The Effects of Going Public on Firm Performance and Strategy: Evidence from International IPOs

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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 firms' initial-public-offering (IPO) attempt. We compare firms that complete their IPO with firms that withdraw their IPO. We instrument the going public decision using prior market returns. We find that firm profitability goes up after going public - reversing previous results in the literature. We also find an expansion in the number of subsidiaries and countries where firms operate post-IPO. Our findings on asset growth in financially dependent industries and in countries with higher investor protection suggest that going public relaxes financial constraints. Overall, our results are consistent with IPOs moving firms toward a strategy of commercialization and growth with a focus on profitability.

Keywords: IPOs, Profitability, Instrumental Variables

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1 Introduction

Going public is one of the most important decisions in the life of many private firms. Explanations for why firms go public include diversification and liquidity for previous owners, as well as to provide financial capital to the firm when it needs more funds than the private equity markets can provide. At the firm level, there are conflicting benefits and costs of becoming publicly listed. There may be a positive effect through additional capital raising that allows the firm to expand and undertake investment opportunities. On the costs side, there may be potential agency costs as going public changes the ownership structure of firms from concentrated ownership to widely dispersed ownership where oversight is more difficult (Jensen and Meckling, 1976). The stylized fact in the literature is that, on average, profitability falls after IPOs, which seems to speak against the advantages of public status. In addition, as Bernstein (2015) shows, IPO firms have lower patenting rates with fewer citations after going public. Potential explanations for these results and the decline in profitability include firms selecting into public status along their life-cycle as they become less profitable, that there is mean reversion in profitability and firms time their IPO decision, or perhaps that IPO firms practice earnings management and focus on short-run outcomes.[1]

Our results shed light on the rationale for why firms choose to go public and the profitability-IPO relation in two ways. First, we collect novel data on firm profitability, capital structure and other financial information around the IPO-attempt for a sample of approximately 3,400 European firms between 1997 and 2017. The data we use contains pre- and post-filing information on firms irrespective of whether they complete their IPO. The profitability of private firms that withdraw their IPOs has not been observable post-withdrawn in the previous literature. Our time series firm data provides a panel structure that allow us to make within-firm comparisons. Second, we apply the instrumental variables strategy of Bernstein (2015) to estimate the treatment effect of going public on firm performance and other firm outcomes.

[1]See Degeorge and Zeckhauser (1993); Jain and Kini (1994); Pagano, Panetta, and Zingales (1998); Mikkelson, Partch, and Shah (1997); Teoh, Welch, and Wong (1998); Pástor, Taylor, and Veronesi (2009).

Maksimovic, Phillips, and Yang (2020) argue that the treatment effect of going public can be as big as the selection effect. However, estimating the causal effect of going public on firm performance has been elusive. We try to fill this gap.

In order to estimate the treatment effect of going public we first compare completed and withdrawn IPOs for a large sample of firms that file for IPOs across 16 European countries. This comparison allows us to control for a host of self-selection issues and life-cycle patterns, as withdrawn IPOs represent a reasonable counterfactual. However, the decision to withdraw is still endogenous. For this reason, a second crucial element of the identification strategy is to instrument for IPO completion using market returns over the 30 days before the IPO decision. Market returns in this short window can affect the decision to complete the IPO, but it is unlikely that they directly affect long-run outcomes. In line with previous evidence we find that positive market returns in the pre-decision period increase the likelihood of IPO completion by 7.2% (from an unconditional probability of 87%). The pre-choice return is basically uncorrelated with firm characteristics of candidate IPOs, so it is also well balanced as an instrument.

Our main results are as follows. The OLS effect of going public on profitability (return on assets, ROA) is basically zero. As in the previous literature, we find that the ROA of IPO firms goes down after going public. However, firms that withdraw their IPOs also experience a similar decline in profitability. This suggests that the previously documented post-IPO drop in profitability is related to selection issues. In other words, we show that the post-IPO drop in profitability is sensitive to the choice of counterfactual.

In our instrumental variables (IV) estimation, we find a significant increase in profitability associated with going public. ROA increases by one standard deviation post-IPO. We also find an increase in the number of firm subsidiaries and the number of countries a firm operates in for both the OLS and IV estimates. Examining variation across industries and countries, we find that the increase in profitability is stronger in industries with high financial dependence, countries with higher levels of disclosure requirements for companies

going public (La Porta, López-de-Silanes, and Shleifer, 2006), and with more protection of minority investors (Djankov, La Porta, López-de-Silanes, and Shleifer, 2008).

The effects of going public on asset growth, the number of firm subsidiaries and the number of countries a firm operates in are interesting because they give hints about the underlying mechanism. The IV coefficient on the asset growth regression is positive and large, but without statistical significance. Even though the average effect on asset growth is weak, we find a positive and significant effect on the asset growth of firms in financially dependent industries (Rajan and Zingales, 1998). The increase in profitability is also stronger in firms from financially dependent industries. These results support the idea that relaxing financial constraints is one of the channels of influence of public status. Firms in less financially dependent industries, although do not have significantly stronger asset growth than firms with withdrawn IPOs, still grow in terms of number of subsidiaries and markets served. In line with Bernstein (2015), we find that patenting goes down after going public, particularly in countries with high levels of investor protection and disclosure. Overall, our results suggest that going public pushes firms towards a commercialization phase with a focus on strong margins, and where growth supports a focus on profitability.

Finally, we conduct placebo tests that allow us to, at least indirectly, check the exclusion restriction of the IV strategy. For the instrument to be valid, short-run returns must be related to long-run outcomes only through the decision to complete the IPO. The reduced form regression implies that the instrument explains long-run firm profitability, but the effect may be through channels other than the choice of listed status. In order to give support to the exclusion restriction we use as placebo instruments those market returns outside the short pre-decision window of 30 days. We find that placebo returns after the IPO have no impact on the likelihood of IPO completion (our 1st stage). Also, placebo returns have no impact on future firm profitability (our 2nd stage). Hence, consistent with the exclusion restriction, when there is no impact on the ownership choice (1st stage), there is no effect either on long-run profitability (2nd stage). This is what one would expect under the exclusion restriction,

because the channel of influence between returns and long-run profitability is severed when listed status is fixed.

Our paper contributes, first and foremost, to the literature on the why firms go public and the consequences of going public. The main challenge in this literature is that post-filing data is usually only available firms that choose to go public. More productive firms, firms with better governance, or firms with more investment opportunities can self-select into public markets. Hence, most of the literature deals with the question of why firms go public (e.g., Pagano, Panetta, and Zingales 1998), precisely because the analysis uncovers the motivations of firms to choose listed status (Kim and Weisbach, 2008). In this paper, instead, we focus on the treatment effect of going public, i.e., does public status cause firm profitability or assets to go up or down?

Recent work also deals with the treatment effect of going public, focusing on outcomes such as innovation, employment, and local spillovers (Bernstein 2015; Borisnov, Ellul, and Sevilir 2019; Babina, Ouimet, and Zarutskie 2020; Jess Cornaggia, Kotter, and Pisciotta 2020). Compared to previous work, we have the advantage of access to panel data with financial variables for both completed and withdrawn IPOs, which allows us to study the long-standing question of the effects of going public on firm profitability. Estimating the treatment effect of going public is a first order question in corporate finance, which speaks directly of the advantages (or disadvantages) of accessing public markets. Our findings suggest that the increased financing and the focus on commercialization firm firms going public provides important benefits for firms. These benefits appear to be large enough, at least for the first few years after going public, to overcome the potential costs associated with increased agency problems.

Our results are also related to the literature that compares the performance of private and public firms. Asker, Farre-Mensa, and Ljungqvist (2015) argue that private firms react more to industry shocks than public firms. Gilje and Taillard (2016), with data for the natural gas industry, and Phillips and Sertsios (2017), with data for the medical devices industry, find

the opposite using quasi-natural experiments. In general, the comparison between private and public companies is blurred by selection issues. Our results contribute by estimating the pure treatment effect of going public, which can help bridging the gap between apparently contradictory results.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 explains the identification strategy behind our IV estimation. Section 4 reports the main IV results, placebo tests, and auxiliary results. Section 5 concludes.

2 Data

2.1 Sample Selection and Panel Structure

Our data consist of 3,410 IPO attempts in European markets, out of which 422 are finally withdrawn and 2,988 are completed. 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 all IPO attempts with filing years between 1997 and 2017 for 16 European countries. We merge this list of IPO attempts with financial information for each firm from *Amadeus*, which has the advantage that it reports data for 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. We keep the IPO attempt only if we have financial data for years before and after the IPO attempt. We drop observations if the 5-year event window overlaps with other IPO attempts for the same firm.[2]

Figure 1.1 shows the distribution of IPO attempts by country. As can be expected, bigger markets, such as the UK, Germany, or France, have more IPO filings.[3] Figure 1.2 shows the

[2]Our sample has 108 firms with more than one IPO attempt in this period, although there are no overlapping observations between attempts.

[3]There are 89 IPO attempts (360 firm-year observations) that represent cross-listings. The main effects are robust to their exclusion.

distribution of IPO attempts by year. There are peaks of IPO filings in 2000 and 2005-7, 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.

Insert Figure 1 here

Figure 2 shows the distribution of the 13,754 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 for completed IPOs.

Insert Figure 2 here

2.2 Variable Description

Table 1 shows summary statistics for the main firm-level variables in our analysis. Return on assets (ROA=EBITDA/book assets) is the main measure of profitability. Mean (median) ROA is -2%(3%), but with a large standard deviation of 24%. There are slightly fewer observations for ROA than for other variables because its computation requires detailed information from both the income statement and the balance sheet of the firm. The coverage for income statements is not as good as for balance sheets. Average assets are 175 million Euros, but the size distribution is highly skewed to the right as implied by a much lower median assets of 10.65 million Euros. Something similar happens with firm sales. Asset growth is the main measure of investment since capital expenditures are rarely reported. Mean (median) asset growth is 61%(9%), which can be expected from high-growth firms that are considering an IPO to raise funds. From the ownership data provided by *Amadeus*, we measure commercialization and expansion using the number of subsidiaries operated by each firm and the countries where these subsidiaries are located.

Insert Table 1 here

Besides financials, we consider some long-term outcomes for each firm. Summary statistics for these variables are reported in Table A.1 in the appendix. Patents correspond to the number of patent applications that are eventually approved. These data comes from *Zephyr*, which matches firms and patent information from the European Patent Office. Acquisitions correspond to the number of firms that the firm acquires. Target is a dummy variable that takes a value of one if the firm is acquired within five years of the IPO. Acquisitions and target data also come from *Zephyr*. Since we want to compute long-term outcomes after the IPO attempt for patents and acquisitions we use a 2-year forward-looking moving average of the following 3 years (e.g., in year t we use the average of patents between years *t+2*, *t+3*, and *t+4*).[4]

We also employ several industry and country characteristics in our analysis. The external finance dependence of each industry, measured at the 3-digit SIC level, is taken from Rajan and Zingales (1998). At the country-level, the anti-self-dealing index is taken from Djankov, La Porta, López-de-Silanes, and Shleifer (2008), while the prospectus disclosure index is taken from La Porta, López-de-Silanes, and Shleifer (2006).

3 Empirical Design

3.1 OLS and Instrumental Variables (IV)

We first estimate the dynamics of firm-level outcomes around the IPO decision by running the following OLS regression:

$$Y_{it} = \beta IPO_{it} + \alpha_i + \alpha_\tau + \alpha_{jt} + \varepsilon_{it} \tag{1}$$

The dependent variable is measured for firm i at the end of calendar year t. The main

[4]The results for patents and acquisitions are qualitatively similar if we use yearly observations instead of the forward-looking moving averages.

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. In other words, this dummy captures the before-and-after of completed IPOs. One of the advantages of the panel structure is that we can include firm fixed effects (α_i). With the firm fixed effects we avoid the need to control for initial conditions such as size, profitability, and others.[5] The unbalanced nature of the panel suggests that it is necessary to control for event-time fixed effects (α_τ).[6] These fixed effects have the additional advantage that they control for life-cycle dynamics and mean reversion related to the timing of IPO attempts (see, for example, Degeorge and Zeckhauser 1993). The industry-by-calendar-year fixed effects (α_{jt}) capture annual swings at the one-digit SIC level.

A causal interpretation of the OLS coefficient on IPO_{it} is problematic. For example, let's consider the case where Y_{it} is firm profitability. A positive signal about future profitability, not fully captured by the set of fixed effects, can trigger the decision to complete the IPO. The resulting correlation between IPO_{it}, and the error term ε_{it}, would violate OLS assumptions. To the extent that there is some type of mean reversion in profitability (e.g., Pástor, Taylor, and Veronesi 2009), the OLS likely downward biases the true effect of the IPO on profitability.

Another indication of endogeneity is presented in Table 2. Panel A shows that the decision to complete the IPO is related to pre-IPO firm characteristics. Firms that complete their IPOs are significantly less profitable and smaller (both in terms of assets and sales), less levered, and have larger cash holdings than withdrawn IPO firms. These differences suggest 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, smaller firms can

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

[6] The event-time fixed effects include event-year dummies from *t-2* to *t+2* together with a calendar-month effect for the post-IPO-decision period. The calendar-month effect allows us to level the field for comparisons between firms that take the IPO decision in, say, January of year t and firms that take the decision in, say, December of year t. It can be expected that firms taking the decision in December show little or no effect on their year-end outcomes in t compared to firms that take the decision in January, hence the need to control for such mechanical differences.

be more financially constrained and more likely to complete their IPO (Hadlock and Pierce 2010).

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 case in the hypothetical case that some firms make random clerical errors which prevent those IPOs from being approved by the stock market regulator. 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 its impact on the decision to complete the IPO.

Bernstein (2015) proposes an instrument for IPO completion based on market returns in the pre-IPO-decision period. Strong market returns right before the IPO can increase the likelihood that owners go through with the listing. For example, good recent returns make owners more prone to accept the traditional underpricing of IPOs (Loughran and Ritter 2002; Edelen and Kadlec 2005). We focus on the returns over 30 days before the IPO completion or withdrawal date. This period encompasses the last few weeks of book-building immediately before an IPO.[7] Since we have IPOs from several markets we use the returns for the main stock index in each country.

Therefore, the first stage of the IV estimation is as follows:

$$IPO_{it} = \gamma ReturnPreDecision_m \times Post_{it} + \alpha_i + \alpha_\tau + \alpha_{jt} + \zeta_{it} \tag{2}$$

In order to account for the time dimension in the panel we need to interact the market return in the pre-decision period ($ReturnPreDecision_m$) with an 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 the post-decision period, and not whatever happened in,

[7]Bernstein (2015) uses returns on the post-SEC-filing period that precedes IPOs. There is no uniform rule in Europe for IPO filings, so it is easier to count backwards from the actual date in which the decision to complete or withdraw the IPO is made. We use 30-day returns as these returns empirically have more power to predict IPO completions.

say, event-year *t-2* or *t-1*. Bernstein (2015) runs only a cross-sectional regression of post-IPO-decision outcomes on a completed IPO indicator dummy (controlling for pre-decision characteristics), so he does not need to interact market returns.

3.2 IV Assumptions

3.2.1 Relevance and Instrument Balance

In terms of instrument balance, Panel B in Table 2 shows that firms considering IPOs are not significantly different between 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. The absence of differences in pre-IPO variables 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 does not bias the first-stage regression. However, including them comes at the cost of losing power.

In terms of relevance, the bottom rows of Panel B in Table 2 show that IPOs are 6.9% more likely to be completed when market returns in the 30 days before the IPO decision are higher than average. That is, when returns are on average 5% instead of -3.3%. These results suggest that the instrument is relevant for the IPO decision.

In Table 3, we examine if completed IPOs after high returns are different (in terms of pre-IPO characteristics) than completed IPOs after low returns, and similarly for withdrawn IPOs. In Panel A, we see that differences within completed (or within withdrawn) IPOs are smaller than differences across the IPO decision. The double sorts also allows us to introduce our definition of compliers. In general, compliers are agents that respond to the instrument as expected. In our setup, compliers are IPOs that are completed after high returns, or IPOs that are withdrawn after low returns. There are 1,823 compliers and 1,587 non-compliers in our sample according to this definition. In Panel B of Table 3 we report average pre-IPO characteristics for compliers and non-compliers. The absence of significant

differences between them (see last column) implies that compliers are not a subset of the population of IPO attempts with special characteristics.

Insert Table 3 here

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. This restriction is ultimately untestable. The reduced form regression can show a correlation between firm outcomes and pre-IPO market returns, but the underlying channel may be different from the firm's listed status.

A potential violation of the exclusion restriction would be as follows. Imagine 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. Under this scenario, future profitability is not caused by listed status, but it is only correlated with it.

One 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 sounds unlikely, one can expect that returns on the 30 days *after* the IPO decision also provide a useful signal about long-run profitability. Hence, a placebo test for our identification strategy is to use as instrument those returns immediately after the IPO decision, but that cannot influence the IPO decision since it is already fixed. Since 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 decision, should also be severed. After presenting our main results, we examine this possibility using reduced-form regressions that relate market returns with firms' outcomes.

4 Results

4.1 OLS Results

Before running the OLS regression in equation (1) we run separate regressions for completed and withdrawn IPOs on firm and event-year fixed effects. This is a close analog to an event study. In Figures 3.1-3.4 we report the event-year fixed effects (α_τ) for different dependent variables. The effects on year *t-1* are normalized to zero. In Figure 3.1 we see a fall in the ROA of completed IPOs starting with the year of the IPO (*t=0*), and also going forward. This post-IPO drop in profitability fits with the facts documented in the literature on U.S. IPOs (Degeorge and Zeckhauser 1993; Jain and Kini 1994; Pástor, Taylor, and Veronesi 2009). A new fact is that withdrawn IPOs see a similar decline in profitability after their IPO attempt. This suggests that the post-IPO drop in profitability is an artifact of using an inappropriate counterfactual rather than a causal effect of going public.

Insert Figure 3 here

In Figure 3.2 we see a post-IPO increase in the asset growth of completed IPOs. Withdrawn IPOs also increase asset growth after their IPO attempts, but the increase is smaller than in the case of completed IPOs. In Figure 3.3, we present the evolution for financial leverage. As can be expected given the increase in equity at IPOs, there is a clear decline in leverage for completed IPOs after they go public, and no effect for withdrawn IPOs. Figure 3.4 showcases that the results for sales are similar than for asset growth.[8]

We now examine firm outcomes surrounding the IPO with OLS regressions following equation (1). We examine firm ROA, asset growth, leverage, log(sales) and two additional variables that capture increased commercialization and expansion by firms - the log number of countries in which a firm operates and the log number of subsidiaries.

[8] Another interesting fact from Figures 3.1-3.4 is that the differences between completed and withdrawn IPOs before their IPO attempts are negligible in almost all cases. To see this look at the coefficients for event year *t=-2* (since coefficients are normalized to zero in year *t=-1*). This evidence supports the parallel trends assumption of the difference-in-differences setup. We do not rely on this assumption since we have an instrument for the IPO decision.

Table 4 shows our results. Firm ROA is not significantly different post IPO in the OLS estimation, consistent with what we see in Figure 3.1. Other outcome variables show significant changes. IPO firms show increased asset growth, decreased leverage, increased sales and also increased expansion through selling in multiple countries and by increasing the number of operating subsidiaries. As we noted earlier, these results do not take into account the endogeneity of the IPO decision as firms with better signals about expansion opportunities may choose to complete an IPO. We now turn to our regression results that address endogeneity.

Insert Table 4 here

4.2 First-satge IV Results

We now examine post-IPO outcomes using market returns as an instrument, as in Bernstein (2015). We use the main stock market index returns in each country as our instrument. The intuition for the first-stage of our instrument is straight forward. Strong market returns right before the IPO can increase the likelihood that owners go through with the listing, while strong negative returns will increase the likelihood a firm will pull its IPO: With high market returns, firms are more willing to accept the underpricing, while after negative market returns firms are more likely to withdraw their IPO.

Table 5 shows our first stage results. Columns 1 and 2 show that the both 30 day returns and the dummy for positive returns in those 30 days predict the decision to complete the IPO. The first stage is stronger when using the dichotomic version of the instrument, so we use this specification throughout the paper. The main takeaway from columns 1 and 2 is that the 30-day returns sharply separate IPO filers into those firms that complete their IPOs versus those that withdraw.

Insert Table 5 here

Columns 3 and 4 conduct placebo tests for the returns 30 days afterwards to see if these two are related to the IPO completion decision. The coefficients are much smaller and statistically insignificant showing that indeed the post 30 day returns do not predict the decision to proceed with the IPO. As adjacent returns likely capture similar market signals, but post-IPO market returns do not affect the IPO completion decision, they represent a good placebo instrument that we can exploit in reduced-form tests to examine the exclusion restriction's validity.

4.3 Second-stage IV results

Using our first-stage instrument, we now examine firm outcomes post-IPO. We examine if the predicted IPO decision influences firm ROA, firm asset growth, leverage and log(sales). We also examine two measures of commercialization: the number of countries in which a firm operates and the number of subsidiaries.

Results in Table 6 show that the instrumented IPO decision is positively and significantly related to firm profitability as measured by ROA and also our measures of firm commercialization: the number of countries a firm operates in and the number of subsidiaries. We still find positive coefficients for asset growth and sales but these coefficients become insignificant given large standard errors. Our interpretation of these results is that firms switch their strategy from exploration and innovation to commercialization after going public. It is likely that public investors put pressure on firms to achieve profitability in exchange for capital. This strategy seems to benefit firms more than potential agency considerations harm them, at least for the first few years after going public.

Insert Table 6 here

The sharpest difference between the IV and OLS results is in the results for firm ROA. In the OLS, the coefficient on the IPO indicator on firm ROA was insignificant and close to zero. In the IV estimation, the coefficient becomes positive, larger in magnitude, and

statistically significant. The result on profitability contradicts previous findings in the literature. Without a proper counterfactual (withdrawn IPOs) and as-random variation (given by the IV strategy), firms that go public appear to reduce their profitability rather than increase it. The increase in profitability we document represents important new evidence, as it sheds light on the treatment effect of going public, isolating this effect from confounding selection effects. Of course, the usual caveats with IV estimations apply, as the IV approach identify the effects of going public by focusing on the sub-population of filers whose IPO decision is affected by prior stock returns. These compliers can be understood as firms who were previously at the "margin" of completing their IPO before they experienced changes in market valuations. However, as we showed in Table 3b, compliers do not seem to be a special set of firms, so the results likely apply to the average firm going public as well.

The magnitude of the IPO coefficient on firm profitability in the IV estimation is large. Firms that go public increase ROA by 0.25, or close to one standard deviation. A large coefficient could indicate an IV-blow-up problem, whereby a weak instrument amplifies a potentially small violation of the exclusion restriction. We address this issue from both the econometric and the theory angles following the recommendations of Jiang (2017). First, from the econometrics perspective, our results pass the standard threshold of 10 using the F-test of Montiel-Olea and Pflueger. The F-test for the main instrument is 37.97 (see Table 5, Column 2), so the instrument is not weak. Second, from the perspective of economic theory, we argue that the magnitude of the IV coefficient is plausible. As suggested by Jiang (2017), the first thing to note is the direction of the endogeneity bias in OLS. The expected mean-reversal in profitability proposed by Pástor, Taylor, and Veronesi (2009) should lead to a negative bias on performance post IPO in OLS estimations. Hence, from an ex-ante perspective we should not be surprised that the IV coefficient is larger than the OLS coefficient. Notice also that the IV identifies the local average treatment effect (LATE) in the context of IPOs. A strong change in strategy — from exploration to commercialization — could, in principle, result in a one-time large change in performance as the one we document.

Table 7 presents the results of the reduced-form regressions of firm outcomes on short-term market returns. The coefficients represent the "intent" to treat effect. Panel A shows the results where the dependent variables are run against the main instrument (*Positive 30-day ret X Post*). The results in Panel A are in principle consistent with the exclusion restriction holding, as the coefficients from the reduced-form regression are approximately the coefficient from the first-stage regression times the coefficient from the second-stage regression. For instance, the reduced-form coefficient for ROA in Column 1 is 1.6%, which is approximately 7.6% (first stage) times 24.7% (second stage). If there was an additional direct effect from short-term returns on long-term profitability, the reduced-form coefficient could have been significantly different. Although potentially consistent with as-random assignment, the fact that the coefficient on the reduced-form regression is "well-behaved" is merely suggestive.

Insert Table 7 here

More compelling evidence on the validity of the exclusion is presented in Panel B. The results show that the placebo instrument (*Positive 30-day fwd X Post*) has no bearing on post-IPO outcomes in reduced-form regressions. Given that the returns just after the IPO are a close substitute of a market signal to the returns pre-IPO, the lack of a reduced-form effects suggests that short-term market returns are a valid instrument for long-term outcomes: When market returns do not affect the IPO decision, there are no effects on profitability or other firm-level strategies.

4.4 Cross-sectional Variation and Mechanisms

We now examine industry- and country-level variation in our results to understand why the IPO decision positively influences firm outcomes. Adding an interaction term between the endogenous IPO decision and a time-invariant characteristic requires estimating two first stages: One for the IPO decision 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 (*Positive 30-day ret x Post*). We present the extended first-stages that we use for the cross-sectional variation in Table A.2 in the Appendix.

We first examine whether the financial dependence of the IPO filer impacts the results. To this end, we interact the IPO dummy with a dummy for high financial dependence at the industry level. The financial dependence index follows from Rajan and Zingales (1998) with industries defined at the 3-digit SIC code level. High financial dependence equals 1 if the firm operates in an industry with financial dependence index above the sample mean, and 0 otherwise. We present the second-stage results in in Table 8.

Insert Table 8 here

The results in Table 8 shows that the impact of going public on ROA and asset growth is higher in industries with high financial dependence. These findings suggest that the impact of the increased funds leads firms to increase profitability and also grow. We also see an incremental negative effect on the number of countries a firm operates in and the number of subsidiaries. These results combined with the positive impact on ROA and asset growth indicate that if a firm is in an industry with a high need for external capital, when it gets fresh capital it stays focused on adding assets within its main industry and country. However, if the firm is an industry with a low need for external capital, when it gets fresh capital it expands the number of subsidiaries and countries.

Next, we study whether the effects of going public vary across countries according to measures of investor protection and disclosure requirements. The rationale for examining investor protection we postulate is that post IPO, investors will be less worried about insiders extracting rents from them in these countries and thus more willing to provide capital at the margin as it will be used productively. The underlying idea for analyzing cross-sectional variation in disclosure requirements is that if higher quality information is disclosed, investors will be more willing to provide capital as they can better ascertain underlying fundamental value of the firm.

We present the results that study how investor protection mediates the going public effects in Table 9. We use the anti-self-dealing index from Djankov, La Porta, López-de-Silanes, and Shleifer (2008) to capture country-level investor protection. We interact the IPO dummy with an indicator variable that takes a value of 1 if the firm operates in a country with investor protection above the sample mean, and 0 otherwise.

Include Table 9 here

Inspection of the results in Table 9 reveals that there is an additional positive impact on ROA, asset growth, and the number of subsidiaries for IPOs in countries with high investor protection. These results are consistent with investors at the margin being more willing to invest in firms in these countries as they are less likely to be subject to agency problems. Alternatively, these findings can be interpreted as evidence that the marginal value of capital is higher when agency problems are smaller.

We now turn to examining how our results differ in countries where more information disclosed in IPO prospectuses. To capture better information we use a country-level measure of the requirements for information disclosed in the IPO prospectus from La Porta, López-de-Silanes, and Shleifer (2006). We use an indicator for high disclosure requirements that equals one if the firm operates in a country with IPO disclosure requirements above the sample mean, and 0 otherwise. As before, we interact the IPO dummy with the cross-country variation indicator. We present the results in Table 10.

Include Table 10 here

The results in Table 10 show an incremental positive effect of high disclosure for ROA and asset growth. These findings are consistent with the idea that investors are more willing to invest in IPO firms in countries where they can better ascertain if a firm has valuable investment opportunities. We note, however, that investor protection and disclosure are positively correlated. Hence, whether the incremental effect in profitability and growth

should be attributed to better investor protection or disclosure is not entirely clear. The key takeaway from tables 9 and 10 is that the positive effects of the IPO are stronger when there is a more investor-friendly environment. This could be either because investors are more willing to provide more capital or, equivalently, because potential agency conflicts where controllers expropriate minority shareholders are curbed in those environments, making investment in firms more profitable to investors.

Finally, in Table 11 we study the combined mediating effects of industry-level financial dependence and country-level investor protection and disclosure, to further isolate the importance of each of these channels on IPOs. As investor protection and disclosure are highly correlated, we present the interaction effects of financial dependence with investor protection and disclosure separately in Panels A and B.

Include Table 11 here

Inspection of the results in Panel A of Table 11 shows that there is a positive incremental effect of high financial dependence on asset growth and the number of countries in which the firm operates when the anti-self-dealing index is high. In Panel B we show the interaction of high financial dependence with high disclosure requirements. We don't see a significant triple interaction effect for asset growth in this case, but we still find a significant effect for the number of countries. Overall, these result show the importance of completing an IPO for commercialization, specially in financially dependent industries and when firms operate in investor-friendly environments.

4.5 Long-term Outcomes

We also explore the impact of going public on longer-term patenting activity. We focus only on the post-IPO number of (eventually granted) patent applications, since we do not have data on patent citations like Bernstein (2015) has for U.S. firms. As explained in Section 3, we use forward-looking moving averages for patent applications post-IPO to account for

the potential delay in the development and granting of patents. We examine the impact of the IPO decision by itself and also interact it with our industry and country variables. We instrument for both the IPO variable and the interaction terms using previous market returns and cross-sectional interactions as an additional instruments, as before.

Column 1 in Table 12 shows a negative but insignificant average impact on patent applications similar to Bernstein (2015). However, we find a negative and significant effect on patents for IPOs in countries with high anti-self-dealing and high disclosure requirements. That is, in markets that resemble the U.S. in terms of investor protection and disclosure, we do find that the number of patents granted eventually declines after going public.

Insert Table 12 here

Our interpretation of these results, combined with the previous results of a positive impact on profitability and asset growth, is that we find strong evidence of a shift in strategy from exploration and searching for new ideas, that can be patented, to a commercialization strategy. These results are consistent with a move along the life cycle of the firm induced by going public: Firms stay private to provide stronger incentives to reward patentable ideas and switch towards commercialization and higher margins with the capital provided by public markets.[9]

5 Conclusions

This paper sheds light on the rationale for why firms choose to go public using a large sample of 3,400 firms that file for IPOs in 16 European countries. Our data contains pre- and post-filing financial information irrespective of whether firms complete their IPO (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

[9]We also examine whether the IPO firm engages in acquisitions or becomes the target of an acquisition after the IPO using our instrumental-variable strategy. We present these results in Appendix Tables A.3 and Table A.4. We do not find no significant results for acquisition activity in our sample.

in the 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 finding in the literature, we show that firms profitability goes down after the IPO. However, we also show that the profitability of withdrawn-IPO firms also goes down after the IPO, so the OLS effect on firm performance is essentially zero. Moreover, after correcting for endogeneity, we find a strong a positive effect on performance. In a nutshell, after using a proper counterfactual and tackling the endogeneity problem, we find a benefit of increased profitability for firms that go public - a result that is the opposite of the prior literature.

We also show that firms expand their operations to more countries and operate more subsidiaries post-IPO. Exploiting cross-sectional variation across industries and countries, we find that the effects on profitability and performance are stronger in financially dependent industries and in investor-friendly countries. However, patenting activity goes down in those environments - suggesting a switch in firm strategy from exploration and innovation towards commercialization.

Overall, our findings support the idea that firms benefit by going public despite potentially higher agency problems, at least for the first few years after the IPO. Becoming publicly traded provides financial capital to firms that helps them commercialize their products. Investors likely push for profitability in exchange for their capital and firms deliver in the years subsequent to the IPO by changing their strategy from innovation to commercialization.

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Figures

Figure 1: IPOs over countries and years

Figure 1.1: Total and Withdrawn IPO Filings per Country

The figure shows the total number of IPO filings by country of listing (right axis) and the proportion of withdrawn IPOs (left axis).

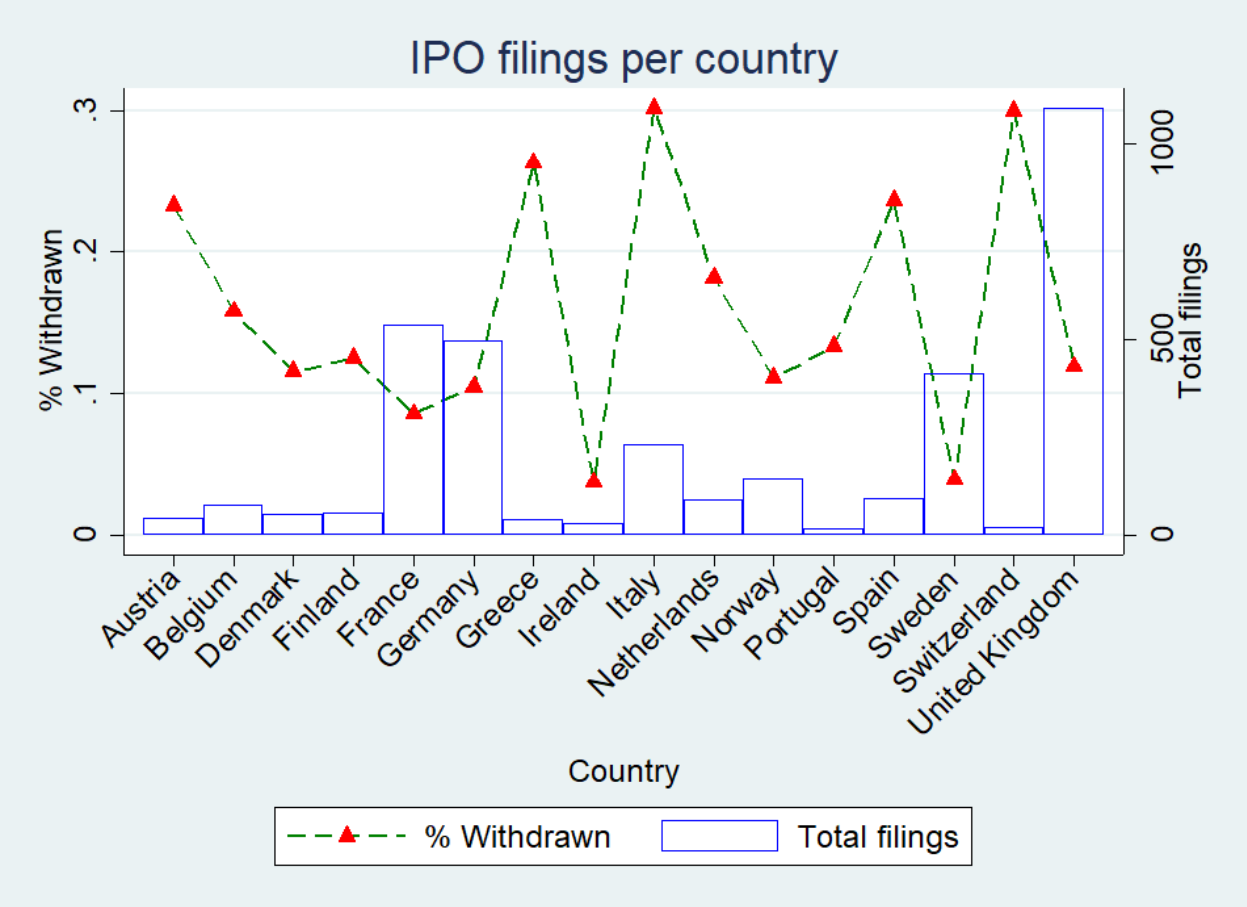


Figure 1.2: Total and Withdrawn IPO Filings per Year

The figure shows the total number of IPO filings by year of intended listing (right axis) and the proportion of withdrawn IPOs (left axis).

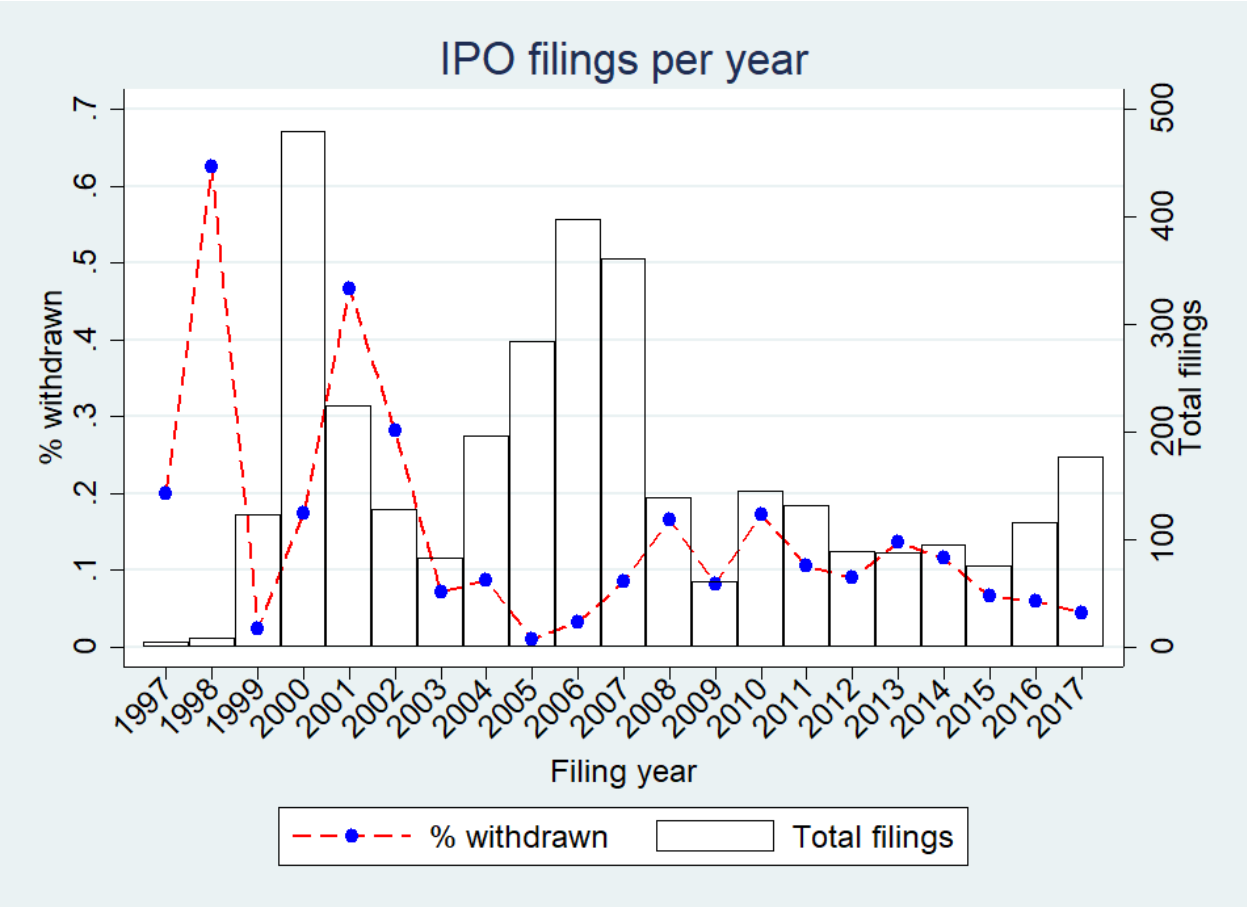


Figure 2: Observations by Event Year

The figure shows the number of observations per event-year for withdrawn IPOs (red bar, left axis) and completed IPOs (white bar, right axis). Event years are measured at the end-of-the-year around the IPO-attempt year (t=0).

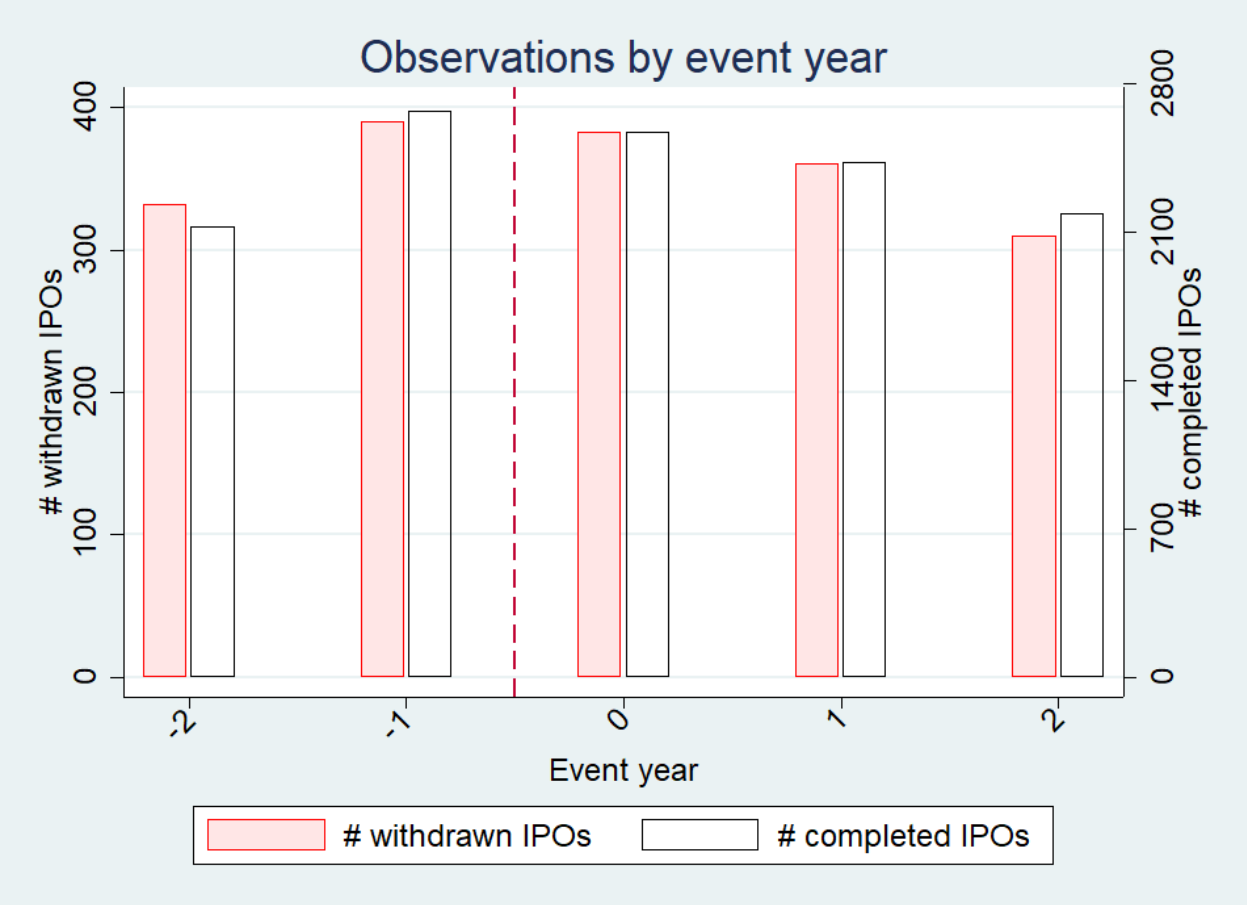


Figure 3: Completed and withdrawn IPOs by event year

The figures displays coefficient estimates 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 3.1: ROA by Event Year

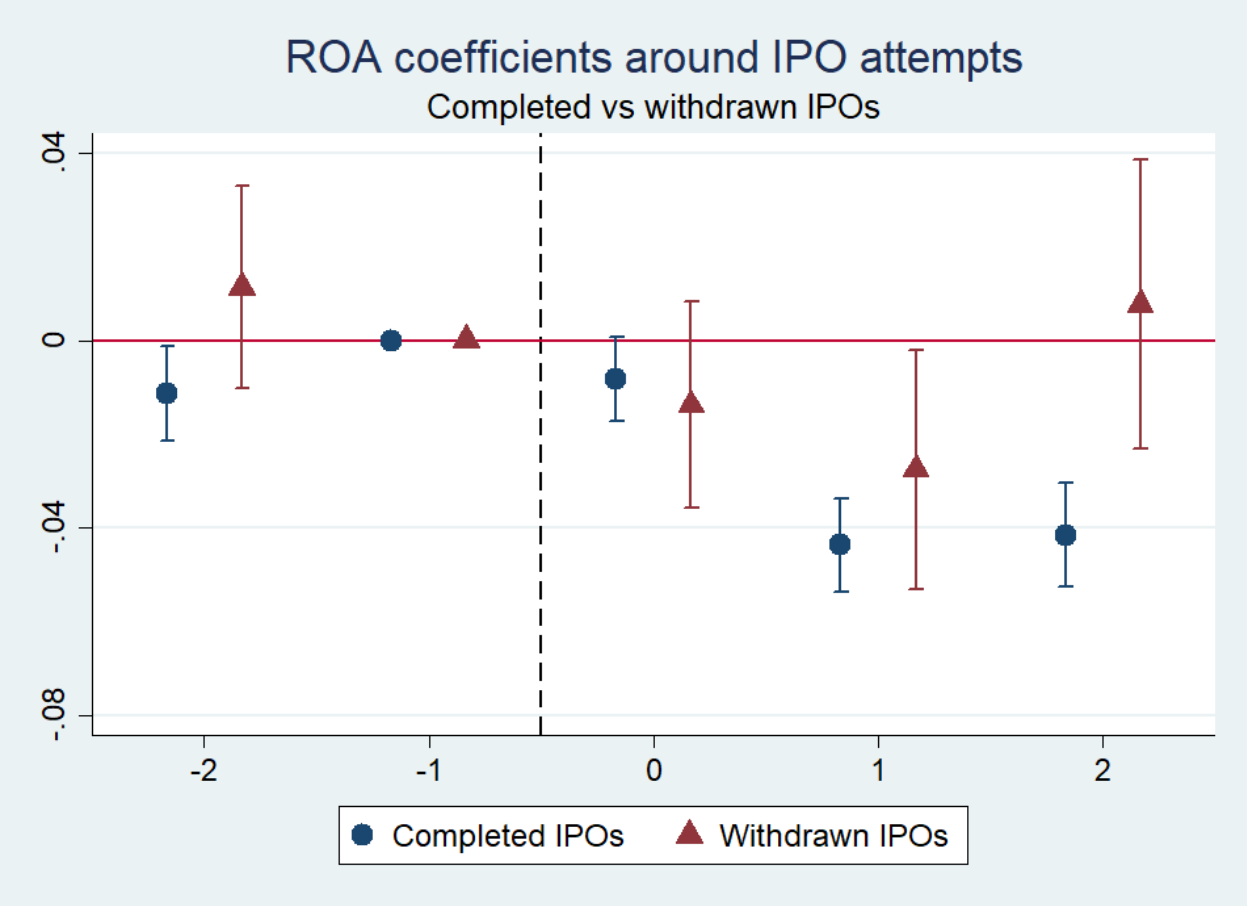


Figure 3.2: Asset Growth by Event Year

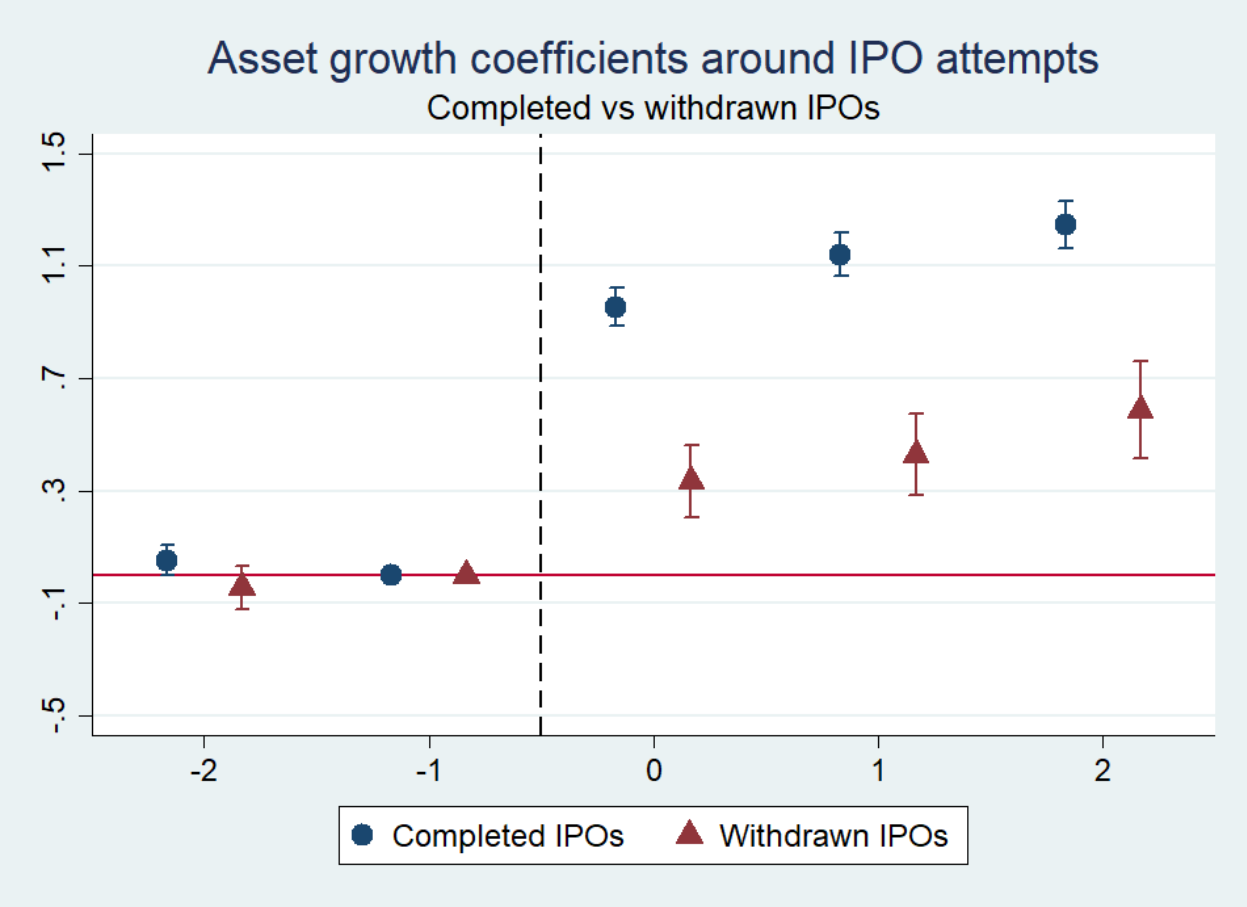


Figure 3.3: Leverage by Event Year

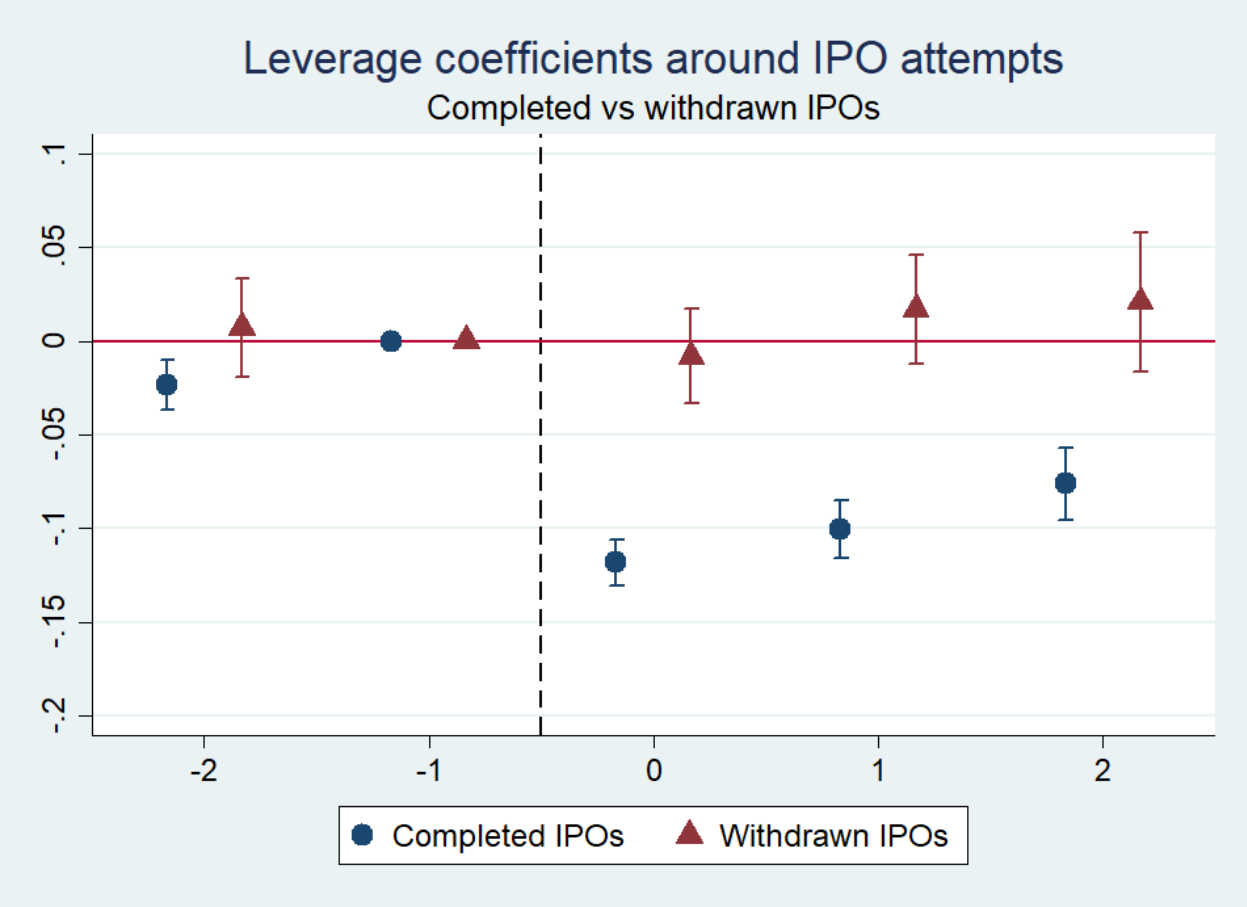
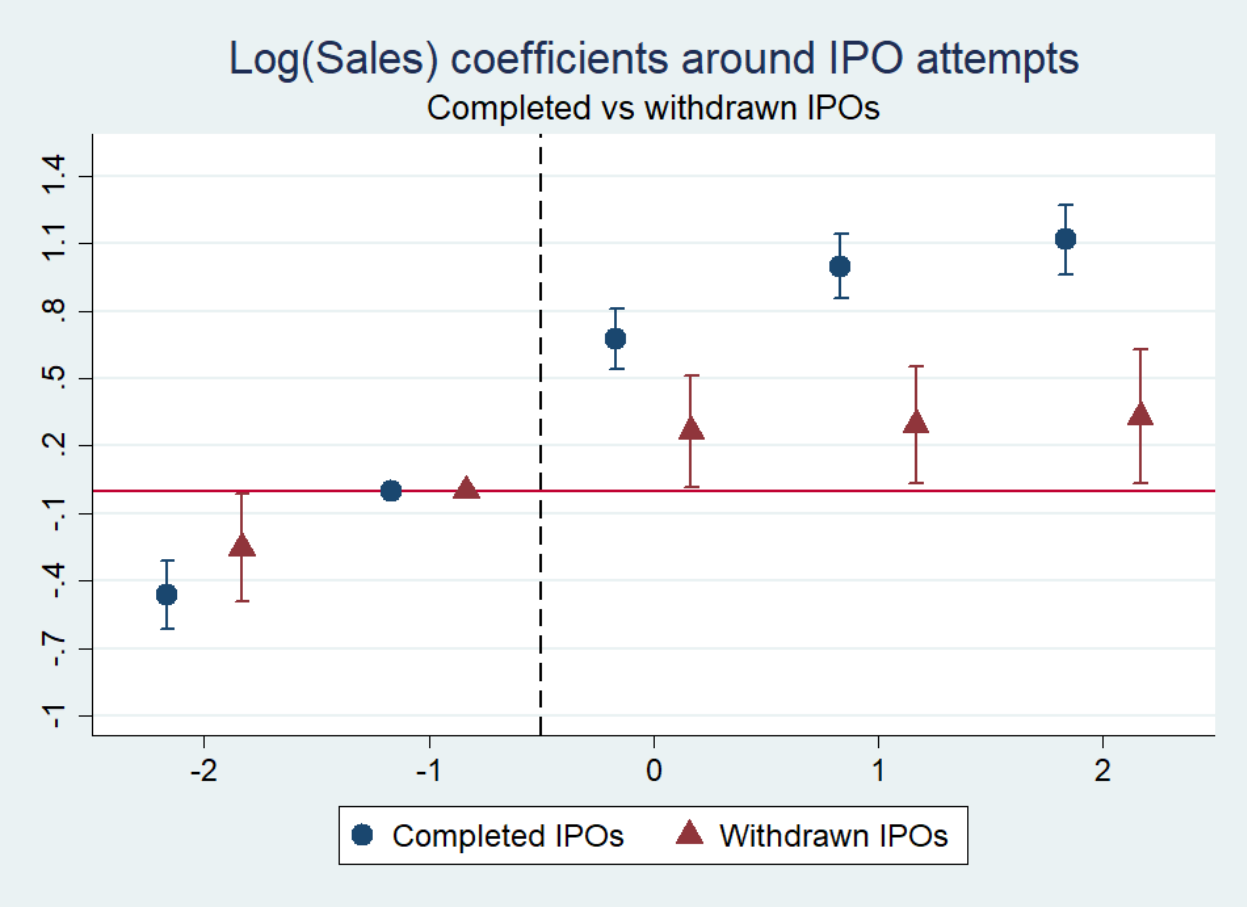


Figure 3.4: Sales by Event Year



Tables

Table 1: Summary Statistics

This table shows the summary statistics of the variables used in our analysis. 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 = Completed IPO x Post. ROA is EBITDA over book assets. Assets (MM) is book assets in 2019 millions of Euros. Asset growth is Log(assets) (t)- log(assets) (t-1). Leverage is the sum of total liabilities divided by the book value of assets. Sales (MM) is yearly sales in 2019 millions of Euros. Cash/Assets is cash holdings to book assets ratio. Countries is the number of countries where a firm operates in a year. Subsidiaries is the number of subsidiaries a firm owns in a year. Age= calendar year – incorporation year. Returns 30 days is the market return (country-index) where the firm is listed, for the month preceding the IPO listing, or withdrawn month. Positive 30-day ret is an indicator variable that takes a value of 1 if Returns 30 days is positive, and 0 otherwise. Accounting variables are winsorized at the 0.5% level.

	Mean	P10	P25	P50	P75	P90	SD	Total
Completed IPO	0.87	0.00	1.00	1.00	1.00	1.00	0.34	13,754
Post	0.60	0.00	0.00	1.00	1.00	1.00	0.49	13,754
IPO	0.52	0.00	0.00	1.00	1.00	1.00	0.50	13,754
ROA	-0.02	-0.35	-0.09	0.03	0.10	0.19	0.24	11,995
Assets (MM)	175.74	0.47	2.31	10.65	55.28	335.24	609.89	13,340
Asset growth	0.61	-0.21	0.00	0.09	0.82	1.85	1.39	11,868
Leverage	0.49	0.08	0.26	0.51	0.72	0.86	0.28	12,346
Sales (MM)	319.53	0.45	3.73	20.50	114.00	614.11	1,098.38	12,020
Cash/Assets	0.22	0.01	0.03	0.11	0.31	0.62	0.25	12,581
Countries	1.22	1.00	1.00	1.00	1.00	1.00	0.93	13,754
Subsidiaries	3.21	0.00	0.00	0.00	2.00	7.00	11.22	13,754
Age	11.41	1.00	3.00	7.00	13.00	24.00	15.30	12,531
Returns 30 days	0.01	-0.06	-0.02	0.01	0.04	0.07	0.06	13,754
Positive 30-day ret	0.62	0.00	0.00	1.00	1.00	1.00	0.49	13,754

Table 2: Sorts by IPO status and 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 the treatment: withdrawn vs. completed IPOs Panel B shows the means and differences according to the instrument's exposure: High vs. low pre-IPO market returns.

	Panel A: Split by endogenous treatment		
Variable (pre IPO)	Withdrawn	Completed IPO	Diff.
ROA	0.015	-0.012	-0.027**
Assets (MM)	257.861	136.839	-121.022***
Asset growth	-0.013	-0.027	-0.014
Leverage	0.577	0.543	-0.035**
Sales (MM)	547.275	256.210	-291.066***
Cash/Assets	0.165	0.208	0.043***
Countries	1.158	1.089	-0.069***
Subsidiaries	1.700	1.369	-0.331
Returns 30 days	-0.009	0.011	0.020***
Positive 30-day ret	0.436	0.643	0.207***
# of firms	422	2,988	

	Panel B: Split by the instrument		
Variable (pre IPO)	Low ret.	High ret	Diff.
ROA	-0.003	-0.015	-0.012
Assets (MM)	153.794	148.574	-5.221
Asset growth	-0.028	-0.023	0.005
Leverage	0.548	0.545	-0.003
Sales (MM)	296.005	289.703	-6.303
Cash/Assets	0.201	0.205	0.004
Countries	1.084	1.110	0.026
Subsidiaries	1.318	1.502	0.184
Returns 30 days	-0.033	0.05	0.083***
Completed IPO	0.842	0.911	0.069***
# of firms	1,705	1,705	

Table 3: Double sorts by IPO status and returns

Panel A shows averages of the main variables for double sorts of high (*High ret.*) and low (*Low ret.*) market return, and completed (*Compl.*) and withdrawn (*With.*) IPOs. Panel B shows differences for Compliers (Completed IPO after High returns + Withdrawn IPOs after low returns) and Non-compliers (Withdrawn IPO after High returns + Completed IPOs after low returns).

Panel A: Double sort by returns and IPO status

Variable (pre IPO)	High ret/ Compl.	Low ret/ Compl.	High ret/ With.	Low ret/ With.
ROA	-0.02	-0.01	0.03	0.01
Assets (MM)	137.85	255.43	262.06	135.73
Asset growth	-0.02	-0.03	-0.03	0
Leverage	0.54	0.55	0.61	0.56
Sales (MM)	260.63	530.36	576.70	251.43
Cash/Assets	0.21	0.21	0.16	0.17
Countries	1.10	1.10	1.25	1.08
Subsidiaries	1.44	1.45	2.14	1.29
# of firms	1,553	1,435	152	270

Panel B: Compliers vs Non-Compliers

Variable (pre IPO)	Complier (C)	Non-complier (NC)	Diff: C-NC
ROA	-0.01	0	-0.01
Assets (MM)	154.35	147.52	6.83
Asset growth	-0.02	-0.03	0.01
Leverage	0.54	0.55	-0.01
Sales (MM)	301.02	283.50	17.52
Cash/Assets	0.2	0.2	0.00
Countries	1.10	1.10	-0.00
Subsidiaries	1.44	1.37	0.07
# of firms	1,823	1,587	

Table 4: OLS

This table shows OLS regressions. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(Countries)	(6) Log(Subs.)
IPO	-0.005	0.541***	-0.101***	0.668***	0.016*	0.155***
	(0.010)	(0.074)	(0.013)	(0.119)	(0.009)	(0.041)
Observations	11,995	11,868	12,346	12,020	13,754	13,754
R-squared	0.061	0.329	0.118	0.123	0.129	0.359
Number of firms	3,269	3,022	3,305	3,209	3,410	3,410
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	OLS	OLS	OLS	OLS	OLS

Table 5: First Stage

This table shows First-Stage regressions and F-tests according to the instrument (columns 1 and 2) and a placebo instrument (columns 3 and 4). Column 1 presents results where the instrument is the Returns 30 days before an IPO is completed or withdrawn. Column 2 shows similar results but using a dummy variable that takes a value of 1 if pre-IPO returns were positive or not. Columns 3 and 4 repeat the analyses of columns 1 and 2, but using a placebo instrument: The market returns in the month after the IPO is completed or withdrawn. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO
Returns 30 days x Post	0.522***			
	(0.116)			
Positive 30-day ret x Post		0.076***		
		(0.012)		
Returns 30 days forward x Post			0.167	
			(0.102)	
Positive 30 days forward x Post				0.006
				(0.012)
Observations	13,754	13,754	13,754	13,754
R-squared	0.888	0.888	0.887	0.887
Number of firms	3,410	3,410	3,410	3,410
Firm FE	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes
Regression	First stage	First stage	Placebo First stage	Placebo First stage
F-test	20.13	37.97	2.68	0.26

Table 6: Second Stage

This table shows the second stage regressions results. The instrument is a dummy variable for high returns pre IPO attempt times the Post dummy (Positive 30-day ret x Post), as shown in column 2 of Table 5. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(# Countries)	(6) Log(# Subs.)
IPO	0.247**	1.275	-0.496***	1.186	0.225**	1.164***
	(0.118)	(0.844)	(0.157)	(1.467)	(0.093)	(0.375)
Observations	11,860	11,838	12,238	11,897	13,754	13,754
Number of firms	3,134	2,992	3,197	3,086	3,410	3,410
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	Second stage	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0

Table 7: Reduced Form

This table shows the results of the reduced-form regressions. Panel A shows the results where the dependent variables are run against the key instrument (Positive 30-day ret x Post), whereas panel B presents the results where the dependent variable are run against the placebo instrument (Positive 30-day ret fwd x Post). Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

	Panel A: Reduced form with instrument					
VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(# Countries)	(6) Log(# Subs.)
Positive 30-day ret x Post	0.016**	0.084	-0.033***	0.083	0.017***	0.089***
	(0.007)	(0.055)	(0.009)	(0.104)	(0.007)	(0.026)
Observations	11,995	11,868	12,346	12,020	13,754	13,754
R-squared	0.062	0.322	0.112	0.119	0.129	0.359
Number of firms	3,269	3,022	3,305	3,209	3,410	3,410
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	Reduced form	Reduced form	Reduced form	Reduced form	Reduced form	Reduced form

	Panel B: Reduced form with placebo instrument					
VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(# Countries)	(6) Log(# Subs.)
Positive 30 days fwd x Post	-0.001	-0.046	-0.01	-0.093	-0.007	0.012
	(0.007)	(0.057)	(0.009)	(0.107)	(0.007)	(0.026)
Observations	11,995	11,868	12,346	12,020	13,754	13,754
R-squared	0.061	0.322	0.11	0.119	0.129	0.358
Number of firms	3,269	3,022	3,305	3,209	3,410	3,410
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	Placebo reduced form	Placebo reduced form	Placebo reduced form	Placebo reduced form	Placebo reduced form	Placebo reduced form

Table 8: Mechanisms: Financial Dependence

This table shows the second stage regressions results, additionally including the interaction of the IPO variable with an indicator for High Financial Dependence (see Table A.1), which takes a value of 1 if the firm operates in an industry with Financial Dependence above the sample mean, and 0 otherwise. To obtain the instrumented interaction coefficient, we extend the first-stage regression to include as an additional instrument Positive 30-day ret x Post x High Fin. Dep., as shown in columns 1 and 2 of Table A.2. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(# Countries)	(6) Log(# Subs.)
IPO	0.235**	1.195	-0.492***	1.21	0.230**	1.208***
	(0.117)	(0.839)	(0.157)	(1.464)	(0.093)	(0.377)
IPO x High Fin. Dep.	0.055***	0.358**	-0.026	-0.091	-0.027**	-0.240***
	(0.020)	(0.152)	(0.022)	(0.254)	(0.014)	(0.054)
Observations	11,860	11,838	12,238	11,897	13,754	13,754
Number of firms	3,134	2,992	3,197	3,086	3,410	3,410
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	Second stage	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2	Pre-IPO ret>0 x High Fin.Dep.	Pre-IPO ret>0 x High Fin.Dep.	Pre-IPO ret>0 x High Fin.Dep.	Pre-IPO ret>0 x High Fin.Dep.	Pre-IPO ret>0 x High Fin.Dep.	Pre-IPO ret>0 x High Fin.Dep.

Table 9: Mechanisms: Investor Protection

This table shows the second stage regressions results, additionally including the interaction of the IPO variable with an indicator for High anti-self-dealing index (see Table A.1), which takes a value of 1 if the firm operates in a country with investor protection above the sample mean, and 0 otherwise. To obtain the instrumented interaction coefficient, we extend the first-stage regression to include as an additional instrument Positive 30-day ret x Post x High anti-self-dealing., as shown in columns 3 and 4 of Table A.2. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(# Countries)	(6) Log(# Subs.)
IPO	0.236**	1.107	-0.496***	1.111	0.247***	1.122***
	(0.117)	(0.820)	(0.156)	(1.447)	(0.093)	(0.370)
IPO x High anti-self-dealing	0.028**	0.313***	0.001	0.149	-0.046***	0.088**
	(0.012)	(0.089)	(0.015)	(0.156)	(0.010)	(0.043)
Observations	11,860	11,838	12,238	11,897	13,754	13,754
Number of firms	3,134	2,992	3,197	3,086	3,410	3,410
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	Second stage	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2	Pre-IPO ret>0 x High anti-sd	Pre-IPO ret>0 x High anti-sd	Pre-IPO ret>0 x High anti-sd	Pre-IPO ret>0 x High anti-sd	Pre-IPO ret>0 x High anti-sd	Pre-IPO ret>0 x High anti-sd

Table 10: Mechanisms: Country-level Index of IPO Disclosure

This table shows the second stage regressions results, additionally including the interaction of the IPO variable with an indicator for High disclosure index (see Table A.1), which takes a value of 1 if the firm operates in a country with IPO disclosure requirements above the sample mean, and 0 otherwise. To obtain the instrumented interaction coefficient, we extend the first-stage regression to include as an additional instrument Positive 30-day ret x Post x High disclosure., as shown in columns 5 and 6 of Table A.2. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) ROA	(2) Asset growth	(3) Leverage	(4) Log(Sales)	(5) Log(# Countries)	(6) Log(# Subs.)
IPO	0.221*	1.107	-0.529***	1.311	0.288***	1.101***
	(0.122)	(0.865)	(0.168)	(1.565)	(0.102)	(0.387)
IPO x High disclosure	0.021*	0.138*	0.029*	-0.098	-0.054***	0.054
	(0.011)	(0.080)	(0.017)	(0.159)	(0.012)	(0.042)
Observations	11,860	11,838	12,238	11,897	13,754	13,754
Number of firms	3,134	2,992	3,197	3,086	3,410	3,410
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	Second stage	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2	Pre-IPO ret>0 x High discl.	Pre-IPO ret>0 x High discl.	Pre-IPO ret>0 x High discl.	Pre-IPO ret>0 x High discl.	Pre-IPO ret>0 x High discl.	Pre-IPO ret>0 x High discl.

Table 11: Mechanisms: Triple Interactions

This table shows the second stage regressions results, including triple interactions for IPO, industry High Fin. Dep., and country-level measures of investor protection (panel A), or disclosure (panel B). The first stage regressions are adjusted accordingly to instrument for these interactions. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

	Panel A					
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROA	Asset growth	Leverage	Log(Sales)	Log(# Countries)	Log(# Subs.)
IPO	0.224*	0.992	-0.493***	1.086	0.251***	1.163***
	(0.116)	(0.810)	(0.156)	(1.439)	(0.092)	(0.370)
IPO x High Fin. Dep.	0.036	0.041	-0.036	-0.325	-0.053***	-0.300***
	(0.023)	(0.108)	(0.027)	(0.280)	(0.020)	(0.068)
IPO x High Anti-self-dealing	0.024**	0.238***	-0.002	0.081	-0.053***	0.07
	(0.011)	(0.090)	(0.016)	(0.163)	(0.011)	(0.046)
IPO x High F.D. x High Anti s.d.	0.053	0.626**	0.023	0.592	0.050**	0.13
	(0.040)	(0.262)	(0.041)	(0.499)	(0.023)	(0.092)
Observations	11,860	11,838	12,238	11,897	13,754	13,754
Number of firms	3,134	2,992	3,197	3,086	3,410	3,410
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	Second stage	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.
Instrument #3	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
	x High anti-sd	x High anti-sd	x High anti-sd	x High anti-sd	x High anti-sd	x High anti-sd
Instrument #4	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
	x High anti-sd	x High anti-sd	x High anti-sd	x High anti-sd	x High anti-sd	x High anti-sd
	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.

	Panel B					
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROA	Asset growth	Leverage	Log(Sales)	Log(# Countries)	Log(# Subs.)
IPO	0.208*	1.017	-0.526***	1.338	0.292***	1.148***
	(0.120)	(0.859)	(0.168)	(1.562)	(0.102)	(0.389)
IPO x High Fin. Dep.	0.043	0.192*	-0.053*	-0.232	-0.055***	-0.265***
	(0.026)	(0.113)	(0.030)	(0.336)	(0.019)	(0.066)
IPO x High Disclosure	0.019*	0.105	0.022	-0.136	-0.061***	0.045
	(0.011)	(0.084)	(0.018)	(0.166)	(0.013)	(0.046)
IPO x High F.D. x High Discl.	0.03	0.338	0.058	0.31	0.055**	0.052
	(0.035)	(0.267)	(0.038)	(0.454)	(0.024)	(0.090)
Observations	11,860	11,838	12,238	11,897	13,754	13,754
Number of firms	3,134	2,992	3,197	3,086	3,410	3,410
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	Second stage	Second stage	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.
Instrument #3	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
	x High Discl.	x High Discl.	x High Discl.	x High Discl.	x High Discl.	x High Discl.
Instrument #4	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
	x High Discl.	x High Discl.	x High Discl.	x High Discl.	x High Discl.	x High Discl.
	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.	x High Fin.Dep.

Table 12: Long-term Outcomes: Patents

This table shows the second stage regressions results using the logarithm of one plus patent applications as the dependent variable. Patent applications granted post-IPO attempt are adjusted to account for long-term outcomes using forward-looking moving averages (see Table A.1). Columns 2-4 additionally include the interaction of the instrumented IPO dummy with cross-sectional dummies based on industry or country-level characteristics. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Log(patents)	(2) Log(patents)	(3) Log(patents)	(4) Log(patents)
IPO	-0.029	-0.047	-0.026	0.015
	(0.121)	(0.115)	(0.116)	(0.128)
IPO x High Ind. Fin. Dep		0.004		
		(0.022)		
IPO x High Anti self-dealing			-0.041***	
			(0.012)	
IPO x High Disclosure				-0.051***
				(0.016)
Observations	13,754	13,754	13,754	13,754
Number of firms	3,410	3,410	3,410	3,410
Firm FE	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes
Regression	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2		Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
		x High Fin.Dep.	x High anti-sd	x High discl.

Appendix A.

Table A.1: Additional Summary Statistics

This table summary statistics for additional variables.Log(patents) is the logarithm of 1 plus the number of (eventually granted) applications in a year for years before the IPO attempt. For years after the IPO we use 3-years rolling averages going forward to get at long-run effects: patents (t)=[patents(t)+patents(t+1)+patents(t+2)/3. Acquisitions is the number of acquisitions undertaken by a firm in a year for years prior to the IPO attempt. For years after the IPO we use 3-years rolling averages going forward to get at long-run effects: acquisitions (t)=[acquisitions(t)+acquisitions(t+1)+acquisitions(t+2)]/3. 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. Financial Dependence is measure of financial dependence index computed using Rajan and Zingales (1998) methodology at the 3-digit SIC code level. Higher financial dependence means higher needs of external financing. 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 Measure of disclosure of initial public offerings at the country level, following La Porta, Lopez-de-Silanes, and Shleifer (2006).

	Mean	P10	P25	P50	P75	P90	SD	Total
Log(patents)	0.06	0	0	0	0	0	0.41	13,754
Log(acquisition)	0.17	0	0	0	0	0.69	0.38	13,754
Target	0.05	0	0	0	0	0	0.23	13,754
Ind. Fin. Dep.	0.89	0.53	0.87	1	1	1.17	1.03	13,754
Anti-self-dealing	0.55	0.28	0.33	0.42	0.95	0.95	0.29	13,754
Disclosure	0.66	0.42	0.5	0.67	0.83	0.83	0.16	13,754

Table A.2: First Stage for Interactions

This table shows the first-stage regressions that include interaction terms with High. Fin. Dep, High anti-self-dealing, and High disclosure. The first stage regressions presented in columns 1 and 2 are used to generate the second stage results presented in Table 8. The first stage regressions presented in columns 3 and 4 are used to generate the second stage results presented in Table 9. The first stage regressions presented in columns 3 and 4 are used to generate the second stage results presented in Table 10. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IPO	IPO x High Fin. Dep.	IPO	IPO x High Anti sd	IPO	IPO x High Discl.
Positive 30-day ret x Post	0.078***	-0.083***	0.086***	-0.386***	0.062***	-0.364***
	(0.013)	(0.007)	(0.014)	(0.014)	(0.014)	(0.014)
Positive 30-day ret x Post x High Fin. Dep	-0.012	0.858***				
	(0.019)	(0.018)				
Positive 30-day ret x Post x High Anti self-dealing			-0.021	0.867***		
			(0.014)	(0.011)		
Positive 30-day ret x Post x High Disclosure					0.029**	0.900***
					(0.013)	(0.009)
Observations	13,754	13,754	13,754	13,754	13,754	13,754
R-squared	0.888	0.689	0.888	0.742	0.889	0.758
Number of firms	3,410	3,410	3,410	3,410	3,410	3,410
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	First stage	First stage	First stage	First stage	First stage	First stage

Table A.3: Long-term Outcomes: Acquisitions

This table shows the second stage regressions results using the logarithm of one plus the number of acquisitions as the dependent variable. Post-IPO attempt acquisitions are adjusted to account for long-term outcomes using forward-looking moving averages (see Table A.1). Columns 2-4 also include the instrumented IPO dummy's interaction with cross-sectional dummies based on industry or country-level characteristics. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Log(acquisition)	(2) Log(acquisition)	(3) Log(acquisition)	(4) Log(acquisition)
IPO	-0.006	0.067	0.064	0.075
	(0.198)	(0.180)	(0.176)	(0.185)
IPO x High Ind. Fin. Dep		-0.102***		
		(0.027)		
IPO x High Anti self-dealing			-0.025	
			(0.020)	
IPO x High Disclosure				-0.02
				(0.020)
Observations	13,754	13,754	13,754	13,754
Number of firms	3,410	3,410	3,410	3,410
Firm FE	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes
Regression	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2		Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
		x High Fin.Dep.	x High anti-sd	x High discl.

Table A.4: Long-term Outcomes: Target

This table shows the second stage regressions results using a dummy variable for whether the IPO-attempt firm was the target of an acquisition during the five years following an IPO attempt (see Table A.1). Columns 2-4 also include the instrumented IPO dummy's interaction with cross-sectional dummies based on industry or country-level characteristics. Standard errors (in parentheses) are adjusted for heteroscedasticity and clustered at the firm level. Significant at: *10%, **5% and ***1%.

	(1)	(2)	(3)	(4)
VARIABLES	Target	Target	Target	Target
IPO	0.11	0.135	0.135	0.138
	(0.150)	(0.138)	(0.135)	(0.141)
IPO x High Ind. Fin. Dep		-0.016		
		(0.022)		
IPO x High Anti self-dealing			-0.005	
			(0.016)	
IPO x High Disclosure				-0.004
				(0.016)
Observations	13,754	13,754	13,754	13,754
Number of firms	3,410	3,410	3,410	3,410
Firm FE	Yes	Yes	Yes	Yes
Event year FE	Yes	Yes	Yes	Yes
SIC x calendar year FE	Yes	Yes	Yes	Yes
IPO month x Post FE	Yes	Yes	Yes	Yes
Regression	Second stage	Second stage	Second stage	Second stage
Instrument #1	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
Instrument #2		Pre-IPO ret>0	Pre-IPO ret>0	Pre-IPO ret>0
		x High Fin.Dep.	x High anti-sd	x High discl.