# IPOs and Corporate Tax Planning

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**Abstract:** How does going public affect firms' tax obligations and tax planning? We compare firms that completed an IPO with those that filed for an IPO but later withdrew and remained private, instrumenting for IPO completion with measures of short-run trends in financial market conditions around IPO filing. Using a panel of U.S. corporate tax return data from 1994 to 2018, we find that in the years immediately following IPO completion, firms have a higher probability of paying taxes and pay higher U.S. taxes as a share of sales and income. The effects are concentrated in firms reporting or using tax losses in the pre-IPO period and are not explained by statutory limitations imposed on these loss firms. Furthermore, the increases in tax obligations do not appear attributable to higher earnings generated from post-IPO corporate investment and employment spending. Rather, preliminary evidence suggests that the increases are associated with increased capital market reporting incentives. Furthermore, the effects are concentrated in firms with relatively more disperse ownership – and possibly greater agency concerns – in the post-IPO period. The evidence adds to the nascent literature examining corporate tax implications of the IPO decision.

The analysis and conclusions set forth are those of the authors and do not indicate concurrence by other members of the Federal Reserve research staff or the Board of Governors. The views expressed in this paper are our own and are not necessarily those of the U.S. Department of the Treasury. We are grateful for comments from Eric Allen, Paul Landefeld, Pete Lisowsky (discussant), Bridget Stomberg (discussant), conference participants at the National Tax Association Annual Meeting and the ATA Midyear Meeting, and seminar participants at the Federal Reserve Board of Governors. We thank Preston Harry, Rebecca John, Sasha Ruby, and Shooka Saket for research assistance.

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## 1. Introduction

An IPO is a seminal event in the lifecycle of a firm, providing an influx of equity capital, expanding the ownership base, and subjecting the firm to public financial reporting requirements. Lowry et al. (2017) show that over 6,500 firms have gone public since 1990, raising approximately $1 trillion in outside capital. A substantial academic literature examines IPOs, focusing on market underpricing, long-run underperformance, determinants of the going-public decision, and investment outcomes (reviewed by Ritter and Welch, 2002; Lowry et al., 2017). However, there is little evidence on the extent to which the IPO affects firms' tax obligations, even though the IPO event is accompanied by operational, investment, and reporting shifts that can directly affect tax payments and provide opportunities to implement tax planning strategies (Edwards, Hutchens, and Rego, 2019). In this paper, we use a panel of U.S. corporate tax filings to first provide descriptive evidence of the extent to which domestic tax payments change following an IPO transaction. We then test the economic drivers of any such change, including (i) corporate investment and employment spending, (ii) financial reporting incentives, (iii) increased principal-agent problems, and (iv) explicit tax planning strategies.

Prior literature motivates how these four channels can affect firm tax payments and tax planning. The capital infusion provided from an IPO can be used to fund corporate investment (Ritter and Welch, 2002), which should drive increased profitability and, by extension, higher tax obligations. Second, the increased capital market pressure shifts firms' focus from minimizing tax obligations to meeting financial reporting targets, possibly resulting in firms engaging in earnings management strategies that cannot be unwound for tax purposes (Erickson, Hanlon, and Maydew 2004). Third, the expansion and dilution of the firm's ownership base may exacerbate principal-agent conflicts between owners and managers, resulting in either increased tax obligations, if

managers underinvest in tax planning, or decreases in tax obligations, if managers pursue overly aggressive tax planning strategies. Finally, firms may use the IPO event as an opportunity to implement a number of tax planning strategies, such as establishing tax structures that facilitate long-run tax avoidance. We empirically test the extent to which each of these factors affect post-IPO tax obligations.

Edwards and Hutchens (2020) state that prior research is largely silent on the relation between corporate taxes and IPOs. The lack of prior evidence may be attributable to two factors. The first is an econometric challenge, as the decision to complete an IPO is endogenous. Indeed, a common critique of the IPO literature is that it is difficult to disentangle the effects of capital infusion from the managerial decision to go public, due to the lack of an appropriate control sample against which to measure effects. The second factor is a data challenge: there are few data sources on private firms (Lisowsky and Minnis, 2020; Badertscher et al., 2013), making it difficult to study tax obligations in the pre-IPO period.

To address the econometric challenge, we follow Bernstein (2015) and compare firms that complete IPOs to firms that filed for an IPO but ultimately withdrew and remained private. These two sets of firms are naturally comparable, as both faced similar incentives in the decision to file for an IPO. Furthermore, firms generally incorporate as a "C corporation" legal entity in advance of an IPO filing, ensuring that both IPO-completing and IPO-withdrawing firms face similar tax incentives and available tax planning strategies during our period of study. To address the endogeneity concerns related to the IPO decision, we also instrument for IPO completion with three short-run measures of financial market conditions around the IPO filing. We find strong first-stage correlation between these instruments and IPO completion, consistent with prior evidence that around half of withdrawals are due to market conditions (Boeh and Dunbar 2013). Moreover,

our instruments are plausibly independent from each firm's long-term tax planning decisions following the IPO, as they reflect short-term, market-wide changes. The use of these instruments, as well as the inclusion of withdrawn firms as a comparison group, allow us to better isolate the effects of IPO capital infusion and expanded ownership on firms' tax planning decisions.

To overcome the data availability challenge, we use a panel of confidential U.S. corporate tax returns from both public and private firms. Our data span 1994 through 2018, with a focus on years around each firm's IPO filing. Although these data only capture U.S. tax liabilities, they permit measurement of these obligations for several years prior to the IPO, including years outside of the S-1 filing. Furthermore, they allow us to distinguish between the effects of tax planning and other investment and operational factors that may naturally drive changes in tax payments, and they include ownership data that enable empirical tests of agency theory, all of which may explain why tax obligations change as firms transition to public markets.

First, we study how tax payments change after an IPO. We start with graphical, descriptive evidence of U.S. tax payments around an IPO filing for firms that complete versus withdraw the IPO, using several measures of cash taxes paid. Because the effective tax rate (ETR) cannot be calculated for a large proportion of IPO firms with tax losses, we use an indicator for paying domestic taxes as well as two ratios with domestic taxes paid as the numerator and either domestic sales or domestic income (for tax purposes) as the denominator. Across the three measures, we consistently find increases in tax payments for firms that complete an IPO versus those that withdraw. Regression analyses confirm that tax payments increase after an IPO, with the probability of paying taxes rising by approximately 19 to 24 percent for IPO-completing firms relative to IPO-withdrawing firms.

The increase in taxpaying post-IPO is driven primarily by firms either reporting or using a tax loss in the year immediately preceding the IPO filing. Among these firms, who comprise approximately 73 percent of the sample, IPO completers experience a 27 to 33 percent increase in the probability of paying taxes post-IPO relative to IPO withdrawers. In contrast, among the remaining 27 percent of firms that had positive taxable income in the year prior to the IPO filing, IPO completers are slightly less likely than withdrawers to pay taxes post-IPO. While a U.S. statutory limitation on net operating loss (NOL) deductibility (Section 382) appears to drive some increased tax payments among the tax loss firms, this constraint is not binding for the vast majority of firms in our data and therefore cannot explain the general results. Moreover, we continue to observe increased tax payments by IPO completers when we isolate the subsample of tax loss firms with a non-binding NOL constraint in the post-IPO period.

Having documented different effects of the IPO on firms' tax payments, we then focus on our primary research question about the economic drivers of these increased payments. We first study the role of corporate investment and employment in this outcome. Specifically, firms cite demand for capital to fund investment opportunities as one reason to enter the public market (Lowry et al., 2017). To the extent that increased investment drives increased long-run profitability, then tax obligations should also increase. However, if the capital infusion is not used for investment purposes (Pagano, Panetta, and Zingales, 1998; Bernstein, 2015), or if the returns on investment are delayed beyond the sample window, we would not observe such effect. We find *decreased* investment activity, particularly among assets with relatively short useful lives (7 years or less) and in R&D expense. We also find *lower* deductions for employee compensation, suggesting less spending on both fixed and human capital. Thus, increased payments do not appear attributable to firms using the capital infusion to grow the business and drive improved financial performance.

We next study how the shift in firms' reporting incentives affects tax payments. We first compare the distribution of income reported for tax purposes from the pre- to the post-IPO period. For both IPO-completing and withdrawing firms in the pre-IPO period, we observe a normal distribution with a clear peak centered just below zero taxable income, suggesting that on average a large proportion of firms report small tax losses. The IPO-withdrawing firms exhibit a virtually identical distribution after they file for the IPO. However, the IPO-completing firms exhibit two changes after going public. The distribution widens, reflective of fewer firms reporting small losses and greater spread in taxable income across the distribution. Furthermore, the peak of the distribution shifts slightly left, implying that, conditional on having a tax loss, the amount of the loss is greater post-IPO.

We also explicitly test the extent to which domestic financial reporting income changed post-IPO and how this change compared to that reported for tax purposes. Using financial statement income as disclosed on the tax return, we find large increases in income reported for financial statement purposes, but only among the subset of firms that were reporting or using tax losses in the pre-IPO period. The increase is similar in magnitude to the observed changes in taxable income. Collectively, this implies that firms' economic performance improved in the post-IPO period and that such increased income was reported for both financial statement and tax purposes. When considered in tandem with the reduced short-term investment and R&D activity, the results are suggestive of firms responding to financial reporting incentives such as through real earnings management (Roychowdhury 2006). In contrast, we find little change in financial reporting income for those firms that were already reporting taxable income and paying positive U.S. cash taxes.

We test whether the increased cash tax payments reflect increased agency costs—and less focus on tax planning—in the firm due to greater separation of ownership and control after the IPO. We proxy for agency issues using reported data on the number of shareholders in the post-IPO firm, under the premise that agency issues are increasing in the number of shareholders and the separation of principals and agents. We find some weak evidence that the increased level of taxes, measured using both the likelihood of paying taxes and the tax to sales ratio, occurs in those firms with relatively larger shareholder groups, suggesting that greater agency issues post-IPO may be associated with the tax payment results.

Finally, we test if firms appear to engage in different tax planning strategies post-IPO to counteract the increased financial reporting income. Across all firms, we find a substantial decline in interest deductions, consistent with large shifts in firms' capital structure as they enter the public markets. Thus, as a percentage of sales, we see that firms report much lower interest tax shields. We find heterogeneous effects on cash ETRs, with positive taxable income firms reporting declines in ETRs, whereas the other firms report no change.

This paper contributes to several strands of literature in accounting and finance. First, prior literature studies companies' tax planning strategies, as surveyed by Hanlon and Heitzman (2010) and Wilde and Wilson (2018). However, this literature focuses almost entirely on well-established public firms, despite the large number and aggregate activity of private firms in the U.S. economy (Lisowsky and Minnis, 2020). More recent work examines tax planning in private firms, documenting different types of tax planning in these companies. For example, Hoopes et al. (2020) also use confidential U.S. corporate tax data to compare the tax planning of public firms to a matched sample of private firms. They find different types of planning within these groups, with private firms engaging in greater conforming tax avoidance (Badertscher et al., 2019). They also

show that public firms have greater tax haven use, report lower ETRs on average, and are more aggressive based on Schedule UTP data. Badertscher, Katz, and Rego (2013) study private U.S. firms that publicly report due to issuing publicly traded debt and demonstrate that more highly concentrated insider ownership is associated with less tax avoidance. Olbert and Severin (2010) study private equity buyouts of private firms in Europe, finding that buyout firms undertake more profit shifting and have higher leverage. The key innovation of our paper is to study tax planning trends in firms' transition periods from private to public status, which helps to bridge between the findings of these other papers and the multitude of papers studying public firms' tax avoidance. This is particularly important as recent literature suggests that the nature of firm's tax planning activities changes during this transition (Badertscher et al., 2019). In so doing, we add to the literature that has primarily focused on investor level taxes (Guenther and Willenborg 1999; Li, Lin, and Robinson 2016), as well as recent work that examines the effect of the TCJA tax rate change (Edwards and Hutchens 2020) and the "supercharged" IPO tax strategy on corporate behavior (Edwards, Hutchens, and Rego 2019).

We also contribute to a large corporate finance literature studying how various firm outcomes are affected by private-to-public transitions (IPOs or public firm acquisitions of private firms) as well as public-to-private transitions (e.g., leveraged buy-outs or LBOs), including Chemmanur, He, and Nandy (2009), Pagano, Panetta, and Zingales (1998), Bernstein (2015), Babina, Oimet, and Zarutskie (2017), Ball and Shivakumar (2007), and Cohn, Mills, and Towery (2014). We add to this literature by studying an important policy outcome—tax-paying behavior—and by quantifying the extent to which tax changes are attributable to investment and employment spending and financial reporting incentives as opposed to explicit tax planning strategies.

Finally, this work contributes to understanding policy ramifications of the substantial decline in the number of U.S. IPOs in the past two decades. This decline has contributed to the diminishing number of public U.S. firms overall (Gao, Ritter, and Zhu 2013; Doidge, Karolyi, Stulz 2017; Chemmanur, He, Ren, and Shu 2020). This decline has been a growing concern for policy-makers, with the Nasdaq CEO stating that, if such trend continues, "job creation and economic growth could suffer, and income inequality could worsen as average investors become increasingly shut out of the most attractive offerings" (Friedman, 2018). Governmental regulatory action to address this concern includes steps such as exempting firms from public disclosure requirements (Barth, Landsman, and Taylor 2017). Because the tax system is an alternative mechanism by which the government can address distributive concerns, it is important to also understand the corporate tax obligations of firms as they transition to public firm status. We offer relevant evidence about the tax position of firms prior, during, and after the going public decision, thereby shedding light on how the IPO decision affects the type and amount of firms generating U.S. corporate tax revenues.

The remainder of the paper proceeds as follows. In Sections 2 and 3 we discuss the empirical methodology and data sources, respectively. We present the descriptive evidence on changes in tax payments in Section 4 and tests of the economic drivers in Section 5. We conclude in Section 6.

## 2. Empirical approach

### *2.1 Graphical evidence of changes in tax payments following an IPO*

We first provide graphical descriptive evidence as to whether corporate tax payments increase or decrease following the IPO transaction. We separately graph tax payments for firms with

completed IPOs and firms with withdrawn IPOs using coefficients estimated from the following ordinary least squares (OLS) equation:

(1) $Y_{it} = \sum_{k=-4}^{5} \beta_{t+k} IPOFiled_{it} + \gamma_{\tau} + \delta_i + \epsilon_{it}$,

where $Y_{it}$ includes three measures of tax payments for firm *i* in year *t*, which are described below in additional detail, and $\beta_{t+k}$ captures the average outcome in year $t + k$, adjusting for tax-year and firm fixed effects ($\gamma_{\tau}$ and $\delta_i$, respectively). We measure time relative to firm *i*'s IPO filing in year (*t*), with year $t - 1$ omitted from the regression. Thus, $\beta_{t+k}$ captures within-firm variation in taxpaying measures by year around the IPO filing date and provides descriptive evidence on changes in tax planning behavior for firms that ultimately go public and for firms that stay private.

We construct three measures of U.S. corporate income tax payments. The first measure is *Positive Taxes Paid*, an indicator equal to one if a firm pays positive taxes; use of this measure captures whether the probability of making a U.S. tax payment changes after the IPO. We also use two continuous measures: the ratio of U.S. taxes paid to domestic sales and the ratio of U.S. taxes paid to domestic income, where sales and income are amounts reported for tax purposes. Specifically, *Tax/Sales* is equal to the total cash tax payments by a firm (U.S. Corporate Income Tax Return Form 1120, Line 31 "Total Tax"), scaled by a firm's total U.S. gross receipts, net of returns and allowances (Form 1120, Line 1c). *Tax/Pre-NOL Taxable Income* is equal to total cash tax payments, scaled by a firm's taxable income before taking into account its net operating loss deduction (NOL) and other special deductions (Form 1120, Line 28). *Tax/Pre-NOL Taxable Income* is set equal to zero for firm-year observations with a current tax loss. The latter measure is most similar to a domestic cash ETR, except for the important fact that it is scaled by income reported for tax purposes instead of financial statement income.[1] Given that loss firms represent

[1] We use amounts reported for tax purposes, as opposed to amounts from financial statements, for two reasons. The first is that the sample includes pre-IPO firm-year observations in years prior to the S-1 filing, and thus, use of amounts

a substantial fraction of firms in both the sample and the economy (Henry and Sansing, 2017; Heitzman and Lester, 2020), and because loss firms exhibit different corporate behaviors as compared to profitable firms (Dobridge, forthcoming), we also use *Tax/Sales* as an alternative measure because it can be measured for firms with both pre-NOL taxable income and tax losses.

We include firm fixed effects in the regression to control for observable and unobservable time-invariant firm-level characteristics. We do not include time-varying firm controls in the regression because most of these potential variables are also potentially affected by the firm IPO, and therefore, inclusion of such measures would introduce a "bad controls" problem (Angrist and Pischke 2009; Roberts and Whited 2013), potentially biasing estimates. In addition to firm fixed effects, we also include year fixed effects to control for common economic shocks that may affect firms across time. We cluster standard errors using the major industry classification codes provided by the Internal Revenue Service (IRS)—the codes with which the firms are asked to report their industry—which generally correspond to three-digit NAICS codes.[2] Clustering standard errors at the industry level corrects for unobserved error correlation within industries, which is particularly important given the documented evidence that IPO waves may be driven by industry-level productivity shocks (Chemmanur and He, 2011).

*2.2 Regression analyses of changes in tax payments following an IPO*

We further test the relation between IPO completion and tax payments by estimating the following regression specification:

reported for tax purposes permits measurement in these years. The second is that, within the years for which financial statement income is available, domestic segment reporting from financial statements that would be necessary to measure domestic sales and income does not provide the same coverage or detail as that available from the tax return. Additional tests in Section 5.4 present results for a cash ETR measure constructed for a subset of the sample following Hoopes et al. (2019).

[2] We use the firm's industry reported in the year prior to the IPO. As the IRS transitioned from an SIC-based to NAICS-based industry classification system in 1998, we assign the first NAICS-based code available to a firm's observations prior to 1998. Untabulated tests also show that results are robust to alternatively clustering standard errors at the firm level as in Bernstein (2015).

$$(2) \qquad Y_{it} = \beta_1 IPO\ Completed\ X\ Post_{it} + \gamma_t + \delta_i + \epsilon_{it},$$

where $Y_{it,}$ $\gamma_\tau$, and $\delta_i$ are as defined above. *IPO Completed* is an indicator variable equal to one for the firms in the sample that completed an IPO, and zero for the withdrawn firms. *Post* is an indicator variable equal to one for the year of the IPO filing and any subsequent year. The main effects for both *IPO Completed* and *Post* are omitted due to the inclusion of firm and year fixed effects, respectively. The interaction term *IPO Completed X Post* captures whether tax payments differ for IPO firms after the firm files and completes the IPO, relative to those firms that withdraw. Standard errors are clustered by industry.

Eq. (2) uses firms that withdraw from an IPO as a comparison group for purposes of evaluating the effect of IPO completion; these firms have similar growth incentives to file for the IPO in the first place and thus are a relevant benchmark group. However, there could also be differences across these firms due to latent characteristics correlated with the decision to complete or withdraw the IPO, such as manager's private information and firm investment prospects (Busaba, Benveniste, Guo 2001). To isolate the effects of becoming a public firm on tax planning behavior and operating performance, therefore, we use a two-stage least-squares empirical strategy that builds on the approach used by Bernstein (2015).[3] The empirical specifications for the first- and second-stage regressions are as follows:

<u>First stage:</u>

$$(3) \qquad IPOCompleted\ X\ Post_{it} = \alpha_1 Instrument_m\ X\ Post_{it} + \delta_i + \gamma_t + \epsilon_{it}$$

<u>Second Stage:</u>

$$(4) \qquad Y_{it} = \beta_1 \widehat{IPOCompleted} X Post_{it} + \gamma_t + \delta_i + \epsilon_{it},$$

[3] Future work will entropy balance the completed IPO firms to the withdrawn IPO firms to further mitigate concerns about differences across the samples. Additional analysis will also explore the use of other comparison samples, such as private firms that obtain private financing, to further isolate the effect of the IPO on corporate tax payments.

where *IPO Completed*, *Post*, $Y_{it}$, $\gamma_\tau$, and $\delta_i$ are as described above. *Instrument* is one of three measures used as an instrumental variable to address the selection decision and is described below; *m* indicates the month and year a given instrument is observed. As in Eq. (2), we cluster standard errors by industry.

The first measure used as an instrument is the NASDAQ composite two-month return following an IPO filing (Bernstein 2015). This measure reflects that managers demonstrate sensitivity to stock market changes during the book building process when deciding to complete the IPO (Busaba, Benveniste, and Guo 2001; Dunbar and Foerster 2008). As Bernstein notes, firms may decide to withdraw instead of waiting for more favorable market conditions due to automatically expiring filing registrations and the costs of waiting, including prohibitions on disclosing new information to investors or banks and the inability to issue private placement. The NASDAQ return is expected to have a positive relationship with IPO completion—when market returns are higher, firms are expected to be more likely to complete the IPO.

The second measure captures investor sentiment and is the average dividend premium two months after filing for the IPO, calculated as the log of the average market-to-book ratios of dividend-paying firms, minus the ratio for non-dividend-paying firms (Baker and Wurgler 2006). Lowry (2003) finds that market sentiment is an important and distinct determinant of IPO volumes, and Baker and Wurgler (2004) suggest that the dividend premium reflects this sentiment by capturing excess demand for stocks of dividend-payers. In particular, the dividend premium should be negatively related to investor sentiment, as dividend-paying firms likely have poorer investment opportunities than non-dividend payers, and thus should correlate negatively with IPO completion.

The third measure used as an instrument is the average closed-end fund discount (CEFD) in the two-months after filing for the IPO. A closed-end fund is a publicly traded investment firm

that invests in securities, and the CEFD is the average difference between the net asset values of closed-end stock fund (CEF) shares (i.e., the prices of underlying securities in which the closed-end fund has invested) and the market price of the CEF. While the CEFD has also been used as a measure of investor sentiment (Lee, Shleifer, and Thaler, 1991; Baker and Wurgler, 2006), theoretical work by Cherkes, Sagi, and Stanton (2008) suggests that the CEFD instead reflects the tradeoff between liquidity benefits of trading in the liquid closed-end fund as opposed to the more illiquid underlying securities.[4] Market liquidity conditions may be important for a manager's decisions to complete an IPO because greater market liquidity or lower liquidity risk has been shown to have a number of trading and pricing benefits for IPO firms (Aggarwal, Krigman, and Womack, 2002; Ellul and Pagano, 2006). The CEFD is expected to have a positive relationship with market liquidity conditions, and by extension, the probability of IPO completion.

A valid instrument must satisfy the relevance condition as well as the exclusion restriction. Section 4 demonstrates that all of these three measures indeed satisfy the relevance condition because they are highly correlated with an issuer's decision to complete or withdraw an IPO. Furthermore, as these variables are reflective of short-run market conditions, they are also unlikely to affect the long-term tax-planning considerations of a firm, thereby satisfying the exclusion restriction. Thus, these measures appear to be valid instruments to use when testing the effect of IPOs on corporate tax planning.

[4] In their model, the CEFD is inversely related to the liquidity benefits of trading in the CEF instead of the underlying stocks and is positively related to CEF manager's fees paid. When liquidity conditions are favorable—i.e., when the liquidity benefits of trading in the CEF are low—the CEFD is expected be high. Intuitively, with favorable market liquidity, there will be less market demand for the closed-end fund for liquidity purposes and the fund will trade at a higher discount due to the manager's fees.

*2.3 Tests of Economic Factors Related to the Change in Tax Payments*

The primary empirical tests focus on examining the economic drivers of any observed change in tax payments. Prior literature motivates four key reasons why tax payments may change, none of which are mutually exclusive. We discuss these reasons in the four sections below and describe the empirical tests used to assess each of these factors.

*2.3.1 Increased Investment and Employment*

One of the reasons that firms state for going public is to obtain necessary capital to pursue growth opportunities. For example, Ritter and Welch (2002) states that a primary reason for firms to go public is "the desire to raise equity capital for the firm," and Chemmanur et al. (2009) finds that capital expenditures and employment increase in the years before and after the IPO.[5] Therefore, we expect that firms that complete the IPO increase capital investment in the post-IPO period. Assuming that capital and labor are complements, we also expect to observe increased employment as well. In the short run, these effects may result in lower tax obligations, as the firm claims accelerated depreciation deductions for its capital investments and reports higher compensation deductions. However, in the long run, such investment in capital and labor should drive increased income if the investments were value-increasing for the firm; that is, to the extent that the return on these investments exceeds the costs, we would observe greater taxable income and higher tax obligations for IPO-completing firms. Whether we observe such return on investment within our post-IPO window is an empirical question.

To test this prediction, we re-estimate Eq. (2)-(4), replacing the dependent variable with five different investment measures following Feldman et al. (2021). *Investment/Tangible Capital*

[5] Lowry et al. (2017) discuss a number of other reasons firms go public, including market timing, readjusting capital structure, providing liquidity for owners, facilitating M&A, obtaining the benefits of an observable stock price, compensation, and the credibility that accompanies public scrutiny.

*Assets* and is equal to a firm's capital and R&D investment during the year, measured using capital expenditure details from IRS Form 4562 (for Depreciation and Amortization) and IRS Form 6765 (R&D Tax Credit), scaled by the total beginning balance of fixed assets from Schedule L. We also decompose this amount into fixed assets (*Investment excl. R&D/Tangible Capital Assets*) and R&D expense (*R&D Investment/Tangible Capital Assets*), and then further decompose the first measure into short-term and long-term investment based on whether the property is listed as being depreciable over a 3 to 7 year period, or over a 10+ year period (*Short-term Investment/Tangible Capital Assets* and *Long-Term Investment/Tangible Capital Assets*). Collectively, these measures not only capture the actual amount of domestic investment a firm makes in a year, but they permit us to study the type of investment that is made.

*Employee Comp/Sales* and *Officer's Comp/Sales* are equal to the deduction amounts for employees and officers, respectively, reported on the U.S. tax return. Both are scaled by gross receipts (for tax purposes). To the extent that the IPO results in the firm expanding its domestic workforce or increasing the pay of its existing workers, *Employee Comp/Sales* would increase. We separately test *Officer's Comp/Sales* to assess how deductible executive compensation varies around the IPO given specific restrictions around public firm's compensation levels (for example, Section 162(m)).

*2.3.2 Shift in Reporting Incentives*

Another reason for changes in corporate tax payments around the IPO transaction is the substantial shift in reporting incentives. Prior to the IPO, the firm primarily reported to tax authorities, the firm's relatively smaller set of owners, and debt holders. Because the primary external authority to which private firms report is the tax authority, firms may opportunistically

*under-report* income and separately provide financial or economic performance to shareholders through alternative information channels. After the IPO, the firm is subject to extensive public reporting requirements, and reporting of financial statement information becomes as or even more important than reporting to tax authorities. In this context, prior literature in financial accounting demonstrates that public firms will opportunistically manage earnings, possibly *overreporting* income, to meet relevant earnings benchmarks (see Dechow et al., 2010 for a review). However, in the IPO setting, Jain and Kini (1994) and Teoh, Welch, and Wong (1998) suggest that managers may "window dress" their accounting numbers prior to going public, leading pre-IPO performance to be understated and post-IPO performance to be overstated. Indeed, Pagano et al. (1998) document such a decline in profitability post-IPO in a set of Italian firms, and Pastor et al. (2009)'s dynamic model demonstrates these effects more generally across a broader sample of firms. By studying tax payments around the IPO, we explicitly test these assertions and examine how firms transition between these differing reporting incentives. To the extent that firms engage in earnings management for capital market purposes post-IPO, and such effect cannot be undone for tax purposes, firms will report higher taxable income and incur higher tax obligations (Erickson, Hanlon, and Maydew 2004).

To test this, we re-estimate Eq. (1)-(4), replacing the dependent variable with several measures of financial performance. We first use *Pre-tax Financial Income/Sales*, which is equal to the amount of financial statement domestic pre-tax income from the tax return (Net income (loss) for the domestic firm as reported on Schedule M-3, plus U.S. current income tax expense, as used by Hoopes et al. (2019)), scaled by gross receipts for tax purposes. We also report results using an alternative measure scaled by lagged assets (*Pre-tax Financial Income/Assets*). These measures assess whether domestic financial reporting income – the best measure of domestic

economic performance – changed post-IPO.[6] We expect to observe an increase in these measures due to improved performance and/or earnings management activity, post-IPO.

We also use two analogous measures of taxable income or loss to assess how much of any increase in financial reporting income was reported for tax purposes, which in turn could drive changes in tax payments. The measures include *Pre-NOL Taxable Income/Sales* (Form 1120, Line 28 scaled by total gross receipts, net of returns, from Line 1c) and *Pre-NOL Taxable Income/Assets* (Form 1120, Line 28 scaled by lagged total assets as reported on Form 1120, Schedule L). By using measures based on both financial reporting income and taxable income, we are able to assess the extent to which any increase in firm reporting captured by financial statement income is also reflected in taxable income, post-IPO.[7]

*2.3.3 Increased Agency Concerns*

A third reason that tax payments could shift post-IPO is due to the increased separation of management and control (Badertscher et al., 2013). Prior literature implies that agency issues increase for all firms that complete an IPO, and thus firms' tax planning will change as a consequence. Therefore, we examine heterogeneity in the extent to which tax payments change

[6] When a firm reports attaching a Schedule M-3 to the Form 1120 (Box A4), financial statement income is measured as the net income (loss) per income statement of includible corporations (Form 1120: Schedule M-3, Part I, line 11) + U.S. current income tax expense (Form 1120: Schedule M-3, Part III, line 1) plus the U.S. deferred income tax expense (Form 1120: Schedule M-3, Part III, line 2). When a firm does not report filing a Schedule M-3 or in the years the Schedule M-3 was not utilized, financial statement income is defined as net income (loss) per books (Form 1120: Schedule M-1, line 1) + federal income tax per books (Form 1120: Schedule M-1, line 2). Ideally, we would also use sales reported on the financial statements, but we are not able to observe this information for years outside of the S-1 period and for firms without requisite domestic segment data. Use of this measure assumes that domestic sales reported on the tax return approximate those on the financial statements. The alternative measure that is scaled by assets does not suffer from book/tax differences because the asset amounts reported on Schedule L are intended to be the same as those reported under U.S. GAAP.

[7] Future work to disentangle financial reporting-related effects on post-IPO tax behavior from other effects will include studying if tax effects occur in those samples with greater capital market pressures, such as those with higher discretionary accruals following Badertscher et al. (2013). Analyses will also study the roles of analyst coverage and institutional ownership, as prior literature shows that firms followed by more analysts engage in less earnings management (Yu 2008) and that there is greater over-weighting of near-term expected earnings by firms with a high level of "transient" institutional owners (Bushee 2001).

based on the extent of post-IPO agency issues. Firms should exhibit variation in the extent of agency issues due to differing amounts of capital market attention, analyst following, publicly traded competitors, and the firms' own internal governance mechanisms. To the extent these factors mitigate the increase in agency concerns, we should observe heterogeneity in the extent to which they also affect tax payments.

To test this prediction, we partition the sample based on a measure of the separation of ownership and control in the post-IPO firm and re-estimate Eq. (2)-(4) using the three measures of tax payments. We use tax return detail on the number of reported shareholders in a firm following the IPO to construct the subsamples. Specifically, we partition the sample based on whether the firm reports to having 100 or more shareholders after the IPO transaction. The implicit assumption is that agency issues should be most pronounced in the firms with a greater separation between a larger group of owners and management.[8]

*2.3.4 Tax Planning*

Finally, a firm's tax payments could change due to explicit tax planning strategies that firms undertake around the IPO. For example, firm's interest deductions may decline as the firm's equity capital infusion is accompanied by a decline in debt financing. Firms could also put into place other tax planning strategies, such as those that are disclosed by their industry peers.[9]

[8] Future work will also examine how pre-IPO venture capital (VC) investment and post-IPO corporate governance mechanisms affect tax payments and tax planning. VC investment has been shown to be an effective monitoring mechanism that improves private-firm outcomes (Bernstein, Giroud, and Townsend 2016) and may alleviate agency problems within the firms but also has been shown to be less effective in terms of tax planning (Allen et al., 2018). Improved corporate governance has been shown to mitigate over- and under-investment in tax planning activity (Armstrong, Blouin, Jagolinzer, and Larker 2015).

[9] Another example of tax planning relates to the uncertain value of the firm and its intangible assets at the time of the IPO transaction. This uncertainty affords the pre-IPO firm the opportunity to establish international tax planning strategies for the post-IPO period at a relatively low tax cost. For example, firms may transfer valuable assets, such as intellectual property rights, to foreign jurisdictions to facilitate tax planning. These transfers are generally accompanied by exit taxes assessed on the "gain" calculated as a function of the IP value at the time that the intellectual

We test changes in firm tax planning by replacing the dependent variable in Eq. (2)-(4) with two variables, *Cash ETR* and *Interest Deduction/Sales*. *Cash ETR* is equal to total U.S. cash tax payments and is scaled by domestic pre-tax financial reporting income following Hoopes et al. (2019). As a widely accepted measure of tax avoidance, it permits an assessment of whether tax planning changed post-IPO. However, because it requires the firm to report positive pre-tax financial reporting income, this measure can only be computed for a subset of the sample. *Interest Deduction/Sales*, which is equal to the firm's total domestic interest reported on the tax return, scaled by gross sales, directly tests whether the firm's reliance on interest deductions as a tax shield changes with the firm's shift in capital structure.

## 3. Data and Summary Statistics

### *3.1 Data*

The dataset consists of firm IPO data from Thompson Financial and the SEC's Edgar platform matched with administrative tax records derived from corporate tax returns. We study IPOs between 1996 and 2016, starting in 1996 because that was the first year in which firms were required to file with Edgar. We draw the dataset of firms that complete or withdraw an IPO from the Thomson Financials' SDC Platinum New Issues database. Following standards in the literature, we exclude non-U.S. firms, financial firms (SIC codes 6000-6999), spin-offs, American depository receipts (ADRs), real estate investment trusts (REITs), closed-end funds, blank-check firms, unit funds, and IPOs for which the data of IPO filing is unavailable. As tax employer identification numbers (EINs) necessary for merging with the tax data are only available for a limited subset of firms in the SDC IPO sample, we scrape the EIN number from the filing when

property leaves the U.S. To the extent that the value is uncertain in the pre-IPO period, the exit tax may be low. Data analyses of firms' foreign tax presence using Forms 5471 details are ongoing.

available (Lowry, Michaely and Volkova, 2017). IPOs for which the EIN cannot be pulled from Edgar are excluded. The IPO sample begins with 3,895 unique IPO events from SDC. Figure 1 shows the number of completed and withdrawn IPOs by year of filing in our sample. The number of completed IPOs was the highest from 1997 to 2000, with the number of withdrawn IPOs also peaking in 2000, prior to the 2001 recession.

We use the EIN to merge the IPO dataset with tax data from 1994 to 2018. We include several years of tax data before and after the IPO sample years to gain a more complete picture of the tax and financial performance of firms pre- and post-IPO. The tax data are derived from two sources of IRS administrative records. We first use the annual sample of returns cleaned and edited by the Statistics of Income (SOI) division of the IRS. The annual SOI data comprise a stratified sample from the universe of corporate and partnership tax returns. Large firms, as measured by either total assets or proceeds, are sampled with 100 percent probability. We next supplement the SOI sample with data available from the universe of C corporation tax returns provided by the IRS, named the Compliance Data Warehouse (CDW). Using the CDW allows us to include additional years of data and additional firms, providing a more complete picture of firm tax planning activity around the IPO.

In total, we match 3,267 IPO filing firms to the tax data. Approximately 94 percent of matched firms have just one IPO event; six percent have two IPO events; and a small number have three or four. We discard all but the earliest event and focus on that in our empirical tests. From the sample of 37,727 firm-years, we drop observations that do not have C-corporation filing status (594 observations), those with non-positive values for either gross receipts or total assets (6,926 observations), and observations for which a major industry classification code is unavailable or cannot be imputed (705 observations). Because the primary research question relates to how tax

payments change around the IPO transaction, we require all firms to be present in the sample for at least years $t$-1, $t$, and $t$+1 relative to the IPO filing in year $t$ (dropping 7,937 observations).[10] The final sample includes 21,565 observations for 1,766 firms, of which over 70% complete the IPO.

To eliminate the influence of outliers for all variables except the cash ETR, we winsorize variables at the five percent level, following others in the literature utilizing corporate tax data (Cohn, Mills, and Towrey, 2014; Zwick and Mahon, 2017; Yagan, 2015). For the cash ETR, we reset observations to one if the ETR exceeds that value. The final sample includes an unbalanced panel of 21,565 firm-year observations.

To estimate Eq. (3) and (4), we also obtain data on the three measures used as instrumental variables in our regression methodology. Specifically, we obtain data on the Nasdaq two-month stock return following the date of IPO filing (Bernstein, 2015) from the Wall Street Journal via Haver Analytics. We obtain data on the monthly equity dividend premium and the closed-end mutual fund discount in the two months following IPO filing from Jeffery Wurgler's website (Baker and Wurgler, 2006). The time series values of the instruments are plotted in Figure 2.

*3.2 Summary Statistics*

Table 1 displays summary statistics on the main sample. Approximately 32.3 percent of the firm-year observations report making U.S. tax payments; the average cash tax payments (inclusive of firms with no tax obligations) are equal to 6.2 percent of pre-NOL taxable income (0.6 percent of sales). This relatively low proportion of firms paying taxes, and the relatively low tax effective tax rate, reflects that only 37.6 percent of the sample observations report positive pre-NOL taxable income. The relatively high proportion of firms with tax losses is consistent with Allen et al.

[10]Results are generally robust to estimation on alternative samples, including two larger samples that do not require that a firm have observations centered in the three years around the IPO filing, as well as three smaller samples that impose more stringent data requirements. See Section 5.5.

(2018), who similarly find, within a sample of VC-backed private firms, that a high proportion report large tax losses. Mean (median) pre-NOL taxable income is -$0.63 million (-$2.3 million).[11] Taxable income—which reflects income reported on the tax return after NOL deductions and is equal to zero for loss firms (Form 1120, line 30)—is highly skewed, with the median firm reporting no taxable income, but firms at the 90$^{th}$ percentile reporting $24.2 million.

Average (median) total assets are $380.5 million ($84.3 million). The samples used for asset and sales growth are slightly smaller, given missing lagged values in the unbalanced panel. For the 91% of observations with the requisite data, we observe that the average firm has 36.5 percent asset growth and 57.4 percent sales growth, reflecting the growth life cycle stage for these firms.

Average equity issuance via the IPO was $26.2 million and equity financing (the ratio of equity issuance to the sum of equity and debt issuance) is equal to 15.1 percent. Figure 3 shows trends in the level of equity issuance (Panel A) and equity financing (Panel B). As with Eq. (1), the omitted time period used in the specification to generate these figures is the year prior to the IPO filing (year $t$-1), and therefore, all coefficient estimates are interpreted as the level relative to the year before filing. These figures graphically demonstrate the extent of equity issuance in our sample and also show that most IPOs are completed in the same year of filing, with some additional IPO-related equity issuance occurring in year $t$+1.

Table 2 presents summary statistics for the year prior to an IPO for firms that complete the IPO and compare that with summary statistics for firms that withdrew. Columns (1) and (4) show the number of distinct completing firms (1,300) and withdrawing firms (466), respectively. Columns (2) and (5) (Columns (3) and (6)) report the averages (standard deviations) of key outcome variables for these two groups. Columns (7) and (8) report the difference in mean values

[11] All percentile estimates (including medians) are calculated as the average of the ten observations around the percentile cutoff to preserve confidentiality of reported tax data.

and the industry-adjusted p-value of the difference. Firms that complete an IPO are not statistically different from firms that withdraw in terms of sales or asset growth prior to an IPO. However, IPO-completing firms have a higher likelihood of reporting positive pre-NOL taxable income (38 percent as compared to 31 percent) and appear to have overall smaller losses as a proportion of sales and assets. Consequently, we observe that IPO-completing firms have a 6.6 percentage point higher probability of paying U.S. taxes, as well as higher levels of tax payments as a proportion of sales and pre-NOL taxable income. The difference in means across the two samples reinforces why we instrument for IPO completion—withdrawn and completed IPOs have different characteristics, such that the withdraw decision is not random.

## 4. Results: Changes in Tax Payments around IPO

### *4.1 Tax Payments*

We begin our analysis of changes in tax planning behavior after the IPO by showing graphical trends from estimation of Eq. (1). Figure 4 shows trends for *Positive Taxes Paid*, *Tax/Sales*, and *Tax/Pre-NOL Taxable Income* in Panels A, B, and C, respectively. Firms that complete and withdraw the IPO exhibit no statistically significant differences in years *t-4* to *t*-1 based on *Positive Taxes Paid* and *Tax/Sales*. We observe differences in *t*-4 and *t*-3 for *Tax/Pre-NOL Taxable Income,* but such differences dissipate by year *t*-2. After the IPO filing year, we see that firms that go public appear to have an increase in tax payments based on the fact that the blue line (for completers) consistently appears higher relative to the red line (for withdrawers). However, we note that these effects only appear statistically significance in year *t* based on *Tax/Sales*, and that after the first or second year, tax payments decline. In contrast, tax payments for firms that withdraw remain fairly flat, with some (weak) decline several years after the IPO filing. These figures provide suggestive evidence of changes in tax payments around the IPO event.

Next, we confirm these graphical results by estimating Eq. (2) through (4). We begin by showing results from the first stage of the IV regression in Table 3. The first-stage results demonstrate that all three instruments are strong predictors of IPO completion in our sample period, exhibiting the expected sign. The coefficient on the 2-month Nasdaq return is positive, for example, indicating that firms are less likely to withdraw an IPO filing during periods of strong market performance. The coefficient on the CEFD is also positive, consistent with this measure reflecting favorable liquidity conditions under which to complete an IPO. Finally, the coefficient on the dividend premium has the expected negative sign, reflecting that the premium is inversely related to investor sentiment. The strong statistical significance confirms that these instruments meet the relevance condition.

We present results of our OLS (Eq. 2) and IV (Eq. 4) specifications in Table 4. Columns (1) and (2) present results using the indicator *Positive Taxes Paid* as the dependent variable, Columns (3) and (4) use *Tax/Sales*, and Columns (5) and (6) present results where the dependent variable is *Tax/Pre-NOL Taxable Income*.

Across the columns, we observe positive and statistically significant coefficients, confirming the graphical evidence that IPO-completing firms exhibit a higher probability of paying U.S. taxes and pay higher taxes as a share of both sales and income. The coefficients in Columns (1) and (2) of 0.0640 and 0.0779 indicate that IPO completion leads to a 6.4 – 7.8 percentage point higher probability that a firm pays U.S. federal taxes. Given that 32.3% of firms on average pay taxes, this is equivalent to a 19.8 – 24.1% increase in the probability that a firm pays taxes. The coefficients in Columns (3) through (6) also imply increases in the amount of taxes as a percentage of either sales (Columns (3) and (4)) or income (Columns (5) and (6)). For example, given the

average value of Tax/Pre-NOL Taxable income of 0.062, the coefficients in Columns (5)-(6) imply a 26.9-36.6 percent increase in the amount paid.

*4.2 Tax Payments for Firms Based on Pre-IPO Losses*

One explanation for an increase in U.S. tax obligations relates to the large proportion of firms in the sample reporting pre-IPO tax losses. U.S. tax law imposes a statutory limitation on use of tax losses following a change in ownership control, such as one that occurs in an IPO. This limitation can reduce the amount of loss carryforwards that the firm can use to offset post-IPO income, resulting in increased tax obligations.[12] To assess whether this explains the increased tax payments observed in Table 4, we partition the sample based on whether the firm had pre-IPO losses in the year immediately preceding the IPO year (year *t*-1) and re-estimate Eq. (2) and (4). Specifically, we identify those firms that either had i) positive taxable income, reflecting that the firm either had no NOLs or insufficient NOLs to fully absorb its income (427 firms, n=5,920 observations), or ii) firms with zero taxable income, reflecting that the firm had a tax loss in year *t*-1 or used an NOL carryforward to fully offset income (1,339 firms, n=15,645). We expect the latter group to be most affected by the statutory limitation that occurs as a consequence of the IPO transaction.

Table 5, Panel A reports results for the subsample of observations with zero taxable income in the pre-IPO year. We consistently observe a positive coefficient that is statistically significant in five of the size columns, indicating that the likelihood and amount of these firms' tax payments increased after the IPO. For example, the coefficients in Columns (1) and (2) imply that firms

[12] Specifically, Section 382 limits the ability of a firm to use its NOLs if the firm has had a greater than 50% ownership change over a three year rolling period. Given that the IPO transaction results in a substantial capital infusion by new owners, we expect that the IPO will trigger the Section 382 limitation in most, if not all, firms. Briefly, the amount of the limitation is equal to the firm's market value at the time of the ownership change, times the federal long-term tax-exempt rate. See Erickson and Heitzman (2010) and Sikes, Tian, and Wilson (2014) for more discussion of this limitation.

reported an 8.95-11.2 percentage point increase in the likelihood that they paid U.S. cash taxes in the post-IPO period.

In contrast, we observe no clear pattern of results for the subsample of firms with positive taxable income in the pre-IPO filing period in Panel B. The negative coefficients in Columns (1) and (2) suggest that firms that had positive taxable income pre-IPO have a *decline* in the probability that they pay U.S. cash taxes, although only the estimate in Column (2) is statistically significant. We observe mixed results across Columns (3)-(6), with the OLS estimates suggesting increases in *Tax/Sales* and *Tax/Pre-NOL Taxable Income*, whereas the IV estimates imply no significant change. Consequently, we cannot make strong inferences about this subsample from these tests, but an overall comparison across the two panels demonstrates a clear difference across the subsamples based on the presence or use of pre-IPO losses.

While the analyses in Table 5 suggests that the limitation on tax loss utilization may play an important role in post-IPO tax obligations, the statutory limitation does not affect all loss firms similarly. In fact, for some firms, the limitation may not be binding. This is because the limitation is a function of i) the firm's valuation at the time of the IPO, ii) the amount of a firm's NOL stock, and iii) the amount of taxable income in the post-IPO period. If a firm has a relatively high valuation, a relatively low amount of NOL stock, and/or low levels of taxable income, then the firm may still be able to fully offset its taxable income with losses in post-IPO years. Alternatively, if the firm continues to report tax losses, the limitation will have no effect until the firm begins to report taxable income. Therefore, to further assess whether the increase in tax burden as observed in Table 5, Panel A is attributable to the U.S. statutory limitation, we conduct two additional analyses.

First, we construct an indicator equal to one if a firm appears to report less than the allowable amount of NOL deduction in either the year of the IPO filing (most often, the year the IPO is completed), or the year immediately after the IPO filing. We identify 49 firms for which the statutory limitation binds based on the fact that the firm does not use the maximum amount of NOL stock to reduce its taxable income to zero. We then re-estimate Eq. (2) and (4) on the sample of firms with zero taxable income in year *t*-1 after replacing the dependent variable with this indicator.[13] Results reported in Panel A suggest that there is no statistically significant increase in the likelihood that a firm would take less than the maximum allowable NOL deduction – that is, even though IPO firms are likely subject to the statutory limitation, there is no statistically significant change in the extent to which this limitation prohibits firms from claiming the full amount of tax losses.

Second, we further partition the sample of firms with zero taxable income into three subsamples. The first subsample is comprised of the 612 firm-year observations for the 49 firms that we identify as having a binding statutory limitation. The second subsample includes 4,537 observations for firms that reported positive taxable income in year *t* or *t+1* and claimed the full amount of NOL deduction. That is, these firms had pre-IPO losses, but their post-IPO utilization of these losses does not appear limited. The third subsample includes 10,384 observations for firms that continue to report current tax losses in the year of or immediately following the IPO. We re-estimate Eq. (2) and (4) for these three subsamples using *Positive Taxes Paid* as the dependent variable and report results in Table 6, Panel B.

[13] As the NOL stock data are unavailable in the CDW dataset prior to 2004, the sample size for this regression is smaller than for the main analysis (n=14,617 as compared to 15,645 in Table 5). We assume that the firm would otherwise use all available NOLs and does not forego loss utilization due to tax compliance or behavioral explanations (Zwick and Mahon, 2017). This assumption is plausible given the number of tax advisors and consultants involved during the IPO process.

Columns (1) and (2) report results for the subsample that appears to have a binding statutory limitation. We observe, as expected, a large 29.6 to 62.7 percentage point increase in the probability of paying taxes. This effect confirms that these firms indeed drive some of the positive effects observed in Table 5, Panel A. However, we also observe positive coefficients in Columns (3) and (4) for the much larger subsample of firms that do not appear to have a binding NOL limitation. The coefficients imply a substantial 28.0 to 39.6 percentage point increase in the likelihood of paying taxes in this sample, suggesting that the statutory limitation cannot entirely explain the increased post-IPO tax burden. The final columns of Table 6, Panel B report results for the large proportion of firms that continue to have tax losses in year *t* and *t*+1. We observe weak negative coefficients, implying either no change (Column (5)) or a decrease (Column (6)) in the probability that a firm pays taxes attributable to the continued tax loss position of these firms. Inferences across all columns hold when alternatively using *Tax/Sales* or *Tax/Pre-NOL Taxable Income* as the dependent variable.

In summary, the results in Tables 4 through 6 demonstrate that 1) on average, tax payments increase post-IPO, 2) firms reporting or using pre-IPO losses appear to be the principal subsample exhibiting this increase, and 3) while the U.S. statutory limitation on loss utilization partially explains this effect, in practice there are a small number of firms for which this limitation appears to bind. A prominent subsample of firms either reporting or using pre-IPO losses also exhibit positive increases in the likelihood and amount of tax payments, and this effect does not appear to be explained by the U.S statutory limitation.

## 5. Results: Economic Drivers of Changes in Tax Payments

We next empirically test the four economic factors that we predict are associated with changes in tax payments: (i) investment and employment responses; (ii) financial reporting incentives; (iii)

agency issues; and (iv) tax planning. Given the differing tax payment effects based on the existence or use of pre-IPO losses, we continue to report results across two different subsamples.

*5.1 Investment in Capital and Labor*

Table 7 reports results from studying whether firm's investment and employment activities change after the IPO transaction. Panels A and B report results for the five measures for firm investment activity: *Investment/Tangible Capital Assets* (Columns (1)-(2)), a decomposition of these measures (*Investment excl. R&D/Tangible Capital Assets* in Col. (3)-(4) and *R&D Investment/Tangible Capital Assets* in Col. (9)-(10)), and separation of total investment into short-term and long-term measures (*Short-term Investment/Tangible Capital Assets* in Col. (3)-(4) and *Long-Term Investment/Tangible Capital Assets* in Col. (5)-(6)).

We observe that firms reporting or using pre-IPO tax losses report statistically significant *decreases* in total investment in Panel A. Further inspection of the coefficients across the columns suggests that these effects are driven primarily by declines in short-term investment (Columns (5)-(6)) and R&D investment (Columns (9)-(10)). In contrast, we observe weak evidence of an increase (Column (7)) or no change (Column (8)) in long-term investment in these firms.

The pattern is similar in Panel B, although the statistical significance of the effects is slightly weaker. That is, we observe evidence of decreased short-term and R&D investment in Columns (6), (9), and (10), and some weak evidence of an increase in long-term investment in Column (7). Thus, despite the earlier results that suggest differing effects across the subsamples formed based on year *t*-1 income, these results imply that completing firms appear to reduce short-term investment and R&D post-IPO, relative to the sample of withdrawing firms.

Panels C and D report results for employee compensation deductions (*Emp Comp/Sales*) in Columns (1)-(2) and officer's compensation deductions (*Officer's Comp/Sales*) in Columns (3)-

(4). In these panels, we do observe differing results across the subsets of firms based on year *t*-1 income, with substantial decreases across all four columns in Panel A. However, we observe no changes in Panel B, meaning that there is no change in depreciation and compensation deductions as a percentage of sales.[14]

These results suggest that any change in taxable income by firms reporting or using losses pre-IPO (firms in Panel A) is not driven by increased real activity that also drives greater firm profits and taxable income. Instead, it appears that the effects could be (at least in part) attributalbe to *decreases* in specific tax deductions tied to investment and, for the subset of firms reporting or using tax losses, employment. Even within the subsample of firms with positive pre-IPO taxable income, we do not observe the predicted increased investment and employment that presumably is one of the central reasons for the firm to IPO.

*5.2 Changes in financial reporting incentives*

We conduct two tests to examine the role of financial reporting incentives in driving the documented tax effects in the post-IPO period. First, we map the distribution of pre-NOL income (Form 1120, Line 28) in both the pre- and post-IPO period for the full sample of firms to assess if the distribution of pre-NOL income changes. The purpose of this analysis is to assess descriptively how taxable income changes for completing firms relative to withdrawn firms. Figure 5, Panels A and C show these figures for completed firms, whereas Panels B and D show these for the firms that withdrew their IPO filing. In each figure, we map the distribution during the pre-filing period (dashed line) against the distribution for the post-filing period (solid line). Panels A and B presents

[14] One explanation for the decreased employee compensation deductions in Panel (A) could be that these firms report a large stock option deduction in the final tax year prior to the IPO (when pre-existing options vest and are exercised), such that any compensation deduction in future years is mechanically lower. However, this effect should occur across both samples and thus does not appear to be the explanation for the differing effect in these two panels.

the densities in a window of -$3 million to $3 million of pre-NOL income; Panels C and D uses a -$10 million to $10 million window.

In all figures, we observe that the peak of the distribution in the pre-filing period is immediately below the zero pre-NOL taxable income threshold, implying that a large proportion of sample firms report relatively small tax losses. For the firms that withdraw their IPO filing in Panels B and D, we observe that the distribution as mapped by the solid line does not appear to change in the post-filing period regardless of the range that is used. That is, withdrawn firms continue to report relatively small tax losses after filing for, and then subsequently withdrawing, their IPO filing. However, we observe that the distribution for completing firms changes after the IPO filing, particularly when focusing on the more narrow range between -$3 million to $3 million in Panel A. We observe two specific changes. First the peak of the distribution shifts left, implying that, among the firms that report losses in the post-IPO period, the magnitude of the losses is greater relative to the pre-IPO period. Second, the distribution appears flatter, with less bunching around the $0 threshold. Panel C also offers suggestive evidence of a slightly fatter distribution, with slightly more firms reporting positive taxable income in the post-IPO period based on where the dashed and solid lines cross. While this cannot be explained by reporting incentives alone, it does suggest notable shifts in the distribution of firms' pre-NOL income that are associated with the IPO.

Second, we use a regression framework to explicitly test whether and to what extent domestic financial statement income changes in the post-IPO period. Unlike taxable income that reflects specific policy goals and incentives, financial statement income is intended to capture a firm's true economic performance; indeed, on this basis, there has been much concern about the loss of earnings informativeness if firms are required to confirm their book and tax income

(Atwood, Drake, and Myers, 2010; Hanlon, Laplante, and Shevlin, 2005; Hanlon, Maydew, and Shevlin, 2008; Hanlon and Maydew, 2009). Examining whether and to what extent financial reporting income changed is a first step in assessing if greater taxable income and tax payments are a function of the post-IPO firm's financial reporting incentives, or if instead changes in post-IPO tax payments are driven primarily by amounts reported only for tax purposes.

Table 8 reports results from directly testing whether firms report a change in financial statement income in the post-IPO period. Columns (1) and (2) in each panel report results using *Pre-tax Financial Income/Sales*, which is equal to the amount of pre-tax financial statement income, scaled by total sales on the U.S. income tax return (Form 1120, Line C). Columns (3) and (4) report results after scaling by total lagged assets.

In Panel A, we see that those firms that had or used tax losses in the pre-IPO period do indeed have higher financial reporting income in the post-IPO period based on the statistically significant coefficients. Coupled with the lack of investment and employment results in Table 7 for this same subsample, these results imply that financial performance is likely unaffected by increased real activity occurring in the post-IPO firm; rather, the increased financial performance may be attributable, at least in part, to reductions in short-term investment and R&D, consistent with real earnings management (Roychowdhury, 2006). Observing these increases in financial reporting income also further mitigates the concerns that the effects are driven by specific tax items associated with the IPO, such as the imposition of statutory tax loss limitations or changes in stock compensation deductions.

We then compare these effects to the amount of taxable income reported by firms; Columns (5) and (6) report results for *Pre-NOL Taxable Income/Sales,* and Columns (7) and (8) report *Pre-NOL Taxable Income/Assets*. The purpose of this analysis is to assess how much of the increase

in taxable income relates to changes in financial reporting income. To the extent that taxable income exhibits similar effects, it suggests that any increase is attributable to changes in either economic performance or financial reporting incentives as seen in Columns (1) through (4).

We find coefficients that appear very similar to those for the analogous financial reporting measures. For example, the coefficient of 0.962 in Column (5) is similar, but appears slightly smaller, to the coefficient in Column (1) of 1.108. We also find similarly sized coefficients when scaling by assets. While the magnitude of the increase in pre-NOL income as a share of sales is large, they imply moderate increases relative to standard deviation changes. The effects measured in the OLS regressions represent about a quarter of a standard deviation change in pre-NOL taxable income/sales in the sample and about a half of a standard deviation change in pre-NOL taxable income/lagged assets.

In contrast, we continue to observe little statistical significance in Panel B across the same measures of both financial statement income (Columns (1)-(4)) and taxable income (Columns (5)-(8)). While we see positive coefficients in three of the four columns for financial statement income, only one coefficient is statistically significant, and that effect is not robust to the IV estimation in Column (4). One interpretation of these results is that firms who were already reporting positive taxable income have relatively smaller shifts in reporting incentives once the firm goes public. This interpretation would be consistent with the fact that we also observe little effect for the taxable income measures in Columns (5) through (8). Much more analysis is necessary to further evaluate and confirm the interpretation of these findings and assess whether the increased income can be attributed to financial reporting incentives.

*5.3 Changes in corporate ownership and agency issues*

We next examine whether the increase in tax payments is related to increased agency issues in the firm. Results are presented in Table 9 after partitioning the sample based on the number of reported owners in the post-IPO period. For presentation purposes, we report only the IV estimates; results are consistent when estimated using OLS.

In Columns (1) and (2) in both panels, we observe no different patterns based on whether the firms had few or many shareholders in the post-IPO period. That is, the increased (decreased) likelihood of paying taxes for firm with zero taxable income in the pre-IPO period (positive taxable income) does not vary across these two columns in Panels A and B, respectively. However, in Panel A, we find some limited evidence suggesting that the amount of tax payments may be different based on post-IPO ownership. We observe statistically significant coefficients in Columns (4) and (6), although the coefficients do not appear significantly different from those in Columns (3) and (5). We observe no statistical significance in Columns (3)-(6) in Panel B, suggestive of difference in tax payments based on post-IPO ownership.

*5.4 Tax Planning*

The final analyses provides an initial assessment of whether firms exhibit changes in tax planning behavior post-IPO. We first present results in Columns (1)-(2) examining the amount by which a firm uses interest tax shields to offset taxable income; specifically, we re-estimate Equations (2) and (4) after replacing the dependent variable with *Interest Deduction/Sales*. Across both subsamples of firms based on year *t-1* taxable income, we find a decrease in the amount of interest deductions. While this could reflect a notable and intentional capital structure shift that is a function of the IPO transaction itself (increasing equity and relying less on debt), the effect is a reduction in the amount of interest tax shields in the post-IPO periods. The coefficients and effects are weaker in Panel B.

We also calculate a cash ETR, where the numerator is the same as that used in Tables 4-6 (cash taxes from Form 1120, Page 1), and the denominator is financial statement income as reported on the tax return. Because this measure requires positive financial statement income, the sample used is much smaller; for example, in Panel A, the sample is approximately 23 percent of the total sample of firms that report or use losses in year *t-1*. However, we use this measure because it is an accepted measure of tax avoidance and because it permits comparison with other findings in the literature.

In Panel A, we observe no statistically significant coefficient for cash ETRs, implying no change after the IPO. However, for the firms that reported positive taxable income in the pre-IPO in Panel B, we observe negative coefficients. This indicates that these firms have a 2.7-5.6 percentage point *decline* in the cash ETR post-IPO. Given the average ETR of 18.0 percent, this is equivalent to a 15.0-31.1 percent decrease. Thus, the evidence across Tables 8 and 10 implies little change in the profitability for these firms, but possibly increased tax avoidance.

*5.5 Robustness*

We present robustness to the main results on tax payments in Table 11, where Panel A presents results for *Positive Taxes Paid*, and Panel B shows results for *Taxes/Sales.* Column (1) repeats results for the main specification as shown in Table 4 for ease of comparison; the remaining columns present coefficient estimates for five alternatives. First, we provide results for two larger samples that impose less stringent data requirements: (i) a sample that does not require a firm to have observations in year *t-1*, *t*, and *t+1* (n=29,502), and (ii) a sample that only requires a firm to be present in year *t-1* and year *t* (n=23,071). We next provide results in Columns (4) through (6) for balanced samples with more stringent data requirements over varying pre- and post-period years. We find the results and magnitudes are generally robust to these changes.

## 6. Conclusion

This paper studies the extent to which U.S. tax payments change around U.S. IPOs and the economic drivers of these changes. Using confidential corporate tax data for a large sample of firms that completed and withdrew IPOs between 1996 and 2016, we find similar tax paying trends for firms that complete vs. withdraw an IPO prior to filing. However, after the IPO, we find a pronounced increase in both the probability that a firm pays taxes and the amount of tax payments. Additional tests demonstrate that this increased probability occurs in those firms that reported or used a loss in the pre-IPO period, and that the change is not driven by a U.S. statutory limitation.

We then test four economic reasons for the change in tax payments. Surprisingly, we find little evidence that the increase is attributable to increased investment and employment; in fact, we observe *decreases* in short-term investment activity suggestive of real earnings management activity. We find that the increased taxable income mirrors increases for financial reporting purposes, consistent with the explanation that the change is (at least in part) attributable to financial reporting incentives. There is some limited evidence that the effects occur in firms with relatively greater changes in shareholding and (possibly) greater agency concerns.

There has been a striking decline in publicly listed firms in the United States in the past two decades, which has raised questions about the reasons for the decline and about the potential consequences of fewer public firms. One critique has been the important constraints imposed by the capital market – so much so that it is has sparked interest in a new "long term stock exchange" to minimize managerial short-termism. Our results document the transition from private to public status and demonstrate the important role that the capital markets play in affecting both firms' financial statement and tax reporting decisions.

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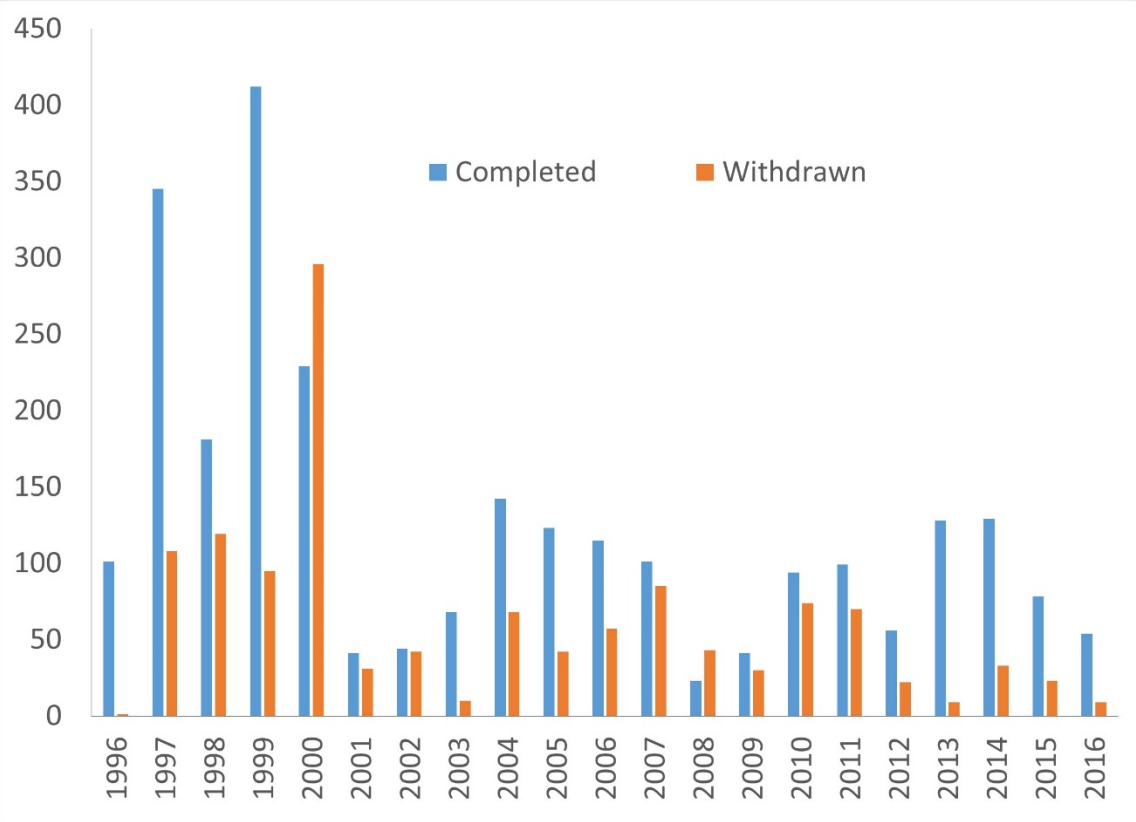
**Appendix A: Variable Definitions**

Note: All data are sourced from the IRS unless otherwise noted.

| | |
|---|---|
| *Sales* | Form 1120: Main Page, line 1c |
| *Sales Growth Rate* | Percent change in *Sales* from the prior year to the current year |
| *Total Assets* | Form 1120: Schedule L, line 15 (column d) |
| *Total Assets Growth Rate* | Percent change in *Total Assets* from the prior year to the current year |
| *Pre-NOL Taxable Income* | Form 1120: Main Page, line 28 |
| *Special Deductions* | Form 1120: Main Page, line 29b |
| *Taxable Income* | Form 1120: Main Page, line 30 |
| *Positive Taxable Income?* | Indicator variable equal to 1 if *Taxable Income* is greater than zero |
| | |
| | |
| *Pre-NOL Taxable Income/Sales* | *Pre-NOL Taxable Income / Sales* |
| *Pre-NOL Taxable Income/ Assets* | *Pre-Interest Income* scaled by *Total Assets* from the prior year |
| *Interest Paid* | Form 1120: Main Page, line 18 |
| *Pre-tax Financial Income* | When a firm reports attaching a Schedule M-3 to the Form 1120 (Box A4), *Pre-tax Financial Income* is measured as net income (loss) per income statement of includible corporations (Form 1120: Schedule M-3, Part I, line 11) + U.S. current income tax expense (Form 1120: Schedule M-3, Part III, line 1) U.S. deferred income tax expense (Form 1120: Schedule M-3, Part III, line 2). When a firm does not report filing a Schedule M-3 or in the years the Schedule M-3 was not utilized, the *Pre-tax Financial Income* is measured as net income (loss) per books (Form 1120: Schedule M-1, line 1) + Federal income tax per books (Form 1120: Schedule M-1, line 2), |
| *Pre-Tax Financial Income/Sales* | *Pre-tax Financial Income/Sales* |
| *Pre-Tax Financial Income/Assets* | *Pre-Tax Financial Income* scaled by *Total Assets* from the prior year |
| *Interest Deduction/Sales* | Form 1120: Main Page, line 18/Sales |
| *Employee Compensation/Sales* | Salaries and Wages (Form 1120: Main Page, line 13) + Pension Plans (Form 1120: Main Page, line 23) + Employment Benefit Programs (Form 1120: Main Page, line 24)/*Sales* |
| *Officer Compensation/Sales* | Compensation of Officers (Form 1120: Main Page, line 7)/*Sales* |
| *Depreciation/Sales* | Form 1120: Main Page, line 20/Sales |
| *Investment/Tangible Capital Assets* | Form 4562/ Form 1120: Schedule L, line 22b (column d)) |

| | |
|---|---|
| *Equity* | Equity Capital Stock (Form 1120: Schedule L, line 22b (column d)) + Additional Paid-in Capital (Form 1120: Schedule L, line 23) |
| *Equity Issuance* | Non-negative increase in *Equity* between the prior year and the current year |
| *Debt* | Form 1120: Schedule L, line 16(d) + line 17(d) + line 18(d) + line 19(d) + line 20(d) + line 21(d) |
| *Equity Financing* | *Equity Issuance* / (*Debt* + *Equity*) |
| *Taxes Paid* | Form 1120: Main Page, Line 31 |
| *Positive Taxes Paid?* | Indicator variable equal to 1 if *Taxes Paid* is greater than zero |
| *Taxes/Sales* | *Taxes Paid/Sales* |
| *Taxes/ Pre-NOL Taxable Income* | *Taxes Paid/Pre-NOL Taxable Income* |
| *Cash Effective Tax Rate (ETR)* | When a firm reports attaching a Schedule M-3 to the Form 1120 (Box A4), the Cash ETR is measured as: *Taxes Paid*/[Net income (loss) per income statement of includible corporations (Form 1120: Schedule M-3, Part I, line 11) + U.S. current income tax expense (Form 1120: Schedule M-3, Part III, line 1) U.S. deferred income tax expense (Form 1120: Schedule M-3, Part III, line 2)]. When a firm does not report filing a Schedule M-3 or in the years the Schedule M-3 was not utilized, the ETR is defined as *Taxes Paid*/[Net income (loss) per books (Form 1120: Schedule M-1, line 1) + Federal income tax per books (Form 1120: Schedule M-1, line 2)] |
| *NOL deduction < max allowable* | Indicator variable equal to 1 if the firm net operating loss deduction (Form 1120, Main Page, line 29a) is less than the maximum allowable NOL deduction. The maximum allowable NOL deduction is defined as the minimum of pre-NOL taxable income (Form 1120: Main Page, line 28) minus special deductions (Form 1120: Main Page, line 29b) and firm net operating loss stock (Form 1120: Schedule K, Line 12) |
| *NASDAQ Return* | Two-month NASDAQ composite return after IPO filing, sourced from the Wall Street Journal and Haver Analytics |
| *Dividend Premium* | Average of the equity dividend premium in the two months following IPO filing, sourced from Jeffrey Wurgler's website |
| *Closed-end Fund Discount* | Average of the closed-end fund discount in the two months following IPO filing, sourced from Jeffrey Wurgler's website |
| *IPO Completed* | Dummy variable equal to 1 for firms that complete an IPO, sourced from SDC Platinum and SEC filings |

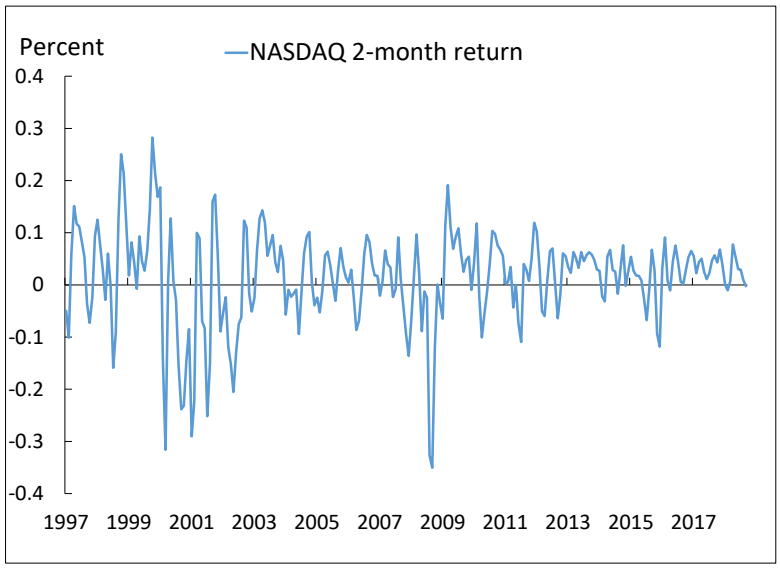
**Figure 1: Completed and Withdrawn IPOs, by Year of Filing**



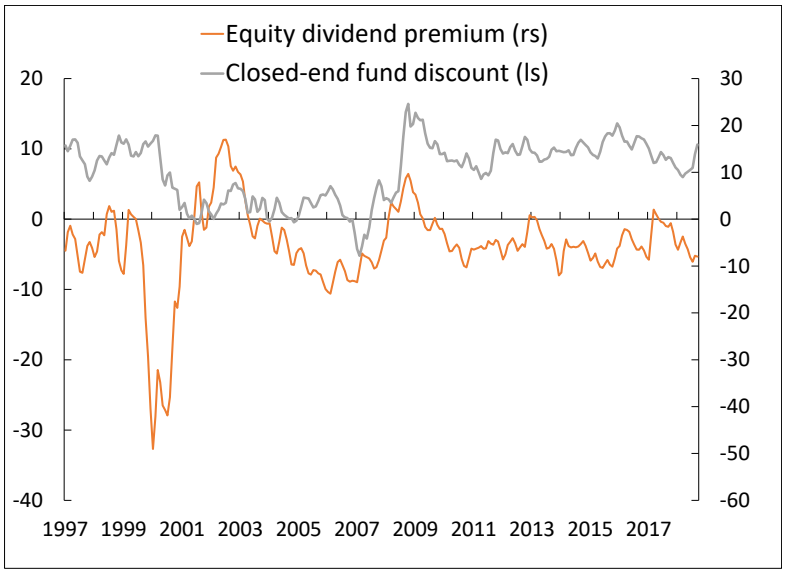

This figure shows the number of firms that completed and withdrew IPOs, by year of filing, for the sample of IPOs for which employer identification numbers of the IPO firms could be collected from the SEC's Edgar database, prior to the merge with the corporate tax return data. Data are sourced from Thomson Reuters SDC Platinum and the SEC.

**Figure 2: NASDAQ Return, Dividend Premium and Closed-End Fund Discount**

*Panel A: NASDAQ Return*



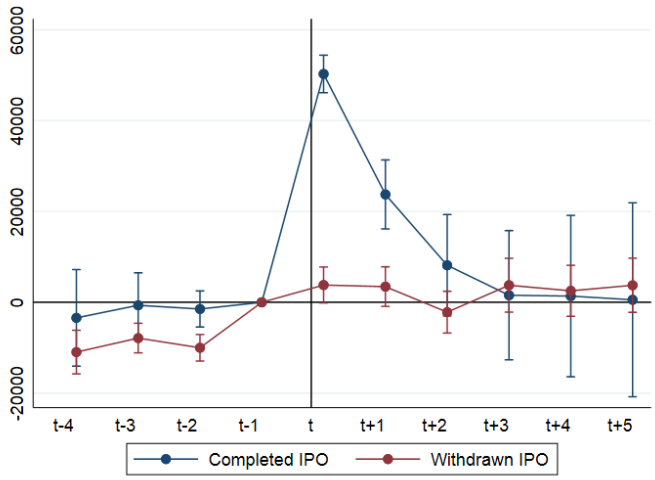

*Panel B: Equity Dividend Premium and Closed-end Fund Discount*



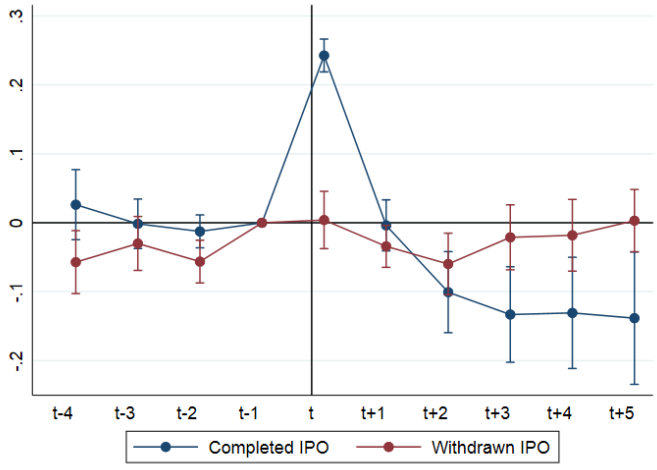

This figure shows the history of the 2-month ahead NASDAQ return (Panel A) and the 2-month-ahead average dividend premium and closed-end fund discount (Panel B), by year. Data on the NASDAQ return are sourced from the Wall Street Journal and Haver Analytics. Data on the dividend premium and the closed-end fund discount are sourced from Jeffery Wurgler's website.

## Figure 3: Equity Issuance and Financing Trends around IPO Filing

*Panel A: Equity Issuance*



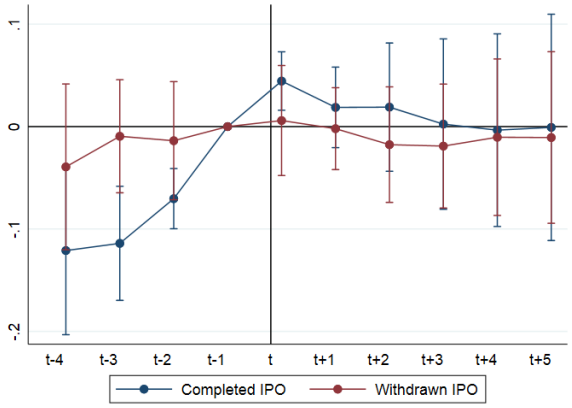

*Panel B: Equity Financing*



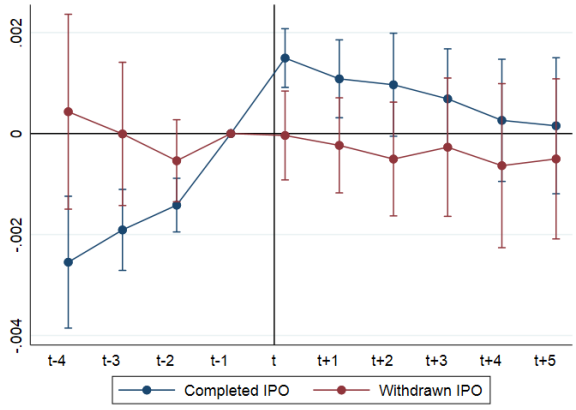

This figure presents trends of equity issuance and equity financing for firms that complete and withdraw an IPO around the year of IPO filing (year *t*). The chart plots coefficients from separately estimating Equation (1) for the samples of firms that either complete an IPO or withdraw their IPO filing; see Section II. Regression coefficients are shown along with 95 percent confidence intervals; the year prior to the IPO filing (year *t*-1) is omitted in estimation, such that coefficient estimates as interpreted as the level relative to this pre-IPO year. All measures are calculated using U.S. tax data and are defined in Appendix A.

## Figure 4: Taxpaying Trends around IPO Filing

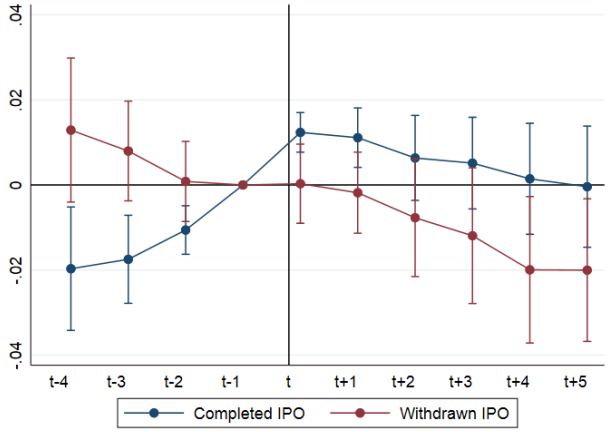
*Panel A: Positive Taxes Paid*




*Panel B: Tax/Sales*

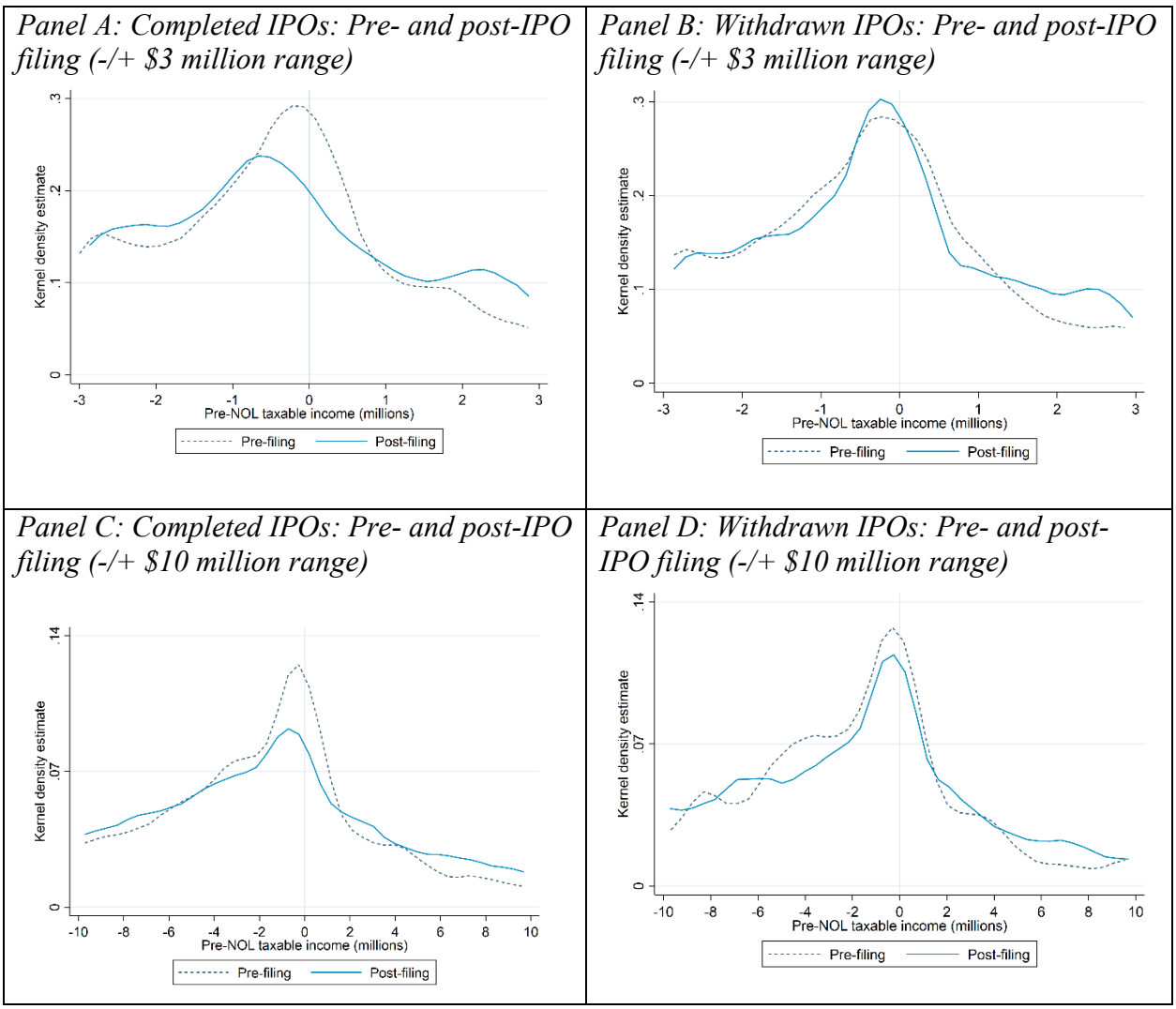



*Panel C: Tax/Pre-NOL Taxable Income*




This figure presents U.S. corporate income tax payment trends for firms that either complete or withdraw an IPO around the year of IPO filing (year *t*). The chart plots coefficients from separately estimating Equation (1) for the samples of firms that either complete an IPO or withdraw their IPO filing; see Section 2. Regression coefficients are shown along with 95 percent confidence intervals; the year prior to the IPO filing (year *t*-1) is omitted in estimation, such that coefficient estimates as interpreted as the level relative to this pre-IPO year. All measures are calculated using U.S. tax data and are defined in Appendix A.

**Figure 5: Bunching behavior around $0 Taxable Income Threshold**




This figure presents estimated kernel densities of firm pre-NOL taxable income. For the kernel density estimation, we use an Epanechnikov kernel and a bandwidth of $300,000 for the figures with a range of +/- $3 million and a bandwidth of $600,000 for the figures with a range of +/- $10 million. Panels (a) and (b) show estimated densities for IPO-withdrawing and IPO-completing firms, respectively. Observations are limited to the four years prior to and eight years after IPO filing. The IPO filing year is omitted.

**Table 1: Summary Statistics**

| | No. Obs | Mean | Median | 10th percentile | 90th percentile | Standard Deviation |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *Tax Variables* | | | | | | |
| Positive taxes paid (0/1) | 21,565 | 0.323 | 0.000 | 0.000 | 1.000 | 0.468 |
| Tax/Sales | 21,565 | 0.006 | 0.000 | 0.000 | 0.024 | 0.013 |
| Tax/Pre-NOL Taxable Income | 21,551 | 0.062 | 0.000 | 0.000 | 0.322 | 0.119 |
| NOL deduction < max allowable | 20,241 | 0.064 | 0.000 | 0.000 | 0.000 | 0.245 |
| Depreciation/Sales | 21,565 | 0.092 | 0.035 | 0.007 | 0.247 | 0.152 |
| Employee Comp/Sales | 21,565 | 0.633 | 0.305 | 0.065 | 1.462 | 0.990 |
| Officer's Comp/Sales | 21,565 | 0.097 | 0.023 | 0.000 | 0.253 | 0.199 |
| Investment/ Tangible Capital Assets | 16,936 | 1.764 | 0.671 | 0.087 | 5.435 | 2.385 |
| Positive Pre-NOL Taxable Income (0/1) | 21,565 | 0.376 | 0.000 | 0.000 | 1.000 | 0.484 |
| Pre-NOL Taxable Income/Sales | 21,565 | -1.322 | -0.061 | -3.698 | 0.130 | 3.474 |
| Pre-NOL Taxable Income/Assets | 19,591 | -0.206 | -0.041 | -0.838 | 0.155 | 0.444 |
| Pre-tax Financial Income/Sales | 18,088 | -1.314 | -0.058 | -3.844 | 0.155 | 3.413 |
| Pre-tax Financial Income/Assets | 18,088 | -0.228 | -0.043 | -0.922 | 0.161 | 0.477 |
| Interest Deduction/Sales | 21,565 | 0.050 | 0.011 | 0.000 | 0.147 | 0.093 |
| Cash effective tax rate | 7,142 | 0.178 | 0.109 | 0.000 | 0.411 | 0.212 |
| Taxes paid ($Thousands) | 21,565 | 1925.559 | 0.000 | 0.000 | 6638.719 | 5154.328 |
| Pre-NOL Taxable Income ($Thousands) | 21,565 | -625 | -2,279 | -35,925 | 36,707 | 34,246 |
| Taxable Income ($Thousands) | 21,565 | 6,892 | 0.000 | 0.000 | 24,197 | 18,386 |
| Pre-tax Financial Income | 18,088 | -1,666 | -4,051 | -53,842 | 53,583 | 50,519 |
| *Other Firm Characteristics* | | | | | | |
| Total assets ($Thousands) | 21,565 | 380,484 | 84,316 | 5,494 | 1,164,706 | 700,438 |
| Asset growth rate | 19,591 | 0.365 | 0.081 | -0.305 | 1.545 | 0.826 |
| Sales ($Thousands) | 21,565 | 247,952 | 54,980 | 1,620 | 804,164 | 434,096 |
| Sales growth rate | 19,591 | 0.574 | 0.156 | -0.298 | 1.969 | 1.267 |
| Equity issuance ($Thousands) | 21,565 | 26,159 | 3,772 | 0.000 | 94,212 | 47,026 |
| Equity financing | 18,081 | 0.151 | 0.036 | 0.000 | 0.557 | 0.227 |

This table presents summary statistics for the main analysis sample as described in Section 3. Variable descriptions are included in Appendix A. Data source is the Statistics of Income division of the Internal Revenue Service and authors' calculations. All percentile estimates are averages of the 10 observations around the percentile cutoff to preserve tax filing confidentiality.

## Table 2: Pre-IPO Filing Firm Characteristics

| | Completed IPO | | | Withdrawn IPO | | | Diff. in Means | |
|---|---|---|---|---|---|---|---|---|
| | No. Obs | Mean | Std. Dev | No. Obs | Mean | Std. Dev | Diff | P-value |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sales growth | 990 | 1.21 | 1.62 | 374 | 1.37 | 1.71 | -0.155 | 0.403 |
| Asset growth | 990 | 0.75 | 0.99 | 374 | 0.88 | 1.08 | -0.127 | 0.152 |
| Positive Pre-NOL Taxable Income (0/1) | 1,300 | 0.38 | 0.48 | 466 | 0.31 | 0.46 | 0.069 | 0.005 |
| Pre-NOL Taxable Income/Sales | 1,300 | -1.58 | 3.70 | 466 | -2.02 | 4.20 | 0.444 | 0.081 |
| Pre-NOL Taxable Income/Assets | 990 | -0.32 | 0.57 | 374 | -0.44 | 0.64 | 0.113 | 0.014 |
| Positive Taxes Paid (0/1) | 1,300 | 0.35 | 0.48 | 466 | 0.28 | 0.45 | 0.066 | 0.008 |
| Taxes/Sales | 1,300 | 0.01 | 0.01 | 466 | 0.00 | 0.01 | 0.002 | 0.012 |
| Taxes/Pre-NOL Taxable Income | 1,298 | 0.07 | 0.12 | 466 | 0.05 | 0.11 | 0.014 | 0.020 |

This table presents firm characteristics in the year prior to filing for an IPO for firms that ultimately complete an IPO and firms that ultimately withdraw the IPO. Columns (1) and (4) present the number of observations in the pre-filing year for firms that complete and withdraw, respectively. Columns (2) and (5) present the associated means, and Columns (3) and (6) present the associated standard deviations. Column (7) presents the difference in means, and Column (8) presents an industry-adjusted p-value for the difference between the two sample means. Variable descriptions are presented in Appendix A.

## Table 3: First-Stage Results

| **Dependent var:** | **IPO Completed** |
|---|---|
| | (1) |
| NASDAQ return | 0.730*** |
| | [0.0883] |
| Closed-end fund discount | 0.0639*** |
| | [0.00206] |
| Dividend premium | -0.00416*** |
| | [0.00153] |
| Year Fixed Effects | + |
| Firm Fixed Effects | + |
| Observations | 21,565 |
| R-squared | 0.331 |

This table presents results from estimating Equation (3), the first-stage specification for IPO completion. The regression sample includes firms that completed and withdrew an IPO from 1997 to 2016. The instruments included in the first-stage regression are the 2-month NASDAQ composite return post-IPO filing, the 2-month average equity dividend premium post-filing, and the 2-month average closed-end fund discount post-filing. Variables are defined in Appendix A. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major 3-digit industry level and are reported in brackets. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

## Table 4: Post-IPO Tax Payments

| Dependent var: | Positive Taxes Paid | | Taxes/Sales | | Taxes/Pre-NOL Taxable Income | |
|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| IPO Completed*Post | 0.0640*** | 0.0779*** | 0.00227*** | 0.00170** | 0.0227*** | 0.0167** |
| | [0.0147] | [0.0272] | [0.000514] | [0.000802] | [0.00390] | [0.00738] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 21,565 | 21,565 | 21,565 | 21,565 | 21,551 | 21,551 |
| R-squared | 0.032 | 0.0323 | 0.0182 | 0.0183 | 0.019 | 0.0193 |

This table presents results for the effect of completing an IPO on measures of tax payments. The odd columns present OLS coefficients from estimating Equation (2), and the even columns present the IV results from Equation (4), using the 2-month NASDAQ return post-IPO filing, the 2-month average equity dividend premium post filing, and the 2-month average closed-end fund discount post filing as instruments. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

## Table 5: Post-IPO Tax Payments

*Panel A: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| **Dependent var:** | **Positive Taxes Paid** | | **Taxes/Sales** | | **Taxes/Pre-NOL Taxable Income** | |
|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| IPO Completed*Post | 0.0895*** | 0.112*** | 0.00139*** | 0.000911 | 0.0161*** | 0.0111* |
| | [0.0223] | [0.0309] | [0.000499] | [0.000679] | [0.00402] | [0.00610] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 15,645 | 15,645 | 15,645 | 15,645 | 15,637 | 15,637 |
| R-squared | 0.041 | 0.043 | 0.019 | 0.017 | 0.022 | 0.020 |

*Panel B: Firms with Positive Taxable Income in Pre-IPO Filing Year*

| **Dependent var:** | **Positive Taxes Paid** | | **Taxes/Sales** | | **Taxes/Pre-NOL Taxable Income** | |
|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| IPO Completed*Post | -0.0329 | -0.191*** | 0.00349*** | -0.000718 | 0.0299*** | -0.016 |
| | [0.0231] | [0.0704] | [0.00127] | [0.00271] | [0.00991] | [0.0223] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 5,920 | 5,920 | 5,920 | 5,920 | 5,914 | 5,914 |
| R-squared | 0.042 | 0.037 | 0.027 | 0.026 | 0.037 | 0.041 |

This table presents estimates of the effect of completing an IPO on measures of tax payments. The odd columns present OLS coefficients from estimating Equation (2), and the even columns present the IV results from Equation (4), using the 2-month NASDAQ composite return post-IPO filing, the 2-month average equity dividend premium post filing, and the 2-month average closed-end fund discount post filing as instruments. Panel A shows results for the sample of firms with zero taxable income (Form 1120, line 30) in the year prior to IPO filing due to either a tax loss in that year or utilization of an NOL Carryforward; Panel B shows results for the sample of firms with positive taxable income in the year prior to IPO filing. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

## Table 6: Post-IPO Section 382 NOL Limitation

*Panel A: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| ***Dependent var:*** | **NOL Deduction Less Than Max Allowable** | |
|---|---|---|
| | OLS | IV |
| | (1) | (2) |
| IPO Completed*Post | 0.0153 | 0.0146 |
| | [0.0115] | [0.0166] |
| Year FEs | + | + |
| Firm FEs | + | + |
| Observations | 14,617 | 14,617 |
| R-squared | 0.0199 | 0.0196 |

*Panel B: Firms with Unclaimed NOL Deductions and Fully Claimed NOL Deductions in IPO Filing Year and Post-IPO Filing Year*

| **Dependent var:** | **Positive Taxes Paid** | | | | | |
|---|---|---|---|---|---|---|
| **Subsample:** | **Unclaimed NOL Deduction** | | **Fully Claimed NOL Deduction** | | **No NOL Deduction** | |
| | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| IPO Completed*Post | 0.296*** | 0.627*** | 0.280*** | 0.396*** | -0.0228 | -0.0269* |
| | [0.0526] | [0.113] | [0.0253] | [0.0425] | [0.0148] | [0.0154] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 612 | 612 | 4,537 | 4,537 | 10,384 | 10,384 |
| R-squared | 0.109 | 0.0781 | 0.0883 | 0.0833 | 0.0206 | 0.0201 |

This table presents results from testing the role of the Section 382 limitation in driving firm's tax payments in the post-IPO period. In Panel A, the dependent variable is an indicator equal to one if a firm claims less than the total amount of NOL that can be taken based on its reported taxable income and its NOL stock. In Panel B, the dependent variable is an indicator equal to one if a firm pays U.S. corporate income taxes. In both panels, the samples are limited to those firms with zero taxable income (Form 1120, Line 30) in the year prior to the IPO filing, either due to a current year tax loss or use of an NOL carryforward. Panel B reports results across three samples: Columns (1) and (2) report results for a sample that claimed less than the maximum amount of NOL deduction (Section 382 limitation is binding); Columns (3) and (4) report reslts for the sample of firms that claimed the maximum amount of NOL deduction (Section 382 limitation is not binding); and Columns (5) and (6) report results for the set of firms with no NOL deduction due to a current year tax loss. The odd columns present OLS coefficients, and the even columns present IV results, using the 2-month NASDAQ composite return post-IPO filing, the 2-month equity dividend premium post filing, and the 2-month closed-end fund discount post filing as instruments. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

**Table 7: Post-IPO Investment and Employment**

*Panel A: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| ***Dependent Var:*** | **Investment/ Tangible Capital Assets** | | **Investment Ex. R&D/ Tangible Capital Assets** | | **Short-Term Investment/Tangible Capital Assets** | | **Long-Term Investment/Tangible Capital Assets** | | **R&D Investment/Tangible Capital Assets** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | OLS | IV | | | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| IPO Completed*Post | -0.487*** | -0.864*** | -0.0600** | -0.173*** | -0.0621*** | -0.157*** | 0.0120* | 0.00646 | -0.322*** | -0.457*** |
| | [0.101] | [0.117] | [0.0257] | [0.0498] | [0.0212] | [0.0452] | [0.00618] | [0.00914] | [0.0914] | [0.104] |
| Year FEs | + | + | + | + | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + | + | + | + | + |
| Observations | 12,014 | 12,014 | 12,014 | 12,014 | 12,014 | 12,014 | 12,014 | 12,014 | 12,014 | 12,014 |
| R-squared | 0.0278 | 0.028 | 0.112 | 0.111 | 0.108 | 0.108 | 0.0363 | 0.0363 | 0.00736 | 0.00829 |

*Panel B: Firms with Positive Taxable Income in Pre-IPO Filing Year*

| ***Dependent Var:*** | **Investment/ Tangible Capital Assets** | | **Investment Ex. R&D/ Tangible Capital Assets** | | **Short-Term Investment/Tangible Capital Assets** | | **Long-Term Investment/Tangible Capital Assets** | | **R&D Investment/Tangible Capital Assets** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | OLS | IV | | | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| IPO Completed*Post | -0.192* | -0.418** | -0.0246 | -0.141** | -0.0468 | -0.166*** | 0.0123* | 0.0172 | -0.163** | -0.260** |
| | [0.102] | [0.169] | [0.0367] | [0.0632] | [0.0304] | [0.0563] | [0.00663] | [0.0115] | [0.0664] | [0.102] |
| Year FEs | + | + | + | + | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + | + | + | + | + |
| Observations | 4,922 | 4,922 | 4,922 | 4,922 | 4,922 | 4,922 | 4,922 | 4,922 | 4,922 | 4,922 |
| R-squared | 0.0127 | 0.0119 | 0.0497 | 0.0454 | 0.0524 | 0.0456 | 0.00977 | 0.00954 | 0.00666 | 0.00643 |

This table presents estimates of the effect of completing an IPO on corporate investment activity, measured using information reported on IRS Form 4562 (Depreciation and Amortization) and IRS Form 6765 (R&D Tax Credit), and corporate employment activity, measured using corporate tax deduction. Panels (A) and (B) include analyses of corporate investment; Panels (C) and (D) include analyses of corporate employment. In Panels A and B, Columns (1) and (2) report results examining total investment (fixed and R&D) scaled by tangible capital assets; Columns (3) and (4) exclude R&D from the ratio. Columns (5)-(10) report results using components of investment, including short-term investment (Columns (5)-(6)), long-term investment (Columns (7)-(8)), and R&D investment (Columns (9) and (10)). The odd columns present OLS coefficients from estimating equation (2), and the even columns present the IV results from equation (4), using the 2-month NASDAQ return post-IPO filing, the 2-month average equity dividend premium post filing, and the 2-month average closed-end fund discount post filing as instruments. Panel A shows results for the sample of firms with zero taxable income (Form 1120, line 30) in the year prior to IPO filing, due to either a current year tax loss or use of NOL carryforward; Panel B shows results for the sample of firms with positive taxable income in the year prior to IPO filing. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

**Table 7: Post-IPO Investment and Employment (cont'd)**

*Panel C: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| ***Dependent Var:*** | **Employee Comp/ Sales** | | **Officer's Comp/ Sales** | |
|---|---|---|---|---|
| | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) |
| IPO Completed*Post | -0.254*** | -0.461*** | -0.0405*** | -0.0769*** |
| | [0.0396] | [0.0499] | [0.00548] | [0.0126] |
| Year FEs | + | + | + | + |
| Firm FEs | + | + | + | + |
| Observations | 15,645 | 15,645 | 15,645 | 15,645 |
| R-squared | 0.0265 | 0.0299 | 0.0226 | 0.0251 |

*Panel D: Firms with Positive Taxable Income in Pre-IPO Filing Year*

| ***Dependent Var:*** | **Employee Comp/ Sales** | | **Officer's Comp/ Sales** | |
|---|---|---|---|---|
| | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) |
| IPO Completed*Post | 0.0095 | -0.00046 | 0.000994 | 0.00991 |
| | [0.0231] | [0.0561] | [0.00416] | [0.0105] |
| Year FEs | + | + | + | + |
| Firm FEs | + | + | + | + |
| Observations | 5,920 | 5,920 | 5,920 | 5,920 |
| R-squared | 0.00627 | 0.00552 | 0.00186 | 0.000523 |

This table presents estimates of the effect of completing an IPO on corporate investment activity, measured using information reported on IRS Form 4562 (Depreciation and Amortization) and IRS Form 6765 (R&D Tax Credit), and corporate employment activity, measured using corporate tax deduction. Panels (A) and (B) include analyses of corporate investment; Panels (C) and (D) include analyses of corporate employment. In Panels C and D, Columns (1) and (2) report results examining the ratio of employee compensation to sales; Columns (3) and (4) report results examining total officer's compensation/sales. The odd columns present OLS coefficients from estimating equation (2), and the even columns present the IV results from equation (4), using the 2-month NASDAQ return post-IPO filing, the 2-month average equity dividend premium post filing, and the 2-month average closed-end fund discount post filing as instruments. Panel C shows results for the sample of firms with zero taxable income (Form 1120, line 30) in the year prior to IPO filing, due to either a current year tax loss or use of NOL carryforward; Panel D shows results for the sample of firms with positive taxable income in the year prior to IPO filing. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

## Table 8: Post-IPO Financial Income

*Panel A: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| Dependent var: | Pre-tax Financial Income/Sales | | Pre-tax Financial Income/Assets | | Pre-NOL Taxable Income/Sales | | Pre-NOL Taxable Income/ Assets | |
|---|---|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| IPO Completed*Post | 1.108*** | 1.859*** | 0.225*** | 0.327*** | 0.962*** | 1.668*** | 0.204*** | 0.309*** |
| | [0.118] | [0.155] | [0.0300] | [0.0267] | [0.115] | [0.186] | [0.0178] | [0.0238] |
| Year FEs | + | + | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + | + | + |
| Observations | 12,883 | 12,883 | 12,883 | 12,883 | 15,645 | 15,645 | 14,129 | 14,129 |
| R-squared | 0.0345 | 0.035 | 0.139 | 0.137 | 0.031 | 0.034 | 0.123 | 0.123 |

*Panel B: Firms with Positive Taxable Income in Pre-IPO Filing Year*

| Dependent var: | Positive Pre-NOL Taxable Income | | Pre-tax Financial Income/Assets | | Pre-NOL Taxable Income/Sales | | Pre-NOL Taxable Income/ Assets | |
|---|---|---|---|---|---|---|---|---|
| | OLS | IV | OLS | IV | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| IPO Completed*Post | 0.0567 | 0.102 | 0.0369*** | -0.00623 | 0.0605* | 0.107 | -0.0084 | -0.0602* |
| | [0.0422] | [0.120] | [0.0112] | [0.0322] | [0.0354] | [0.146] | [0.00897] | [0.0321] |
| Year FEs | + | + | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + | + | + |
| Observations | 5,205 | 5,205 | 5,205 | 5,205 | 5,920 | 5,920 | 5,462 | 5,462 |
| R-squared | 0.0161 | 0.0144 | 0.0287 | 0.0373 | 0.009 | 0.009 | 0.033 | 0.027 |

This table presents estimates of the effect of completing an IPO on measures of firm profitability measured using domestic financial reporting income and taxable income as reported on the tax return. The odd columns present OLS coefficients from estimating equation (2), and the even columns present the IV results from equation (4), using the 2-month NASDAQ return post-IPO filing, the 2-month average equity dividend premium post filing, and the 2-month average closed-end fund discount post filing as instruments. Panel A shows results for the sample of firms with zero taxable income (Form 1120, line 30) in the year prior to IPO filing, due to either a current year tax loss or use of NOL carryforward; Panel B shows results for the sample of firms with positive taxable income in the year prior to IPO filing. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

**Table 9: Post-IPO Ownership**

*Panel A: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| ***Dependent Var:*** | **Positive Taxes Paid** | | **Taxes/Sales** | | **Taxes/Pre-NOL Taxable Income** | |
|---|---|---|---|---|---|---|
| | < 100 SH | >100 SH | < 100 SH | >100 SH | < 100 SH | >100 SH |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| IPO Completed*Post | 0.0991** | 0.130*** | 0.000871 | 0.00108* | 0.00863 | 0.0155*** |
| | [0.0458] | [0.0290] | [0.00107] | [0.000578] | [0.00913] | [0.00556] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 8,383 | 7,119 | 8,383 | 7,119 | 8,382 | 7,112 |
| R-squared | 0.0264 | 0.0702 | 0.0101 | 0.0345 | 0.0114 | 0.0411 |

*Panel B: Firms with Positive Taxable Income in Pre-IPO Filing Year*

| ***Dependent Var:*** | **Positive Taxes Paid** | | **Taxes/Sales** | | **Taxes/Pre-NOL** | |
|---|---|---|---|---|---|---|
| | < 100 SH | >100 SH | < 100 SH | >100 SH | < 100 SH | >100 SH |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| IPO Completed*Post | -0.175** | -0.190** | 0.0000465 | -0.00129 | -0.00531 | -0.0277 |
| | [0.0865] | [0.0822] | [0.00363] | [0.00303] | [0.0287] | [0.0271] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 3,622 | 2,289 | 3,622 | 2,289 | 3,617 | 2,288 |
| R-squared | 0.0279 | 0.0653 | 0.0267 | 0.0275 | 0.0394 | 0.0435 |

This table presents results from examining whether changes in corporate tax payments differ based on the size of post-IPO firm ownership as a proxy for agency issues. All columns present IV results from equation (4), using the 2-month NASDAQ return post-IPO filing, the 2-month average equity dividend premium post filing, and the 2-month average closed-end fund discount post filing as instruments. Panel A shows results for the sample of firms with zero taxable income (Form 1120, line 30) in the year prior to IPO filing, due to either a current year tax loss or use of NOL carryforward; Panel B shows results for the sample of firms with positive taxable income in the year prior to IPO filing. The sample is partitioned based on whether the firm reports less than (even columns) or more than (odd columns) 100 shareholders in the post-IPO period. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

## Table 10: Post-IPO Tax Planning

*Panel A: Firms with Zero Taxable Income in Pre-IPO Filing Year*

| **Dependent var:** | **Interest Deduction/Sales** | | **Cash ETR** | |
|---|---|---|---|---|
| | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) |
| IPO Completed*Post | -0.0196*** | -0.0250*** | 0.00342 | 0.00236 |
| | [0.00514] | [0.00818] | [0.0157] | [0.0240] |
| Year FEs | | | | |
| Firm FEs | + | + | + | + |
| | + | + | + | + |
| Observations | 15,645 | 15,645 | 3,621 | 3,621 |
| R-squared | 0.0123 | 0.013 | 0.022 | 0.022 |

*Panel B: Firms with Positive Taxable Income in Pre-IPO Filing Year*

| **Dependent var:** | **Interest Deduction/Sales** | | **Cash ETR** | |
|---|---|---|---|---|
| | OLS | IV | OLS | IV |
| | (1) | (2) | (3) | (4) |
| IPO Completed*Post | -0.0108*** | -0.00188 | -0.0273* | -0.0564** |
| | [0.00281] | [0.00471] | [0.0151] | [0.0278] |
| Year FEs | + | + | + | + |
| Firm FEs | + | + | + | + |
| Observations | 5,920 | 5,920 | 3,521 | 3,521 |
| R-squared | 0.011 | 0.007 | 0.033 | 0.033 |

This table presents results from estimating how measures related to tax planning change in the post-IPO period. The odd columns present OLS coefficients from estimating specification (2), and the even columns present the IV results from specification (4), using the 2-month NASDAQ return post-IPO filing, the 2-month equity dividend premium post filing, and the 2-month closed-end fund discount post filing as instruments. Panel A shows results for the sample of firms with positive taxable income (Form 1120, line 30) in the year prior to IPO filing, and Panel B shows results for the sample of firms with zero taxable income in the year prior to IPO filing. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major industry level and are reported in brackets. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.

## Table 11: Robustness of Tax Payment Results to Alternative Samples

*Panel A: Positive Taxes Paid*

| ***Dependent var:*** | **Main Sample** (1) | **Full SOI & CDW Sample** (2) | **Firms in Sample t-1** (3) | **Balanced Panel: t-2 to t+3** (4) | **Balanced Panel: t-2 to t+4** (5) | **Balanced Panel: t-3 to t+4** (6) |
|---|---|---|---|---|---|---|
| IPO Completed * Post | 0.0779*** | 0.0807*** | 0.0742*** | 0.0934*** | 0.107*** | 0.0695* |
| | [0.0272] | [0.0263] | [0.0282] | [0.0339] | [0.0381] | [0.0421] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 21,565 | 29,502 | 23,071 | 6,294 | 6,370 | 5,560 |
| R-squared | 0.032 | 0.033 | 0.033 | 0.028 | 0.033 | 0.038 |

*Panel B: Taxes/Sales*

| **Dependent var:** | **Main Sample** (1) | **Full SOI & CDW Sample** (2) | **Firms in Sample t-1** (3) | **Balanced Panel: t-2 to t+3** (4) | **Balanced Panel: t-2 to t+4** (5) | **Balanced Panel: t-3 to t+4** (6) |
|---|---|---|---|---|---|---|
| IPO Completed * Post | 0.00170** | 0.00209** | 0.00153* | 0.00172* | 0.00165 | 0.00153 |
| | [0.000802] | [0.000837] | [0.000838] | [0.000969] | [0.00100] | [0.00145] |
| Year FEs | + | + | + | + | + | + |
| Firm FEs | + | + | + | + | + | + |
| Observations | 21,565 | 29,502 | 23,071 | 6,294 | 6,370 | 5,560 |
| R-squared | 0.018 | 0.020 | 0.017 | 0.022 | 0.023 | 0.032 |

This table presents robustness of the coefficient estimates for two measures of firm tax payments, as measured using corporate tax data: the indicator *Positive Taxes Paid* (Panel A) and *Tax/Sales* (Panel B). Column (1) in each panel repeats results from the main specification presented in Table 4 for comparison purposes. Column (2) presents results using all data included in the SOI and CDW tax data sample, which includes firms that do not have the requisite data in year *t-1* , t, or t+1. Column (3) shows results for firms with observations in year *t-1* (but not necessarily *t or* t+1*)* relative to the IPO. Column (4) shows results for a balanced panel of firm-year observations for firms that were in the data sample for two years prior to the IPO through three years following the IPO. Column (5) shows results for a balanced panel of firm-year observations for firms that were in the data sample for two years prior to the IPO through four years following the IPO. Column (6) shows results for a balanced panel of firm-year observations for firms that were in the data sample for three years prior to the IPO through four years following the IPO. Regressions include firm and year fixed effects. Variable descriptions are presented in Appendix A. ***, ** and * indicate levels of 1 percent, 5 percent, and 10 percent significance, respectively.