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MOVING BEYOND THE VALLEY OF DEATH:
REGULATION AND VENTURE CAPITAL INVESTMENTS
IN EARLY-STAGE BIOPHARMACEUTICAL FIRMS

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ABSTRACT

Venture capitalists (VCs) traditionally invest in risky, early-stage innovations. Recent research suggests, however, that VCs may be herding into less risky, later-stage projects. Such a shift can create funding gaps for early-stage firms. Can regulation reverse this trend by providing information that may reduce the risk of early-stage investments? Using the regulatory setting of the European Union and the passage of the Orphan Drug Act (EU-ODA), we examine this question in the biopharmaceutical industry. We provide causal evidence that VCs are more likely to invest in early-stage biopharmaceutical firms operating in sub-fields disproportionately affected by EU-ODA. We also find that the level of syndication declined for early-stage investments and exit performance improved. Importantly, the shift towards early-stage investment did not lead to any higher proportion of bankruptcies. Collectively, our results suggest that the information provided by EU-ODA helped alleviate information asymmetries faced by VCs investing in early-stage biopharmaceutical firms. We conclude by discussing implications for entrepreneurial finance and innovation policy.

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1. Introduction

Extant research shows that many startups find it difficult to secure early-stage funding (Kerr and Nanda, 2011). A notable reason for this shortage is the difficulty in valuing these firms; they often involve novel scientific approaches or target new markets. They also often lack verifiable measures such as publications, patents, products, or sales that can be useful in objectively estimating the commercial feasibility and value of a venture. In the absence of such measures nascent firms may turn to alternative signals to convey quality (*e.g.*, Hsu and Ziedonis, 2013; Higgins *et al.,* 2011; Nicholson *et al.*, 2005; Stuart *et al.*, 1999; Audretsch and Stephan, 1996; Podolny, 1993). However, in these cases VCs often have to depend on their 'gut feelings' thereby making early-stage deal valuation as much an art as it is a science (Huang and Pearce, 2015).

This information asymmetry has led to the concern that VCs underfinance high-tech ventures that push the scientific frontier (*e.g.*, Dimov and Murray, 2008; Parhankangas, 2007; Auerswald and Branscomb, 2003) resulting in a rotation from early-stage to late-stage investments (Lerner, 2009). Within the biopharmaceutical industry some have argued that VCs have begun to herd into similar technologies (Dimov and Murray, 2008; Auerswald and Branscomb, 2003). Others have suggested that the lack of early-stage funding has slowed the transition from the 'valley of death' thereby hindering productivity (Hudson and Khazragui, 2013).

This paper examines whether regulation can effectively be used to help alleviate these information asymmetries (Alvarez-Garrido, 2015; Milanesi *et al*., 2013; Schwienbacher, 2013) and drive investment towards early-stage firms. Empirical work linking regulation and venture capital is sparse.[1] To fill this gap we exploit the introduction of the Orphan Drug Act in the European Union (EU-ODA) in 2000. The EU-ODA was designed to incentivize and facilitate treatments for rare diseases. We present causal evidence that the EU-ODA increased early-stage VC investments by five percent, on average, for firms operating in biopharmaceutical sub-fields affected by the policy.

Unintendedly, the provisions of the EU-ODA provided investors credible signals about the scientific viability of novel drug candidates and clarity on their potential market value. We find that the dissipation of information asymmetries allowed VCs to shift from late-stage to early-stage investments when investing in EU-based startups, relative to US-based startups. This suggests that the expected return for EU-based startups increased relative to their counterparts from the US. Interestingly, the European policy also benefitted US startups seeking early-stage investment,

[1] Lerner (2000) considers the relationship between SBIR grants and subsequent VC funding. Also focusing on the SBIR program, Gans and Stern (2003) find that awardees performed better in industries that attracted more VC investment. Finally, Samila and Sorenson (2011) show that federal R&D funding and VC funding are complements.

although the magnitude of impact is half of that for EU-based startups. We see the harmonized orphan designation procedure between the European Medicine Agency (EMA) and the US Food and Drug Administration (FDA) as one possible channel for this spillover. For those interested in national innovation policy, this finding is important as it demonstrates a mechanism to induce cross-border investment.

In addition to causing VC investment to shift to earlier stages we also find that the level of syndication declines in early-round investments. This suggests that the information-provisioning role of the EU-ODA for early-stage startups diminishes the need for peer input and evaluation that comes from syndication. It also suggests that benefits conferred by the EU-ODA outweigh the potential value-adding activities normally attributed to syndication (*e.g.*, Chemmanur and Tian, 2011; Casamatta and Haritchabalet, 2007; Brander *et al.*, 2002). Additionally, the amount raised in these early rounds doesn't change after EU-ODA suggesting that VCs had used syndication as a way to decrease portfolio risk.

Relatedly, we document a significant increase in exit performance for our focal EU-ODA treated firms focusing on orphan markets. Notably, this increase was in the form of IPOs versus acquisitions, reversing a trend observed over the recent past (Gao *et al.*, 2013). It appears that the signals conferred by the EU-ODA allowed VCs to select higher quality firms earlier and move them to IPO. This trend reversal should be viewed positively for investors since IPOs, on average, have higher returns than acquisitions (Smith *et al*., 2011). Importantly, we do not see any statistically significant difference in bankruptcies for firms affected by the EU-ODA. This suggests that the mitigation in risk due to the signals of the EU-ODA make these treated investments no more risky (in terms of failure) than control investments. This is important evidence that demonstrates the role regulation can play in mitigating market failures that may exist due to information asymmetries, opening the door to private investment.

2. European Union Regulation 141/200: Orphan Drug Act

The first Orphan Drug Act enacted anywhere was by the US in 1983 (US-ODA). It was intended to facilitate the development of treatments for rare diseases (Grabowski, 2005; Rohde, 2000). Most rare diseases remain "orphans" because market sizes are too small to justify their development costs. To solve this market failure, the US-ODA provided for a variety of incentives to firms. The considerable success of the US-ODA encouraged others, including the EU, to adopt similar legislation (Yin, 2008; Cheung *et al.*, 2004; Lichtenberg and Waldfogel, 2003). The EU's adoption of their Orphan Drug Act occurred in December 1999 and it was implemented starting in January 2000.[2]

In order to file for orphan designation in the EU the prevalence of the underlying disease must be below five per 10,000 of the EU population. Exceptions exist in cases where the expected return on investment is insufficient to justify a drug's development costs. The EU also considers whether the condition being treated is life threatening and if there exists a current treatment (or if the proposed treatment provides significant benefit over an existing drug). Key aspects of the application include discussions on the scientific rationale and medical plausibility of a drug candidate. Firms may file for orphan designation at any time during the development process up until they file for marketing authorization for the drug. In reality, however, applications need to be filed 8-12 months prior to a submission for marketing approval given the time delays by the Committee for Orphan Medicinal Products (COMP) to process applications.

Receiving orphan drug status confers several key benefits to a firm including: protocol assistance and follow-up, reduced/waived regulatory fees, accelerated approval pathways and extensions to market exclusivity. Importantly, orphan status provides an assessment by the COMP of the medical plausibility of a drug candidate. It is this assessment that provides key scientific information to the market about the viability and risk of a drug candidate. In the EU, new drugs are awarded eight years of market exclusivity. The granting of orphan status confers another two years of market exclusivity, for a total of 10 years.[3] Another two years is available (for a total of 12 years) if the drug targets a pediatric indication.[4] Moreover, the granting of orphan status limits approvals of other drugs for the same indication unless they can be shown to provide significant benefit over an existing treatment (Hall and Carlson, 2014).[5]

All of these incentives were designed to encourage pharmaceutical innovation directed towards rare diseases. The evidence appears to suggest that the ODAs in the US and EU have been successful (Stockklausner *et al*., 2016). For example, since its passage in 1983, close to 3,000 drugs have received orphan drug status with 448 approvals in the US. In the EU, designations exceed 1,200 with nearly 100 approvals (Hall and Carlson, 2014). The ODAs are not without their

[2] EU Regulation 141/200: http://ec.europa.eu/health//sites/health/files/files/eudralex/vol-1/reg_2000_141_cons-2009-07/reg_2000_141_cons-2009-07_en.pdf

[3] In contrast, in the US chemical-based drugs are awarded five years of market exclusivity with orphan drug status conferring another two years for a total of seven years.

[4] During market exclusivity generics are unable to enter the market. While this confirms monopoly positions to these firms, drug prices are regulated in the EU.

[5] There are exceptions to these rules, for example if the original firm provides their consent or if they are unable to supply enough product. See Hall and Carlson (2014) for a more extensive discussion.

detractors, however, where issues of gaming and high prices in the US have recently been called into question.[6]

Finally, the EU-ODA includes provisions that make some of the benefits tagged to protocol assistance and fee waivers more generous for small and medium size firms. As noted in Figure 1, the EU-ODA does not include the same kind of R&D tax credits that exist in the US. It is important to note that the intention of the EU-ODA was to incentivize development of treatments for rare diseases; it was not intended *per se* to solve potential underfinancing of nascent firms. We could not find any relevant discussion of this topic in the legislative record. As such, for the purposes of providing an information-provisioning role to VCs and steering investment towards these firms, the EU-ODA can plausibly be viewed as an exogenous shock. This will be important for identification as parties might *a priori* behave strategically, a topic we return to below.

3. Venture Financing of Early-Stage Firms

Most biopharmaceutical startups lack the financial resources to take a product all the way to market. These firms largely depend on outside funding, especially during their nascent stages. It is at this stage of development, unfortunately, that conventional means of financing is severely limited (*e.g.*, Budish *et al*., 2015; Murray, 1999; Myers and Majluf, 1984). Traditionally, VCs have filled this financing gap and carried firms forward to a liquidity event. Moreover, early-stage biopharmaceutical firms are notoriously difficult to value as many are working on innovative products at the frontier of technology and often lack publications, patents or products necessary to evaluate their commercial viability (Higgins *et al.*, 2011; Gans *et al.*, 2008). As such, investments in these firms often depend on the 'gut feelings' of VCs (Huang and Knight, 2017; Huang and Pearce, 2015) or other less traditional signals (*e.g.*, Hsu and Ziedonis, 2013; Higgins *et al.,* 2011; Nicholson *et al.*, 2005; Stuart *et al.*, 1999; Audretsch and Stephan, 1996; Podolny, 1993) .

These difficulties make investors seeking to fund early-stage startups vulnerable to information asymmetry problems such as adverse selection and moral hazard (*e.g*., Wu, 2016; Kerr *et al*., 2014). The problems compound when VCs do not have the specialized scientific knowledge to fully understand the nuances of startup technologies (Schwienbacher, 2013). Some have argued that VCs have responded to these challenges by switching from financing exploratory to exploitative ventures that are easier to understand and shifting from early- to late-stage firms (Alvarez-Garrido, 2015). The net effect of this herding behavior (Scharfstein and Stein, 1990) is that many firms suffer a financing gap in their early-stages or when they are at their so-called "valley of death" (Hudson and Khazragui, 2013).

[6] For a discussion see: https://www.npr.org/sections/health-shots/2017/02/10/514373480/sen-grassley-launches-inquiry-into-orphan-drug-laws-effect-on-prices

3.1. Signaling effects of the ODA

There is a vast literature on the role that signals play in markets dating back to Spence (1974). Effective signals can moderate the market failure problem caused by information asymmetry (*e.g.*, Gorry and Useche, 2017; Heeley *et al*., 2007; Mann, 2004; Long, 2002). For example, in the context of entrepreneurial finance, prior work has demonstrated the signaling role of status (*e.g.*, Stuart *et al.*, 1999; Podolny, 1993), star-scientists (*e.g*., Higgins *et al.*, 2011; Zucker *et al.*, 2002; Zucker and Darby, 1997), alliance partners (Nicholson *et al.*, 2005), venture capital backing (Meggison and Weiss, 1991), prestige of the underwriter (Higgins and Gulati, 2003; Meggison and Weiss, 1991) and university connections (Audretsch and Stephan, 1996). Directly relevant to our study is the literature examining the role that regulation and policy plays in providing government-backed signals so that the private sector can reasonably estimate the commercial and scientific viability of a project (*e.g.*, Hoenig and Henkel, 2015; Useche, 2014; Hsu and Ziedonis, 2013).[7]

The EU-ODA provides two different signals that are beneficial in decreasing information asymmetries that we will categorize as scientific-based and market-based. Scientific-based signals are ones that help a VC understand and form estimates about the scientific viability of a project while market-based signals help estimate the economic viability of projects. If we consider a simple expected profit function: $E(\Pi) = \rho(TR - TC)$, where $E(\Pi)$ is defined as expected profit, TR is defined as the sum of all future discounted revenues, TC is the sum of all future discounted costs and ρ represents some estimated probability that those revenues and costs will be realized. Effectively what the EU-ODA does is increase (or bring clarity to) TR, decrease TC and improve estimates of ρ, all of which should either individually or collectively increase expected profits.

Expanding on the above, the early scientific review by regulators during the EU-ODA application process should improve clarity about the viability of a drug candidate. Because of this early review, orphan designation is often seen as a 'golden badge'. Essentially the EU-ODA transforms unobservable information about the quality of novel drugs into observable information, thereby decreasing the VC's cost of acquiring information necessary to make more informed decisions. Ultimately, this should translate into better approximations of transition probabilities and ultimately improved estimates of ρ.[8] The additional years of market exclusivity and limits on approvals of other drugs within the same therapeutic category should improve estimates of TR. It is important to note that the restrictions on other drugs do not include those that are shown to be

[7] Unlike prior literature that has studied the impact of government grants, awards and funding on subsequent venture capital financing (*e.g.*, Islam *et al*., 2018), here the companies are not receiving funding. Rather, the signal is coming in the form of scientific validation and additional market protections.

[8] In a different context, research has demonstrated the positive signaling effects of regulatory certification in the case of the ISO 9000 Quality Management Standard (Terlaak and King, 2006).

superior. As such, revenue estimates still remain probabilistic. Finally, fee waivers and protocol assistance should reduce TC.

3.2. Venture capital syndication

VC deal syndication refers to two or more funds participating in an equity stake for a given investment and financing round. The argued benefits behind syndication include: improved deal quality selection; peer evaluation of technology; 'better' or more accurate valuations; improved guidance to investee firms; and, a way to decrease VC portfolio risk (*e.g.*, Gompers *et al*., 2016; Jääskeläinen *et al*., 2007; Wright and Lockett, 2003; Brander *et al*., 2002; Gompers and Lerner, 2000; Lerner, 1994). Unfortunately, these benefits do not come without potential costs. Casamatta and Haritchabalet (2007) argue that during the selection process VCs will 'tip their hand' and reveal potential deals to syndicate partners who themselves could turn into competitors for the deal.

Finally, information and benefits provided by the EU-ODA could diminish the need for early-stage deal syndication in several ways. First, the medical and scientific review should decrease the need for peer evaluation of an underlying technology. The granting of orphan status should also serve as a signal of quality and improve overall deal selection, again reducing the need for peer evaluation. Second, the extensions to market exclusivity and limits on potential competition should improve a VC's ability to value the firm. Finally, the cost benefits of EU-ODA, on the margin, may decrease the need for funds making it less likely that a VC may want or need to spread risk across other firms.

4. Empirical Methodology & Data

4.1 Methodology

To tease out the causal relationship between EU-ODA and VC investments, we employ a difference-in-differences (DiD) approach to compare subfields primarily affected by EU-ODA to non-affected subfields, as we discuss more fully below. We estimate the following equation:

$$(1)\quad Y_{ijt} = \alpha_j + \gamma_t + X_i + \beta_0(Drug\ related_j) + \beta_1(After\ ODA_t) + \beta_2\{(Drug\ related_j) * (After\ ODA_t)\} + \varepsilon_{ijt}$$

where Y_{ijt} is defined as the various outcome variables we explore (*i.e.*, timing of investment, the number of investors per round, invested amount per round and exit performance), *i* indexes individual investments at the investee-round-investor level ($i \in \{1...54{,}970\}$), *j* indexes industry categories ($j \in \{1...12\}$), and *t* indexes the year ($t \in \{1985...2015\}$). *Drug related* is a dummy variable that equals one if an investment is in the EU-ODA affected subfields (treatment group), zero otherwise. *After ODA* is a dummy variable equal to one if an investment occurred after 2000, zero otherwise. X_i is a vector of control variables that includes: location of the startup headquarters, location of the investor firm headquarters, and type of investors.

The coefficient of interest is β_2. The coefficient captures the difference in the outcome variables of the treatment group relative to the control group as a result of the treatment by the EU-ODA. To assign the treatment and the control groups, we use the fact that EU-ODA disproportionately affects firms pursuing development of novel drugs for human diseases. Among the investment categories in *VentureExpert* relating to medical, health and life sciences, we categorized the following into our treatment group: Biotech-Human, Med/Health Products, Medical Diagnostics, Medical Therapeutics and Pharmaceuticals. The control group consists of investment categories in the medical, health and life sciences not directly related to developing treatments for human disorders: Biosensors, Biotech Equipment, Biotech Other, Biotech Research, Biotech Animal, Biotech Industrial, and Med/Health Services.[9]

In order to verify our selection of fields into treatment (drug related fields) and control (non-drug related fields) groupings, we examine the pretreatment trends and evolution of VC investment patterns over time in both groups. Panel A, Figure 2 compares the change in the percentage of early-stage deals in the treatment to the control group over time. Panel B, Figure 2 plots the average days a startup takes to receive initial VC investment from firm founding across our treatment and control groups. Both figures show that the control group is comparable to the treatment group prior to EU-ODA. The trends diverge around 2000, providing initial evidence that EU-ODA may have impacted early-stage investment decisions by VCs.

It is possible that the composition of VCs may somehow change after EU-ODA. For example, there may be entry of new VCs into drug-related fields for reasons other than the EU-ODA. If this happened then our DiD would only capture the impact of how investment patterns of entrant VCs differed from incumbent VCs, but not the changes of incumbent VCs caused by EU-ODA. To account for this possibility we report both OLS and fixed effect models with the intuition being that new VC entry will be controlled for by technology category, investor and time fixed effects.[10]

4.2 Data and variables

Our data comes from VentureXpert and we start by collecting the population of global investments between 1985 and 2015 in the medical, health and life science categories. The dataset includes 70,355 investments made to 14,650 startups by 4,017 investing firms. We exclude

[9] Modifications in the composition of the treatment and the control groups do not change the nature of results. For example, if we include Biotech Research and Biotech Other in the treatment instead of the control group our findings remain consistent. We include Medical Diagnostics in the treatment group because these technologies, such as biomarkers, are complements to drug development. If we move them from the treatment to control group our results remain unchanged.

[10] In addition to the OLS and the FE models we report in the paper in the Appendix we also report logit regressions. Results remain consistent with our reported results.

observations that do not disclose essential information such as: investment date, investment stage, industry category and other major characteristics of investing firms. This leaves us with a final dataset of 54,970 investments made to 7,657 startups by 3,535 investing firms. A time trend of investments by year is presented in Appendix Figure 1 and summary statistics are presented in Table 1.

Our primary unit of analysis is at the investment round level but for our analysis of performance the unit of analysis is at the firm level. Our startups, on average, receive investments over four rounds. Each round, on average, includes 4.8 investors and raises $12.8 million. The average time difference between a startup's founding and an investment is 2,209 days (*i.e.*, six years). Approximately 22 percent of investments are made in early-stage start-ups; 67 percent of investors and 82.6 percent of startups are located in the US, which aligns with the observation that the US has been the locus of global biopharmaceutical research.

To explore the timing of VC investments we construct three variables. First, we define *Early-stage* as a dummy variable equal to one if VentureExpert classifies an investment as early-stage, zero otherwise. Second, because an early-stage investment can occur across firms of different ages we define *Time to investment* that measures the time between firm founding and the investment. If the EU-ODA causes investments to shift to early-stages, then the first variable will detect that effect. However, if the EU-ODA simply moves investments in the early-stage back further, this effect will be captured by our second variable. Finally, we define *Late-stage* as a dummy variable equal to one if VentureExpert classifies an investments as late-stage, zero otherwise.

We control for the type of VC making the investment and categorize them as independent venture capital (*IVC*), corporate venture capital (*CVC*), government-backed venture capital (*GVC*) or an angel investor (*Angel*). Again, we depend on VentureExpert's classification of VC type. We also control for whether the start-up was based in the US (*US startup*) or EU (*EU startup*) and whether the VC investor was based in the US (*US investor*) or EU (*EU investor*). In all cases these variables are defined as dummies that equal one if it falls within one of these categories, zero otherwise. In order to determine the number of VCs involved in syndication we count the number of investors participating in a single round (*Number of investors*).

To investigate the investment performance of VCs, we define several dummy variables to capture both startup success and failure. An investment is considered a success if it leads to a liquidity event for the VC. We define *M&A* as a dummy variable that equals one if a VC-backed investment exits through merger or acquisition, zero otherwise. We also define *IPO* as a dummy variable that equals one if the VC-backed investment exits through an initial public offering, zero otherwise. Lastly, failure is defined as bankruptcy and we define a dummy variable, *Bankruptcy*, equal to one if a startup reports bankruptcy or it is defunct, zero otherwise.

Finally, we recognize that measuring the impact of EU-ODA on performance is challenging because startups founded prior to 2000 may continue to receive investments after 2000. To avoid any contamination we restrict our sample to early-stage startups that received investment in the five years prior to EU-ODA to those that received an investment in five years after EU-ODA.

5. Results

5.1 Impact of EU-ODA on timing and location of venture capital investments

Table 2 supports our prediction related to the shift of VC investments from late-stage towards early-stage. Across all four models our coefficient of interest is β_2 or the interaction (*Drug related* * *After ODA*). Given the number of controls in the regression we report our main independent variables in Table 2 while the full set of estimates are reported in Appendix Table 1. Models (1) and (2) indicate that VCs are 3-5 percent more likely to make early-stage investments in EU-ODA-related fields. This translates into roughly 660 to 1,100 new early-stage investments. Results in Models (3) and (4) show that VCs shift their investments by 1-2 years earlier. The coefficients from OLS regressions in Models (1) and (3) are greater than those from the fixed effect models in Models (2) and (4). Recall that the OLS model takes into account both the change of pre-existing VCs as well as newly established VCs, while the fixed effect models include only pre-existing VCs. Taken together, the results imply that the EU-ODA promotes the entry of new VCs in EU-ODA-related fields, who fund much younger startups than incumbent investors do.[11]

Table 3 separates the sample into VC investments made in EU-based startups and those made in US-based startups. Again, given the number of controls in the regression we report our main independent variables in Table 3 while the full set of estimates are reported in Appendix Table 6. The results show that the EU-ODA caused a switch towards early-stage deals in both the EU (Model 1) and US (Model 3). The effect, not surprisingly, is stronger among EU-based startups since they are more likely to pursue orphan designation in their home market. The harmonization between orphan designation procedures in the US and EU provides a possible explanation for the positive impact on US-based startups. Interestingly, the decrease in time to investment, between 645 days (Mode 2) and 630 days (Model 4), is similar across both sub-samples. The rationale for a VC to push an investment earlier transcends the location of the start-up. Consistent with prior work on signals

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[11] To ensure that our results are not sensitive to our selection of time frames we repeat the analysis in Models (1) and (2) with three, five and seven year windows (Appendix Table 2). We repeat the same three, five and seven years time frame for the analysis in Models (3) and (4) (Appendix Table 3). In Appendix Table 4 we replicate Table 2 using a multinomial logit regression and in Appendix Table 5 we replicate Table 2 using alternative definitions of the treatment group. Results remain robust across these specifications.

(*e.g.*, Conti *et al.*, 2013a and 2013b; Higgins *et al*., 2011), the results in Table 3 seem to suggest that the information signaling effects of the EU-ODA have some dynamics inherent in them.[12]

5.2 Impact of ODA on syndication of venture capital investments

Table 4 shows the changes in syndication behaviors of investors. Again, given the number of controls in the regression we report our main independent variables in Table 4 while the full set of estimates are reported in Appendix Table 8. Model (1) reports that overall VCs increase the use of syndication after EU-ODA in drug-related fields. However, this result is driven by late-stage investments. This can be seen when we split the sample into early- and late-stage deals. Results in Model (2) indicate that VCs are less likely to syndicate for early-stage deals; while in Model (3) we see an increase in deal syndication for late-stage deals.

This diverging pattern suggests that the information conferred by the EU-ODA affects an investor's incentive for syndication differently across investment stages. A VC is likely to syndicate early-stage deals when there is less information available to evaluate a nascent investment opportunity. As a result, they depend on peer opinion. The signals created by the EU-ODA appear to be sufficient enough in quality to replace the need for peer opinion. Likewise, if the EU-ODA changes the expected profit of a start-up, they will become more valuable and command greater valuations in later rounds of financing. For these firms, we may see the level of syndication actually increase not because VCs need peer opinion but because VCs want to minimize risk to their own investment portfolio coming from any single investment.

Results in Table 5 support this view. Again, given the number of controls in the regression we report our main independent variables in Table 5 while the full set of estimates are reported in Appendix Table 10. In Model (1) we find an overall increase in amounts invested after EU-ODA. This result is completely driven by late-stage deals. In Model (3) we find that in EU-ODA affected fields the amount invested in late-stage deals increased by $2 million. In Model (2) we see that the EU-ODA doesn't have a statistically significant impact on the amount invested in early-stage deals. Coupled with our prior findings, this is important because it suggests that while investments are being shifted to an earlier stage (*i.e.*, back over the 'valley of death') and the level of syndication is declining, the investment amount is not changing, on average. In the absence of any type of risk-mitigation by the benefits of the EU-ODA we would expect to see the values of investments decline as they are shifted to an earlier stage.[13]

5.3 Impact of EU-ODA on performance of venture capital investments

[12] In Appendix Table 7 we replicate Table 3 using a multinomial logit regression; results remain robust.

[13] Relating back to our earlier example, $E(\Pi) = \rho\,(TR - TC)$, if investments are shifted back in time without any mitigation in risk, then ρ would decrease thereby decreasing the expected value of a firm. This should lead to a lower valuation and, all else equal, a decline in investment.

Finally, in Table 6 we compare the exit performances of startups that received early-stage investments during the five years prior to the EU-ODA to those for the five years after the EU-ODA. As before, given the number of controls in the regression we report our main independent variables in Table 6 while the full set of estimates are reported in Appendix Table 11. Overall, we see significant differential exit performance between IPOs and acquisitions for our EU-ODA related fields. Specifically, in Models (2) and (5) we find that the rate of exit via IPO increased while in Models (1) and (4) the rate of exit via acquisition decreased. This pattern is a reversal of the general pattern observed in the more recent literature (Gao *et al.,* 2013).[14] Given that biopharmaceutical IPOs tend to have higher returns than acquisitions, this suggests that VCs are able to maximize returns to investors (Gompers *et al.*, 2016).

This result is interesting, especially given the presence of CVC investors within this market, which we control for in our regression. In general, a tension exists between VCs and CVCs in that VCs tend to push for a liquidity event while CVCs are more patient as they are interested in the underlying technology (Ceccagnoli *et al.*, 2018). For them, acquiring technology once a firm has gone public is more expensive than acquiring it while still private. Further, founders and management teams of startups tend to have a preference, on average, for exit via an IPO.[15] Collectively, these results suggest that those parties favoring exit via IPO appear to be winning any underlying tension relating to mode of exit.

Finally, the results in Models (3) and (6) suggest that early-stage firms are no more less likely to exit via bankruptcy. This implies that the investment performance of VCs does not get worse as a result of the shift toward early-stage deals. In general, a shift towards earlier stage investments should come with increased risk. However, these results suggest that the signals and information conferred by EU-ODA were sufficient enough to reduce risk thereby allowing for investments to be made earlier or back across the 'valley of death'.

6. Conclusion

Given significant information asymmetries in early-stage investing, underinvestment can occur. Recent research suggests that VCs may be herding into less risky, later-stage projects. Such a shift can create funding gaps for early-stage firms. We explore the role that regulation may be able to

[14] In Appendix Table 12 we replicate Table 6 over alternative time periods (3 and 7 years) and in Appendix Table 13 we replicate Table 6 using multinomial logit regressions. Results remain robust.

[15] "It's very hard as a venture capitalist, as a professional board member, to tell a management team, 'you're going to build this company to be acquired. When these companies get swallowed by larger entities, the passion dies, the entrepreneurship dies," said Ted Schlein, a managing partner of Kleiner, Perkins, Caufield & Byers: https://www.forbes.com/2010/03/05/venture-capital-ipo-entrepreneurs-finance-wharton.html#5765046a7137

play in helping early-stage firms through the so-called valley-of -death. Using the regulatory setting of the EU and the passage of the Orphan Drug Act, we examine this question in the biopharmaceutical industry. To the best of our knowledge, this is one of the first papers to empirically demonstrate the causal impact from a reduction in information asymmetry through governmental regulation on the investment decisions of VCs. We find that due to the benefits conferred by the EU-ODA that VCs shift their investments towards earlier-stages. Importantly, the average amount invested does not change. We also find that the level of syndication decreases during this shift, suggesting that the information conferred by the EU-ODA replaced the need for peer evaluation. Exit performance appears to improve with an increased probability of IPO and no greater risk of bankruptcy resulting from the shift towards earlier stage investments. Collectively, our results appear to demonstrate the regulation can play a significant role in mitigating risk and helping drive private investment back across the 'valley of death'.

Our findings also have important policy implications given that many countries have made establishing a solid ecosystem for entrepreneurship a priority. Unfortunately, for some technologies and industries, such as biopharmaceuticals, significant information asymmetries exist making the valuation of early-stage firms difficult. If these firms are unable to communicate the genuine value of their early-stage innovations, they may end up being disproportionately underfinanced compared to other startups for which information is more readily available and discernable. This could dampen the incentives of entrepreneurs and early-stage firms to pursue high-risk, high-reward type of innovations in important science-based sectors like biopharmaceuticals. Our results here demonstrate that policy has a role in correcting this market failure.

Our project, however, is not without limitations. First, we do not study systematically how entry and exit of VCs might be driving our results, although we partly aim to address it econometrically by using a fixed effects strategy. If it is the case that new VCs are responsible for shifting the nature of VC activity towards early-stage startups, then future studies can build on our intuition to investigate the moderating role of industry evolution among VCs in conjunction with regulation, such as the EU-ODA. Second, as VCs shift their investment focus to early-stage startups, they might need to come up with new investment strategies and/or governance structures to manage their portfolio. While our study partly examines the changes in deal syndication strategies of VCs, the shift towards less syndication in early-stages and more syndication in late-stages may cause investment patterns, due to factors such as risk, to change. To the extent this has unintended consequences remains to be seen.

Finally, while we do our best to tease out the causal impact of the EU-ODA, it is still possible that the group of firms in drug-related biopharmaceutical fields may differ from the group in non-drug-related fields in some unobservable ways. Future work could also consider extending our findings to sectors beyond biopharmaceuticals to other emerging fields like artificial intelligence or climate change. A cross-industry study would also be helpful to help determine if our results are generalizable or whether the biopharmaceutical industry remains a 'black duck'. Related to this, it would be meaningful to examine what types of VC-specific characteristics lead to the tendency toward financing younger innovations, such as the background of partners, reputation or previous experiences in relevant markets. As always, much remains to be done.

References

Alvarez-Garrido, E. (2015). The value translation model: A theory of venture growth and innovation. Academy of Management Proceedings, No. 1, 17910.

Audretsch, D., Stephan, P. (1996). Company-scientist locational links: the case of biotechnology. American Economic Review, 86(3), 641-652.

Auerswald, P. E., Branscomb, L. M. (2003). Valleys of death and Darwinian seas: Financing the invention to innovation transition in the United States. The Journal of Technology Transfer, 28(3-4), 227-239.

Brander, J. A., Amit, R., Antweiler, W. (2002). Venture-capital syndication: Improved venture selection versus the value-added hypothesis. Journal of Economics & Management Strategy, 11(3), 423-452.

Budish, E., Roin, B. N., Williams, H. (2015). Do firms underinvest in long-term research? Evidence from cancer clinical trials. American Economic Review, 105(7), 2044-2085.

Casamatta, C., Haritchabalet, C. (2007). Experience, screening and syndication in venture capital investments. Journal of Financial Intermediation, 16(3), 368-398.

Ceccagnoli, M., Higgins, M.J., Kang, H. (2018). Corporate venture capital as a real option in the market for technology. Strategic Management Journal, *forthcoming*.

Chemmanur, T., Tian, X. (2011). Peer monitoring, syndication, and the dynamics of venture capitalist interactions. Available at SSRN: https://ssrn.com/abstract=1343116

Cheung, R. Y., Cohen, J. C., & Illingworth, P. (2004). Orphan drug policies: implications for the United States, Canada, and developing countries. Health Law Journal, 12, 183.

Conti, A., Thursby, M., Rothaermel, F. T. (2013a). Show me the right stuff: Signals for high-tech startups. Journal of Economics & Management Strategy, 22(2), 341-364.

Conti, A., Thursby, J., Thursby, M. (2013b). Patents as signals for startup financing. The Journal of Industrial Economics, 61(3), 592-622.

Dimov, D., Murray, G. (2008). Determinants of the incidence and scale of seed capital investments by venture capital firms. Small Business Economics, 30(2), 127-152.

Gans, J., Stern, S. (2003). When does funding research by smaller firms bear fruit?: Evidence from the SBIR program. Economics of Innovation and New Technology, 12(4), 361-384.

Gans, J. S., Hsu, D. H., & Stern, S. (2008). The impact of uncertain intellectual property rights on the market for ideas: Evidence from patent grant delays. Management Science, 54(5), 982-997.

Gao, X., Ritter, J. R., Zhu, Z. (2013). Where have all the IPOs gone?. Journal of Financial and Quantitative Analysis, 48(6), 1663-1692.

Gompers, P., Gornall, W., Kaplan, S. N., Strebulaev, I. A. (2016). How do venture capitalists make decisions? National Bureau of Economic Research, Working Paper No. 22587: http://www.nber.org/papers/w22587.

Gompers, P., Lerner, J. (2000). The determinants of corporate venture capital success: Organizational structure, incentives, and complementarities. In *Concentrated Corporate Ownership,* 17-54. University of Chicago Press, Chicago, IL.

Gorry, P., Useche, D. (2017). Orphan Drug Designations as Valuable Intangible Assets for IPO Investors in Pharma-Biotech Companies. In *Economic Dimensions of Personalized and Precision Medicine*. University of Chicago Press, Chicago, IL.

Grabowski, H. G. (2005). Increasing R&D incentives for neglected diseases: Lessons from the Orphan Drug Act. In *International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime.* Cambridge University Press, Cambridge, UK.

Hall, A. K., Carlson, M. R. (2014). The current status of orphan drug development in Europe and the US. Intractable & Rare Diseases Research, 3(1), 1-7.

Heeley, M. B., Matusik, S. F., Jain, N. (2007). Innovation, appropriability, and the underpricing of initial public offerings. Academy of Management Journal, 50(1), 209-225.

Higgins, M. J., Stephan, P. E., Thursby, J. G. (2011). Conveying quality and value in emerging industries: Star scientists and the role of signals in biotechnology. Research Policy, 40(4), 605-617.

Higgins, M., Gulati, R. (2003). Getting off to a good start: the effects of upper echelon affiliations on underwriter prestige. Organization Science, 14(3), 244-263.

Hoenig, D., Henkel, J. (2015). Quality signals? The role of patents, alliances, and team experience in venture capital financing. Research Policy, 44(5), 1049-1064.

Hsu, D., Ziedonis, R. (2013). Resources as dual sources of advantage: Implications for valuing entprenrenueiral firm patents. Strategic Management Journal, 34(7), 761-781.

Huang, L., Knight, A. P. (2017). Resources and relationships in entrepreneurship: an exchange theory of the development and effects of the entrepreneur-investor relationship. Academy of Management Review, 42(1), 80-102.

Huang, L., Pearce , J.L. (2015). Managing the unknowable the effectiveness of early-stage investor gut feel in entrepreneurial investment decisions. Administrative Science Quarterly, 60(4), 634-670.

Hudson, J., Khazragui, H. F. (2013). Into the valley of death: research to innovation. Drug Discovery Today, 18(13-14), 610-613.

Islam, M., Fremeth, A., Marcus, A. (2018). Signaling by early stage startups: US government research grants and venture capital funding. Journal of Business Venturing, 33(1), 35-51.

Jääskeläinen, M., Maula, M., Murray, G. (2007). Profit distribution and compensation structures in publicly and privately funded hybrid venture capital funds. Research Policy, 36(7), 913-929.

Kerr, W. R., Nanda, R. (2011). Financing constraints and entrepreneurship. Handbook of Research on Innovation and Entrepreneurship, 88.

Kerr, W. R., Nanda, R., Rhodes-Kropf, M. (2014). Entrepreneurship as experimentation. Journal of Economic Perspectives, 28(3), 25-48.

Lerner, J. (1994). The syndication of venture capital investments. Financial Management, 16-27.

Lerner, J. (2000). The government as venture capitalist: the long-run impact of the SBIR program. The Journal of Private Equity, 55-78.

Lerner, J. (2009). *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed--and What to Do About It*. Princeton University Press, Princeton, NJ.

Lichtenberg, F. R., Waldfogel, J. (2003). Does misery love company? Evidence from pharmaceutical markets before and after the Orphan Drug Act. National Bureau of Economic Research, Working Paper No. 9750: http://www.nber.org/papers/w9750.

Long, C. (2002). Patent signals. The University of Chicago Law Review, 625-679.

Mann, R. J. (2004). Do patents facilitate financing in the software industry. Texas Law Review, 83: 961.

Meggison, W., Weisss, K. (1991). Venture capitalist certification in initial public offerings. Journal of Finance, 46(3), 879-901.

Milanesi, G., Pesce, G., El Alabi, E. (2013). Technology-based startup valuation using real options with Edgeworth expansion. Journal of Finance and Accounting, 1(2), 54-61.

Murray, G. (1999). Early-stage venture capital funds, scale economies and public support. Venture Capital: An International Journal of Entrepreneurial Finance, 1(4), 351-384.

Myers, S. C., Majluf, N.S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics, 13(2), 187-221.

Nicholson, S., Danzon, P., & McCullough, J. (2005). Biotech-pharmaceutical alliances as a signal of asset and firm quality. The Journal of Business, 78(4), 1433-1464.

Parhankangas, A. (2007). An overview of research on early stage venture capital: Current status and future directions. *Handbook of Research on Venture Capital* 1: 253. Edward Elgar Publishing, Northampton, MA.

Podolny, J. M. (1993). A status-based model of market competition. American Journal of Sociology, 98(4), 829-872.

Rohde, D. D. (2000). Orphan drug act: An engine of innovation-at what cost. Food & Drug Law Journal, 55: 125.

Samila, S., Sorenson, O. (2011). Venture capital, entrepreneurship, and economic growth. The Review of Economics and Statistics, 93(1), 338-349.

Scharfstein, D. S., Stein, J. C. (1990). Herd behavior and investment. The American Economic Review, 465-479.

Schwienbacher, A. (2013). The entrepreneur's investor choice: The impact on later-stage firm development. Journal of Business Venturing, 28(4), 528-545.

Smith, R., Robert, P., Vijay, S. (2011). VC fund financial performance: The relative importance of IPO and M&A exits and exercise of abandonment options. Financial Management, 40(4), 1029-1065.

Spence, M. (1973). Job market signaling. The Quarterly Journal of Economics, 87(3), 355-374.

Stockklausner, C., Lampert, A., Hoffmann, G. F., Ries, M. (2016). Novel treatments for rare cancers: the US orphan drug act is delivering—a cross-sectional analysis. The Oncologist, 21(4), 487-493.

Stuart, T. E., Hoang, H., Hybels, R. C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. Administrative Science Quarterly, 44(2), 315-349.

Terlaak, A., King, A.A. (2006). The effect of certification with the ISO 9000 Quality Management Standard: A signaling approach. Journal of Economic Behavior & Organization, 60(4), 579-602.

Useche, D. (2014). Are patents signals for the IPO market? An EU–US comparison for the software industry. Research Policy, 43(8), 1299-1311.

Wright, M., Lockett, A. (2003). The structure and management of alliances: Syndication in the venture capital industry. Journal of Management Studies, 40(8), 2073-2102.

Wu, A. (2016). Organizational decision-making and information: Angel investments by venture capital partners. In Academy of Management Proceedings (Vol. 2016, No. 1, p. 11043). Briarcliff Manor, NY 10510: Academy of Management.

Yin, W. (2008). Market incentives and pharmaceutical innovation. Journal of Health Economics, 27(4), 1060-1077.

Zucker, L.G., Darby, M.R. (1997). Individual action and the demand for institutions: Star scientists and institutional transformation. American Behavioral Scientist, 40, 502-153.

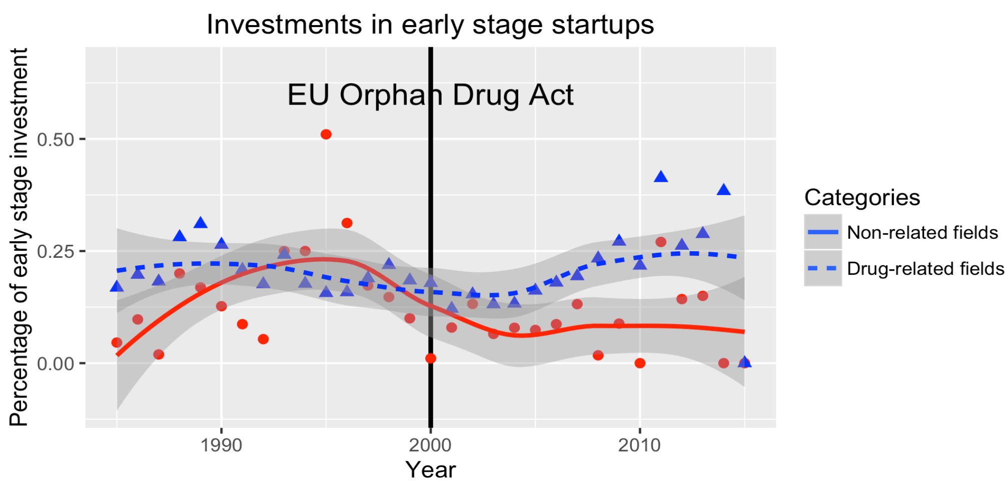
Zucker, L.G., Darby, M.R., Armstrong, J. (2002). Commercializing knowledge: University science, knowledge capture and firm performance in biotechnology. Management Science, 48, 138-153.

Figure 1. Comparison of the EU-ODA to the US-ODA.

Items	EU-ODA	US-ODA
Timetable	Timetable published by EMA	Any time; no defined timetable
Prevalence criteria	Disease or condition affects < 5 in 10,000 persons in the EU	Disease or condition affects < 200,000 persons in the US
Sponsor criteria	Proof of establishment in EU	Not required
Key aspects of the application	- Medical plausibility - Prevalence - Justification of significant benefit or why other methods are not satisfactory	- Scientific rationale - Prevalence
Benefits	- Protocol assistance (scientific advice) - 10 years of market exclusivity - Reduced regulatory fees - None - Funding may be available from other sources within the EU - Access to the centralized authorization procedure in the EU	- Protocol assistance - 7 years of market exclusivity - Reduced/waived regulatory fees - Tax credit on clinical trials - Specific subsidies for clinical trials - None
Harmonized procedure	- Parallel applications for orphan designation to the EU, the US and Japan - Parallel scientific advice from the EU EMA and the US FDA - Submission of a single annual development report to the US and the EU	

Figure 2. Orphan Drug Act (EU-ODA) and timing of VC investments. Panel A compares the change in the percentage of early-stage deals in drug-related biopharmaceutical fields to those in non-drug related fields. Panel B plots the average days a startup takes to receive investments in drug-related fields and those in non-drug related counterparts.

Panel A. Investments in early-stage startups



Panel B. Time to receive investments

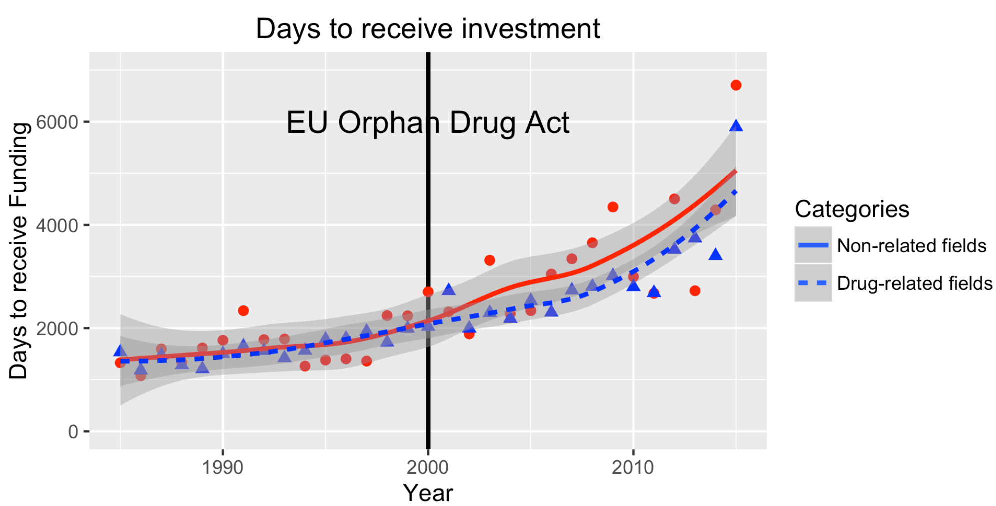


Table 1. Descriptive statistics.

Variable	N	Mean	St. Dev.	Min	Max
Round ID	54,970	4.097	2.943	1	26
Number of investors	54,970	4.868	3.577	1	27
Investment amount per round ($1K)	54,970	12,822.030	10,185.370	1	32,572
Drug-related (%)	54,970	0.805	0.396	0	1
After ODA	54,970	0.730	0.444	0	1
Time to investment	54,970	2,209.090	1,941.146	0	16,414
Early-stage (%)	54,970	0.220	0.414	0	1
Late-stage (%)	54,970	0.408	0.491	0	1
IVC	54,970	0.910	0.286	0	1
CVC	54,970	0.059	0.236	0	1
Angel	54,970	0.003	0.050	0	1
GVC	54,970	0.008	0.088	0	1
EU startup (%)	54,970	0.134	0.341	0	1
US startup (%)	54,970	0.826	0.379	0	1
M&A (%)	54,970	0.311	0.463	0	1
Bankruptcy (%)	54,970	0.072	0.259	0	1
IPO (%)	54,970	0.216	0.412	0	1
EU investor (%)	54,970	0.140	0.347	0	1
US investor (%)	54,970	0.673	0.469	0	1

Table 2. Timing of VC investments. The unit of observation is at the investee-investor-round level. The dependent variable in Models 1 and 2 is *Early-stage* while in Models 3 and 4 the dependent variable is *Time to investment.* The coefficients in Models 3 and 4 can be interpreted as days. All models include our full set of controls and complete results are reported in Appendix Table 1. Standard errors are clustered at the investing firm level. *p<0.10, **p<0.05, and ***p<0.01.

	Early-stage		Time to investment	
	OLS	Fixed effects	OLS	Fixed effects
	(1)	(2)	(3)	(4)
Drug-related	0.193***	-0.243***	1,480.895***	997.478***
	(0.023)	(0.056)	(101.242)	(219.082)
After ODA	0.027	-0.084**	2,679.704***	3,101.838***
	(0.035)	(0.038)	(154.976)	(149.475)
Drug-related*After ODA	0.050***	0.036***	-681.082***	-353.234***
	(0.010)	(0.011)	(43.722)	(42.741)
Controls	YES	YES	YES	YES
Category FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Investor FE	NO	YES	NO	YES
Observations	54,970	54,970	54,970	54,970
R^2	0.241	0.134	0.622	0.385

Table 3. Impact of EU ODA on early-stage investment by origin of startups. The unit of observation is at the investee-investor-round level. This table replicates our main specification on split samples by the origin of the start-up. Models 1 and 2 include EU startups while Models 3 and 4 include US startups. The dependent variable in Models 1 and 3 is *Early-stage* while the dependent variable in Models 2 and 4 is *Time to investment*. All models include our full set of controls and complete results are reported in Appendix Table 6. Standard errors are clustered at the investing firm level. $^{*}p<0.10$, $^{**}p<0.05$, and $^{***}p<0.01$.

	EU startup		US startup	
	Early-stage	Time to investment	Early-stage	Time to investment
	(1)	(2)	(3)	(4)
Drug-related	0.012	458.808	0.210^{***}	$1,030.366^{***}$
	(0.127)	(619.591)	(0.018)	(78.737)
After ODA	0.215	$3,300.749^{***}$	0.024	$2,600.108^{***}$
	(0.149)	(727.480)	(0.039)	(166.442)
Drug-related*After ODA	0.095^{**}	-645.407^{***}	0.045^{***}	-630.634^{***}
	(0.039)	(192.074)	(0.011)	(45.264)
EU investor	0.029^{**}	-271.242^{***}	-0.001	309.280^{***}
	(0.011)	(55.643)	(0.009)	(39.661)
Controls	YES	YES	YES	YES
Category FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	7,362	7,362	45,389	45,389
R^2	0.285	0.626	0.238	0.626

Table 4. Syndication of VC investments. The unit of observation is at the investee-investor-round level. The dependent variable across all Models is *Number of investors*. Model 1 includes our full sample while Models 2 and 3 split the sample into early- and late-stage, respectively. All models include our full set of controls and complete results are reported in Appendix Table 8. Standard errors are clustered at the investing firm level. *p<0.10, **p<0.05, and ***p<0.01.

	(1) Total	(2) Early-stage	(3) Late-stage
Drug-related	0.827*	1.706***	1.107
	(0.439)	(0.579)	(0.814)
After ODA	-2.662***	-1.644***	-3.849***
	(0.300)	(0.387)	(0.429)
Drug-related*After ODA	0.179**	-0.993***	0.283**
	(0.086)	(0.181)	(0.122)
Controls	YES	YES	YES
Category FE	YES	YES	YES
Year FE	YES	YES	YES
Investor FE	YES	YES	YES
Observations	54,970	12,101	30,216
R^2	0.273	0.380	0.362

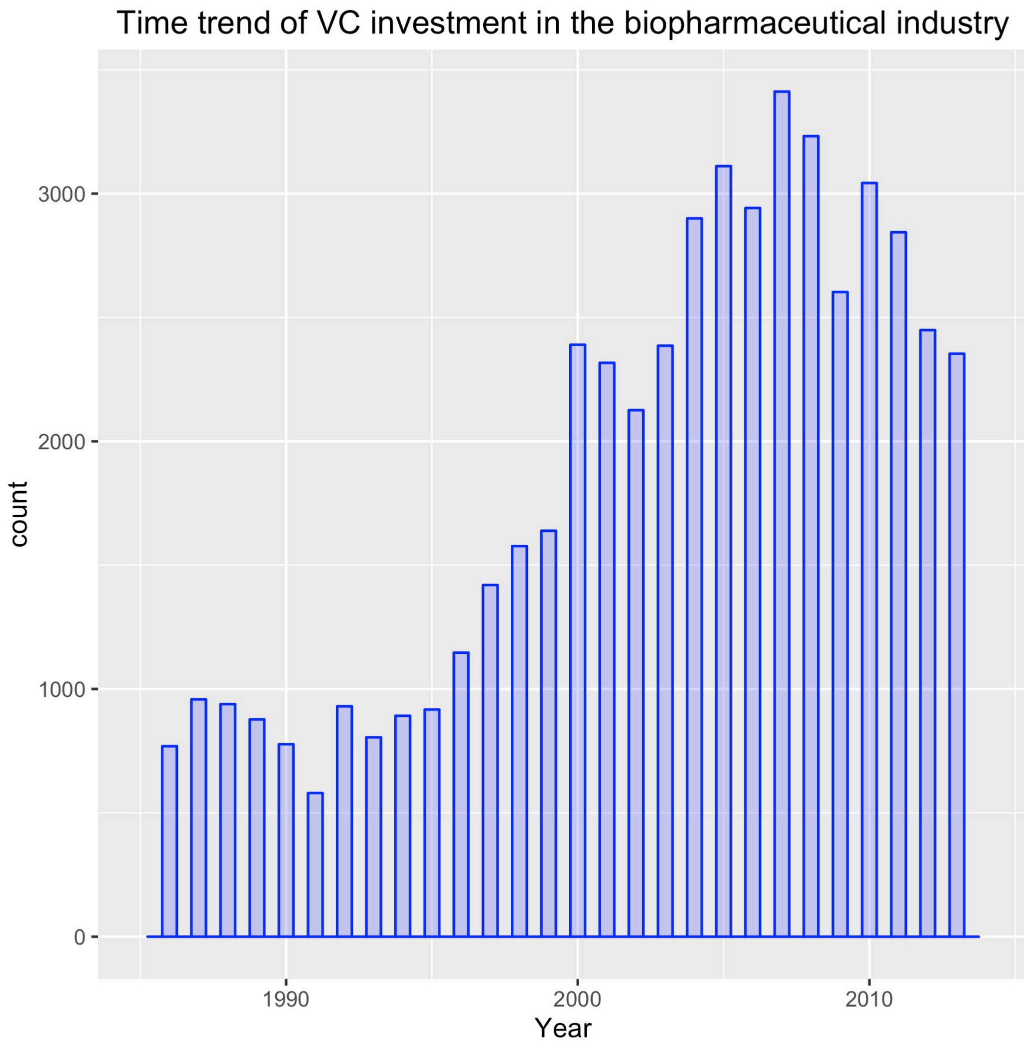
Table 5. Changes in the invested amount after EU-ODA. The level of observation is at the investee-round level. The dependent variable across Models 1-3 is *Invested amount in round* ($1k). Model 1 includes our full sample while Models 2 and 3 split the sample into early- and late-stage, respectively. All models include our full set of controls and complete results are reported in Appendix Table 10. Standard errors are clustered at the investee firm level. *p<0.10, **p<0.05, and ***p<0.01.

	(1) Total	(2) Early-stage	(3) Late-stage
Drug-related	13,057.680***	12,653.340***	12,891.950***
	(731.455)	(1,724.819)	(1,001.774)
After ODA	-1,875.544	6,104.513**	-3,926.689**
	(1,194.991)	(2,510.070)	(1,537.848)
Drug-related*After ODA	1,723.383***	-522.448	2,018.730***
	(328.310)	(775.689)	(438.356)
Controls	YES	YES	YES
Category FE	YES	YES	YES
Year FE	YES	YES	YES
Observations	28,312	6,241	14,624
R^2	0.590	0.674	0.601

Table 6. Exit performance of early-stage startups. The level of observation is at the investee-investor-round level. Models 1-3 are run utilizing OLS while Models 4-6 are run utilizing fixed effects. The dependent variable in Models 1 and 4 is defined as *M&A*. The dependent variable in Models 2 and 5 is defined as *IPO* and the dependent variable in Models 3 and 6 are defined as *Bankruptcy*. All models include our full set of controls and complete results are reported in Appendix Table 11. Standard errors are clustered at the investing firm level. $^{*}p<0.10$, $^{**}p<0.05$, and $^{***}p<0.01$.

	OLS			Fixed effects		
	M&A	IPO	Bankruptcy	M&A	IPO	Bankruptcy
	(1)	(2)	(3)	(4)	(5)	(6)
Drug-related	0.163**	0.481***	0.092**	0.070	-0.044	-0.113
	(0.067)	(0.056)	(0.047)	(0.119)	(0.099)	(0.085)
After ODA	0.087*	-0.407***	-0.194***	0.096	-0.399***	-0.119***
	(0.051)	(0.042)	(0.035)	(0.060)	(0.051)	(0.043)
Drug-related*After ODA	-0.114***	0.173***	0.040	-0.140***	0.158***	0.010
	(0.039)	(0.032)	(0.027)	(0.045)	(0.038)	(0.032)
Controls	YES	YES	YES	YES	YES	YES
Category FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Investor FE	NO	NO	NO	YES	YES	YES
Observations	4,475	4,475	4,475	4,475	4,475	4,475
R^2	0.369	0.270	0.187	0.328	0.350	0.297

Appendix Figure 1. Time Trend of VC Investment in the Biopharmaceutical Industry.



Appendix Table 1. VCs switch to Early Stage Investments with EU-ODA – All Controls. This table replicates Table 2 reporting the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. $^{*}p<0.10$; $^{**}p<0.05$; $^{***}p<0.01$.

	Dependent variables			
	Early-stage		Time to investment	
	OLS	*Fixed effect*	*OLS*	*Fixed effect*
	(1)	(2)	(3)	(4)
Drug-related	0.193^{***}	-0.243^{***}	$1,480.895^{***}$	997.478^{***}
	(0.023)	(0.056)	(101.242)	(219.082)
After ODA	0.027	-0.084^{**}	$2,679.704^{***}$	$3,101.838^{***}$
	(0.035)	(0.038)	(154.976)	(149.475)
Drug-related*After ODA	0.050^{***}	0.036^{***}	-681.082^{***}	-353.234^{***}
	(0.010)	(0.011)	(43.722)	(42.741)
EU startups	0.034^{***}	0.065^{***}	-122.874^{***}	-462.831^{***}
	(0.010)	(0.017)	(44.115)	(66.648)
US startups	0.019^{**}	0.034^{**}	-252.457^{***}	-316.326^{***}
	(0.009)	(0.015)	(39.911)	(58.784)
IVC	-0.017		-218.926^{***}	
	(0.013)		(55.552)	
CVC	-0.002		-270.910^{***}	
	(0.014)		(63.451)	
Angel	0.149^{***}		$-1,125.789^{***}$	
	(0.037)		(162.646)	
GVC	-0.094^{***}		115.399	
	(0.023)		(102.978)	
Biosensors	0.299^{***}	-0.131^{**}	574.089^{***}	-21.075
	(0.031)	(0.059)	(137.747)	(232.500)
Biotech Equipment	0.184^{***}	-0.247^{***}	$1,179.394^{***}$	427.476^{*}
	(0.025)	(0.056)	(111.440)	(219.451)
Biotech Other	0.486^{***}		488.176^{**}	
	(0.056)		(248.946)	
Biotech Research	0.238^{***}	-0.183^{***}	787.431^{***}	6.679
	(0.026)	(0.056)	(113.543)	(219.656)
Biotech-Animal	0.217^{***}	-0.193^{***}	$1,278.401^{***}$	334.558
	(0.025)	(0.056)	(111.517)	(222.813)
Biotech-Human	0.059^{***}	0.074^{***}	-122.413^{***}	-587.100^{***}
	(0.006)	(0.008)	(27.290)	(30.398)
Biotech-Industrial	0.221^{***}	-0.217^{***}	$1,021.111^{***}$	348.415

	(0.026)	(0.056)	(114.907)	(221.353)
Med/Health Products	-0.036***		649.837***	
	(0.008)		(36.771)	
Med/Health Services	0.099***	-0.250***	2,012.093***	556.922**
	(0.023)	(0.055)	(103.081)	(217.417)
Medical Diagnostics	-0.045***	-0.011	461.792***	-160.477***
	(0.008)	(0.009)	(35.779)	(36.982)
Medical Therapeutics	-0.023***	0.012	126.199***	-419.501***
	(0.007)	(0.008)	(29.398)	(31.320)
Pharmaceutical		0.039***		-664.817***
		(0.009)		(35.477)
1986	0.020	0.028	-2.053	30.948
	(0.022)	(0.023)	(98.829)	(91.343)
1987	-0.009	-0.020	281.965***	314.688***
	(0.021)	(0.022)	(94.565)	(87.892)
1988	0.043**	0.037*	122.332	280.399***
	(0.021)	(0.022)	(94.921)	(88.418)
1989	0.106***	0.091***	116.690	335.801***
	(0.022)	(0.023)	(96.231)	(90.582)
1990	0.042*	0.028	362.022***	612.381***
	(0.022)	(0.024)	(98.807)	(92.937)
1991	0.028	0.013	513.305***	791.788***
	(0.024)	(0.025)	(105.817)	(99.483)
1992	-0.009	-0.024	397.459***	624.797***
	(0.022)	(0.023)	(95.288)	(90.661)
1993	0.016	-0.004	293.650***	537.386***
	(0.022)	(0.024)	(98.213)	(93.157)
1994	-0.014	-0.036	387.866***	612.981***
	(0.022)	(0.023)	(96.188)	(91.641)
1995	0.012	-0.020	468.715***	716.213***
	(0.022)	(0.023)	(95.576)	(91.484)
1996	-0.019	-0.053**	370.817***	591.774***
	(0.021)	(0.022)	(91.786)	(88.484)
1997	0.032	0.009	509.491***	678.847***
	(0.020)	(0.022)	(88.667)	(86.454)
1998	0.041**	0.007	417.428***	629.475***
	(0.020)	(0.022)	(87.341)	(85.535)
1999	0.048**	0.019	546.841***	744.192***
	(0.020)	(0.022)	(86.974)	(85.647)
2000	-0.040	0.043	-1,561.467***	-2,059.366***
	(0.031)	(0.033)	(136.758)	(129.136)
2001	-0.074**	0.013	-1,329.210***	-1,810.632***
	(0.031)	(0.033)	(136.928)	(129.071)
2002	-0.064**	0.028	-1,446.549***	-1,933.628***

	(0.031)	(0.033)	(137.385)	(129.418)
2003	-0.070**	0.016	-1,194.831***	-1,638.287***
	(0.031)	(0.033)	(136.791)	(128.795)
2004	-0.100***	-0.010	-1,131.538***	-1,583.684***
	(0.031)	(0.032)	(135.895)	(128.000)
2005	-0.083***	0.008	-953.428***	-1,367.816***
	(0.031)	(0.032)	(135.594)	(127.698)
2006	-0.095***	-0.012	-1,068.551***	-1,457.610***
	(0.031)	(0.032)	(135.809)	(127.739)
2007	-0.066**	0.015	-716.727***	-1,131.586***
	(0.031)	(0.032)	(135.236)	(127.255)
2008	-0.053*	0.021	-677.987***	-1,063.417***
	(0.031)	(0.032)	(135.441)	(127.319)
2009	-0.028	0.044	-551.191***	-881.224***
	(0.031)	(0.032)	(136.348)	(128.088)
2010	-0.049	0.025	-354.976***	-680.222***
	(0.031)	(0.032)	(135.677)	(127.535)
2011	0.001	0.066**	-292.515**	-576.204***
	(0.031)	(0.032)	(135.952)	(127.690)
2012	-0.020	0.038	-15.307	-299.387**
	(0.031)	(0.032)	(136.629)	(128.172)
2013	-0.002	0.043	-31.189	-204.150
	(0.031)	(0.033)	(136.818)	(128.245)
2014	0.045	0.083**	106.942	-75.844
	(0.031)	(0.033)	(138.213)	(129.146)
Observations	54,970	54,970	54,970	54,970
R^2	0.241	0.134	0.622	0.385

Appendix Table 2. VCs switching to Early-Stage Investments with EU-ODA Given Alternative Time Periods Before/After EU-ODA This table replicates Model (1) of Table 2 by restricting the sample to three different time periods in our analysis, 3, 5, and 7 years before and after EU-ODA. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition, this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level.
$^{*}p<0.10$; $^{**}p<0.05$; $^{***}p<0.01$.

	Dependent variable		
	Investment into early-stage startups (binary)		
	(1)	(2)	(3)
	3 years before/after	5 years before/after	7 years before/after
Drug-related	0.386***	0.312***	0.292***
	(0.031)	(0.027)	(0.025)
After ODA	-0.025	-0.030	-0.039**
	(0.019)	(0.019)	(0.019)
Drug-related*After ODA	-0.022	0.005	0.026**
	(0.018)	(0.014)	(0.013)
EU startups	-0.028	-0.026	-0.023*
	(0.020)	(0.016)	(0.013)
US startups	-0.054***	-0.037**	-0.034***
	(0.018)	(0.015)	(0.012)
IVC	-0.066***	-0.038**	-0.026
	(0.022)	(0.018)	(0.016)
CVC	-0.045*	-0.017	-0.016
	(0.026)	(0.021)	(0.018)
Angel	0.033	0.090	0.120**
	(0.072)	(0.055)	(0.048)
GVC	-0.211***	-0.167***	-0.134***
	(0.048)	(0.040)	(0.034)
Biosensors	0.582***	0.414***	0.404***
	(0.063)	(0.046)	(0.040)
Biotech Equipment	0.317***	0.274***	0.267***
	(0.036)	(0.031)	(0.029)
Biotech Other	0.678***	0.584***	0.592***
	(0.074)	(0.065)	(0.061)
Biotech Research	0.371***	0.322***	0.324***
	(0.035)	(0.031)	(0.029)
Biotech-Animal	0.515***	0.416***	0.393***
	(0.037)	(0.033)	(0.031)
Biotech-Human	-0.003	-0.007	0.010
	(0.012)	(0.009)	(0.008)
Biotech-Industrial	0.291***	0.296***	0.318***

	(0.043)	(0.036)	(0.031)
Med/Health Products	-0.088***	-0.062***	-0.047***
	(0.016)	(0.012)	(0.011)
Med/Health Services	0.235***	0.204***	0.194***
	(0.032)	(0.028)	(0.026)
Medical Diagnostics	-0.072***	-0.063***	-0.057***
	(0.016)	(0.012)	(0.010)
Medical Therapeutics	-0.049***	-0.041***	-0.031***
	(0.013)	(0.010)	(0.008)
1994			-0.029
			(0.019)
1995			-0.007
			(0.019)
1996		-0.032*	-0.039**
		(0.018)	(0.018)
1997		0.017	0.010
		(0.017)	(0.018)
1998	0.007	0.026	0.019
	(0.015)	(0.017)	(0.017)
1999	0.013	0.034**	0.027
	(0.015)	(0.017)	(0.017)
2000	0.030***	0.038***	0.024**
	(0.012)	(0.011)	(0.011)
2001	-0.004	0.004	-0.010
	(0.012)	(0.011)	(0.011)
2002	0.009	0.017	0.002
	(0.012)	(0.011)	(0.011)
2003		0.009	-0.005
		(0.011)	(0.011)
2004		-0.016	-0.031***
		(0.010)	(0.010)
2005			-0.015
			(0.010)
2006			-0.030***
			(0.010)
Observations	13,855	21,930	29,981
R^2	0.236	0.216	0.213

Appendix Table 3. VC time to investment in Early-Stage Investments with EU-ODA Given Alternative Time Periods Before/After EU-ODA. This table replicates Model (3) of Table 2 by restricting the sample to three different time periods in our analysis, 3, 5, and 7 years before and after EU-ODA. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01.

	Dependent variable		
	Time to investment		
	(1)	(2)	(3)
	3 years before/after	5 years before/after	7 years before/after
Drug-related	1,632.053***	1,627.111***	1,466.149***
	(124.628)	(112.537)	(106.218)
After ODA	690.840***	1,088.396***	1,624.957***
	(77.222)	(80.106)	(81.554)
Drug-related*After ODA	-273.752***	-447.770***	-601.875***
	(71.381)	(59.935)	(54.818)
EU startups	16.294	-6.111	35.774
	(78.919)	(65.879)	(57.393)
US startups	139.486*	-40.934	-52.842
	(71.611)	(60.855)	(52.642)
IVC	-266.565***	-206.083***	-212.346***
	(88.413)	(74.389)	(67.520)
CVC	-195.065*	-201.708**	-196.827**
	(104.899)	(87.317)	(78.561)
Angel	-603.439**	-727.232***	-879.157***
	(289.933)	(228.472)	(204.939)
GVC	492.673**	242.271	229.276
	(194.532)	(165.962)	(143.960)
Biosensors	1,031.738***	922.095***	633.324***
	(252.657)	(191.453)	(171.329)
Biotech Equipment	1,563.937***	1,493.213***	1,319.955***
	(143.107)	(129.054)	(121.795)
Biotech Other	1,173.518***	861.479***	584.034**
	(296.632)	(267.873)	(262.511)
Biotech Research	959.362***	938.772***	785.347***
	(142.122)	(128.873)	(122.565)
Biotech-Animal	1,230.907***	1,354.024***	1,191.870***
	(150.872)	(138.556)	(130.514)
Biotech-Human	-46.053	54.060	25.736
	(46.970)	(36.818)	(32.371)
Biotech-Industrial	1,565.786***	1,755.842***	1,333.494***
	(171.051)	(149.192)	(133.644)

Med/Health Products	669.790***	856.923***	833.863***
	(63.145)	(51.228)	(45.293)
Med/Health Services	2,222.515***	2,192.188***	2,095.964***
	(128.546)	(117.320)	(111.229)
Medical Diagnostics	521.278***	603.152***	581.811***
	(64.034)	(50.448)	(44.317)
Medical Therapeutics	11.812	96.105**	117.279***
	(51.217)	(40.562)	(35.459)
1994			100.399
			(82.643)
1995			181.251**
			(82.102)
1996		-86.836	86.599
		(73.801)	(78.492)
1997		52.032	227.022***
		(70.611)	(75.325)
1998	-88.049	-36.209	137.405*
	(59.849)	(69.157)	(73.881)
1999	55.482	97.412	272.098***
	(59.457)	(68.672)	(73.375)
2000	-363.822***	-598.760***	-835.477***
	(47.426)	(45.277)	(45.431)
2001	-136.025***	-364.880***	-602.182***
	(47.745)	(45.644)	(45.818)
2002	-268.570***	-489.663***	-721.506***
	(48.827)	(46.778)	(47.012)
2003		-227.186***	-464.892***
		(45.251)	(45.435)
2004		-180.826***	-408.967***
		(42.911)	(43.103)
2005			-231.564***
			(42.216)
2006			-346.015***
			(42.773)
Observations	13,855	21,930	29,981
R^2	0.553	0.569	0.581

Appendix Table 4. Replication of Table 2 with Multinomial Logit Models. We report here results with multinomial logit models, taking into account that the dependent variable is binary. Model (1) replicates Model 2, Table 2 while Models (2), (3) and (4) replicate Models (1), (2) and (3) from Appendix Table 2. Results are consistent. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01

	Dependent variable			
	Investment into early-stage startups (binary)			
	(1)	(2)	(3)	(4)
Drug-related	-1.446***	-0.364**	-0.741***	-0.837***
	(0.144)	(0.173)	(0.161)	(0.151)
After ODA	0.077	-0.174	-0.212*	-0.296**
	(0.206)	(0.123)	(0.124)	(0.123)
Drug-related*After ODA	0.381***	-0.103	0.060	0.216**
	(0.065)	(0.113)	(0.093)	(0.085)
EU startups	0.202***	-0.149	-0.142	-0.138*
	(0.061)	(0.111)	(0.094)	(0.081)
US startups	0.115**	-0.298***	-0.211**	-0.199***
	(0.056)	(0.101)	(0.086)	(0.074)
IVC	-0.102	-0.345***	-0.216**	-0.149
	(0.074)	(0.119)	(0.103)	(0.094)
CVC	-0.018	-0.233	-0.092	-0.094
	(0.084)	(0.144)	(0.122)	(0.110)
Angel	0.709***	0.153	0.445	0.595**
	(0.190)	(0.383)	(0.297)	(0.259)
GVC	-0.667***	-1.978***	-1.475***	-1.105***
	(0.161)	(0.527)	(0.381)	(0.286)
Biosensors	-0.781***	0.534	-0.182	-0.161
	(0.186)	(0.326)	(0.260)	(0.234)
Biotech Equipment	-1.466***	-0.742***	-0.955***	-0.963***
	(0.159)	(0.206)	(0.188)	(0.177)
Biotech Other	0.013	0.869**	0.465	0.568*
	(0.293)	(0.380)	(0.337)	(0.324)
Biotech Research	-1.112***	-0.428**	-0.661***	-0.598***
	(0.161)	(0.202)	(0.186)	(0.176)
Biotech-Animal	-1.268***	0.225	-0.221	-0.274
	(0.156)	(0.204)	(0.191)	(0.180)
Biotech-Human	0.310***	-0.016	-0.042	0.056
	(0.036)	(0.067)	(0.053)	(0.046)
Biotech-Industrial	-1.209***	-0.905***	-0.817***	-0.637***
	(0.163)	(0.258)	(0.217)	(0.191)

Med/Health Products	-0.223***	-0.544***	-0.386***	-0.298***
	(0.051)	(0.099)	(0.079)	(0.068)
Med/Health Services	-2.182***	-1.392***	-1.492***	-1.559***
	(0.149)	(0.188)	(0.173)	(0.163)
Medical Diagnostics	-0.283***	-0.430***	-0.395***	-0.365***
	(0.050)	(0.098)	(0.078)	(0.068)
Medical Therapeutics	-0.137***	-0.287***	-0.248***	-0.193***
	(0.040)	(0.075)	(0.060)	(0.052)
1986	0.134			
	(0.142)			
1987	-0.059			
	(0.139)			
1988	0.273**			
	(0.135)			
1989	0.613***			
	(0.133)			
1990	0.272*			
	(0.140)			
1991	0.184			
	(0.149)			
1992	-0.049			
	(0.140)			
1993	0.114			
	(0.141)			
1994	-0.073			-0.187
	(0.140)			(0.123)
1995	0.088			-0.046
	(0.138)			(0.121)
1996	-0.129		-0.221*	-0.269**
	(0.136)		(0.116)	(0.119)
1997	0.213*		0.101	0.055
	(0.128)		(0.106)	(0.110)
1998	0.262**	0.040	0.154	0.109
	(0.125)	(0.090)	(0.103)	(0.107)
1999	0.300**	0.076	0.196*	0.150
	(0.125)	(0.088)	(0.102)	(0.106)
2000	-0.221	0.181**	0.232***	0.142**
	(0.173)	(0.071)	(0.067)	(0.065)
2001	-0.428**	-0.027	0.027	-0.062
	(0.174)	(0.074)	(0.070)	(0.068)
2002	-0.361**	0.056	0.104	0.012

	(0.174)	(0.075)	(0.071)	(0.069)
2003	-0.402**		0.058	-0.032
	(0.174)		(0.069)	(0.067)
2004	-0.593***		-0.107	-0.201***
	(0.173)		(0.067)	(0.065)
2005	-0.480***			-0.094
	(0.172)			(0.063)
2006	-0.570***			-0.195***
	(0.173)			(0.065)
2007	-0.378**			
	(0.171)			
2008	-0.294*			
	(0.171)			
2009	-0.154			
	(0.172)			
2010	-0.273			
	(0.172)			
2011	0.002			
	(0.171)			
2012	-0.112			
	(0.172)			
2013	-0.018			
	(0.172)			
2014	0.217			
	(0.173)			
Observations	54,970	13,855	21,930	29,981
Log Likelihood	-28,205.410	-7,045.621	-10,925.980	-14,802.110

Appendix Table 5. Replication of Table 2 with Alternative Definitions of the Treatment Group. We report here Table 2 results using alternative definitions of the treatment group. In Panel 1, we include Biotech Research and Biotech Other in the treatment group instead of the control group. In Panel 2, we switch Medical Diagnostics from the treatment group to the control group. Results across all the robustness checks remain consistent. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01

Appendix Table 5 Panel 1. Table 2 with inclusion of Biotech Research and Biotech Other in the treatment group

	Dependent variables			
	Investment into early-stage startups (binary)		Time to investment	
	OLS	*Fixed effect*	*OLS*	*Fixed effect*
	(1)	(2)	(3)	(4)
Drug-related	0.193***	0.107*	1,494.425***	300.488
	(0.023)	(0.060)	(101.243)	(235.522)
After ODA	0.027	-0.082**	2,733.656***	3,121.578***
	(0.035)	(0.038)	(155.238)	(149.882)
Drug-related*After ODA	0.050***	0.032***	-746.797***	-373.808***
	(0.010)	(0.011)	(45.222)	(44.478)
EU startups	0.034***	0.065***	-123.450***	-462.276***
	(0.010)	(0.017)	(44.102)	(66.647)
US startups	0.019**	0.034**	-253.525***	-316.103***
	(0.009)	(0.015)	(39.897)	(58.783)
IVC	-0.017		-219.758***	
	(0.013)		(55.537)	
CVC	-0.002		-270.834***	
	(0.014)		(63.433)	
Angel	0.149***		-1,124.056***	
	(0.037)		(162.602)	
GVC	-0.093***		106.823	
	(0.023)		(102.949)	
Biosensors	0.299***		530.192***	
	(0.031)		(137.926)	
Biotech Equipment	0.184***	-0.116***	1,147.291***	451.433***
	(0.025)	(0.025)	(111.542)	(99.124)
Biotech Other	0.256***		-495.715**	
	(0.052)		(229.393)	
Biotech Research	0.002	-0.186***	-113.316**	42.555
	(0.012)	(0.056)	(52.996)	(219.610)

Biotech-Animal	0.217***	-0.062**	1,256.864***	362.150***
	(0.025)	(0.027)	(111.539)	(107.265)
Biotech-Human	0.058***	-0.143***	-122.234***	147.788
	(0.006)	(0.055)	(27.282)	(215.591)
Biotech-Industrial	0.221***	-0.086***	979.721***	369.982***
	(0.026)	(0.026)	(115.103)	(104.148)
Med/Health Products	-0.036***	-0.217***	650.041***	735.505***
	(0.008)	(0.055)	(36.757)	(216.949)
Med/Health Services	0.099***	-0.119***	1,988.104***	584.883***
	(0.023)	(0.024)	(103.121)	(94.899)
Medical Diagnostics	-0.045***	-0.228***	461.196***	574.450***
	(0.008)	(0.055)	(35.763)	(216.818)
Medical Therapeutics	-0.023***	-0.205***	126.391***	315.457
	(0.007)	(0.055)	(29.388)	(216.019)
Pharmaceutical		-0.178***		70.150
		(0.055)		(216.318)
1986	0.020	0.028	-3.748	29.623
	(0.022)	(0.023)	(98.797)	(91.339)
1987	-0.009	-0.020	276.210***	312.606***
	(0.021)	(0.022)	(94.543)	(87.893)
1988	0.043**	0.037*	116.214	278.325***
	(0.021)	(0.022)	(94.900)	(88.419)
1989	0.107***	0.091***	108.350	332.741***
	(0.022)	(0.023)	(96.212)	(90.584)
1990	0.043*	0.028	353.434***	609.286***
	(0.022)	(0.024)	(98.790)	(92.941)
1991	0.029	0.014	496.410***	785.593***
	(0.024)	(0.025)	(105.814)	(99.498)
1992	-0.008	-0.024	388.611***	622.242***
	(0.022)	(0.023)	(95.275)	(90.667)
1993	0.016	-0.004	284.457***	534.524***
	(0.022)	(0.024)	(98.200)	(93.166)
1994	-0.014	-0.036	379.278***	610.540***
	(0.022)	(0.023)	(96.175)	(91.647)
1995	0.012	-0.021	458.556***	713.166***
	(0.022)	(0.023)	(95.564)	(91.490)
1996	-0.018	-0.053**	355.213***	585.069***
	(0.021)	(0.022)	(91.759)	(88.477)
1997	0.033*	0.010	493.520***	671.869***
	(0.020)	(0.022)	(88.644)	(86.449)
1998	0.042**	0.007	401.647***	622.845***

	(0.020)	(0.022)	(87.325)	(85.536)
1999	0.050**	0.020	522.589***	733.665***
	(0.020)	(0.022)	(86.982)	(85.665)
2000	-0.040	0.043	-1,558.633***	-2,058.170***
	(0.031)	(0.033)	(136.721)	(129.132)
2001	-0.074**	0.013	-1,327.153***	-1,810.068***
	(0.031)	(0.033)	(136.890)	(129.068)
2002	-0.064**	0.028	-1,445.147***	-1,933.231***
	(0.031)	(0.033)	(137.348)	(129.416)
2003	-0.071**	0.016	-1,192.644***	-1,637.083***
	(0.031)	(0.033)	(136.754)	(128.791)
2004	-0.100***	-0.010	-1,130.454***	-1,583.338***
	(0.031)	(0.032)	(135.858)	(127.997)
2005	-0.083***	0.008	-952.579***	-1,367.349***
	(0.031)	(0.032)	(135.557)	(127.696)
2006	-0.095***	-0.012	-1,068.703***	-1,457.755***
	(0.031)	(0.032)	(135.772)	(127.736)
2007	-0.066**	0.015	-717.911***	-1,131.947***
	(0.031)	(0.032)	(135.199)	(127.252)
2008	-0.053*	0.021	-677.905***	-1,063.413***
	(0.031)	(0.032)	(135.404)	(127.316)
2009	-0.028	0.044	-551.525***	-881.575***
	(0.031)	(0.032)	(136.311)	(128.085)
2010	-0.049	0.025	-356.505***	-680.929***
	(0.031)	(0.032)	(135.640)	(127.532)
2011	0.001	0.066**	-294.413**	-576.950***
	(0.031)	(0.032)	(135.915)	(127.687)
2012	-0.020	0.039	-17.557	-300.363**
	(0.031)	(0.032)	(136.592)	(128.169)
2013	-0.002	0.043	-33.018	-205.203
	(0.031)	(0.033)	(136.781)	(128.242)
2014	0.045	0.083**	104.511	-77.269
	(0.031)	(0.033)	(138.175)	(129.143)
Observations	54,970	54,970	54,970	54,970
R^2	0.241	0.133	0.622	0.385

Appendix Table 5 Panel 2. Table 2 results with Medical Diagnostics in the control group

	Dependent variables			
	Investment into early-stage startups (binary)		Time to investment	
	OLS	*Fixed effect*	*OLS*	*Fixed effect*
	(1)	(2)	(3)	(4)
Drug-related	0.184***	-0.215***	1,507.800***	248.165
	(0.023)	(0.055)	(101.765)	(218.112)
After ODA	0.033	-0.088**	2,440.505***	2,976.237***
	(0.035)	(0.037)	(153.126)	(147.595)
Drug-related*After ODA	0.056***	0.050***	-477.770***	-237.477***
	(0.009)	(0.009)	(38.229)	(36.882)
EU startups	0.033***	0.062***	-116.582***	-458.064***
	(0.010)	(0.017)	(44.162)	(66.713)
US startups	0.018**	0.032**	-249.167***	-313.183***
	(0.009)	(0.015)	(39.961)	(58.827)
IVC	-0.017		-218.959***	
	(0.013)		(55.596)	
CVC	-0.001		-274.289***	
	(0.014)		(63.504)	
Angel	0.150***		-1,142.518***	
	(0.037)		(162.768)	
GVC	-0.095***		121.447	
	(0.023)		(103.064)	
Biosensors	0.296***	-0.130**	777.901***	-6.333
	(0.031)	(0.059)	(136.201)	(232.543)
Biotech Equipment	0.180***	-0.247***	1,346.316***	421.934*
	(0.025)	(0.056)	(110.182)	(219.506)
Biotech Other	0.481***		664.020***	
	(0.056)		(248.486)	
Biotech Research	0.234***	-0.182***	988.302***	21.695
	(0.025)	(0.056)	(111.694)	(219.694)
Biotech-Animal	0.214***	-0.194***	1,404.105***	305.521
	(0.025)	(0.056)	(110.856)	(222.802)
Biotech-Human	0.059***	0.036***	-124.022***	77.667***
	(0.006)	(0.006)	(27.319)	(25.519)
Biotech-Industrial	0.218***	-0.216***	1,218.436***	356.651
	(0.026)	(0.056)	(113.143)	(221.405)
Med/Health Products	-0.035***	-0.037***	647.608***	663.143***

	(0.008)	(0.009)	(36.828)	(35.510)
Med/Health Services	0.096***	-0.251***	2,153.737***	531.029**
	(0.023)	(0.055)	(102.132)	(217.417)
Medical Diagnostics	0.174***	-0.235***	1,690.197***	617.474***
	(0.023)	(0.055)	(101.575)	(216.904)
Medical Therapeutics	-0.022***	-0.026***	124.556***	244.336***
	(0.007)	(0.007)	(29.435)	(28.431)
1986	0.022	0.029	-29.405	22.939
	(0.022)	(0.023)	(98.884)	(91.359)
1987	-0.006	-0.018	261.694***	308.929***
	(0.021)	(0.022)	(94.685)	(87.934)
1988	0.045**	0.039*	115.446	278.781***
	(0.021)	(0.022)	(95.015)	(88.450)
1989	0.109***	0.092***	105.217	332.576***
	(0.022)	(0.023)	(96.335)	(90.617)
1990	0.044**	0.029	357.256***	612.479***
	(0.022)	(0.024)	(98.909)	(92.969)
1991	0.030	0.015	510.838***	792.193***
	(0.024)	(0.025)	(105.925)	(99.522)
1992	-0.006	-0.022	396.601***	626.343***
	(0.022)	(0.023)	(95.402)	(90.703)
1993	0.019	-0.001	288.736***	537.862***
	(0.022)	(0.024)	(98.361)	(93.221)
1994	-0.010	-0.032	375.779***	608.969***
	(0.022)	(0.023)	(96.367)	(91.726)
1995	0.015	-0.018	457.881***	714.679***
	(0.022)	(0.023)	(95.708)	(91.533)
1996	-0.016	-0.051**	335.681***	577.703***
	(0.021)	(0.022)	(91.877)	(88.506)
1997	0.037*	0.012	468.616***	661.904***
	(0.020)	(0.022)	(88.780)	(86.491)
1998	0.045**	0.010	379.700***	614.488***
	(0.020)	(0.022)	(87.476)	(85.586)
1999	0.054***	0.023	508.914***	730.314***
	(0.020)	(0.022)	(87.157)	(85.723)
2000	-0.041	0.044	-1,557.580***	-2,057.810***
	(0.031)	(0.033)	(136.865)	(129.169)
2001	-0.074**	0.013	-1,327.222***	-1,810.294***
	(0.031)	(0.033)	(137.035)	(129.105)
2002	-0.064**	0.028	-1,442.518***	-1,931.983***
	(0.031)	(0.033)	(137.494)	(129.452)
2003	-0.071**	0.016	-1,185.612***	-1,634.239***

	(0.031)	(0.033)	(136.899)	(128.828)
2004	-0.101***	-0.010	-1,130.013***	-1,583.886***
	(0.031)	(0.032)	(136.003)	(128.034)
2005	-0.083***	0.007	-951.212***	-1,367.678***
	(0.031)	(0.032)	(135.701)	(127.732)
2006	-0.096***	-0.013	-1,062.587***	-1,455.952***
	(0.031)	(0.032)	(135.917)	(127.773)
2007	-0.067**	0.014	-711.816***	-1,129.718***
	(0.031)	(0.032)	(135.343)	(127.288)
2008	-0.053*	0.021	-673.554***	-1,062.188***
	(0.031)	(0.032)	(135.548)	(127.353)
2009	-0.029	0.043	-547.686***	-880.444***
	(0.031)	(0.032)	(136.458)	(128.123)
2010	-0.050	0.024	-349.406**	-678.590***
	(0.031)	(0.032)	(135.785)	(127.570)
2011	-0.0002	0.065**	-286.088**	-574.152***
	(0.031)	(0.032)	(136.060)	(127.726)
2012	-0.021	0.038	-9.346	-297.527**
	(0.031)	(0.032)	(136.738)	(128.208)
2013	-0.003	0.042	-25.733	-202.625
	(0.031)	(0.032)	(136.928)	(128.280)
2014	0.045	0.082**	111.930	-74.353
	(0.031)	(0.033)	(138.323)	(129.180)
Observations	54,970	54,970	54,970	54,970
R^2	0.241	0.134	0.621	0.385

Appendix Table 6. Impact of EU-ODA on Early-stage Investment by Origin of Startups – Results with All Controls. This table replicates Table 3 reporting the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01.

	EU startups only		US startups only	
	Dependent variables			
	Early-stage	Time to inv.	Early-stage	Time to inv.
	(1)	(2)	(3)	(4)
Drug-related	0.012	458.808	0.210***	1,030.366***
	(0.127)	(619.591)	(0.018)	(78.737)
After ODA	0.215	3,300.749***	0.024	2,600.108***
	(0.149)	(727.480)	(0.039)	(166.442)
Drug-related*After ODA	0.095**	-645.407***	0.045***	-630.634***
	(0.039)	(192.074)	(0.011)	(45.264)
EU investor	0.029**	-271.242***	-0.001	309.280***
	(0.011)	(55.643)	(0.009)	(39.661)
Biosensors	0.163	-254.215	0.304***	184.440
	(0.143)	(699.826)	(0.029)	(123.374)
Biotech Equipment	0.187	145.873	0.168***	828.000***
	(0.134)	(653.686)	(0.021)	(90.653)
Biotech Other	0.362**	-845.459	0.265***	859.620***
	(0.168)	(819.352)	(0.077)	(326.583)
Biotech Research	-0.009	-189.293	0.264***	447.275***
	(0.133)	(651.562)	(0.022)	(95.427)
Biotech-Animal	0.058	92.516	0.205***	965.000***
	(0.135)	(660.945)	(0.022)	(92.371)
Biotech-Human	0.024*	-136.375*	0.057***	-87.910***
	(0.014)	(69.976)	(0.007)	(30.336)
Biotech-Industrial	0.100	732.801	0.229***	410.165***
	(0.135)	(661.162)	(0.023)	(96.451)
Med/Health Products	-0.071***	1,538.020***	-0.037***	576.338***
	(0.023)	(112.634)	(0.009)	(39.735)
Med/Health Services	-0.137	2,003.670***	0.116***	1,486.772***
	(0.132)	(645.000)	(0.019)	(78.876)
Medical Diagnostics	-0.031	358.557***	-0.054***	502.252***
	(0.023)	(110.537)	(0.009)	(38.825)
Medical Therapeutics	0.030	402.969***	-0.035***	138.565***
	(0.019)	(93.537)	(0.007)	(31.742)
1986	0.185	-1.890	0.017	-17.823
	(0.162)	(789.963)	(0.023)	(96.896)
1987	-0.020	1,924.626**	-0.014	230.676**

	(0.181)	(885.976)	(0.022)	(92.413)
1988	0.007	25.022	0.041*	100.794
	(0.153)	(747.783)	(0.022)	(92.930)
1989	0.378**	187.285	0.096***	86.023
	(0.156)	(761.086)	(0.022)	(94.151)
1990	0.323**	519.143	0.032	337.444***
	(0.157)	(765.681)	(0.023)	(96.768)
1991	0.259	1,098.045	0.017	474.033***
	(0.161)	(789.849)	(0.024)	(103.545)
1992	0.047	2,020.221***	-0.018	344.149***
	(0.147)	(717.391)	(0.022)	(93.524)
1993	0.335**	796.461	0.001	273.810***
	(0.149)	(729.183)	(0.023)	(96.342)
1994	0.109	1,707.621**	-0.023	310.190***
	(0.140)	(684.542)	(0.022)	(94.805)
1995	0.094	1,676.594**	0.007	404.481***
	(0.144)	(704.600)	(0.022)	(93.781)
1996	0.111	1,148.766*	-0.028	324.105***
	(0.133)	(650.608)	(0.021)	(91.161)
1997	0.200	1,117.172*	0.023	499.053***
	(0.133)	(650.034)	(0.021)	(87.865)
1998	0.272**	754.987	0.031	406.547***
	(0.132)	(644.293)	(0.020)	(86.529)
1999	0.317**	1,065.045*	0.030	531.330***
	(0.130)	(634.569)	(0.020)	(86.675)
2000	-0.035	-1,542.608***	-0.068*	-1,488.751***
	(0.072)	(353.655)	(0.035)	(151.086)
2001	-0.151**	-1,587.250***	-0.075**	-1,222.721***
	(0.073)	(354.955)	(0.035)	(151.112)
2002	-0.146**	-1,460.293***	-0.053	-1,402.195***
	(0.073)	(357.104)	(0.036)	(151.394)
2003	-0.096	-1,029.099***	-0.076**	-1,207.875***
	(0.072)	(353.690)	(0.035)	(150.953)
2004	-0.159**	-907.241***	-0.095***	-1,187.147***
	(0.071)	(348.587)	(0.035)	(150.222)
2005	-0.156**	-790.296**	-0.075**	-1,008.784***
	(0.071)	(348.495)	(0.035)	(149.831)
2006	-0.170**	-1,038.115***	-0.090**	-1,078.352***
	(0.072)	(352.297)	(0.035)	(149.799)
2007	-0.085	-501.584	-0.074**	-728.998***
	(0.072)	(352.270)	(0.035)	(149.122)
2008	-0.075	-796.838**	-0.059*	-655.463***
	(0.072)	(352.713)	(0.035)	(149.346)
2009	-0.029	-401.743	-0.032	-596.400***

	(0.073)	(354.928)	(0.035)	(150.367)
2010	-0.061	-300.820	-0.045	-419.644***
	(0.072)	(351.775)	(0.035)	(149.762)
2011	0.029	-356.915	-0.002	-315.490**
	(0.072)	(354.254)	(0.035)	(150.009)
2012	-0.127*	397.002	0.002	-106.046
	(0.073)	(355.067)	(0.035)	(150.761)
2013	-0.002	-289.719	-0.008	6.839
	(0.073)	(355.179)	(0.035)	(150.864)
2014	0.037	324.742	0.042	55.724
	(0.073)	(358.624)	(0.036)	(152.382)
Observations	7,362	7,362	45,389	45,389
R^2	0.285	0.626	0.238	0.626

Appendix Table 7. Replication of Table 3 with multinomial logit regressions. We report here Table 3 results with multinomial logit models. Model (1) restricts the sample to the investments into EU-based startups only, replicating Model (1) of Table 3. Model (2) replicates Model (3) of Table 3 using the investments into US startups only. Results remain consistent. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level.
*p<0.10; **p<0.05; ***p<0.01

	Dependent variable	
	Investment into early-stage startups (binary)	
	(1)	(2)
	EU Startups only	**US Startups only**
Drug-related	-14.496	-1.333***
	(265.735)	(0.117)
After ODA	13.106	0.049
	(265.735)	(0.227)
Drug-related*After ODA	0.663***	0.344***
	(0.254)	(0.071)
EU investor	0.178***	-0.002
	(0.068)	(0.054)
Biosensors	-13.549	-0.747***
	(265.735)	(0.171)
Biotech Equipment	-13.449	-1.585***
	(265.735)	(0.139)
Biotech Other	-12.659	-1.002**
	(265.735)	(0.432)
Biotech Research	-14.601	-0.955***
	(265.735)	(0.140)
Biotech-Animal	-14.160	-1.342***
	(265.735)	(0.136)
Biotech-Human	0.121	0.300***
	(0.081)	(0.041)
Biotech-Industrial	-13.899	-1.157***
	(265.735)	(0.142)
Med/Health Products	-0.436***	-0.229***
	(0.141)	(0.057)
Med/Health Services	-16.498	-2.035***
	(265.735)	(0.122)
Medical Diagnostics	-0.187	-0.344***
	(0.131)	(0.057)
Medical Therapeutics	0.145	-0.214***
	(0.106)	(0.045)
1986	13.122	0.112
	(265.735)	(0.143)

1987	-0.110	-0.088
	(384.528)	(0.139)
1988	0.096	0.252*
	(320.239)	(0.135)
1989	14.187	0.548***
	(265.735)	(0.134)
1990	13.805	0.203
	(265.735)	(0.141)
1991	13.460	0.109
	(265.735)	(0.151)
1992	11.739	-0.110
	(265.736)	(0.141)
1993	13.860	0.015
	(265.735)	(0.143)
1994	12.549	-0.138
	(265.735)	(0.142)
1995	12.387	0.049
	(265.735)	(0.139)
1996	12.514	-0.187
	(265.735)	(0.139)
1997	13.159	0.151
	(265.735)	(0.130)
1998	13.545	0.195
	(265.735)	(0.128)
1999	13.760	0.188
	(265.735)	(0.128)
2000	-0.206	-0.389*
	(0.389)	(0.199)
2001	-0.850**	-0.430**
	(0.397)	(0.199)
2002	-0.821**	-0.295
	(0.400)	(0.199)
2003	-0.519	-0.434**
	(0.392)	(0.199)
2004	-0.908**	-0.560***
	(0.388)	(0.198)
2005	-0.902**	-0.426**
	(0.388)	(0.197)
2006	-1.015**	-0.527***
	(0.396)	(0.198)
2007	-0.462	-0.420**
	(0.391)	(0.196)
2008	-0.397	-0.328*
	(0.391)	(0.196)

2009	-0.159	-0.175
	(0.392)	(0.197)
2010	-0.322	-0.248
	(0.390)	(0.196)
2011	0.130	-0.008
	(0.390)	(0.196)
2012	-0.723*	0.011
	(0.397)	(0.197)
2013	-0.024	-0.045
	(0.391)	(0.197)
2014	0.157	0.205
	(0.394)	(0.198)
Observations	7,362	45,389
Log Likelihood	-3,776.652	-23,212.240

Appendix Table 8. Syndication of VC Investments – Results with All Controls. This table replicates Table 4 reporting the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01.

	Dependent variable		
	Number of investors per round		
	(1) Total	(2) Early-stage	(3) Late-stage
Drug-related	0.827*	1.706***	1.107
	(0.439)	(0.579)	(0.814)
After ODA	-2.662***	-1.644***	-3.849***
	(0.300)	(0.387)	(0.429)
Drug-related*After ODA	0.179**	-0.993***	0.283**
	(0.086)	(0.181)	(0.122)
EU investor	0.542***	1.039***	0.493***
	(0.134)	(0.271)	(0.188)
US investor	1.673***	1.295***	2.189***
	(0.118)	(0.246)	(0.166)
Biosensors	1.130**	0.564	1.126
	(0.466)	(0.624)	(0.850)
Biotech Equipment	1.105**	0.117	1.361*
	(0.440)	(0.576)	(0.817)
Biotech Research	1.430***	1.139**	1.924**
	(0.440)	(0.573)	(0.818)
Biotech-Animal	1.205***	1.059*	1.241
	(0.446)	(0.588)	(0.825)
Biotech-Human	0.901***	0.369***	1.306***
	(0.061)	(0.118)	(0.089)
Biotech-Industrial	1.070**	0.261	1.546*
	(0.444)	(0.582)	(0.821)
Med/Health Products		-0.976***	
		(0.151)	
Med/Health Services	0.442	0.014	0.423
	(0.436)	(0.577)	(0.811)
Medical Diagnostics	0.488***		0.375***
	(0.074)		(0.105)
Medical Therapeutics	0.279***	-0.175	0.157*
	(0.063)	(0.125)	(0.090)
Pharmaceutical	0.627***	-0.143	0.870***
	(0.071)	(0.136)	(0.102)
1986	0.949***	1.015***	1.363***

	(0.183)	(0.384)	(0.285)
1987	0.207	0.329	0.406
	(0.176)	(0.385)	(0.272)
1988	0.311*	0.817**	0.128
	(0.177)	(0.366)	(0.274)
1989	-0.940***	0.802**	-2.401***
	(0.181)	(0.362)	(0.285)
1990	-1.668***	-2.725***	-2.056***
	(0.186)	(0.384)	(0.276)
1991	-2.877***	-3.393***	-3.758***
	(0.199)	(0.399)	(0.294)
1992	-2.008***	-2.856***	-2.761***
	(0.182)	(0.386)	(0.277)
1993	-2.293***	-2.446***	-2.871***
	(0.187)	(0.383)	(0.294)
1994	-2.054***	-1.242***	-2.469***
	(0.184)	(0.386)	(0.288)
1995	-2.141***	-3.000***	-2.463***
	(0.183)	(0.387)	(0.279)
1996	-2.547***	-2.985***	-3.171***
	(0.177)	(0.386)	(0.268)
1997	-1.835***	-3.036***	-2.044***
	(0.173)	(0.363)	(0.258)
1998	-2.031***	-3.385***	-2.192***
	(0.171)	(0.360)	(0.257)
1999	-2.096***	-3.383***	-2.822***
	(0.172)	(0.359)	(0.253)
2000	1.025***	-0.714***	1.523***
	(0.259)	(0.178)	(0.366)
2001	1.597***	-0.251	2.166***
	(0.259)	(0.183)	(0.365)
2002	1.596***	-0.124	2.101***
	(0.259)	(0.182)	(0.366)
2003	1.279***	-0.568***	1.795***
	(0.258)	(0.176)	(0.364)
2004	1.356***	-0.418**	1.813***
	(0.256)	(0.174)	(0.362)
2005	1.462***	0.050	1.765***
	(0.256)	(0.165)	(0.362)
2006	1.160***	-0.611***	1.626***
	(0.256)	(0.169)	(0.362)
2007	1.200***	-0.292*	1.758***
	(0.255)	(0.157)	(0.361)
2008	0.852***	-0.324**	1.418***

	(0.255)	(0.156)	(0.363)
2009	0.226	-0.328**	0.589
	(0.257)	(0.159)	(0.367)
2010	0.054	-0.543***	0.528
	(0.256)	(0.155)	(0.365)
2011	0.283	-0.428***	0.793**
	(0.256)	(0.150)	(0.365)
2012	0.031	-0.742***	0.492
	(0.257)	(0.156)	(0.365)
2013	-0.071	-0.548***	0.051
	(0.257)	(0.154)	(0.367)
2014	0.018		0.171
	(0.259)		(0.371)
Observations	54,970	12,101	30,216
R^2	0.273	0.380	0.362

Appendix Table 9. Syndication of VC Investments with Alternative Time Periods Before and After EU-ODA. This table replicates Model (2) and Model (3) of Table 4 by restricting the sample to three different time periods in our analysis, 3, 5, and 7 years before and after EU-ODA. Model (1) to Model (3) restrict samples to investments made in early round only and report the Table 4 results with the alternative sample periods, while Model (4) to (6) repeat the process with investments made in late rounds only. Results remain consistent. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01.

	Dependent variable					
	Number of investors per round					
	(1)	(2)	(3)	(4)	(5)	(6)
		Early-stage			**Late-stage**	
	3 years	5 years	7 years	3 years	5 years	7 years
Drug-related	1.426*	0.535	0.519	1.355**	0.119	0.252
	(0.814)	(0.600)	(0.585)	(0.571)	(0.589)	(0.354)
After ODA	0.872***	1.513***	0.214	0.853***	1.054***	0.122
	(0.320)	(0.306)	(0.317)	(0.211)	(0.213)	(0.208)
Drug-related*After ODA	-0.942***	-0.515**	-0.461**	0.389**	0.403***	0.412***
	(0.283)	(0.227)	(0.217)	(0.187)	(0.154)	(0.138)
EU investor	2.412***	1.765***	1.073***	0.540	0.834***	0.538**
	(0.668)	(0.440)	(0.356)	(0.357)	(0.281)	(0.229)
US investor	2.810***	2.024***	1.575***	2.039***	1.837***	1.615***
	(0.642)	(0.416)	(0.331)	(0.331)	(0.261)	(0.211)
Biosensors		0.057	0.169		-0.506	
		(0.760)	(0.714)		(0.668)	
Biotech Equipment	0.691	0.018	-0.062	1.801***	0.345	0.600*
	(0.804)	(0.591)	(0.574)	(0.566)	(0.586)	(0.349)
Biotech Other	0.892			1.346		0.131
	(0.941)			(0.857)		(0.605)
Biotech Research	1.568**	0.997*	1.059*	1.959***	1.005*	1.229***
	(0.775)	(0.577)	(0.565)	(0.556)	(0.580)	(0.345)
Biotech-Animal	1.513*	0.812	1.057*	1.881***	0.397	0.541
	(0.803)	(0.600)	(0.590)	(0.590)	(0.603)	(0.381)
Biotech-Human	0.426*	0.503***	0.828***	0.797***	0.759***	0.890***
	(0.229)	(0.175)	(0.158)	(0.153)	(0.124)	(0.104)
Biotech-Industrial	0.675	0.050	0.223	1.647***	0.023	0.399
	(0.926)	(0.642)	(0.604)	(0.620)	(0.612)	(0.377)
Med/Health			-0.006		-0.155	-0.003

Products						
			(0.203)		(0.157)	(0.133)
Med/Health Services	0.787	-0.128	0.018	0.744	-0.485	-0.097
	(0.813)	(0.594)	(0.580)	(0.559)	(0.582)	(0.343)
Medical Diagnostics	-0.077	-0.093		-0.092		
	(0.299)	(0.228)		(0.197)		
Medical Therapeutics	-0.360	-0.433**	-0.025	-0.217	-0.316**	-0.071
	(0.241)	(0.183)	(0.167)	(0.158)	(0.130)	(0.109)
Pharmaceutical	0.228	0.305	0.488***	0.598***	0.491***	0.607***
	(0.251)	(0.191)	(0.173)	(0.172)	(0.137)	(0.116)
1994			1.278***			0.369**
			(0.278)			(0.183)
1995			-0.780***			-0.196
			(0.280)			(0.185)
1996		0.034	-0.744***		-0.331*	-0.562***
		(0.271)	(0.286)		(0.177)	(0.179)
1997		0.136	-0.844***		0.084	-0.178
		(0.244)	(0.256)		(0.172)	(0.174)
1998	-0.255	-0.071	-1.043***	0.119	0.185	-0.079
	(0.211)	(0.241)	(0.250)	(0.149)	(0.168)	(0.170)
1999	-0.286	-0.076	-0.961***	0.114	0.182	-0.059
	(0.209)	(0.242)	(0.250)	(0.149)	(0.167)	(0.168)
2000	-0.028	-0.844***	-0.581***	-0.332***	-0.520***	0.138
	(0.182)	(0.162)	(0.171)	(0.125)	(0.117)	(0.115)
2001	0.421**	-0.415**	-0.114	0.428***	0.237**	0.900***
	(0.186)	(0.168)	(0.176)	(0.124)	(0.116)	(0.115)
2002	0.442**	-0.402**		0.353***	0.121	0.770***
	(0.178)	(0.163)		(0.127)	(0.119)	(0.118)
2003		-0.786***	-0.373**		-0.185	0.463***
		(0.158)	(0.170)		(0.117)	(0.117)
2004		-0.582***	-0.287*		-0.374***	0.251**
		(0.153)	(0.168)		(0.113)	(0.113)
2005			0.198			0.613***
			(0.165)			(0.111)
2006			-0.474***			-0.056
			(0.172)			(0.111)
2007			-0.108			
			(0.165)			
Observations	2,987	4,475	6,019	9,784	14,550	19,049
R^2	0.405	0.393	0.380	0.318	0.303	0.289

Appendix Table 10. Changes in the Invested Amount After EU-ODA – Results with All Controls. This table replicates Table 5 reporting the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investee startup level. *p<0.10; **p<0.05; ***p<0.01.

	Dependent variable		
	Investment amount in a round ($1K)		
	(1)	(2)	(3)
	Total	Early-stage	Late-stage
Drug-related	13,057.680***	12,653.340***	12,891.950***
	(731.455)	(1,724.819)	(1,001.774)
After ODA	-1,875.544	6,104.513**	-3,926.689**
	(1,194.991)	(2,510.070)	(1,537.848)
Drug-related*After ODA	1,723.383***	-522.448	2,018.730***
	(328.310)	(775.689)	(438.356)
EU investor	-2,132.735***	-1,608.695**	-2,427.886***
	(296.486)	(658.077)	(379.675)
US investor	-8.351	348.267	537.242
	(268.613)	(605.471)	(344.443)
IVC	-538.472	80.420	-226.223
	(329.845)	(665.393)	(428.996)
CVC	265.749	-257.863	731.458
	(376.231)	(755.567)	(489.555)
Angel	-194.469	385.830	-739.566
	(925.538)	(1,503.612)	(1,631.922)
GVC	-118.152	2,102.258	-434.674
	(608.568)	(1,563.630)	(787.540)
Biosensors	16,058.070***	13,048.440***	17,005.180***
	(1,020.658)	(2,155.237)	(1,413.917)
Biotech Equipment	14,542.300***	11,683.190***	15,997.440***
	(815.408)	(1,905.015)	(1,107.290)
Biotech Other	14,102.230***	9,432.002***	20,583.880***
	(1,756.629)	(2,927.029)	(3,080.176)
Biotech Research	14,539.000***	12,707.270***	14,338.760***
	(828.981)	(1,928.071)	(1,122.339)
Biotech-Animal	14,516.570***	12,500.270***	14,226.790***
	(812.611)	(1,888.286)	(1,088.806)
Biotech-Human	928.133***	88.698	1,579.648***
	(215.891)	(434.983)	(308.910)
Biotech-Industrial	15,037.430***	12,512.020***	14,928.630***
	(830.930)	(1,935.440)	(1,131.786)
Med/Health Products	-448.077	314.765	-592.399

	(281.796)	(609.403)	(378.971)
Med/Health Services	11,791.180***	12,034.010***	11,493.590***
	(747.827)	(1,788.199)	(1,016.861)
Medical Diagnostics	509.791*	798.734	572.172
	(278.447)	(609.285)	(373.327)
Medical Therapeutics	324.584	361.477	841.114***
	(234.307)	(487.827)	(324.426)
1986	1,989.478**	742.059	1,751.634
	(802.598)	(1,875.710)	(1,182.652)
1987	1,282.401*	415.942	-40.494
	(774.610)	(1,856.369)	(1,133.139)
1988	1,693.275**	2,271.223	603.564
	(777.164)	(1,801.622)	(1,138.755)
1989	1,713.638**	3,651.012**	294.381
	(773.686)	(1,760.620)	(1,130.970)
1990	1,636.424**	2,242.766	477.325
	(783.969)	(1,787.941)	(1,100.462)
1991	765.360	-667.281	201.568
	(822.237)	(1,838.020)	(1,142.614)
1992	1,735.507**	2,897.052	1,208.142
	(757.197)	(1,787.021)	(1,082.212)
1993	1,477.449*	3,371.204*	1,255.969
	(776.594)	(1,829.323)	(1,155.700)
1994	-145.502	-888.792	142.663
	(771.603)	(1,861.882)	(1,183.015)
1995	1,935.298**	3,086.351*	544.465
	(756.815)	(1,723.046)	(1,113.020)
1996	1,303.945*	3,137.722*	1,202.649
	(721.270)	(1,714.956)	(1,029.393)
1997	753.955	2,461.239	314.012
	(700.006)	(1,621.028)	(998.201)
1998	698.085	2,603.039	375.983
	(685.302)	(1,591.754)	(982.488)
1999	1,701.632**	2,987.915*	979.142
	(686.360)	(1,585.933)	(962.306)
2000	1,051.398	-3,303.392	2,559.726*
	(1,050.470)	(2,036.259)	(1,310.601)
2001	1,634.727	-3,660.441*	3,048.703**
	(1,054.290)	(2,058.828)	(1,311.761)
2002	579.457	-4,514.654**	1,707.015
	(1,060.555)	(2,066.583)	(1,321.509)
2003	-451.011	-5,360.502***	1,073.634
	(1,053.864)	(2,053.883)	(1,312.949)
2004	-1,125.785	-5,073.976**	518.598

	(1,046.058)	(2,045.486)	(1,299.297)
2005	17.808	-3,338.537	804.923
	(1,044.222)	(2,047.087)	(1,295.752)
2006	663.104	-4,063.216**	1,457.222
	(1,043.430)	(2,048.182)	(1,296.243)
2007	-545.634	-4,536.853**	245.410
	(1,039.235)	(2,026.893)	(1,290.869)
2008	-727.049	-4,028.859**	122.947
	(1,039.966)	(2,026.908)	(1,298.058)
2009	-1,377.270	-4,830.108**	362.027
	(1,045.549)	(2,035.747)	(1,311.408)
2010	-2,719.120***	-6,070.121***	-94.400
	(1,039.164)	(2,025.581)	(1,298.568)
2011	-1,599.147	-5,693.433***	486.089
	(1,042.007)	(2,016.920)	(1,302.972)
2012	-1,873.960*	-6,013.332***	-246.006
	(1,045.015)	(2,027.446)	(1,305.161)
2013	-1,995.391*	-4,987.218**	-623.572
	(1,046.799)	(2,027.904)	(1,310.188)
2014	-831.667	-2,875.634	17.911
	(1,053.899)	(2,035.774)	(1,322.344)
Observations	28,312	6,241	14,624
R^2	0.590	0.674	0.601

Appendix Table 11. Exit Performance of Early-stage Startups – Results with All Controls. This table replicates Table 6 reporting the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01.

	Dependent variables					
	M&A	IPO	Bankruptcy	M&A	IPO	Bankruptcy
		OLS			*Fixed effect*	
	(1)	(2)	(3)	(4)	(5)	(6)
Drug	0.163**	0.481***	0.092**	0.070	-0.044	-0.113
	(0.067)	(0.056)	(0.047)	(0.119)	(0.099)	(0.085)
After ODA	0.087*	-0.407***	-0.194***	0.096	-0.399***	-0.119***
	(0.051)	(0.042)	(0.035)	(0.060)	(0.051)	(0.043)
Drug-related* After ODA	-0.114***	0.173***	0.040	-0.140***	0.158***	0.010
	(0.039)	(0.032)	(0.027)	(0.045)	(0.038)	(0.032)
EU investor	0.218***	-0.085***	0.072***	0.120	-0.113	0.110*
	(0.038)	(0.032)	(0.027)	(0.087)	(0.073)	(0.063)
US investor	0.259***	-0.092***	0.091***	0.120	-0.135*	0.128**
	(0.036)	(0.030)	(0.025)	(0.082)	(0.069)	(0.059)
IVC	-0.013	0.056	0.012			
	(0.042)	(0.035)	(0.029)			
CVC	-0.004	0.033	-0.009			
	(0.050)	(0.042)	(0.035)			
Angel	0.061	-0.128	-0.055			
	(0.112)	(0.094)	(0.078)			
GVC	-0.080	-0.084	0.030			
	(0.171)	(0.142)	(0.118)			
Biosensors	-0.040	0.399***	0.058	0.192	-0.108	-0.227**
	(0.103)	(0.086)	(0.072)	(0.150)	(0.126)	(0.108)
Biotech Equipment	0.098	0.535***	0.081	0.147	0.053	-0.242***
	(0.078)	(0.065)	(0.054)	(0.117)	(0.098)	(0.084)
Biotech Other	-0.101	0.412***	0.331***			
	(0.117)	(0.097)	(0.081)			
Biotech Research	-0.069	0.479***	0.193***	-0.016	-0.023	-0.097
	(0.076)	(0.063)	(0.053)	(0.114)	(0.096)	(0.082)
Biotech-Animal	0.045	0.624***	0.138***	0.024	0.194*	-0.104
	(0.075)	(0.062)	(0.052)	(0.119)	(0.099)	(0.085)
Biotech-Human	-0.094***	0.067***	-0.030**	0.069**	0.100***	-0.140***
	(0.022)	(0.018)	(0.015)	(0.035)	(0.029)	(0.025)
Biotech-Industrial	-0.157*	0.645***	0.038	-0.030	0.266**	-0.280***
	(0.090)	(0.075)	(0.062)	(0.127)	(0.106)	(0.091)
Med/Health Products	-0.132***	-0.083***	0.091***			

	(0.033)	(0.028)	(0.023)			
Med/Health Services	0.079	0.414***	0.186***	0.061	-0.036	-0.081
	(0.072)	(0.060)	(0.050)	(0.117)	(0.098)	(0.084)
Medical Diagnostics	-0.040	-0.144***	0.042*	0.131***	-0.080**	-0.058*
	(0.033)	(0.027)	(0.023)	(0.045)	(0.038)	(0.032)
Medical Therapeutics	-0.078***	-0.073***	0.028*	0.054	-0.012	-0.074***
	(0.025)	(0.021)	(0.017)	(0.036)	(0.030)	(0.026)
Pharmaceutical				0.169***	0.020	-0.102***
				(0.038)	(0.032)	(0.027)
1996	0.002	-0.044	-0.002	0.0004	-0.070	0.020
	(0.049)	(0.040)	(0.034)	(0.054)	(0.045)	(0.038)
1997	0.128***	-0.263***	0.050*	0.125***	-0.286***	0.082**
	(0.044)	(0.036)	(0.030)	(0.048)	(0.040)	(0.035)
1998	-0.018	-0.147***	-0.010	0.004	-0.186***	0.008
	(0.043)	(0.035)	(0.030)	(0.048)	(0.040)	(0.034)
1999	0.190***	-0.313***	-0.002	0.191***	-0.341***	0.033
	(0.042)	(0.035)	(0.029)	(0.048)	(0.040)	(0.034)
2000	0.077***	-0.005	0.108***	0.084***	-0.005	0.106***
	(0.028)	(0.023)	(0.019)	(0.032)	(0.027)	(0.023)
2001	0.051*	-0.033	0.082***	0.022	-0.042	0.078***
	(0.029)	(0.024)	(0.020)	(0.033)	(0.028)	(0.024)
2002	0.016	0.026	0.051**	0.002	0.014	0.048**
	(0.029)	(0.025)	(0.020)	(0.032)	(0.027)	(0.023)
2003	0.011	-0.016	0.053***	-0.004	-0.008	0.056**
	(0.029)	(0.024)	(0.020)	(0.031)	(0.026)	(0.022)
2004	-0.007	0.024	0.020	-0.002	0.025	0.023
	(0.028)	(0.023)	(0.019)	(0.030)	(0.025)	(0.022)
Observations	4,475	4,475	4,475	4,475	4,475	4,475
R^2	0.369	0.270	0.187	0.328	0.350	0.297

Appendix Table 12. Exit performance of early-stage startups given Alternative Time Periods Before/After EU-ODA. This table replicates Model (1) to Model (3) of Table 6 by restricting the sample to two different time periods in our analysis, 3 and 7 years before and after EU-ODA. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01.

	Dependent variables					
	M&A	IPO	Bankruptcy	M&A	IPO	Bankruptcy
	(1)	(2)	(3)	(4)	(5)	(6)
	3 years Before and after			7 years Before and after		
Drug-related	0.219***	0.245***	0.102*	0.299***	0.301***	0.007
	(0.072)	(0.057)	(0.053)	(0.062)	(0.052)	(0.040)
After ODA	-0.018	-0.122***	-0.219***	-0.101**	-0.277***	-0.089***
	(0.050)	(0.040)	(0.037)	(0.051)	(0.043)	(0.033)
Drug-related* After ODA	-0.111**	0.116***	0.080**	-0.115***	0.170***	0.032
	(0.046)	(0.037)	(0.034)	(0.035)	(0.030)	(0.023)
EU investor	0.205***	-0.088**	0.093***	0.225***	-0.094***	0.050**
	(0.045)	(0.036)	(0.033)	(0.033)	(0.028)	(0.021)
US investor	0.281***	-0.114***	0.124***	0.250***	-0.077***	0.075***
	(0.042)	(0.033)	(0.031)	(0.030)	(0.025)	(0.020)
IVC	0.024	0.030	0.006	-0.011	0.061*	0.007
	(0.047)	(0.037)	(0.035)	(0.038)	(0.032)	(0.025)
CVC	0.032	0.014	0.005	-0.008	0.026	-0.009
	(0.058)	(0.046)	(0.043)	(0.045)	(0.038)	(0.029)
Angel	0.236	-0.155	-0.151	0.090	-0.110	-0.059
	(0.143)	(0.114)	(0.106)	(0.096)	(0.081)	(0.063)
GVC	-0.307	-0.125	0.144	-0.251**	0.008	0.096
	(0.241)	(0.192)	(0.177)	(0.125)	(0.106)	(0.082)
Biosensors	-0.037	0.179*	0.086	0.072	0.208***	-0.015
	(0.121)	(0.096)	(0.089)	(0.093)	(0.078)	(0.061)
Biotech Equipment	0.186**	0.262***	0.153**	0.252***	0.309***	0.008
	(0.087)	(0.069)	(0.064)	(0.073)	(0.062)	(0.048)
Biotech Other	-0.096	0.136	0.425***	0.043	0.228**	0.222***
	(0.125)	(0.100)	(0.092)	(0.111)	(0.094)	(0.072)
Biotech Research	-0.002	0.215***	0.260***	0.103	0.274***	0.110**
	(0.082)	(0.065)	(0.060)	(0.071)	(0.060)	(0.047)
Biotech-Animal	0.125	0.385***	0.179***	0.185***	0.433***	0.052
	(0.077)	(0.062)	(0.057)	(0.070)	(0.060)	(0.046)
Biotech-	-0.096***	0.102***	-0.028	-0.062***	0.041***	-0.005

Human						
	(0.027)	(0.021)	(0.020)	(0.019)	(0.016)	(0.012)
Biotech-Industrial	-0.159	0.469***	0.064	0.094	0.429***	-0.021
	(0.109)	(0.087)	(0.081)	(0.079)	(0.067)	(0.052)
Med/Health Products	-0.095**	-0.022	0.081***	-0.068**	-0.120***	0.078***
	(0.042)	(0.033)	(0.031)	(0.028)	(0.024)	(0.018)
Med/Health Services	0.153**	0.165***	0.225***	0.248***	0.241***	0.088**
	(0.078)	(0.062)	(0.057)	(0.067)	(0.056)	(0.044)
Medical Diagnostics	0.024	-0.092***	0.021	-0.013	-0.147***	0.038**
	(0.041)	(0.033)	(0.030)	(0.028)	(0.024)	(0.018)
Medical Therapeutics	-0.062**	-0.051**	0.048**	-0.066***	-0.095***	0.023*
	(0.031)	(0.025)	(0.023)	(0.021)	(0.018)	(0.014)
1994				-0.080	0.040	0.082**
				(0.050)	(0.043)	(0.033)
1995				-0.162***	0.181***	0.100***
				(0.049)	(0.042)	(0.032)
1996				-0.151***	0.132***	0.102***
				(0.049)	(0.042)	(0.032)
1997				-0.026	-0.085**	0.155***
				(0.045)	(0.038)	(0.029)
1998	-0.139***	0.112***	-0.056**	-0.171***	0.034	0.090***
	(0.037)	(0.029)	(0.027)	(0.043)	(0.037)	(0.028)
1999	0.068*	-0.058**	-0.047*	0.033	-0.129***	0.100***
	(0.036)	(0.029)	(0.027)	(0.043)	(0.036)	(0.028)
2000	0.068**	0.009	0.056***	0.109***	0.056**	0.106***
	(0.029)	(0.023)	(0.022)	(0.026)	(0.022)	(0.017)
2001	0.040	-0.014	0.028	0.085***	0.027	0.079***
	(0.031)	(0.025)	(0.023)	(0.028)	(0.024)	(0.018)
2002	0.003	0.045*	-0.002	0.052*	0.080***	0.049***
	(0.031)	(0.025)	(0.023)	(0.028)	(0.024)	(0.018)
2003				0.044	0.043*	0.052***
				(0.027)	(0.023)	(0.018)
2004				0.027	0.081***	0.020
				(0.027)	(0.023)	(0.018)
2005				0.033	0.058***	0.0003
				(0.026)	(0.022)	(0.017)
2006				-0.053**	0.080***	-0.013
				(0.027)	(0.023)	(0.018)
Observations	2,987	2,987	2,987	6,019	6,019	6,019
R^2	0.398	0.245	0.196	0.356	0.260	0.173

Appendix Table 13. Replication of Table 6 with multinomial logit regressions. We report here Table 6 results with multinomial logit models, taking into account that the dependent variable is binary. We also report here the coefficient estimates for our full set of fixed effects at the technology category and year level. In addition this table reports coefficient estimates for all our controls in the baseline specification. Standard errors are clustered at the investing firm level. *p<0.10; **p<0.05; ***p<0.01

	Dependent variables		
	M&A	IPO	Bankruptcy
	(1)	(2)	(3)
Drug	-1.935***	0.132	-2.940***
	(0.355)	(0.357)	(0.530)
After ODA	0.381	-2.935***	-2.049***
	(0.237)	(0.306)	(0.348)
Drug-related*After ODA	-0.505***	1.725***	0.217
	(0.178)	(0.264)	(0.239)
EU startup	1.428***	-0.553***	1.201***
	(0.251)	(0.202)	(0.400)
US startup	1.621***	-0.619***	1.407***
	(0.242)	(0.186)	(0.383)
IVC	-0.050	0.360	0.118
	(0.190)	(0.242)	(0.291)
CVC	-0.003	0.212	-0.115
	(0.231)	(0.285)	(0.363)
Angel	0.279	-14.707	-0.785
	(0.500)	(505.885)	(1.081)
GVC	-0.413	-14.394	0.460
	(0.863)	(788.191)	(1.170)
Biosensors	-2.842***	-14.233	-4.184***
	(0.520)	(348.440)	(1.154)
Biotech Equipment	-2.224***	0.564	-3.198***
	(0.398)	(0.432)	(0.597)
Biotech Other	-3.348***	-13.620	-0.865
	(0.722)	(485.548)	(0.683)
Biotech Research	-2.979***	0.035	-2.194***
	(0.396)	(0.443)	(0.556)
Biotech-Animal	-2.437***	1.235***	-2.623***
	(0.386)	(0.400)	(0.552)
Biotech-Human	-0.422***	0.358***	-0.377**
	(0.098)	(0.111)	(0.161)
Biotech-Industrial	-3.549***	1.510***	-4.784***

	(0.500)	(0.490)	(1.135)
Med/Health Products	-0.598***	-0.571***	0.672***
	(0.154)	(0.197)	(0.197)
Med/Health Services	-2.307***	-0.532	-2.343***
	(0.374)	(0.391)	(0.538)
Medical Diagnostics	-0.178	-1.155***	0.340*
	(0.147)	(0.220)	(0.204)
Medical Therapeutics	-0.345***	-0.510***	0.255
	(0.112)	(0.141)	(0.166)
1996	0.013	-0.092	-0.004
	(0.226)	(0.225)	(0.259)
1997	0.554***	-1.448***	0.254
	(0.199)	(0.227)	(0.226)
1998	-0.079	-0.726***	-0.054
	(0.199)	(0.199)	(0.229)
1999	0.818***	-1.898***	-0.021
	(0.191)	(0.229)	(0.225)
2000	0.356***	-0.007	1.547***
	(0.130)	(0.157)	(0.254)
2001	0.238*	-0.223	1.238***
	(0.137)	(0.174)	(0.269)
2002	0.077	0.171	0.938***
	(0.138)	(0.163)	(0.279)
2003	0.048	-0.111	0.963***
	(0.136)	(0.164)	(0.273)
2004	-0.031	0.155	0.446
	(0.134)	(0.155)	(0.294)
Observations	4,475	4,475	4,475
Log Likelihood	-2,772.888	-2,060.221	-1,547.926