed firms (based on the lower mean *AB_ACCR* for PE-backed vs. non-PE-backed private firms). In contrast, the positive coefficient on *AB_ACCR* in Table 5 indicates that all else equal, across PEbacked and non-PE-backed private firms, abnormal accruals are positively associated with corporate tax avoidance. ³⁴ Stolzenberg and Relles (1997) argue that if selection bias is moderate then the two-step estimation approach can

make estimates worse. In untabulated results we re-estimate equation (1) after excluding *INV_MILLS* and our primary inferences are unchanged. We lose 18 observations in the equation (1) regression due to missing values needed to compute the *INV_MILLS* ratio.

³⁵ Tables 3 and 5 compare the tax avoidance of *all* PE-backed firms to non-PE-backed firms. Untabulated analyses reveal that all results hold for comparisons of both majority PE-backed firms versus non-PE-backed firms and for minority PE-backed firms versus non-PE-backed firms, with majority PE-backed firms exhibiting the greatest amount of tax avoidance.

presents the results for broad firm characteristics, while Panel B presents the results for the measures of tax avoidance.

[PLACE TABLE 6 HERE]

The statistics in Panel A suggest that majority PE-backed private firms are not statistically different from minority PE-backed private firms in many respects, including profitability (*ROA*, *RNOA*, *CFO*, *LOSS*), leverage (*LEV*), interest expense (*INT_EXP*), sales growth (*SALES_GR*), and abnormal accruals (*AB_ACCR*). However, majority PE-backed firms are more likely to have foreign operations (*MNC*), report more total and intangible assets (*ASSETS* and *INTANG*), have more *NOL*s but lower revenues (*SALES*). Thus, there are several significant operating differences between majority and minority PE-backed private firms.

Panel B contains descriptive statistics for the measures of tax avoidance. The results indicate that majority PE-backed firms engage in more tax avoidance than minority PE-backed firms. In particular, majority PE-backed firms exhibit higher mean book-tax differences (*BTD*) and discretionary book-tax differences (*DTAX*), but lower cash effective tax rates (*CASH_ETR* and *CASH_ETR2*) and marginal tax rates (*MTR*). The correlations between *MAJORITY_PE* and measures of tax avoidance (untabulated) are consistent with the results in Panel B. Specifically, the indicator variable for majority PE-backed firm-years (*MAJORITY_PE*) is significantly, positively correlated with *BTD* and *DTAX* and significantly, negatively correlated with *CASH_ETR2*, and *MTR*.

Table 7 contains the regression results for tests of H2. The coefficients on *MAJORITY_PE* in all five regressions suggest that majority PE-backed firms engage in more tax avoidance than minority PE-backed firms. In particular, the coefficients on *MAJORITY_PE* are significant and positive in the *BTD* and *DTAX* regressions and significant and negative in the

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CASH_ETR, CASH_ETR2, and *MTR* regressions. These results are consistent with majority ownership stakes (relative to minority ownership stakes) enhancing the impact of PE firm expertise and resources on tax avoidance at portfolio firms.³⁶

[PLACE TABLE 7 HERE]

Results for Private Companies that Are Owned by Large vs. Small PE Firms

Our last set of analyses test H3, which predicts private firms that are owned by *large* PE firms engage in different levels of tax avoidance than private firms that are owned by *small* PE firms. We empirically capture ownership by a large PE firm in *LARGE_PE*, which equals one if a firm is owned by a large PE firm, and zero otherwise. To identify a PE firm's size, we rank all PE firms according to the total cumulative amount of capital investment between 1980 and 2005 as reported in Thomson Financials VentureXpert. The largest 14 private equity firms with more than five billion dollars of cumulative capital investment are considered large PE firms (i.e., *LARGE_PE* = 1), while the remaining are classified as small PE firms (i.e., *LARGE_PE* = 0).³⁷

Table 8 contains the descriptive statistics that compare private firms that are owned by large PE large vs. small PE firms. The results in Panel A indicate private firms that are owned by large PE firms are similar in many dimensions (e.g., *ROA*, *RNOA*, *CFO*, *LOSS*, *INT_EXP*, and *AB_ACCR*) to those that are owned by small PE firms. Nonetheless, the mean and median values in Panel A indicate that private firms that are owned by large PE firms are more likely to have foreign operations (*MNC*), report more total and intangible assets (*ASSETS* and *INTANG*), have higher leverage (*LEV*) and sales growth (*SALES_GR*), and greater *SALES* than private firms that are owned by small PE firms. Despite the similar rates of profitability between private firms that are owned by

³⁶ We do not include the *INV_MILLS* ratio in Tables 7 and 9 because all firms in these analyses are PE-backed. Therefore, the Heckman selection model for PE ownership is no longer relevant.

³⁷ In particular, large PE firms include: Warburg Pincus, Carlyle Group, KKR, Apax, Blackstone, Goldman Sachs, J.P. Morgan, Welsh Carson Anderson & Stone, Hicks Muse Tate & Furst, 3i Group, Bain Capital, Thomas H. Lee, Morgan Stanley, and Cinven. Small PE firms include all other PE firms.

large vs. small PE firms, the results in Panel B suggest private firms that are owned by large PE firms engage in significantly more tax avoidance than private firms that are owned by small PE firms. In particular, private firms that are owned by large PE firms have significantly higher mean *BTD* and *DTAX* and significantly lower mean and median *CASH_ETR*, *CASH_ETR2*, and *MTR* than private firms that are owned by small PE firms. Untabulated correlations between *LARGE_PE* and the measures of tax avoidance support these results.

[PLACE TABLE 8 HERE]

Table 9 contains the regression results for tests of H3. The coefficients on all five measures of tax avoidance suggest private firms that are owned by large PE firms engage in more tax avoidance than those that are owned by small PE firms. In particular, the coefficients on *LARGE_PE* are significant and positive (negative) in the *BTD* and *DTAX* (*CASH_ETR*, *CASH_ETR2*, and *MTR*) regressions. These results are consistent with large PE firms possessing greater expertise and resources to facilitate effective tax planning at portfolio firms compared to small PE firms.³⁸

[PLACE TABLE 9 HERE]

Taken together, the results in Tables 3-9 are consistent with PE firm expertise and resources outweighing any potential reputational concerns, leading to greater tax avoidance at PE-backed private firms compared to other privately-held firms. Prior research asserts that PE firms strictly monitor and control their portfolio firms with the intent of creating economic value (e.g. Cotter and Peck 2001; Lerner 1995; Renneboog and Simons 2005). Thus, our results are consistent with PE firms utilizing tax avoidance as another means of increasing firm value.

³⁸ To determine whether the results reported in Table 9 are driven by PE ownership stake, we perform additional analyses that compare private firms that are majority-owned by large vs. small PE firms, and private firms that are minority-owned by large vs. small PE firms. The untabulated results reveal that inferences from Table 9 generally hold regardless of ownership stake.

Supplemental Analyses

Propensity Score Matching Procedure

We performed a propensity score matching procedure to mitigate concerns that our results are driven by fundamental differences between our PE-backed and non-PE-backed samples (e.g., Table 3 shows that these samples differ with respect to profitability, leverage, and intangible assets, characteristics which prior research shows are associated with tax avoidance). We first calculated propensity scores derived from a PROBIT model, where the dependent variable is a PE ownership indicator variable, and the model includes variables that are significantly different between PE-backed and non-PE-backed firms, including *RNOA*, *LOSS*, *NOL*, *LEV*, *MNC*, *INTANG*, *AB_ACCR*, *SALES*, and *ASSETS*. We then matched each non-PE-backed firm, one-to-one, with the PE-backed firm with the closest propensity score, without replacement.³⁹ To ensure that each non-PE-backed firm and its match are similar to each other, we restricted the two firms to have propensity scores within 0.10 of each other.

As shown in Panel A, Table 10, the samples no longer differ in any dimension after the propensity matching, yet PE-backed firms continue to avoid more income taxes than non-PE-backed firms. In addition, the regression results in Panel B, which are based on the propensity score matched samples, also indicate that PE-backed firms avoid more income taxes than non-PE-backed firms based on all measures of tax avoidance, except for *DTAX*, which is larger for PE-backed firms, but only significant based on a one-tailed t-test. Thus, our results are robust to the propensity score matching procedure.⁴⁰

Deletion of Firms with Negative Pre-Tax Income

³⁹ For further discussion on the propensity score matching process, see Marosi and Massoud (2008), Angrist and Pischke (2009), or Armstrong et al. (2010).

⁴⁰ We further apply the propensity score matching procedure and other matching procedures to the comparison of minority versus majority owned PE-backed firms, and firms that are owned by large versus small PE firms, respectively. All results remain similar to those reported in Tables 7 and 9 (untabulated).

Although our calculation of *CASH_ETR* and *CASH_ETR2* require the deletion of firmyears if the sum of pre-tax income over years *t*-2 to year *t* is negative, we do not impose a similar data requirement on the other measures of tax avoidance (i.e., *BTD*, *DTAX*, and *MTR*). To further evaluate whether our results are sensitive to the exclusion of firms with negative pre-tax income, we impose a 3-year, positive pre-tax income data requirement on regressions where *BTD*, *DTAX*, and *MTR* are the dependent variables and PE-backed and non-PE-backed firms are the comparison samples. Our results (untabulated) are both quantitatively and qualitatively stronger for this smaller, more profitable sample of firms relative to those shown in Table 5. *Tax Benefits from Employee Stock Options*

Graham et al. (2004) find that employee stock options (ESOs) generate significant tax savings and reduce marginal tax rates for large firms, and thus are important non-debt tax shields. While tax deductions from ESOs reduce cash effective tax rates, they are not reflected in *BTD*, *DTAX*, or *MTR*. Consistent with PE firms tying portfolio firm management compensation to performance, the CEOs of PE-backed portfolio firms more frequently receive stock options than the CEOs of non-PE-backed firms (see Table 2). However, as pointed out by Kaplan and Stromberg (2009), the equity stake of a portfolio firm manager is illiquid because the manager cannot sell portfolio firm equity or exercise stock options until the firm is publicly traded. Therefore, we do not expect stock options to generate tax benefits for PE-backed firms.

Nonetheless, we hand-collected ESO tax benefit data for the 114 firms for which we hand-collected tax footnote, ownership, board, and CEO data. Our untabulated analysis reveals that only 12 of the 114 firms reported ESO tax benefits, and the differences between the PE-backed and non-PE-backed are not statistically significant. Furthermore, Compustat data regarding ESO tax benefits, which is available for fiscal years 2005 and thereafter (*TXBCO* and

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TXBCOF), indicates that less than 10 percent of our observations for fiscal year 2005 report ESO tax benefits, and the differences between PE-backed and non-PE-backed firms remain insignificant. We conclude that ESO tax benefits do not significantly affect our results.

Inferences from Tax Footnote Data

To gain a better understanding of the nonconforming tax strategies used by our sample of private firms, we hand-collected tax footnote data from SEC filings. In particular, we hand-collected data regarding the components of: 1) temporary book-tax differences from deferred tax asset and liability schedules (where positive (negative) values represent net deferred tax assets (liabilities), which are then scaled by total assets and multiplied by 1,000 to avoid small values), and 2) "permanent" book-tax differences from statutory reconciliation schedules (where positive (negative) values represent items that cause a firm's effective tax rate to be higher (lower) than the statutory U.S. tax rate).⁴¹ Four of our measures of tax avoidance, *BTD*, *DTAX*, *CASH_ETR*, and *CASH_ETR2* reflect temporary and/or permanent book-tax differences. Thus, this analysis reveals the sources of variation in those tax avoidance measures. Table 11 provides descriptive statistics for the hand-collected data for majority PE-backed, minority PE-backed, and non-PE-backed private firms.⁴²

[PLACE TABLE 11 HERE]

The results in Table 11 indicate that comparisons of the aggregate measures of tax avoidance for our hand-collected sub-samples are generally similar to those in Tables 3 and 5 except the t-statistics for differences are smaller, likely due to the smaller sample sizes. In particular, both PE-backed private firms and majority PE-backed private firms have higher mean

⁴¹ "Permanent" book-tax differences include "traditional" permanent differences (e.g., tax-exempt interest and nondeductible expenses) and other items that cause a firm's effective tax rate to differ from the U.S. statutory rate (e.g. foreign and state tax rate differentials and tax credits).

⁴² For brevity, we do not tabulate results for private firms that are owned by large versus small PE firms. For sample selection method see discussion in Section IV.

and median *BTD* and *DTAX* and lower *CASH_ETR*, *CASH_ETR* 2, and *MTR* than non-PE-backed private firms, and minority PE-backed private firms, respectively.

We classified each deferred tax asset and liability disclosed in the tax footnotes in one of seven categories: 1) accruals and reserves ($\Delta ACCR_RES$), 2) depreciation and amortization (ΔDEP_AMORT), 3) sale and leaseback transactions ($\Delta SALE_LEAS$), 4) inventory ($\Delta INVENTORY$), 5) the valuation allowance account (ΔVAA), 6) stock-based compensation ($\Delta STOCK_COMP$), and 7) other ($\Delta OTHER$). Because *changes* in deferred tax assets and liabilities generate deferred tax expense (or benefit), we compute the changes in each of these deferred tax accounts. Positive values indicate an increase in a deferred tax asset or a decrease in a deferred tax liability, which *reduces* deferred tax expense, while negative values indicate a decrease in a deferred tax asset or an increase in a deferred tax liability, which *reduces* deferred tax liability, which *increases* deferred tax expense. We expect PE-backed (majority-PE-backed) firms to report *more negative* changes in their deferred tax accounts than non-PE-backed (minority-PE-backed) firms, if they engage in nonconforming tax planning that generates a temporary book-tax difference (such that taxable income).

The results in Table 11 suggest that compared to non-PE-backed firms, PE-backed firms report smaller changes in deferred tax accounts related to accruals and reserves ($\Delta ACCR_RES$), sale and leaseback transactions ($\Delta SALE_LEAS$), and other deferred tax assets and liabilities ($\Delta OTHER$), but larger $\Delta INVENTORY$ and $\Delta STOCK_COMP$. The results also suggest that compared to minority-PE-backed firms, majority-PE-backed firms report smaller $\Delta ACCR_RES$ and $\Delta OTHER$, but larger changes in most other deferred tax accounts. Taken together, we conclude that to the extent that PE-backed firms systematically avoid taxes in a temporarily nonconforming manner (as reflected in *BTD* or potentially *CASH_ETR* and *CASH_ETR2*), they

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mainly utilize tax strategies that generate deferred taxes classified as accruals and reserves, sales and leasebacks, and/or other.⁴³

We classified each statutory reconciliation item disclosed in the tax footnotes in one of nine categories, which include items related to: 1) foreign taxes (*FOR_TAX*), 2) state taxes (*STATE_TAX*), 3) intangible assets (*INTANG*), 4) tax-exempt income (*TAX_EXEMPT*), 5) non-deductible expenses (*NONDED_EXP*), 6) tax contingencies, aka "tax reserves" (*TAX_RESERV*), 7) tax credits (*TAX_CREDITS*), 8) change in the valuation allowance account (ΔVAA)⁴⁴, and 9) other (*OTHER*). Statutory reconciliation schedules contain items that cause a firm's effective tax rate to differ from the statutory U.S. tax rate. If a firm engages in nonconforming tax planning that causes its effective tax rate to be lower than the statutory tax rate, then the firm will report a negative statutory reconciliation item. Thus, we expect PE-backed (majority-PE-backed) firms to report *more negative* statutory reconciliation items than non-PE-backed (minority-PE-backed) firms, if they avoid taxes in a "permanently" nonconforming manner.

The results in Table 11 suggest that compared to non-PE-backed firms, PE-backed firms report more negative statutory reconciliation items related to foreign taxes (*FOR_TAX*), intangible assets (*INTANG*), tax-exempt income (*TAX_EXEMPT*), and tax credits (*TAX_CREDIT*). Except for *TAX_CREDIT*, the results are similar for the comparison of majority-PE-backed and minority-PE-backed firms. Differences in *INTANG* between the comparison groups likely reflect both tax avoidance *and* different financial and tax accounting

⁴³ Examples of $\triangle ACCR_RES$ are those related to: prepaid pension costs, benefit plan costs, self-insurance reserves, restructuring and other reserves, reserves not currently deductible, allowance for doubtful accounts, and warranty reserves. Phillips et al. (2004) show that these deferred tax assets and liabilities can reflect upward earnings management to meet or beat an earnings target. These findings may not apply to our sample, since Katz (2009) finds that PE-backed firms employ *less* upward earnings management than non-PE-backed firms. Nonetheless, we control for earnings management in our multivariate regressions.

⁴⁴ Firms are required to disclose the beginning and ending balance of the valuation allowance account in the deferred tax asset and liability schedule, and if the change in that account is considered material, then it should also be disclosed as a separate item in the statutory reconciliation schedule.

rules for goodwill.⁴⁵ The differences in *FOR_TAX* are generated by operating in a low-tax foreign jurisdiction and reflect U.S. tax avoidance, and the differences in *TAX_EXEMPT* and *TAX_CREDIT* are also likely reflective of common tax strategies.⁴⁶ In sum, the results in Table 11 indicate that PE-backed firms utilize foreign operations, tax-exempt investments, as well as tax credits to reduce their tax liabilities.

V. CONCLUSION

This study investigates the tax planning at firms with different private ownership structures. In particular, we examine whether PE-backed private firms engage in more or less tax avoidance than other privately-held firms. Our results indicate that PE-backed firms engage in significantly more nonconforming tax planning and have lower marginal tax rates than other private firms. In addition, we find that majority PE-backed firms engage in more tax avoidance than minority PE-backed firms and that portfolio firms that are owned by larger PE firms engage in more tax avoidance than portfolio firms that are owned by smaller PE firms. Results from the tax footnote analyses are consistent with portfolio firms using sale and leaseback transactions, foreign operations, tax-exempt investments, and tax credits to reduce their income taxes.

Taken together, our results are consistent with PE firms having the resources and expertise to promote greater tax avoidance at portfolio firms, and this effect is magnified for portfolio firms that are either *majority*-owned or owned by *larger* PE firms. Our results are also consistent with the benefits of tax planning outweighing the associated costs for our PE portfolio

⁴⁵ Non-PE-backed firms and minority-PE-backed firms report positive *INTANG* on average, while PE-backed and majority-PE-backed firms report negative *INTANG* on average A positive statutory reconciliation item related to intangibles is consistent with the existence of goodwill for book purposes but not for tax purposes, a common phenomenon since the 1986 Tax Reform Act and the product of a book-tax rule difference rather than tax avoidance. This result underscores the importance of controlling for intangible assets that generate book-tax differences but are not related to tax avoidance in our multivariate regressions.

⁴⁶ Although many firms in our hand-collected sub-samples used the generic terms "income exempt from tax" and "tax-exempt income", one firm disclosed a negative statutory reconciliation item for "increase in cash surrender value of officers' life insurance", consistent with the use of corporate-owned life insurance policies as a tax planning tool.

firms (and their PE firm owners), including any potential reputational costs associated with aggressive tax avoidance.

To our knowledge, this is the first study to compare the tax practices of firms with different private ownership structures and to document that PE firms utilize tax planning in their portfolio firms as an additional source of economic value, above and beyond debt tax shields. Our study should be of interest to tax regulators that are concerned with the tax practices of private firms in general and PE-backed firms in particular, and to researchers that are interested in the impact of ownership structure on tax avoidance activity. In addition, our investigation into the tax practices of companies owned by PE firms should be of interest to critics that contend PE firms extract excessive tax benefits from their portfolio firms.

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APPENDIX Variable Measurement

Measures of Tax	x Avoidance:
BTD	= Firm <i>i</i> 's book-tax differences, which equal book income less taxable income scaled by lagged total assets. Book income is pre-tax income (#170) in year <i>t</i> . Taxable income is calculated by summing current federal tax expense (#63) and current foreign tax expense (#64) and dividing by the statutory tax rate (<i>STR</i>) and then subtracting the change in NOL carryforwards (#52) in year <i>t</i> . If current federal tax expense is missing, total current tax expense is calculated by subtracting deferred taxes (#50), state income taxes (#173) and other income taxes (#211) from total income taxes (#16) in year <i>t</i> .
DTAX	= Firm <i>i</i> 's residual from the following regression, estimated by industry and year: $PERMDIFF_{it} = \beta_0 + \beta_1 INTANG_{it} + \beta_2 UNCON_{it} + \beta_3 MI_{it} + \beta_4 CSTE_{it} + \beta_5 \Delta NOL_{it}$ $+ \beta_6 LAGPERM_{it} + e_{it}$; where $PERMDIFF$ = Total book-tax differences – temporary book-tax differences = [$\{BI - [(CFTE + CFOR) / STR]\} - (DTE / STR)\}$, scaled by beginning of year assets (#6); BI = pretax book income (#170); $CFTE$ = current federal tax expense (#63); $CFOR$ = current foreign tax expense (#64); STR = statutory tax rate; DTE = deferred tax expense (#50); $INTANG$ = goodwill and other intangible assets (#33), scaled by beginning of year assets (#6); $UNCON$ = income (loss) reported under the equity method (#55), scaled by beginning of year assets (#6); MI = income (loss) attributable to minority interest (#49), scaled by beginning of year assets (#6); $CSTE$ = current state tax expense (#173), scaled by beginning of year assets; ΔNOL = change in net operating loss carryforwards (#52), scaled by beginning of year assets (#6); $LAGPERM$ = $PERMDIFF$ in year t-1.
CASH_ETR	 Firm i's cash effective tax rate, which equals cash taxes paid (Compustat #317), over years t-2 to year t, divided by the sum of pretax net income (#170) minus special items (#17) in years t-2 to year t. CASH_ETR is set to missing when the denominator is zero or negative. We truncate CASH_ETR to the range [0,1].
CASH_ETR2	 Firm i's cash taxes paid to cash flow from operations, which equals cash taxes paid (Compustat #317), divided by the sum of cash flow from operations (#308) minus extraordinary income and discontinued operations (#124) plus cash taxes paid (#317). CASH_ETR2 is set to missing when the denominator is zero or negative. We truncate CASH_ETR2 to the range [0,1].
MTR	 After financing marginal tax rate, which equals the simulated marginal tax rate after both depreciation and financing related tax shields (Graham 1996; Graham et al. 1998).
Private Firm In	dicator Variables:
PE_BACKED	= 1 if a PE firm has a majority or minority ownership stake in a private company and 0 otherwise.
MAJORITY_PE	= 1 if 50 percent or more of the firm is backed by private equity firms and 0 otherwise.
LARGE PE	= 1 if the firms is one of the following: Warburg Pincus, Carlyle Group, KKR, Apax,

Muse Tate & Furst, 3i Group, Bain Capital, Thomas H. Lee, Morgan Stanley, and Cinven and 0 for all other PE firms. PE firms are ranked according to total U.S. dollar investment during the years 1980-2005. (Source: Thomson Financials, VentureXpert.)

Control Variables and Other Variables of Interest:

AB_ACCR	= Firm <i>i</i> 's abnormal total accruals in year <i>t</i> computed derived from the modified cross- sectional Jones (1991) model. To estimate the model yearly by two-digit SIC code, we require that at least 10 observations be available. The regression is: $TACC_{j,t}/TAj_{t-1} = a_1*[1/TA_{j,t-1}] + a_2*[(\Delta REV_{j,t} - \Delta TR_{j,t})/TAj, t-1] + a_3*[PPE_{j,t}/TAj, t-1]$ where: <i>TACC</i> is total accruals for firm <i>j</i> in year <i>t</i> , which is defined as income before extraordinary items (#123) minus net cash flow from operating activities, adjusted to extraordinary items and discontinued operations (#308 – #124). For the years prior to 1988, <i>TACC</i> is defined as Δ (current assets #4) – Δ (current liabilities #5) – Δ (cash #1) + Δ (short-term debt #34) – (depreciation and amortization #125). To correct for measurement errors in the balance-sheet approach, we eliminate firm- year observations with "non-articulating" events (Hribar and Collins 2002). <i>TA</i> is the beginning-of-the-year total assets (lagged #6). ΔREV is the change in sales in year t (#12), <i>PPE</i> is gross property, plant, and equipment in year t (#7), and ΔTR is the change in trade receivables in year <i>t</i> (#151). To control for the asymmetric recognition of gains and losses, the modified Jones model is augmented with the following independent variables: cash flow from operations in year <i>t</i> (<i>CF</i> _t), a dummy variable set to 1 if <i>CF</i> _t <1 and 0 otherwise (<i>DCF</i> _t), and an interactive variable, <i>CF</i> _t × <i>DCF</i> _t (as suggested by Ball and Shivakumar 2006). <i>CF</i> _t is defined, for years after 1988, as cash from operations in year t adjusted for extraordinary items and discontinued operations (#308 – #124), and prior to 1988 as funds from operations (#110) – Δ (current assets #4) + Δ (cash and cash equivalent #1) + Δ (current liabilities #5) – Δ (short-term debt #34). All variables are standardized by total assets at year-end <i>t-1</i> .
ASSETS	= Natural logarithm of the total assets (#6) for firm i, at the end of year t .
CFO	= Firm <i>i</i> 's cash flows from continuing operations (#308 - #124) for year <i>t</i> , scaled by lagged total assets.
EQ_EARN	= Firm i's equity income in earnings (#55) in year <i>t</i> , scaled by lagged total assets.
INTANG	= Firm i's intangible assets (#33) in year <i>t</i> , scaled by lagged total assets.
INT_EXP	= Firm i's interest expense in year <i>t</i> , scaled by lagged total assets
INV_MILLS	= The inverse mills ratio from Heckman (1979) two-stage sample selection correction procedure. In the first stage, we estimate the following probit model (results not tabulated):
	$\begin{split} PE_BACKED &= \beta_0 + \beta_1 BVE + \beta_2 RNOA + \beta_3 Q_RATIO + \beta_4 OPER_CYCLE + \\ \beta_5 FIRM_AGE + \beta_6 CASH + \beta_7 CAP_EXP + \beta_8 BIG_AUDIT + \beta_9 LOSS + \\ \beta_{10} NOL + \beta_{11} LEV + \beta_{12} MNC + \beta_{13} INTANG + \beta_{14} EQ_EARN + \\ \beta_{15} SALES_GR + \beta_{16} AB_ACCR + \beta_{17} SGA + \beta_{18} ASSETS + \varepsilon \end{split}$

	$BVE =$ book value of equity (<i>Compustat</i> #60 _t + #130 _t + #35 _t , scaled by #6 _{t-1}); <i>RNOA</i> = profitability (defined as operating income divided by net operating assets, see above), Q_RATIO = quick ratio [cash and short-term investments (#1 _t) + total receivables (#2 _t), scaled by current liabilities (#5 _t)], <i>OPER_CYCLE</i> = length of operating cycle [calculated as (yearly average accounts receivable (#2 _t)) / (total revenues (#12 _t)/360) + (yearly average inventory (#3 _t)) / (cost of goods sold(#41 _t)/360)], <i>FIRM_AGE</i> = firm age (years since first appearance on <i>Compustat</i>), <i>CASH</i> = cash holdings (#1 _t scaled by #6 _{t-1}), <i>CAP_EXP</i> = capital expenditures (#128 _t) scaled by #6 _{t-1} , <i>LOSS</i> = 1 if net income (#172) less than zero, and 0 otherwise; and <i>BIG_AUDIT</i> = an indicator variable for large accounting firms (#149 _t). All other variables as defined above. We use the estimates from the first-stage probit model to compute the inverse Mills' ratio for each sample firm-year. The inverse Mills' ratio serves as a control variable in equation (1), which is the second step of the Heckman estimation procedure. ⁴⁷
LEV	= Firm i's leverage in year <i>t</i> , measured as total long-term debt (#9) divided by total assets;
LOSS	= 1 if firm i reports a loss, where loss is net income before extraordinary items (#123) and 0 otherwise.
MNC	= 1 if firm's foreign pre-tax income (#273) or foreign income taxes (#64) is positive or negative and 0 otherwise.
NOL	= 1 if firm i has net operating loss carryforwards available at the beginning of year t , and 0 otherwise.
RNOA	= Firm i's operating income divided by net operating assets, where operating income is net income (#172) + Δ (cumulative translation adjustment #230) + after-tax interest expense (#15) – after-tax interest income (#62) + minority interest in income (#49). Net operating assets (NOA) are common equity (#60) + debt in current liabilities (#34) + total long-term debt (#9) + preferred stock (#130) – cash and short-term investments (#1) – investments and advances (#32) + minority interest (#38); (see Nissim and Penman 2003).
ROA	= Firm i's income before extraordinary items (#18) in year <i>t</i> divided by lagged total assets.
SALES	= Firm i's total sales (#12) for year t .
SALES_GR	= Firm i's sales growth, where sales growth is sales (#12) at the end of year t minus sales at the beginning of year t divided by sales at the beginning of year t.
SGA	= Selling, general & administrative expenses (#189) for year t, scaled by lagged total assets.

⁴⁷ Inverse Mills ratio is defined as: $\lambda(Z) = \varphi(Z)/\Phi(Z)$ if private or PE-backed = 1, and $\lambda(Z) = -\varphi(Z)/(1 - \Phi(Z))$ if private or PE-backed = 0, where: $\varphi(Z)$ is the standard normal pdf, $\Phi(Z)$ is the standard normal cdf, and Z are the estimates of the first stage probit model.

STR	= Firm i's statutory tax rate. From 1980 to 1986 the <i>STR</i> is 46%, for 1987 the <i>STR</i> is 40%, from 1988 to 1992 the <i>STR</i> is 34%, from 1993 to 2005 the <i>STR</i> is 35%.
Σ _j INDUS	= 1 (0) if firm <i>i</i> is (is not) in industry <i>j</i> in year <i>t</i> , based on three-digit SIC codes.
$\Sigma_{j}YEAR$	= 1 (0) if firm <i>i</i> is (is not) in year <i>j</i> .

FIGURE 1 Diagram of Typical Organizational Structure for a Private Equity Firm with One PE Fund and Four PE Portfolio Firms



* Approximately ten percent of the total gain is usually distributed to the management team as part of performance based compensation, reducing the investors' share to approximately seventy percent (Fruhan 2009)

	No. of Firm-year	No. of Firms
"Potential" private firms with public debt (COMPUSTAT) ^a	13,062	3,355
Eliminate firms that:		
Do not have historical (non-prospectus) data ^b	(3,233)	(1,242)
Are public firms	(2,324)	(371)
Are subsidiaries of public firms	(561)	(102)
Are public spin-offs	(111)	(34)
Are involved in bankruptcy proceedings	(295)	(100)
Have insufficient information	(1,683)	(344)
Are foreign firms	(772)	(184)
Other ^c	(918)	(396)
Subtotal of private firms with public debt	3,165	582
Eliminate firms that:		
Are cooperatives, LPs, government-owned and firms for which ownership structure cannot be ascertained	(550)	(59)
Private firms with public debt	2,615	523
Private firms that are majority-owned by PE firms	1,404	318
Private firms that are minority-owned by PE firms	339	75
Private firms without PE ownership	872	130

TABLE 1Sample Selection Procedures for Private Firms with Public Debt (1980 – 2005)

^a The sample of "potential" private firms with public debt consists of all firm-year observations on *Compustat* in any year from 1978 to 2005 that satisfy the following criteria: (1) the firm's stock price at fiscal year-end is unavailable, (2) the firm has total debt as well as total revenues exceeding \$1 million, (3) the firm is a domestic company, (4) the firm is not a subsidiary of another public firm, and (5) the firm is not a financial institution or in a regulated industry (SIC codes 6000-6999 and 4800-4900).

^b *Compustat* reports three years of historical information for public firms that file for initial public offering. This financial information is taken from the prospectus.

^c "Other" includes observations of the same firm with different names, firms that do not have information for consecutive years, firms that have joint ventures and partnerships with public firms, holding companies of public firms, and observations with information available only for the years 1978-1979.

PE PE Non-PE Majority Minority Backed Diff Diff Diff (1)(3)(1) - (2)(1) - (3)(2) - (3)(2)No. of Firms 38 38 38 **Ownership** 51.6%*** Owned by PE Firms Mean 82.7% 31.1% 54.0%*** Median 86.1% 32.1% Owned by -17.5%** -54.0% Mean 15.1% 32.6% 69.1% -36.5% Management -22.9%*** -85.9%^{***} Median 6.1% 29.0% 92.0% -63.0% -15.3%*** -28.7% -44.0% Owned by CEO Mean 7.1% 22.4% 51.0% <u>-10.6</u>%*** <u>-5</u>4.0%^{***} -43.4%** Median 4.0% 14.7% 58.0% Board -15.0%*** -14.3%*** -29.4%^{****} -21.4%^{****} Insiders Mean 29.7% 44.7% 59.1% -14.3% Median 28.6% 42.9% 50.0% -7.1% PE Firms' 23.2%*** Representatives on Mean 62.4% 39.2% Board 20.8%*** 63.6% Median 42.9% Chair is PE 28.9% 47.8% -18.9% Mean CEO is Chair 48.9% 69.6% 65.7% -20.7% -16.8% 3.9% Mean CEO is Director Mean 91.1% 95.7% 94.3% -4.6% -3.2% 1.4% 1.2^{*} 1.2^{*} **Board Size** 5.9 -0.1 Mean 7.1 5.9 1.0** 2.0^{**} Median 7.0 5.0 1.0 6.0 No. of Board Ν 2 6 10 Meetings 2.4*** -3.3*** -0.9* Mean 4.07.3 4.9 3.5** -3.5* Median 4.0 7.5 4.0 0.0 CEO CEO Has an MBA Mean 62.5% 55.6% 66.7% 6.9% -4.2% -11.1% **CEO** Has Finance 12.1%* 20.4%* Mean 17.8% 26.1% 5.7% -8.3% Background -2.7* CEO Age -3.0 0.3 Mean 53.6 56.7 56.4 -4.0* Median 53.0 56.0 57.0 -3.0 -1.0 CEO Years with the -7.5*** -10.5*** Mean 8.2 11.2 18.7 -3.0 Firm -9.0*** -5.0** -4.0* Median 6.0 10.0 15.0 CEO Has Stock 60.9% 31.4% 39.7%*** 29.4%** Mean 71.1% 10.2% Options CEO Nominated by Mean 57.8% 43.5% 14.3% PE

 TABLE 2

 Descriptive Statistics on Ownership, Board Composition, and CEO Characteristics

***, **, * Significant at the 0.01, 0.05, and 0.10 level, respectively. Differences in means are tested for significance using a twotailed t-test; differences in medians are tested for significance using a two-tailed Wilcoxon signed rank test. Insiders equals the number of directors who serve as executives in the firm divided by total board size; PE Firms' Rep. equals the number of directors who represent PE firms divided by total board size; Chair is PE is the percentage of firms for which the chairman is also a general partner of the PE firm; CEO is Chair is the percentage of firms for which the CEO is the chairman of the board of directors; CEO is Director is the percentage of firms for which the CEO is a director (including chair) of the board of directors; Board Size is the total number of directors on the board; CEO has an MBA is the percentage of firms for which the CEO hold an MBA degree; CEO has Finance Background is the percentage of firms for which the CEO has past experience as investment banker, CFO, have a CPA or is a partners in a PE firm; CEO has Stock Options is the percentage of firms for which the CEO received stock options as part of her/his compensation package; CEO Nominated by PE is the percentage of firms for which the CEO is was either nominated or is affiliated with the PE firm owner.

TABLE 3

Descriptive Statistics that Compare PE-Backed Private Firms (Upper Rows, in Bold) to Non-PE-Backed Private Firms (Lower Rows, No Bold)

	^	25 th		75 th	Standard	Differenc	e between:	
	# Obs	Percentile	Mean	Median	Percentile	Deviation	Mean	Median
ROA	1,743	-0.039	-0.004	0.000	0.039	0.262	-0.071***	-0.025**
	872	-0.001	0.068	0.026	0.114	0.461		
RNOA	1,743	-0.068	-0.029	-0.012	0.038	0.163	-0.108***	-0.052**
	872	-0.010	0.079	0.040	0.140	0.185		
CFO	1,649	0.017	0.065	0.054	0.098	0.099	-0.019***	-0.011***
	722	0.027	0.084	0.065	0.145	0.115		
LOSS	1,743	0.000	0.557	1.000	1.000	0.497	0.226***	1.000***
	872	0.000	0.331	0.000	1.000	0.448		
NOL	1.743	0.000	0.347	0.000	1.000	0.476	0.139***	0.000
	872	0.000	0.208	0.000	0.000	0.388		
LEV	1,743	0.518	0.706	0.673	0.819	0.363	0.139***	0.091***
	872	0.193	0.567	0.582	0.688	0.334		
INT EXP	1.743	0.057	0.084	0.082	0.105	0.042	0.013*	0.015*
-	872	0.027	0.071	0.067	0.087	0.043		
MNC	1.743	0.000	0.447	0.000	1.000	0.498	0.124***	0.000
	872	0.000	0.323	0.000	1.000	0.468		
INTANG	1,743	0.000	0.258	0.156	0.356	0.446	0.118***	0.153***
	872	0.000	0.140	0.003	0.125	0.406		
EQ_EARN	1,743	0.000	0.001	0.000	0.000	0.008	-0.003	0.000

Panel A: Descriptive Statistics for Firm Characteristics

	872	0.000	0.004	0.000	0.000	0.103		
SALES_GR	1,743 872	-0.035 -0.007	0.097 0.113	0.004 0.024	0.103 0.121	0.695 0.644	-0.016	-0.020
AB_ACCR	1,416 717	-0.058 -0.026	-0.025 0.001	-0.018 0.003	0.018 0.032	0.099 0.078	-0.026***	-0.021***
SALES	1,743 872	227 188	773 1,065	430 384	836 1,060	1,204 2,921	-292***	46**
SGA	1,743 872	-0.035 -0.007	0.097 0.113	0.004 0.024	0.103 0.121	0.695 0.644	-0.016	-0.020
ASSETS	1,743 872	5.325 4.980	5.922 5.730	5.926 5.686	6.500 6.620	1.060 1.420	0.192***	0.240***

Panel B: Descriptive Statistics for Measures of Tax Avoidance

		25^{th}			75 th	Standard	Difference	ce between:
	# Obs	Percentile	Mean	Median	Percentile	Deviation	Mean	Median
BTD	1,743	-0.048	-0.019	-0.013	0.007	0.078	0.015***	0.002
	872	-0.022	-0.034	-0.015	0.032	0.071		
DTAX	1,743	-0.034	-0.052	0.006	0.083	0.304	0.024**	0.011
	872	-0.031	-0.076	-0.005	0.074	0.372		
CASH ETR	808	0.081	0.314	0.264	0.460	0.298	-0.032**	-0.058***
_	508	0.098	0.346	0.322	0.439	0.271		
CASH ETR2	1,132	0.021	0.140	0.091	0.200	0.160	-0.026***	-0.044***
—	872	0.020	0.166	0.135	0.249	0.167		
MTR	732	0.000	0.123	0.024	0.292	0.146	-0.088***	-0.256***
	508	0.024	0.211	0.280	0.350	0.165		

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. Differences between means are tested for significance using a two-tailed t-test; differences in medians are tested for significance using a two-tailed Wilcoxon signed rank test. All variables are as defined in the Appendix.

	PE_BACKED	BTD	DTAX	CASH_ETR	CASH_ETR2	MTR
PE_BACKED		0.067***	0.056**	-0.061**	-0.074***	-0.329***
BTD	0.071***		0.063**	-0.144***	-0.005	0.366***
DTAX	0.055**	0.139***		0.032	-0.003	-0.052*
CASH_ETR	-0.060**	-0.220***	0.013		0.356***	0.049*
CASH_ETR2	-0.066***	-0.039	-0.027	0.394***		0.159***
MTR	-0.317***	0.416***	0.024	0.108***	0.262***	

Panel C: Pearson (Spearman) Correlation Coefficients for *PE_BACKED* and Measures of Tax Avoidance

 $Pr > \chi^2$ Coefficient 0.001 Intercept -1.113 **BVE** -0.407 0.009 **RNOA** -0.617 0.002 Q_RATIO -0.536 0.001 0.005 0.001 OPER_CYCLE -0.034 0.106 FIRM_AGE CASH 0.303 0.614 CAP_EXP -0.482 0.474 BIG_AUDIT 0.439 0.001 LOSS 0.122 0.123 NOL 0.370 0.001 LEV0.568 0.001 **MNC** 0.191 0.008 0.001 **INTANG** 1.229 EQ_EARN -4.265 0.361 SALES_GR -0.018 0.796 AB_ACCR -0.231 0.608 SGA 0.122 0.326 ASSETS 0.057 0.059 McFadden's LRI Pseudo-R² 0.190 MacKelvey_Zavonia Pseudo-R² 0.681 N of PE-Backed Firm-Years 1,406 N of Non-PE-Backed Firm-Years 709

 TABLE 4

 Results for First-Stage Regression of Heckman Two-Stage Procedure, where PE_BACKED

 Is the Dichotomous Dependent Variable

All variables are as defined in the Appendix.

	В	TD	DTAX		CASI	H_ETR	CASH_ETR2		MTRA	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Intercept	-0.018	-2.08**	0.168	3.57***	0.399	8.32***	0.208	7.45***	0.282	12.38***
PE_BACKED	0.012	2.02**	0.029	1.77*	-0.056	-2.99***	-0.076	-4.24***	-0.076	-5.25***
LOSS	-0.058	-9.86***	0.045	1.29	0.041	0.94	-0.014	-0.72	-0.108	-6.48***
LOSS×PE_BACKED	0.002	0.24	0.001	0.01	-0.003	-0.07	0.002	0.08	-0.006	-0.36
NOL	-0.008	-1.26	0.086	2.51**	-0.017	-0.57	0.024	1.20	-0.184	-12.61***
NOL×PE_BACKED	0.004	0.61	-0.011	-0.26	-0.016	-0.41	-0.060	-2.64***	0.079	4.58***
LEV	0.032	4.01***	-0.001	-0.04	-0.158	-3.92***	-0.172	-7.20***	-0.078	-4.15***
LEV×PE_PACKED	-0.027	-3.02***	0.053	0.94	0.132	2.68***	0.162	5.85***	0.058	2.69***
RNOA	0.090	12.07***	0.127	2.15**	0.058	1.01	0.070	2.14**	0.093	4.42***
MNC	-0.013	-5.01***	-0.005	-0.28	0.099	5.98***	0.040	4.81***	-0.006	-0.90
INTANG	-0.012	-3.76***			-0.001	-0.04	-0.010	-1.04	-0.001	-0.11
EQ_EARN	0.055	0.34			-3.450	-4.25***	-0.224	-0.30	0.412	1.39
SALES_GR	-0.002	-1.01	0.032	1.44	-0.030	-2.12**	-0.033	-5.08***	0.011	0.68
AB_ACCR	0.169	11.45***	0.388	2.66***	0.138	1.06	0.205	1.84*	-0.034	-0.75
SGA	-0.006	-1.36	-0.031	-0.93	0.024	0.78	0.023	1.70*	0.024	1.77*
ASSETS	0.004	3.67***	-0.027	-4.02***	0.000	-0.04	0.002	0.64	0.004	1.41
INV_MILLS	0.033	1.07	-0.016	-0.74	0.069	1.13	-0.160	-1.07	0.023	0.75
Adjusted R ²	0.4151 0.064		0644	0.1	537	0.1	215	0.4	1793	
N	2,	115	2,	115	1,	240	1,	461	1,	142

 TABLE 5

 Results for OLS Regressions of Measures of Tax Avoidance on Indicator Variable for PE Ownership (*PE_BACKED*) and Controls for Determinants of Corporate Tax Avoidance, where the Comparison Sample is a Sample of Non-PE-Backed Private Firms

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. All variables are as defined in the Appendix. Regressions include industry and year indicator variables, which have not been tabulated. The t-stats have been adjusted to control for the clustering by year and multiple firm observations

TABLE 6 Descriptive Statistics that Compare Majority-Owned PE-Backed Private Firms (Upper Rows, in Bold) to Minority-Owned PE-Backed Private Firms (Lower Rows, No Bold)

	25 th				75 th	Standard	Difference	e between:
	# Obs	Percentile	Mean	Median	Percentile	Deviation	Mean	Median
ROA	1,404	-0.039	-0.003	0.000	0.039	0.286	0.003	-0.002
	339	-0.033	-0.006	0.002	0.046	0.128		
RNOA	1 404	-0 069	-0 029	-0.012	0 039	0 155	0.002	0.001
	339	-0.057	-0.031	-0.013	0.036	0.193	0.002	0.001
CFO	1.335	0.014	0.065	0.053	0.098	0.099	-0.005	-0.006
	314	0.026	0.069	0.059	0.100	0.097		
LOSS	1.404	0.000	0.554	1.000	1.000	0.497	-0.015	0.000
	339	0.000	0.569	1.000	1.000	0.569		
NOL	1,404	0.000	0.362	0.000	1.000	0.481	0.075***	0.000
	339	0.000	0.287	0.000	1.000	0.453		
LEV	1,404	0.511	0.704	0.671	0.822	0.357	-0.010	-0.014
	339	0.541	0.714	0.685	0.808	0.387		
INT_EXP	1,404	0.054	0.083	0.079	0.104	0.042	-0.007	-0.008
	339	0.068	0.090	0.087	0.111	0.037		
MNC	1,404	0.000	0.479	0.000	1.000	0.498	0.161***	0.000
	339	0.000	0.318	0.000	1.000	0.466		
INTANG	1,404	0.001	0.283	0.173	0.387	0.485	0.124***	0.120***
	339	0.000	0.159	0.053	0.271	0.211		
EQ_EARN	1,404	0.000	0.001	0.000	0.000	0.008	0.001	0.000
	339	0.000	0.000	0.000	0.000	0.002		

Panel A: Descriptive Statistics for Firm Characteristics

SALES_GR	1,404 339	-0.043 -0.019	0.099 0.094	0.000 0.022	0.100 0.110	0.743 0.462	0.005	-0.022
AB_ACCR	1,137 279	-0.058 -0.054	-0.025 -0.027	-0.018 -0.016	0.018 0.015	0.099 0.102	0.002	-0.002
SALES	1,404 339	225 238	732 938	422 450	814 898	1,104 1,529	-206**	-28
SGA	1,404 339	0.106 0.115	0.284 0.327	0.189 0.216	0.376 0.410	0.286 0.348	-0.043**	-0.027*
ASSETS	1,404 339	5.367 5.220	5.950 5.840	5.960 5.715	6.530 6.340	0.970 1.010	0.110*	0.245**

Panel B: Descriptive Statistics for Measures of Tax Avoidance

		25 th			75^{th}	Standard	Difference	e between:
	# Obs	Percentile	Mean	Median	Percentile	Deviation	Mean	Median
BTD	1,404	-0.049	-0.013	-0.013	0.008	0.078	0.030***	0.005
	339	-0.051	-0.043	-0.018	0.005	0.079		
DTAX	1,404	-0.098	-0.083	-0.004	0.048	0.340	0.032*	0.000
	339	-0.057	-0.115	-0.004	0.022	0.279		
CASH_ETR	663	0.087	0.320	0.246	0.451	0.295	-0.077***	-0.096***
	145	0.163	0.397	0.342	0.509	0.303		
CASH_ETR2	920	0.021	0.137	0.088	0.199	0.128	-0.018*	-0.019**
_	212	0.037	0.154	0.106	0.198	0.114		
MTR	560	0.000	0.115	0.021	0.271	0.141	-0.032***	-0.048***
	172	0.000	0.147	0.069	0.324	0.131		

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. Differences between means are tested for significance using a two-tailed t-test; differences in medians are tested for significance using a two-tailed Wilcoxon signed rank test. All variables are as defined in the Appendix.

Results for OLS Regressions of Measures of Tax Avoidance on Indicator Variable for Majority Private Equity Ownership
(MAJORITY_PE) and Controls for Determinants of Corporate Tax Avoidance, where the Comparison Sample is a Sample of Minority
Owned PE-Backed Private Firms

TABLE 7

	В	TD	D	TAX	CASH	H_ETR	CASH	_ETR2	M	TRA
	Coeff	t-stat								
Intercept	-0.056	-4.02***	0.325	4.46***	0.374	4.45***	0.153	3.86***	0.145	4.47***
MAJORITY_PE	0.020	2.18**	0.034	1.72*	-0.042	-2.02**	-0.067	-2.80***	-0.035	-1.97**
LOSS	-0.049	-6.48***	-0.033	-0.72	0.081	1.28	-0.037	-1.34	-0.107	-4.94***
LOSS×MAJORITY_PE	-0.012	-1.54	0.098	1.95*	-0.050	-0.77	0.022	0.80	-0.017	-0.71
NOL	-0.009	-1.10	0.095	2.03***	0.004	0.07	-0.046	-2.12**	-0.125	-6.36***
NOL×MAJORITY_PE	0.006	0.74	-0.029	-0.55	-0.025	-0.34	0.016	0.64	0.029	1.29
LEV	0.014	1.64	-0.034	-0.76	-0.147	-4.20***	-0.039	-2.18**	0.020	1.14
LEV×MAJORITY_PE	-0.009	-0.90	0.113	1.96**	0.153	3.08***	0.042	1.88*	-0.048	-2.39**
RNOA	0.070	8.01***	0.122	1.73*	0.082	1.12	0.071	1.57	0.060	2.77
MNC	-0.012	-3.95***	0.034	1.49	0.089	4.21***	0.035	3.48***	-0.007	-0.75
INTANG	-0.017	-5.29***			-0.002	-0.15	-0.013	-1.43	0.006	0.77
EQ_EARN	-0.336	-1.13			-3.400	-2.86***	1.422	1.33	-1.245	-1.05
SALES_GR	0.001	0.54	0.053	1.86*	-0.020	-0.98	-0.034	-3.88***	0.007	0.38
AB_ACCR	0.187	11.44***	0.420	2.44**	0.041	0.26	0.103	0.81	-0.020	-0.37
SGA	-0.016	-2.90***	-0.094	-2.10**	0.014	0.38	0.020	1.20	0.004	0.24
ASSETS	0.010	6.15***	-0.040	-4.19***	0.012	1.09	0.008	1.50	0.011	2.58***
Adjusted R ²	0.4	262	0.0	0414	0.1	538	0.0	645	0.3	8668
Ν	1,	416	1,	416	8	02	9	81	6	93

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. All variables are as defined in the Appendix. Regressions include industry and year indicator variables, which have not been tabulated. The t-stats have been adjusted to control for the clustering by year and multiple firm observations.

TABLE 8 Descriptive Statistics that Compare Private Firms that Are Owned by Large PE Firms (Upper Rows, in Bold) to Private Firms that Are Owned by Small PE Firms (Lower Rows, No Bold)

		25 th			75 th Standard		Difference between:	
	# Obs	Percentile	Mean	Median	Percentile	Deviation	Mean	Median
ROA	463	-0.043	0.005	0.004	0.041	0.309	0.011	0.005
	1,280	-0.037	-0.006	-0.001	0.041	0.248		
RNOA	463	-0.079	-0.029	-0.011	0.039	0.172	0.000	0.001
	1,280	-0.065	-0.029	-0.012	0.037	0.160		
CFO	449	0.015	0.069	0.061	0.102	0.091	0.006	0.010
010	1 200	0.017	0.063	0.051	0.093	0.100	0.000	01010
	1,200	0.017	0.005	0.001	0.075	0.100		
LOSS	463	0.000	0.530	1.000	1.000	0.500	-0.042	0.000
	1,280	0.000	0.572	1.000	1.000	0.495		
NOL	463	0.000	0.377	0.000	1.000	0.485	0.038*	0.000
	1,280	0.000	0.340	0.000	1.000	0.474		
LEV	463	0.518	0.756	0.685	0.846	0.419	0.067***	0.015
	1,280	0.518	0.689	0.670	0.803	0.341		
INT EXP	463	0.054	0.088	0.081	0.102	0.044	0.004	-0.002
	1 280	0.057	0.084	0.083	0.102	0.041	0.001	0.002
	1,200	0.007	0.000	01000	01100	01011		
MNC	463	0.000	0.536	1.000	1.000	0.499	0.113***	1.000***
	1,280	0.000	0.423	0.000	1.000	0.494		
INTANG	463	0.040	0.316	0.219	0.443	0.447	0.078***	0.077***
	1,280	0.000	0.238	0.142	0.337	0.447		
EO EADN	460	0.000	0.000	0.000	0.000	0.011	0.000	0.000
EQ_EARN	463	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1,280	0.000	0.000	0.000	0.000	0.006		

Panel A: Descriptive Statistics for Firm Characteristics

SALES_GR	463 1,280	-0.041 -0.035	0.168 0.067	0.003 0.005	0.116 0.096	0.841 0.609	0.101**	-0.002
AB_ACCR	370 1,046	-0.065 -0.055	-0.031 -0.023	-0.023 -0.017	0.014 0.019	0.119 0.094	-0.008	-0.006
SALES	463 1,280	314 208	875 733	534 386	991 741	1,441 1,109	142*	148*
SGA	463 1,280	0.101 0.108	0.279 0.296	0.181 0.198	0.361 0.390	0.317 0.293	-0.017	-0.017
ASSETS	463 1,280	5.240 5.210	6.230 5.806	6.100 5.844	6.770 6.371	0.854 1.101	0.424***	0.256***

Panel B: Descriptive Statistics for Measures of Tax Avoidance

		25^{th}			75 th	Standard	Different	between:
	# Obs	Percentile	Mean	Median	Percentile	Deviation	Mean	Median
BTD	463	-0.051	-0.015	-0.011	0.010	0.076	0.007*	0.003
	1,280	-0.047	-0.022	-0.014	0.006	0.077		
DTAX	463	-0.125	-0.073	-0.003	0.061	0.362	0.027*	0.001
	1,280	-0.078	-0.097	-0.004	0.035	0.369		
CASH_ETR	227	0.068	0.295	0.205	0.379	0.292	-0.056***	-0.081***
	599	0.114	0.351	0.286	0.472	0.201		
CASH_ETR2	308	0.020	0.115	0.075	0.204	0.145	-0.022*	-0.023**
	838	0.023	0.137	0.098	0.197	0.151		
MTR	178	0.009	0.101	0.015	0.333	0.152	-0.033***	-0.017**
	554	0.000	0.134	0.032	0.272	0.142		

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. Differences between means are tested for significance using a two-tailed t-test; differences in medians are tested for significance using a two-tailed Wilcoxon signed rank test. All variables are as defined in the Appendix.

Results for OLS Regressions of Measures of Tax Avoidance on Indicator Variable for Private Firms that Are Owned by Large PE Firms (LARGE_PE) and Controls for Determinants of Corporate Tax Avoidance, where the Comparison Sample is a Sample of Private Firms that Are Owned by Small PE Firms

TABLE 9

	В	TD	D	TAX	CASH	H_ETR	CASH	I_ETR2	М	TRA
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Intercept	-0.038	-3.67***	0.261	4.20***	0.177	2.44**	0.096	2.86***	0.186	6.84***
LARGE_PE	0.018	2.28**	0.036	1.67*	-0.049	-2.01**	-0.033	-1.65*	-0.030	-1.67*
LOSS	-0.057	-14.61***	0.052	1.95*	0.043	1.39	-0.026	-1.79*	-0.119	-10.16***
LOSS×LARGE_PE	-0.007	-1.02	-0.031	-0.53	-0.026	-0.51	0.034	1.30	0.002	0.12
NOL	0.003	0.76	0.043	1.55	-0.049	-1.77*	-0.036	-3.43***	-0.098	-9.59***
NOL×LARGE_PE	-0.019	-2.68***	0.100	1.63	0.081	1.47	0.000	0.00	-0.027	-1.27
LEV	0.010	1.83*	0.039	1.00	0.007	0.18	0.012	0.77	-0.024	-2.11**
LEV×LARGE_PE	-0.004	-0.52	0.039	0.54	-0.063	-1.15	-0.055	-2.21**	0.014	0.74
RNOA	0.070	8.03***	0.114	1.58	0.107	1.45	0.074	1.59	0.055	2.53**
MNC	-0.011	-3.67***	0.037	1.59	0.090	4.19***	0.031	3.10***	-0.004	-0.45
INTANG	-0.016	-4.88***			-0.005	-0.31	-0.016	-1.77	0.002	0.24
EQ_EARN	-0.244	-0.82			-4.410	-3.65***	1.248	1.19	-1.087	-0.91
SALES_GR	0.002	0.73	0.048	1.72	-0.031	-1.54	-0.033	-3.75***	0.008	0.44
AB_ACCR	0.187	11.46***	0.420	2.41**	0.027	0.17	0.103	0.80	-0.006	-0.01
SGA	-0.018	-3.15***	-0.098	-2.18**	0.026	0.67	0.023	1.39	0.003	0.15
ASSETS	0.009	6.10***	-0.038	-4.05***	0.021	1.99**	0.007	1.32	0.008	1.86*
Adjusted R ²	0.4	1282	0.0)386	0.1	304	0.0)639	0.3	3861
Ν	1,	416	1,	416	8	02	9	81	ϵ	593

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. All variables are as defined in the Appendix. Regressions include industry and year indicator variables, which have not been tabulated. The t-stats have been adjusted to control for the clustering by year and multiple firm observations.

TABLE 10 Results for Propensity Score Matching Procedure Analyses

E	PE-Bac	ked Private Fir	m-Years	Non-PE-Backed Private Firm-Years			Di	Difference between			
	# Obs	Mean	Median	# Obs	Mean	Median	Means		Medians		
BTD	388	0.006	-0.002	388	-0.008	-0.003	0.014	*	0.001		
DTAX	388	0.054	0.016	388	0.006	0.000	0.048	**	0.016		
CASH_ETR	228	0.291	0.217	239	0.322	0.239	-0.031	*	-0.022	*	
CASH_ETR2	288	0.114	0.081	264	0.155	0.111	-0.041	**	-0.030	*	
MTRA	197	0.169	0.121	245	0.184	0.177	-0.015	*	-0.056	**	
ROA	388	0.013	0.018	388	0.022	0.016	-0.009		0.002		
RNOA	388	0.029	0.020	388	0.019	0.013	0.010		0.007		
CFO	372	0.071	0.059	372	0.083	0.059	-0.012		0.000		
LOSS	388	0.355	0.000	388	0.396	0.000	-0.041		0.000		
NOL	388	0.257	0.000	388	0.237	0.000	0.020		0.000		
LEV	388	0.609	0.612	388	0.627	0.617	-0.018		-0.005		
INT_EXP	388	0.074	0.071	388	0.760	0.072	-0.686		-0.001		
MNC	388	0.381	0.000	388	0.381	0.000	0.000		0.000		
INTANG	388	0.223	0.141	388	0.198	0.111	0.025		0.030		
EQ_EARN	388	0.002	0.000	388	0.000	0.000	0.002		0.000		
SALES_GR	388	0.082	0.035	388	0.122	0.035	-0.040		0.000		
AB_ACCR	388	-0.010	-0.008	388	-0.008	-0.001	-0.002		-0.007		
SGA	388	0.282	0.171	388	0.253	0.151	0.029		0.020		
SALES	388	805	423	388	843	409	-38		14		
ASSETS	388	5.850	5.882	388	5.880	5.856	-0.030		0.026		

Panel A: Descriptive Statistics that Compare PE-Backed Private Firms to Non-PE-Backed Private Firms after Propensity Score Matching Based on *RNOA*, *LOSS*, *NOL*, *LEV*, *MNC*, *INTANG*, *AB_ACCR*, *SALES*, and *ASSETS*

	B	TD	DT	AX	CASH	I_ETR	CASH	_ETR2	МТ	TRA
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Intercept	0.003	0.15	-0.022	-0.33	0.306	3.31***	0.224	4.55***	0.240	6.05^{***}
PE_BACKED	0.024	1.85*	0.020	1.43	-0.080	-1.80 *	-0.099	-3.10***	-0.044	-1.98**
LOSS	-0.064	-6.09***	-0.046	-1.57	0.073	1.31	0.013	0.50	-0.082	-4.13***
LOSS×PE_BACKED	-0.005	-0.49	0.037	0.86	-0.098	-1.35	-0.022	-0.71	-0.005	-0.18
NOL	-0.009	-1.16	-0.005	-0.17	-0.014	-0.34	0.044	1.57	-0.165	-9.89***
NOL×PE_BACKED	0.017	1.40	0.097	2.05^{**}	0.017	0.26	-0.095	-2.79***	0.014	0.55
LEV	0.008	0.52	0.102	2.16**	-0.150	-2.42**	-0.222	-5.90^{***}	-0.033	-1.32
LEV×PE_PACKED	0.016	0.85	0.017	0.24	0.159	1.80^{*}	0.193	4.25***	0.050	1.53
RNOA	0.087	1.97	0.067	0.75	0.075	0.70	0.109	2.21^{**}	0.159	4.00^{***}
MNC	-0.018	-3.78***	-0.001	-0.03	0.142	5.04***	0.039	2.59^{***}	0.013	1.02
INTANG	0.044	3.79***			-0.022	-1.59	-0.009	-0.95	-0.008	-0.24
EQ_EARN	0.386	1.48			-3.984	-2.94***	-0.511	-0.51	-0.914	-0.94
SALES_GR	-0.019	-2.41**	0.009	0.72	-0.021	-1.24	-0.023	-2.74**	0.002	0.08
AB_ACCR	0.100	1.37	0.230	1.20	0.050	0.24	0.394	3.15***	0.032	0.43
SGA	-0.044	-2.11**	-0.019	-0.48	-0.019	-0.37	0.010	0.38	-0.004	-0.12
ASSETS	0.004	1.19	-0.002	-0.26	0.008	0.73	0.007	1.15	0.003	0.66
INV_MILLS	0.360	0.42	-0.810	-1.03	0.930	1.11	0.069	0.44	0.084	0.91
Adjusted R ²	0.4	108	0.03	538	0.1	060	0.1	813	0.4	328
Ν	7.	30	73	30	4	45	52	26	4	13

Panel B: Results for OLS Regressions of Measures of Tax Avoidance on Indicator Variable for PE Ownership (*PE_BACKED*) and Controls for Determinants of Corporate Tax Avoidance, where the Comparison Sample is a Sample of Non-PE-Backed Private Firms with a Matched Propensity Score within 0.10 of the PE-Backed Firm

	PE-Ba	cked vs. Non-PH	E-Backed	PE-Ma	ajority vs. PE-M	inority	
	PE	Non-PE	T-Stat	Majority	Minority	T-Stat	
Panel A: Measures of	Tax Avoidaı	nce:					
BTD							
Mean	0.016	-0.011	3.54***	0.023	0.008	1.75*	
Median	0.008	-0.006	1.66*	0.001	-0.014	1.67*	
Ν	76	38		38	38		
DTAX							
Mean	0.004	-0.052	1.59	0.025	-0.024	1.80*	
Median	0.021	0.011	0.42	0.018	0.001	1.26	
Ν	76	38		38	38		
CASH_ETR							
Mean	0.285	0.331	-1.87*	0.283	0.287	-0.05	
Median	0.314	0.332	-0.76	0.273	0.390	-1.73	
Ν	35	27		13	22		
CASH_ETR2							
Mean	0.148	0.221	-1.76*	0.129	0.162	-1.39	
Median	0.110	0.185	-1.45	0.099	0.135	-1.41	
Ν	44	30		20	26		
MTR							
Mean	0.134	0.215	-2.38**	0.091	0.165	-1.81*	
Median	0.045	0.350	-1.74*	0.020	0.055	-1.04	
Ν	31	22		13	18		
	PE-Ba	cked vs. Non-PH	E-Backed	PE-Majority vs. PE-Minority			
	PE	Non-PE	T-Stat	Majority	Minority	T-Stat	

TABLE 11 Means and Medians for Components of Total Book-Tax Differences, Including Changes in Deferred Tax Assets and Liabilities and Items in the Statutory Reconciliation Schedule

Panel B: Changes in Deferred Tax Assets and Liabilities:

AACCR_RES						
Mean	-2,144.8	1,893.8	-2.02**	-3,958.2	-426.8	-1.06
Median	-723.0	913.4	-1.39	-1,352.0	-48.4	-1.13
Ν	74	38		36	38	
△DEP_AMORT						
Mean	-985.9	-1,492.1	0.22	-1,273.2	-713.8	0.84
Median	-1,132.8	-1,033.9	-0.07	-1,497.7	-792.7	-0.57
Ν	74	38		36	38	
∆SALE_LEAS						
Mean	-94.8	575.2	-1.69*	0.000	-184.6	1.07
Median	0.000	0.000	-0.26	0.000	0.000	0.95
Ν	74	38		36	38	

$\Delta INVENTORY$						
Mean	320.6	-637.0	2.21**	959.1	-284.3	1.29
Median	0.000	0.000	1.27	0.000	0.000	1.33
Ν	74	38		36	38	
∆VAA						
Mean	-4,225.9	-4,071.3	-0.05	515.3	-8,717.7	1.32
Median	0.000	0.000	0.68	0.000	0.000	0.39
Ν	74	38		36	38	
∆STOCK_COMP						
Mean	185.5	-50.33	1.26	381.4	0.000	1.08
Median	0.000	0.000	0.83	0.000	0.000	1.48
Ν	74	38		36	38	
∆OTHER						
Mean	599.4	1,403.1	-0.45	343.9	841.4	-0.27
Median	0.004	-89.34	-0.66	-89.18	171.3	-2.17**
N	74	38		36	38	
	<u>PE-Bac</u>	ked vs. Non-PF	E-Backed	PE-Ma	ajority vs. PE-M	<u>linority</u>
	PE	Non-PE	T-Stat	Majority	Minority	T-Stat

Panel C: Statutory Reconciliation Items:

FOR_TAX						
Mean	-0.020	-0.002	-1.14	-0.051	0.010	-1.12
Median	0.000	0.000	-0.49	0.000	0.000	-0.34
Ν	73	36		36	37	
STATE_TAX						
Mean	0.019	0.022	-0.12	0.015	0.024	-0.14
Median	0.008	0.011	-0.47	0.002	0.016	-2.21
Ν	73	36		36	37	
INTANG						
Mean	-0.007	0.038	-1.69*	-0.032	0.017	-1.62
Median	0.000	0.000	-0.41	0.000	0.000	-0.40
Ν	73	36		36	37	
TAX_EXEMPT						
Mean	-0.015	0.012	-2.33**	-0.004	0.001	-1.61
Median	0.000	0.000	-1.22	0.000	0.000	-1.00
Ν	73	36		36	37	
NONDED_EXP						
Mean	0.013	0.001	1.74*	0.010	0.016	-0.39
Median	0.000	0.000	0.06	0.000	0.000	-0.30
Ν	73	36		36	37	
TAX_RESERV						
Mean	0.006	0.003	0.61	0.013	-0.001	0.77
Median	0.000	0.000	0.38	0.000	0.000	-0.31
Ν	73	36		36	37	

TAX_CREDITS						
Mean	-0.013	-0.001	-1.67*	0.000	-0.025	1.42
Median	0.000	0.000	-0.03	0.000	0.000	0.66
Ν	73	36		36	37	
ΔVAA						
Mean	0.012	0.016	-0.16	-0.010	0.034	-0.91
Median	0.000	0.000	-0.08	0.000	0.000	-0.52
Ν	73	36		36	37	
OTHER						
Mean	-0.004	-0.001	-0.13	0.005	-0.013	0.22
Median	0.000	0.000	-0.08	0.001	0.000	0.83
Ν	73	36		36	37	
ETR						
Mean	0.235	0.339	-1.71*	0.192	0.278	-0.81
Median	0.309	0.370	-1.87*	0.254	0.335	-0.82
Ν	73	36		36	37	

*,**,*** indicates significance at the 10%, 5%, and 1% level, respectively. Differences between means are tested using a t-test while differences in medians are tested using a Wilcoxon signed rank test. We classified each deferred tax asset and liability disclosed in the tax footnotes in one of seven categories: 1) accruals and reserves ($\Delta ACCR_RES$), 2) depreciation and amortization (ΔDEP_AMORT), 3) sale and leaseback transactions ($\Delta SALE_LEAS$), 4) inventory ($\Delta INVENTORY$), 5) the valuation allowance account (ΔVAA), 6) stock-based compensation ($\Delta STOCK_COMP$), and 7) other ($\Delta OTHER$). Positive (negative) values indicate net deferred tax assets (liabilities), scaled by current year total assets and then multiplied by 1,000. We classified each statutory reconciliation item disclosed in the tax footnotes in one of nine categories, which include items related to: 1) foreign taxes (FOR_TAX), 2) state taxes ($STATE_TAX$), 3) intangible assets (INTANG), 4) tax-exempt income (TAX_EXEMPT), 5) non-deductible expenses ($NONDED_EXP$), 6) tax contingencies, aka "tax reserves" (TAX_RESERV), 7) tax credits ($TAX_CREDITS$), 8) change in the valuation allowance account (ΔVAA), and 9) other ($\Delta OTHER$). All other variables are as defined in the Appendix.