IPOs and Corporate Tax Planning

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***** PRELIMINARY – PLEASE DO NOT CIRCULATE *****

Abstract: How does becoming a publicly listed firm affect tax planning decisions? To examine this question, we compare firms that completed an IPO with a control set of firms 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. 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 but have lower domestic cash effective tax rates. These shifts are not driven solely by non-tax changes in operations or profitability; we observe changes in tax planning behavior, such as reduced bunching of reported taxable income at kinks in the tax schedule. Our results suggest that increased equity ownership and the corresponding agency issues within firms in the post-IPO period have important effects on corporate tax obligations.

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 Paul Landefeld and Bridget Stomberg, conference participants at the National Tax Association Annual 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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I. Introduction

Firms' tax planning strategies have generated considerable public and academic interest in the past several decades, leading to an extensive literature on companies' tax avoidance and tax aggressiveness (Hanlon and Heitzman 2010; Wilde and Wilson 2018). A key finding is that agency issues attributable to the separation of ownership and management are associated with suboptimal levels of tax planning (Hanlon and Slemrod, 2009; Edwards et al. 2016; Hanlon et al., 2015; Armstrong et al., 2015). However, most of the tax planning literature primarily examines well-established public firms with established corporate governance structures that minimize the range of such agency concerns within the cross-section of companies studied. In this paper, we use a panel of U.S. corporate tax filings to examine how the initial expansion of the shareholder group via an initial public offering (IPO)—and the associated substantial change in principal-agent dynamics—affects firm tax planning. Specifically, we (i) study to what extent tax payments and tax-planning actions change following an IPO transaction, (ii) decompose income to determine whether these changes are attributable to explicit tax planning strategies or known post-IPO operational and investment shifts (Bernstein, 2015), and (iii) test whether tax planning strategies vary based on post-IPO agency concerns.

An IPO is a seminal event in the lifecycle of a firm, providing an influx of equity capital and expanding the ownership base, while also subjecting a firm to increased investor scrutiny and public disclosure requirements. Agency theory suggests that these ownership and monitoring changes will have opposing effects on a firm's tax planning. On the one hand, greater separation between ownership and control after an IPO may introduce or exacerbate agency problems such as short-termism (Stein 1989), sub-optimal risk-taking due to managerial career concerns (Holmstrom 1982; Fama and Jensen 1983), empire building tendencies (Baumol 1959), or

expropriation of firm resources (Jensen 1986). These increased agency concerns may result in less optimal tax planning decisions after an IPO. For example, managers may underinvest in corporate tax strategies because they are focused on other operational uses of the capital infusion or pursue overly aggressive tax planning strategies due to greater investor emphasis on short-run corporate profitability. On the other hand, greater public scrutiny of the firm after an IPO may lead to more optimal tax planning, in which a firm balances its level of tax avoidance with both tax and non-tax reputational costs (Hanlon and Slemrod, 2009; Dyreng et al., 2010; Dyreng et al., 2016). Thus, whether and to what extent agency concerns affect post-IPO tax planning is an open question.

Despite these theoretical predictions, there is limited prior work examining how going public alters managerial tax planning decisions (Hoopes et al., 2020). This lack of evidence may be attributable to two factors. The first is an econometric challenge: the decision to complete an IPO filing is endogenous. Indeed, a well-known critique of the IPO literature is that it is difficult to disentangle the effects of capital infusion on firm outcomes from the managerial decision to go public, due to the lack of an appropriate control sample against which to measure effects.

To address this 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, such that both our treatment (IPO-completing) and control (IPO-withdrawing) groups 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 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 control sample, allow us to better isolate the effects of IPO capital infusion and expanded ownership on firms' tax planning decisions.

The second empirical challenge is the limited available data on private firms (Lisowsky and Minnis, 2020), which has constrained researchers' ability to study tax planning in the pre-IPO period. We overcome this by using a panel of confidential U.S. corporate tax returns from both public and private firms. Our data span 1994 through 2018, and we 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 operational factors that may naturally drive changes in tax payments, and they include ownership data that enable empirical tests of agency theory to 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. Following the large literature that studies effective tax rates (ETRs) as a key indicator of firm tax planning, we construct a domestic cash ETR from the tax data. Because the ETR cannot be calculated for a large proportion of IPO firms with tax losses, we also 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 as the denominator, where the latter three are constructed using amounts reported for tax (not financial reporting) purposes.

Across these latter 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 rise after an IPO. The probability of paying taxes rises by approximately 20 to 25 percent for IPO-completing firms, for example, as compared to the IPO-withdrawing firms. However, we find that, for the subsample of firms with positive pre-tax financial reporting income (as obtained from Schedule M-3 of the corporate tax return), cash ETRs decline. This different result appears attributable to the divergence in book and tax income post-IPO as the focus on firm's financial reporting increases.

To examine whether the difference is attributable to (i) changes in firm fundamentals and operating performance as a consequence of going public (Bernstein, 2015), (ii) transaction tax items, such as large income inclusions or limitations on tax losses that mechanically occur because of the IPO, and/or (iii) changes in tax planning strategies, we conduct a number of additional tests.[1] A graphical analysis of profitability trends using sales and income numbers reported on the tax return shows that following an IPO filing, firms that complete and withdraw the filing exhibit similar trends: operating performance peaks in the IPO filing year and subsequently declines for both sets of firms. This suggests that changes in firm fundamentals, such as easier access to financial capital, are not solely driving the observed short- to medium-run increase in tax payments post-IPO.

We then estimate how much of the additional increase in tax payments is attributable to transaction-related items that increase income as compared to specific tax planning or tax reporting

[1] For example, agency theory suggests that firms may engage less in certain tax planning strategies because managers focus on other uses for the funds received by the IPO. An alternative explanation is that higher tax payments reflect the change in firms' reporting incentives and increased focus on reporting higher financial statement income (and, by extension, higher taxes). Finally, managers may sustain or even increase tax planning activities, but some strategies generate higher taxable income in the short run. One example of this is the intercompany sale of domestically created intellectual property to foreign tax havens to facilitate future income shifting activities. Future work will empirically test these different explanations to better isolate the role of agency considerations in this setting.

strategies implemented during or after the IPO process. We first examine how various firm tax deductions change following the IPO. Interestingly, we find that one of the largest changes is a decline in "other" firm deductions, a catch-all category on the U.S. corporate tax return that may include both transactional and tax planning-related items. The second largest post-IPO changes are related to the employee compensation deduction. We do not see particularly large changes related to investment-related or capital structure-related deductions following the IPO.

Second, we directly test a specific tax reporting strategy: bunching in taxable income at the kink where tax liability begins ($0). A growing body of work argues that the tendency of firms and individuals to bunch around kink points in the income tax schedule is suggestive of manipulated tax reporting behavior (Saez, 2010; Coles et al., 2019; Mortenson and Whitten, 2020). Income bunching is similar in spirit to earnings management, whereby firms are motivated to report earnings relative to some threshold (Burgstahler and Dichev, 1997). However, the tax and financial reporting incentives are opposing: firms have incentives to reduce taxable income so as to minimize tax liabilities, as compared to increasing income to meet or beat financial statement earnings expectations. The IPO setting allows us to assess the relative importance of these opposing incentives by observing whether a firm's tax reporting behavior (e.g., propensity to bunch at zero taxable income) changes as it transitions from a private firm (where the primary external reporting is to a tax authority) to a publicly traded company (where the tax authority may become secondary to the public market).

Prior to IPO filing, we indeed observe a stark discontinuity in the density of firms around the zero taxable income kink point, with a disproportionate number of firms reporting small taxable losses. However, after IPO completion, we observe significantly less bunching, consistent with a reduced likelihood that a firm manages its taxable income just below the $0 taxable income

threshold. Meanwhile, in our control group of IPO-withdrawing firms, bunching continues unabated. This test helps to quantify the extent to which financial reporting incentives imposed by capital markets alter tax reporting and reduce a firm's ability to avoid cash tax payments.

Finally, 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 that the increased level of taxes, measured using both the tax to sales ratio and the cash ETR, are concentrated in those firms with relatively larger shareholder groups, suggesting that greater agency issues post-IPO may be driving the tax payment results.

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 large public firms in which the extent of agency concerns has been extensively examined. A notable exception is Badertscher, Katz, and Rego (2013), who study private U.S. firms that publicly report due to issuing publicly traded debt. Their work implies that changes of ownership and control—such as that which occurs around an IPO—indeed affect tax planning. 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 Badertscher, Katz, and Rego (2013) and the multitude of papers studying public firms' tax avoidance. Specifically, we extend this prior work by examining an event in which firms experience substantial changes in ownership and agency issues and documenting the extent to which this change affects manager's tax planning decisions. In so doing,

we also evaluate tax planning strategies of both loss firms and profitable firms, extending the subset of firms often studied by prior literature.

A related paper in the tax-planning literature that compares public and private firms is a recent study by Hoopes et al. (2019). They also use confidential U.S. corporate tax data, but instead of focusing on IPO firms, they compare the tax planning of all public firms to a matched sample of private firms. They find that, on some measures, public firms undertake more tax planning than private firms. This stands somewhat in contrast to our finding of increased tax-paying for post-IPO firms, suggesting that perhaps firms in the transition period around going public have substantially different behavior than private or public firms generally. Our results are consistent with other work providing evidence that public firms are less tax aggressive than private firms. Hanlon, Mills, and Slemrod (2007), for example, show that public firms have lower tax audit adjustments—i.e., lower tax noncompliance—than private firms. DeBacker, Heim and Tran (2015) show a similar result among foreign-owned public and private firms.

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 known operational factors as opposed to explicit tax planning strategies.

Finally, this work contributes to understanding ramifications of the substantial decline in the number of U.S. IPOs in the past two decades. This decline has been a growing concern for

policymakers and has contributed to the diminishing number of public U.S. firms overall (Gao, Ritter, and Zhu 2013; Doidge, Karolyi, Stulz 2017). The potential economic effects of the IPO downtrend are difficult to predict, however, as there is limited empirical evidence to date on the consequences of going public for firm performance or tax-paying behavior. Our results show that the downward trend in firms going public may have meaningful tax consequences, as firms that stay private may engage in more tax planning.

The remainder of the paper proceeds as follows. In Sections II and III we discuss the empirical methodology and data sources, respectively. We present the results of the analysis in Section IV and show robustness of these results in Section V. We conclude in Section VI.

II. Empirical approach

II.A. 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 OLS equation:

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

where Y_{it} includes four measures of tax payments for firm i in year t, which are described below in additional detail, and β_{t+k} captures the average outcome in year $t + k$, adjusting for tax-year and firm fixed effects (γ_τ and δ_i, respectively). We measure time relative to firm i's IPO filing year (t), with year $t - 1$ omitted from the regression. Thus β_{t+k} captures within-firm variation in the dependent variable around the IPO. This analysis shows the evolution of average taxpaying measures by year around the IPO filing date, thus providing descriptive evidence on changes in tax planning behavior for firms that ultimately go public and for firms that stay private.

We construct four measures of U.S. corporate income tax payments. Prior literature primarily uses the corporate effective tax rate as an indicator of planning, and therefore, we first construct the domestic firm cash effective tax rate. An ETR measure is commonly constructed from publicly available financial statement data; specifically, the literature calculates domestic cash ETRs as domestic tax expense divided by pre-tax domestic income. We construct an analogous measure with the available tax return data following the methodology from Hoopes, Langetieg, Maydew and Mullaney (2019). Specifically, the cash ETR is equal to total taxes paid as shown on the corporate tax return, divided by pre-tax income, which we estimate by adding back federal income tax expense (Form 1120, Schedule M-1, Line 2) to reported financial statement Net Income (from Schedule M-1, line 1). However, as the effective tax rate can only be calculated for firms with positive taxable income, we also study three alternative measures so as to capture the tax behavior of loss-making firms: the ratio of taxes paid to sales, the ratio of taxes paid to income, and the probability of paying U.S. taxes.[2] Firm sales and income are amounts reported for tax purposes. Specifically, firm sales are measured using the balance of firm gross receipts—Line 1c on Form 1120. Firm income is firm taxable income before the net operating loss deduction (NOL) and special deductions—line 28. We will refer to firm income as "pre-NOL taxable income" for the remainder of the paper. For taxes paid, we use firm total tax—line 31. Inclusion of loss firms is particularly important in this setting, as these firms represent a considerable proportion of the sample and a substantial fraction of firms in the economy (Henry and Sansing, 2017; Heitzman and Lester, 2020).

II.B Regression analysis of changes in tax payments following an IPO

[2]

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

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

where $Y_{it,}$ γ_τ, and δ_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.

We include firm fixed effects in the regression to control for observable and unobservable time-invariant firm-level characteristics, such as firm size, asset tangibility, or ownership composition. Particularly, these firm fixed effects capture any pre-treatment level of firm 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. Inclusion of these time-varying controls thus may introduce a "bad controls" problem (Angrist and Pischke 2009; Roberts and Whited 2013), potentially biasing estimates of β_1 in the regression. 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 four- or five-digit NAICS codes.[3] Clustering standard errors at the industry level corrects for unobserved error correlation within industries, which is

[3] As firms occasionally change industry over the sample, we use the firm's reported industry in the year prior to the IPO. If the firm is not observed in the pre-IPO year, we include the industry recorded in the first year the firm is observed in the dataset. Additional tests also show that results are robust to alternatively clustering standard errors at the firm level.

particularly important given evidence that industry-level productivity shocks may drive IPO waves (Chemmanur and He, 2011).

Eq. (2) uses firms that withdraw from an IPO as control firms for purposes of estimating the effect of IPO completion; the use of these firms assumes that any observed differences in tax payments are attributable to the effect of becoming a public firm, which is the effect that we intend to capture. 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. 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). The empirical specifications for the first- and second-stage regressions are as follows:

First stage:

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

Second Stage:

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

where *IPO Completed*, *Post*, Y_{it}, γ_τ, and δ_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 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) shows that market sentiment is an important and distinct determinant of IPO volumes. 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 the 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 IV 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.

In subsequent tests, we further examine the potential drivers of the change in tax payments. Specifically, we re-estimate Eq. (1)-(4), replacing the dependent variable with several measures of profitability, including pre-NOL taxable income as a share of sales and as a share of lagged assets, total taxable income as a share of sales, and the probability of reporting positive pre-NOL taxable income. These tests permit an estimate of the extent to which these profitability items changed and thus could be an important cause for the change in tax payments.

II.C Tests of Heterogeneity Attributable to Variation in Agency Concerns

[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.

Estimation of Eq. (1) through (4) permits a quantification of the extent to which tax payments change post-IPO, where the IPO introduces a substantial shift in the separation of management and control. Prior literature implies that agency issues increase for all firms that complete an IPO, and thus fall firms shift to less optimal planning after the firm has gone public. In additional tests, we examine heterogeneity in the increased tax payments 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 planning.

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

III. Data and Summary Statistics

III.A. 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 1997 and 2016, starting in 1997 because that was the first full 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, ADRs, REITS, closed-end funds, blank-check firms, and unit funds. As tax identification numbers are only available for a limited subset of firms in the SDC IPO sample, we link the SDC IPO observations to the IPO filings registered in the Edgar database (usually the form S-1 filing), following the procedure presented in Lowry, Michaely and Volkova (2017) to scrape the EIN number from the filing, when available. The IPO sample begins with 3,872 unique IPO events from SDC.

We then merge the IPO dataset with the tax data. The tax data are derived from two sources of IRS administrative records from 1994 to 2018. We include several years of tax data around the IPO sample years to gain a more complete picture of the tax and financial performance of firms before and after the IPO. We first use the annual sample of returns cleaned and edited by the Statistics of Income (SOI) division of the IRS (the "SOI sample"). The annual SOI data comprise a stratified sample from the universe of C corporation tax returns. Large corporations, 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 corporate 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 to ensure a more complete history of firm tax planning activity around the IPO.[5]

[5]Although our main sample utilizes all firm-years in the SOI-CDW dataset that meet the data qualifications, we demonstrate robustness to alternative sample choices in Section VI. For example, not all tax variables are available in the CDW (such as Schedule M-3 line items), thereby limiting construction of variables such as the cash ETR to the SOI sample. Therefore, the robustness tests report results after limiting the data to the SOI sample. We also report results using only the subset of our data comprising a balanced panel of firms for various windows around the IPO filing date.

In total, we match 3,031 IPOs to the tax data, merging on employer identification number. 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. The final sample includes 2,849 firms with 2,849 IPO events. Seventy-two percent eventually complete the IPO; twenty-eight percent withdraw. Figure 1 shows the number of completed and withdrawn IPOs per year in our sample. The number of completed IPOs was the highest from 1997 to 2000, with the number of withdrawn IPOs also peaking immediately prior to the 2001 recession.

For the firm-year analysis sample, we drop observations with non-positive values for either gross receipts or total assets (6,913 observations). 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 drop all observations with negative or zero pre-tax income and with a cash ETR greater than one following prior literature (Dyreng et al. 2008). The final sample includes an unbalanced panel of 29,587 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.

III.B. Summary Statistics

Table 1 displays summary statistics on the main sample. Sales (i.e., gross receipts) are highly skewed among these firms, with a mean value (around $260 million) substantially above the median value (around $58 million).[6] Average (median) sales growth of 57 percent (14 percent) is high, reflecting the IPO firm's lifecycle stage. While sales are positive for all firms by construction, we only observe sales growth for 85 percent of observations due to unbalanced nature of the panel. Total assets among our firms are substantial, with mean (median) values of $400 million ($92 million). Annual asset growth rates are also high. The median firm sees 7 percent growth in assets, and the average firm sees 34 percent growth.

The table shows that average equity issuance via the IPO was $29.7 million and equity financing (equity issuance as a share of equity plus debt issuance) was equal to 15.0 percent. Figure 3 shows trends in the level of equity issuance (Panel A) and equity financing (Panel B).[7] 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 1 also shows that most observations in our sample are in a net tax loss position and have zero U.S. corporate income tax liability. Median pre-NOL taxable income is -$2.1 million, and mean pre-NOL taxable income is -$0.4 million. At the 90th percentile, taxable income—which reflects income reported on the tax return after NOL deductions (Form 1120, line 30)—is only $34 million, but the mean for taxable income is around $7 million. Federal taxes paid are similarly skewed, with mean value of $2 million and a value of $10 million at the 90th percentile. The average (median) effective domestic cash tax rate, which is calculated using domestic tax

[6] 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.
[7] The omitted time period in the regression is the year prior to IPO filing (year t-1); therefore, all coefficient estimates are interpreted as the level of a variable relative to the level in the year before filing.

payments divided by firm pre-tax book income estimated from Schedule M-3 reporting, is approximately 18 percent (12 percent), while it is 42 percent at the 90th percentile.

Pre-NOL income as a share of sales is negative for the majority of the sample, with a median value of 6 percent. Mean pre-NOL income-to-sales is over -140 percent in the sample and is over -450 percent at the 10^{th} percentile. Pre-NOL-income as a share of lagged firm assets are similarly negative. For every dollar of a firm's lagged total assets, the average firm generates pre-interest income of -$0.20.

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 withdraw. Columns 1 and 3 present averages of our key outcome variables for completing and withdrawing firms, respectively. Columns 2 and 4 report standard deviations. Column 5 reports the industry-adjusted p-value of the difference between the means for completed and withdrawn IPOs. Firms that withdraw an IPO have more negative operating performance prior to filing than IPO completing firms: pre-NOL income as a share of sales and as a share of lagged assets are lower on average prior to filing for the IPO, as is taxable income as a share of sales. The two groups of firms have similar sales growth in the pre-filing year, however. For taxpaying outcomes, firms that complete an IPO have higher taxes/sales, taxes/pre-interest income and a higher frequency of paying positive taxes than firms that withdrawn an IPO, but similar ETR levels. 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.

IV. Results

IV.A Tax Payments

We begin our analysis of changes in tax planning behavior after the IPO by showing graphical trends for various measures of taxes paid around the IPO filing decision. The graphs are generated from estimating Eq. (1). Figure 4 shows trends for taxes paid as a share of sales, taxes as a share of pre-NOL income, and the fraction of firms paying positive taxes. Firms that complete and withdraw the IPO have similar trends before the IPO. After the IPO filing year, we see a substantial divergence in taxpaying trends. For firms that go public, we see a notable increase in all three measures of taxes paid directly after the IPO; after the first or second year, we then observe tax payments decline. In contrast, tax payments for firms that withdraw remain fairly flat and low, with some (weak) decline several years after the IPO filing. These figures provide suggestive evidence that becoming a public company has notable effects on U.S. corporate tax payments.

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 and have 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 this measure should be 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. Panel A shows results for the full set of firms, including the large proportion of the sample that reports a current year tax loss. Columns (1) and (2) present results using a measure of tax payments to total sales,

Columns (3) and (4) present results where the dependent variable is tax payments to pre-NOL taxable income, and Columns (5) and (6) is an indicator for whether the firm paid positive taxes.

Across the columns, we observe positive and statistically significant coefficients, confirming the graphical evidence that IPO-completing firms exhibit higher taxes paid as a share of both sales and income, as well as a higher probability of paying U.S. taxes. The coefficients of 0.00233 and 0.0235 in Columns (1) and (3), respectively, mean that completing an IPO is associated with a 0.23 percentage point higher cash tax payment per dollar of sales and a 2.35 percentage point higher cash tax payment per dollar of pre-NOL income. We observe similar estimates of 0.211 and 2.12 percentage points from the IV estimation in Columns (2) and (4), respectively. The coefficients in Columns (5) and (6) of 0.0619 and 0.0816 indicate that IPO completion leads to a 6.2 – 8.2 percentage point higher probability that a firm pays U.S. federal taxes. Given that 33.0% of firms on average pay taxes, this is equivalent to an 18.8 – 24.8% increase in the probability that a firm pays taxes.

In Panel B of Table 4, we limit the sample to firms with requisite data to calculate domestic cash ETRs. That is, this sample includes observations with positive pre-tax book income (estimated using Schedule M-3 detail). For this subsample of firms with positive financial performance, we present results for taxes paid as a share of sales and pre-NOL income (Columns (1) to (4)) as well as the domestic cash ETR (Columns (5) and (6)). We observe similar positive coefficients for taxes paid as a share of sales and pre-NOL taxable income for these firms in Columns (1) and (3), suggesting that the results for the full sample are not driven by firms switching from zero taxable income to positive taxable income overall. However, the coefficients for the IV specification in Columns (2) and (4) are no longer statistically significant, suggesting mixed evidence about whether these profitable firms had an increase in tax obligations after the

IPO. Consequently, the coefficient estimates imply a larger range of magnitudes, with 0.00-0.33 percentage point increases in the ratio of taxes paid to sales and 0.00-2.64 percentage point increases in the ratio of taxes paid to pre-NOL income.

Columns (5) and (6) present results for the domestic cash ETR. The negative coefficients indicate that these firms have a 2.1-3.6 percentage point *decline* in the cash ETR post-IPO. Given the average ETR of 18.0%, this is equivalent to an 11.7-20.0% decrease. Because the numerator is the same across all six columns in Panel B (U.S. cash taxes paid during the tax year), these results imply that tax payments are weakly increasing as a proportion of sales and pre-NOL taxable income in this subsample (from Columns (1) through (4)), but decreasing as a proportion of book income (Columns (5)-(6)). One possible explanation to reconcile these results is a divergence in the amount of income reported for financial reporting and tax reasons due to the increased focus on the firm by the capital markets. The next section further examines trends in reported taxable sales and income. Future tests will also attempt to reconcile these differences by using data on specific book-tax differences during both the pre- and post-IPO period.

IV.B Mechanisms driving change in tax payments

The results in Table 4 demonstrate that domestic cash tax payments as a percentage of reported taxable sales and income increase post-IPO. We next examine changes in reported profitability, where we define "profitability" in this section based on reported taxable sales, pre-NOL taxable income and overall taxable income (line 30 of Form 1120—taxable income after NOL and special deductions). The purpose of this analysis is to assess whether the changes in tax payments documented in Table 4 are mechanically related to increased (tax) profitability and other firm fundamentals, increased tax burdens, or both. Profitability could change after an IPO for several reasons. Firms may complete an IPO seeking additional capital to pursue strong growth

opportunities, and as a result they may become more profitable and therefore pay more taxes. There may also be changes in principal-agent dynamics after the IPO, which can affect profitability. On one hand, greater investor scrutiny may increase pressure on managers to focus on short-term profits, potentially leading to distortions in investment policies and reducing long-term profitability (Graham, Harvey, and Rajgopal, 2005; Asker, Farre-Mensa, Ljungqvist, 2015). On the other hand, increased public disclosure and investor scrutiny may boost firm corporate governance, leading to improved operating performance overall.

We re-estimate Eq. (1), replacing tax payments with various measures of performance and firm profitability, pre-NOL taxable income as a share of sales, pre-NOL taxable income as a share of lagged assets, and the probability of reporting positive taxable income. We present the graphs in Figure 5. We generally observe similar trends across all three measures, with higher levels for completing IPO firms in each panel. That is, the blue line plotting the profitability measures for completed IPOs is consistently higher than the red line for withdrawn IPOs, though larger statistical differences are observed between the two sets of firms for income as a share of assets and the probability of reporting taxable income, suggesting some variation in the extent to which profitability changes post-IPO for the completed and withdrawn firms.[8]

We further test these effects by re-estimating Eq. (2)-(4) after replacing the dependent variable with three profitability measures: pre-NOL income as a share of sales, pre-NOL income as a share of lagged assets, and an indicator for whether taxable income is positive or not. Results are presented in Table 5, with the full sample results shown in Panel A and the subsample with

[8] While Figure 5 panel (a) does not indicate that pre-NOL taxable income as a share of sales is statistically different between IPO-completing and withdrawing firms on a year-by-year basis, there are considerably fewer observations in any given year of the regression estimation, lowering power and increasing noise in the regression. The overall trend is suggestive that IPO-completing firms observed higher profitability following the IPO.

non-missing data for ETRs shown in Panel B. The odd columns show OLS results and the even columns present corresponding coefficient estimates from the second-stage IV regressions.

For the full sample of firms, across all measures, we observe positive and statistically significant increases in tax profitability in the post-IPO period, with the magnitude of the results generally becoming stronger after instrumenting for IPO completion across all variables and for both samples. For example, the coefficient of 0.730 in Column (1) and the coefficient of 0.155 in Column (3) mean that IPO completion is associated with a 73.0 percentage point increase in pre-NOL income as a share of sales and a 15.5 percentage point increase in pre-NOL income as a share of lagged 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 represent about a fifth of a standard deviation change in pre-NOL taxable income/sales in the sample and about a third of a standard deviation change in pre-NOL taxable income/lagged assets. This finding that tax profitability rises for IPO-completing firms compared to IPO-withdrawing firms is consistent on the whole with overall evidence on tax profitability trends provided in Figure 5.

In the positive taxable income sample in Panel B, however, we observe the opposite result—profitability based on reported sales and income (for tax purposes) declines for IPO completing firms by all three measures. The divergence in trends suggests that the increases observed in Panel A may be driven by loss firms reported increased profitability post-IPO. The coefficients in Panel B imply a 2.9-4.1 percentage point decrease in return on (taxable) sales and a 2.7-3.8 percentage point decrease in return on assets, with the larger estimates derived from the IV specifications.

Given that profitability appears to increase post-IPO for the full sample of firms, but decline for already-profitable firms, we further examine tax return data to assess whether the underlying

drivers of the changes of profitability are changes in firm fundamentals or are changes linked to tax planning. Specifically, we focus on one measure—pre-NOL income as a share of sales—and examine changes in the deductions that firms claim. In this way, we study how each deduction category as a share of sales contributes to the observed changes in Tables 4 and 5.

We present results for the changes in deductions in Table 6. Panels A and B present results for total deductions and for deductions most clearly related to real activity and capital structure changes—including officer compensation, employee compensation, depreciation deductions and interest deductions—for the full sample of firms and the sample with non-missing ETRs, respectively. Panels C and D show results for the remaining deductions as listed on Form 1120 for the full sample and the ETR sample, respectively, including deductions for rents paid, advertising, taxes and licenses paid, and "other" deductions—a catch-all category that includes items such as travel and meals. Panels C and D also present results for NOL deductions and other "special" deductions that factor into the income tax calculation.[9]

For the full sample of firms, in which we observe an increase in the tax profitability measures, the largest changes are in employee compensation (Panel A) and in the "other" category (Panel C), both of which decline notably (by 0.40 and 0.58 as a share of firm sales, respectively). In additional deductions related to employment and investment, we observe that officer compensation and net depreciation as a share of sales also decline but by much smaller amounts, by about 0.06 and 0.040, respectively, after the IPO. The relatively small change in net depreciation deductions particularly suggests that changes in firm investment behavior is not a first-order effect driving our results following the IPO. Changes in interest deductions have quite a small effect on firm operating performance post-IPO—there is a decline in interest paid as a fraction of sales of about

[9] At present, only our SOI-sample observations have information on rents, repairs, bad debts, taxes paid, and other deductions. We will add this information for CDW-sample observations in future iterations of this research.

0.03. The remainder of deduction categories also show small changes overall, with small declines in deductions for rents, repairs, advertising, taxes paid, and bad debts and no substantive change in deductions for charitable contributions or for the domestic production activities deduction (DPAD). Finally, we observe no statistically significant change in NOL deductions or special deductions claimed.

For the sample of firms with non-missing ETR, we observe total deductions rise and we observe the largest *increases* in officer compensation and employee compensation (Panel B). The remainder of deductions show quite small changes overall.

IV.C Bunching Behavior

To further assess whether the driver of changes in tax payments, we next examine firms' tendencies to bunch at the zero taxable income kink. We define the kink point as the amount where pre-NOL taxable income equals the sum of special deductions plus the stock of NOLs held by the firm. This is the point at which a firm would switch from having zero to positive tax liability assuming it takes the maximum possible NOL deduction, up to its full NOL stock. During our sample period, marginal tax rates change from zero to 15 percent at the kink. Coles et al. (2019) show that small private firms exhibit notable bunching behavior at this kink point.

Figure 6 shows the distribution of firm profits less the NOL stock around the zero taxable income point for firms that complete and withdraw the IPO. The figure depicts estimated kernel densities in a window of -$3 million to $3 million. Panels (a) and (b) show density estimates pre- and post-IPO-filing for IPO-withdrawing and IPO-completing firms, respectively. For the years prior to the IPO, both sets of private firms show considerable bunching around the zero kink point, with a sharp discontinuity in the density of firms from the left to the right side. These graphs exhibit

how firms opportunistically *under-report* income given that the primary authority to which firms report when private is the tax authority.

Once a firm becomes public, reporting of financial statement information becomes as or even more important than reporting to tax authorities. In this context, prior work demonstrates that firms will also opportunistically manage earnings to meet relevant earnings benchmarks. For example, Burgstahler and Dichev (1997) find a sharp discontinuity consistent with firms *over-reporting* income to meet or beat earnings benchmarks. Interesting, we find that in the years following an IPO filing, firms' bunching behavior changes. Specifically, Figure 6 panel (a) shows that the firms that withdrew the filing continue to show a very sharp discontinuity at the zero taxable income point, consistent with the tax authority being the primary body to which these firms report. However, for firms that complete the IPO in panel (b), we observe substantially less bunching after the IPO filing.

There are four possible explanations for this shift in bunching. One possibility is that firms are simply more profitable after the IPO, and they have less ability to manage their tax liabilities below the kink point. The second is that these firms had tax losses that would normally shelter taxable income, but the IPO transaction resulted in a statutory limitation that limited these firms' ability to use losses. Another possibility is that, because public firms manage earnings to meet or beat capital market benchmarks, on average earnings are managed to be higher and they cannot be undone via book-tax differences to facilitate continued bunching. The fourth option is that firms engage in less tax planning following the IPO, thereby increasing corporate tax payments. Future work will empirically test these varying explanations to provide evidence as to the extent each of these explanations explains the change in IPO-completing firms' bunching behavior.

To examine bunching behavior in a regression framework as well, we study the probability that a firm reports profits between three negative income thresholds of pre-NOL income minus special deductions minus the NOL stock: (i) greater than or equal to -$1.5 million and less than or equal to $0, (ii) greater than or equal to -$2.0 million and less than or equal to $0, and (iii) greater than or equal to -$2.5 million and less than or equal to $0. We study these ranges because by visual inspection, this appears to be the region of the firm-year density plot that exhibits a so-called "excess mass" of observations—a larger fraction of observations than would be expected if the density of firms was smooth around the zero tax liability kink point. We find, both in the OLS and IV results shown in Table 7, that for the full sample of firms, firms are substantially less likely to bunch in each of these three ranges after completing the IPO. In the OLS results, firms are about 4.4 to 6.4 percentage points less likely to bunch in this region, while in the IV results, firms are about 8.0 to 11.3 percentage points less likely to bunch. Given that bunching behavior is derived from firm's incentives to reduce tax liability to zero, observing less bunching after the IPO in an additional indicator that suggests firms' reporting incentives have changed around the IPO.

IV.III The Role of Agency Issues in Corporate Tax Payments

We next directly examine whether the increase in tax payments is related to agency issues in the firm. While all firms with completing IPOs increase their shareholder group via an IPO transaction, some firms have much more substantial changes in the number of owners. Assuming that the number of owners is correlated with the extent of agency problems—given that the separation of management and control is increasing in the number of owners—we partition our sample based on the number of owners in the post-IPO period. Specifically, we use information from the tax return on line 10 of schedule K, in which firms are instructed to enter the number of

shareholders at the end of the tax year if there are 100 or fewer.[10] We separate firms into two groups: (i) a "few shareholders" group, which continues to have a relatively limited number of shareholders after the IPO (i.e., firms that report between 1 and 100 shareholders in at least one year after either completing the IPO issuance—for completing firms—or in at least one year after IPO filing for withdrawing firms) and (ii) a "many shareholders" group, which are firms that never report fewer than 100 shareholders after the IPO completion or after IPO filing. We then re-estimate Eq. (2) through (4) on these groups.

Results are presented in Table 8. We find that the changes in tax payments appear to be concentrated in those firms with relatively more shareholders – that is, greater than 100. In Column (2), we observe that the ratio of taxes to sales increases by about 0.26 percentage points. However, this result seems to primarily be driven by loss firms, as we observe a decrease in the cash ETR within the smaller sample of firms reporting positive pre-tax income of approximately 7.3 percentage points on average. In contrast, we observe no statistically significant change in tax payments by these two measures for firms that maintained relatively few shareholders in at least 1 year after the IPO. Furthermore, we observe no difference in bunching behavior in Columns (5) and (6). Future work will further test whether these patterns hold using a number of other measures, including pre-IPO venture capital ownership, post-IPO institutional ownership and analyst coverage to better assess the channel through which tax payments increase. Additionally, we plan to study ex-post measures of tax enforcement, such as tax settlements.

V. Robustness

[10] Prior to 2008, firms were instructed to enter the number of shareholders if there were 75 or fewer.

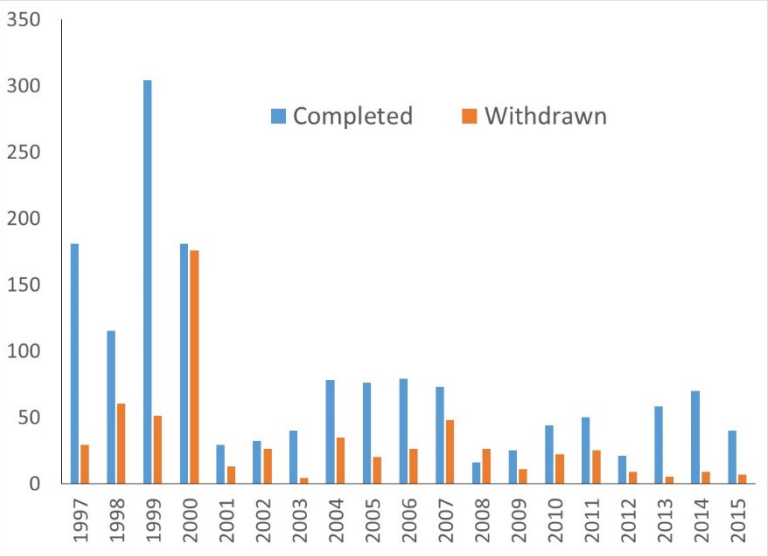
We present robustness to the main results on tax payments and profitability in Table 9, for taxes to sales in Panel A, cash ETR in Panel B, and Pre-NOL income to sales in Panel C. Column 1 shows results for the main specification and the remaining columns present coefficient estimates for alternatives: using firm-years included in the SOI sample only, instead of the SOI and CDW samples (column 2), clustering the standard errors at the firm level as opposed to the industry level (column 3), limiting the sample to firms that are in the dataset in the year prior to filing the IPO (column 4), and limiting the sample to a balanced panel of firms in the dataset for varying pre- and post-period years (columns 5 to 7). We find the results are generally robust to these changes, although for several of the balanced panel samples—which have considerably lower sample sizes—the coefficients become insignificant. The magnitudes of the estimated effects remain generally similar for these samples, however.

VI. Conclusion

In this paper, we investigate the evolution of U.S. tax payments and corporate profitability around U.S. IPOs. Using confidential corporate tax data on financial performance of a large sample of firms that completed and withdrew IPOs between 1997 and 2016, we gain unique insight into the tax and financial consequences of the going-public decision. On tax-paying, we see that on average, firms that complete an IPO trend similarly to firms that withdraw the IPO prior to filing, but following filing, taxes paid as a share of sales and pre-tax income rise notably for firms that complete an IPO compared to firms that withdraw an IPO. Additional work on a subsample of profitable firms shows *declines* in the domestic cash effective tax rate. Given similar tax inputs into constructing the numerator, the results imply that the differences may be attributable to divergences in book and tax reporting. Additional tests demonstrate important shifts in tax bunching behavior post-IPO.

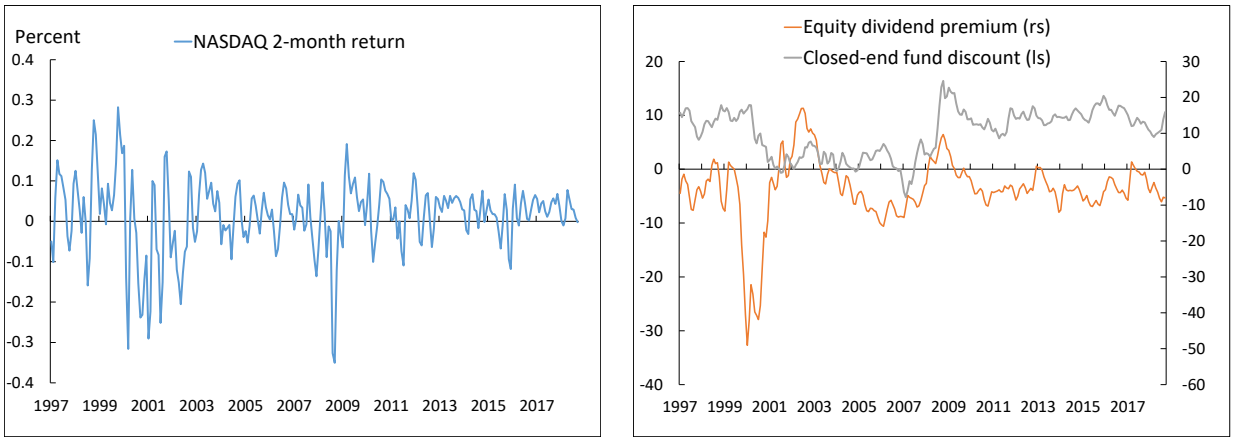
Our results have implications for policymakers considering initiatives aimed at encouraging firms to go public or to remain private. There has been a striking decline in publicly listed firms in the United States in the past two decades, which has raised questions about the reasons for the decline and about the potential consequences of fewer public firms. Our results show that the downward trend in firms going public may have meaningful tax consequences, as firms that stay private may pay fewer taxes as a result.

Figure 1: Completed and Withdrawn IPOs, by Year



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

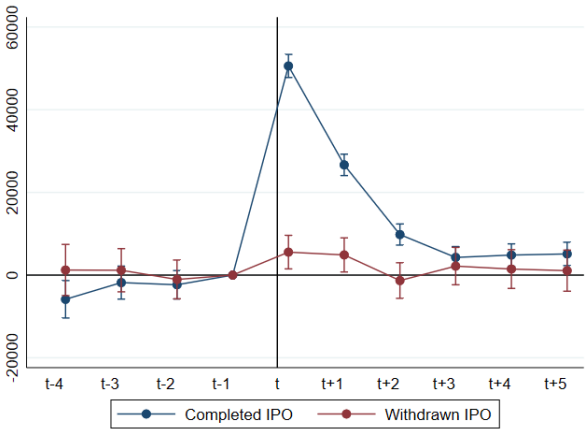
Figure 2: NASDAQ Return, Dividend Premium and Closed-End Fund Discount



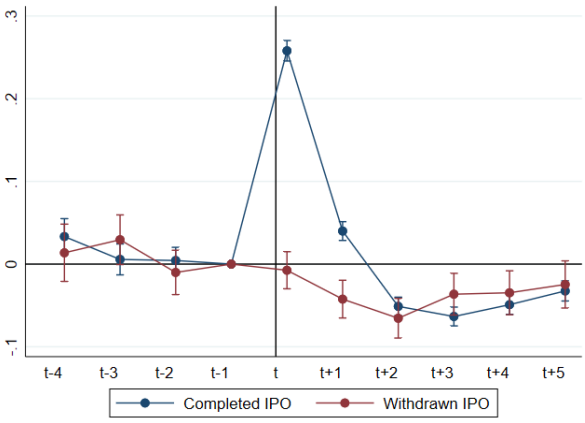
This figure shows the history of the 2-month ahead NASDAQ return (left chart) and the 2-month-ahead average dividend premium and closed-end fund discount (right chart), by year. Data on the NASDAQ return are sourced from the Wall Street Journal and Haver Analytics. Data on the dividend premium and the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

Figure 3: Equity Issuance and Financing Trends around IPO Filing

(a) Equity Issuance



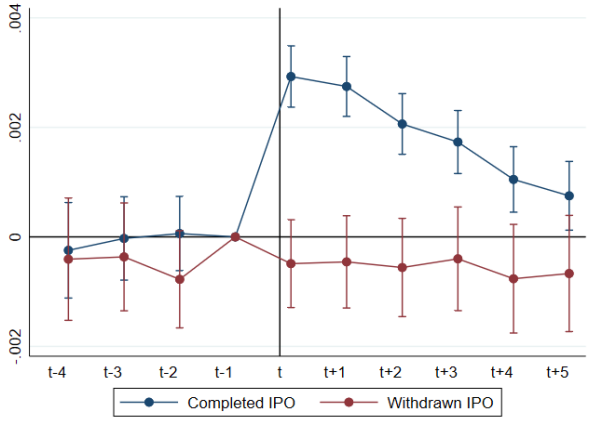
(b) Equity Financing



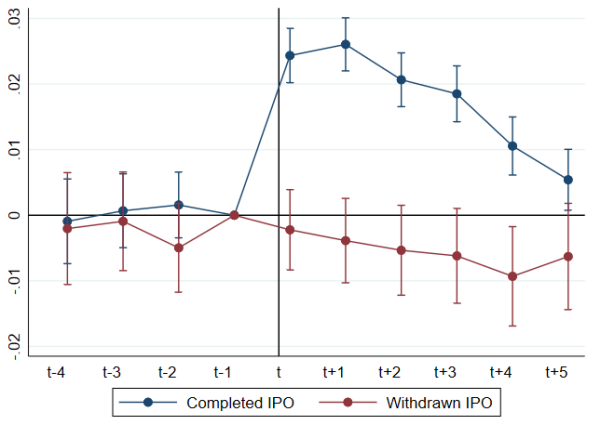
This figure presents trends of equity issuance and equity financing for firms that complete and withdraw an IPO around the year of IPO filing (year *t*). The chart plots coefficients estimated from equation (1); see Section III. Regression coefficients are shown along with 95 percent confidence intervals. Equation (1) is estimated separately for the samples of firms that either complete an IPO or withdraw their IPO filing.

Figure 4: Taxpaying Trends around IPO Filing

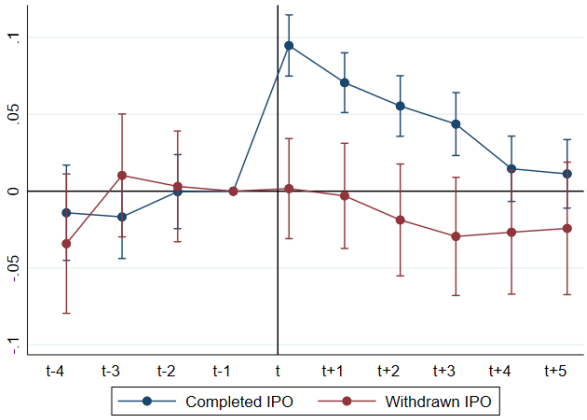
(a) Tax/Sales



(b) Tax/Pre-NOL Taxable Income



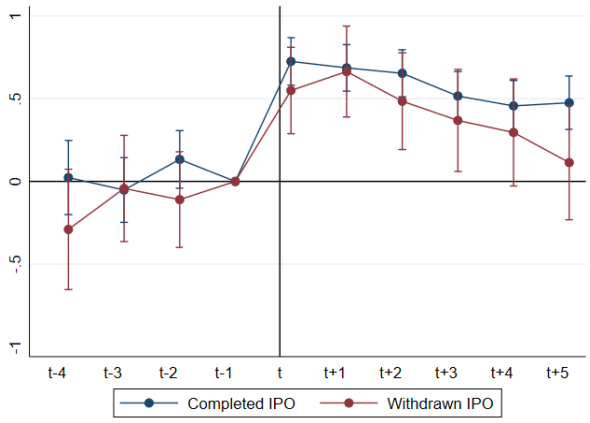
(c) Paid Taxes?



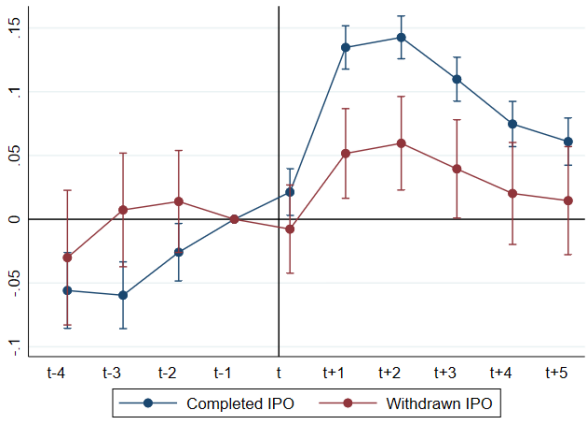
This figure presents tax payment trends for firms that either complete or withdraw an IPO around the year of IPO filing (year *t*). All measures are calculated using U.S. tax data and are defined in Appendix A. The chart plots coefficients estimated from equation (1); see Section III. Regression coefficients are shown along with 95 percent confidence intervals. Equation (1) is estimated separately for the samples of firms that either complete an IPO or withdraw their IPO filing.

Figure 5: Corporate Profitability Trends around IPO Filing

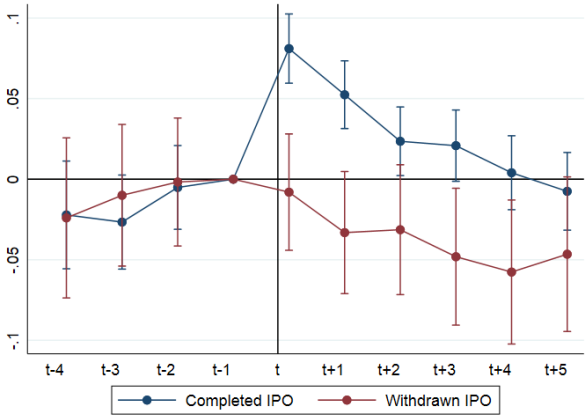
(a) Pre-NOL Taxable Income/Sales



(b) Pre-NOL Taxable Income/Lagged Assets



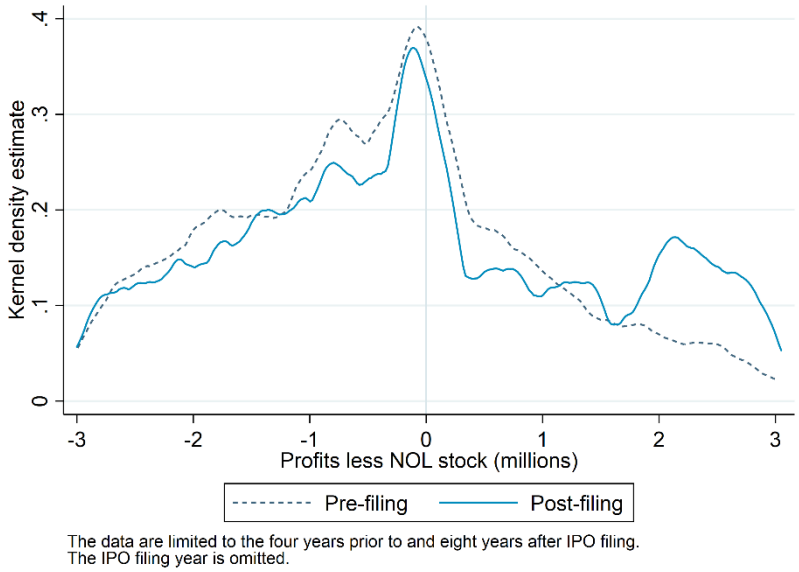
(c) Positive Taxable Income?



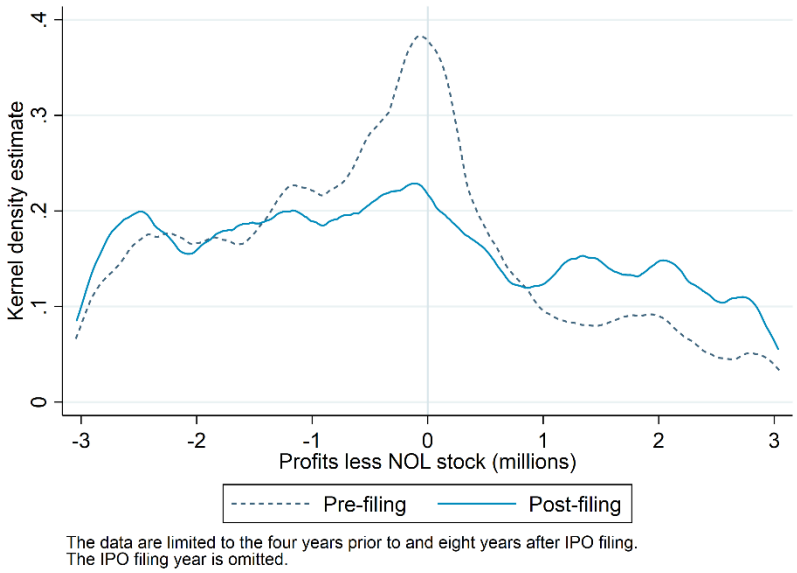
This figure presents trends in corporate financial performance for firms that either complete or withdraw an IPO around the year of IPO filing (year *t*). All measures are calculated using U.S. tax data and are defined in Appendix A. The chart plots coefficients estimated from equation (1); see Section III. Regression coefficients are shown along with 95 percent confidence intervals. Equation (1) is estimated separately for the samples of firms that either complete an IPO or withdraw their IPO filing.

Figure 6: Bunching behavior around the IPO

(a) Withdrawn IPOs: Pre- and post-IPO filing



(b) Completed IPOs: Pre- and post-IPO filing



This figure presents estimated kernel densities of firm pre-NOL income reported on the tax return minus the sum of special deductions and the stock of net operating losses. For the kernel density estimation, we use a bandwidth of $150,000 and an Epanechnikov kernel. Panels (a) and (b) show estimated densities for IPO-withdrawing and IPO-completing firms, respectively. The vertical line at $0 denotes the kink in the tax schedule at which a firm's tax liability becomes positive.

Table 1: Main Sample Summary Statistics

	No. Obs	Mean	50th percentile	10th percentile	90th percentile	Standard Deviation
	(1)	(2)	(3)	(4)	(5)	(6)
Sales ($Thousands)	29,587	258,746	58,513	1,400	1,002,521	454,402
Sales growth rate	26,311	0.57	0.14	-0.31	1.97	1.29
Total assets ($Thousands)	29,587	402,996	92,090	5,671	1,526,127	736,718
Total assets growth rate	26,311	0.34	0.07	-0.32	1.43	0.81
Equity issuance ($Thousands)	26,306	29,667	8,933	0	0	53,183
Equity financing	22,929	0.15	0.04	0.00	0.55	0.23
Pre-NOL income ($Thousands)	29,587	-369	-2,098	-37,848	49,926	36,145
NOL deduction ($Thousands)	29,587	1,456	0	0	6,612	4,036
Taxable income ($Thousands)	29,587	7,393	0	0	34,464	19,293
Taxes paid ($Thousands)	29,587	2,091	0	0	9,714	5,444
Positive taxable income?	29,587	0.38	0.00	0.00	1.00	0.49
Positive taxes paid?	29,587	0.33	0.00	0.00	1.00	0.47
Pre-NOL income/Sales	29,587	-1.47	-0.06	-4.56	0.14	3.69
Pre-NOL income/Lagged Assets	26,311	-0.20	-0.04	-0.82	0.16	0.44
Employee compensation//Sales	29,587	0.66	0.29	0.06	1.64	1.06
Officer compensation/Sales	29,587	0.10	0.02	0.00	0.29	0.21
Interest deduction/Sales	29,587	0.05	0.01	0.00	0.17	0.10
Depreciation/Sales	29,587	0.10	0.03	0.01	0.27	0.16
NOL deduction/Sales	29,587	0.01	0.00	0.00	0.04	0.03
Taxable income/Sales	29,587	0.02	0.00	0.00	0.09	0.04
Total tax/Sales	29,587	0.01	0.00	0.00	0.03	0.01
Cash ETR	9,955	0.18	0.12	0.00	0.42	0.22
Bunching ($2 million)	29,587	0.06	0.00	0.00	0.00	0.24
Bunching ($1.5 million)	29,587	0.05	0.00	0.00	0.00	0.22
Bunching ($2.5 million)	29,587	0.07	0.00	0.00	0.00	0.26

Note: This table presents summary statistics for the main analysis sample as described in Section III. 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		P-value Diff.
	Mean	Std. Dev	Mean	Std. Dev	
	(1)	(2)	(3)	(4)	(5)
Sales growth	1.25	1.67	1.29	1.69	0.93
Pre-NOL Income/Sales	-1.70	3.81	-2.26	4.40	0.02
Pre-NOL Income/Lagged Assets	-0.35	0.58	-0.46	0.64	0.00
Tax/Sales	0.01	0.01	0.00	0.01	0.01
Taxes paid?	0.33	0.47	0.27	0.45	0.01
Cash ETR	0.23	0.24	0.21	0.24	0.47

Note: This table presents firm characteristics in the year prior to filing the IPO for firms that ultimately complete an IPO as compared to firms that ultimately withdraw the IPO. Characteristics are presented at left. Columns 1 and 3 present means for firms that complete and withdraw, respectively. Columns 2 and 4 present the associated standard deviations. Column 5 presents an industry-adjusted p-value of 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_2m	0.753***
	[0.0850]
CEFD_2m	0.0642***
	[0.00203]
DivPrem_2m	-0.00431***
	[0.00160]
Year Fixed Effects	+
Firm Fixed Effects	+
Observations	29,587
R-squared	0.581

This table presents estimates of the first-stage regression results for IPO completion (specification 3). 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 return post-IPO filing, the 2-month equity dividend premium post-filing, and the 2-month closed-end fund discount post-filing an are defined in Appendix A. Regressions include firm and year fixed effects. Standard errors are clustered at the IRS major 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

Panel A: Full Sample

Dependent var:	Taxes/Sales		Taxes/Pre-NOL Taxable Income		Positive Taxes Paid?	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IPO Completed	0.00233***	0.00211**	0.0235***	0.0212***	0.0619***	0.0816***
	[0.000583]	[0.000917]	[0.00442]	[0.00821]	[0.0129]	[0.0275]
Year FEs	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+
Observations	29,587	29,587	29,563	29,563	29,587	29,587
R-squared	0.020	0.000	0.029	0.000	0.033	0.000

Panel B: ETR Sample

Dependent var:	Taxes/Sales		Taxes/Pre-NOL Taxable Income		Cash ETR	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IPO Completed	0.00329***	0.00209	0.0264***	0.00847	-0.0208*	-0.0364*
	[0.00100]	[0.00175]	[0.00670]	[0.0135]	[0.0105]	[0.0190]
Year FEs						
Firm FEs						
Observations	9,955	9,955	9,948	9,948	9,955	9,955
R-squared	0.036	0.020	0.054	0.037	0.033	0.025

This table presents estimates of the effect of completing an IPO on measures of tax payments. 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 full sample, and Panel B shows results for the sample of firm-years with a non-missing cash ETR. 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 Corporate Profitability

Panel A: Full Sample

Dependent var:	Pre-NOL Taxable Income/Sales		Pre-NOL Taxable Income/Lagged Assets		Positive Taxable Income?	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IPO Completed	0.730***	1.424***	0.155***	0.272***	0.0409***	0.0619**
	[0.0974]	[0.136]	[0.0162]	[0.0226]	[0.0129]	[0.0264]
Year Fixed Effects	+	+	+	+	+	+
Firm Fixed Effects	+	+	+	+	+	+
Observations	29,587	29,587	26,311	26,311	29,587	29,587
R-squared	0.034	0.000	0.090	0.000	0.029	0.000

Panel B: ETR Sample

Dependent var:	Pre-NOL Taxable Income/Sales		Pre-NOL Taxable Income/Lagged Assets		Positive Taxable Income?	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IPO Completed	-0.0287*	-0.0414*	-0.0269***	-0.0375**	-0.0429**	-0.0757**
	[0.0165]	[0.0237]	[0.00823]	[0.0162]	[0.0164]	[0.0314]
Year Fixed Effects	+	+	+	+	+	+
Firm Fixed Effects	+	+	+	+	+	+
Observations	9,955	9,955	9,382	9,382	9,955	9,955
R-squared	0.004	0.000	0.029	0.000	0.018	0.000

This table presents estimates of the effect of completing an IPO on measures of corporate profitability measured using U.S. tax data: pre-NOL income as a share of sales, pre-NOL income as a share of lagged total assets, an indicator variable equal to 1 if a firm reports positive taxable income, and taxable income as a share of sales. Panel A shows results for the full sample and Panel B shows results for the sample of firm-years with a non-missing data to calculate cash ETR. The odd columns present results from estimating specification (2), and the even columns present second-stage results from estimating specification (4), respectively. 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: Changes in Tax Deductions Post-IPO

Panel A: Full Sample: Total deductions, production-related deductions, and capital-structure-related deductions

Dependent var:	Total Ded. /Sales	Officer Comp. /Sales	Emp Comp /Sales	Interest Ded. /Sales	Net Dep. /Sales	Rents /Sales	DPAD /Sales	Repairs /Sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IPO Completed	-1.570***	-0.0634***	-0.395***	-0.0230***	-0.0432***	-0.0461***	0.0000	-0.00428***
	[0.142]	[0.00993]	[0.0394]	[0.00516]	[0.00496]	[0.00688]	[0.0000]	[0.000908]
Year FEs	+	+	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+	+	+
Observations	29,587	29,587	29,587	29,587	29,587	24,975	29,587	24,975
R-squared	0.0161	0.0153	0.0187	0.01	0.0194	0.0245	0.0538	0.00391

Panel B: ETR Sample: Total deductions, production-related deductions, and capital-structure-related deductions

Dependent var:	Total Ded. /Sales	Officer Comp. /Sales	Emp Comp /Sales	Interest Ded. /Sales	Net Dep. /Sales	Rents /Sales	DPAD /Sales	Repairs /Sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IPO Completed	0.241*	0.0144**	0.0646**	-0.00335	0.00262	0.00204	0.0000252	0.00095
	[0.139]	[0.00660]	[0.0317]	[0.00430]	[0.00417]	[0.00439]	[2.54e-05]	[0.000887]
Year FEs	+	+	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+	+	+
Observations	9,955	9,955	9,955	9,955	9,955	9,955	9,955	9,955
R-squared	0.00184	0.000922	0.00683	0.00423	0.00795	0.00234	0.126	0.0102

Table 6 (cont.): Changes in Tax Deductions Post-IPO

Panel C: Full Sample: Non-production-related deductions and non-capital-structure-related deductions

Dependent var:	Bad Debts /Sales	Adver. /Sales	Charit. Contib. /Sales	Taxes Paid /Sales	Other Ded. /Sales	NOL Ded. /Sales	Special Ded./ Sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO Completed	0.000812**	-0.00930***	2.43e-05*	-0.0398***	-0.576***	0.00106	0.000000118
	[0.000406]	[0.00206]	[1.33e-05]	[0.00494]	[0.0859]	[0.000719]	[1.07e-07]
Year FEs	+	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+	+
Observations	24,975	29,587	29,587	24,975	24,975	29,587	29,587
R-squared	0.0373	0.0297	0.0115	0.0147	0.0106	0.0144	0.0275

Panel D: ETR Sample: Non-production-related deductions and non-capital-structure-related deductions

Dependent var:	Bad Debts /Sales	Adver. /Sales	Charit. Contib. /Sales	Taxes Paid /Sales	Other Ded. /Sales	NOL Ded. /Sales	Special Ded./ Sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO Completed	0.00172**	0.00471*	4.96e-05**	0.00345	0.0522	-0.00827***	4.96e-07**
	[0.000713]	[0.00281]	[2.21e-05]	[0.00243]	[0.0491]	[0.00276]	[2.39e-07]
Year FEs	+	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+	+
Observations	9,955	9,955	9,955	9,955	9,955	9,955	9,955
R-squared	0.011	0.000	0.008	0.006	0.001	0.012	0.080

This table presents estimates of the effect of completing an IPO on firm tax deductions. All columns present IV results obtained from estimating 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. Panels A and B present estimates of the effect of completing an IPO on total tax deductions and tax deductions related to production and capital structure, measured as a share of firm sales. Panel A shows results for the full sample and Panel B shows results for the sample of firm-years with a non-missing data to calculate cash ETR. Panels C and D present estimates of the effect of completing an IPO on tax deductions that are not related to firm production or capital structure, measured as a share of firm sales. Panel C shows results for the full sample and Panel D shows results for the sample of firm-years with a non-missing data to calculate cash ETR. Regressions include firm and year fixed effects. Standard errors are clustered at the firm 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 "Bunching" Behavior

Dependent var:	Indicator = 1 if bunching > -$1.5m		Indicator = 1 if bunching > -$2.0m		Indicator = 1 if bunching > -$2.5m	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IPO Completed	-0.0442***	-0.0799***	-0.0527***	-0.0913***	-0.0642***	-0.113***
	[0.00532]	[0.0157]	[0.00607]	[0.0164]	[0.00727]	[0.0200]
Year FEs	+	+				
Firm FEs	+	+				
Observations	29,587	29,587	29,587	29,587	29,587	29,587
R-squared	0.06	0.06	0.07	0.07	0.08	0.07

This table presents regression estimates of the effect of completing an IPO on the likelihood of bunching behavior, specifications (2) and (4). The dependent variables are indicator variables equal to one for bunching behavior; in Columns 1 and 2 (3 and 4; 5 and 6), the indicator is equal to one for firms for which pre-NOL income, less special deductions and the stock of NOLs, is between -$1.5 million and $0 (between -$2 million and $0; between -$2.5 million and $0). The odd columns present OLS coefficients, and the even columns present IV results that use 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. 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: Agency Costs and Tax Planning

Dependent var:	**Taxes/Sales**		**Cash ETR**		**Indicator = 1 if bunching > -$2.0m**	
	Few Shareholders	Many Shareholders	Few Shareholders	Many Shareholders	Few Shareholders	Many Shareholders
	(1)	(2)			(5)	(6)
IPO Completed	0.00192	0.00259***	-0.00777	-0.0733**	-0.0952***	-0.0875***
	[0.00118]	[0.000897]	[0.0206]	[0.0318]	[0.0173]	[0.0224]
Year FEs	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+
Observations	15,816	13,069	5,773	4,060	15,816	13,069
R-squared	0.0211	0.0284	0.0253	0.0165	0.0658	0.0726

This table presents results from testing whether tax payments, a firm's Cash ETR, and bunching behavior vary based on the extent of a company's agency issues. The coefficients reflect IV results from estimating specification (4) after partitioning based on whether the firms reported few shareholders (less than 100) or many shareholders (greater than 100) on its income tax return in any year in the post-filing 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 9: Robustness to Alternative Samples and Specifications

Panel A: Tax Payments—Taxes/Sales

Dependent var:	Main Sample	SOI Sample Only	Clustering by Firm	Firms in Sample t-1	Balanced Panel: t-3 to t+4	Balanced Panel: t-2 to t+4	Balanced Panel: t-2 to t+5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO Completed	0.00211**	0.00235***	0.00211***	0.00186**	0.00202	0.00229**	0.00235*
	[0.000917]	[0.000900]	[0.000527]	[0.000939]	[0.00143]	[0.00110]	[0.00128]
Year FEs	+	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+	+
Observations	29,587	24,975	29,587	23,689	5,676	6,512	6,352

Panel B: Tax Payments—Cash ETR

Dependent var:	Main Sample	SOI Sample Only	Clustering by Firm	Firms in Sample t-1	Balanced Panel: t-3 to t+4	Balanced Panel: t-2 to t+4	Balanced Panel: t-2 to t+5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO Completed	-0.0364*	-	-0.0364**	-0.0372*	-0.0584*	-0.00309	-0.00884
	[0.0190]	-	[0.0185]	[0.0191]	[0.0326]	[0.0279]	[0.0274]
Year FEs	+	-	+	+	+	+	+
Firm FEs	+	-	+	+	+	+	+
Observations	9,955	-	9,955	7,747	2,072	2,354	2,462

Panel C: Profitability—Pre-NOL taxable income/Sales

Dependent var:	Main Sample	SOI Sample Only	Clustering by Firm	Firms in Sample t-1	Balanced Panel: t-3 to t+4	Balanced Panel: t-2 to t+4	Balanced Panel: t-2 to t+5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO Completed	1.424***	1.502***	1.424***	1.474***	0.297	0.887***	0.798***
	[0.136]	[0.153]	[0.156]	[0.139]	[0.247]	[0.175]	[0.163]
Year FEs	+	+	+	+	+	+	+
Firm FEs	+	+	+	+	+	+	+
Observations	29,587	24,975	29,587	23,689	5,676	6,512	6,352

This table presents robustness of the coefficient estimates on our main measures of firm tax payments and profitability, as measured using corporate tax data: taxes paid as a share of sales (Panel A), the cash ETR (Panel B), and pre-NOL taxable income as a share of sales (Panel C). Column 1 in each panel presents results from the main specification. Column 2 presents results using data included in the SOI sample only. Column 3 shows results when clustering by firm. Column 4 shows results for firm-year observations in which the firm was included in the main analysis dataset in the year prior to the IPO. Column 5 shows results for firm-year observations for firms that were in the data sample for three years prior to the IPO through four years following the IPO. Column 6 shows results for 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 7 shows results for firm-year observations for firms that were in the data sample for two years prior to the IPO through five 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.

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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 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?	Dummy variable equal to 1 if *Taxable Income* is greater than zero
Operating Profit	Form 1120: Main Page, lines 1c + 12 + 18 + 19 + 20 + 25 - 2 – 27
Profit Margin	*Operating profit / Sales*
Pre-NOL Income/Sales	*Pre-NOL Income / Sales*
Pre-NOL/ Lagged Assets	*Pre-Interest Income / Total Assets* from the prior year
Interest Paid	Form 1120: Main Page, line 18
Total Compensation	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) + Compensation of Officers (Form 1120S: Main Page, line 7)
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?	Dummy variable equal to 1 if *Taxes Paid* is greater than zero
Taxes/Sales	*Taxes Paid/Sales*
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)]
Net Operating Loss (NOL) Stock	Form 1120: Schedule K, line 12
Indicator = 1 if Bunching > -$2.5m	Dummy variable equal 1 if *Pre-NOL Income* minus *Special Deductions* minus the *NOL Stock* is greater than -$2.5 million and less than or equal to $0.
Indicator = 1 if Bunching > -$2m	Dummy variable equal 1 if *Pre-NOL Income* minus *Special Deductions* minus the *NOL Stock* is greater than -$2.0 million and less than or equal to $0.
Indicator = 1 if Bunching > -$1.5m	Dummy variable equal 1 if *Pre-NOL Income* minus *Special Deductions* minus the *NOL Stock* is greater than -$1.5 million and less than or equal to $0.
NASDAQ _2mRet	Two-month NASDAQ return, sourced from the Wall Street Journal and Haver Analytics
DivPrem_2m	Average of the equity dividend premium in the two months following IPO filing, sourced from Jeffrey Wurgler's website
CEFD_2m	Average of the closed-end fund premium in the two months following IPO filing, sourced from Jeffrey Wurgler's website
IPOComplete	Dummy variable equal to 1 for firms that complete an IPO in years greater than or equal to the IPO filing year, sourced from SDC Platinum and SEC filings