The Effects of Going Public on Firm Profitability and Commercialization Strategy

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Abstract

We study the effects of going public using a unique panel of firms in 16 European countries for which we observe financial data before and after initial-public-offering (IPO) attempts. We compare completed and withdrawn IPO attempts. We instrument for the decision to complete the IPO using prior market returns. Contrary to previous results, we find that firm profitability goes up after going public. We also find a post-IPO expansion in sales per employee, and in the number of subsidiaries and countries in which firms operate. Overall, our results are consistent with going public inducing a shift in strategy towards commercialization.

Keywords: IPOs, Profitability, Commercialization, Selection versus Treatment
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1   Introduction

Going public is a key decision for any firm. Explanations for why firms go public include raising capital for expansion, as well as diversification and liquidity for owners. Raising capital benefits the firm by allowing it to undertake investment opportunities. However, ownership dispersion can lead to diverging incentives between managers and investors (Jensen and Meckling, 1976), and managers faced with stock market pressure can become myopic (Stein, 1989). Overall, it is unclear whether going public is beneficial or detrimental for firms.

The stylized fact in the literature is that profitability on average falls after IPOs (Degeorge and Zeckhauser 1993, Jain and Kini 1994, Mikkelson, Partch, and Shah 1997). This result has often been interpreted as evidence that, for the average firm, the costs of going public can exceed the benefits. Some authors have also considered selection effects to explain the post-IPO drop in profitability. For instance, firms may time IPO decisions according to their life-cycle, their peers, profitability shocks, or industry shocks (Pástor, Taylor, and Veronesi 2009, Chemmanur, He, and Nandy 2010, Spiegel and Tookes 2020, Aghamolla and Thakor 2022). Under these explanations, the dynamics of exogenous variables explain which firms self-select and their post-IPO outcomes, and not going public in itself. In order to provide a better answer regarding the costs and benefits of going public, it is crucial to distinguish the causal effect of going public from potential selection effects.

Our paper makes two main contributions. First, our empirical design attempts to isolate the causal effect of going public on profitability. This causal effect refers to changes in profitability that happen *because* firms go public, and not simply changes that are correlated with the going public decision. Second, we propose an explanation for the change in profitability that is related to a shift in firm strategy: IPO firms increase commercialization activity and focus less on exploration.[1] Our results are consistent with the focus on commercialization

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[1] Although not in our sample, the recent experience of Uber can illustrate this new focus on profitability and less exploration after going public: "*Mr. Khosrowshahi (CEO) has moved to restructure Uber to deliver on a promise to make the company profitable, scaling back many of its expensive side businesses (...) The*

as an optimal strategy aligned with the preferences of public investors (Aghion and Stein, 2008).

The empirical design rests on two building blocks. First, we focus on the profitability of firms that complete their IPOs relative to firms that withdraw their IPOs. This implies that we identify the effect of going public within the population of IPO-attempts. Withdrawn attempts represent a reasonable counterfactual for firms that go public and allow us to control for a host of self-selection issues. We collect data on close to 3,500 IPO-attempt firms spread across 16 European countries between 1997 and 2017. A key advantage of the European data is that, due to reporting requirements, we have post-IPO-attempt profitability data even for firms that withdraw their IPOs. This type of data has not been available in the previous literature. The panel structure of the data also allows us to include firm fixed effects and, therefore, to control for all time-invariant characteristics at the firm level.

We use withdrawn IPOs as counterfactuals for completed IPOs, but the decision to withdraw is still endogenous. Therefore, a second building block of the identification strategy is to instrument for IPO completion. In the same spirit as Bernstein (2015), we use market returns over the previous 30 days as instrument. These 30 days coincide with the marketing and book-building phase of the IPO. Firms that pull their IPOs usually blame poor market conditions for the withdrawal. In line with previous evidence, we find that positive market returns in the previous 30 days increase the likelihood of IPO completion by 6.9% (from an unconditional probability of 87%). We show that the pre-choice return is uncorrelated with firm characteristics of candidate IPOs, thus it behaves as a well-balanced instrument. Market returns in this narrow window are unlikely to directly affect firm outcomes several years after the attempt, which is what the exclusion restriction requires. In short, the identification strategy is based on the idea that good returns are a nudge for some firms that are at the margin between listing or not, but have no effect on firms except for their impact

company has promised to be profitable on an adjusted basis before interest, taxes, depreciation and amortization by the end of next year (2021)." (Uber Sells Self-Driving-Car Unit to Autonomous-Driving Startup, *Wall Street Journal*, December 7, 2020).

on the going public decision.

As in the previous literature, we find that the profitability of IPO firms goes down after going public. However, withdrawn IPOs exhibit a similar downward pattern in profitability, so the effect in OLS regressions that compare completed and withdrawn IPOs is basically zero. This suggests that the post-IPO drop in profitability is related to selection effects in IPO attempts rather than to a causal effect of going public.

In our instrumental variables (IV) estimation, we attempt to isolate the causal impact of firms going public. We find a significant increase in profitability for firms that go public relative to firms that withdraw. Hence, once we are able to isolate the exogenous transitions to listed status, we find a positive effect instead of a negative effect in profitability. The profitability of completed IPOs relative to withdrawn firms increases by close to one standard deviation in this sample. The effect is large, but plausible. One possible explanation is that, in equilibrium, a large increase in profitability is needed to compensate for the equally large costs of going public (close to 5% of firm value according to Gahng, Ritter, and Zhang 2021).[2]

We highlight two important results regarding the exclusion restriction of the IV strategy. First, we conduct placebo tests with market returns that accrue right after the IPO attempt. If returns provide a signal of future profitability, then their predictive power should not vanish at the IPO. However, we find that placebo returns have no impact on the likelihood of IPO completion (1st stage), and no predictive power for future profitability (reduced-form regressions). Hence, consistent with the exclusion restriction, if there is no impact on the ownership choice (1st stage), then there is no effect on firm outcomes (2nd stage). One would expect this under the exclusion restriction because the channel of influence between returns and long-run outcomes is severed once the listed status is fixed.

Second, we note that the type of self-selection that follows models of asymmetric information with unobservable quality does not invalidate our analysis. In asymmetric information

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[2]We also check that our results are not affected by a weak-instruments problem, which could artificially increase the magnitude of IV coefficients (Jiang, 2017). In addition, we show that our inference is robust to the exclusion of clusters of observations, which Young (2022) recently recommends as a robustness exercise for IV estimations.

models, strong firms are more likely to stay out of the market because raising equity is too costly for them (Myers and Majluf, 1984). To the extent that better firms are more likely to opt out of the market, then OLS underestimates the true effect of going public on profitability when comparing firms that enter the market (completed IPOs) with firms that stay outside (withdrawn IPOs). The IV estimation is already designed to overcome this obstacle.

A similar concern is that our instrument may be correlated with self-selection. The costs of asymmetric information decrease with high market returns, and hence the average quality of firms going public improves in hot markets (Lucas and McDonald, 1990). However, the relevant comparison in our IV estimation is not between the average issuer in hot and cold markets, but among marginal firms that respond to short-term returns by completing or withdrawing (i.e., complier firms). That is, the IV coefficient relies on the comparison between the marginal issuer after high returns and the marginal withdrawal after low returns. According to asymmetric information models, these two types of firms are of similar quality. Thus, even if there is a change in the average quality of issuers following 30-day returns, it does not affect the exclusion restriction. The main reason is that quality is comparable across firms that are nudged by returns to complete or withdraw their IPOs.

In order to identify mechanisms, we study variation of our IV estimates across countries and firms. We find that the increase in profitability is stronger in countries with high disclosure requirements for IPOs (La Porta, López-de-Silanes, and Shleifer, 2006) and high investor protection (Djankov, La Porta, López-de-Silanes, and Shleifer, 2008). These results suggest that an investor-friendly environment is important for firms to obtain the full benefits of listed status. Quantitatively speaking, however, the impact of disclosure and investor protection is small. We also find that the post-IPO increase in profitability is weaker in small firms. This result is not consistent with a financial constraints explanation, but with heterogeneous effects along the firm life-cycle, where the benefits of going public are highest for firms that have already grown their asset base. Overall, although informational frictions, agency problems, and financial constraints may play a role in the impact of going public, the

main effect seems to go beyond these channels. Our hypothesis is that going public pushes firms towards a commercialization strategy, whereby firms achieve higher profitability by increasing the market penetration of the firms' products.

Our evidence in favor of the commercialization hypothesis includes the following six findings with the same IV setup as before. First, we find that firms experience a significant increase in sales per employee. Second, sales and assets strongly increase in small and young firms. Third, IPO firms increase their subsidiaries and expand their presence in international markets. Fourth, we confirm in our sample the decline in patenting found by Bernstein (2015) for U.S. IPO firms. Fifth, we find that innovation falls strongly in exploratory patents, but exploitative patents (i.e., those based on previous knowledge) increase at the margin (Custodio, Ferreira, and Matos, 2019). Sixth, we find more CEO and CFO turnover as firms go public. The commercialization hypothesis can encompass all these results. Increasing sales per employee through the expansion to international markets; the need for new management with a different set of skills; and focusing on innovation that takes advantage of already acquired knowledge, are all facts consistent with a change in strategy that privileges commercialization.

Our paper contributes, first and foremost, to the literature on the consequences of going public (Pagano, Panetta, and Zingales 1998, Kim and Weisbach 2008). The going public decision is an endogenous outcome. For instance, more productive firms, firms with better governance, or firms with more investment opportunities, can self-select into public markets. Our focus is on isolating the causal effect of going public from selection effects. Estimating the causal effect is a first-order question in corporate finance, which speaks directly of the advantages (or disadvantages) of accessing public markets. We interpret this causal effect as showing that going public induces a shift in firm strategy towards commercialization.

Other recent work also deals with the causal effect of going public, but focusing on outcomes such as the structure of a firm's labor force, the geographical diversification of acquisitions, and local spillovers (Babina, Ouimet, and Zarutskie 2020; Borisov, Ellul, and

Sevilir 2021; Butler, Fauver, and Sypiridopoulos 2019; Cornaggia, Gustafson, Kotter, and Pisciotta 2020, 2021; Dambra, Gustafson, and Pisciotta 2021). Many of these findings are also consistent with the commercialization hypothesis. Compared to this recent work, we have access to panel data with financial variables for both completed and withdrawn IPOs, which allows us to study the long-standing puzzle of the post-IPO drop in profitability (Degeorge and Zeckhauser 1993, Jain and Kini 1994, Mikkelson, Partch, and Shah 1997). Two important caveats are worth mentioning. First, we obtain the causal *differential* effect between completed and withdrawn IPOs, but we cannot identify the causal *level* effect of going public on profitability. Second, we focus, like the previous literature, on profitability or the ability of the firm to generate cash-flows out of assets-in-place. We do not deal with the impact of going public on firm value (not observable before the IPO, or for withdrawn IPO firms) or other measures of firm performance.

Our results are also related to the literature that compares the performance of private and public firms. Asker, Farre-Mensa, and Ljungqvist (2015) and Sheen (2020) argue that private firms react more to industry shocks than similar public firms. Gilje and Taillard (2016), Phillips and Sertsios (2017) find the opposite using events in the natural gas and medical devices industries respectively. The comparisons between private and public companies can be blurred by selection issues. In this respect, our results contribute by estimating the pure causal effect of going public, which can help bridge the gap between apparently contradictory results. Still, it is important to note that our results apply specifically to private firms that are attempting to go public, and not necessarily to the overall population of private firms.

2   Data

2.1   Sample Selection and Panel Structure

Our data consist of 3,467 IPO attempts, out of which 3,037 are completed and 430 are withdrawn. Hence, the unconditional likelihood of IPO completion is 87%. We arrive at

this sample through the following procedure. From *Dealogic*, *SDC*, and *Zephyr* we obtain the dates of all IPO attempts between 1997 and 2017 in 16 European countries. These data vendors compile dates for IPO completions and withdrawals from regulators, stock exchanges, the financial press, and other outlets. We merge the list of IPO attempts with financial information for each firm from *Amadeus*, which reports data for public and, crucially, private firms. We get year-end financial information from two years before the IPO attempt to two years after the IPO attempt. This gives us a 5-year event window from *t-2* to *t+2*, where year *t* is the year of the IPO attempt for each firm.[3] We keep the IPO attempt only if we have financial data, albeit incomplete, for years before and after the attempt. We drop observations if the 5-year window overlaps with other IPO attempts, successful or not, for the same firm.[4]

Figure 1 shows the distribution of IPO attempts by country and calendar year. As can be expected, bigger markets, such as the UK, Germany, and France, have more IPO filings. There are peaks in 2000 and 2006-7, which coincide with years of high stock market valuations. The percentage of withdrawn IPOs also moves with the stock market cycle, with relatively more withdrawals in years of poor returns such as 2001, 2008, and 2010. In terms of country coverage and distribution across years, our sample is comparable to the sample in Helbing, Lucey, and Vigne (2019) who also study IPOs in Europe.

<center>Insert Figure 1 here</center>

Figure 2 shows the distribution of the 14,110 firm-year observations by event year. Observations for completed and withdrawn IPOs are shown separately. The panel is not perfectly balanced as there are close to 15% fewer observations in the extreme years of the event window (years *t+2* and *t-2*) than in the years adjacent to the IPO attempt (years *t* and *t-1*). However, the panel for withdrawn IPOs is not more unbalanced than the panel for completed

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[3]We use a relatively short window to minimize attrition in the sample. In Section 4.6 we show that our results are robust to extending the horizon.

[4]We drop 52 withdrawn attempts that are followed by a completed IPO within the 5-year period. We also exclude 15 withdrawn attempts that are followed by another withdrawn attempt within the 5-year period. The appendix provides more details on our sample selection and details on withdrawn attempts.

IPOs. There is attrition in the extreme years because firms do not have operating history so much in advance of their IPO attempts, or because firms disappear or get acquired later on.[5]

Insert Figure 2 here

Table 1 shows summary statistics for the main variables in our analysis. The first three variables in the table make reference to the structure of the data. The average of the Completed IPO dummy implies that firms that eventually go public represent 87% of the firm-year observations. The Post dummy captures the post-attempt observations for completed and withdrawn firms. The average of 60% shows that typically there are 3 post-attempt years (t, $t+1$, and $t+2$) and 2 pre-attempt years ($t-2$ and $t-1$). The IPO dummy is the Completed IPO dummy times the Post dummy, and it captures the post-IPO period for the firms that go public. The average of the IPO dummy implies that 52% of the observations correspond to firms while they are publicly traded.

Insert Table 1 here

2.2 Firm-level Variables

The advantage of the European setting is that all private firms have to file financial statements with regulators. This gives us access to financial data for a wide range of private firms, which is hard to get in the U.S. (with the exception of some regulated industries). Operating return on assets (OROA=earnings before interest and taxes/book assets) is the main measure of profitability. In Table 1 we show that mean (median) profitability is -2%(3%), but with a large standard deviation of 24%. There are slightly fewer observations for profitability than other variables because its computation requires information from both the income statement and the balance sheet of the firm. The coverage for income statements is

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[5]Most European markets require at least three annual reports before listing. However, the AIM in the UK does not require a minimum of operating history (Helbing, Lucey, and Vigne, 2019).

not as good as for balance sheets due to variation in reporting standards across Europe (see Bernard, Burgstahler, and Kaya 2018). For instance, in smaller firms the obligation to file refers only to abbreviated financial statements. For a similar reason we do not have access to good measures of capital expenditures or R&D since these are often not reported.

Average assets are 172 million Euros, but the size distribution is highly skewed to the right as implied by a much lower median assets of 10.6 million Euros. Something similar happens with sales. Both sales over employees and sales over assets are skewed to the right. From the ownership data provided by *Amadeus*, we can measure firm scope using the information on the subsidiaries operated by each firm. On average, 35% of firm-year observations in our sample correspond to firms with subsidiaries, 19% to firms with subsidiaries in multiple industries, and 9% to firms with subsidiaries in countries other than the firm's headquarters.

Patent data come from *Zephyr*, which matches firms and patent information from the European Patent Office. The number of patents corresponds to patent applications for each firm and year that are eventually granted. Average patents are low in our sample, where only a few firms concentrate most patents. Patent is a dummy for firm-years with at least one patent application that is eventually granted. We follow Custodio, Ferreira, and Matos (2019) in classifying patents as exploratory or exploitative. An exploratory (exploitative) patent is one where 60% or more of its citations are based on new (old) knowledge. New knowledge refers to citations outside of the firm's previous portfolio of patents. Acquisitions, also from *Zephyr*, correspond to the number of firms acquired.[6] Table A.1 provides summary statistics for additional variables in our analysis.

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[6]As Erel, Jang, and Weisbach (2015), we use *Zephyr* for acquisitions rather than the *SDC* because *Zephyr* shares with *Amadeus* the firm identifiers from Bureau Van Dyck. The coverage of the acquisitions of private firms is also better with *Zephyr*.

3   Empirical Design

3.1   OLS and Instrumental Variables (IV)

We first estimate the effect on firm profitability (Y_{it}) around the IPO decision with the following differences-in-differences regression:

$$Y_{it} = \beta IPO_{it} + \alpha_i + \alpha_\tau + \alpha_{m\tau} + \alpha_{jt} + \varepsilon_{it} \qquad (1)$$

The dependent variable is measured for firm i at the end of calendar year t. The main variable of interest is IPO_{it}, which takes a value of 1 if firm i has gone public in year t or earlier, and 0 if the firm is still private. IPO_{it} captures the before-and-after for completed IPOs relative to withdrawn IPOs. Since withdrawn attempts represent the counterfactual, our comparisons are all among IPO attempts. Hence, our setup already controls for a host of selection effects that explain why firms attempt to go public in the first place (e.g., Degeorge and Zeckhauser 1993, Pástor, Taylor, and Veronesi 2009, Spiegel and Tookes 2020).

One of the advantages of the panel structure is that we can include firm fixed effects (α_i), and focus on within-firm variation. With the firm fixed effects we also avoid the need to control for firm conditions that are fixed over time such as initial conditions.[7] We do not include time-varying firm-level controls because they are endogenous to the IPO decision, and hence defeat the purpose of the IV strategy. The unbalanced nature of the panel suggests that it is necessary to control for event-time fixed effects (α_τ). These fixed effects absorb the $Post_{it}$ dummy while also allowing us to control for life-cycle dynamics that are common to all IPO attempts (see, for example, Degeorge and Zeckhauser 1993). We also include an IPO-month effect for the post-IPO-decision period $(\alpha_{m\tau})$, which controls for the potential

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[7]Alternatively, one could collapse the panel into a pre-vs-post setting. In that case, and in order to level the field for cross-sectional comparisons, it is common to include in the regression firm-level initial characteristics (e.g., assets in *t-2*). However, this implies having a full set of control variables in the pre-attempt period. In our context, this would mean losing 15% of the sample, and thus losing substantial power in the IV estimates we discuss later on. See more on the relationship between the panel and cross-sectional estimations in Section 4.6.

differential effect of firms going public in the early part of the year compared to firms going public near the end of the year. Firms that go public in December have a short post-IPO first year, while firms that go public in January have a long post-IPO first year. Finally, the industry-by-calendar-year fixed effects (α_{jt}) capture annual swings at the one-digit SIC level.[8] For example, Spiegel and Tookes (2020) argue that more than 50% of IPO decisions are related to industry trends.

Even within a sample of IPO attempts there can be selection effects for completing the IPO. For example, industry trends can induce many firms in an industry to attempt to go public, but on top of those there can be firm-specific signals that induce some firms to complete their attempt. This is problematic for a causal interpretation of the OLS coefficient on IPO_{it}. As in Pástor, Taylor, and Veronesi (2009), a positive shock to current firm profitability (ε_{it}) triggers the decision to complete the IPO. To the extent that there is mean reversion in profitability, future residuals in equation (1) will look unusually low (i.e., ε_{it+1} and subsequent residuals will be low). Therefore, as the initial shock fades away, completed IPOs will show a larger drop in future profitability than withdrawn IPOs. This negative correlation between IPO_{it} and residuals introduces a downward bias in the OLS estimate of β.[9] If there is momentum in profitability shocks instead of mean reversion, then there is an upward bias in the OLS estimate. In any case, OLS is unlikely to capture the true causal effect of going public on profitability.

An indication of endogeneity is presented in Table 2. Panel A shows that, on average, firms that complete their IPOs are significantly less profitable and smaller (both in terms of assets and sales), and have lower leverage than withdrawn IPOs. This evidence is consistent with Busaba, Benveniste, and Guo (2001) who show that highly levered firms and firms with higher sales are more likely to withdraw their IPOs in the U.S. These differences suggest

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[8]Our results are robust to including industry-by-year fixed effects when industries are defined at the two-digit SIC level. See section 4.6 on robustness.

[9]Another possibility is that firms practice earnings management and inflate profitability before the IPO (Teoh, Welch, and Wong, 1998). In this case, the post-IPO period simply reveals the true nature of the firm, while the pre-IPO period is manipulated.

that, even this late in the IPO process, firms self-select into listed status. For instance, although all firms in this sample have announced their intention to list, larger firms can be less financially constrained (Hadlock and Pierce 2010), and hence be more likely to withdraw their IPO.

Insert Table 2 here

In order to interpret the effect of going public in a causal way we need exogenous variation in the decision to complete the IPO. Exogenous does not mean totally random, as could be the hypothetical case of a stock market regulator who runs a lottery for firms that have been short-listed for an IPO, analogous to lotteries for foreigners applying for visas. Exogenous does not mean either that the firm is unaware of the consequences of going public, or that the firm is subsequently surprised by what going public entails. Similarly, visa applicants are not unaware of what a visa implies. We need to clear a lower bar than that; namely, that the source of variation in IPO completion is uncorrelated with future firm outcomes except through the decision to complete the IPO.

Bernstein (2015) proposes as an instrument for IPO completion the market returns in the pre-IPO-decision period. He uses returns on the two months that follow the IPO filing date with the SEC. There is no uniform rule in Europe for IPO filings, nor a unique form such as the SEC's Form S-1, thus we need to count backwards from the actual date in which the decision to complete or withdraw the IPO is made.

The typical IPO process starts approximately six months before the planned date, in most cases by contacting an investment bank. A preliminary prospectus is submitted to the stock market regulator about one or two months before the IPO. However, most of the IPO-related activities, such as presentation to analysts, investor education, roadshow, and book-building, are reserved for the last month before the planned date (see, for example, Table 8 in Ljungqvist and Wilhelm (2002) for the typical timeline of European IPOs). We focus on the market returns over the 30 days that precede the IPO completion or withdrawal

date.[10] Since we have IPOs from several countries we use the returns for the main stock index in each country.

It is common for firms to blame "poor market conditions" for their decision to withdraw the IPO. There are rational and behavioral explanations for this behavior, although we do not take a stance as to which explanation is more appropriate. According to Edelen and Kadlec (2005), if owners are focused on reaching a certain level of proceeds, then strong prior returns increase the likelihood that they will accept the underpricing that affects listings. Loughran and Ritter (2002) give a related explanation based on the prospect-theory preferences of owners. Finally, Derrien (2005) and Cornelli, Goldreich, and Ljungqvist (2006) argue that prior returns are a proxy for the mood or sentiment of IPO investors. Strong returns are a sign of overvaluation in this case. Irrespective of the particular explanation, strong market returns are likely to increase the willingness of owners to go through with the listing. Naturally, this relationship does not need to be deterministic, as in no IPO being completed when returns are low. Rather, high and low returns need only affect the likelihood of completion for those firms at the margin between listing or not.

The first stage of the IV estimation is then:

$$IPO_{it} = \gamma 30dayRet_c \times Post_{it} + \alpha_i + \alpha_\tau + \alpha_{m\tau} + \alpha_{jt} + \zeta_{it} \qquad (2)$$

In order to account for the time dimension in the panel we need to interact the market return in each country in the previous 30 days ($30dayRet_c$) with the indicator variable for the post-decision period ($Post_{it}$). This is necessary because the returns in the pre-decision period are only relevant to explain post-decision outcomes, and not whatever happened in, say, event-year t-2 or t-1.

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[10]For example, if the IPO is on August 15, we compute the returns between July 15 and August 14.

3.2 IV Assumptions

3.2.1 Balance and Instrument Relevance

In terms of instrument balance, Panel B in Table 2 shows that IPO attempts are not significantly different when comparing periods of high and low 30-day returns. This goes against the idea that high market returns coincide with a stronger cohort of firms attempting to list in the stock market. Perhaps high long-run returns (e.g., annual returns) coincide with a strong cohort of firms, but short-run returns do not seem to make a difference. Potential differences in the average quality of annual cohorts are captured by calendar time fixed effects in our regression. The absence of differences in pre-IPO variables across samples of short-run returns is consistent with as-random assignment of the instrument (Atanasov and Black 2016; Bennedsen, Nielsen, Perez-Gonzalez, and Wolfenzon 2007). It also means that excluding these pre-IPO characteristics, which are also absorbed by the firm fixed effects, does not bias the first-stage regression.

As seen in Panel B of Table 2, firms are 7.3% more likely to complete their IPO when market returns in the previous 30 days are higher than average. That is, when average returns are 5% instead of -3.3%. This difference in completion rates suggests that the instrument is relevant for the IPO decision.

3.2.2 Exclusion Restriction

The exclusion restriction implies that 30-day market returns have no effect on future firm outcomes, except through their impact on the IPO decision. All firms in our sample are at the margin of listing. Some firms receive a "nudge" in the form of high (low) market returns and end up listing (withdrawing). Crucially, this nudge needs to have no influence on future outcomes except through its impact on the going public decision.

One challenge to the exclusion restriction is that the instrument may induce the self-selection of firms into listed status according to some unobservable measure of quality. Mod-

els of asymmetric information, such as Myers and Majluf (1984), predict that strong firms stay out of the market because raising equity is too costly for them. Therefore, withdrawn attempts should represent, on average, better firms than completed IPOs, which would bias the comparison against (instead of in favor) completed IPOs. Firm fixed effects capture unobserved, time-invariant firm quality, but there may still be a residual, time-varying element of quality. Hence, a potential concern is whether 30-day returns induce a sorting of firms based on unobservable and time-varying quality.

It is important to note that standard asymmetric information models do not imply a sorting that invalidates our IV setup. When there is a time-varying asymmetric information (Lucas and McDonald, 1990), more firms decide to list after high market returns and the quality of the average issuer goes up. This happens because the asymmetric information discount is lower in hot markets. However, the relevant comparison in the IV setup is not between the average issuer after high and low returns, but between the marginal issuer and withdrawal responding to market returns. In the language of IV, these firms constitute the sub-population of *compliers*. The IV coefficient is the local average treatment effect (LATE) for compliers, and not necessarily for the overall population of firms. In our case, compliers are firms that complete their IPOs after high returns, and firms that withdraw their IPOs after low returns. In asymmetric information models, the marginal issuer after high returns and the marginal withdrawal after low returns are both firms of similar quality. The IV only requires that all compliers are of comparable quality. A violation of the exclusion restriction would be that completed IPOs after high returns are better (or worse) than withdrawn IPOs after low returns, but this is not what asymmetric information models predict.

Figure 3 summarizes the theoretical implications of standard asymmetric information models that are relevant for our setup. More firms complete their IPOs after positive returns, and the average quality of issuers goes up. Compliers, i.e., firms that change their decision based on returns, are firms of intermediate quality in this model. What is crucial for our identification strategy is that compliers are of homogeneous quality so, even in the presence

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of asymmetric information, there should be no bias when making comparisons across them. The very high-quality firms that withdraw regardless of returns (the "never-takers"), and the very low-quality firms that list regardless of returns (the "always-takers"), are not part of the IV comparisons.[11] Naturally, other models besides asymmetric information may provide different predictions regarding the quality of firms that list or withdraw. The necessary condition for our identification strategy to be valid is that compliers are homogeneous or that we can make fair comparisons between them. Whether the estimates from this sub-population are representative of the entire population is an external validity issue, but it does not invalidate the IV estimation.

Insert Figure 3 here

Another potential violation of the exclusion restriction would be that 30-day returns provide a valuable signal of higher expected profitability according to the market. Some firms pick up this signal and complete their IPOs to raise capital. Perhaps the signal is only relevant for the firms that decide to complete their IPO. Under this scenario, future profitability is not caused by listed status, but it is only correlated with it.

One immediate doubt about this alternative hypothesis is whether 30-day returns have predictive power for profitability in two or even three more years. As far as we know, this predictive power has not been documented in the literature. Another way to tackle this alternative hypothesis is to take advantage of the binary nature of the IPO decision. Unless the informational content of returns discontinuously drops at the IPO date, which is unlikely, one can expect that returns on the 30 days *after* the IPO decision also provide a useful signal for long-run profitability. Hence, a placebo test for our identification strategy is to use as instrument the returns immediately after the IPO decision, which cannot influence the IPO decision since it has already been taken. Given that the first stage of the IV setup is severed by construction in this case, then the second stage, which relates future outcomes to the IPO

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[11] "Never-takers" are not firms that literally never had the intention to list. It is only the case that their withdrawal decision is not affected by returns.

decision, should also be severed. We examine this possibility using reduced-form regressions that explore the predictive power of returns at different horizons.

4   The Effect of Going Public on Firm Profitability

4.1   OLS Results

Before showing results for regression (1), we report a close analog in Figure 4. We run regressions with separate event-year fixed effects for completed and withdrawn IPOs (firm fixed effects are also included, but industry-year fixed effects are not). In Figure 4 we report these event-year fixed effects (α_τ) for OROA. The effects on year *t-1* are normalized to zero. In Figure 4 we see a fall in the OROA of completed IPOs starting with the year of the IPO ($t=0$), and going forward. This post-IPO drop in profitability of about 4 percentage points fits with the previous literature on U.S. IPOs (Degeorge and Zeckhauser 1993; Jain and Kini 1994; Mikkelson, Partch, and Shah 1997). Therefore, European and U.S. IPOs share similar profitability dynamics around the going public decision.

A new finding is that withdrawn IPOs see a similar decline in profitability after their IPO attempt. In fact, for *t=0* and *t=1* the decline in profitability of completed and withdrawn IPOs is statistically indistinguishable. This suggests that the post-IPO drop in profitability is related to selection issues rather than a causal effect of going public. This is also in line with the conclusion of Spiegel and Tookes (2020) who argue that most IPOs anticipate (not cause) broad negative trends that affect all participants in an industry.

Insert Figure 4 here

Column 1 in Table 3 shows results for the OLS regression in equation (1). Firm OROA is not significantly different post IPO, consistent with what we see in Figure 4. Both completed and withdrawn IPOs face a similar decline in profitability after the attempt, so the difference-in-differences β coefficient becomes negligible. As we noted earlier, this result does not take

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into account the endogeneity of the IPO decision. We now turn to the IV estimation that directly addresses endogeneity.

Insert Table 3 here

4.2   First-stage IV Results

Column 2 in Table 3 shows that 30-day returns nudge firms into completing their IPOs. If returns over the previous 30 days are positive, then the likelihood of listing increases by 6.9%. The first stage works well with the continuous measure of returns instead of the dummy for positive returns, but the interpretation is easier with the dummy variable so we use this specification throughout the paper. The first-stage F-statistic is also stronger with the dummy variable, which gives us more precision in the second stage.

The dummy for positive returns passes the standard threshold of an F-statistic of 10 using the Kleinbergen-Paap test for weak instruments, which is robust to non i.i.d. errors.[12] The F-statistic for the main instrument is 27.84 (see column 2), far from weak. In Table A.2 in the appendix we explore the power of returns at other horizons before the attempt to explain listing decisions (e.g., returns between days *t-60* and *t-30*, or between *t-90* and *t-60*). Although statistically significant, they have less power than those over the previous 30 days, and present lower F-tests.

Column 3 in Table 3 explores the predictive power of market returns over the 30 days that follow the IPO decision. The coefficient is much smaller and statistically insignificant showing that post-IPO returns are not correlated with the decision to complete the IPO. Pre- and post-IPO returns are likely to capture similar market signals since they are adjacent in time. However, given that post-IPO returns are basically uncorrelated with the IPO decision, they represent a good placebo instrument that we can use to examine the validity of the

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[12]An alternative F-test for weak instruments is proposed by Montiel-Olea and Pflueger (2013). Their test is not yet available for panel IV estimation. To implement their test, we estimate our main regressions with a LSDV model instead of a panel fixed-effects model. We find that the Olea-Montiel F-test is nearly identical to the Kleinbergen-Paap test that we report.

exclusion restriction.

4.3   Second-stage IV results

Column 4 in Table 3 shows the second-stage results. We see that the IPO dummy is positively and significantly related to firm profitability. The IV result is in sharp contrast with the OLS result in column 1, where the coefficient on the IPO dummy was insignificant and close to zero. The IV result suggests that the post-IPO drop in profitability documented in the previous literature is a consequence of endogenous forces rather than a causal effect of going public. With as-random variation (given by the instrument), firms that go public appear to increase their profitability rather than decrease it. It is important to remember that this effect is relative to the counterfactual (withdrawn IPOs) and not an absolute effect on profitability. In a similar vein, although isolating the treatment effect of going public provides important new evidence, it does not imply that selection effects are small or irrelevant. In fact, Maksimovic, Phillips, and Yang (2020) argue that selection effects can be as large as the treatment effect of going public. We simply argue that the exogenous piece of the variation in listing decisions (i.e., the variation predicted by recent market returns) has a positive impact on profitability.

Our interpretation is that completed IPOs switch their focus to profitability, which does not happen among still-private firms. For example, Gear4music, a UK-based online retailer of musical instruments that went public in 2015, announced in 2017 that the company had recently open new distribution centers in Sweden and Germany. The CEO was quoted as saying: "This has been a transformational year for the business, with further expansion of the Gear4music brand driving record sales and profits." It is likely that, in exchange for capital, public investors put pressure on firms to achieve profitability. This pressure seems to promote profitability more than the potential drop from agency costs, at least for the initial years after going public.

Column 5 in Table 3 shows results for the regression of OROA directly on the instrument

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(the dummy for positive 30-day returns interacted with Post). The coefficient represents the reduced-form or intent-to-treat effect. The result is consistent with the exclusion restriction holding, as the coefficient from the reduced-form regression (1.6%) is approximately the coefficient from the first-stage regression (6.9%) times the coefficient from the second-stage regression (23.3%). If there was an additional direct effect from short-term returns on long-term profitability, the reduced-form coefficient could have been significantly different (e.g., in the hypothetical case that after strong returns all firms receive a long-term benefit such as perpetually lower cost of capital). Although consistent with as-random assignment, the fact that the coefficient on the reduced-form regression is well-behaved is merely suggestive (Atanasov and Black, 2016).

More compelling evidence on the validity of the exclusion restriction is presented in column 6 of Table 3. The results show that the placebo instrument (*Positive 30 days forward X Post*) has no bearing on post-IPO outcomes in a reduced-form regression. If market returns were acting as market signals that correlate with future profitability, we should find a direct effect on profitability, regardless of whether returns are from right before or right after the IPO attempt. However, if the effect on profitability is coming from the IPO decision itself, then only when returns alter the IPO decision (i.e., when there is a first stage effect) there should be an effect on profitability. Overall, the results speak in favor of the exclusion restriction since, when market returns are uncorrelated to the IPO decision (column 3 in Table 3), there is no effect on profitability either (column 6 in Table 3).

4.4   Magnitude of the IV Coefficients

The IV coefficient in column 4 of Table 3 is large, but plausible considering our sample of small, high-growth firms. Firms that go public increase OROA by 23 percentage points, or close to one standard deviation of profitability in this sample (which includes within- and across-firm variation). For instance, a firm in the 20th percentile of the distribution of profitability would jump to close to the 80th percentile of the distribution in response to

going public. The within-firm standard deviation of OROA in our sample is 19%, so the going public effect entails a similar increase of 1.2 standard deviations if we consider only within-firm changes.

Large IV coefficients relative to OLS coefficients could indicate a weak instruments problem, whereby a weak instrument amplifies a potentially small violation of the exclusion restriction. We address this issue from both the econometrics and theory angles following the recommendations of Jiang (2017).

First, from the econometric perspective, we already showed that our instrument passes standard weak-instruments tests, including those robust to non-i.i.d. errors (see the K-P F-statistic in column 2 of Table 3). Similarly, our inference is robust to the adjustment of standard errors as a function of first-stage F-statistics proposed by Lee, McCrary, Moreira, and Porter (2021).[13] We study further empirical robustness in Section 4.6, and all auxiliary tests imply that our inference is on firm ground.

Second, from the perspective of economic theory, we argue that the magnitude of the IV coefficient is plausible. The first thing to note is the direction of the endogeneity bias in OLS. Several theories suggest that this bias is negative. First, asymmetric information models imply that firms that complete IPOs are on average worse, i.e., less profitable, than firms that withdraw their attempts. Second, Pástor, Taylor, and Veronesi (2009) argue that mean-reversion in profitability should lead to a negative bias in estimating post-IPO profitability. Hence, from an ex-ante perspective, it is possible to find IV coefficients that are larger than OLS coefficients.[14]

Also from a theoretical perspective, a change in strategy associated with going public

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[13]Standard errors in column 4 of Table 3 have to be multiplied by a factor of 1.008 as implied by the Cragg-Donald Wald F-statistic of 97.06 in our first stage (column 2 in Table 3). See Table 3.a in Lee, McCrary, Moreira, and Porter (2021).

[14]Other theories may suggest a positive bias in OLS. However, such theories are not entirely consistent with some of our findings. For instance, suppose stronger firms are more likely to go public and increase their profitability. Then, the OLS coefficient would be higher than the IV coefficient. However, Table 2 Panel A shows that larger and more profitable firms are less likely to complete their IPOs. Alternatively, suppose only weak firms are compliers. Then, the IV would identify the causal effect of going public among weak firms, potentially identifying a smaller effect than that of the OLS estimation. Nonetheless, we show in the next section that compliers are not weak firms on average.

can result in a one-time large change in performance like the one we document. A jump in profitability is likely to be needed in equilibrium to compensate for the large costs involved in going public. For example, Gahng, Ritter, and Zhang (2021) show that the costs of the median IPO are close to 5% of market capitalization (e.g., underwriter commissions, underpricing, etc.). Save for exceptions, going public happens only once in a firm's life cycle, so it is not unreasonable to think that it can change the course of a firm's history in a dramatic way.

4.5 External Validity and Compliers

The IV approach identifies the effects of going public by focusing on *compliers*, i.e., the sub-population of firms whose IPO decision is affected by prior market returns. This local average treatment effect (LATE) may not coincide with the average treatment effect (ATE) in the population. In order to assess the external validity of our results it is important to identify and characterize the complier population.

Compliers can be understood as firms that are at the "margin" of completing their IPO before they are nudged by market returns to complete or withdraw. Compliers cannot be identified individually, because we observe each firm's decision once and not under different return scenarios. However, the first stage coefficient gives us the fraction of compliers in the full sample. As implied by column 2 in Table 3, compliers represent 6.9% of the sample. This size of the complier population is comparable to other IV studies (see, for example, Table 4.4.2 in Angrist and Pischke 2009), and hence it can be enough for identification purposes.

We can further decompose the complier population into the fraction of compliers among the completed (treated) and the withdrawn (untreated) IPOs. The fraction of compliers among completed IPOs is given by:

$$P(\text{Complier}|\text{Completed IPO}) = \frac{\text{1st Stage Coefficient} \times P(\text{Positive 30 day returns})}{P(\text{Completed IPO})} \quad (3)$$

As we show in Panel A of Table 4, the fraction of compliers among completed IPOs is 4.87%. Analogously, the fraction of compliers among withdrawn IPOs is 34.38%, which implies that market returns have a stronger incidence in the decision to withdraw than in the decision to complete. This fits well with the fact that firms more often cite poor market conditions as a reason to withdraw than good returns as a reason to complete.

<center>Insert Table 4 here</center>

In Panel B of Table 4 we study the characteristics of compliers. The relative likelihood that compliers have a given characteristic is equal to the ratio of the first stage coefficient in the sub-sample with that characteristic over the first stage coefficient in the full sample. A ratio of one means that compliers are as likely as the rest of the sample of having a given characteristic. For example, the likelihood that compliers are large firms (i.e., with assets above the sample median) is just 1.04 times the likelihood in the full sample. Compliers are marginally more likely to have high pre-IPO OROA (ratio 1.12), to be older (ratio 1.17), and to come from countries with high disclosure requirements (ratio 1.48) and high anti-self-dealing index (ratio 1.27).[15] Overall, compliers do not seem to be weak firms timing the market, but instead they are relatively average firms, as in asymmetric information models. Since compliers' characteristics are similar to those of the overall population, our results are likely to carry over to most IPO attempts.

4.6 Robustness

IV estimations have been subject to recent scrutiny (see, among others, Atanasov and Black 2016, Jiang 2017, Lee, McCrary, Moreira, and Porter 2021, Young 2022). For instance, Young (2022) shows that many IV setups are sensitive to minimal changes in sample definition. He finds that results are often not robust to deleting just one cluster of observations. In our case,

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[15]The disclosure index of IPO prospectuses is taken from La Porta, López-de-Silanes, and Shleifer (2006). The anti-self-dealing index, which measures investor protection, is taken from Djankov, La Porta, López-de-Silanes, and Shleifer (2008).

clusters are defined at the firm level, so we check whether results are robust to excluding firms. As seen in Figure 5, the coefficient and p-values for the main profitability regression are tightly estimated in the samples that result from excluding one firm at a time. The largest p-value that we find is 4%, while the smallest is 2.6%. Hence, our results are not dependent on just a few extreme observations.

Insert Figure 5 here

Another indication of potential problems with the IV estimation is that confidence bands often contain the OLS point estimate. In our case, the IV confidence bands (from column 4 in Table 3) reject the OLS estimate (column 1 in Table 3). Overall, our statistical inference is on solid ground.

In Table 5, we show that the first and second stages are robust to changes in sample definition and empirical specification. Our main results do not vary in significance if we include events dropped in our cleaning procedure in the appendix, nor if we exclude particular events such as cross-listings. The IV coefficient for profitability varies between 21% and 25.8% in the different robustness exercises in columns 1 through 5.

Include Table 5 here

The event window that we study goes up to the end of the second calendar year after the IPO attempt (e.g., for an IPO attempt in the year 2010 we take data up to 2012). As a robustness check, we gradually extend the post-attempt window up to the end of the fourth year. We do this without changing the sample of firms, hence some firms have a 3- or 4-year post-event window and others remain with the 2-year window because they disappear or are acquired after the second year. Extending the pre-event sample beyond two years is not feasible due to limited data on very early years. As seen in columns 6-7 of Table 5, the statistical significance and magnitude of the coefficients are very stable in the estimations with longer post-event windows. In fact, the effect on profitability increases with the horizon

instead of reverting to zero, implying that the effect that we identify is not a pure short-term boost in profitability. Figure A.1 in the appendix shows the dynamics of our effects by event year. We show the reduced-form estimates where each event-year dummy is multiplied by the indicator for positive 30-day returns, and the IV estimates where each event-year dummy times the indicator for completed IPOs is instrumented with the event-year dummy multiplied by positive returns. As seen in the figure, the effects become stronger in years $t+3$ and $t+4$.

Finally, in Table A.3 we connect the panel estimation with a cross-sectional alternative where the dependent variable is simply the change in profitability between the post- and pre-attempt periods. The panel regression has advantages like the possibility to add firm and event time fixed effects. Still, the cross-sectional regression can showcase the variation in the data in an interesting way. The IV coefficient in the profitability regression increases from 23.3% in the baseline panel estimation to 51.3% in the cross-sectional regression (significant at the 5% level). The cross-sectional regression boosts the coefficient mainly through the inclusion of country and filing year fixed effects, which in the panel regression can be replicated by adding country times *Post* and filing year times *Post* fixed effects.[16] In the next section, we explore the heterogeneity to country and other variables that this suggests.

4.7 Cross-sectional Variation in the Effect of Going Public On Profitability

In Table 6 we examine the heterogeneity of our results to country and firm-level variation. Adding an interaction term between the endogenous IPO decision and a time-invariant characteristic requires estimating two first stages: One for the IPO dummy and one for the interaction term. The standard approach is to use as additional instrument the interaction of the cross-sectional characteristic with the time-varying instrument. We present the

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[16]Adding more fixed effects has the risk of over-fitting, which could also explain the large coefficients in Table A.3.

extended first-stages in Table A.4.

Include Table 6 here

Cross-sectional variation speaks about the underlying mechanism that changes profitability. The first characteristic that we study is related to informational frictions. We capture cross-country variation in information with an index for disclosure requirements in the IPO prospectus (La Porta, López-de-Silanes, and Shleifer, 2006). The variable *High Disclosure* takes a value of one when the disclosure index is above the sample mean. In column 1 of Table 6 we find an incremental positive effect of high disclosure on OROA of 2.4 percentage points. If more and better information is disclosed, then IPO capital is more likely to be used efficiently. However, the extra boost in profitability in a high-disclosure environment is small relative to the baseline effect of going public in a low-disclosure environment, which is captured by the main IPO coefficient (20.3%).

A second country characteristic is related to agency problems. One potential disadvantage of going public is the dispersion of ownership, which results in weaker incentives for owner-managers (Jensen and Meckling, 1976). If agency is a serious concern, then the benefits of going public should be stronger when minority investors are better protected by laws and regulations. We capture cross-country variation in investor protection using the anti-self-dealing index of Djankov, La Porta, López-de-Silanes, and Shleifer (2008), which reflects how difficult it is for corporate insiders to get away with the diversion of resources and opportunities. In column 2 of Table 6 we find an additional positive impact of investor protection on OROA. For example, a firm that goes public in the UK (high investor protection) would achieve a 2.5% higher profitability than a similar firm going public in Germany (low investor protection). However, and in a similar way as with disclosure, the extra profitability that is achieved by going public in a high-protection country is small when compared to the baseline effect on profitability in a low-protection country (22.2%).

We have two key takeaways from studying country-level variation. First, the positive effect of the IPO on profitability is stronger when there is a more investor-friendly envi-

ronment. In practice, investor protection and disclosure are positively correlated. Hence, whether the incremental effect in profitability can be attributed to better investor protection or to better disclosure is not entirely clear. Second, neither information nor agency seem to be first order effects when explaining the boost in profitability associated with going public.

We now study variation according to firm characteristics, in particular those related to financial constraints. One of the advantages of going public is to improve a firm's access to capital. For example, Brav (2009) concludes that public equity is cheaper than private equity. For this reason, the benefits of going public should be more prevalent among financially constrained firms. Traditional indicators of financial constraints include firm size and age (Hadlock and Pierce, 2010). We use dummy variables for small and young firms compared to the sample mean of assets and age before the IPO attempt. Column 3 in Table 6 shows that the impact of going public on profitability is 3.4 percentage points lower for small firms when compared to large firms. The baseline effect captured by the main IPO indicator (24.2%) implies that the increase in profitability for small firms is still strongly positive (20.8%=24.2%-3.4%). The differential effect on younger firms in column 4 is economically small and statistically insignificant.[17] These cross-firm results speak against financial constraints. However, the results are consistent with small and large firms being at different stages of their life cycle. Large firms show a more immediate return to becoming public firms since they have grown their capital base earlier. Small firms, instead, need to grow their asset base before reaping the full benefits of public status (see also the next section).

Overall, although information, agency, and financial constraints may play a role in the impact of going public, the baseline effect of going public on profitability seems to go beyond any of these channels. Going public is, in essence, a capital infusion. However, the mere injection of capital to a financially needy firm is not the main driver of the effects. Our results suggest that the capital infusion related to IPOs is special. Our preferred interpretation is that going public causes a shift in firm strategy towards commercialization. By

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[17]In unreported results we find that cash-holdings before the IPO, which can be another proxy for financial constraints, have no differential impact on post-IPO profitability.

focusing on the commercialization of tested products, and the expansion towards untapped markets, firms are able to increase margins and reach higher levels of profitability. Since capital raising does not immediately equate to increased commercialization, we explore the commercialization hypothesis in detail in the next section.

5 Evidence for Commercialization

In this section, we study whether there is evidence of a shift towards commercialization. We examine the main building blocks of firm strategy: scale, productivity, firm scope, innovation, and corporate governance. The results in this section are also consistent with recent evidence showing that going public has a material impact on several dimensions of firm behavior such as the composition of its labor force (Babina, Ouimet, and Zarutskie, 2020), its hierarchical structure (Bias, Lochner, Obernberger, and Sevilir, 2022), and the geographical diversity of acquisitions (Cornaggia, Gustafson, Kotter, and Pisciotta, 2021).

5.1 Scale and Productivity

One natural consequence of the shift towards commercialization is to increase sales, which we explore in Table 7. The OLS coefficient on sales is large and positive (0.626 in column 1), but the IV coefficient, although larger than the OLS coefficient, is not statistically significant (0.74 in column 2). When we add interactions we find interesting heterogeneity. IPO firms in high disclosure countries add fewer sales than the average IPO (column 3). Small and young firms add significantly more sales after going public, as implied by the positive interactions of *IPO* with the dummy variables for small and young (column 3). Thus, small and young firms appear to be particularly focused on their sales efforts after going public.

Include Table 7 here

Columns 4 to 6 examine asset expansion. The behavior of assets mirrors the behavior of sales. In particular, small and young firms are also adding more assets (column 6). The

pace at which small firms add assets is stronger than the pace at which they add sales, hence the negative coefficient of *IPO x Small Firm* on the regression for sales over assets (column 9). These results can also explain the negative differential effect of going public on the profitability of small firms documented before (column 3 of Table 6). The most natural explanation is that small firms need to invest more heavily in the early stages of their growth path. Going public helps advance firms along their life cycle with heterogeneous effects on growth and profitability since the starting point of different firms is different.

The last three columns in Table 7 show the results for sales per employee, which is a proxy for labor productivity. We find a strong average effect of going public on productivity (columns 11 and 12). None of the interactions is significant (column 12), which implies that the effects on sales per employee do not depend on country or firm characteristics. Irrespective of the heterogeneous paths to profitability suggested by Table 6, the unconditional effect on sales per employee is positive and strong, which is consistent with a shift in strategy towards commercialization and efficiency for all IPOs.

5.2 Firm Scope and Acquisitions

In Table 8 we provide evidence of changes in firm scope as firms go public. We find that completed IPOs expand significantly towards multiple industries, new subsidiaries, and international markets. The effects are statistically significant for both OLS and IV, but the magnitudes are much bigger in the IV estimation. All of these results are strongly consistent with an increase in commercialization by firms post-IPO. Our results also coincide with the increase in geographical diversification of IPO firms documented by Cornaggia, Gustafson, Kotter, and Pisciotta (2021), and with anecdotal evidence. For example, Vexim, a French manufacturer of medical equipment that went public in 2012, announced in 2013 it was opening offices in Spain and the UK to serve those new markets.

Insert Table 8 here

We note that, as indicated by the negative coefficient on *IPO x Small Firm* across Table 8, small firms tend to grow more organically. They aggressively increase sales and assets, as we saw before, but diversifying less across industries (column 3), and without adding as many subsidiaries (column 6), nor stepping as strongly into more countries (column 9). Small firms still grow in scope. For instance, the overall effect on subsidiaries is positive (0.355=0.481-0.126, from column 6), but they do it less strongly than large firms. These results, combined with the results on sales and assets, are consistent with small firms needing the new capital to exploit existing opportunities within their current scope. Larger firms, instead, step outside their current market segments in order to achieve higher margins and profitability.

We also examine whether IPO firms engage in acquisitions or become targets of acquisitions after IPOs. In Table 9 we find a significant increase in acquisition activity with OLS (column 1), in line with Arikan and Stulz (2016) who find that recent IPO firms make many acquisitions (although relative to older *public* firms, not relative to withdrawn IPOs like we do). The effect is very small and not significant once we instrument for the IPO decision (column 2). This also shows that the IV estimates are not always bigger than OLS, as would be implied by a weak-instruments problem. We do find that young firms make significantly more acquisitions post-IPO (column 3) even after instrumenting for the IPO decision.

In columns 4 to 6 of Table 9 we show results where the dependent variable is a dummy equal to one if the firm is the target of an acquisition in the 5 years after the IPO attempt. We find that the average IPO firm is not less likely to become the target of an acquisition than withdrawn IPOs.[18] However, small firms are less likely than the average firm to become targets as implied by the negative and significant coefficient on the interaction *IPO x Small Firm* (column 6).

Insert Table 9 here

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[18]Gao, Ritter, and Zhu (2013) argue that, instead of going public, many small firms prefer to be acquired by a large organization to bring their product to market faster and more efficiently than what they can do by growing on a stand-alone basis. This result suggests a higher likelihood of being the target of an acquisition among withdrawn IPO firms, which we do not find in Table 9.

5.3 Innovation

In Table 10 we explore the impact of going public on patenting activity. First, we study whether IPO firms apply more or less frequently for patents (that are eventually granted). As our focus is to study changes in firm strategy, we focus on the extensive margin and use a dummy for patent applications as the dependent variable.[19] We examine the impact of the IPO decision by itself and also interacted with country and firm characteristics.

<center>Insert Table 10 here</center>

There is a positive, but insignificant OLS effect of going public on patenting (column 1 in Table 10). Using the IV setup we find a negative average impact of going public on patent applications (column 2), which is consistent with firms becoming less innovative as they go public (Bernstein, 2015).

In columns 4-9 of Table 10 we study the impact of going public on patent applications that are exploratory or exploitative following the classification of Custodio, Ferreira, and Matos (2019). We find a negative IV coefficient on exploratory patents (-0.088 in column 5), and a positive, although smaller, IV coefficient on exploitative patents (0.040 in column 8). These results are consistent with the firm's marginal efforts shifting towards the commercialization of proven ideas instead of new ones.[20]

5.4 Corporate Governance

Finally, we study whether management turnover is related to going public. The need to shift firm strategy, and the pressure to achieve higher profitability, can translate into higher executive turnover. In Table 11, we study the frequency of changes in CEO and CFO.

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[19]Another reason to use a dummy variable for patents is the problems with count data in financial applications (Cohn, Liu, and Wardlaw, 2022).

[20]In the last column of Table 10 we find a negative coefficient on the interaction of IPO and high disclosure, implying that increased disclosure reduces exploitative innovation. This can be related to the negative impact of disclosure rules across the U.S. on the innovation of newly listed firms documented by Dambra and Gustafson (2021).

With IV we find that it is 14.9% (5.6%) more likely to see a change in CEO (CFO) in completed than in withdrawn IPOs (columns 2 and 5). Hence, going public has an impact on corporate governance that arm's-length capital is unlikely to have. Interestingly, the effect is heterogeneous in young and old firms, in line again with the different stages of their life cycle. CEOs are less likely to change in young firms when compared to large firms (-2.4% in column 3). CFOs, on the other hand, are more likely to change in young firms (0.8% in column 6). This is consistent with the idea that young firms need the leadership of their founder (most likely the CEO), but at the same time, they need more financial expertise to transit towards a commercialization strategy.

Insert Table 11 here

6   Conclusions

This paper sheds light on the consequences of going public using a large sample of close to 3,500 firms that file for an initial public offering in 16 European countries between 1997-2017. Our data contains pre- and post-filing financial information irrespective of whether firms complete their IPO or not (i.e., for completed and withdrawn IPOs). The panel structure of our data allows us to control for a host of self-selection issues and life-cycle patterns. We directly address the endogeneity of IPO completion following the strategy in Bernstein (2015). We instrument for IPO completion using short-term market returns before the IPO decision. Market returns in this short window can affect the decision to complete the IPO, but are unlikely to directly affect long-run outcomes.

Consistent with prior findings in the literature, we show that firms' profitability goes down after the IPO. However, we show that the profitability of withdrawn-IPO firms also goes down, so the OLS differences-in-differences effect on firm profitability is essentially zero. Moreover, once we directly tackle the endogeneity problem using the instrumental variables approach, we find increased profitability in firms that go public - a result that is

the opposite of prior literature. One important caveat is that we obtain the causal *differential* effect between completed and withdrawn IPOs, but we cannot identify the causal *level* effect of going public on profitability.

We also find evidence in support of a shift to a commercialization strategy. We find that the average IPO firm increases sales per employee and expands operations to more countries and subsidiaries. Small firms, in particular, strongly increase their sales and assets. Also, patenting activity goes down, particularly in terms of exploratory patents.

Overall, we show that going public is unlikely to be like other capital infusions as it goes above and beyond simply raising capital. Market pressure can lead firms to switch strategy to align with investor preferences (Aghion and Stein, 2008). The positive effect on profitability, sales per employee, new subsidiaries and countries, combined with the negative impact on innovation, are consistent with a change from exploration and searching for new ideas to the commercialization of tested products and services.

References

Aghamolla, Cyrus, and Richard Thakor, 2022, IPO peer effects, *Journal of Financial Economics* 144, 206–226.

Aghion, Philippe, and Jeremy C. Stein, 2008, Growth versus margins: Destabilizing consequences of giving the stock market what it wants, *Journal of Finance* 63, 1025–1058.

Angrist, Joshua D., and Jorn-Steffen Pischke, 2009, *Mostly Harmless Econometrics: An Empiricist's Companion* (Princeton University Press: Princeton).

Arikan, Asli, and Rene M. Stulz, 2016, Corporate acquisitions, diversification, and the firm's life-cycle, *Journal of Finance* 71, 139–193.

Asker, John, Joan Farre-Mensa, and Alexander Ljungqvist, 2015, Corporate investment and stock market listing: A puzzle?, *Review of Financial Studies* 28, 342–390.

Atanasov, Vladimir, and Bernard Black, 2016, Shock-based causal inference in corporate finance and accounting research, *Critical Finance Review* 5, 207–304.

Babina, Tania, Paige Ouimet, and Rebecca Zarutskie, 2020, IPOs, human capital, and labor reallocation, Columbia University and University North Carolina Chapel Hill Working Paper.

Bennedsen, Morten, Kasper Meiner Nielsen, Francisco Perez-Gonzalez, and Daniel Wolfenzon, 2007, Inside the family firm: The role of families in succession decisions and performance, *Quarterly Journal of Economics* 122, 647–691.

Bernard, Darren, David Burgstahler, and Devrimi Kaya, 2018, Size management by European private firms to minimize proprietary costs of disclosure, *Journal of Accounting and Economics* 66, 94–122.

Bernstein, Shai, 2015, Does going public affect innovation?, *Journal of Finance* 70, 1365–1403.

Bias, Daniel, Benjamin Lochner, Stefan Obernberger, and Merih Sevilir, 2022, Going public and the internal organization of the firm, Working Paper.

Borisov, Alexander, Andrew Ellul, and Merih Sevilir, 2021, Access to public capital markets and employment growth, *Journal of Financial Economics* 141, 896–918.

Brav, Omer, 2009, Access to capital, financial structure, and the funding of the firm, *Journal of Finance* 64, 263–308.

Busaba, Walid, Lawrence Benveniste, and Re-Jin Guo, 2001, The option to withdraw IPOs during the premarket: Empirical analysis, *Journal of Financial Economics* 60, 73–102.

Butler, Alexander, Larry Fauver, and Ioannis Sypiridopoulos, 2019, Local economic spillover effects of stock market listings, *Journal of Financial and Quantitative Analysis* 54, 1025–1050.

Chemmanur, Thomas, Shan He, and Debarshi Nandy, 2010, The going public decision and the product market, *Review of Financial Studies* 23, 1855–1908.

Cohn, Jonathan, Zack Liu, and Malcolm Wardlaw, 2022, Count (and count-like) data in finance, *Journal of Financial Economics* pp. –.

Cornaggia, Jess, Mathew Gustafson, Jason Kotter, and Kevin Pisciotta, 2020, Initial public offerings and the local economy, Penn State University Working Paper.

——— , 2021, Does being private constrain geographical expansion?, Penn State University Working Paper.

Cornelli, Francesca, David Goldreich, and Alexander Ljungqvist, 2006, Investor sentiment and pre-IPO markets, *Journal of Finance* 61, 1187–1216.

Custodio, Claudia, Miguel Ferreira, and Pedro Matos, 2019, Do general managerial skills spur innovation?, *Management Science* 65, 459–476.

Dambra, Michael, and Matthew Gustafson, 2021, Do the burdens to being public affect the the investment and innovation of newly public firms?, *Management Science* 57, 594–616.

———— , and Kevin Pisciotta, 2021, What is the effect of an additional dollar of IPO proceeds?, *Journal of Corporate Finance* 66, –.

Degeorge, Francois, and Richard Zeckhauser, 1993, The reverse LBO decision and firm performance: Theory and evidence, *Journal of Finance* 48, 1323–1348.

Derrien, Francois, 2005, IPO pricing in "hot" market conditions: Who leaves money on the table?, *Journal of Finance* 60, 487–521.

Djankov, Simeon, Rafael La Porta, Florencio López-de-Silanes, and Andrei Shleifer, 2008, The law and economics of self-dealing, *Journal of Financial Economics* 88, 430–465.

Edelen, Roger, and Gregory Kadlec, 2005, Issuer surplus and the partial adjustment of IPO prices to public information, *Journal of Financial Economics* 77, 347–373.

Erel, Isil, Yeejin Jang, and Michael Weisbach, 2015, Do acquisitions relieve target firms' financial constraints?, *Journal of Finance* 70, 289–329.

Gahng, Minmo, Jay Ritter, and Donghang Zhang, 2021, SPACs, *Working Paper* pp. –.

Gao, Xiaohui, Jay Ritter, and Zhongyan Zhu, 2013, Where have all the IPOs gone?, *Journal of Financial and Quantitative Analysis* 48, 1663–1692.

Gilje, Erik, and Jerome Taillard, 2016, Do private firms invest differently than public firms? Taking cues from the natural gas industry, *Journal of Finance* 71, 1733–1778.

Hadlock, Charles, and Joshua Pierce, 2010, New evidence on measuring financial constraints: Moving beyond the KZ index, *Review of Financial Studies* 23, 1909–1940.

Helbing, Pia, Brian Lucey, and Samuel Vigne, 2019, The determinants of IPO withdrawal - Evidence from Europe, *Journal of Corporate Finance* 56, 415–436.

Jain, Bharat, and Omesh Kini, 1994, The post-issue operating performance of IPO firms, *Journal of Finance* 49, 1699–1726.

Jensen, Michael, and William Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305–360.

Jiang, Wei, 2017, Have instrumental variables brought us closer to truth?, *Review of Corporate Finance Studies* 6, 127–140.

Kim, Woojin, and Michael Weisbach, 2008, Motivations for public equity offers: An international perspective, *Journal of Financial Economics* 87, 281–307.

La Porta, Rafael, Florencio López-de-Silanes, and Andrei Shleifer, 2006, What works in securities laws?, *Journal of Finance* 61, 1–32.

Lee, David, Justin McCrary, Marcelo Moreira, and Jack Porter, 2021, Valid *T*-ratio inference for IV, *NBER Working Paper 29124* pp. –.

Ljungqvist, Alexander, and William Wilhelm, 2002, IPO allocations: Discriminatory or discretionary?, *Journal of Financial Economics* 65, 167–201.

Loughran, Tim, and Jay Ritter, 2002, Why don't issuers get upset about leaving money on the table in IPOs?, *Review of Financial Studies* 15, 413–433.

Lucas, Deborah, and Robert McDonald, 1990, Equity issues and stock price dynamics, *Journal of Finance* 45, 1019–1043.

Maksimovic, Vojislav, Gordon Phillips, and Liu Yang, 2020, Are public firms really myopic? Evidence from matching IPO firms at birth, University of Maryland and Dartmouth College Working Paper.

Mikkelson, Wayne H., M. Megan Partch, and Kshitij Shah, 1997, Ownership and operating performance of companies that go public, *Journal of Financial Economics* 44, 281–307.

Montiel-Olea, Jose, and Carolin Pflueger, 2013, A robust test for weak instruments, *Journal of Business & Economic Statistics* 31, 358–369.

Myers, Stewart, and Nicholas Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187–221.

Pagano, Marco, Fabio Panetta, and Luigi Zingales, 1998, Why do companies go public? An empirical analysis, *Journal of Finance* 53, 27–64.

Pástor, Luboš, Lucian Taylor, and Pietro Veronesi, 2009, Entrepreneurial learning, the IPO decision, and the post-IPO drop in firm profitability, *Review of Financial Studies* 22, 3000–3046.

Phillips, Gordon M., and Giorgo Sertsios, 2017, Financing and new product decisions of private and publicly traded firms, *Review of Financial Studies* 30, 1744–1789.

Sheen, Albert, 2020, Do public and private firms behave differently? An examination of investment in the chemical industry, *Journal of Financial and Quantitative Analysis* 55, 2530–2554.

Spiegel, Matthew, and Heather Tookes, 2020, Why does an IPO impact rival firms?, *Review of Financial Studies* 33, 3205–3249.

Stein, Jeremy, 1989, Efficient capital markets, inefficient firms: A model of myopic corporate behavior, *Quarterly Journal of Economics* 104, 655–669.

Teoh, Siew-Hong, Ivo Welch, and T.J. Wong, 1998, Earnings management and the long-run market performance of initial public offerings, *Journal of Finance* 53, 1935–1974.

Young, Alwyn, 2022, Consistency without inference: Instrumental variables in practical application, *European Economic Review* pp. –.

Figure 1: IPOs over Countries and Years
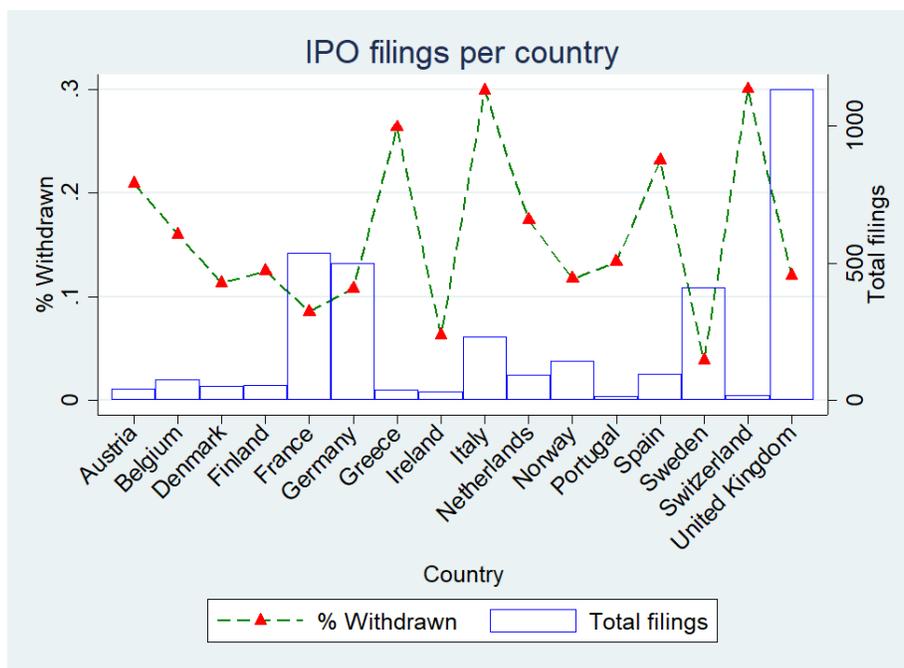
(a)
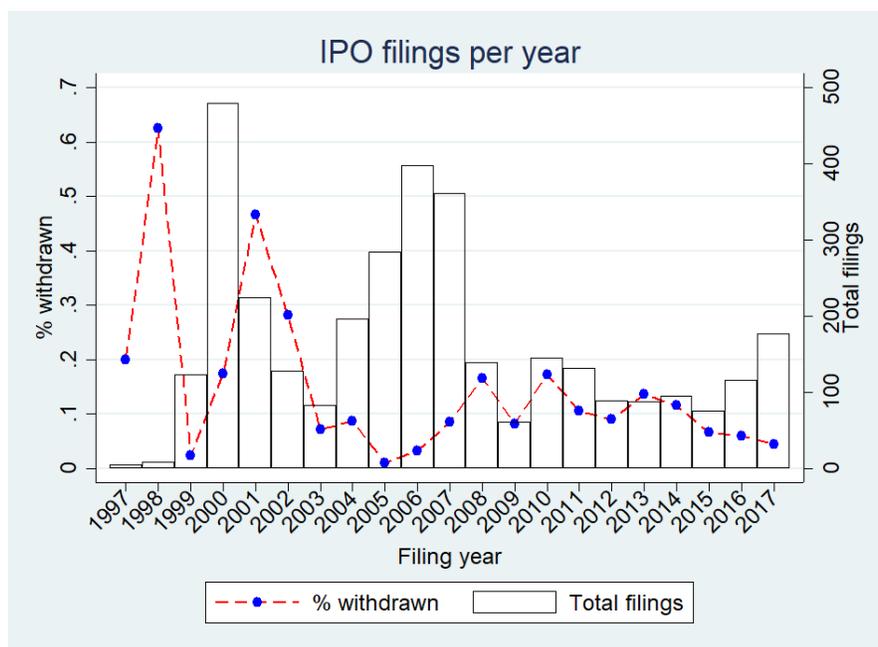
(b)

Notes: This figure shows the total number of IPO filings and the fraction of withdrawn IPOs by country of listing (panel a) and year (panel b).

Figure 2: Observations by Event Year
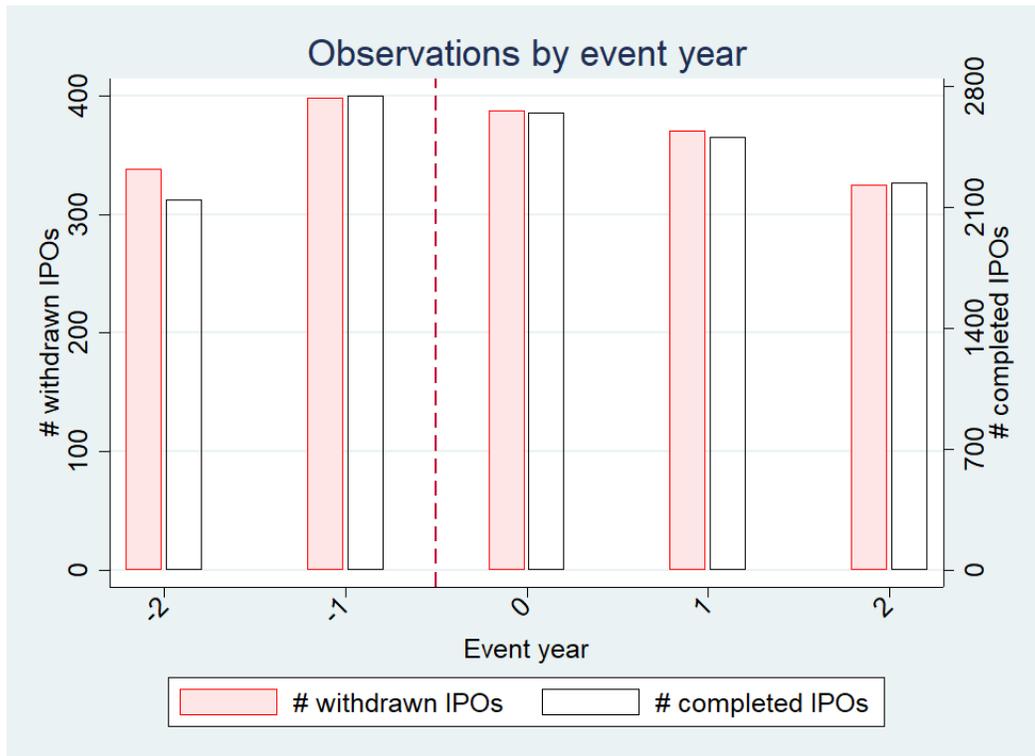
Notes: The figure shows the number of observations per event-year for withdrawn IPOs (dark bar, left axis) and completed IPOs (light bar, right axis). Event years are measured at the end-of-the-year around the IPO-attempt year (t=0).

Figure 3: Asymmetric Information and Market Returns

Notes: The figure shows the theoretical predictions of asymmetric information models regarding the decision to complete or withdraw the IPO according to (unobservable) firm quality and past market returns. More firms complete their IPOs after positive returns, and the average quality of issuers goes up. In the language of treatment effects, firms that complete or withdraw their IPOs in response to past returns are "compliers." Compliers are of intermediate quality. Firms that complete (withdraw) their IPOs regardless of past returns are "always takers" ("never takers").

Figure 4: Profitability by Event Year for Completed and Withdrawn IPOs
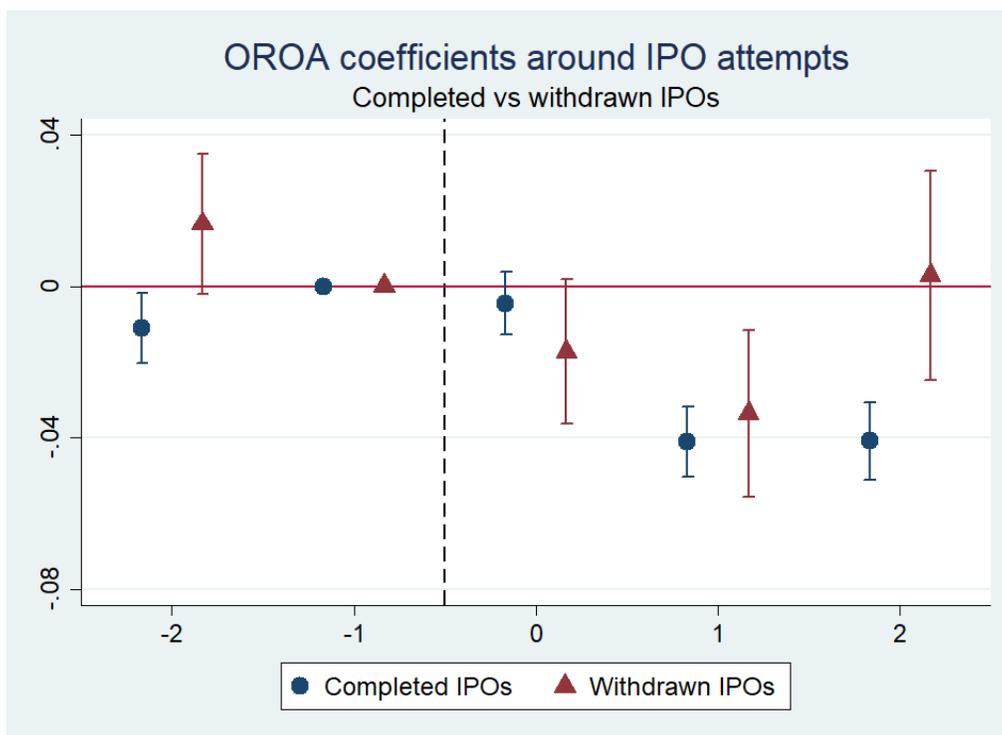
Notes: The figures displays coefficient estimates and 95% confidence intervals of event-time fixed effects. The dependent variable is run against event-time fixed effects for completed and withdrawn IPOs, setting t=-1 as the default category. The regressions include firm fixed effects to account for within-firm dynamics.

Figure 5: Statistical Inference when Excluding Clusters

(a)

(b)
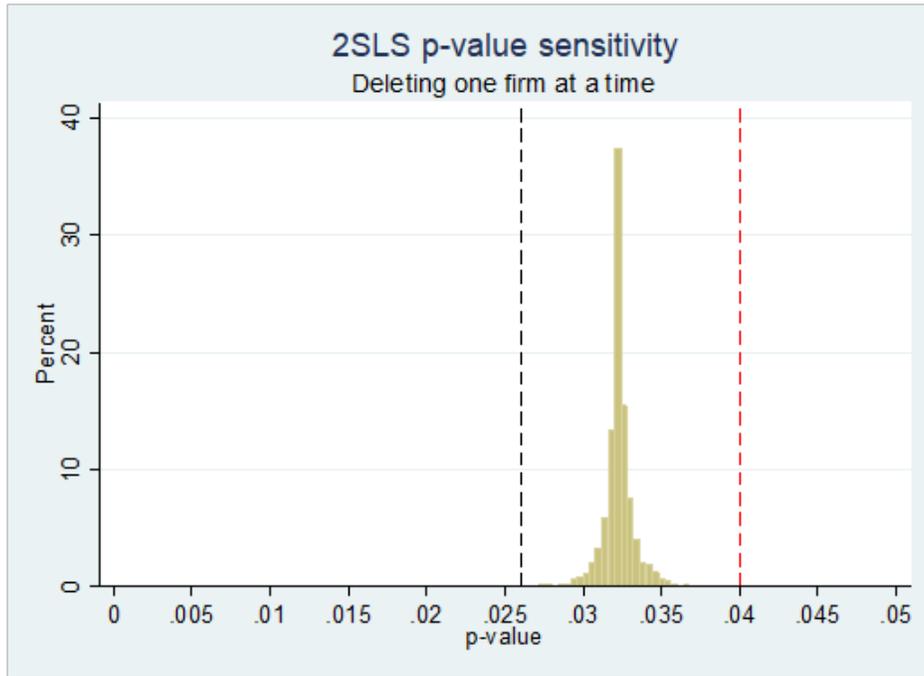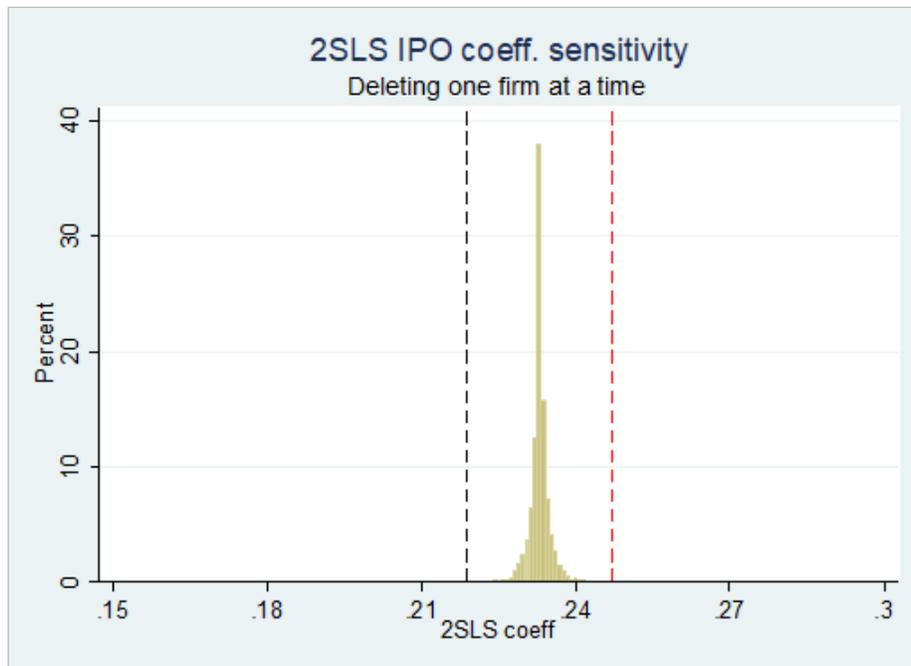
Notes: The figure shows the distribution of p-values (panel a) and β coefficients (panel b) from the second stage OROA regression of the multiple samples that result from excluding one firm (cluster) at a time. Dashed vertical lines show the maximum and minimum values obtained.

Table 1: Summary Statistics

Completed IPO is an indicator variable that takes a value of 1 if a firm completed an IPO and 0 otherwise. Post is an indicator variable that takes a value of 1 for the IPO-attempt year and after; 0 otherwise. IPO is the Completed IPO dummy times the Post dummy. OROA (operating return on assets) is EBIT over book assets. Assets (Sales) is book assets (yearly sales) in 2019 million Euros. Sales are also reported over the number of employees (Sales(MM)/Empl.) and over book assets (Sales/Assets). Age is calendar year minus incorporation year. Subsidiary is a dummy for when the firm has a subsidiary. Multiple industries is a dummy for when subsidiaries are in different 3-digit SIC industries. International is a dummy for when at least one subsidiary is in a different country from the firm's headquarters. The number of patents corresponds to patent applications that are eventually granted. Patent (exploratory/exploitative) is a dummy for years with (exploratory/exploitative) patent applications that are eventually granted. Acquisitions corresponds to the number of firms acquired. Returns 30 days is the market return (country-index) where the firm is listed, for the month preceding the IPO attempt. Positive 30-day ret is a dummy for when 30-day returns are positive. Accounting variables are 1%-winsorized.

	Mean	P10	P25	P50	P75	P90	SD	Total
Completed IPO	0.87	0	1	1	1	1	0.34	14,110
Post	0.6	0	0	1	1	1	0.49	14,110
IPO	0.52	0	0	1	1	1	0.5	14,110
OROA	-0.02	-0.35	-0.09	0.03	0.1	0.19	0.24	12,321
Assets (MM)	172.77	0.48	2.34	10.6	55.21	333.48	598.43	13,696
Sales(MM)	318.67	0.45	3.73	20.27	113.76	640.92	1,085.94	12,332
Sales(MM)/Empl	0.65	0.04	0.09	0.18	0.4	1.13	2	9,801
Sales/Assets	2.69	0.11	0.66	1.96	3.65	6.01	2.9	12,024
Age	11.31	1	3	7	13	24	15.22	12,883
Subsidiary	0.35	0	0	0	1	1	0.48	14,110
Multiple Industries	0.19	0	0	0	0	1	0.4	14,110
International	0.09	0	0	0	0	0	0.28	14,110
# Patents	0.49	0	0	0	0	0	7.8	14,110
Patent	0.02	0	0	0	0	0	0.15	14,110
Exploitative	0.01	0	0	0	0	0	0.11	14,110
Exploratory	0.02	0	0	0	0	0	0.14	14,110
Acquisitions	0.23	0	0	0	0	1	0.71	14,110
Returns 30 days	0.01	-0.06	-0.02	0.01	0.04	0.07	0.06	14,110
Positive 30-day ret	0.62	0	0	1	1	1	0.49	14,110

Table 2: Average Firm Characteristics by IPO status and Market Returns

This table shows averages of the main variables for sample splits before the IPO attempt. Panel A presents the means and differences according to IPO status (treatment): withdrawn vs. completed IPOs. Panel B shows the means and differences according to pre-attempt market returns above or below the sample mean (exposure to the instrument). Significant at: *10%, **5% and ***1%.

Panel A: Split by Endogenous Treatment			
Variable (pre IPO attempt)	Completed IPO	Withdrawn	Diff.
OROA	-0.015	0.013	-0.028**
Assets (MM)	135.69	251.926	-116.236***
Sales (MM)	255.154	540.566	-285.412***
Sales(MM)/Employees	0.579	0.843	-0.264**
Sales/Assets	2.87	3.078	-0.207
Multiple Industries	0.08	0.1	-0.020*
Subsidiary	0.153	0.166	-0.014
International	0.034	0.048	-0.014*
Leverage	0.541	0.571	-0.030*
Acquisitions	0.075	0.122	-0.047**
Patents	0.413	1.022	-0.61
Returns 30 days	0.011	-0.009	0.020***
Positive 30-day ret	0.645	0.428	0.217***
# of firms	3,037	430	
Panel B: Split by the Instrument			
Variable (pre IPO attempt)	High Returns	Low Returns	Diff.
OROA	-0.018	-0.005	-0.012
Assets (MM)	146.306	152.721	-6.415
Sales (MM)	284.995	296.418	-11.423
Sales(MM)/Employees	0.551	0.671	-0.12
Sales/Assets	2.838	2.953	-0.115
Multiple Industries	0.082	0.082	0.000
Subsidiary	0.154	0.155	-0.001
International	0.039	0.033	0.006
Leverage	0.542	0.547	-0.005
Acquisitions	0.087	0.075	0.012
Patents	0.494	0.483	0.011
Returns 30 days	0.05	-0.033	0.083***
Positive 30-day ret	1	0.237	0.763***
Completed IPO	0.912	0.84	0.073***
# of firms	1,733	1,734	

Table 3: The Effects of Going Public on Firm Profitability: Main Results

Column 1 presents results of the OLS regression of OROA using equation 1. Column 2 is the first stage of the IV setup where the instrument is a dummy for positive returns over the 30 days before the IPO is completed or withdrawn. Column 3 is a placebo first stage using a dummy for positive market returns in the 30 days after the IPO is completed or withdrawn. Column 4 is the second stage of the IV setup that follows the first stage in Column 2. Column 5 is the reduced form regression of OROA directly on the dummy for positive returns. Column 6 is a placebo reduced form regression of OROA on the dummy for positive returns on the following 30 days. We report the Kleibergen-Paap F-test for weak instruments that is robust to non-i.i.d. errors. Standard errors (in parentheses) are adjusted for heteroskedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) OROA	(2) IPO	(3) IPO	(4) OROA	(5) OROA	(6) OROA
IPO	-0.002			0.233**		
	(0.010)			(0.109)		
Positive 30-day ret x Post		0.069***			0.016**	
		(0.013)			(0.007)	
Positive 30 days forward x Post			0.010			0.001
			(0.013)			(0.007)
Observations	12,189	12,189	12,189	12,189	12,189	12,189
R-squared	0.062	0.894	0.893		0.063	0.062
Number of firms	3,195	3,195	3,195	3,195	3,195	3,195
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes
Regression	OLS	First stage	Placebo 1st	Second stage	Red. form	Placebo r.f.
K-P F-test		27.84	0.69			
Instrument				Positive 30d ret.		

Table 4: Frequency and Characteristics of Compliers

Panel A computes the fraction of compliers among the completed IPOs (withdrawn IPOs) as the first stage coefficient from the full sample (column 2 in Table 3) times the likelihood of experiencing positive returns divided by the likelihood of completing (withdrawing) the IPO in the cross section. Panel B shows the first stage coefficient in different subsamples of firms with a given characteristic above the full-sample median. The relative complier likelihood of having a given characteristic is the first stage coefficient in each subsample divided by the full-sample first stage coefficient.

Panel A: Frequency of Compliers				
P(Completed IPO)	P(Positive 30d ret.)	First Stage	% of Compliers in Completed IPOs	% of Compliers in Withdrawn IPOs
87.59%	61.84%	6.90%	4.87%	34.38%

Panel B: Characteristics of Compliers		
Variable (pre IPO attempt)	First Stage	Relative complier likelihood
High OROA	7.74%	1.12
High Assets	7.18%	1.04
High Sales	6.97%	1.01
High Sales/Employees	7.17%	1.04
High Sales/Assets	4.59%	0.66
High Age	8.05%	1.17
High Leverage	4.10%	0.59
High Disclosure Index	10.18%	1.48
High Anti-self-dealing Index	8.76%	1.27

Table 5: Robustness to Sample Selection and Regression Specification

This table shows the second-stage results for OROA across different samples and specifications. Columns 1-3 deal with particular events identified in the appendix on sample selection. In column 1, we add to the baseline sample excluded IPOs due to overlapping events. In column 2, we drop from the baseline sample firms with non-overlapping attempts. In column 3, we exclude the 12 withdrawn attempts that represent follow-up withdrawn attempts outside the 5-year interval window. In column 4, we drop cross-listings. Cross-country listing is when the main country of listing is different from the country where the firm is headquartered. In column 5, we add industry-times-year fixed effects when industries are defined at the 2-digit SIC level. In columns 6-7 we extend the post-IPO-attempt horizon keeping the same sample of firms. The first year in each sample is always year t-2, and the last year goes from t+3 in column 6 to t+4 in column 7. Standard errors (in parentheses) are adjusted for heteroskedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

Sample/ Specification	(1) plus excl. IPO	(2) drop non-overlap	(3) drop prior withdr.	(4) drop cross-list	(5) 2-dig-SIC x Year FE	(6) Window [-2, 3]	(7) Window [-2, 4]
VARIABLES	OROA	OROA	OROA	OROA	OROA	OROA	OROA
IPO	0.210**	0.237**	0.250**	0.258**	0.253**	0.245**	0.268**
	(0.093)	(0.108)	(0.116)	(0.114)	(0.117)	(0.107)	(0.107)
Observations	12,450	12,076	12,143	11,889	12,189	14,162	15,932
Number of firms	3,259	3,165	3,183	3,121	3,195	3,195	3,195
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Cross-sectional Variation in the Effect of Going Public on Profitability

This table shows the second stage regressions including interactions of the IPO variable with indicators for countries with high disclosure, high the anti-self-dealing index, small firms, and young firms. These variables are defined with respect to the sample average of each characteristic pre-IPO-attempt. To obtain the instrumented interactions, we extend the first-stage regression to include as additional instruments the interaction of our main instrument times the dummy indicators for high disclosure, high anti-self-dealing, small and young firms. Standard errors (in parentheses) are adjusted for heteroskedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) OROA	(2) OROA	(3) OROA	(4) OROA	(5) OROA
IPO	0.203*	0.222**	0.242**	0.216*	0.187
	(0.112)	(0.108)	(0.110)	(0.119)	(0.121)
IPO x High Disclosure	0.024**				0.026**
	(0.011)				(0.011)
IPO x High Anti-self-dealing		0.025**			0.015
		(0.011)			(0.012)
IPO x Small Firm			-0.034***		-0.032***
			(0.012)		(0.012)
IPO x Young Firm				-0.007	-0.007
				(0.011)	(0.011)
Observations	12,189	12,189	12,055	10,884	10,789
Number of firms	3,195	3,195	3,142	2,835	2,798
Firm FE	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes
Regression	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument #1	Positive 30d ret	Positive 30d ret	Positive 30d ret	Positive 30d ret	Positive 30d ret
Instrument #2	Positive 30d ret x High Discl.	Positive 30d ret x High anti-sd	Positive 30d ret x Small	Positive 30d ret x Young	All interactions

Table 7: The Effects of Going Public on Firms Scale and Productivity

This table shows regression results for log sales (columns 1-3), log assets (columns 4-6), the ratio of sales over assets (columns 7-9), and sales per employee (columns 10-12). For each dependent variable we show the OLS regression, the basic IV regression following Table 3, and the IV regression with interactions following Table 6. All log variables correspond to the log of one plus the variable of interest. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Sales	(2) Sales	(3) Sales	(4) Assets	(5) Assets	(6) Assets	(7) S/A	(8) S/A	(9) S/A	(10) S/Empl.	(11) S/Empl.	(12) S/Empl.
IPO	0.626***	0.74	0.633	0.659***	0.529	-0.181	-0.266**	-0.426	-0.926	0.113	2.983**	4.524**
	(0.128)	(1.392)	(1.790)	(0.092)	(0.834)	(0.900)	(0.109)	(1.205)	(1.356)	(0.124)	(1.408)	(2.177)
IPO x High Disclosure			-0.456**			-0.231***			0.309***			-0.156
			(0.182)			(0.086)			(0.118)			(0.155)
IPO x High Anti-self-dealing			0.223			0.237**			0.122			0.157
			(0.189)			(0.101)			(0.132)			(0.166)
IPO x Small Firm			0.844***			1.127***			-0.310**			-0.196
			(0.161)			(0.085)			(0.125)			(0.171)
IPO x Young Firm			1.151***			0.621***			0.191			-0.194
			(0.146)			(0.085)			(0.118)			(0.124)
Observations	12,208	12,208	10,554	13,670	13,670	12,158	11,884	11,884	10,463	9,462	9,462	8,130
R-squared	0.13			0.27			0.06			0.04		
Number of firms	3,141	3,141	2,697	2,660	2,660	2,274	3,091	3,091	2,694	2,660	2,660	2,274
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regression	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage

Table 8: The Effects of Going Public on Firm Scope

This table shows regression results using as dependent variables dummies for firm-years with operations in multiple industries (columns 1-3), with subsidiaries (columns 4-6), and international presence (columns 7-9). For each dependent variable we show the OLS regression, the basic IV regression following Table 3, and the IV regression with interactions following Table 6. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Mult. Ind.	(2) Mult. Ind.	(3) Mult. Ind.	(4) Sub.	(5) Sub.	(6) Sub.	(7) Int'l	(8) Int'l	(9) Int'l
IPO	0.084***	0.361**	0.431**	0.103***	0.481***	0.481**	0.035***	0.215**	0.375***
	(0.016)	(0.141)	(0.181)	(0.019)	(0.160)	(0.200)	(0.012)	(0.106)	(0.141)
IPO x High Disclosure			0.026			0.031			-0.025
			(0.019)			(0.021)			(0.015)
IPO x High Anti-self-dealing			0.026			0.012			-0.036**
			(0.020)			(0.023)			(0.016)
IPO x Small Firm			-0.163***			-0.126***			-0.113***
			(0.021)			(0.022)			(0.016)
IPO x Young Firm			0.040**			0.051***			0.000
			(0.017)			(0.020)			(0.013)
Observations	14,110	14,110	12,299	14,110	14,110	12,299	14,110	14,110	12,299
R-squared	0.26			0.39			0.13		
Number of firms	3,467	3,467	2,992	3,467	3,467	2,992	3,467	3,467	2,992
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regression	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage

Table 9: The Effects of Going Public on M&A Activity

This table shows regressions using the log of the number of acquisitions (columns 1-3) and a dummy for being the target of an acquisition (columns 4-6) as dependent variables. For each dependent variable we show the OLS regression, the basic IV regression following Table 3, and the IV regression with interactions following Table 6. All log variables correspond to the log of one plus the variable of interest. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Acquisitions	(2) Acquisitions	(3) Acquisitions	(4) Target	(5) Target	(6) Target
IPO	0.128***	0.012	-0.036	0.001	0.063	0.056
	(0.014)	(0.130)	(0.166)	(0.012)	(0.094)	(0.120)
IPO x High Disclosure			-0.032*			-0.003
			(0.018)			(0.013)
IPO x High Anti-self-dealing			0.000			-0.020
			(0.019)			(0.014)
IPO x Small Firm			-0.032			-0.029**
			(0.019)			(0.014)
IPO x Young Firm			0.047***			0.000
			(0.016)			(0.012)
Observations	14,110	14,110	12,299	14,110	14,110	12,299
R-squared	0.11			0.09		
Number of firms	3,467	3,467	2,992	3,467	3,467	2,992
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes
Regression	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage

Table 10: The Effects of Going Public on Innovation

This table shows regressions using the dummies for firm-year observations with patent applications that are eventually granted (*Patent*), and for the presence of exploratory (*Exploratory*) or exploitative (*Exploitative*) patents. The classification of patents into exploratory and exploitative follows (Custodio, Ferreira, and Matos, 2019). We show the OLS regression, the second stage from the basic IV regression following Table 3, and the IV regressions with interactions following Table 6. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Patent	(2) Patent	(3) Patent	(4) Exploratory	(5) Exploratory	(6) Exploratory	(7) Exploitative	(8) Exploitative	(9) Exploitative
IPO	0.003	-0.079*	-0.041	0.004	-0.088**	-0.057	0.001	0.040*	0.027
	(0.004)	(0.041)	(0.048)	(0.004)	(0.042)	(0.049)	(0.003)	(0.023)	(0.030)
IPO x High Disclosure			-0.001			0.001			-0.007**
			(0.004)			(0.004)			(0.003)
IPO x High Anti-self-dealing			-0.004			-0.003			-0.003
			(0.004)			(0.004)			(0.002)
IPO x Small Firm			-0.002			0.002			0.000
			(0.005)			(0.005)			(0.003)
IPO x Young Firm			0.006			0.008*			-0.002
			(0.004)			(0.004)			(0.002)
Observations	14,110	14,110	12,299	14,110	14,110	12,299	14,110	14,110	12,299
R-squared	0.03			0.03			0.00		
Number of firms	3,467	3,467	2,992	3,467	3,467	2,992	3,467	3,467	2,992
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regression	OLS	2nd Stage	2nd Stage	OLS	2nd Stage	2nd Stage	OLS	2nd Stage	2nd Stage

Table 11: The Effects of Going Public on Management Turnover

This table shows regressions where dependent variables are dummies for firm-years with a change in CEO or CFO. We show the OLS regression, the second stage from the basic IV regression following Table 3, and the IV regressions with interactions following Table 6. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

| VARIABLES	(1) CEO Change	(2) CEO Change	(3) CEO Change	(4) CFO Change	(5) CFO Change	(6) CFO Change
IPO	0.014	0.149*	0.188	0.001	0.056**	0.039
	(0.009)	(0.090)	(0.119)	(0.004)	(0.028)	(0.034)
IPO x High Disclosure			-0.009			0.004
			(0.011)			(0.003)
IPO x High Anti-self-dealing			0.004			0.006
			(0.013)			(0.004)
IPO x Small Firm			-0.015			-0.004
			(0.013)			(0.005)
IPO x Young Firm			-0.024**			0.008**
			(0.011)			(0.004)
Observations	14,110	14,110	12,299	14,110	14,110	12,299
R-squared	0.02			0.03		
Number of firms	3,467	3,467	2,992	3,467	3,467	2,992
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes
Regression	OLS	2nd stage	2nd stage	OLS	2nd stage	2nd stage

Appendix

Sample Selection

From raw data to final sample

- IPO attempts with valid IPO-attempt dates and data (not necessarily for all variables in our analysis) before and after the attempt: 3,534.

- Define a 5-year event window around the event: from -2 to +2.

- Exclude firms with overlapping withdrawn IPO and a completed IPO events: 52 events.

- Exclude the first withdrawn event that is followed by another withdrawn event within 5 years: 15 events.

  - 12 were followed by another withdrawn event included in the sample.

  - 2 were followed by non-overlapping withdrawn-and-completed IPO events included the sample.

  - 1 was followed by overlapping withdrawn-and-completed IPO events not included in the sample.

- Final sample: 3,467 IPO attempts (=3,534-52-15)

  - 430 withdrawn and 3,037 completed.

  - Final sample includes:

    * 12 withdrawn attempts that represent the follow-up withdrawn attempt outside the 5-year interval.

    * 19 firms (38 events) that have a withdrawn attempt followed by a completed IPO more than 5 years apart (non-overlapping events).

Firms that withdraw

- Combining the included and excluded events from the sample there are 456 firms that withdraw their IPOs.

- 408 firms that withdraw their IPO do not file again.

- 48 attempt to go public again.

- 36 eventually go public later on.

- Mean (median) time between a withdrawn IPO attempt and the next attempt is 2.4 (0.5) years.

- Mean (median) time between a withdrawn IPO attempt and the next withdrawn attempt is 2.2 years (0.16 year = 2 months).

- Mean (median) time between a withdrawn IPO attempt and a completed IPO is 2.5 years (1.2 years).

Figure A.1: Dynamics of the Effects by Event-Year

(a)

(b)
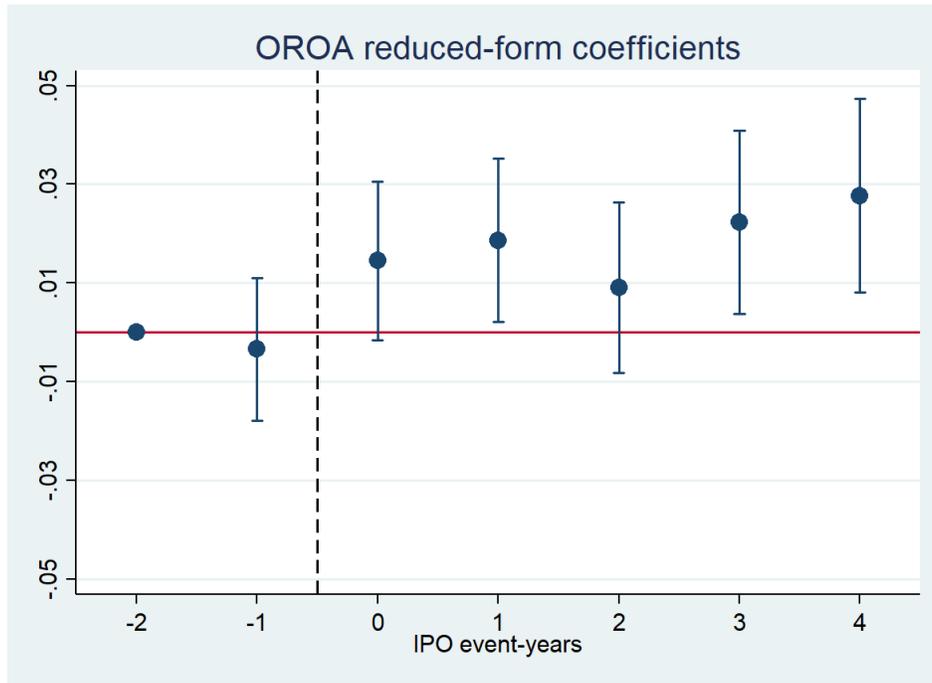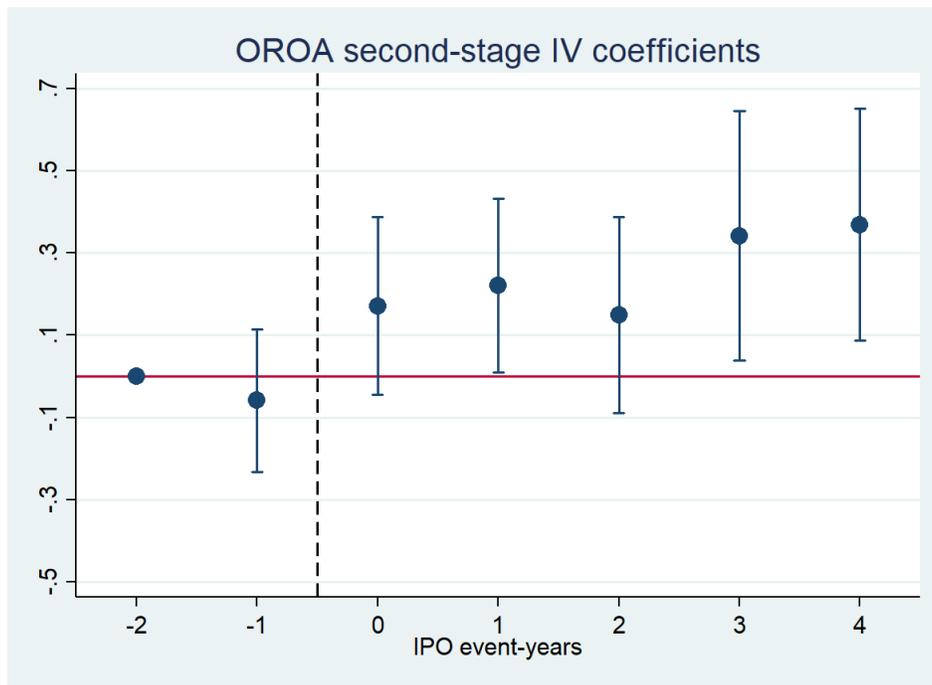
Notes: The figures displays the reduced-form coefficient estimates with 95% confidence intervals of event-year fixed effects times the indicator for positive returns (panel a), and the IV coefficients with 95% confidence intervals for event-year fixed effects times the completed IPO indicator (panel b). We set $t=-2$ as the default category. In the IV estimation the instruments are the event-year fixed effects times the indicator for positive returns.

Table A.1: Additional Summary Statistics

This table summary statistics for additional variables. Anti-self-dealing is a measure of legal protection of minority shareholders against expropriation by corporate insiders at the country level following Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). Disclosure is an index of disclosure requirements for initial public offerings at the country level following La Porta, Lopez-de-Silanes, and Shleifer (2006). Target is an indicator variable that takes a value of 1 if the firm is the target of an acquisition during the first 5 years after the IPO attempt. Patents exploratory (exploitative) is the number of exploratory (exploitative) patent applications that are eventually granted. An exploratory (exploitative) patent is one where 60% or more of its citations are based on new (current) knowledge (Custodio, Ferreira, and Matos, 2019). The last two variables are dummies for years with a change in CEO or CFO.

	Mean	P10	P25	P50	P75	P90	SD	Total
Anti-self-dealing	0.562	0.28	0.33	0.42	0.95	0.95	0.291	14,110
Disclosure	0.661	0.42	0.5	0.67	0.83	0.83	0.164	14,110
Target	0.03	0	0	0	0	0	0.171	14,110
# Exploitative	0.16	0	0	0	0	0	2.92	14,110
# Exploratory	0.29	0	0	0	0	0	4.67	14,110
CEO change	0.04	0	0	0	0	0	0.197	14,110
CFO change	0.005	0	0	0	0	0	0.072	14,110

Table A.2: First and Second Stage Results with Alternative Return Instruments

This table shows the first stage (columns 1-4) and second stage (columns 5-6) results for OROA when using dummy indicators for positive market returns at different horizons (30, 60 or 90 days before the IPO attempt). Standard errors (in parentheses) are adjusted for heteroskedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) OROA	(6) OROA
IPO					0.183** (0.091)	0.162** (0.082)
Positive 30-day ret x Post			0.071*** (0.013)	0.070*** (0.013)		
Positive (60-30)-day ret x Post	0.042*** (0.013)		0.045*** (0.013)	0.049*** (0.013)		
Positive (90-60)-day ret x Post		0.038*** (0.013)		0.039*** (0.013)		
Observations	12,189	12,175	12,189	12,175	12,189	12,175
R-squared	0.893	0.894	0.895	0.895		
Number of firms	3,195	3,192	3,195	3,192	3,195	3,192
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes
Stage	First	First	First	First	Second	Second
1st Stage K-P F-stat	9.93	8.04	19.53	15.02		
Instruments					Col. (3)	Col. (4)

Table A.3: From Panel to Cross-Sectional Regressions

This table shows the connection between our baseline panel regression for OROA (column 1) and cross-sectional regressions. In column (2) the sample is restricted to firms with OROA observations before and after the IPO attempt. Column (3) adds country and filing-year times Post fixed effects to level the field with subsequent cross-sectional regressions that include country and filing-year fixed effects (columns 4-5). Column 4 uses a cross-sectional sample where for each firm we consider the change in OROA. The change in OROA is the difference between the after-IPO-attempt average OROA and the before-IPO-attempt average OROA. Column 5 adds pre-attempt control variables (log of the average number of subsidiaries, log of the average number of countries, log of assets, and leverage). Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) OROA	(2) OROA	(3) OROA	(4) OROA Change	(5) OROA Change
IPO	0.233**	0.231**	0.485**	0.453*	0.513**
	(0.109)	(0.110)	(0.248)	(0.239)	(0.250)
Observations	12,189	11,531	11,531	2,934	2,771
Number of firms	3,195	2,934	2,934	2,934	2,771
Data structure	Panel	Panel	Panel	Cross-section	Cross-section
Estimation	IV	IV	IV	IV	IV
Firm FE	Yes	Yes	Yes	No	No
Event year FE	Yes	Yes	Yes	No	No
SIC x calendar year FE	Yes	Yes	Yes	No	No
IPO month x Post FE	Yes	Yes	Yes	No	No
Country FE x Post	No	No	Yes	No	No
Filing year x Post FE	No	No	Yes	No	No
SIC FE	No	No	No	Yes	Yes
Country FE	No	No	No	Yes	Yes
Filing year FE	No	No	No	Yes	Yes
Month FE	No	No	No	Yes	Yes
Sample	All	OROA pre & post	Col. (2)	Col. (2)	Col. (2) + pre controls

Table A.4: First Stage for Interactions

This table shows the first-stage regressions that include interaction terms with High Disclosure, High Anti-self-dealing, and dummies for small and young firms in comparison to the sample mean. These first stage regressions correspond to the results presented in Table 6. For example, columns 1 and 2 in this table are used to generate the second stage results presented in column 1 of Table 6. The sample is restricted to observations where OROA is available. Standard errors (in parentheses) are adjusted for heteroskedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) IPO	(2) IPO x High Discl.	(3) IPO	(4) IPO x High Anti-sd	(5) IPO	(6) IPO x Small	(7) IPO	(8) IPO x Young
Positive 30-day ret x Post	0.055***	-0.363***	0.081***	-0.391***	0.041***	-0.388***	0.055***	-0.400***
	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)
Positive 30-day ret x Post x High Disclosure	0.028**	0.902***						
	(0.014)	(0.010)						
Positive 30-day ret x Post x High Anti-sd			-0.025*	0.874***				
			(0.014)	(0.012)				
Positive 30-day ret x Post x Small					0.065***	0.931***		
					(0.013)	(0.009)		
Positive 30-day ret x Post x Young							0.024*	0.915***
							(0.015)	(0.010)
Observations	12,189	12,189	12,189	12,189	12,055	12,055	10,884	10,884
R-squared	0.89	0.76	0.89	0.74	0.90	0.76	0.90	0.75
Number of firms	3,195	3,195	3,195	3,195	3,142	3,142	2,835	2,835
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes