Research Policy 54 (2025) 105289

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

How Brexit reshaped venture capitals market: An analysis of UK and EU investments

Andrea Odille Bosio [a], Vicenzo Butticè [a], Andrea Crisanti [b], Annalisa Croce [a,*,1], Simone Signore [b]

[a] Politecnico di Milano, School of Management, Italy
[b] EIF- European Investment Fund Research & Market Analysis, Luxembourg

ARTICLE INFO

JEL classifications numbers:
G24
G28
L14

Keywords:
Venture capital
Startups
Brexit
Financial hubs

ABSTRACT

This study examines the distinct impacts of Brexit's announcement and enforcement on cross-region VC investments between the UK and the EU. The findings reveal contrasting trends for VC hubs in these regions. Following the Brexit announcement, UK VC hubs immediately reduced their investments in the EU, with no further changes after enforcement. Conversely, EU VC hubs did not alter their investment behavior toward the UK at the announcement but significantly increased their activity after Brexit enforcement. These results align with the hypothesis that UK and EU VC investors faced asymmetric uncertainty, with the EU being less equipped to anticipate how Brexit would reshape European VC markets. Our analysis is the first to offer a picture following Brexit enforcement, showing that, overall, UK VC hubs reduced their incidence on the EU market as well as in the domestic market.

1. Introduction

On the 23rd of June 2016 the UK electorate cast a historic referendum to exit the European Union, an event commonly referred to as Brexit. This landmark decision stands as one of the most significant economic reforms of recent years, carrying profound implications for companies and entire economic systems (e.g. Wright et al., 2016). Following Brexit, UK firms experienced a pronounced reduction in investments from EU, leading to a drop in their productivity (Bloom et al., 2019; Breinlich et al., 2020). Post-referendum a two-digits decline in EU-UK bilateral export values led to a drop in competitiveness of firms operating in these markets (Graziano et al., 2021; Ahmad et al., 2023) and welfare loss (McGrattan and Waddle, 2020). Brexit has also significantly reduced the UK's ability to attract skilled talent, particularly from EU countries, weakening the country's innovation potential and labor market dynamism (Amuedo-Dorantes and Romiti, 2024). The uncertainty surrounding Brexit has been identified as a factor diminishing the attractiveness of UK startups for institutional investors in the VC market (Groh et al., 2018; Brown et al., 2019; Kellard et al., 2022).

The impacts of Brexit on VC, in particular, sparked a significant debate about how the reform would have affected innovation in Europe (Cumming and Zahra, 2016; Brown et al., 2019). As a matter of fact, VCs occupy a pivotal role within the entrepreneurial ecosystem, providing financial support and strategic guidance to startups. They serve as a catalyst for entrepreneurship, creating an environment conducive to innovation (Florida and Kenney, 1988; Kortum and Lerner, 2001) and nurturing the emergence of hubs for knowledge exchange and collaboration (Zook, 2004). The European VC market has evolved into strong geographical clusters (Cumming et al., 2022; Colombo et al., 2019; Chen et al., 2010), with a limited number of highly concentrated investment centers. In the pre-Brexit scenario, intense cross-regional investment activity occurred from UK VC hubs to EU startups and vice versa. The UK VC hubs played a significant role consistently representing the largest VC market in Europe, and accounting for over 30 % of the overall investment amount (Bellucci et al., 2021). UK VC hubs historically invested, alone or in syndication with local players (Cumming et al., 2021), in EU-based startups (Harrison et al., 2020; Harrison and Mason, 2003) enabling them to gain international exposure (Schertler and Tykvová, 2011) and pursue potential exit opportunities (Coakley et al., 2009). Similarly, although with lower investment volumes, the EU VC hubs have played a key role for UK startups (Wright et al., 2005). Brexit, introducing a trade barrier among these two regions, may have impacted these cross-regional investment flows, raising a question regarding whether the role of EU and UK VC hubs has shifted and how the overall

* Corresponding author at: Politecnico di Milano, Department of Management, Economics and Industrial Engineering, Via Lambruschini 4/b, 20156 Milano, Italy.
E-mail address: annalisa.croce@polimi.it (A. Croce).
[1] Bureau of Entrepreneurial Finance.

https://doi.org/10.1016/j.respol.2025.105289
Received 12 June 2024; Received in revised form 19 June 2025; Accepted 19 June 2025

market has responded to this change. Accordingly, the goal of this paper is to assess how cross-regional VCs have changed following Brexit.

To answer this research question, the paper moves from the consideration that, due to its complexity, Brexit unfolded gradually. In the first period following the referendum, a multitude of conjectures regarding the potential outcomes of Brexit proliferated across various channels, including the popular press (Goodman, 2016), policy think tanks (Garnett and Lorenzoni, 2021), and professional organizations (Coen and Katsaitis, 2021). In this period, a climate of uncertainty permeated the market, fostering a sense of turmoil and volatility (Ahmad et al., 2023; Hassan et al., 2024; Graziano et al., 2021). Our main tenet is that, in this phase, UK and EU VC hubs were exposed to a different stock of information about Brexit which made them perceive more or less certain the trade barriers that the reform would have imposed. In response to this asymmetrical uncertainty about Brexit, EU and UK VC hubs reacted differently, with the former remaining more cautious, while the latter adapting immediately their strategy following the announcement. The signing of the withdrawal agreement and subsequent enforcement mechanisms marked the termination of this initial phase, ushering in a distinct second phase characterized trade barriers outlined in the agreement (Alexandre-Collier et al., 2022) that are now certain in both markets. This transition engendered a fundamental change in the competitive landscape and introduced novel costs for investment between the UK and the EU. Without any remaining uncertainty at this stage, also the EU VC hubs reacted.

Following this intuition, our analysis divides the observation period into three distinct phases. The first phase encompasses the pre-Brexit period, extending prior to 2016. This period serves as a baseline, characterized by the absence of Brexit-related uncertainties or reforms. The second phase involves the post-announcement period, which represents the asymmetrical uncertainty period covering the years between 2016 and 2018, before Brexit enforcement. During this interval, the specter of Brexit engendered considerable ambiguity and speculation within the VC market, fostering a climate of unpredictability and caution among investors, particularly in EU. Finally, the third phase marks the post-enforcement period, commencing in 2019 (Faccini and Palombo, 2021). With the formalization and implementation of Brexit-related agreements and barriers, the uncertainties surrounding Brexit began to dissipate, replaced by the tangible effects of the reform. This phase represents a new era, characterized by a clearer understanding of the regulatory landscape and its implications for VC activities.

To conduct our analysis, we rely on a the EDC dataset comprising European-level data on VC deals, sourced from the European Investment Fund (EIF) and Invest Europe. This dataset covers a substantial share of the investments made in Europe between 2007 and 2021, standing as one of the most comprehensive sources available on Venture Capital deals in Europe. In comparison with commercial database (e.g. Pitchbook), EDC data includes a larger number of smaller deals while concurrently excluding deals that are not directly linked to VC activity and that are commonly included in other sources that use broader and more accommodating definition (Crisanti et al., 2023). Taking advantage of this database, we explore the consequences of these three-phases analysis for both the UK and EU VC hubs separately. To this aim, we conducted econometric analyses that included two treatment periods, to isolate post-announcement and post-enforcement effects of Brexit on the VC hubs activity. Our results suggest that following the Brexit announcement, UK VC hubs immediately reacted by decreasing their investment activity toward EU startups. Notably, post-Brexit enforcement, no further changes were observed for UK VC hubs, suggesting immediate reactions by UK VC investors ahead of the actual EU exit. In contrast, in the EU, the Brexit prompted different dynamics for VC investors. Following the announcement, EU VC hubs have not changed their investment activity toward UK startups, consistently with the view that these actors phased higher uncertainty that motivated a wait-and-see strategy. Post-enforcement EU VC hub increased their activity toward UK startups. A post-hoc analysis shows that overall, UK VC hubs reduced their share on both the EU market as well as in the domestic market.

The paper unfolds as follows. In chapter 2, we describe the Brexit storyline to motivate our empirical choices on the splits of the period under investigation. In chapter 3, we develop our research hypotheses, while chapter 4 describes our database and the methodology. In chapter 5 we report the results and post-hoc analyses. Finally, chapter 6 concludes the work defining the implications of this study, research limitations and venues for future research.

2. Brexit storyline

The trajectory toward Brexit was characterized by multiple accelerations and setbacks, that exposed the market to a long period of uncertainty. The primary aim of this chapter is to delineate the milestones of this process in order to identify the key events that led to the transformation of the VC market in Europe.[2]

The political debate about leaving the EU began in the UK following the 2010 election of a Conservative-Liberal Democrat coalition party (Lynch and Whitaker, 2018). As far as 2011, the parliament was called to express a preference on the motion to ask for a referendum on the UK's membership of the EU.[3] The motion was ultimately rejected (111 Ayes against 483 Noes) fading the UK instances of leaving the EU and limiting this position among a fringe of Eurosceptics Members of Parliament. The EU membership of UK remained stable for several years, and Brexit urges seemingly were resolved through the signing of a legally binding and irreversible deal to strengthens Britain's special status in the EU on the 17th of February 2016.

Nonetheless, the UK's process to exit from the European Union officially initiated on the 20th of February 2016, when the UK prime minister announced a referendum to call UK citizens to express their preference between remain or leaving EU. On the 23rd of June 2016, when the outcome of the referendum was announced, Brexit became a priority for UK and EU agendas. On this date, for the first time in EU history, a country voted in favor of leaving the EU. From that day onward, economic and financial analysts started pondering on the possible consequences of such decisions, generating a wave of uncertainty and fear on the markets (Ahmad et al., 2023; Bloom et al., 2018). The effects of the shock were immediate, causing a fall of the financial markets during the day after the announcement (Caporale et al., 2018). In this phase, two alternative scenarios, *Soft Brexit* and *Hard Brexit*, were discussed. On the one hand, *Soft Brexit* would have allowed UK to keep a privileged status and trade relations with the EU and minimize the legal and economic consequences of Brexit, especially with regards to the disruption of supply chains and trade. At the same time, *Soft Brexit* would have kept the restrictions related to EU regulations and standards. In brief it would have permitted the UK to stay within both the EU's single market and customs union (Menon and Fowler, 2016). On the other hand, the *Hard Brexit* scenario would have implied the exit of the UK without any preferential relationship with the European Single Market and relying solely on World Trade Organization rules (Menon and Fowler, 2016). This scenario would have entailed significant barriers, including tariffs and regulatory obstacles, hindering the free

[2] The content of this chapter has been discussed with and validated by a panel of experts involving academics, EIF personnel and practitioners of the VC sector.

[3] See: House of Parliament, Monday 24 October 2011, Volume 534, "National Referendum on the European Union", https://hansard.parliament.uk/Commons/2011-10-24/debates/1110247000001/NationalReferendumOnTheEuropeanUnion.

movement of people, capital, ideas, and trade from UK to EU and vice versa.[4] Additionally, there would have been a lack of commitment to adopting Single Market laws, undermining alignment, and regulatory stability across participating countries.

The discussion surrounding multiple Brexit scenarios, each with potentially divergent outcomes, initiated a period of considerable turmoil and apprehension, both within financial markets and affected industries. This sentiment was vividly depicted in specialized press reports (Wright, 2016). Key concerns pertaining to Brexit, and particularly the *Hard Brexit* scenario, revolved around the deep interconnection between the UK and EU economies and the potential loss of privileges associated with the Single Market. Concerns were centered on the EU's capability to develop a capital market to reduce the European economy's dependency on bank lending, and the potential loss of passport benefits which allow businesses to acquire human resources and conduct cross-border operations. Additional concerns included the loss of the economies of scale provided by the already mentioned Single Market, which would have implied an increase in complexity and cost of cross-border financial operations (Wright, 2016). The divergent information available to the UK and EU players (Walter, 2019; Borchardt et al., 2018) significantly influenced their ability to anticipate a *Hard Brexit* scenario. For the UK, proximity to political developments and better access to direct negotiations enabled a clearer estimation of the likelihood and implications of a *Hard Brexit*. Conversely, EU markets faced greater uncertainty. Their position as external observers to UK political deliberations made it more challenging to gauge the probability and consequences of a *Hard Brexit*. This uncertainty stemmed from a lack of transparency in UK policymaking and the complex interdependence between the two economies, leaving EU investors with a broader range of potential outcomes and a higher degree of ambiguity (Levy et al., 2016).

Given the complexity of the reform, it comes with no surprise that the process to define a clear Brexit direction was long and, occasionally, disorderly. The key dates of this process are reported in Table 1.

After the Brexit vote, the preliminary negotiation process took several months. As David Cameron, the UK prime minister, explained in the first European Council following Brexit, this time allowed *"the dust to settle"* in the UK. Only on the 29th of May 2017, the UK triggered Article 50 of the Treaty on European Union. Following this action, the official negotiation took an additional eleven months to reach a first draft for the Withdrawal Agreement, which would set the regulation governing the EU-UK relationship moving forward. In this phase the key topics of discussion were the citizens' rights and finding a backstop solution to prevent an evident border between Ireland (EU) and Northern Ireland (UK). Between February and March 2018, the initial draft of the Withdrawal Agreement and the European Council guidelines for post-Brexit relationship with the UK better defined the possible final outcome. At this stage, both the EU and UK have agreed on multiple topics, including citizens' rights, financial settlement, and transition period. It was already clear at this stage, particularly in the UK, that *Hard Brexit* was the only possible result of the negotiation process. This agreement, though, was far from conclusive and mainly represented an intermediate point for confrontation between the EU and the UK. Thus, the entirety of 2018 was characterized by continuous negotiations between the parties.

From 2019 the EU Council takes the first formal step toward the conclusion of the withdrawal agreement. In this period, the understanding about how Brexit would have looked like became more pronounced, for both EU and UK firms (Hassan et al., 2024). Despite not having any official announcement, the post-Brexit scenario was clear among policymakers and industry players. In this phase, companies in multiple sectors (e.g. Sohns and Wójcik, 2020), and the society as whole, adapted to the new scenario (Brewster et al., 2023; Vandenbussche et al., 2022) and started to reallocate their activities to navigate shifting competition (Asimakopoulos, 2020). On January 24th 2020 the actual withdrawal agreement was signed, taking effect from the 31st of January 2020. Following this date, despite certain aspects remaining undefined (e.g., some country-specific implementation of agreements; the Ireland/Northern Ireland protocol), Brexit officially became a reality and induced its full effect on import/exports trades (Buigut and Kapar, 2023). After nearly 50 years since its inception, the European Economic Community split into two fragmented markets.[5]

Overall, the historical excursus of Brexit delineates three distinct periods that are considered in our analysis. The first phase encompasses the pre-Brexit period till 2016. The second phase characterized by high uncertainty, particularly for EU players, covers the years between 2016 and 2018. Finally, the third phase marks the post-enforcement period, commencing in 2019. The paper aims at isolating the effects of Brexit distinguishing among these periods.

Table 1
Brexit timeline and key dates.

Date	Event
23 June 2016	UK citizens voted to leave the European Union.
29 June 2016	Informal meeting of the 27 EU heads of state or government, where the UK government notifies the European Council of its intention to withdraw from the EU.
13 October 2016	Donald Tusk, President of the European Council states "'Hard Brexit' or 'no Brexit'" and British Prime Minister Theresa May starts the negotiations with the EU.
29 March 2017	UK formally triggers Article 50 to leave the EU. Six rounds of negotiation follow.
28 February 2018	Published the draft Withdrawal Agreement between the European Union and the United Kingdom.
23 March 2018	The European Council (art. 50) adopts guidelines for post-Brexit relationship with the UK.[a]
21 October 2019	EU Council takes first formal step toward the conclusion of the withdrawal agreement. On the 29th of October 2019 the European Council extends Brexit deadline to 31st of January 2020 to allow the agreement to be ratified.
24 January 2020	Withdrawal agreement signed by the EU (Presidents Charles Michel and Ursula von der Leyen) and UK Prime Minister Boris Johnson.
31 January 2020	The United Kingdom leaves the European Union and all restrictions become effective.

Sources: House of Commons (2021) and European Commission (2023).
[a] For more information see: https://www.consilium.europa.eu/en/press/press-releases/2018/03/23/european-council-art-50-guidelines-on-the-framework-for-the-future-eu-uk-relationship-23-march-2018/.

3. Research hypotheses

As discussed, the Brexit referendum triggered a period of profound uncertainty about the future relationship between the UK and the EU, related to the lack of clarity about the form Brexit would take; whether it would be a *Soft Brexit* involving continued access to the Single Market, or a *Hard Brexit* entailing significant regulatory and economic decoupling and trade barriers. This uncertainty affected economic agents differently (Frenkel and Stefan, 2024), shaping divergent expectations and responses in the VC markets across the UK and the EU.

In the UK, as the promoter of the referendum, public and political

[4] See: European Commission (2023), "The EU-UK Withdrawal Agreement", https://commission.europa.eu/strategy-and-policy/relations-non-eu-countries/relations-united-kingdom/eu-uk-withdrawal-agreement_en (Accessed on 08/04/2024).

[5] For a more detailed timeline of all the events, please consider: European Council (2023), "Timeline - The EU-UK withdrawal agreement", https://www.consilium.europa.eu/en/policies/eu-relations-with-the-united-kingdom/the-eu-uk-withdrawal-agreement/timeline-eu-uk-withdrawal-agreement/ or House of Commons (2021), "Brexit timeline: events leading to the UK's exit from the European Union", https://commonslibrary.parliament.uk/research-briefings/cbp-7960/ (accessed on 10/04/2024).

discourse quickly converged on anticipating the *Hard Brexit*, with multiple media outlets supporting this view (The Economist, 2018; Walter, 2019). Statements from key policymakers reinforced this expectation. For example, former UK Prime Minister Theresa May's declaration that "*no deal is better than a bad deal*" signaled that a clean break from the EU, including leaving the Single Market and Customs Union, was a plausible and even probable outcome (Johnson, 2017). Public opinion and media narratives further amplified this expectation, creating a relatively certain scenario for UK-based investors to anticipate transaction costs and the regulatory barriers of a *Hard Brexit* (Walter, 2019). In contrast, the EU was exposed to a more complex and ambiguous set of information. EU policymakers emphasized the importance of unity among member states and avoided committing to specific scenarios regarding the future relationship with the UK (Levy et al., 2016). For example, Donald Tusk, then-President of the European Council, emphasized the need for "preparedness for various outcomes" without suggesting which scenarios were more likely. In the same period the EU's broader political and economic priorities, including ongoing efforts to strengthen the internal market and address macroeconomic challenges, further diluted the focus on Brexit, within the EU. A comparative content analysis of 39 media outlets in Ireland, Germany, France, Spain, Sweden, Italy, Greece and Poland over a period of seven months, following Brexit, found that while the reporting was fairly stable in volume, it was rather dispassionate in tone. In most countries media regarded Brexit as a domestic challenge for the UK, not as a problem for the EU (Borchardt et al., 2018). With less information available, EU-based VC investors faced a higher level of uncertainty, lacking a clear framework for estimating the likelihood of hard Brexit and its potential impacts on cross-border operations.

This asymmetry in the visibility and predictability of Brexit scenarios led to differing responses in the VC markets of the UK and the EU. UK-based VC investors, with clearer expectations about the probable realization of *Hard Brexit*, reacted immediately by incorporating anticipated transaction costs into their investment decisions. This preemptive response aligns with transaction costs theory (Williamson, 1981), where agents adjust their behavior to minimize anticipated costs associated with institutional and regulatory changes. Specifically, UK VC funds reduced their cross-border investments in the EU to preemptively avoid future costs associated with post-Brexit regulatory change. In contrast, EU-based VC investors, operating under greater uncertainty, adopted a more cautious approach. Consistent with the real options theory (Dixit and Pindyck, 1994), uncertainty incentivizes decision-makers to delay irreversible commitments until additional information becomes available. For EU VC funds, this translated into maintaining their existing investment behavior toward the UK during the announcement phase, awaiting clarity on the form Brexit would take. Intuitively, if VC funds were uncertain whether they would invest or disinvest after the shock took place (i.e. they were unable to predict whether *Hard* or *Soft Brexit* would have occurred), then they would have waited, to save on future adjustment costs. But if VC funds expected to eventually disinvest in any case, because of the *Hard Brexit*, while being uncertain only about the amount of disinvestment, then they would have started to decumulate capital straightaway (Faccini and Palombo, 2021). Following this line of reasoning we expect that:

H1. Following Brexit announcement, UK-based VC funds significantly reduced investments toward the EU, while EU-based VC funds maintained their investment activity toward the UK.

The enforcement of Brexit marked the transition from uncertainty to clarity, as the terms of the UK's departure became definitive. By this stage, UK-based VC investors, having anticipated a *Hard Brexit* from the outset, had already adjusted their investment strategies to account for increased transaction costs and regulatory barriers. Thus, enforcement brought no additional behavioral changes for UK investors. For EU-based VC investors, however, enforcement provided the clarity necessary to recalibrate their strategies. With uncertainty resolved, they could now accurately assess the implications of Brexit for cross-regional investments. Specifically, the clarity brought by the Brexit enforcement allowed EU VC hubs to reassess the long-term trade barriers and regulatory divergences between the UK and the EU. Investors were better equipped to evaluate the cost-benefit trade-off of investing in the UK. This shift in perspective likely led some EU VC hubs to scale back their engagement with UK startups, viewing the increased transaction costs, limited access to EU markets by UK startups, and heightened operational risks as significant deterrents to cross-regional investments. This view is consistent with the empirical literature on regional economic integration which suggests that reduced trade barriers encourage cross-border VC investment flows within the integrated region (Alhorr et al., 2008). Conversely, the trade barriers introduced by Brexit may have diminished EU investors' appetite for UK startups, prompting them to redirect resources toward EU-based ventures where regulatory alignment and market access offered greater stability and growth opportunities. Moreover, Brexit may have highlighted a deeper institutional misalignment between the UK and the EU. Empirical evidence indicates that such misalignments can divert investment away from affected regions (Chen et al., 2024). As a result, Brexit enforcement likely reinforced EU VC hubs' focus on startups within the EU, where institutional alignment and seamless market integration remained intact.

H2. Following Brexit enforcement, EU-based VC funds significantly reduced investments their investment activity toward the UK, while UK-based VC funds will exhibit minimal changes in their investment activity toward the EU.

4. Methodology

4.1. Data

The dataset we resort to is the result of a partnership between the European Investment Fund (EIF) and Invest Europe via the European Data Cooperative (EDC).[6] The dataset covers VC investments in the European Union Member States, the UK, Norway and Switzerland, enabling a broad overview of the European VC market. The database tracks investments made by 2824 VC firms toward 35,310 start-ups, between 2007 and 2021. The data include VC investments flowing from Europe as well as flowing to Europe. Investments outside Europe are not considered.

We aggregated data by Functional Urban Areas (FUAs), which have been developed by the OECD to provide a harmonized comparison of metropolitan areas and their surrounding commuting zones, overcoming the limitations of country-specific administrative boundaries. The definition of FUA by OECD uses population density to identify urban areas and travel-to-work distances to identify the hinterlands (Dijkstra et al., 2019). Thus, FUAs capture, better than cities, highly connected urban districts and suburban metropolitan areas, in terms of population, accessibility to human capital, and economic conditions. In simple terms, a FUA includes a city and its interconnected suburbs, forming a cohesive urban region where economic, social, and demographic interactions take place. Provided this feature, FUAs "[…] offers a balanced perspective, capturing the dynamism of cities without losing sight of the broader regional context" (Crisanti et al., 2023, p. 2). FUAs have been used in a number of prior studies on the European VC market (e.g. Guerini and Tenca, 2018; Fisch et al., 2022). The choice of aggregating data at the FUAs level is consistent with the primary objective of this study, namely to understand how different VC hubs, rather than individual VC firms, have adjusted their relevance and investment patterns in response to Brexit. The hub-level perspective allows us to capture the broader regional shifts in VC activity, which are shaped by the

[6] The EDC is a platform for collecting pan-European VC and private equity data, developed by Invest Europe and national association partners.

institutional, economic, and policy environments in which VC firms operate. As Brexit represents a structural shock that affects entire financial ecosystems, analyzing investment flows at the hub level provides insights into how entire financial clusters have responded, rather than focusing solely on individual firm behaviours.

To this aim, we geo-localized each VC firm and associate them with their corresponding FUA, thus allowing us to detect the VC hubs.[7] Out of the 729 VC hubs in the EU27, UK, Norway and Switzerland, the database unveils 613 VC hubs with at least one active VC firm between 2007 and 2021. According to the European Investment Fund and Invest Europe report (Crisanti et al., 2023): "Functional Urban Areas have a remarkable ability to capture the essence of the European VC ecosystem. An impressive 89% of geolocated startups and VC firms reside within the boundaries of the 613 identified FUAs. […] An additional 10% of startups and VC firms are located reasonably close to one of these hubs. While not directly within the hub, they remain within its sphere of influence, contributing to the overall VC ecosystem. Only a small fraction, less than 1%, falls outside the reach of the 613 FUAs. These outliers represent a minimal share of the VC landscape" (Crisanti et al., 2023, p. 2). In summary, FUAs serve as an effective and reliable framework for understanding the geography of European VC, capturing most of the VC activity and providing a clear picture of where the supply of capital is concentrated. For each FUA, the database contains information about the investments performed toward startups in other FUAs in terms of total number of deals.

We apply two filters to our original database: first, we excluded investments from or toward FUAs for which we do not have complete geolocation data either on the receiving (startups) or investing (VC firms) end; secondly, since we aim to explore the effect of Brexit, we focus only on FUAs for which we are able to observe investments both before and after Brexit. These filters leave us with a final database composed by 480 VC hubs for which we observe VC investments from 2007 to 2021 for a total of 5180 observations.[8] Out of these 480 VC hubs, 63 are in UK while the remaining 417 are in other EU countries.

The country distribution of sample VC hubs is reported in Table 2, which shows, for each country, the number of VC hubs included in the sample and the total number of VC investments performed by the country in the observed period in a different FUAs of the one the VC investor is located. Data are sorted according to the number of VC hubs located in the focal country.

VC hubs located in France represent the 16.250 % of total FUAs in our sample. These VC hubs perform 19.973 % of total VC investments. German VC market plays also a significant role including 14.792 % of hubs. Overall, these VC hubs provided 24.246 % of total VC investments to the entire market. As to Spain, while having a quite high coverage of hubs (13.333 % of total VC hubs), VC investors located in Spanish FUAs cover only 5.540 % of total VC investments. UK plays a different role with a lower number of VC hubs (13.125 %) but higher relevance in terms VC investments performed by UK VC investors (14.871 %).

In Table 3 we report the 10 top VC hubs in terms of VC investments toward other FUAs.

Our analysis reveals a significant concentration of investments in few VC hubs. The top 10 VC hubs are responsible for a substantial 66.293 % of the total VC investments. This concentration of investments underscores the pivotal role these hubs play in the European VC ecosystem. The concentration of the supply of VC capital is confirmed by an additional data. All the investments originate from only 48.333 % of VC hubs while, almost all nodes but one, serve as destinations for investments, indicating that they host one or more invested startups. Interestingly, more than two-thirds of total investments in the VC ecosystem involve two different FUAs.

In Table 4 we report the trend of VC investments over time highlighting the different Brexit phases: we show both VC investments across different FUAs and within the boundaries of the focal VC hub (i.e. same FUA investments). For each category we show both the number of deals, and the total amount invested.

One-half of VC investments are related to the pre-Brexit period (55.685 %). Since the invested amount is increasing over time, when looking at amount invested the percentage is lower: the capital invested before Brexit is 43.543 % of the total amount invested in the observed period. As to investments into the same FUA where the investor is located, we detect lower values: 48.772 % and 39.235 %, respectively

Table 2
Country distribution of VC hubs.

	VC hubs		Nr. investments performed by the VC hubs	
Country	nr.	%	nr.	%
France	78	16.250 %	13,852	19.973 %
Germany	71	14.792 %	16,815	24.246 %
Spain	64	13.333 %	3842	5.540 %
UK	63	13.125 %	10,313	14.871 %
Italy	40	8.333 %	1298	1.872 %
Netherlands	33	6.875 %	3832	5.525 %
Hungary	17	3.542 %	967	1.394 %
Poland	13	2.708 %	536	0.773 %
Sweden	12	2.500 %	4489	6.473 %
Portugal	11	2.292 %	1083	1.562 %
Belgium	9	1.875 %	1830	2.639 %
Switzerland	9	1.875 %	1720	2.480 %
Finland	7	1.458 %	2274	3.279 %
Austria	6	1.250 %	1096	1.580 %
Greece	6	1.250 %	125	0.180 %
Norway	6	1.250 %	1591	2.294 %
Ireland	5	1.042 %	993	1.432 %
Denmark	4	0.833 %	1006	1.451 %
Lithuania	4	0.833 %	192	0.277 %
Romania	4	0.833 %	11	0.016 %
Czechia	3	0.625 %	151	0.218 %
Slovakia	3	0.625 %	95	0.137 %
Bulgaria	2	0.417 %	53	0.076 %
Cyprus	2	0.417 %	4	0.006 %
Estonia	2	0.417 %	199	0.287 %
Latvia	2	0.417 %	33	0.048 %
Croatia	1	0.208 %	28	0.040 %
Luxembourg	1	0.208 %	899	1.296 %
Malta	1	0.208 %	5	0.007 %
Slovenia	1	0.208 %	20	0.029 %
Total	480	100 %	69,352	100 %

Table 3
Top 10 hubs for VC investments performed toward other FUAs (2007–21).

FUA	Country	VC investments performed toward other FUAs	
		Nr.	%
Paris	France	10,840	20.399 %
London	UK	6071	11.424 %
Stockholm	Sweden	4019	7.563 %
Bonn	Germany	3488	6.564 %
München	Germany	2588	4.870 %
Berlin	Germany	2014	3.790 %
Helsinki	Finland	2010	3.782 %
Amsterdam	Netherlands	1486	2.796 %
Frankfurt am Main	Germany	1423	2.678 %
Madrid	Spain	1290	2.428 %

[7] We determine the geographical proximity of entities (i.e. VC firms, startups) to a FUA based on its territorial extension. To this end, we calculate the FUA's radius – assuming the boundaries of FUAs are approximately circular.

If entities are located within 200 km and 1.5 times the radius of the closest FUA, then the entity and the associated FUA are "reasonably close". In rare cases, the entity might belong to a different NUTS-2 region than the associated FUA.

[8] These "lost" FUAs make up for <0.747 % of total deals (0.662 % of total volumes) in terms of VC outflows, so the bias introduced by sample attrition is limited.

Table 4
Distribution of VC investments over time.

Period	Investment year	VC investments		Amount of VC investments		Same FUA VC investments		Amount of same FUA VC investments	
		nr.	%	000/€	%	nr.	%	000/€	%
Before Brexit	2007	3835	5.530 %	3,898,808 €	6.535 %	2012	5.989 %	1,442,661 €	5.656 %
	2008	4291	6.187 %	3,880,128 €	6.504 %	1899	5.653 %	1,536,047 €	6.022 %
	2009	3970	5.724 %	2,745,606 €	4.602 %	1654	4.923 %	967,068 €	3.791 %
	2010	4225	6.092 %	2,699,718 €	4.525 %	1689	5.028 %	980,291 €	3.843 %
	2011	4294	6.192 %	2,770,560 €	4.644 %	1698	5.054 %	989,311 €	3.879 %
	2012	4166	6.007 %	2,114,805 €	3.545 %	1784	5.310 %	984,026 €	3.858 %
	2013	4736	6.829 %	2,463,592 €	4.129 %	1974	5.876 %	952,128 €	3.733 %
	2014	4374	6.307 %	2,553,274 €	4.280 %	1809	5.385 %	890,300 €	3.490 %
	2015	4728	6.817 %	2,851,032 €	4.779 %	1866	5.554 %	1,265,924 €	4.963 %
After Brexit announcement	2016	4143	5.974 %	3,264,710 €	5.472 %	2045	6.087 %	1,270,966 €	4.983 %
	2017	4687	6.758 %	4,219,548 €	7.073 %	2508	7.465 %	1,957,122 €	7.673 %
	2018	5064	7.302 %	5,129,806 €	8.598 %	3138	9.341 %	2,438,445 €	9.560 %
After Brexit enforcement	2019	5730	8.262 %	6,147,429 €	10.304 %	3468	10.323 %	3,122,245 €	12.241 %
	2020	5664	8.167 %	5,949,102 €	9.971 %	3068	9.132 %	2,684,274 €	10.524 %
	2021	5445	7.851 %	8,973,072 €	15.040 %	2983	8.879 %	4,026,235 €	15.785 %
	Total	69,352	100.000 %	59,661,190 €	100.000 %	33,595	100.000 %	25,507,044 €	100.000 %

for the number of VC investments and amount invested, in the years before Brexit announcement.

After Brexit announcement and before Brexit enforcement, i.e. in the 2016–2018 period, we observe 20.034 % of total VC investments in different FUAs (21.143 % of total invested capital in different FUAs). As to VC investments in the same FUA, there is an increase, both in terms of number of investments (22.893 % of total VC investments in the same FUA) and amount invested (22.216 % of total capital invested in the same FUA), this providing first evidence on the effect of Brexit announcement on the VC ecosystem.

These different trends are confirmed when looking at the remaining investments included in our sample, relative to the years following the Brexit enforcement (2019–2021): we observe 24.280 % of VC investments (35.315 % of invested capital) toward different FUAs and 28.334 % of VC investments (38.550 % of invested capital) in the same FUA.

To explore the impact of Brexit on VC investment strategies in the European market, we created a variable, *cross-regional investments*, that accounts investments performed in the focal year by the focal VC hub toward FUAs in the other region, i.e. for UK FUAs investments toward EU and for EU FUAs investments toward UK. In addition, we showed statistics on *intra-regional investments*, i.e. investments performed in the focal year by the focal VC hub toward FUAs in the same region, i.e. for UK FUAs domestic investments toward UK startups and for EU VC hubs, we separate between domestic investments performed by the focal EU VC hub toward startups located in the same country and investments performed by the focal EU VC hub toward FUAs in other EU countries but UK. We examine both yearly number of investments and amount invested.

Table 5 provides descriptives statistics on these measures.[9]

On average, cross region investments by EU VC hubs account for 0.455 investments in UK startups, while, UK VC hubs showed higher cross-regional activity, with 1.588 annual investments directed toward EU startups. EU VC hubs carried out 8.212 domestic investments per year plus 1.635 investments per year in startups located in other EU countries. UK VC hubs demonstrated higher domestic activity, with 9.192 annual investments in UK startups.

4.2. Econometric model

To investigate our research hypotheses, we resort to a multivariate analysis by estimating the following model (Model 1):

$$y = \alpha + \beta d_{Adfter\ Brexit\ announcement} + \delta d_{After\ Brexit\ enforcement} + \text{controls} + \varepsilon \quad (1)$$

where, y represent the cross-region VC investments that are proxied by the number of international VC deals or by the amount invested in cross-regional deals. As to our main independent variables, $d_{After\ Brexit\ announcement}$ is a dummy taking value 1 after the Brexit announcement and before Brexit enforcement, i.e. from 2016 to 2018, while $d_{After\ Brexit\ enforcement}$ is a dummy taking value 1 after Brexit enforcement, i.e. from 2019 onward. As control variables, we include the yearly *GDP* per capita *growth* in order to account for the relative wealth of a country, a dummy *founding member country*[10] indicating whether a specific country is one of the original six countries of the European Coal and Steel Community that initially established the EU[11] and a dummy *communist country*[12] to identify whether or not the country is a politically transitioning country. Specifically, we are concerned about the social and cultural institutional differences that may exist between former communistic countries and western countries[13] (Alhorr et al., 2008). Finally, we also control for the yearly number (or amount invested) of same FUA VC deals measuring the VC activity intensity that take place into the boundaries of the focal hub and for the yearly number

[9] All investments measure (both number of investments and total amount invested) have been winsorized to control for outliers.

[10] The measure is coded as a value of 1 for FUAs located in France, Italy, Luxembourg, Germany, The Netherlands, and Belgium and a value of 0 for FUAs located in the remaining countries included in this study.

[11] The founding members of the European Union gained full access to economic integration by default. In contrast, new member states, in order to join the European Monetary System, were required to implement a series of macroeconomic reforms related to foreign debt, unemployment, and the banking sector. Consequently, the integration into the European common market for these joining members typically occurred only after significant reforms in the banking, financial, and enterprise sectors had been implemented (Scharpf, 1998).

[12] The measure is coded as a value of 1 for FUAs located in a country that was formally a communist country, and 0 for FUAs in countries that were not formally under a communist political regime.

[13] As more Eastern European countries join the EU, there is a possibility that lingering communist political ties may influence the behavior of venture capital (VC) investors. Political regimes can shape the forms and patterns of investment strategies adopted by both individuals and organizations (Hyder and Abraha, 2006; Jensen, 2003).

Table 5
Descriptive statistics.

		nr. VC investments					Amount invested (mln €)				
		n. obs.	Mean	st.dev	Min	Max	n. obs.	Mean	st.dev	Min	Max
Cross-regional investments											
EU VC hubs	International investments toward UK	4520	0.455	1.950	0	14	4520	0.218	0.710	0	2.819
UK VC hubs	International investments toward EU	660	1.588	9.022	0	60	660	0.717	3.009	0	16.902
Intra-regional investments											
EU VC hubs	Domestic investments	4520	8.212	23.300	0	154	4520	3.002	6.389	0	24.473
	International investments toward other EU countries	4520	1.635	6.223	0	42	4520	1.004	2.953	0	11.669
UK VC hubs	Domestic investments	660	9.192	23.325	0	154	660	3.810	7.194	0	24.473

(or amount invested) of domestic VC deals measuring the VC activity intensity that take place into the boundaries of the focal country.[14]

5. Results

5.1. Main model

Given the count data nature of number of VC investments as the dependent variable and the presence of FUAs without international investments, we estimate Model [1] by zero-inflated negative binomial regression, while, when using the amount invested, we resort to a Heckman regression model in which we control, in the first stage, for the probability of non-zero total amount invested. We split the sample between EU VC hubs and UK VC hubs for exploring whether and how Brexit impacted differently the respective VC markets.[15] In first stage regressions of both zero inflated negative binomial (predicting the probability of zero international investments) and Heckman regressions (predicting the probability of non-zero total amount invested), we include, as additional control, the percentage of international investments (respectively in terms of number of investments and amount invested) performed by country *c* in year *t* out of the total international investments performed in year *t* by all countries in the sample, as to proxy the relative propensity of the focal country toward international investments (*% of yearly international investments at country level*). Results of first stage regressions are reported in Appendix A (Table A1).

Results of the second stage are reported in Table 6. More in detail, in Column I and Column II we consider the number of cross-regional investments of EU and UK FUAs respectively, while in Column III and Column IV, we focus on the amount invested by EU and UK FUAs, respectively. These two dependent variables should not be viewed in isolation but rather considered jointly as complementary measures that capture different dimensions of the same underlying phenomenon: the response of VC funds to Brexit. A decline in cross-border investment activity may manifest as a reduction in the number of deals, a decrease in the total deal volume, or a combination of both.

Overall, the results support our hypothesis *H1* that UK VC hubs reacted quickly to the Brexit announcement, while EU VC hubs did not change their investment activity at this stage. Indeed, following the Brexit announcement, the β coefficient for UK VC hubs is negative and statistically significant at the 0.1 % level. This result suggests that, among UK FUAs engaged in cross-regional investments, the Brexit announcement led to a decrease in the expected number of cross-regional deals by a factor of 0.263 (exp of the coefficient of the $d_{After\ Brexit\ announcement}$ variable), holding other covariates constant. No significant effects were observed with respect to the total amount invested. Overall, these results suggest that UK VC FUAs adjusted their investment activity, reducing the overall number of cross-regional VC investments. Regarding EU VC hubs, no significant effects were detected either in terms of the number of cross-regional investments directed toward UK startups nor in terms of total investment volume. We interpret these results as confirmation of our hypothesis *H1*: UK-based VC investors, with clearer expectations about the likely realization of *Hard Brexit*, reacted swiftly by incorporating anticipated transaction costs into their investment decisions, leading to a reduction in the number of cross-regional deals as a preemptive measure against future costs associated with post-Brexit regulatory changes. In contrast, EU-based VC investors, faced with greater uncertainty, adopted a more cautious stance, maintaining their existing investment patterns toward the UK during the announcement phase as they awaited further clarity on the final form of

Table 6
Estimate results on cross-regional investments.

	Nr. Investments		Amount invested	
	EU FUAs	UK FUAs	EU FUAs	UK FUAs
	(I)	(II)	(III)	(IV)
$d_{After\ Brexit\ announcement}$	0.118	−1.335**	0.118	−0.529
	(0.156)	(0.439)	(0.096)	(4.813)
$d_{After\ Brexit\ enforcement}$	0.419*	−1.290**	0.202*	−3.876
	(0.164)	(0.481)	(0.092)	(4.828)
Same FUA investments	0.038***	0.031**	0.110***	2.197
	(0.003)	(0.011)	(0.013)	(1.285)
Domestic investments	0.002	0.011	−0.013	1.067
	(0.002)	(0.01)	(0.009)	(0.693)
GDP per capita growth	−0.004	0.037	0.008	0.086
	(0.019)	(0.03)	(0.011)	(0.474)
Founding member country	0.063		0.242**	
	(0.147)		(0.083)	
Communist country	−0.003		−0.188	
	(0.231)		(0.241)	
Constant	−0.977***	0.086	0.717**	−42.808
	(0.144)	(0.393)	(0.268)	(32.612)
N. obs.	4520	660	4520	660
N. FUA	417	63	417	63

Note: The table reports Zero-inflated negative binomial estimates on the number of deals (Columns I and II) and Heckman estimates on the total amount invested (Columns III and IV). Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** < 0.001, significance level.

[14] As a robustness check, we also included FDI figure of a nation indicate the amount of international activities since an organization within a country that is highly involved with international markets is more likely to seek out investment opportunities outside of the focal country. Several studies have empirically demonstrated the importance of FDI to economic growth (e.g., Bengoa and Sanchez-Robles, 2003; Borensztein et al., 1998). Using FDI significantly reduces the number of observations since FDI figures are available from 2013 on. Results, that are very similar to those discussed in Section 5, are not reported in the text for the sake of brevity but are available from the authors upon request.

[15] As robustness check, one may wonder whether the crisis related to COVID may affect our results. For this purpose, we excluded 2021 data on investments, thus reducing the post-enforcement observation period. Results, that remain unchanged respect to those discussed in the current section, are not reported in the text for the sake of brevity but are available from the authors upon request.

Brexit.

Hypothesis *H2* founds partial support. Consistent with expectations, EU VC hubs adjusted their investment strategies following Brexit enforcement. However, contrary to our hypothesis, we found that EU VC hubs significantly increased the number and the total volume of cross-regional investments toward UK startups. This unexpected result aligns with recent literature examining other post-Brexit dynamics, particularly in the context of trade flows, which highlights an asymmetry in adjustment patterns, with reductions in exchange being less pronounced for EU players compared to their UK counterparts (Kren and Lawless, 2024). We further explore this result in the following sections. We tested the difference between the $d_{After\ Brexit\ enforcement}$ and $d_{After\ Brexit\ announcement}$ coefficients to assess if any additional reduction in cross-regional investments occurred for the UK VC hubs at the enforcement. However, the difference was not statistically significant, suggesting that UK VC hubs did not further adjust their cross-regional investment strategy after Brexit enforcement, confirming the reduction in deals observed after the Brexit announcement. Overall, these results provide partial confirmation of our Hypothesis *H2*: the enforcement of Brexit marked the shift from uncertainty to clarity, as the terms of the UK's departure were finalized. By this stage, UK-based VC investors, who had anticipated a *Hard Brexit* from the announcement, had already adjusted their investment strategies to account for heightened transaction costs and regulatory barriers. Consequently, Brexit enforcement did not trigger any additional changes among UK investors. For EU-based VC investors, however, the enforcement of Brexit brought the clarity needed to recalibrate their investment strategies. With the uncertainty resolved, they could more accurately assess the implications of Brexit for cross-regional investments.

5.2. Additional analysis and further robustness checks

This section presents additional analyses and robustness checks aimed at exploring the underlying mechanisms behind the results of our main model. These analyses are motivated by an unexpected result: following Brexit enforcement, EU VC hubs significantly increased the number of cross-regional investments toward UK startups. While this result contrasts with our initial expectations, multiple plausible explanations may account for this shift in investment patterns. First, Brexit may have weakened the fundraising capacity of UK VC firms, by reducing the size and the number of domestic VC funds and creating a void subsequently filled by EU investors. These difficulties stem from the uncertainty and institutional fragmentation triggered by Brexit, which likely heightened the perceived risk of UK-based funds, particularly among EU institutional investors. Second, there may have been an increase in syndication between UK and EU VC funds post-enforcement, as cross-border partnerships offer a strategic response to mitigate the trade barriers introduced by Brexit. By partnering with EU-based investors, UK startups may gain easier access to European markets and reduce political and market uncertainty. As a side effect this would lead to an increased demand for investment from EU investors driven by UK ones. Third, Brexit-induced transaction costs and reduced EU market access may have led to lower valuations for UK startups, making them relatively more attractive to EU investors. These investors, often possessing broader international networks and operational knowledge across jurisdictions, may offer a comparative advantage to portfolio companies navigating post-Brexit challenges (Lavery et al., 2023). Lower valuations, combined with these strategic advantages, may have more than offset the increased entry costs for EU investors. Finally, UK VC funds may have concentrated their activity in specific investment stages, leaving other segments underserved and thus creating new opportunities for EU funds to step in. To test these mechanisms, we collected additional investor-level and deal-level data sourced from PitchBook, covering the period from 2007 to 2022. The dataset includes detailed information on venture capital investments involving investors and companies based in the UK and EU. Depending on the specific analysis, data are examined either at the deal level, capturing individual investment transactions, or at the investor level, to assess VC firms' behavior and trends.

5.2.1. Fundraising capacity

To explore the mechanism related to fundraising capacity, we conducted an analysis comparing UK VC firms based on their founding period: before the Brexit announcement, between the announcement and enforcement, and after enforcement. We examine two key indicators of fundraising strength, assets under management (AUM) and the number of funds opened by each firm. The results reported in Table 7 suggest that VC firms founded after Brexit enforcement manage significantly lower assets and operate fewer funds compared to those established prior to Brexit, indicating a weakening in fundraising capacity among newer UK investors in the post-Brexit period. This result is compatible with the view that EU VC firms increased their presence in the UK following Brexit enforcement because of a contraction of domestic supply of capital. This view is supported by a survey of European venture capital firms conducted by the EIF (Kraemer-Eis et al., 2018), which found that 38 % of UK VC firms expected the fundraising environment to deteriorate following Brexit, more than three times the share of European VC firms (12 %) expressing the same concern. Similar concerns on a slowdown in the amounts received by UK funds were expressed in 2018 by the British Private Equity & Venture Capital Association (BVCA) in response to an inquiry by EIB.[16] This interpretation is further corroborated by descriptive statistics from Invest Europe (2019, 2023) that confirm that the share of total fundraising by UK-based VC funds relative to their EU counterparts declined steadily following Brexit.

5.2.2. Syndication between EU and UK VC funds

To further investigate the mechanisms behind the increased EU investment activity in the UK following Brexit enforcement, we examine the composition of VC syndicates for deals involving a startup in UK over time. In particular, we distinguish between solo and syndicated deals and identify cross-border syndicates as those involving at least one UK-based and one EU-based investor. The descriptive statistics provided in

Table 7
Estimate results on fundraising capacity of UK investors.

	UK investors			
	Asset Under Management		n. funds open	
VC firm founded between Brexit announcement and enforcement	−840.786	**	−0.771	*
	(1002.439)		(0.349)	
VC firm founded after Brexit enforcement	−2170.008	*	−0.997	***
	(1045.444)		(0.284)	
Constant	2406.609	***	2.151	***
	(531.714)		(0.17)	
N. UK investors	409		174	

Note: The table reports OLS estimates with dependent variable the total Asset Under Management and the number of funds open by each UK VC firms. Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

[16] Written evidence submitted to the House of Lords EU Financial Affairs Sub-Committee inquiry "Brexit: The European Investment Bank" (EIB0009). https://committees.parliament.uk/writtenevidence/94876/html.

Table 8 reveal a notable rise in cross-border syndication post-Brexit enforcement: the share of deals involving both UK and EU investors increased from 11.34 % pre-Brexit to 14.99 % after the announcement, and further to 20.84 % following enforcement. At the same time, the number of deals involving only UK investors decreased steadily. These trends suggest that syndication between UK and EU investors may have been used strategically to mitigate the barriers introduced by Brexit by providing startups with a gateway to both regions.

The growing role of cross-border syndication is confirmed by the results of a multinomial logit model (Table 9), which analyzes deals involving UK startups and uses solo EU investor deals as the reference category. The results confirm that the likelihood of cross-border syndication between UK and EU investors in deals involving UK startups increases, while the likelihood of deals involving only UK investors, both solo and syndicated, declines. This pattern reinforces the idea of an adaptive investor response aimed at preserving access to cross-market opportunities and reducing the frictions introduced by Brexit. The increased demand for cross-border syndication for deals in UK ventures, might be an additional mechanism that contributed to an increase of cross-border VC activity in UK from EU investors.

5.2.3. Deal valuation and stage composition

Finally, to explore whether changes in deal valuation and stage composition explain the post-Brexit investment dynamics, we analyze deals involving UK startups and UK investors. Results of these analyses are reported in Table 10. More in detail, in Column I, we resort to an OLS estimator using deal valuation as dependent variable, while in Column II we resort to a probit estimator using a dummy indicating seed and early-stage VC deals as dependent variable. In both models we control for the number of co-investors investing in the deal and a dummy indicating whether the specific round of financing is a following round. The results indicate that, contrary to expectations, deal valuations did not decline following Brexit announcement or enforcement. We find a notable change in investment stage composition. The negative and statistically significant coefficient on the post-enforcement dummy in Column II indicates that UK investors reduced their participation in early-stage deals after Brexit enforcement, redirecting their focus toward later-stage or follow-on investments. This result is further corroborated by the significant increase in average deal valuations observed in the same period, as shown in Column I. This strategic reorientation suggests that UK VC funds, rather than withdrawing from the market, concentrated their resources on supporting existing portfolio companies. Importantly, this shift may have opened space for EU investors to step in at earlier stages—potentially contributing to the observed rise in EU cross-border investment activity in the UK following Brexit enforcement.

Table 8
UK investment breakdown by national and international investors (solo and syndicated deals).

	Pre Brexit	Post Brexit Announcement	Post Brexit Enforcement	Total
Cross border syndicates: UK and EU investors	601 11.34 %	576 14.99 %	2.572 20.84 %	3.749 17.45 %
Only EU investors: no syndication	296 5.59 %	271 7.05 %	1.083 8.77 %	1.650 7.68 %
Only EU investors: syndicated deals	116 2.19 %	107 2.78 %	399 3.23 %	622 2.90 %
Only UK investors: no syndication	2.340 44.17 %	1.530 39.81 %	4.316 34.97 %	8.186 38.10 %
Only UK investors: syndicated deals	1.945 36.71 %	1.359 35.36 %	3.973 32.19 %	7.277 33.87 %
Total	5.298 100.00 %	3.843 100.00 %	12.343 100.00 %	21.484 100.00 %

Table 9
Estimate results on cross border syndication.

	Multinomial logit (Base outcome: Only EU investors: no syndication)	
International syndicates: UK and EU investors		
$d_{After\ Brexit\ announcement}$	0.056	
	(0.102)	
$d_{After\ Brexit\ enforcement}$	0.21	**
	(0.081)	
GDP	−0.024	***
	(0.007)	
Constant	0.734	***
	(0.071)	
Only EU investors: syndicated deals		
$d_{After\ Brexit\ announcement}$	0.011	*
	(0.158)	
$d_{After\ Brexit\ enforcement}$	−0.023	
	(0.127)	
GDP	−0.01	
	(0.011)	
Constant	−0.926	***
	(0.11)	
Only UK investors: no syndication		
$d_{After\ Brexit\ announcement}$	−0.318	***
	(0.09)	
$d_{After\ Brexit\ enforcement}$	−0.642	***
	(0.072)	
GDP	−0.043	***
	(0.006)	
Constant	2.111	***
	(0.062)	
Only UK investors: syndicated deals		
$d_{After\ Brexit\ announcement}$	−0.252	**
	(0.091)	
$d_{After\ Brexit\ enforcement}$	−0.519	***
	(0.073)	
GDP	−0.042	***
	(0.006)	
constant	1.925	***
	(0.063)	
N. deals	19,770	

Note: The table reports multinomial logit estimates. Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance levels.
** $p < 0.01$, significance levels.
*** $p < 0.001$, significance levels.

5.2.4. Firm-level analysis

Our primary objective is to understand how different VC hubs, rather than individual VC firms, have adjusted their relevance and investment patterns in response to Brexit, given that the hub-level perspective allows us to capture broader regional shifts shaped by institutional, economic, and policy environments. However, to ensure the robustness and validity of our findings, we also replicated our analysis at the firm level. We replicated the model discussed in Table 6 adding some control variables at investor and year level: the age of the investor (in logs), the median round amount, the number of funds managed by the investor and the number of co-invested deals. The results, reported in Table 11, consistent with the main model, confirm that the observed patterns hold even when analysis at the level of individual VC firms.

5.3. Post-hoc analyses

Even though it is not at the core of our research question, a direct extension of our analysis examines whether the observed changes in cross-regional investment activity were accompanied by any variations in intra-regional investments. To this aim, we estimated Model [1] using domestic VC investments as dependent variable. More in details,

Table 10
Estimate results on deal valuation and investment stage in UK deals.

	Deal valuation		Early stage deal	
	I		II	
$d_{After\ Brexit\ announcement}$	0.903		0.165	***
	(15.716)		(0.031)	
$d_{After\ Brexit\ enforcement}$	35.79	**	−0.111	***
	(12.886)		(0.024)	
n. investors	7.832	**	0.024	***
	(2.906)		(0.006)	
Following round	35.584	**	−0.881	***
	(12.348)		(0.026)	
Constant	−25.482	*	1.068	***
	(14.631)		(0.028)	
N. deals	11,438		17,584	

Note: The table reports OLS and probit estimates, respectively in column I and II. Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

domestic investment activity is proxied by the number of VC deals performed by a FUA in startups located in the same country or the total amount invested in domestic deals. The independent variables are the same as already described. The only difference pertains control variable: we control for the yearly number of same FUA VC deals measuring the VC activity intensity that take place into the boundaries of the focal hub as in Model 1 and, when estimating domestic investments, for the yearly number of international VC deals, measuring the VC activity intensity that take place out of the boundaries of the focal country. Moreover, for EU VC hubs, to complete the picture of intra-regional investments, we also consider the investments toward other EU FUAs but UK outside of the domestic markets by resorting to Model [1] in which we use the number of deals and the total amount invested toward other EU FUAs but UK as dependent variables.

Results of these estimates are reported in Table 12. More in details, Column I, II, and III report the results of the model with the number of investments as dependent variable, while Column IV, V, and VI are related to the total amount invested. Column I and II (and Column IV and V for the total amount invested) refer to EU VC hubs focusing respectively on domestic deals and deals toward foreign EU FUAs, while Column III (and Column VI for the total amount invested) focuses on domestic deals by UK VC hubs. Again, we resort to a zero-inflated negative binomial regression in Column I-III, while, in Column IV-VI, we resort to a Heckman regression. Results of first stage regressions are reported in the Appendix A (Table A2).

Following the Brexit announcement, no significant variations were detected in terms of either the number of domestic investments or the total amount invested, both for EU and UK VC hubs. The only exception is related to the total investment amount by the EU VC hubs when investing toward startups located in other EU countries. This result is consistent with the idea that EU investors appear to have compensated for the reduced participation of UK VC funds in EU markets by increasing the amount invested in EU-based startups. It is worth noting that, in this market, EU investors do not face any uncertainty considering that the possible trade barriers would have been created between EU and UK and not among EU countries.

After Brexit enforcement, UK VC hubs responded by focusing more

Table 11
Estimate results of the replication of the main model at investor level.

	Nr. Investments				Amount invested			
	EU FUAs		UK FUAs		EU FUAs		UK FUAs	
	(I)		(II)		(III)		(IV)	
$d_{After\ Brexit\ announcement}$	0.125		−0.171	*	3.434		40.818	
	(0.106)		(0.076)		(2.497)		(26.292)	
$d_{After\ Brexit\ enforcement}$	0.297	**	−0.219	*	6.264	**	46.956	
	(0.094)		(0.11)		(2.083)		(28.426)	
Domestic investments	−0.019	**	−0.248	***	0.108	***	0.241	
	(0.006)		(0.028)		(0.009)		(0.219)	
International investments toward other EU countries	0.031				1.089	***		
	(0.029)				(0.008)			
GDP per capita growth	0.035	***	0.029		0.328		8.508	
	(0.007)		(0.028)		(0.227)		(6.682)	
Founding member country	0.045				3.508	*		
	(0.068)				(1.703)			
Communist country	0.062				−0.824			
	(0.149)				(4.739)			
Investor age (log)	−0.02		0.041		−0.899		−3.659	
	(0.048)		(0.042)		(0.959)		(10.751)	
Median round amount	−0.003	*	0.002		0.398	***	5.821	***
	(0.002)		(0.002)		(0.073)		(1.444)	
n. funds	−0.135		−0.403	*	1.93		123.882	
	(0.121)		(0.190)		(4.842)		(110.470)	
n. coinvested deals	0.092	***	0.276	***	0.726	***	11.799	*
	(0.018)		(0.028)		(0.145)		(5.346)	
Constant	−1.175	***	0.135		−9.456		−557.371	
	(0.217)		(0.256)		(5.684)		(369.169)	
N. obs.	28,026		5832		28,026		5832	
	2.951		953		2.951		953	
Enforcement - announcement	0.172	**	−0.048		2.830		6.138	
	(0.081)		(0.117)		(2.116)		(20.136)	

Note: The table reports Zero-inflated negative binomial estimates on the number of deals (Columns I and II) and Heckman estimates on the total amount invested (Columns III and IV). Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

Table 12
Estimate results on intra-regional investments.

	nr. VC investments			Amount invested		
	EU FUAs		UK FUAs	EU FUAs		UK FUAs
	Domestic investments	Investments toward other EU countries	Domestic investments	Domestic investments	Investments toward other EU countries	Domestic investments
	(I)	(II)	(III)	(IV)	(V)	(VI)
$d_{After\ Brexit\ announcement}$	−0.129	0.219	0.236	0.257	1.204***	1.779
	(0.099)	(0.152)	(0.161)	(0.393)	(0.354)	(1.243)
$d_{After\ Brexit\ enforcement}$	−0.056	0.348*	0.437*	0.968*	1.322***	5.051**
	(0.097)	(0.139)	(0.177)	(0.398)	(0.339)	(1.238)
Same FUA investments	0.036***	0.029***	0.021**	0.637***	0.387***	0.340
	(0.002)	(0.002)	(0.008)	(0.067)	(0.048)	(0.242)
International investments	0.006		0.002	0.309***		0.716**
	(0.004)		(0.013)	(0.035)		(0.126)
Domestic investments		0.003			0.034	
		(0.002)			(0.033)	
GDP per capita growth	0.009	0.004	−0.002	0.026	0.015	0.073
	(0.012)	(0.02)	(0.015)	(0.046)	(0.04)	(0.118)
Founding member country	0.973***	0.094		3.092***	0.386	
	(0.077)	(0.133)		(0.320)	(0.305)	
Communist country	−0.17	0.028		−2.848*	−1.35	
	(0.242)	(0.296)		(1.249)	(0.891)	
Constant	1.591***	0.553***	2.542***	4.438***	2.651**	7.116*
	(0.068)	(0.133)	(0.09)	(0.694)	(0.989)	(2.164)
N. obs.	4520	4520	660	4520	4520	660
N. FUA	417	417	63	417	417	63

Note: The table reports Zero-inflated negative binomial estimates on the number of deals (Columns I, II and III) and Heckman estimates on the total amount invested (Columns IV, V and VI). Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

on the domestic market, increasing the number of deals in UK startups and the total investment volume. Similarly, EU VC hubs became more actively engaged in their own domestic markets, increasing the amount invested in startups located within their own country.[17] Similarly, at the enforcement, EU VC hubs increased the number of investments in other EU countries (by a factor of 1.416). The total amount invested in startups located in other EU countries remains positive and significant compared to the pre-Brexit period. However, a test of differences shows that EU VC hubs continue their strategy of compensating for the reduced presence of UK investors in EU markets, with no significant change from the post-Brexit announcement period. When considered alongside the main model results, which highlight a strategic adjustment by UK investors at the announcement stage, these findings suggest that the void left by UK investors in the EU VC market was partly filled by EU VC hubs during the post-announcement period, as they increased the total amount invested in EU-based startups. This adjustment was further reinforced at Brexit enforcement, when EU VC hubs expanded their investment activity, by increasing the total investment amount in their domestic market and the number of investments in other EU countries.

Finally, considering the finding that both EU and UK VC hubs increased their investment activity in the UK, we examined whether UK VC hubs experienced changes in their domestic market share following Brexit. Specifically, we analyzed the share of investments directed toward UK startups by UK VC investors relative to the total investments received by UK startups from both UK and EU investors. To do so, we employed a Tobit model, estimating the share of investments in terms of both the number of deals (Column I of Table 13) and the total amount invested (Column II of Table 13).

The results presented in Table 13 reveal that the reduction in cross-regional investment activity by UK VC hubs at the announcement was not matched by a proportional increase in domestic market investment activity. At the announcement, we do not observe any market share variation for UK VC hubs either in terms of number of investments nor in the total amount invested. Post-Brexit enforcement, we detected a reduction in the share of VC deals conducted by UK VC hubs in their

Table 13
Estimate results on the share of UK VC hubs investments toward UK startups.

	Nr. VC investments	Amount invested
	(I)	(II)
$d_{After\ Brexit\ announcement}$	−0.033	−0.029
	(0.017)	(0.017)
$d_{After\ Brexit\ enforcement}$	−0.044*	−0.025
	(0.017)	(0.017)
Same FUA investments	0.009***	0.008*
	(0.001)	(0.002)
International investments	−0.007**	0.021**
	(0.002)	(0.003)
GDP per capita growth	−0.001	−0.002
	(0.002)	(0.002)
Constant	−0.045***	−0.051**
	(0.01)	(0.010)
N. obs.	660	660
N. FUA	63	63

Note: The table reports Tobit estimates (Columns I, II). Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.
* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

[17] We also estimate whether Brexit engendered some significant effects in terms of same FUA investments (i.e. investments performed by VC investors in startups located in the same FUA). Results do not indicate any significant effect, for both EU and UK investors in terms of investments performed in the same FUA. These estimates are not reported in the text for the sake of brevity but are available from the authors upon request.

domestic market. This suggests that the increase in domestic activity was offset by a stronger presence of EU VC investors in the UK market after 2019. Overall, these findings raise concerns about the future role of UK VC hubs in maintaining dominance within their own domestic market.

6. Conclusions

Since its announcement, Brexit has animated a lively academic debate regarding its potential implications for the VC market (Wright et al., 2016; Cumming and Zahra, 2016; Alvarez-Garrido and Alcácer, 2023). In this study, we provide an assessment of the actual impact of Brexit on the VC markets investigating how the cross-regional activity of VC hubs in EU and UK, in terms of number of deals and total amount invested, has changed following Brexit announcement and enforcement.

We found that, following the Brexit announcement and before Brexit enforcement, UK VC hubs experienced an immediate decrease in the number of cross-regional investments. Remarkably, post-Brexit enforcement, no further changes were detected for UK VC hubs, suggesting the ability for investors operating within these hubs to anticipate the changes induced by the actual EU exit. In contrast, in the EU, VC hubs exhibited different dynamics. Post-announcement, EU VC hubs have not changed their investment activity toward UK startups, consistently with the view that these actors experienced higher uncertainty that motivated a wait-and-see strategy. Post-enforcement EU VC hub increased their activity toward UK startups. Our findings suggest a substitution effect among EU and UK VCs. In summary, Brexit has profoundly impacted the VC market, resulting in contrasting investment behavior within both the UK and the EU. These results align with the idea that Brexit has prompted concerns among market participants regarding the fragmentation of the VC market, leading to expected heightened transaction costs for cross-regional investments between UK and EU. At the Brexit announcement, these concerns were higher for investors in UK VC hubs who had more information to anticipate the *Hard Brexit* scenario and accordingly reduced their cross-regional investment activity immediately. Their behavior left investment opportunities available for investors in EU VC hubs, who, accordingly, increased their investment activity within EU following Brexit.

This study complements existing research on the impact of Brexit on the venture capital market. Notably, Alvarez-Garrido and Alcácer (2023) examine startup-level investment inflows across regions and industries, emphasizing institutional mechanisms and reporting a general decline in investments in UK startups, particularly in highly regulated sectors. In contrast, our study adopts the perspective of capital providers, EU and UK VC investors, and investigates how their cross-border investment activity evolved following Brexit. By analyzing capital flows from the standpoint of investors, our study provides a supply-side view that complements the demand-side focus of existing research. Taken together, these perspectives offer a more comprehensive understanding of how different actors within the venture capital ecosystem responded to the institutional disruption caused by Brexit. Our findings underscore the nuanced and multifaceted impact of Brexit on the VC landscape, highlighting the importance of region-specific analyses, and pave the way for research in multiple directions. First, while in this paper we identify two treatments periods, namely Brexit announcement and enforcement, our analysis primarily focuses on short-term effects post-enforcement. As the post-Brexit landscape continues to evolve, further research could delve into the long-term effect of Brexit on investment flows and competitive dynamics within the European VC market. Second, our analysis suggests a substitution effect between UK and EU VC hubs in terms of number of investments and amount invested. However, it leaves unanswered questions regarding the implications of Brexit on the quality of investors operating in the focal FUA pre- treatment versus post-treatment. Future research could investigate whether the investors located in UK VC hubs who left the EU markets are comparable to the EU ones in terms of their ability to select and provide value to promising startups. Third, our analysis provides an extensive perspective on how UK and EU VC market have been affected by Brexit, however, it did not analyze heterogeneity among startups in terms of stage of investments or industrial sectors. Further analysis might investigate whether the results described in this work are homogenous when such differences are taken into account. Similarly, we do not account for heterogeneity at the VC firm level, such as differences in fund size, specialization, or international experience. These elements may also shape responses to institutional shocks like Brexit and represent important directions for future research. Finally, another promising area for future research concerns the choice of treating EU as of a homogeneous market in our analysis. While this choice is consistent with the framing of the Brexit debate, which centered around the UK's departure from the European Single Market, as well as with the broader EU policy objective of fostering a more integrated and unified capital market, we acknowledge that significant cross-country differences exist in terms of environmental policies (Croce and Bianchini, 2022), governmental intervention (Testa et al., 2024), and broader national innovation strategies (Sunley et al., 2005), within EU. These national-level differences may have played an important role in shaping the distribution of VC investments following Brexit. A more granular investigation into how national-level policy frameworks interact with institutional shocks could complement our analysis and offer valuable insights into the reconfiguration of investment flows across Europe and the mechanisms driving investor behavior.

Our results provide important implications for policymakers, investors, and entrepreneurs, who must remain alert in monitoring the evolving post-Brexit landscape and adapting strategies accordingly. Policymakers in both the UK and the EU should closely monitor the dynamics of the VC market post-Brexit. Understanding how VC hubs are responding to Brexit regulatory changes can inform future policy initiatives aimed at fostering innovation and entrepreneurship. Our results suggest that Brexit created new barriers and frictions to cross border investment between EU and UK. While consistent with the *Hard Brexit* scenario, these results also raise concerns about the integrity of the European market (Alvarez-Garrido and Alcácer, 2023) and its ability to foster entrepreneurship in both the EU and the UK. Relatedly, a significant finding specific to the UK is the reduction in the relevance of UK VC hubs in the international market and domestic markets. Policymakers in the EU and the UK may welcome this differently: while it may suggest a diminishing relevance for the UK in the VC market, it presents new opportunities for EU VC hubs to strengthen their international position. Our study also offers valuable insights for practitioners. VC firms should be aware that cross-regional investments from UK investors have decreased following Brexit. While this may create opportunities for EU VCs, it may also complicate syndication among VC firms operating in different markets (EU and UK). Given the growing importance of syndication between European and UK VC funds (Arundale, 2020), this result highlights the need to develop new investment strategies to navigate the challenges posed by Brexit. Similarly, startups in EU should be aware of the reduced opportunity to receive investments from UK investors. If a startup aims to penetrate the UK market and leverage VC investments from UK investors to achieve this goal, Brexit may have made this plan more complex.

In conclusion, our analysis of the post-Brexit VC market has revealed

a significantly different landscape compared to the pre-Brexit scenario and has highlighted dramatic changes in the entrepreneurial finance ecosystem in Europe. Addressing the new challenges presented by Brexit will be crucial to contribute to growth in both the UK and the EU.

CRediT authorship contribution statement

Andrea Odille Bosio: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Vicenzo Butticè:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Andrea Crisanti:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Annalisa Croce:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Simone Signore:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The research team acknowledges and is grateful to Invest Europe for providing access to the European Data Cooperative (EDC) dataset. The authors declare that they received no financial support for the research, authorship, and/or publication of this article.

Appendix A. First stage regressions

This section presents additional analyses that have been instrumental in informing and supporting the development of our main empirical model. Although these analyses fall beyond the core scope of our research questions, they provide important insights into key modeling choices and data patterns. Specifically, we report the first-stage estimates of the zero-inflated negative binomial (ZINB) model and Heckman regressions used in our main analysis. This first-stage component estimates the likelihood that a VC hub has zero international investments in ZINB model and non-zero total amount invested in international deals in Heckman model, helping to account for excess zeros in the data and ensuring proper specification of the model.

Table A1
First stage of Zero Inflated Negative Binomial and Heckman regressions on cross-region investments.

	Nr. VC investments		Amount invested	
	EU FUAs	UK FUAs	EU FUAs	UK FUAs
	(I)	(II)	(III)	(IV)
$d_{After\ Brexit\ announcement}$	−0.467	−0.623	0.014	0.008
	(0.289)	(0.564)	(0.069)	(0.261)
$d_{After\ Brexit\ enforcement}$	0.057	−0.315	0.076	−0.214
	(0.261)	(0.786)	(0.067)	(0.325)
% of yearly international investments at country level	−2.32	6.095	4.713***	−4.414
	(2.059)	(10.551)	(0.544)	(5.46)
Same FUA investments	−1.016***	−0.164	0.156***	0.140***
	(0.432)	(0.127)	(0.01)	(0.024)
Domestic investments	−0.917***	−0.015	0.087***	0.062***
	(0.238)	(0.025)	(0.005)	(0.01)
GDP per capita growth	−0.083*	0.01	0.011	0.003
	(0.033)	(0.038)	(0.008)	(0.021)
Founding member country	0.32		−0.435***	
	(0.264)		(0.065)	
Communist country	−0.194		0.744***	
	(0.479)		(0.165)	
Constant	2.265***	0.731	−1.625***	−1.568***
	(0.27)	(1.3)	(0.055)	(0.476)
ln(alpha)	1.372***	0.273	−0.222	20.401
	(0.088)	(0.41)	(0.157)	(14.505)
N. obs.	4520	660	4520	660
N. FUA	417	63	417	63

Note: The table reports first stage regressions of Zero-inflated negative binomial estimates on the number of deals (Columns I and II) and first stage regressions of Heckman estimates on the total amount invested (Columns III and IV). Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.

* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

Table A2
First stage of Zero Inflated Negative Binomial and Heckman regressions on intra-regional investments.

	nr. VC investments			Amount invested		
	EU FUAs	EU FUAs	UK FUAs	EU FUAs	EU FUAs	UK FUAs
	Domestic investments	Investments toward other EU countries	Domestic investments	Domestic investments	Investments toward other EU countries	Domestic investments
	(I)	(II)	(III)	(IV)	(V)	(VI)
$d_{After\ Brexit\ announcement}$	0.212*	−0.134	0.242	−0.156**	0.014	−0.182
	(0.146)	(0.133)	(0.189)	(0.055)	(0.069)	(0.147)
$d_{After\ Brexit\ enforcement}$	0.248**	−0.018	0.334	−0.219***	0.076	−0.232
	(0.083)	(0.127)	(0.184)	(0.055)	(0.067)	(0.145)
% of yearly investments at country level	−2.077***	−1.017	−1.166	2.966***	4.713***	−2.285
	(0.309)	(1.291)	(3.66)	(0.282)	(0.544)	(3.075)
Same FUA investments	−1.663***	−0.318	−1.969***	0.378***	0.156***	0.360***
	(0.173)	(0.192)	(0.437)	(0.018)	(0.010)	(0.050)
International investments	−1.406***		−0.696	0.074***		0.184*
	(0.184)		(1.359)	(0.009)		(0.077)
Domestic investments		−0.509***			0.087***	
		(0.11)			(0.005)	
GDP per capita growth	0.005	−0.031	0.017	−0.007	0.011	−0.018
	(0.010)	(0.017)	(0.019)	(0.006)	(0.008)	(0.014)
Founding member country	−0.063	0.240		−0.019	−0.435***	
	(0.081)	(0.149)		(0.052)	(0.065)	
Communist country	1.468	−0.657*		−0.222	0.744***	
	(0.766)	(0.323)		(0.172)	(0.165)	
Constant	1.087***	1.680***	0.830	−0.795***	−1.625***	−0.130
	(0.070)	(0.122)	(0.522)	(0.042)	(0.055)	(0.486)
ln(alpha)	0.512***	1.227***	−0.006	−2.895***	−0.564	−0.611
	(0.037)	(0.103)	(0.14)	(0.600)	(0.579)	(2.063)
N. obs.	4520	4520	660	4520	4520	660
N. FUA	417	417	63	417	417	63

Note: The table reports first stage regressions of Zero-inflated negative binomial estimates on the number of deals (Columns I, II and III) and first stage regressions of Heckman estimates on the total amount invested (Columns IV, V and VI). Robust standard errors in parentheses. Coefficients and standard errors have been rounded to three decimal places.

* $p < 0.05$, significance level.
** $p < 0.01$, significance level.
*** $p < 0.001$, significance level.

Data availability

The authors do not have permission to share data.

References

Ahmad, S., Limão, N., Oliver, S., Shikher, S., 2023. Brexit uncertainty and its (dis) service effects. Am. Econ. J. Econ. Pol. 15 (4), 459–485. https://doi.org/10.1257/pol.20200808.

Alexandre-Collier, A., Schnapper, P., Usherwood, S. (Eds.), 2022. The Nested Games of Brexit. Routledge. https://doi.org/10.4324/9781003291770.

Alhorr, H.S., Moore, C.B., Payne, G.T., 2008. The impact of economic integration on cross–border venture capital investments: evidence from the European Union. Entrep. Theory Pract. 32 (5), 897–917. https://doi.org/10.1111/j.1540-6520.2008.00261.x.

Alvarez-Garrido, E., Alcácer, J., 2023. Deglobalization and Entrepreneurial Investment: The Natural Experiment of Brexit. Harvard Business School Strategy Unit Working Paper, (24-017). https://doi.org/10.2139/ssrn.4608527.

Amuedo-Dorantes, C., Romiti, A., 2024. International student applications in the UK after Brexit. J. Econ. Geogr. 24 (5), 637–662. https://doi.org/10.1093/jeg/lbae019.

Arundale, K., 2020. Syndication and cross-border collaboration by venture capital firms in Europe and the USA: a comparative study. Ventur. Cap. 22 (4), 355–376. https://doi.org/10.1080/13691066.2020.1847414.

Asimakopoulos, P., 2020. What Do EU Capital Markets Look like on the Other Side of Brexit. New Financial.

Bellucci, A., Gucciardi, G., Nepelski, D., 2021. Venture Capital in Europe: Evidence-Based Insights about Venture Capitalists and Venture Capital-Backed Firms. JRC technical report, European Commission. https://doi.org/10.2760/076298.

Bengoa, M., Sanchez-Robles, B., 2003. Foreign direct investment, economic freedom and growth: new evidence from Latin America. Eur. J. Polit. Econ. 19 (3), 529–545. https://doi.org/10.1016/S0176-2680(03)00011-9.

Bloom, N., Bunn, P., Chen, S., Mizen, P., Smietanka, P., Thwaites, G., Young, G., 2018. Brexit and uncertainty: insights from the decision maker panel. Fisc. Stud. 39 (4), 555–580. https://doi.org/10.1111/1475-5890.12179.

Bloom, N., Bunn, P., Chen, S., Mizen, P., Smietanka, P., Thwaites, G., 2019. The impact of Brexit on UK firms (wp 26218). National Bureau of Economic Research. https://doi.org/10.3386/w26218.

Borchardt, A., Simon, F., Bironzo, D., 2018. Interested but not engaged: how Europe's media cover Brexit. Reuters Institute for the Study of Journalism 1–57. https://ora.ox.ac.uk/objects/uuid:8a9e1d27-cb47-4269-84f0-cdc7b1277adb.

Borensztein, E., De Gregorio, J., Lee, J.W., 1998. How does foreign direct investment affect economic growth? J. Int. Econ. 45 (1), 115–135. https://doi.org/10.1016/S0022-1996(97)00033-0.

Breinlich, H., Leromain, E., Novy, D., Sampson, T., 2020. Voting with their money: Brexit and outward investment by UK firms. Eur. Econ. Rev. 124, 103400. https://doi.org/10.1016/j.euroecorev.2020.103400.

Brewster, C., Fontinha, R., Haak-Saheem, W., Lamperti, F., Walker, J., 2023. Linking embeddedness to physical career mobility: how Brexit affected the preference of business, economics and management academics for leaving the UK. Research Policy 52 (9), 104855. https://doi.org/10.1016/j.respol.2023.104855.

Brown, R., Liñares-Zegarra, J., Wilson, J.O., 2019. The (potential) impact of Brexit on UK SMEs: regional evidence and public policy implications. Regional Studies 53 (5), 761–770. https://doi.org/10.1080/00343404.2019.1597267.

Buigut, S., Kapar, B., 2023. How did Brexit impact EU trade? Evidence from real data. The World Economy 46 (6), 1566–1581. https://doi.org/10.1111/twec.13419.

Caporale, G.M., Gil-Alana, L., Trani, T., 2018. Brexit and uncertainty in financial markets. International Journal of Financial Studies 6 (1), 21. https://doi.org/10.3390/ijfs6010021.

Chen, H., Gompers, P., Kovner, A., Lerner, J., 2010. Buy local? The geography of venture capital. J. Urban Econ. 67 (1), 90–102. https://doi.org/10.1016/j.jue.2009.09.013.

Chen, G., Dong, J., Hu, J., Zhang, F., 2024. Regulatory institutional misalignment and cross-border acquisitions: evidence from an emerging-market country. J. Int. Bus. Stud. 55 (2), 172–193. https://doi.org/10.1057/s41267-023-00665-4.

Coakley, J., Hadass, L., Wood, A., 2009. UK IPO underpricing and venture capitalists. Eur. J. Financ. 15 (4), 421–435. https://doi.org/10.1080/13518470802560915.

Coen, D., Katsaitis, A., 2021. Lobbying Brexit negotiations: who lobbies michel barnier? Politics and Governance 9 (1), 37–47. https://doi.org/10.17645/pag.v9i1.3666.

Colombo, M.G., d'Adda, D., Quas, A., 2019. The geography of venture capital and entrepreneurial ventures' demand for external equity. Research Policy 48 (5), 1150–1170. https://doi.org/10.1016/j.respol.2018.12.004.

Crisanti, A., Krantz, J., Lo Sordo, L., Pavlova, E., Signore, S., 2023. *The VC factor – gender lens edition: data-driven insights about European VC and its gender diversity trends*. Joint EIF – invest Europe study, online, published 24 October 2023. Retrieved from. https://www.investeurope.eu/media/7246/the-vc-factor-gender-lens-edition-2023-digital.pdf.

Croce, A., Bianchini, R., 2022. The role of environmental policies in promoting venture capital investments in cleantech companies. Review of Corporate Finance 2 (3), 587–616.

Cumming, D.J., Zahra, S.A., 2016. International business and entrepreneurship implications of Brexit. Br. J. Manag. 27 (4), 687–692. https://doi.org/10.1111/1467-8551.12192.

Cumming, D.J., Mohammadi, A., Zambelli, S., 2021. Misconduct risks, legal enforcement and venture capital networks. Eur. Financ. Manag. 28 (3), 607–650. https://doi.org/10.1111/eufm.12346.

Cumming, D.J., Kumar, S., Lim, W.M., Pandey, N., 2022. Mapping the venture capital and private equity research: a bibliometric review and future research agenda. Small Bus. Econ. 61 (1), 1–49. https://doi.org/10.1007/s11187-022-00684-9.

Dijkstra, L., Poelman, H., Veneri, P., 2019. The EU-OECD definition of a functional urban area. OECD Regional Development Working Papers, No. 2019/11. OECD Publishing, Paris. https://doi.org/10.1787/d58cb34d-en.

Dixit, A.K., Pindyck, R.S., 1994. Investment Under Uncertainty. Princeton University press, Princeton, New Jersey. https://doi.org/10.2307/j.ctt7sncv.

European Commission, 2023. Timeline - Post-Brexit agreements - Consilium. https://www.consilium.europa.eu/en/policies/post-brexit-agreements/timeline-post-brexit-agreements/.

European Council, 2023. Timeline - the EU-UK withdrawal agreement. European Council, pp. 12–44. Retrieved from. https://www.consilium.europa.eu/en/policies/eu-relations-with-the-united-kingdom/the-eu-uk-withdrawal-agreement/timeline-eu-uk-withdrawal-agreement/.

Faccini, R., Palombo, E., 2021. News uncertainty in brexit United Kingdom. American Economic Review: Insights 3 (2), 149–164. https://doi.org/10.1257/aeri.20200019.

Fisch, C., Meoli, M., Vismara, S., 2022. Does blockchain technology democratize entrepreneurial finance? An empirical comparison of ICOs, venture capital, and REITs. In *Innovative Behavior of Minorities, Women, and Immigrants,* Routledge 70–89.

Florida, R.L., Kenney, M., 1988. Venture capital-financed innovation and technological change in the USA. Res. Policy 17 (3), 119–137. https://doi.org/10.1016/0048-7333(88)90038-8.

Frenkel, M., Stefan, H., 2024. The impact of the Brexit referendum on greenfield foreign direct investments from countries within and outside the European single market. Appl. Econ. Lett. 31 (12), 1125–1128. https://doi.org/10.1080/13504851.2023.2176437.

Garnett, M., Lorenzoni, V., 2021. 23. British think tanks in the time of 'Brexit'. In: Handbook on Think Tanks in *Public Policy*, pp. 354–368. https://doi.org/10.4337/9781789901849.00036.

Goodman, P.S., 2016. Turbulence and uncertainty for the market after "Brexit". New York Times (24 June 2016). Retrieved from. https://www.nytimes.com/2016/06/25/business/international/brexit-financial-economic-impact-leave.html.

Graziano, A.G., Handley, K., Limão, N., 2021. Brexit uncertainty and trade disintegration. Econ. J. 131 (635), 1150–1185. https://doi.org/10.1093/ej/ueaa113.

Groh, A., Liechtenstein, H., Lieser, K., Biesinger, M., 2018. The Venture Capital and Private Equity Country Attractiveness Index 2018. University of Navarra, IESE Business School.

Guerini, M., Tenca, F., 2018. The geography of technology-intensive start-ups and venture capital: European evidence. Economia e Politica Industriale 45 (3), 361–386. https://doi.org/10.1007/s40812-018-0098-9.

Harrison, R.T., Mason, C.M., 2003. Public policy and the development of the informal venture capital market: UK experience and lessons for Europe. In: Industrial Policy in Europe. Routledge, pp. 199–223. https://doi.org/10.4324/9780203103098-23.

Harrison, R.T., Yohanna, B., Pierrakis, Y., 2020. Internationalisation and localisation: foreign venture capital investments in the United Kingdom. Local Econ. 35 (3), 230–256. https://doi.org/10.1177/0269094220924344.

Hassan, T.A., Hollander, S., Lent, L.V., Tahoun, A., 2024. The global impact of Brexit uncertainty. J. Financ. 79 (1), 413–458. https://doi.org/10.1111/jofi.13293.

House of Commons, 2021. Brexit timeline: events leading to the UK's exit from the European Union. https://commonslibrary.parliament.uk/research-briefings/cbp-7960/.

Hyder, A.S., Abraha, D., 2006. Strategic alliances in the Baltic States: a case of Swedish firms. Competitiveness Review: An International Business Journal 16 (3/4), 173–196. https://doi.org/10.1108/cr.2006.16.3_4.173.

Invest Europe, 2019. Investing in Europe: Private Equity Activity 2018. https://www.investeurope.eu/media/2585/invest-europe-2018-european-private-equity-activity.pdf.

Invest Europe, 2023. Investing in Europe: Private Equity Activity 2022. https://www.investeurope.eu/media/6719/investing-in-europe-pe-activity-2022-report.pdf.

Jensen, N.M., 2003. Democratic governance and multinational corporations: political regimes and inflows of foreign direct investment. Int. Organ. 57 (3), 587–616. https://doi.org/10.1017/S0020818303573040.

Johnson, M., 2017. Unpicking the "no deal is better than a bad deal" mantra: what would a 'bad deal' look like? LSE Brexit, online, published (8 June 2017). Retrieved from. https://blogs.lse.ac.uk/brexit/2017/06/08/unpicking-the-no-deal-is-better-than-a-bad-deal-mantra-what-would-a-bad-deal-look-like/.

Kellard, N.M., Kontonikas, A., Lamla, M., Maiani, S., 2022. Deal or no deal? Modelling the impact of Brexit uncertainty on UK private equity activity. British Journal of Management 33 (1), 46–68. https://doi.org/10.1111/1467-8551.12479.

Kortum, S., Lerner, J., 2001. Does venture capital spur innovation?. In: Entrepreneurial Inputs and Outcomes: New Studies of Entrepreneurship in the United States. Emerald Group Publishing Limited, pp. 1–44. https://doi.org/10.1016/S1048-4736(01)13003-1.

Kraemer-Eis, H., Botsari, A., Gvetadze, S., Lang, F., 2018. EIF VC survey 2018: fund managers' market sentiment and views on public intervention (EIF working paper 2018/48). In: European Investment Fund. No. 2018/48, p. 41. https://www.eif.org/news_centre/publications/EIF_Working_Paper_2018_48.htm.

Kren, J., Lawless, M., 2024. How has Brexit changed EU–UK trade flows? Eur. Econ. Rev. 161, 104634. https://doi.org/10.1016/j.euroecorev.2023.104634.

Lavery, P., Serena, J.M., Spaliara, M.E., Tsoukas, S., 2023. Private equity buyouts and exports: the impact of Brexit on UK firms. British Journal of Management 35 (1), 364–377. https://doi.org/10.1111/1467-8551.12716.

Levy, D., Aslan, B., Bironzo, D., 2016. UK press coverage of the EU referendum. Reuters Institute for the Study of Journalism, pp. 8–11. https://ora.ox.ac.uk/objects/uuid:8a0aac1f-8805-4ce4-96a8-207c1479c0c6.

Lynch, P., Whitaker, R., 2018. All Brexiteers now? Brexit, the conservatives and party change. Br. Polit. 13, 31–47. https://doi.org/10.1057/s41293-017-0064-6.

McGrattan, E.R., Waddle, A., 2020. The impact of Brexit on foreign investment and production. Am. Econ. J. Macroecon. 12 (1), 76–103. https://doi.org/10.1257/mac.20170399.

Menon, A., Fowler, B., 2016. Hard or soft? The politics of Brexit. Natl. Inst. Econ. Rev. 238 (1), 4–12. https://doi.org/10.1177/002795011623800110.

Scharpf, F., 1998. Negative and positive integration in the political economy of European welfare states. In: Rhodes, M., Mény, Y. (Eds.), The Future of European Welfare. Palgrave Macmillan, London. https://doi.org/10.1007/978-1-349-26543-5_8.

Schertler, A., Tykvová, T., 2011. Venture capital and internationalization. Int. Bus. Rev. 20 (4), 423–439. https://doi.org/10.1016/j.ibusrev.2010.07.009.

Sohns, F., Wójcik, D., 2020. The impact of Brexit on London's entrepreneurial ecosystem: the case of the FinTech industry. Environment and Planning A: Economy and Space 52 (8), 1539–1559. https://doi.org/10.1177/0308518X20925820.

Sunley, P., Klagge, B., Berndt, C., Martin, R., 2005. Venture capital programmes in the UK and Germany: in what sense regional policies? Reg. Stud. 39, 255–273. https://doi.org/10.1080/0034340052000321913.

Testa, G., Quas, A., Compañó, R., 2024. Governmental venture capital policies are not all alike: design features in 11 European countries. Venture Capital 1–40.

The Economist, 2018. How a soft Brexit differs from a hard one and why the ultimate Brexit may be a mixture of both. The Economist, online, published (25 June 2018). Retrieved from. https://www.economist.com/the-economist-explains/2018/06/25/how-a-soft-brexit-differs-from-a-hard-one.

Vandenbussche, H., Connell, W., Simons, W., 2022. Global value chains, trade shocks and jobs: an application to Brexit. World Econ. 45 (8), 2338–2369. https://doi.org/10.1111/twec.13259.

Walter, S., 2019. Better off without you? How the British media portrayed EU citizens in Brexit news. The International Journal of Press/Politics 24 (2), 210–232. https://doi.org/10.1177/1940161218821509.

Williamson, O.E., 1981. The economics of organization: the transaction cost approach. Am. J. Sociol. 87 (3), 548–577. https://doi.org/10.1086/227496.

Wright, W., 2016. The Potential Impact of Brexit on European Capital Markets: A Qualitative Survey of Market Participants. New Financial.

Wright, M., Pruthi, S., Lockett, A., 2005. International venture capital research: from cross-country comparisons to crossing borders. Int. J. Manag. Rev. 7 (3), 135–165. https://doi.org/10.1111/j.1468-2370.2005.00113.x-.

Wright, M., Wilson, N., Gilligan, J., Bacon, N., Amess, K., 2016. Brexit, private equity and management. British Journal of Management 27 (4), 682–686. https://doi.org/10.1111/1467-8551.12191.

Zook, M.A., 2004. The knowledge brokers: venture capitalists, tacit knowledge and regional development. Int. J. Urban Reg. Res. 28 (3), 621–641. https://doi.org/10.1111/j.0309-1317.2004.00540.x.